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Instruction Manual  
Scanreco - IRC

99601





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## 1. Introduction

This instruction manual on Scanreco-IRC radio remote control is meant for the user of the loader and must be considered as a supplement to:

- the Instruction Manual for the individual Loader Series and
- the RCL 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 designation IRC is short for Integrated Radio Control, which means that the transmission of data from the radio remote control is an integrated part of the loader's RCL safety system.

During loader operation, the IRC-system sends signals to the RCL 5100/5200 controller which monitors which loader functions that are activated.

The RCL safety system is thus monitoring the following parameters:

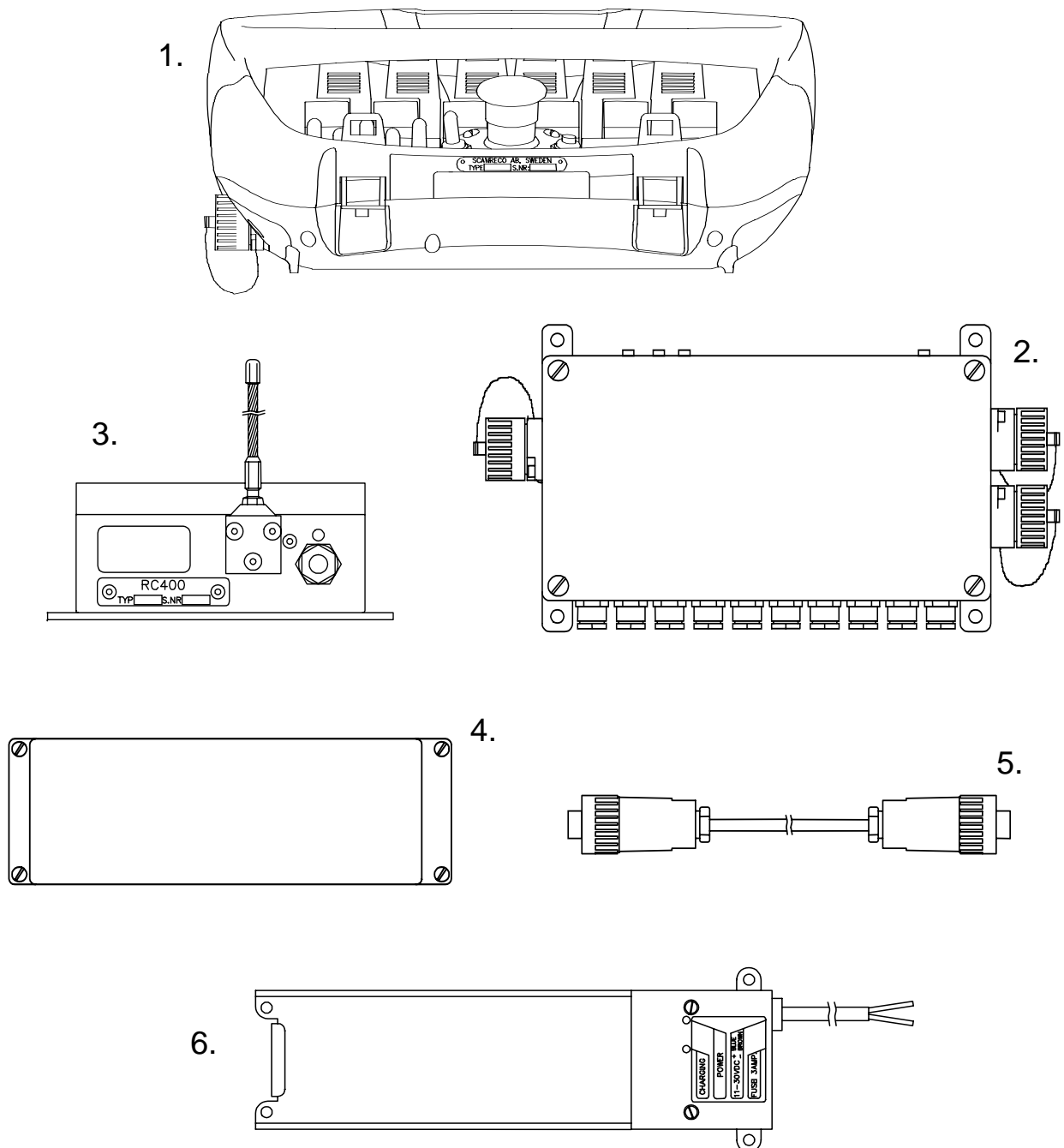
- The load moment of the loader
- The operation of the loader
- The functional conditions

and stops the loader if critical situations occur.

## 2. The Components of the IRC-System

The IRC system consists of the following components:

1. Remote control box with radio transmitter
2. Electronic box
3. Radio Receiver Box
4. Battery for the remote control box (2 pcs.)
5. Remote control cable
6. Battery Charger



### 3. Description of the System

#### 3.1 The IRC-System, general Description

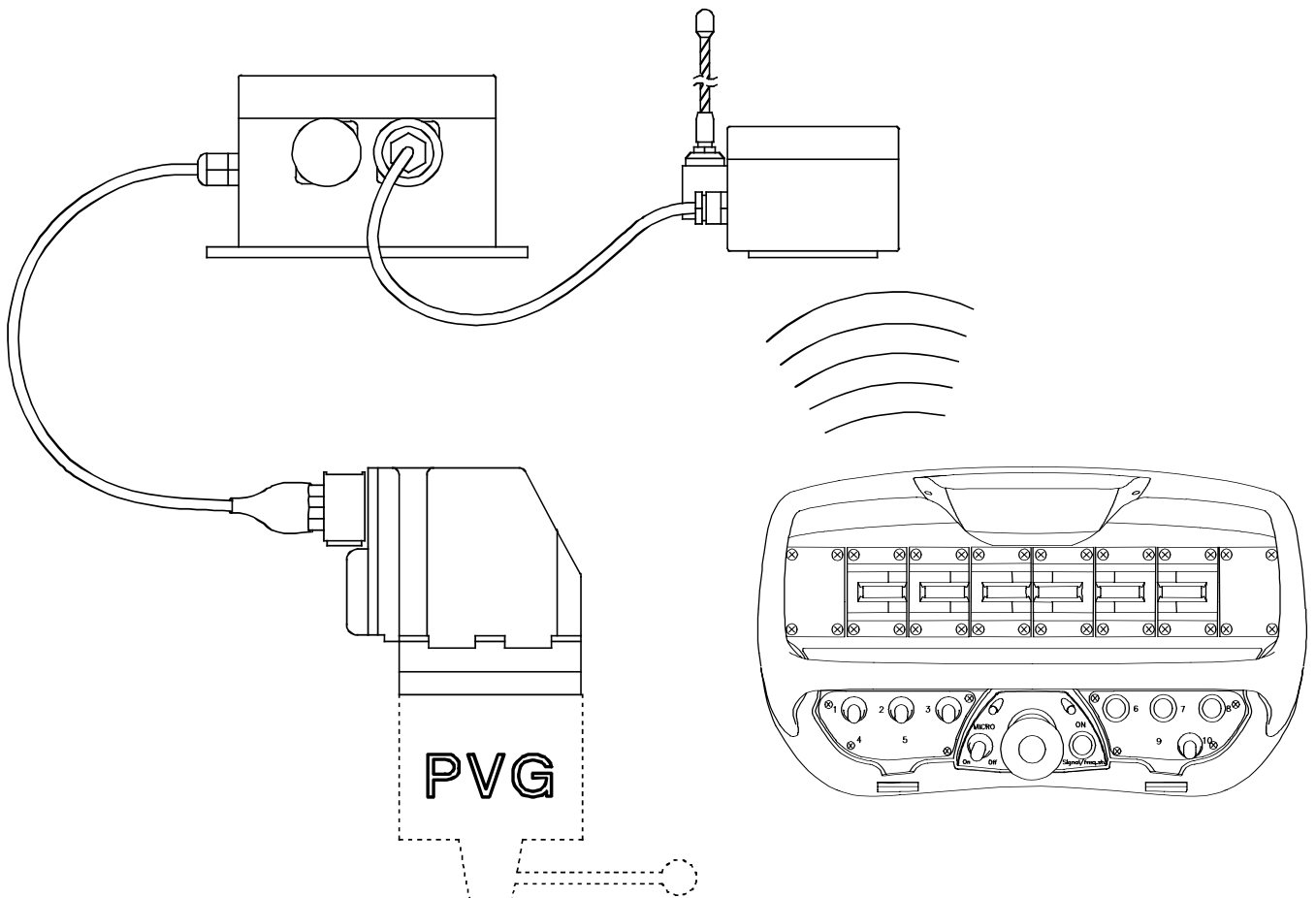
The electronic box is connected to the electric activations on the valve block by means of electric cables.

During loader operation, the control levers on the remote control box are operated. Digitally coded control information is thus sent via radio signals to the radio receiver box and on to the electronic box.

The radio signals are converted to electric voltage, which is sent to the electric activations of the valve block.

In the electric activations the electric voltage controls small hydraulic solenoid valves. These solenoid valves control a hydraulic oil pressure, which activates the control levers of the valve block.

The control levers on the valve block move at the same speed and in the same direction as the control levers on the remote control box.



## 3.2 IRC-Remote Control Box

### 3.2.1 General Description of the Remote Control Box

The remote control box can be equipped with up to 8 **control levers** (pos. 1) depending on how many loader functions are to be operated.

To the left there are three **tumbler switches** (pos. 2), for operating extra functions. Please note: extra functions related to the engine control of the vehicle, are only active when the vehicle body builder has carried out the necessary electric connections.

In the middle there is a **stop button** (pos. 3) with a detachable key. The stop button is used when the system is to be interrupted as well as in case of emergency stop of the loader.

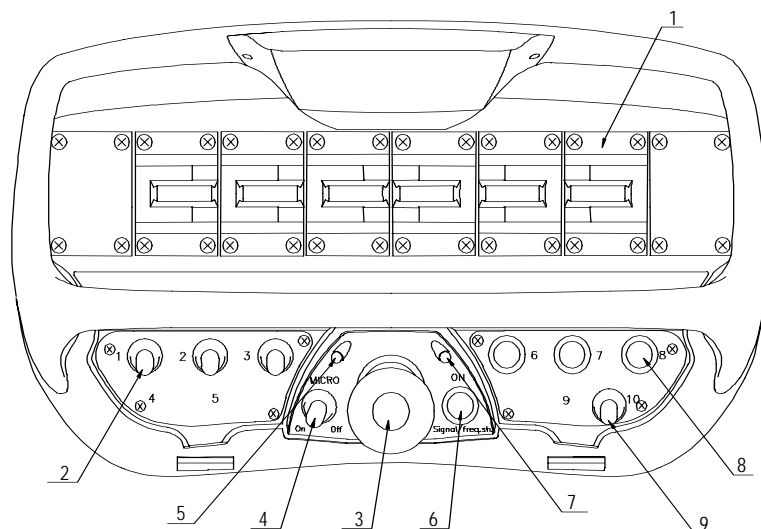
Right to the left of the stop button there is a **tumbler switch** (pos. 4) with a **green diode** (pos. 5) above. The tumbler switch is used for micro operation of the loader.

Right to the right of the stop button there is a **“ON” push button** (pos. 6) with a **red diode** (pos. 7) above. The push button is used for starting up the system as well as for changing frequency.

On the right there are 3 built-in **push buttons** (pos. 8) for remote control of functions in the RCL controller. To the extreme right there is a built-in **tumbler switch** (pos. 9) for operation of option-functions.

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

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



## 3.2.2 Control Levers

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

The control levers on the valve block move at the same speed and in the same direction as the control levers on the remote control box.

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 loader 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 loader functions, which are to be remote controlled. From HMF the positioning of the individual control lever as well as the direction of travel of the loader in relation to the direction of travel of the control levers are determined as standard configurations.

A standard configuration can be changed by an HMF service point, if required.

### 3.2.2.1 Operating Symbols

Loaders equipped with IRC-system are delivered from HMF with operating symbols labelled on the remote control box.

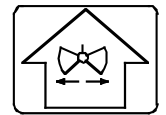
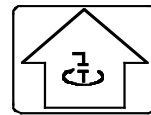
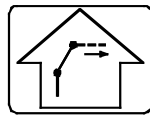
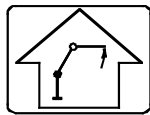
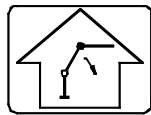
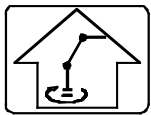
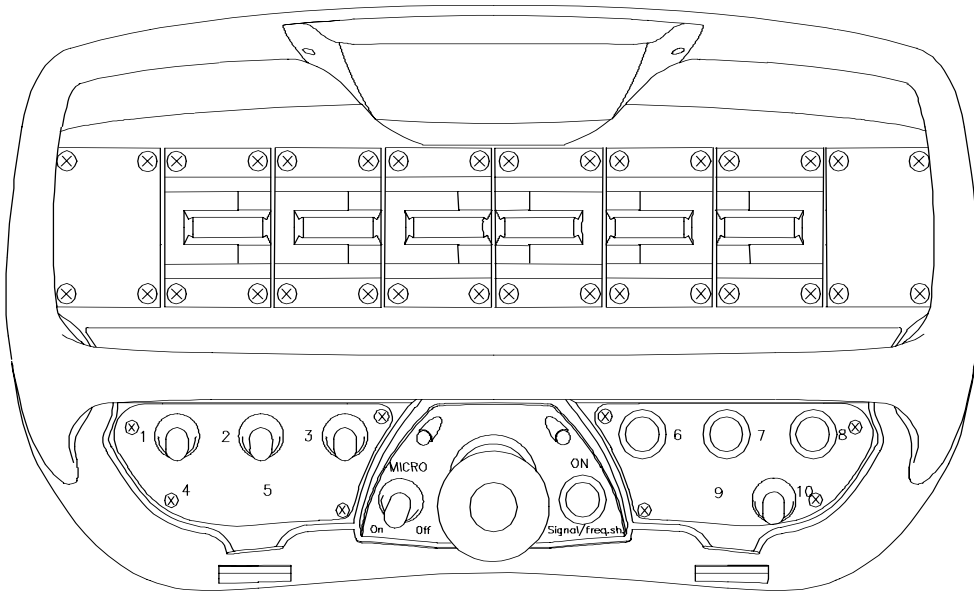
When changing a standard configuration, the operating symbols must be labelled on the remote control corresponding to the lever sequence in question.

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

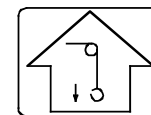
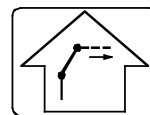
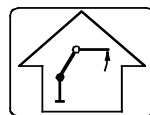
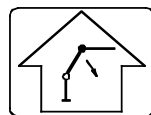
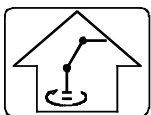
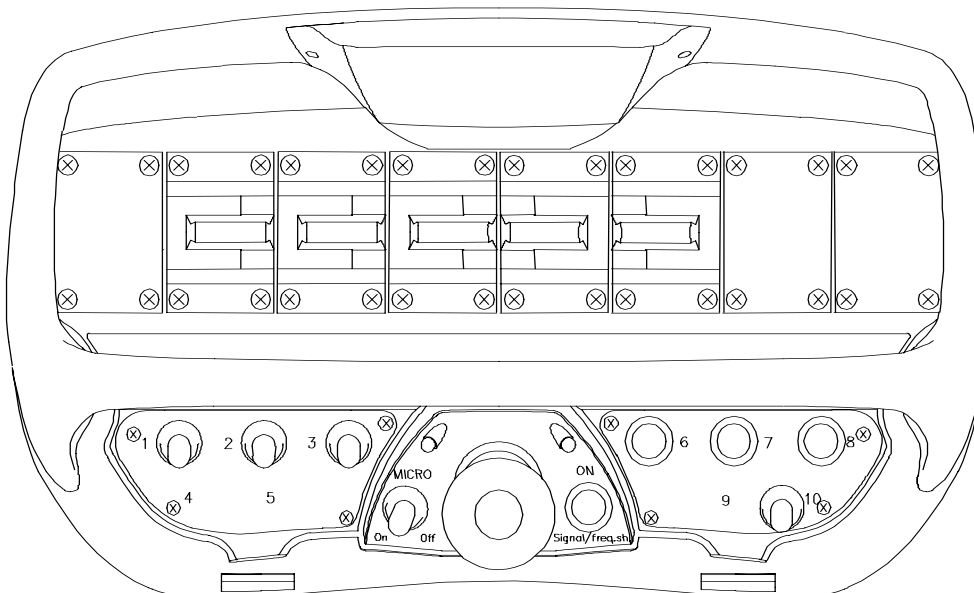
In the following pages are indicated the different standard configurations of the remote control boxes with their corresponding operating symbols.



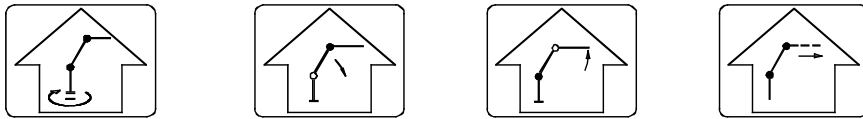
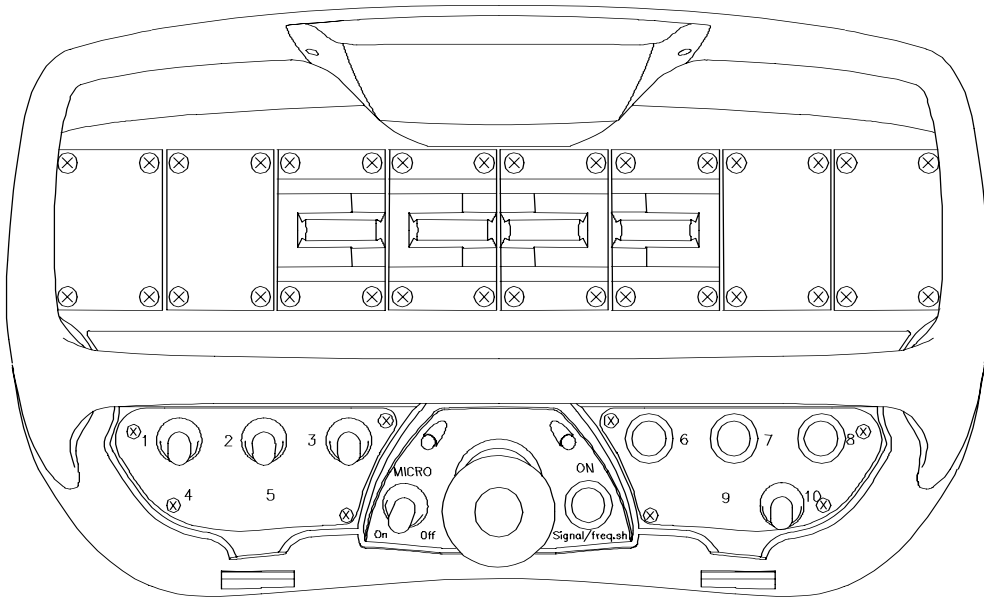
### 3.2.2.2 Lever Sequence, 6 Loader Functions



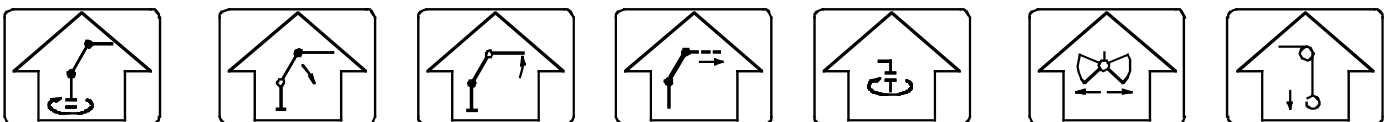
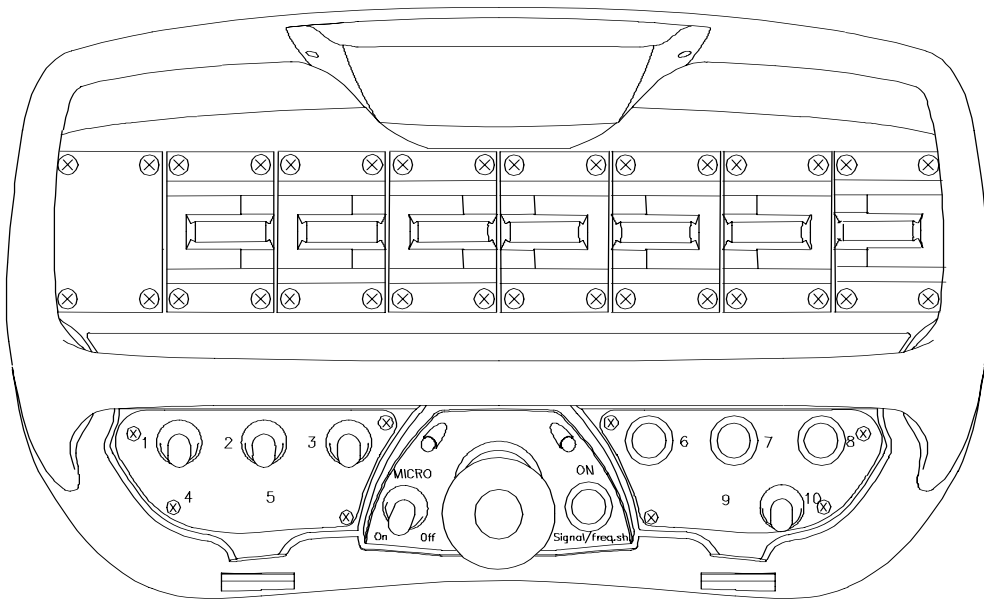
### 3.2.2.3 Lever Sequence, 5 Loader Functions



### 3.2.2.4 Lever Sequence, 4 Loader Functions



### 3.2.2.5 Lever Sequence, 7 Loader Functions

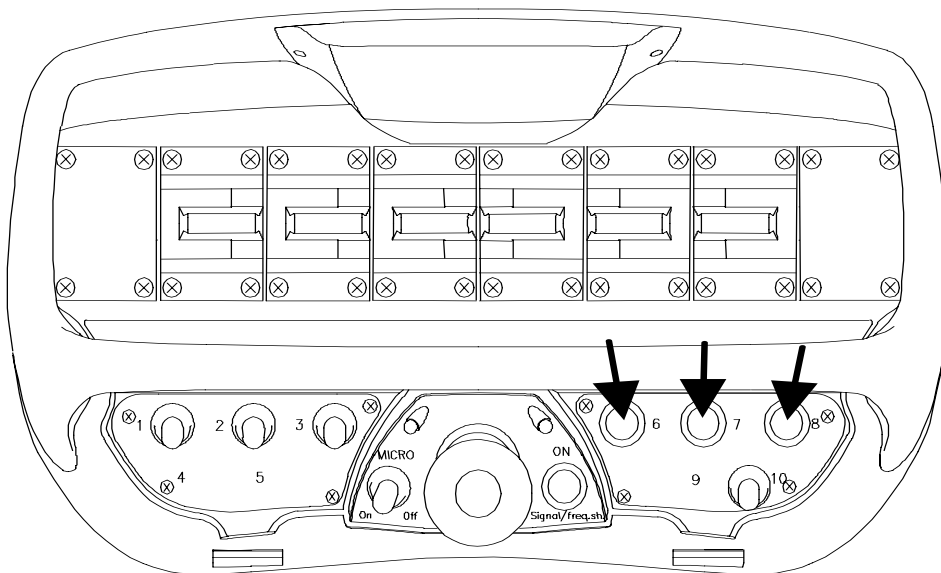


### 3.2.3 Push Buttons and Tumbler Switches

All push buttons and tumbler switches on the remote control box only control the “ON/OFF”-functions in the IRC-system.

#### 3.2.3.1 Remote Control of RCL Functions

On the RCL controller, different functions can be operated by means of the three press buttons; red, yellow and green. These functions can also be remote controlled by means of the *press buttons* on the right side of the remote control box.



The following functions are operated by means of the press buttons:

- Green press button:** Activation of the RCL-system / Deactivation of buzzer
- Red press button:** Override / Manual activation of HDL / Indication of errors
- Yellow press button:** Alternative function mode.

These RCL functions are thoroughly described in the RCL Instruction Manual.

### 3.2.3.2 Engine Throttle Control (Option)

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 EDC-engine control by the supplier of the vehicle.

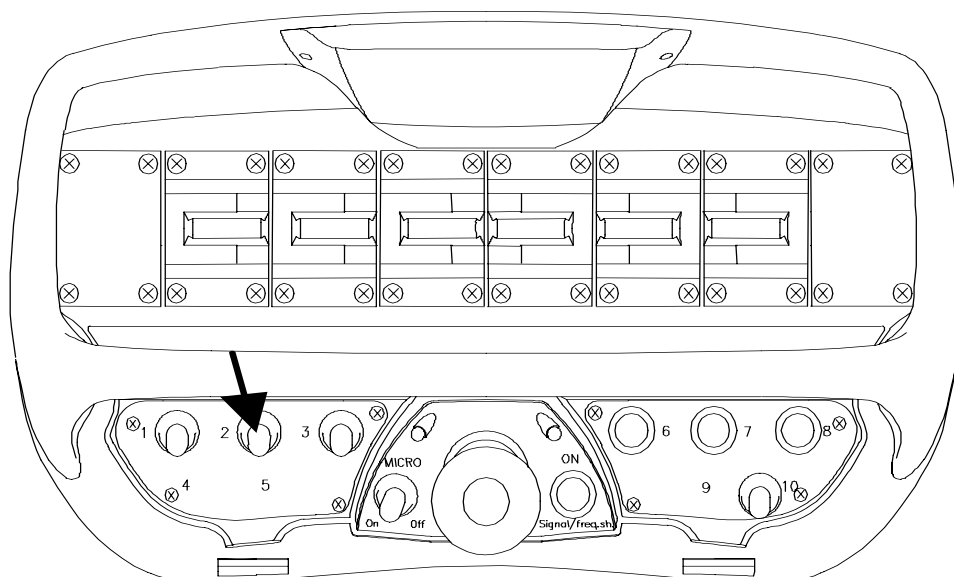
The throttle control is operated by means of the *tumbler switch* (pos. 1), which automatically goes back into neutral position:

- 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

### 3.2.3.3 Engine Start-Stop (Option)

The engine of the vehicle can be started and stopped from the remote control by means of the *tumbler switch* (pos. 2), 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



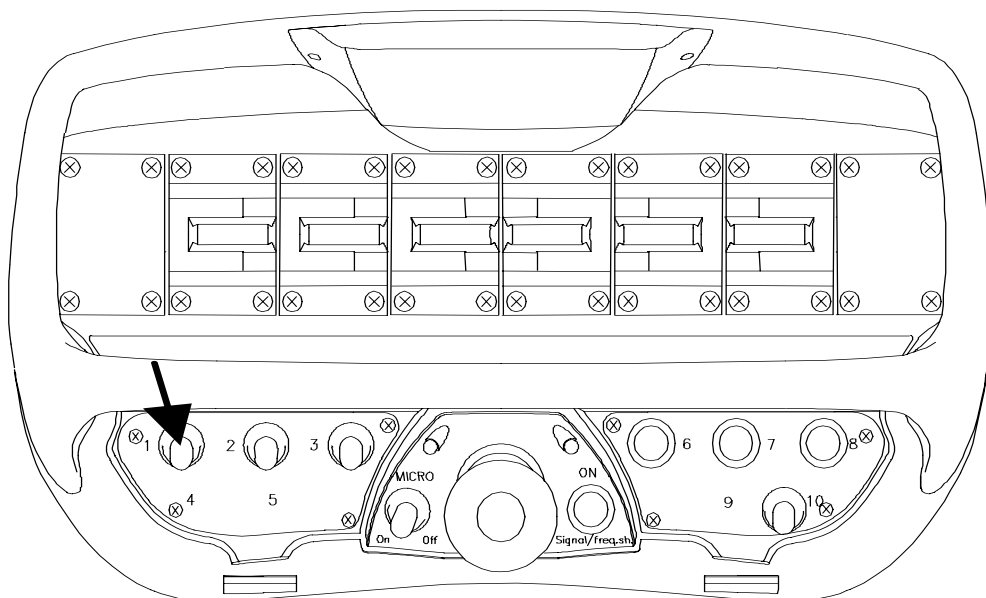
### 3.2.3.4 Choice of Engine Revolutions (Option)

During loader 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 loader.

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* (pos. 1) to the left on the remote control box, you can choose between two types of engine revolutions.

- If the *tumbler switch* is in central position, the engine revolutions are not activated and the engine is running idle.
- If the *tumbler switch* is pushed to the left (+ RPM), the engine is continuously running at high engine revolutions.
- If the *tumbler switch* is pushed to the right (AUTO RPM), the high engine revolutions are automatically engaged and disengaged. I.e. when one of the control levers is being operated, the high engine revolutions are engaged. When the control levers are back in neutral position, the high engine revolutions are disengaged and the engine is running idle.

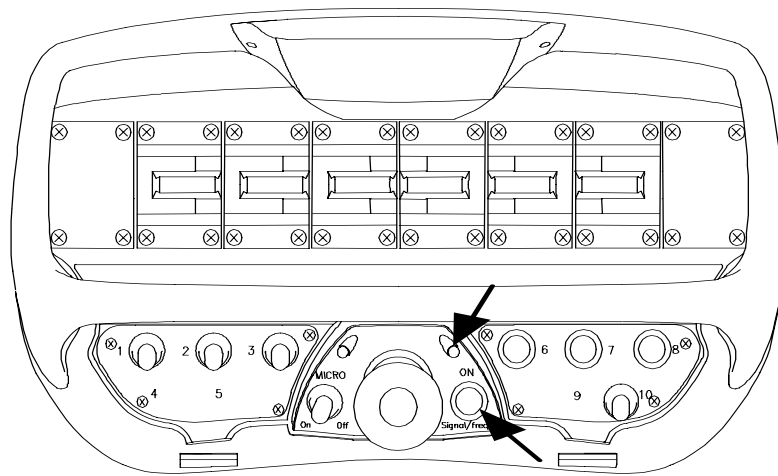


### 3.2.4 The Remote Control Box in Stand-By Mode

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.e. if there has been no operation from the remote control box for the last approx. 5 minutes, it goes into stand-by mode, where the power consumption is very limited.

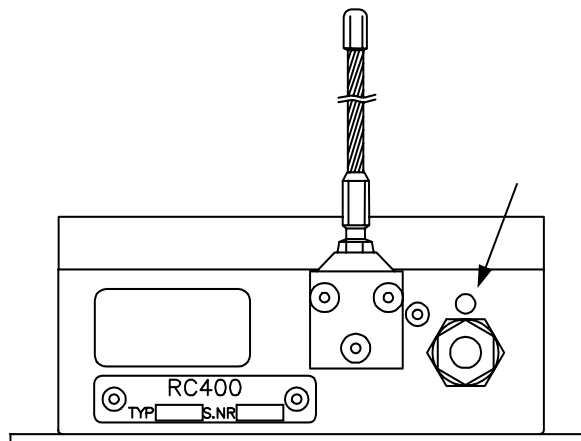
Please note! The remote control box is re-activated by means of the “ON” push button.



### 3.3 IRC-Radio Receiver Box

The radio receiver box is a small separate unit, which by means of the antenna fitted, receives radio signals from the remote control box.

A green diode is lit when it receives power from the electronic box (after starting up the system).



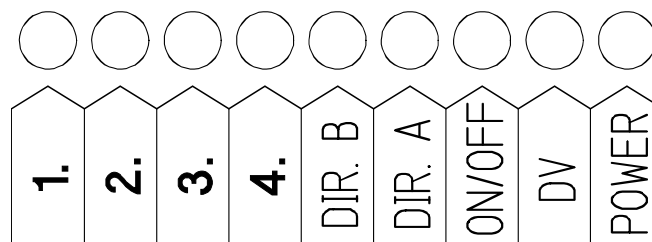
### 3.4 IRC-Electronic Box

The electronic box receives digitally coded control information from the remote control box via the radio receiver box.

The electronic box is connected to either 12 or 24 volts power supply from the accumulator of the vehicle. There are outputs for cable connection to the electric activations of the valve block as well as to the RCL-system.

On one of the sides of the electronic box there is a socket for connection of the radio receiver box and a socket for cable connection of the ON/OFF functions for the RCL system.

On the other side there is a plug for connection of the remote control cable. Furthermore there are 9 built-in diodes indicating the functional status.



Diode	Function
Power	Green diode – is lit when the system is powered.
DV	Red diode – is lit when there is voltage from the dump valve output in the electronic box to the RCL controller.
ON/OFF	Yellow diode – is lit when the ON/OFF functions are activated (push buttons and tumbler switches).
DIR.A	Green diode – is lit when a control lever activates the control valve for the A-port. The more the control lever is moved towards the extreme position, the more the diode is shining.
DIR.B	Red diode – is lit when a control lever activates the control valve for the B-port. The more the control lever is moved towards the extreme position, the more the diode is shining.
1.	Red diode – is flashing in combination with the diodes 2., 3., and 4. Indicating the type of error in case of system error. Please see chapter on troubleshooting.
2.	Green diode – is lit during normal loader operation. Is flashing in case of a system error. Please see chapter on troubleshooting.
3.	Red diode – is lit during normal loader operation. Is flashing in case of a system error. Please see chapter on troubleshooting.
4.	Yellow diode – is lit during normal loader operation. Is flashing in case of a system error. Please see chapter on troubleshooting.

## 3.5 IRC-Battery and Battery Charger

Together with the IRC-system there are two rechargeable batteries. The battery is placed at the bottom of the remote control box and can be replaced by one single movement.

Please note: A completely charged battery works for approx. 8 hours of remote control operation.

The battery charger must be mounted in the driver's cab where it is protected against dirt and humidity. The charger must via a fuse be connected to 12 or 24 volts power supply directly to the battery of the vehicle. This is how charging is made possible, also when the ignition is turned off.

Please note: There are two types of battery chargers, a standard charger characterized by a red function label and a fast charger characterized by a blue label.

It takes approx. 12-14 hours for a standard charger, and approx. 3 hours for a fast charger to recharge a battery that has been completely discharged.

### 3.5.1 Replacement of the Battery

The transmitter electronics in the remote control box currently monitor 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 starts to flash

Now the battery has to be replaced by a recharged battery from the battery charger.

Follow the procedure below:

- Move the loader 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 and press it into position so that it is fixed and has a good electric connection
- Start up the remote control box according to the chapter: "Starting Up of the IRC-System"

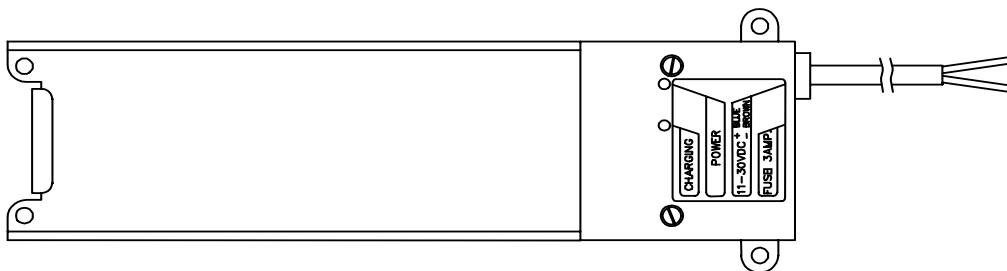
The radio remote control is now ready for operation.



### 3.5.2 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:

- Put the battery into the battery compartment of the battery charger and press it into position so that it is fixed and has a good electric connection.
- The red POWER diode on the charger is lit when there is power supply from the accumulator of the vehicle.
- The green CHARGING diode on the standard charger is constantly lit, whereas the green Ready Charging diode on the fast charger is flashing, indicating that the battery is being charged.
- The battery charger registers when the battery is completely charged; the green CHARGING diode of the standard charger is constantly lit, whereas the green Ready Charging diode of the fast charger stops flashing and starts to be constantly lit, indicating that the battery is charged.
- After approx. 12 to 14 hours the charging is completed with the standard charger, whereas the fast charger completely charges a battery in approx. 3 hours.
- 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



### 3.5.3 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 diodes of the remote control box start 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
- When a rechargeable battery is discarded, dispose of it as special waste

### **3.6 Remote control cable**

The remote control box can be connected to the electronic box via a three-conductor remote control cable, which is a part of the IRC-system.

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

The cable has round sockets in both ends. Connect one of the sockets to the plug of the electronic box marked CABLE/OPTO. Connect the other socket to the plug on the remote control box.

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

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

### **3.7 Transmitter System, Frequencies**

The IRC-system is working in the frequency range from 433 through 434 MHz, and it is possible to change between 12 radio channels with 25 kHz intervals.

In the self-test phase during start up of the remote control box, the system is testing whether the chosen frequency can be used or whether it collides with other radio transmitters.

A coded data telegram is now transmitted from the remote control box with an address that must be in accordance with a corresponding data telegram with its address in the radio receiver box at the frequency in question.

When the radio receiver has accepted the coded data telegram of the radio transmitter, the IRC-system is ready for operation.

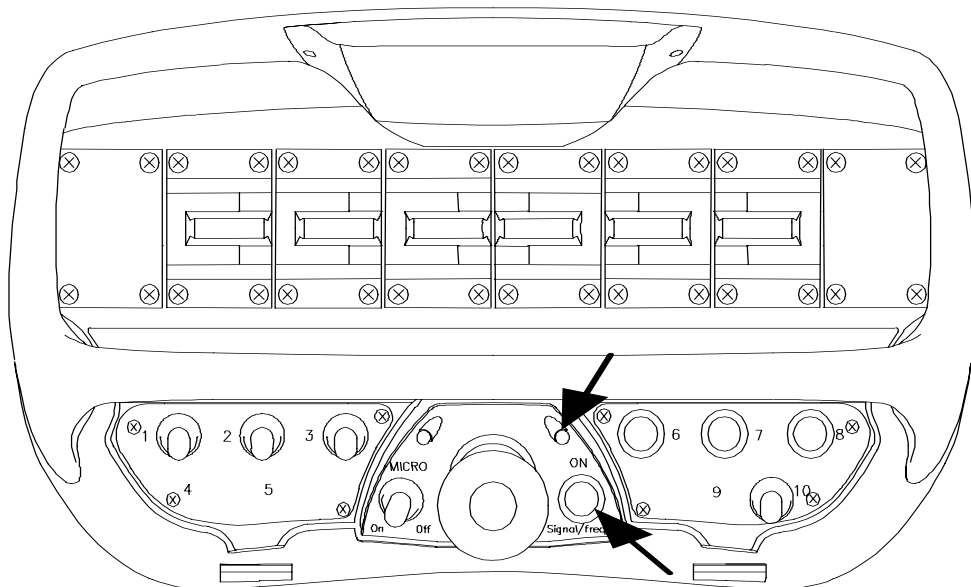
### 3.7.1 Change of Radio Channel

If the radio frequency collides with other radio transmitters, the IRC-system will not start up. In case of interferences during loader operation, the system disconnects and the loader is stopped.

In such cases it is possible to change the radio channel by quickly pressing the "ON" push button twice. The change of radio channel is indicated on the remote control box:

- The red diode is flashing
- The buzzer gives a signal once

If interferences continue, it is possible to change between up to 12 radio channels. Change of radio channel can happen any time during loader operation.



## 4. Safety Regulations

The IRC-system makes it possible to control the loader 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 loader.
- The loader operator must read the instruction manuals delivered together with the loader before starting up loader operation, and follow the instructions during loader operation.
- When the remote control box is not being used, disconnect it, and pull out the key from 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
- Do not change or remove anything from the safety devices.
- When cleaning the loader, avoid spraying on water and never use high-pressure rinsing for cleaning the electronic components.

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

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

During loader operation the operator must:

- stand in a suitable distance from the hook and the load, have a good visibility, and see to it 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 loader movements.

After loader operation the operator must:

- *push* the stop button on the remote control box and on the loader.
- 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 loader

## 5. Starting Up of the Loader

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

Please see the *Instruction Manual* of the loader as well as the *RCL Instruction Manual*.

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

### 5.1 Starting Up from the Indicator Panel of the RCL

When the loader is equipped with an IRC-system, the diodes on the RCL indicator panel have different indications than a manually operated loader during start up.

- Connect the pump (PTO); the controller is thus powered
- All stop buttons must be pulled out (there is a stop button at each control position).
- Push the green press button on the RCL indicator panel.
- The RUN and FUNC diodes are flashing
- Push the yellow press button *twice* to choose the stabilizer function
- When the stabilizer legs have been lowered, *start up the IRC-system*

Loader operation can start.

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



## 5.2 Starting Up of the IRC-System

Starting up of the IRC-System from the remote control box:

- All stop buttons must be pulled out (there is a stop button at each control position).
- The stop button on the remote control box must be pulled out (turn the key to the right).
- All control levers must be in neutral position
- Press the “ON” push button
- Press the green push button (starting up the RCL).

The diodes indicate as follows:

Components	Radio remote control		Cable remote control	
	Diode	Colour	Diode	Colour
Electronic box	<b>POWER</b>	Green	<b>POWER</b>	Green
	<b>DV</b>	Green	<b>DV</b>	Red
	<b>3.</b>	Red	<b>4.</b>	Yellow
	<b>2.</b>	Green	<b>3.</b>	Red
			<b>2.</b>	Green
Remote control box	The red diode is lit		The red diode is lit	
RCL indicator panel	The RUN diode is lit.		The RUN diode is lit.	

The RCL/IRC-system is ready and loader operation can start.

## 5.3 Starting Up from the IRC-remote control box

Alternatively the RCL/IRC-system can be started up from the remote control box:

- Connect the pump (PTO); the controller is thus powered
- All stop buttons must be pulled out (there is a stop button at each control position).
- Start up the IRC system (see that item)
- Push the yellow press button *twice*.
- Extend the stabilizer beams and lower the stabilizer legs

Loader operation can start.

## 6. Signalling during Loader Operation

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

During loader operation the diodes are lit as stated in the chapter “Starting Up of the IRC-system”. Furthermore the diodes DIR. A and DIR. B indicate as follows:

- When one or several control levers are moved in the direction away from the loader operator, the diode DIR. B is lit
- When one or several control levers are moved in the direction towards the loader operator, the diode DIR. A is lit

The more the control levers are moved towards the extreme position, the more the diodes are shining.

To avoid unexpected stops of the loader 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 starts flashing, move the loader into a safe position, and change the battery (for recharging).

If the indicator lamp on the remote control box turns off and the loader cannot be remote controlled, it may be due to radio interference or system errors. Please see chapter on “Troubleshooting”.

## 7. Emergency Stop during Loader Operation

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

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

Start up the IRC-system again according to the procedure and continue loader operation.

**Please note!** Every time the IRC-system is started up, always test the functioning of the stop button. When pushing the stop button, it must not be possible to remote control the loader.

## 8. Stopping the IRC-System

After loader operation, interrupt the IRC-system according to the following procedure:

- Push the stop button.
- Pull out the key from the stop button and keep it with you.
- Stop the hydraulic pump, the power to the system is thus interrupted

## 9. Emergency Operation of the Loader

In case of IRC-system errors the following is indicated:

- The red diode on the electronic box is flashing (in case of internal errors in the electronic box)
- The RUN and FUNC diodes on the RCL indicator panel are flashing

In this fault condition it is not possible to remote control the loader.

However, it is possible to change into *emergency operation of the loader* in the following way:

- On the RCL indicator panel, hold down the yellow press button while pushing the red press button
- The RUN and FUNC diodes on the RCL indicator panel are still flashing
- The POWER diode (green) on the electronic box is lit and the diode 4. is flashing

Now emergency operation of the loader is possible by using the control levers on the valve block of the loader.

As a control of whether the system is set for emergency operation, it is possible to push the red press button 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 loader, the loader's lifting capacity is reduced (the loader is derated) to 90% of its normal capacity.

To change back into remote control mode, repeat the procedure stated above: push/hold down the yellow press button and push the red press button.



## 10. The HDL-System (Option)

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

### 10.1 Proportional HDL

In connection with the IRC-system, activation of the HDL-system is proportional, i.e. step-less.

Example:

A heavy load is extended at max. speed at a longer out-reach by means of the "extension out"-function.

When the loader has reached 70% of its capacity limit, 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 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 loader functions, which increase or reduce the load moment of the loader.

When the HDL-system is activated, this is indicated on the RCL indicator panel by the FUNC diode flashing.

## 10.2 Micro Operation, HDL

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

Irrespective of the loader's load moment, the working speed of the loader can be reduced to approx. 20% by pushing *the red press button* on the remote control box, thus activating the HDL.

By pushing *the red press 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 loader's normal lifting capacity limit.

## 11. Micro Operation

The loader can be controlled at varying speed by activating the "Micro" tumbler switch.

When activating the switch several times to the left towards "ON", the loader 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 flashes once in step 1, twice in step 2, etc.

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

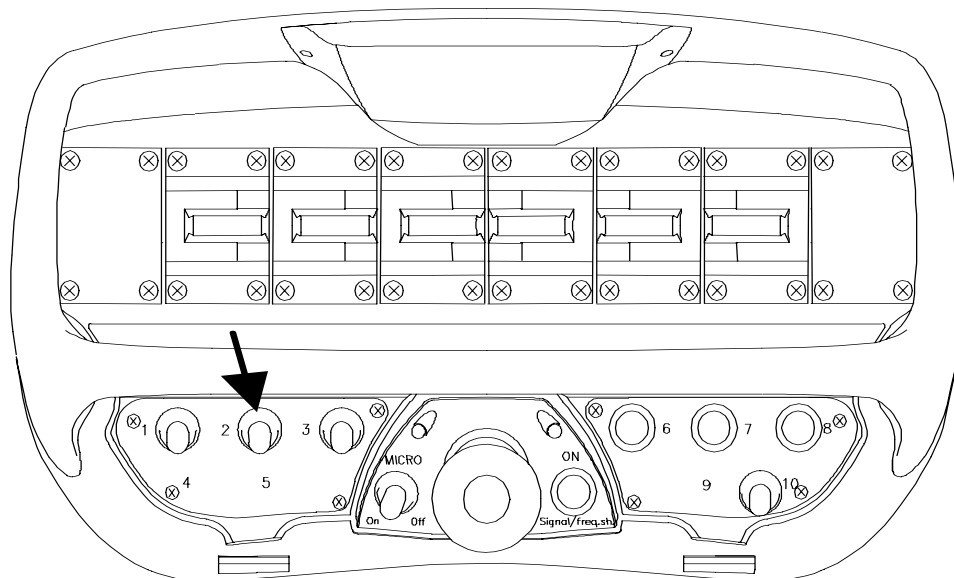
Please note!

After pushing the stop button, the system starts up again at the speed the loader had when it was stopped.

## 12. Working light

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

- Turn on the spotlight by activating the **Engine start/stop** tumbler switch to the left (engine start) with a short pulse. This short pulse does not affect the working of the engine.
- Turn off the spotlight by activating the **Engine start/stop** tumbler switch to the right (engine stop) with a short pulse.



### 13. Control of the Winch on the Stowing Bracket

Certain loader models are fitted with a winch sitting on a hydraulically controlled stowing bracket (swing-up).

When working with the winch, the stowing bracket/the winch is placed at the back on the right side of the main boom.

By means of the hydraulic stowing bracket, the winch can be moved on top of the main boom before the loader is folded in stowing position. In this position, it is not possible to lift by means of the winch.

The winch and the stowing bracket functions can be controlled by the remote control box.

Starting up of the winch from stowing position:

- Activate the "winch – down"-function with a small movement of the remote control lever, then the stowing bracket/the winch moves down on the side of the main boom thus activating a proximity switch.
- When the winch is completely moved down, put the remote control lever in neutral position.
- Then the winch function is ready for operation, and the wire can be pulled out of the winch drum.
- After mounting of the swivel hook and wire rollers, the winch system is ready for operation.

Move the winch into stowing position before folding the loader:

- Remove the hook and the wire rollers.
- Wind the wire rope completely onto the winch drum, and put the remote control lever for the winch in neutral position.
- Hold down the yellow push button while activating the "winch – up"-function (within 5 seconds) by a small movement of the remote control lever. This is how the swing-up function of the stowing bracket is activated.
- Move the stowing bracket/the winch completely up into its stowing position on top of the main boom and then fold the loader.

## 14. Securing of the Remote Control Box

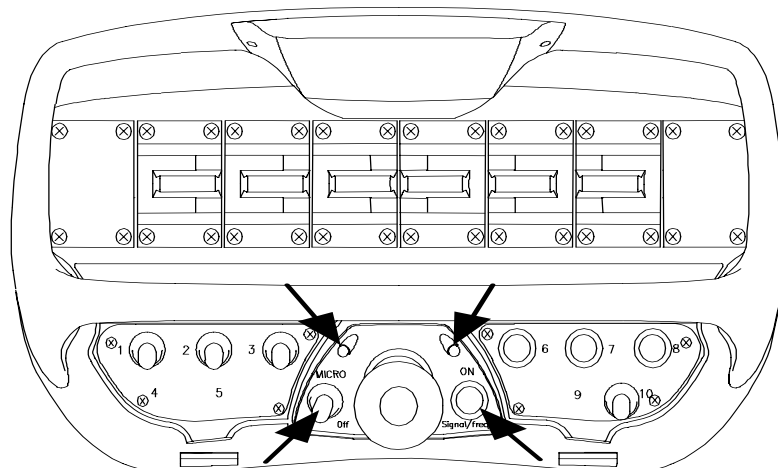
The remote control box is available with **two systems** for securing against unintentional operation by unauthorized persons, when the box is left unattended for a short while.

**One of the types** has a key fitted in the stop button. If you remove the key, it is not possible to activate the stop button and thus start up the system.

**The other type** of remote control box has no key in the stop button. This box can be secured by the following procedure:

- Check that the remote control box is turned on. If not, pull out the stop button and press the “ON” push button once.
- Activate the “MICRO” tumbler switch to the right and keep it in this position, while quickly pressing the “ON” push button 5 times.
- The buzzer of the remote control box gives a short, clear signal, and the two diodes (red and green) placed on the right and the left side of the emergency stop are flashing alternately.
- Now the remote control box is locked, i.e. the system does not react when the levers of the remote control box are moved, or in case of operation of the other tumbler switch functions.

Re-activate the remote control box by repeating the above procedure.



## 15. Troubleshooting

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

- The POWER diode (green) on the electronic box is lit and the diode 4. (yellow) is flashing
- The RUN and FUNC diodes on the RCL indicator panel are flashing

It will now be possible to troubleshoot by *pushing and holding down the red press button* on the RCL indicator panel.

Now a diode indicates where to find the error in the system.

Flashing diode	Type of error	Remedy
80% diode	No CAN communication	Try to re-start the IRC-system. Otherwise please contact an authorised HMF service point.
85% diode	The IRC-system has not been started up	Re-start the IRC-system
90% diode	Start up error in the Can-bus communication	Re-start the IRC-system
100% diode	The RCL controller has been set for emergency operation	Change back into remote control mode. Please see chapter on Emergency Operation.
80% / 85% diodes	The stop button on the remote control box is activated (pushed in)	Pull out the stop button (turn it to the right)
80%, 90% diodes	Error at the cable connection for the dump valve input in the RCL (The wire security connection)	Please contact an authorised HMF service point.
80%, 100% diodes	Unknown version of the remote control.	Please contact an authorised HMF service point.
85%, 90% diodes	Check sum error	Try to re-start the IRC-system. Otherwise please contact an authorised HMF service point.

If one of the following errors occurs:

- internally in the electronic box,
- in the wire connections between the electronic box and the electric activations of the control valve, or
- in the wire connection between the electronic box and the RCL-system

The diodes 1.-4. of the electronic box indicate in a certain combination where to find the error in the system.

Flashing diodes (repeated sequency)	Type of error	Remedy
1. - pause - 2.	Overload/short circuit in an ON/OFF output	Unscrew the cable on the ON/OFF socket of the electronic box. It is possible to work with the loader, but not to operate the ON/OFF functions.
1. - pause - 2. and 4.	Overload/short circuit in the wire connection from the dump valve output in the electronic box to the RCL controller	Please contact an authorised HMF service point.
1. - pause - 2. and 3.	Overload/short circuit in an electric activation on the control valve or in the wire connection/socket-outlet and plug for the electric activation	Remove the socket one by one on the electric activations, until the indication of error stops. Check the wire/socket for faults or moisture.
1. - pause - 3. and 4.	Overload/short circuit in the regulation signal from the electronic box to an electric activation on the control valve	Remove the socket one by one on the electric activations, until the indication of error stops. Check the wire/socket for faults or moisture
1. - pause - 2., 3. and 4.	Wrong voltage from the RCL to the dump valve output in the electronic box	Please contact an authorised HMF service point.
1. - pause - 4.	Check sum error	Please contact an authorised HMF service point.
4. - pause - 2	Incorrect or missing ID-code (the remote control box has been mixed up with another one)	Please contact an authorised HMF service point to get information on programming of a new ID-code

If problems continue, contact an authorised HMF service point immediately .

## 16. HMF InfoCentre

With an InfoCentre built into the remote control box, it is possible for the operator to obtain useful information on the general condition of the loader regarding operation.

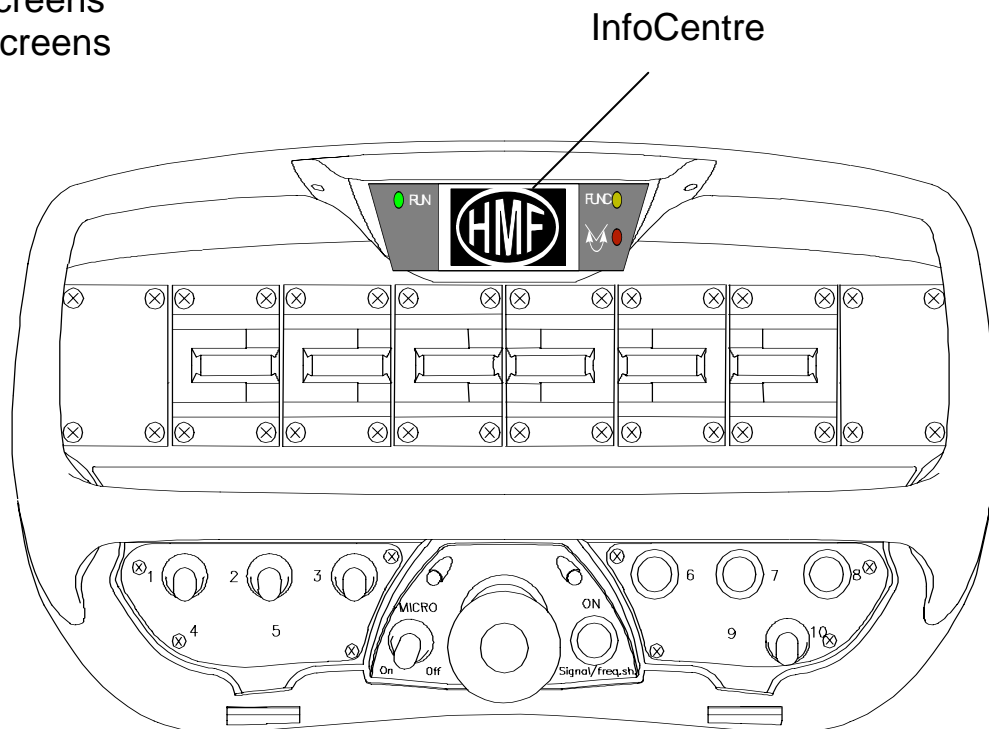
The different screens of the InfoCentre can be programmed and adapted to each individual loader operator. This can be carried out by an HMF service point or by the user himself by following the guide in this instruction manual. Furthermore it is possible by means of the remote control box and the InfoCentre to radio remote control the stabilizer functions of the loader.

Please note! Only functions corresponding to the equipment fitted on the loader can be indicated on the display of the InfoCentre.

### 16.1 Screens, HMF InfoCentre

The following screens can occur during starting up and operation:

1. Start up screens
2. Operation screens
3. Information screens
4. Stop screens
5. Error screens





### 16.1.1 Start up Screens

When starting up the remote control box the following picture occurs on the display for approx. 5 sec.



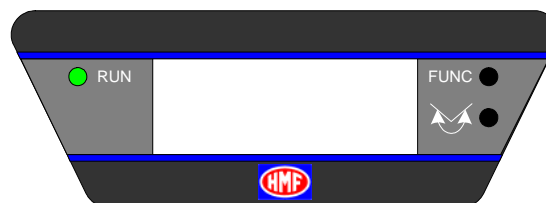
Then the display automatically changes to operation screen no. 1. Please see item 2. **Operation screens.**

If this does not happen, one of the following pictures occurs:



**No radio communication.**

Check that all stop buttons are pulled out, and that the system is powered.



**No contact with the RCL**

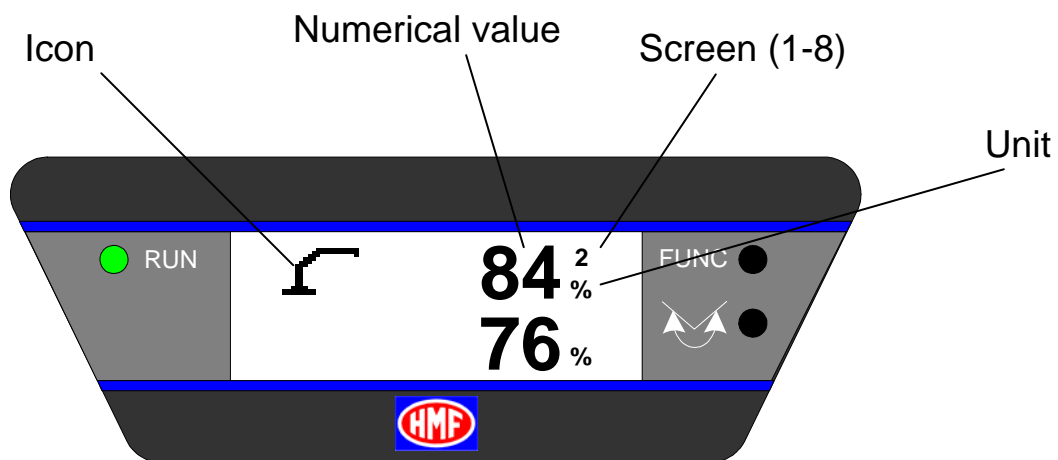
Check that the RCL has been started up by activating the green press button on the RCL indicator panel or on the remote control box.

If the above screen remains, contact an HMF service point.

## 16.1.2 Operation screens

Operation screens appear during normal loader operation, and consist of up to 8 screens with 2 pieces of operation information on each picture.

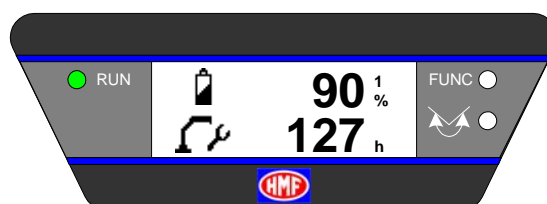
Every piece of operation information consists of an icon, which graphically indicates the function in question, a numerical value and a unit, e.g. %, KGs etc.



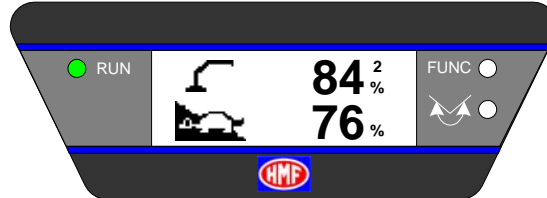
The InfoCentre has been programmed from HMF in relation to the loader and the equipment, if any.

The following sequence of the operation screens is standard, and the number of pictures on the screen will depend on the equipment on the loader.

The first picture (screen 1) states the level of the battery as well as the next time for service overhaul (if this function has been programmed by the HMF dealer).



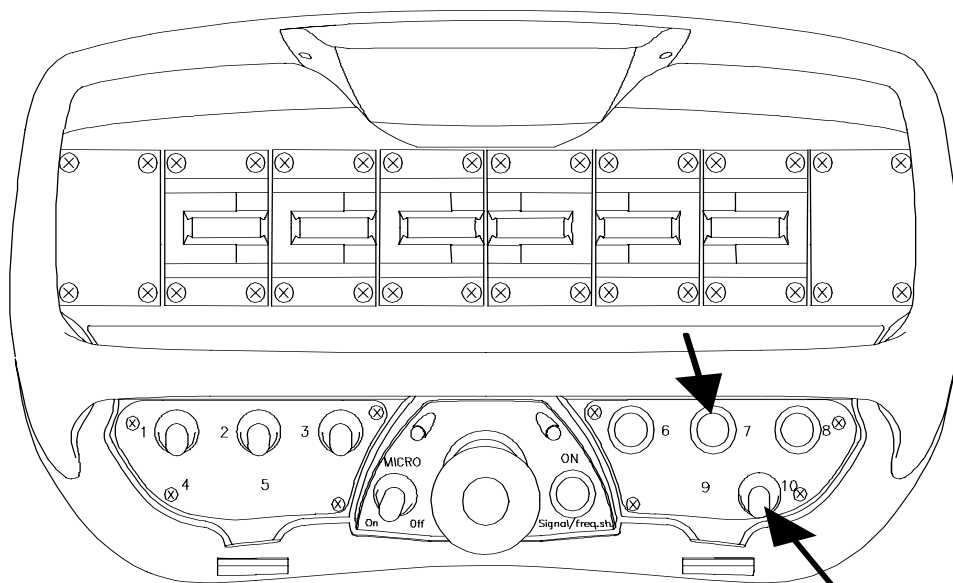
Screen no. 2 will also be standard from HMF, and shows the load on the loader as well as the speed of the loader in HDL mode (if this is fitted).



The number of screens depends on the configuration of the loader and the equipment. See the below table on possible operation screens.

If you wish to change the picture from e.g. screen 1 to screen 2, do as follows:

- Activate the “Option” switch.
- Press the yellow button for each change of the screen. After the last screen, it automatically starts from the beginning again (scroll menu)



### 16.1.3 Operation Information. How to change Screens/Sequence

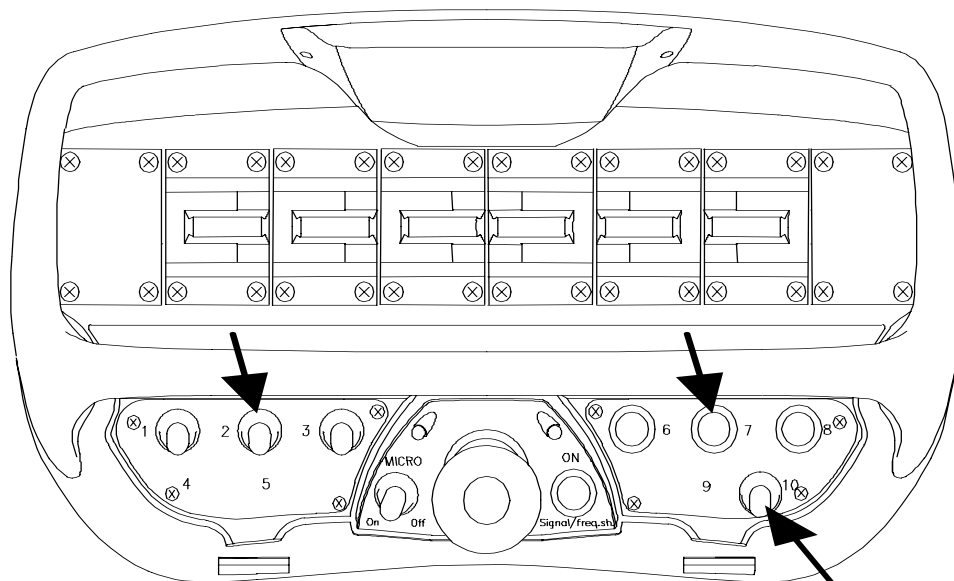
It is possible to adapt the sequence of the individual screens directly from the control box. The indication of the different operation information in both the top and the bottom section of the display can be changed or removed.

In principle, all screens regarding operation information can be chosen, but no numerical value will be indicated for a function, which is related to equipment that is not fitted on the loader.




















We distinguish between indications in the top and the bottom section. I.e. the upper and the lower section are programmed, where the icon is flashing. At the same time screen number will also appear.

If you wish to change the sequence or add / remove screens from the InfoCentre, do as follows:





















- Activate the “Option” switch.
- Press the yellow button and hold it down until you hear an acoustic signal. The icon in the top section starts to flash.
- Change between the screens by means of the “engine start/stop”-button, and when you have found the screen required, push the yellow press button once. Then the current screen has been chosen, and you can scroll onto the next screen.
- When the changes required have been carried out, hold down the yellow press button until you hear an acoustic signal. Now the changes have been saved, and the InfoCentre returns to the normal indication again.



The following tables show the available operation screens, information, and indications.

Operation Screens				
Description	Icon	Icon no.	Numerical value for	Unit
Load moment, loader		22	Load moment, loader	%
Load moment, Fly-Jib		21	Load moment, Fly-Jib	%
Load on winch		20	Load on winch	kg
Load on winch		20	Load on winch	US lb
Load moment, winch		20	Load on winch	%
Heel of the vehicle in the X-direction		15	EVS heel in the X-direction	%
Heel of the vehicle in the Y-direction		16	EVS heel in the Y-direction	%
Initial heel in the X-direction when calibrating		13	EVS initial heel in the X-direction	m°
Initial heel in the Y-direction when calibrating		14	Offset in the Y-direction	m°
Oil temperature		23	Temperature	°C
Oil temperature		23	Temperature	°F
Load on hook in known loader position			Weight of load	kg
Load on hook in known loader position			Weight of load	US lb
HDL-speed in the area of a load moment of 80-100%		24	Speed of the loader in HDL mode	%
The time that remains before the next service overhaul		7	Remaining time before the next service overhaul	Hours
Remaining time in case of override		8	Remaining time	Seconds
Remaining capacity of the battery		3	Battery capacity	%
The largest load moment of the loader at the moment (dynamic)		22	Load moment, loader	%
The largest load moment of the Fly-Jib at the moment (dynamic)		21	Load moment, Fly-Jib	%
The largest load moment of the winch at the moment (dynamic)		20	Load moment, winch	%
The largest heel in the X-direction at the moment (dynamic)		15	EVS heel in the X-direction	%
The largest heel in the Y-direction at the moment (dynamic)		16	EVS heel in the Y-direction	%
Weighing system, load on the loader hook		19	Weight of load	kg
Weighing system, load on the loader hook		19	Weight of load	US lb
Weighing system, load on the loader hook		19	Weight of load	%

### 16.1.4 All Icons for Operation Screens








Icon	Screen no. / Unit
	1 %
	2 %
	3 kg
	4 lb
	5 %
	6 %
	7 %
	8 m°
	9 m°
	10 C°
	11 F°
	12 kg
	13 lb
	14 %
	15 h
	16 s
	17 %
	18 %
	19 kg
	20 lb

## 16.1.5 Information Screens

An information screen overwrites an operation screen, i.e. the display changes between a normal operation screen and the current information screen in an interval of 1.6 seconds as regards operation screens, and 0.8 seconds as regards the information screens.

An information screen will appear in the following situations:





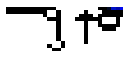



- In case of a load moment exceeding 90% on the loader, the Fly-Jib or the winch.
- In case of a heel of the vehicle exceeding 90% of the max. permissible heel.
- In case of the automatic calibration of the EVS-System. The numerical value indicates whether the calibration has been optimised.
- In case of high oil temperature

Information Screens				
Description	Icon	Icon no.	Numerical value	Unit
Load moment > 90%		15	90-100	%
Load moment > 90%		16	90-100	%
Load moment > 90%		20	90-100	%
Load moment > 90%		21	90-100	%
Load moment > 90%		22	90-100	%
EVS calibration		18	80/85/90/95 /100	%
Oil temperature		23	0-100	°C
Oil temperature		23	0-250	°F












## 16.1.6 Stop Screens

A stop screen has first priority and will overwrite any other indication on the display.

A stop screen appears in all situations where the loader is stopped by the safety system. The below table shows the parameters, which lead to loader stop.

<b>Stop Screens</b>				
<b>Cause</b>	<b>Icon</b>	<b>Icon no.</b>	<b>Numerical value</b>	<b>Unit</b>
The loader is overloaded TCL, SLM		22	Load moment, loader	%
The Fly-Jib is overloaded TCL, SLM		21	Load moment, Fly-Jib	%
Winch on loader is overloaded		20	Load on winch	Kg
Winch on loader is overloaded			Load on winch	US lb
Winch on Fly-Jib is overloaded		20	Load on winch	Kg
Winch on Fly-Jib is overloaded			Load on winch	US lb
Stop of the "Winch – ease"-function due to only 3 winds of cable left on the cable drum		26	-	
Stop of the "Winch – hoist"-function due to too much wire on the cable drum		27	-	
Stop of the "Extension – out"-function due to too much load on the winch		28	Load on winch	kg
Stop of the "Extension – out"-function due to too much load on the winch		28	Load on winch	US lb
Stand-up controls, lowering stop		30	-	
Stand-up controls, slewing stop		25	-	
2-stage LMB, slewing stop		25	Load moment, loader	%
Personnel basket, slewing stop		25	Load moment, loader	%



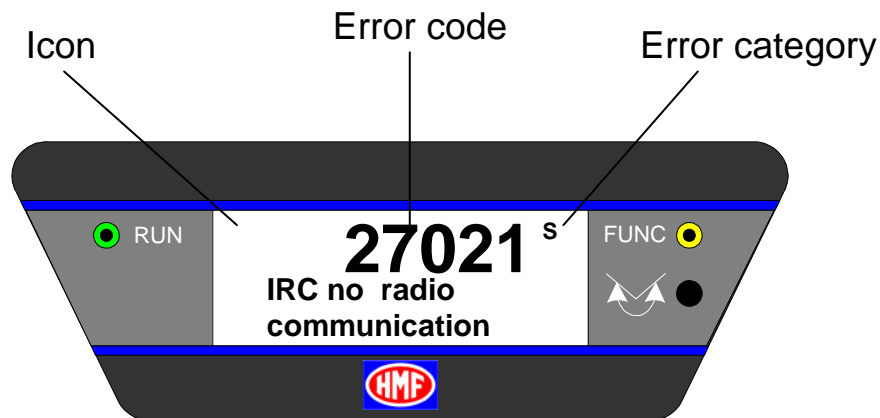
<b>Stop Screens (continued)</b>				
<b>Cause</b>	<b>Icon</b>	<b>Icon no.</b>	<b>Numerical value</b>	<b>Unit</b>
Stabilizer deployment monitoring Stabilizer beam, extend		9	-	-
Stabilizer deployment monitoring Stabilizer leg, down		10	-	-
The EVS-System calibrates. Indication of the optimisation of the calibration.		18	80/85/90/95/100	%
The EVS-system has stopped the slewing movement		17	The largest value in the X or Y-direction	%
EVS-stop due to too much heel of the vehicle in the X-direction		15	Percentage heel in relation to the max. permissible heel (X)	%
EVS-stop due to too much heel of the vehicle in the Y-direction		16	Percentage heel in relation to the max. permissible heel (Y)	%
Too high oil temperature		23	Temperature	°C
Too high oil temperature		23	Temperature	°F
The RCL is in stand-by mode		5	-	-
Stability reminder for personnel basket. Stabilizers must be extended/lowered before starting up		11	-	-
The safety system for the personnel basket is the reason for the loader stop		29	-	-
High jib position: Securing against the jib exceeding vertical position		37	-	-

### 16.1.7 Error Screens

The display indicates any system error. A system error may be permanent or it may appear at the moment when a function is activated.

In case of a permanent error, this is indicated by a constant error screen. If an error appears only when activating a function, the error screen does not appear before at the moment where the lever for the function in question is activated. If the lever is moved back into neutral position, and the error thus stops, the operation screen will reappear.

System errors are divided in 3 categories, and indicated by the letters **W**, **E** and **S** at the top right-hand corner of the display:



#### **W: Indication:**

The display shows the operation screen and the error screen alternately. It is a relatively harmless system error and the present loader operation can be finished.

#### **E: Reduction of the lifting capacity to 90%**


The display shows the operation screen and the error screen alternately. It is a less dangerous system error and the present loader operation can be finished; however the lifting capacity will be reduced.





#### **S: Stop of the Loader**

The error screen overwrites all other screens as long as the error is present. It is a critical system error, which stops the loader. It is possible to make an emergency operation (please see chapter on Emergency Operation of the Loader in the RCL Instruction Manual), i.e. fold the loader and remedy the error.

**Please note!** No matter which category of error, the error **must** be found and remedied, please contact an HMF service point and state the error code.

In the following table you will see the causes of the errors and their corresponding error screens as well as the error code.

<b>Error Screens</b>				
<b>Cause</b>	<b>Icon</b>	<b>Icon no.</b>	<b>Error code</b>	<b>Error category</b>
No internal set up		6	26030	S
Incorrect set up of RCL		6	26020	S
Initialization of CAN-bus connected controllers		6	01020	W
Can-Bus not initialized		6	01010	W
Pressure transducer, boom signal too low		6	23040	S
Pressure transducer, boom signal too high		6	23041	S
Pressure transducer, boom, compensated signal too low		6	23050	S
Pressure transducer, boom, compensated signal too high		6	23051	S
Pressure transducer, Fly-Jib signal too low		6	23030	S
Pressure transducer, Fly-Jib signal too high		6	23031	S
Pressure transducer, Fly-Jib, compensated signal too low		6	23020	S
Pressure transducer, Fly-Jib, compensated signal too high		6	23021	S
Pressure transducer, winch signal too low		6	23010	S
Pressure transducer, winch signal too high		6	23011	S
Spool sensor, slewing		6	22070	S
Spool sensor, boom		6	12060	E
Spool sensor, jib		6	12050	E
Spool sensor, extension		6	12040	E
Spool sensor, Fly-Jib		6	12030	E
Spool sensor, Fly-Jib extension		6	12020	E
Spool sensor, winch		6	12010	E
Spool sensor, extra		6	12080	E
Spool sensor, extra 1		6	12081	E
Spool sensor, option		6	12090	E
Dump valve, output error		6	24060	S
Output error, HDL-valve		6	14050	E
Output error for oil cooler.		6	04040	W
Output error DIG OUT 1		6	24010	S
Output error DIG OUT 2		6	24020	S
Output error DIG OUT 3		6	24030	S
Critically high oil temperature	6	25010	S	

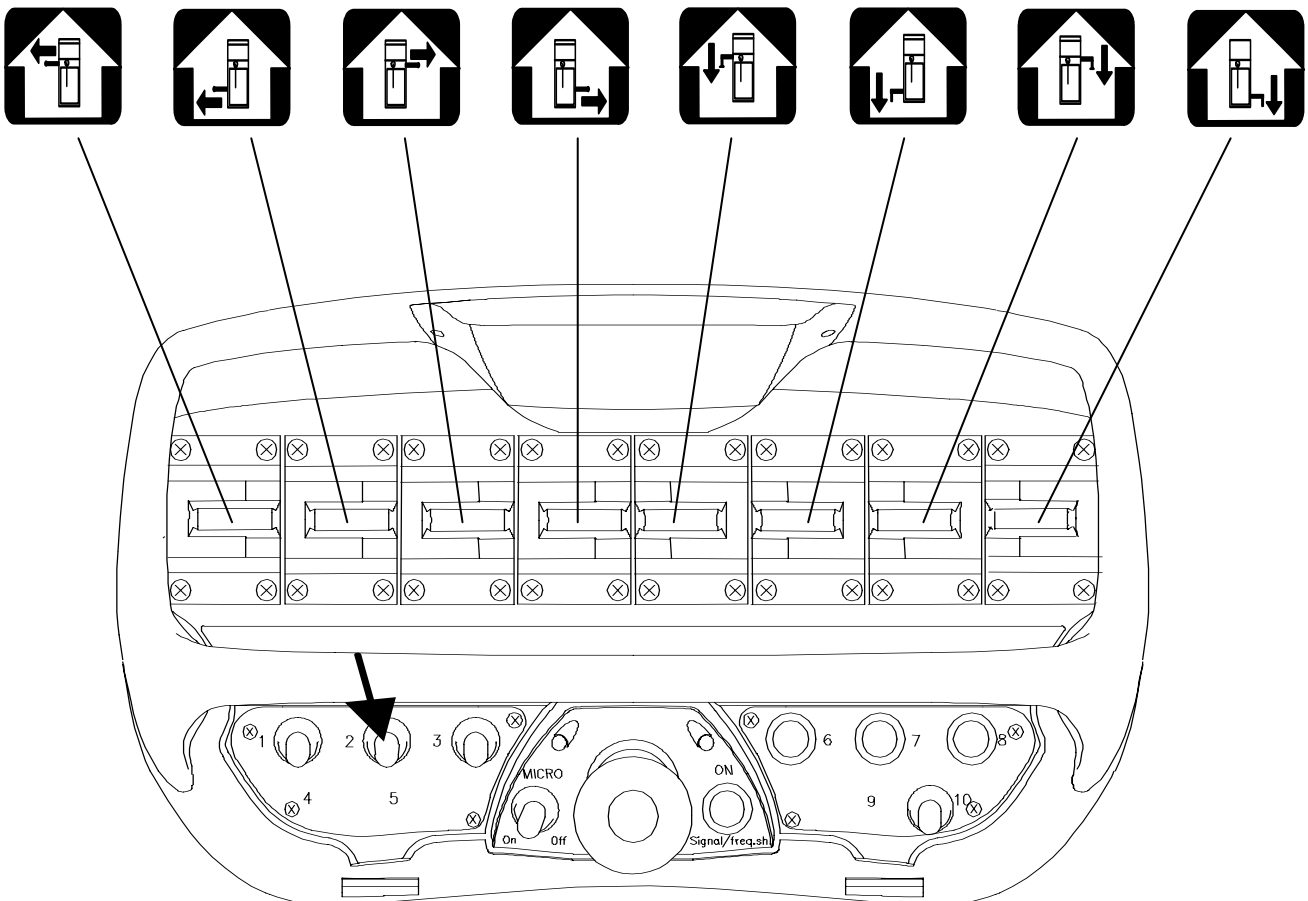
<b>Error Screens (continued)</b>				
<b>Cause</b>	<b>Icon</b>	<b>Icon no.</b>	<b>Error code</b>	<b>Error category</b>
Internal error in the AIC controller		12	27090	S
Communication error with the AIC controller		12	27070	S
CIO 5070 stabilizer controller, communication error	CIO 5070	37	27010	S
CAN-bus communication (IRC)		2	27020	S
No RF-signal (IRC)		1	27021	S
Stop button pushed in (IRC)		2	27024	S
Missing wire security signal (IRC)		2	27022	S
IRC internal error		2	27025	S
Emergency operation (IRC)		2	27023	S
Output error, solenoid valve A2		CIO 5070		14070
Output error, solenoid valve A6			14071	E
Output error, solenoid valve A4			14072	E
Output error, solenoid valve A8			14073	E
Output error, solenoid valve A1			14074	E
Output error, solenoid valve A7			14075	E
Output error, solenoid valve A3			14076	E
Output error, solenoid valve A5			14077	E
Output error, solenoid valve 13			14080	E
Output error, solenoid valve 12			14081	E
Output error, solenoid valve 9B			14082	E
Output error, solenoid valve 9B			14083	E

## 16.2 Control of the hydraulic Stabilizers

In connection with the HMF InfoCentre, it is possible to control the stabilizers of the loader as well as a separate traverse from the remote control box. The remote control box can be set in stabilizer mode (see next item), and now the remote control levers become alternative functions and control the stabilizers instead of the loader functions.

Please see the labels with the two different kits of operating symbols.

Standard sequence for the stabilizer functions:



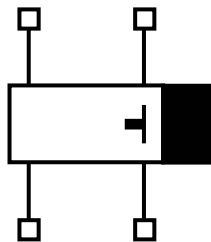
## 16.2.1 Stabilizer Mode

Choose stabilizer operation by pushing the yellow press button on the RCL box or the remote control box, twice.

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

In stabilizer mode the following is indicated:

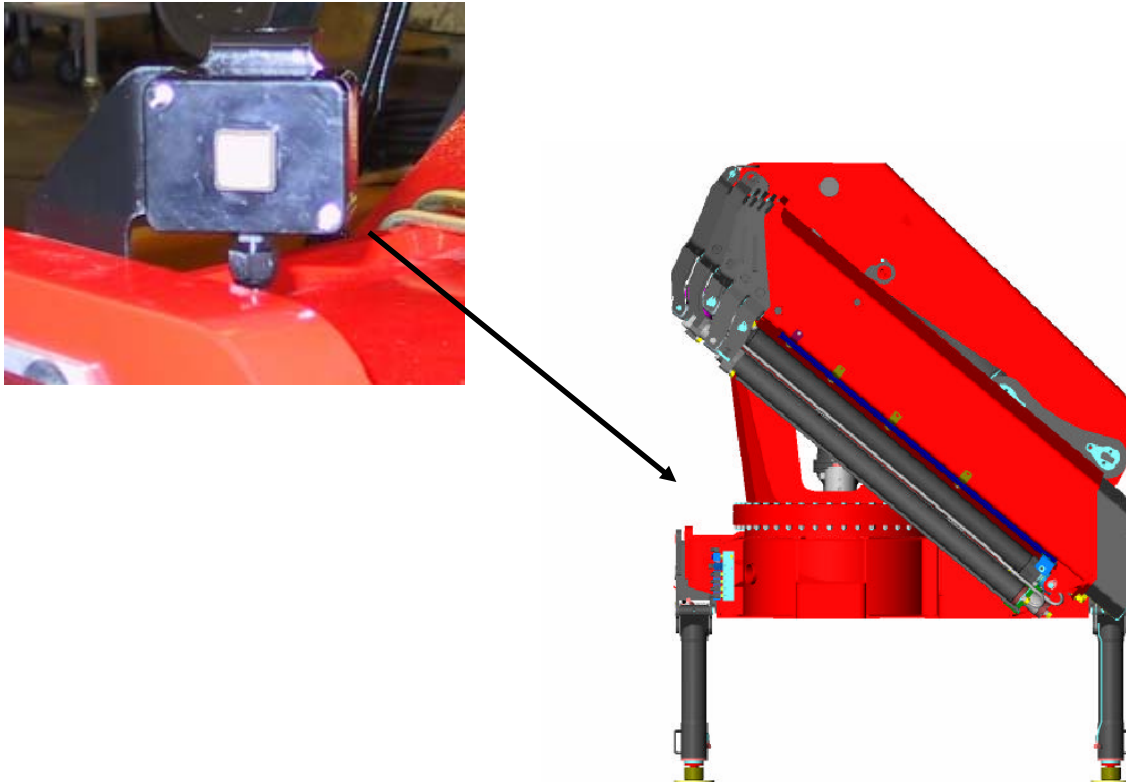
- A periodic signal with slow frequency appears from the buzzer in the RCL and the remote control box.
- On the display of the remote control box appears a vehicle with 4 stabilizer legs.



## 16.2.2 Operation of the Stabilizer Beam – in/out

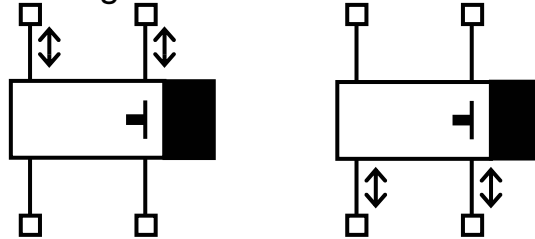
For safety reasons, the operator must stand on the side of the vehicle where the stabilizer beams are to be retracted/extended, while stabilizer operation takes place. This is necessary to have a full view of the working area, which must be completely free of any objects.

Therefore you will have to choose, which side you are going to operate the stabilizers from, before it is possible to operate the stabilizer beams in/out. On each side of the loader base, a box with a safety button has been placed next to the stabilizer beam.



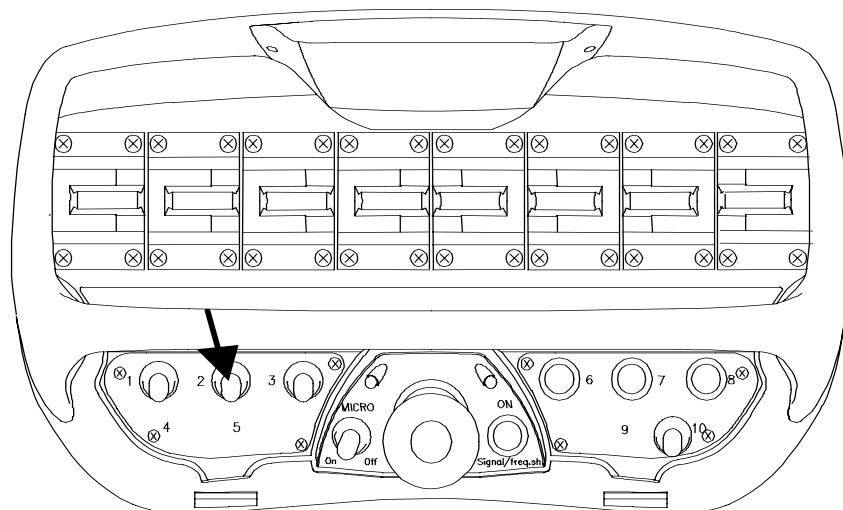
Operation of the Stabilizer Beam – in/out is carried out as follows:

- Push the safety button on the side of the vehicle where the stabilizer beams are to be retracted or extended. On the display of the remote control box, it is indicated on the symbol of the vehicle, which stabilizers that can be extended/retracted (in the right or the left side of the vehicle).



- Activate tumbler switch no. 2 (engine start/stop) on the remote control box to the left and keep it in this position.
- Now it is possible to extend or retract the stabilizers on the side of the vehicle where the operator is standing. The operating symbols indicate, which remote control lever that is to be operated, to extend/retract the stabilizer beam required.

Please note: Activate tumbler switch no. 2, at the latest 10 seconds after having activated the safety button next to the stabilizer beam. If it takes longer time, push the safety button again.





When operating the stabilizer beam on the opposite side of the vehicle, push the safety button on this side, and repeat the above procedure.

Please note: Move tumbler switch no. 2 on the remote control box in neutral position, before it is possible to choose, which side you are going to operate the stabilizers from, by means of the safety button.

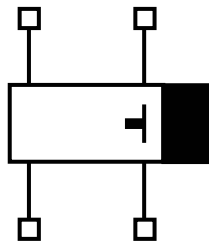
### 16.2.3 Operation of the Stabilizer Legs – up/down

All stabilizer legs can be operated up/down without having to choose, which side you are going to operate them from (the safety button).

Operation of the Stabilizer Leg – up/down is carried out as follows:

- Activate tumbler switch no. 2 (engine start/stop) on the remote control box to the left and keep it in this position.
- The operating symbols indicate, which remote control lever that is to be operated, to lift/lower the stabilizer leg required.

On the display of the remote control box appears a vehicle with 4 stabilizer legs.



### 16.2.4 Operation of the Stabilizer at low or high Speed

The stabilizers can be operated at low or high speed depending on how much the control levers of the remote control box are moved:

- When moving the control levers up to approx. 80% of the travel of the lever, the stabilizers work at low speed.
- During the last part of the travel of the levers (between 80 and 100%), the stabilizers work at high speed.

### 16.2.5 Back into Loader Mode

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

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

## 16.3 Activation of the Regeneration System

Certain loader 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 loader), in the outgoing direction. If a cylinder function is retracted, the regeneration system is not activated.

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

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

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

Connection of the regeneration system

- Push the "ON" start button once on the remote control box.
- If the load moment of the loader is below 50%, the figure 2 appears together with the turtle/hare icon in the display for 5 seconds. Now you have chosen regeneration for both the boom, jib and extension functions.
- If the load moment of the loader is above 50%, the figure 1 appears together with the turtle/hare 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 once on the remote control box. A zero appears on the display for 5 seconds, which indicates that the regeneration system has been disconnected.

## 16.4 Weighing Function

By means of the InfoCentre it is possible to read the load of the current load, in a certain boom position. The hydraulic pressure in the boom cylinder of the loader 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.

### 16.4.1 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 loader into the boom position required as described in the previous item. There must not be any load in the loader hook.
3. Activate the OPTION tumbler switch on the control box.
4. Push and hold down the yellow button on the remote control box, and activate the tumbler switch no. 2 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 loader in the current position is set at 0 kg.
6. The display automatically changes into picture 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. 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 the normal indication again.

### 16.4.2 Weighing of Load

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

- Move the load up to a known boom position
- The picture on the display changes into the icon for "hook load in known loader position", where you can read the weight of the load.

## 16.5 All Icons

<u>Ikön</u>	<u>No</u>
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## 17. Maintenance

It is important to check and maintain the IRC-system both currently and when the loader has its regular service overhaul at an authorised HMF service point.

The following items must be respected:

- When cleaning the loader, 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 IRC-system. If yes, the equipment must be repaired immediately.

## 18. Technical Data

### General System Data

Frequency:	405 – 490 MHz
Range:	approx. 100 metres
Operating temperature:	-25° to + 60°C
Modulation:	FM (16KOFIDBN)

### Electronic box

Degree of protection:	IP 65
Operating voltage:	12 or 24 VDC (+/- 20%)
Fuse:	+ 10 Amp (Red, standard car fuse) – 30 Amp (Green, standard car fuse)
Control signal version:	7 digital outputs, 24 VDC – 1.2 Amp 8 analogue outputs
Idling current:	140 mA, Stand by
Dimensions: approx. (LxWxH)	290 x 165 x 87 mm
Weight:	2.8 kg

### Remote Control Box

Degree of protection:	IP 65 (from above), IP 43 (from below)
Battery:	7.2 VDC (NiCd)
Running time:	Approx. 8 hours pr. recharging
HF-output	approx. 10mW
Dimensions: approx. (LxWxH)	348 x 200 x 145 mm
Weight (incl. battery and strap):	2.4 Kg

### Radio Receiver Box

Degree of protection:	IP 67
Sensitivity:	< 0,4 $\mu$ V (12dB SINAB)
Dimensions: approx. (LxWxH)	150 x 100 x 60 (190 incl. antenna) mm
Weight:	1.1 Kg

### Battery Charger

Operating voltage:	12 / 24VDC
Charging current:	130 - 140 mA
Static/Idling current:	10 - 20 mA
Dimensions: approx. (LxWxH)	217 x 66 x 28 mm
Weight:	0.2 kg