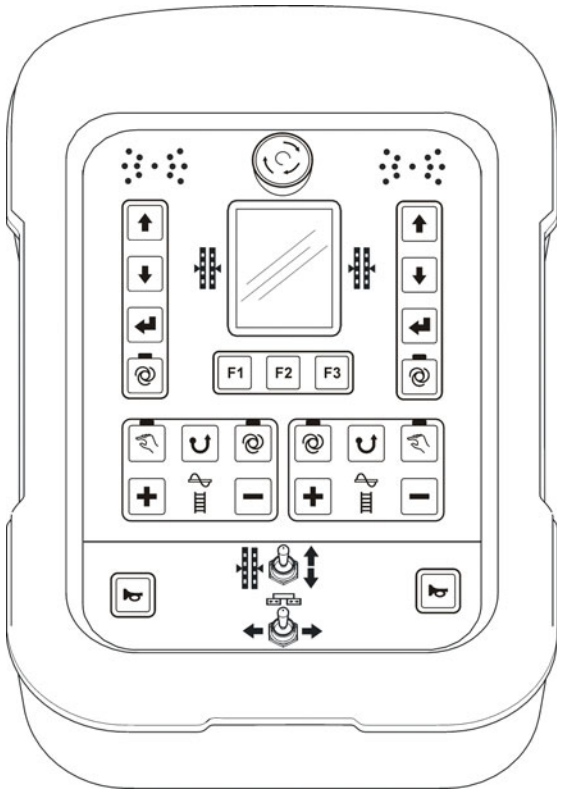
DYNAPAC
FAYAT GROUP

OPERATION



Dynapac
SCREED-CONTROL
-Pavemanager-

GB 04-0616 4812019539 (A5)
Keep for later use in document compartment

Valid for:
_____ bis _____
_____ bis _____

Table of contents

1 General information

1.1 Information on the operating instructions

General

These operating instructions contain basic notes which have to be observed when operating and maintaining the remote control.
The prerequisite of safe working is adherence to all safety instructions and handling instructions which are specified.
These operating instructions must therefore be read and applied by every person commissioned to work on the vehicle under all circumstances, e.g. operation, malfunction rectification and upkeep (maintenance, care).

These operating instructions form part of the product and must be passed on to third parties or subsequent owners along with the product if necessary. They must be available and accessible to the operating personnel at the product's operating location at all times.

Adherence to the local accident prevention regulations applicable to the product's area of application, the general safety regulations and the vehicle manufacturer's safety regulations is additionally required.

The remote control is available with diverse sensor combinations.
When working with your remote control, always proceed according to these instructions. If your system is not equipped with all of the sensors, the description of these sensors is irrelevant to you.

Modification rights reserved

We make every effort to ensure that these operating instructions are correct and up to date. To maintain our technological advantage, however, it may be necessary to carry out modifications to the product and its operation without prior notification. Under certain circumstances, these modifications may not correspond to these operating instructions. In this case, ask the manufacturer for up-to-date operating instructions. We accept no liability for malfunctions, failures and damages arising as a result of these.

Figures

The figures contained in these operating instructions serve to improve understanding. It may be the case that the figures contained in these operating instructions are not to scale or deviate slightly from the original.

1.2 Explanation of symbols

Warnings

In these operating instructions, warnings are identified by means of symbols. These notes are introduced using signal words which express the extent of the hazard.
Adhere to these notes under all circumstances and act cautiously to avoid accidents, personal injury and material damage.

DANGER!

… refers to an immediately hazardous situation which leads to death or severe injuries if it is not avoided.

WARNING!

… refers to a possibly hazardous situation which may lead to death or severe injuries if it is not avoided.

CAUTION!

… refers to a possibly hazardous situation which may lead to minor or slight injuries if it is not avoided.

CAUTION!

… refers to a possibly hazardous situation which may lead to material damage if it is not avoided.

Tips and recommendations

NOTE!
… emphasises useful tips and recommendations plus information for efficient and trouble-free operation.

Step-by-step Step-by-step instructions which are to be carried out by the operating personnel are numbered.

1) …
2) …
3) …

Lists

- Lists are marked with a black dot.

1.3 Limitation of liability

All information and notes provided in these operating instructions have been compiled under consideration of the applicable standards and regulations, the state-of-the-art and our many years of knowledge and experience.

The manufacturer accepts no liability for damages arising due to:

- Improper assembly and installation
- Non-observance of the operating instructions
- Improper and incorrect use
- Usage outside of the operating boundaries
- Use of inadequately qualified and trained personnel
- Use of unauthorised spare parts and accessories
- Conversions carried out on the product

In the event of special versions and the selection of additional order options or due to the latest technical modifications, the actual scope of delivery may deviate from the explanations and illustrations described here.

1.4 Copyright

In this regard, refer to page 2 of these operating instructions.

1.5 Other applicable documents

Additional information on the assembly of the Big Sonic-Ski® and on the structure and setting of the remote control's parameter menu can be found in the following documents:

10-02-02120 Big Sonic-Ski® assembly instructions (de)
10-02-00894 Remote control parameter setting (de)

1.6 Spare parts

Genuine spare parts and accessories authorised by the manufacturer serve to enhance safety.
The use of other parts may limit the user's right to commission the product and may invalidate liability for consequences arising from use.

CAUTION!

Risk of injury due to incorrect spare parts!
Incorrect, faulty or unauthorised spare parts may lead to damage, malfunctions or total failures and may impair safety.
Therefore: • Only use genuine spare parts from the manufacturer.

Ask the manufacturer about genuine spare parts.

1.7 Final decommissioning / rendering useless

During final decommissioning, the remote control components must be protected against re-commissioning - particularly by unauthorised third parties - by rendering them useless.

1) Switch off the product's voltage supply.
2) Disconnect the product from all poles.
3) Remove the product.
4a) In the case of components with connection cable → cut off the connection cable.
4b) In the case of components with connectors → mechanically destroy the connector.

1.8 Disposal

Packaging

For transportation purposes, the products are protected with special packaging in the factory. This consists of environmentally compatible, easily separated materials and can be recycled.
We recommend using recycling companies to dispose of the packaging material.

Product

The product must not be disposed of in the domestic refuse. Dispose of the product properly.
If no take-back or disposal agreements have been concluded, forward disassembled components for recycling following proper removal:

- Scrap metal material residues;
- Dispose of electronic components according to the locally applicable regulations.

CAUTION!

Risk of injury due to improper disposal of the product!
Burning plastic parts leads to the occurrence of toxic gases, which may cause people to fall ill.
Therefore: • Dispose of the product properly according to the applicable national, country-specific disposal regulations.

CAUTION!

Risk of injury due to improper disposal of the product!
Negligent disposal enables unauthorised persons to make improper use of the product. As a result of this, these persons and/or third parties may be severely injured and the environment may be polluted.
Therefore: • Protect the product against access by unauthorised persons at all times.

1.9 Warranty regulations

These operating instructions do not contain any warranty commitments. The warranty regulations form part of the manufacturer's "Conditions of sale and delivery".

1.10 Customer service

The manufacturer and its service network will be happy to provide technical information.

2 Basic safety instructions

General

This section provides an overview of all important safety aspects for optimal personnel protection and for safe and trouble-free operation.
The instructions are intended to enable the owner and user to recognise any usage hazards in good time and to avoid these in advance wherever possible.

The owner must ensure that all users understand and comply with these instructions.

2.1 Intended use

2.1.1 Proper use

The Dynapac Screed Control System has been designed and constructed exclusively for the proper, intended use described here.

- *Monitoring of a reference level and/or reference slope using rotary, laser or ultrasonic sensors.*
- *Monitoring of the screed inclination with a slope sensor.*
- *Monitoring of the vibration, tamper and auxiliary compactor frequency using impulse sensors installed in the screed.*
- *Monitoring of the screed crowning with a cable sensor.*
- *Monitoring of the material quantity in the area of the auger using ultrasonic material sensors.*
- *Setting of various nominal values plus parameters for the vehicle's hydraulic system performance.*
- *Automatic calculation of control variances for screed levelling and crowning adjustment, and transmission of the control variances to a higher-level controller via the CAN bus.*

Any use other than that listed here, and any application which does not correspond to the technical data is regarded as improper and incorrect.

WARNING!

Danger due to improper use

Any use of the system which exceeds the proper use and/or any other use of the systems may lead to hazardous situations.

Therefore: • Only put the product to the proper use.

2.1.2 Incorrect use

- Improper use.
- Exceeding the limit values specified in the data sheet.
- Use of the product without instruction.
- Use of the product outside of the operating boundaries.
- Deactivation of safety facilities.
- Removal of information panels or warning signs.
- Opening the product (unless expressly permitted for specific purposes).
- Conversions on or modifications to the product.
- Commissioning the product following misappropriation.
- Use of the product when obvious defects or damage are recognisable.
- Use of the product with unauthorised accessories from third-party manufacturers.
- Use of the product in an inadequately secured construction site area (e.g. during work on the road).
- Use of the product to control vehicles, systems or moving objects if these are not equipped with an additional control system and higher-level safety facility.

2.2 Operating boundaries

The remote control is suitable for use in an atmosphere which is permanently habitable for man. It must not be used in an aggressive or explosive environment.

Local safety authorities and safety managers must be contacted by the owner before work is carried out in an endangered environment, in the vicinity of electrical systems or in similar situations.

2.3 Modifications to and conversions on the product

To avoid hazards and to ensure optimal performance, neither modifications, attachments or conversions which have not been expressly approved by the manufacturer may be carried out on the product.

2.4 Content of the operating instructions

Each person who is commissioned to carry out work on or with the product must have read and understood the operating instructions before starting to work with the product. This applies even if the affected person has already worked with this or a similar product, or has been trained by the manufacturer or supplier.

2.5 Responsibility of the owner

The remote control is used in the commercial sector. The owner of the product is therefore subject to the legal duties of health and safety at work.

In addition to the notes on health and safety at work contained in these operating instructions, adherence to the safety, accident prevention and environmental protection regulations applicable to the product's area of application is required.

The following particularly applies:

- The owner must obtain information on the applicable health and safety at work regulations and must determine additional hazards arising due to the special working conditions at the product's operating location in a hazard assessment. These must be implemented in the form of operating instructions for the operation of the product.
- These operating instructions must be stored in the immediate vicinity of the product and must be accessible to the persons working on and with the product at all times.
- The owner must clearly define the responsibilities of the operating personnel.
- The owner must ensure that the operating personnel understands the content of the operating instructions in full.
- The information provided in the operating instructions must be observed completely and unreservedly!
- The owner must ensure that all maintenance, inspection and installation work is carried out by qualified specialist personnel which has been provided with adequate information by studying the operating instructions in detail.
- The owner informs the manufacturer or its authorised dealers if safety defects occur on the product or during its use.

2.6 Operating personnel

WARNING!

Risk of injury with inadequate qualification!
Improper handling of the product may lead to significant personal injury and material damage.
Therefore:
- Have special activities carried out solely by the persons specified in the relevant chapters of these operating instructions.

The following qualifications are specified for various activity areas in the operating instructions:

Layman

Whoever is not qualified as either a specialist or a trained person is regarded as an unskilled worker without specialist knowledge or as a layman.

Trained person

A trained person is regarded as a person who has been informed of the tasks transferred to him and the possible hazards in the event of improper behaviour and has been trained on the job if necessary, and who has been instructed in the necessary safety facilities and protective measures by the owner or the manufacturer.

Qualified specialist personnel

Qualified specialist personnel in the sense of the operating instructions refers to persons who are familiar with the installation, commissioning and operation of the product and who have qualifications corresponding to their activities. Due to their specialist training, knowledge and experience, plus knowledge of the relevant regulations, specialist employees are able to recognise risks and avoid possible hazards which may be caused by operating or maintaining the product.
Amongst others, knowledge of first aid measures and the local rescue facilities are necessary.

2.7 Special risks

General

The residual risks arising on the basis of the hazard analysis are specified in the following section.
Observe the safety instructions listed here and the warnings in the other chapters of these operating instructions in order to reduce health risks and avoid hazardous situations.

Electrical current

DANGER!

Danger due to electrical current!
When working with the laser mast or the power mast in the immediate vicinity of electrical systems, e.g. overhead cables or electric railways, a life-threatening risk exists due to electric shock.
Therefore:
- Maintain a sufficient safety distance away from electrical systems.
- If working in such systems is vitally necessary, inform the departments or authorities responsible for these systems prior to carrying out this work and follow their instructions.

Moving components

CAUTION!

Risk of injury due to moving vehicle parts!
During screed control and regulation, vehicle parts and assembles are moved manually or automatically. Rotating vehicle components and assemblies and/or those which execute linear movements may lead to severe injuries and to material damage.
Therefore:
- Keep persons away from the working area of the vehicle or the screed.
- Remove objects from the working area of the vehicle or the screed.
- Do not reach into moving parts during operation.
- Always switch off the system when the vehicle is stationary.
- Do not carry out any work on the sensor system when the system is set to automatic mode.

Projecting vehicle parts

CAUTION!

Risk of injury due to projecting vehicle parts!

Retrofitted system components (e.g. sensors) may extend beyond the vehicle's typical dimensions. This may lead to injuries and material damage.

Therefore:
- Make sure that the vehicle is operated by a qualified and experienced operator.
- Keep persons away from the working area of the vehicle or the screed.
- Remove objects from the working area of the vehicle or the screed.

Malfunction

WARNING!

Risk of injury due to malfunction!

Uncontrolled vehicle actions due to system component malfunctions may cause severe injuries to persons in the vehicle's working area or material damage.

Therefore:
- Make sure that the vehicle is operated, controlled and monitored by a qualified and experienced operator. The operator must be able to implement emergency measures such as e.g. an emergency stop.
- Keep persons away from the working area of the vehicle or the screed.
- Remove objects from the working area of the vehicle or the screed.
- Secure the construction site area.

Missing instructions

WARNING!

Risk of injury due to missing or incomplete instructions!

Missing and incomplete instructions may lead to operator errors or improper use. This may in turn lead to accidents involving severe personal injury, material damage and environmental pollution.

Therefore:
- Follow the manufacturer's safety instructions and the owner's instructions.

Inadequate securing

WARNING!

Risk of injury due to inadequate securing!

Inadequate securing of the construction site and the location of a component, e.g. the laser transmitter, may lead to hazardous situations in road traffic and on the construction site.

Therefore:
- Ensure that the construction site is adequately secured.
- Ensure that the locations of the individual components are adequately secured.
- Observe the country-specific, applicable safety and accident prevention regulations and the valid road traffic regulations.

Incorrect measurement results

CAUTION!

Danger due to incorrect measurement results!

Incorrect measurement results caused by using a product which has been dropped, any other impermissible stress or a modification may lead to significant material damage.

Therefore:
- Do not use products which are obviously damaged.
- Before reusing a component which has been dropped, carry out a control measurement.

2.8 Safety facility

The remote control is equipped with a separate, higher-level safety facility in the form of an emergency off switch.
Integration of this emergency off switch lies in the area of responsibility of the vehicle manufacturer and is urgently recommended.

The remote control is additionally equipped with a defined CAN command, via which external intervention into the control system can be achieved. This command can be used to shut off the calculation of a control variance.

In the event of a fault, all of the LED arrow's LEDs on the remote control additionally flash, thereby drawing the operator's attention to a malfunction.

2.9 Behaviour in the event of danger and accidents

Preventative measures

- Always be prepared for accidents or fire!
- Keep first-aid facilities (first-aid kit, blankets, etc.) and fire extinguishers close at hand.
- Familiarise personnel with accident report, first-aid and rescue facilities.
- Keep access routes for rescue vehicles clear.

If the worst should happen: act correctly

- Immediately shut off the product using the EMERGENCY stop function.
- Implement first-aid measures.
- Rescue persons from the danger zone.
- Inform the parties responsible at the operating location.
- Notify a physician and/or the fire brigade.
- Clear access routes for rescue vehicles.

2.10 Signs

WARNING!

Risk of injury due to illegible symbols!

Over time, stickers and symbols on the product may become soiled or illegible in another manner.

Excessive mechanical strain may cause stickers and symbols to become detached.

Therefore:
- Always keep safety, warning and operating instructions in a clearly legible condition.
- Regularly check to ensure that stickers and symbols are firmly attached to the product.
- Do not remove stickers or symbols from the product.

3 Transportation, packaging and storage

3.1 Transportation inspection

To ensure adequate protection during shipping, the products have been carefully packaged.
On receipt, immediately check the delivery as regards completeness and transportation damage.

Proceed as follows in the event of externally recognisable transportation damage:

- Do not accept the delivery or only accept it conditionally.
- Note the extent of the damage on the transportation documents or on the freight forwarder's delivery note.
- Institute a complaint.
- Do not commission products which are obviously damaged.

Complain about each defect as soon as it is discovered. Claims for damages can only be asserted within the valid complaint periods.

3.2 Transportation

When transporting your equipment to the operating location or in the field, always make sure that the product is transported in suitable transportation containers and that these are secured accordingly.
Never transport the product loose in a vehicle. The product's function may be severely impaired by impacts and jolts.

When shipping by rail, air or ship, always use the original packaging, transportation containers and cardboard shipping boxes or corresponding packaging. The packaging protects the product against impacts and vibrations.

3.3 Storage

Only store the product in well ventilated, dry rooms, protect against moisture during storage and use the original packaging to do this wherever possible.

Avoid severe temperature fluctuations during storage. The formation of condensation may cause the function to become impaired.

Note the product's temperature limit values during storage, particularly in the summer if the equipment is stored in the interior of vehicles. Please refer to the products' technical data for the permissible storage temperatures.

4 Product description

The remote control is a universal control and regulation system for construction vehicles.
The extensive range of sensors for distance and slope monitoring, its extensive operating comfort and high operating safety make the remote control a flexible and efficient control system.

The system is based on state-of-the-art microprocessor technology and operates with a so-called "CAN bus" (**C**ontroller **A**rea **N**etwork).
This CAN bus represents the latest standard and guarantees maximum system safety. It also enables central operation of the system in a very simple manner and, thanks to its modular design, the successive extension of this. For example, new sensors can be retrofitted without problem at any time depending on the application requirement.
The remote control is the core element of the system, and automatically detects connected sensors on switching on.

Product identification

Each system component (with the exception of the cables) is provided with a type plate.
The type plate contains the CE identification (1), the precise designation of the device (2), the product's article number (3) and a sequential serial number (4).
The following illustration shows an example of a type plate.

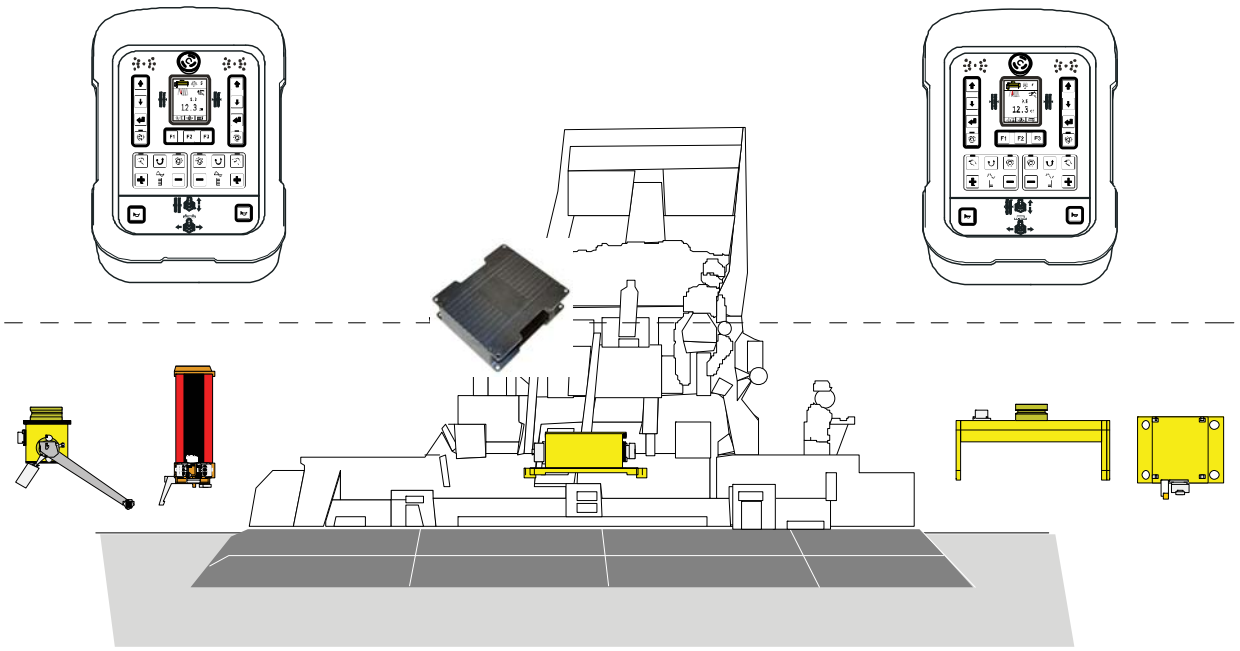
5 Design, system overview and function

General

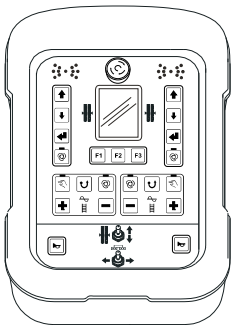
In this section, you will be familiarised with the design of the Dynapac remote control and the basic way in which it functions.

5.1 Design

A separate regulator (remote control) and at least one relevant sensor is required for each control circuit or side of the vehicle.
The user can compile his system individually depending on the vehicle and application.
To do this, he simply selects a sensor which best meets the relevant requirement from the large pool of available sensors and combines it with the Dynapac remote control.
The CAN bus enables several sensors to be connected simultaneously to one remote control. In this case, the operator selects the relevant, active sensor with the aid of the software.



5.2 System overview and function

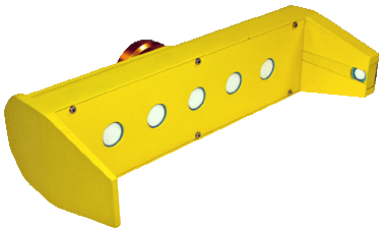


The Dynapac remote control offers all of the buttons required to control the system and optical displays from which the current status of the system can be read off at any time.
Here, the sensor signals and keypad inputs are processed and forwarded to the tractor's higher-level control system.

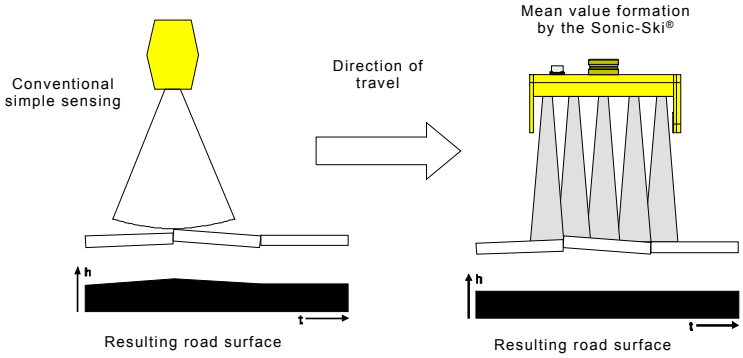
The Dynapac Screed Controller evaluates the following sensors, which are installed in and on the screed, and transmits the measured values to the tractor's higher-level control system.
The sensors which are evaluated include:
Tamper frequency, vibration frequency, auxiliary compactor frequency, left auger material sensor, right auger material sensor, left screed width sensor, right screed width sensor.
It additionally undertakes and monitors all bi-directional communication with the tractor's higher-level control system.

The digital slope sensor *SLOS-0150* (slope sensor) operates with a highly-accurate, electromechanical measurement system and is used to monitor the screed's inclination.

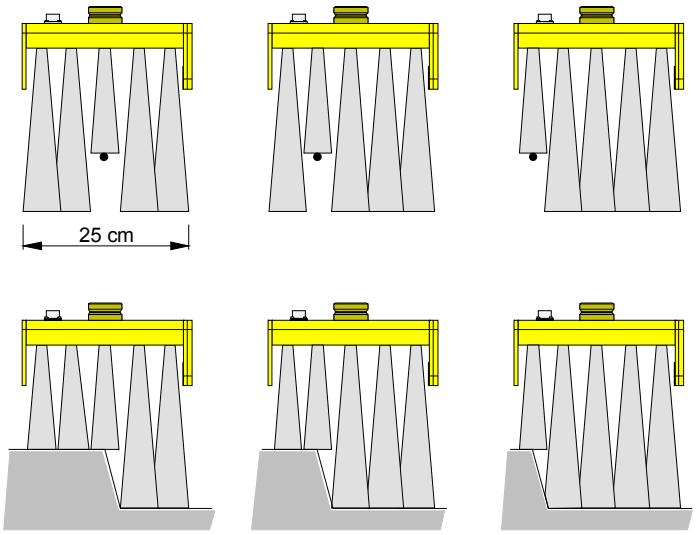
The digital rotary sensor *ROTS-0300* is a sensor for measuring distance and scans the measured values from an available reference by means of mechanical aids.
This may be both a tensed and measured cable or a surface (e.g. an already paved road surface).



The Sonic-Ski® plus *SKIS-1500* is a distance measurement sensor and operates with five ultrasonic sensors. A sixth sensor is used for temperature compensation.
On sensing the ground, a mean value is formed from the values measured by the five ultrasonic sensors of the Sonic-Ski® plus.

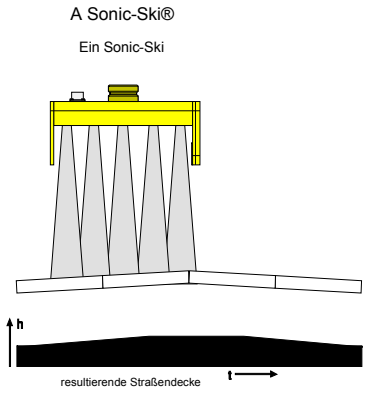


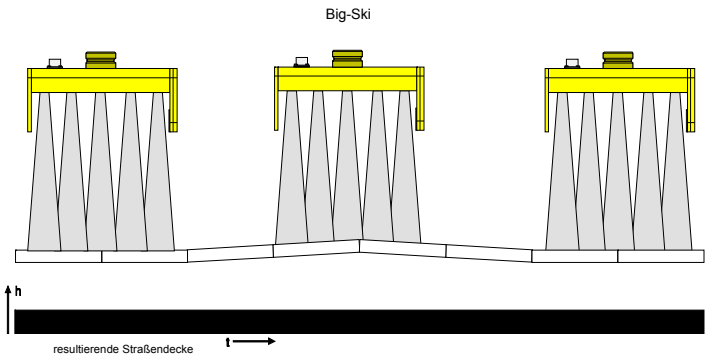
In the case of cable sensing, the Sonic-Ski® plus is not only able to measure the distance from the reference, but can additionally detect the position of the cable or an edge beneath the sensor heads over its entire working width of approx. 25 cm.



The Big Sonic-Ski® again takes up the principle of mean value formation familiar from the Sonic-Ski® plus.
To achieve this, three sensors (e.g. 3x Sonic-Ski® plus) are typically distributed over the length of the vehicle - or even beyond it with the assistance of a corresponding mechanical system.
In exceptional cases, mean value formation can also be carried out using just two sensors (e.g. Sonic-Ski® plus at the front and rear).

Once small areas of unevenness and foreign bodies have been neutralised by the mean value formed by each individual Sonic-Ski® plus, the Big Sonic-Ski® set-up now additionally determines and reduces undulations and small, elongated differences in height in the ground's longitudinal profile.



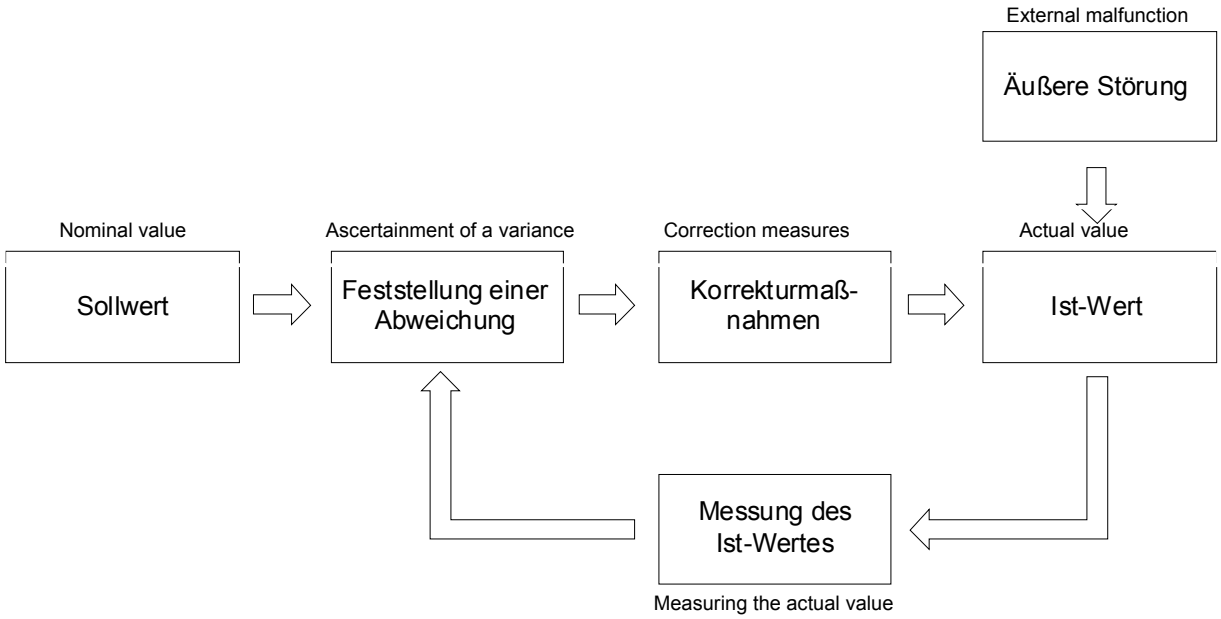


The dual sonic sensor *DUAS-1000* is a distance measurement sensor and operates using ultrasonic technology.
The temperature of the value measured by the Dual-Sonic Sensor is compensated by means of a reference measurement versus a bracket with a defined distance parallel to the actual distance measurement.

The prop. laser receiver *LS-3000* is a distance measurement sensor which operates with all conventional rotary lasers such as e.g. red light transmitters (helium, neon) and infrared transmitters.
It is used for square construction, etc. and is equipped with a reception range of 29 cm.

Power masts are only used in combination with laser receivers.
Power Mast *ETM-900* significantly increases the reception range of a laser receiver, as the sensor can be guided over the lifting cylinder's entire adjustment range.
One further advantage offered by the power mast is the fact that the user can very quickly and comfortably position the laser receiver in the transmitter's laser beam.
If both sides of the vehicle are to be regulated using laser receivers, a power mast must be installed for each side to consistently exploit the above mentioned advantages.

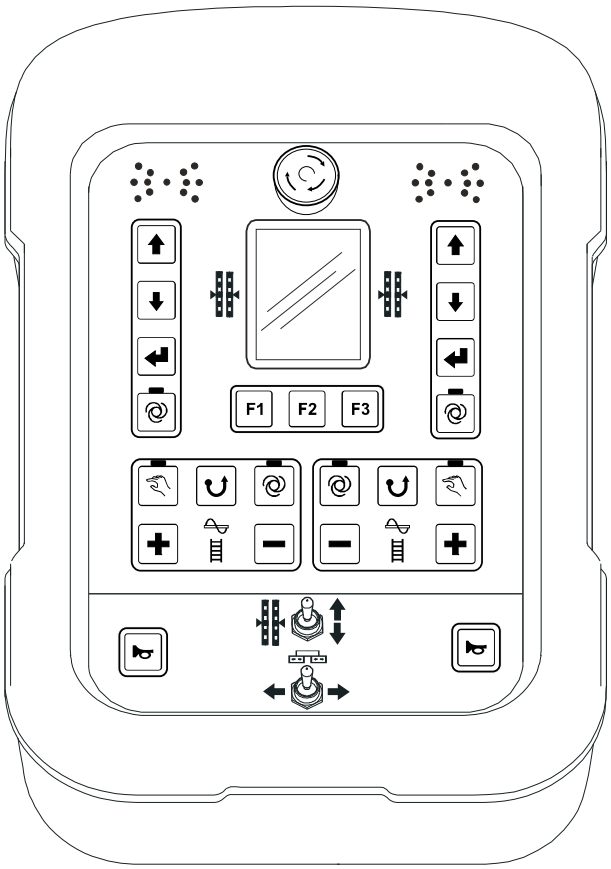
Irrespective of which sensor is operated, the basic principle of regulation is always the same:
The basic principle of regulation is continuous: **measurement - comparison - adjustment**
A control circuit serves to set a specified physical variable (control variable) to a desired value (nominal value) and to maintain it at this value, regardless of any malfunctions which may occur. To perform the control task, the control variable's momentary value - the actual value - must be measured and compared with the nominal value. If variances occur, readjustment must be carried out in a suitable manner.



6 Controls and displays, operating modes

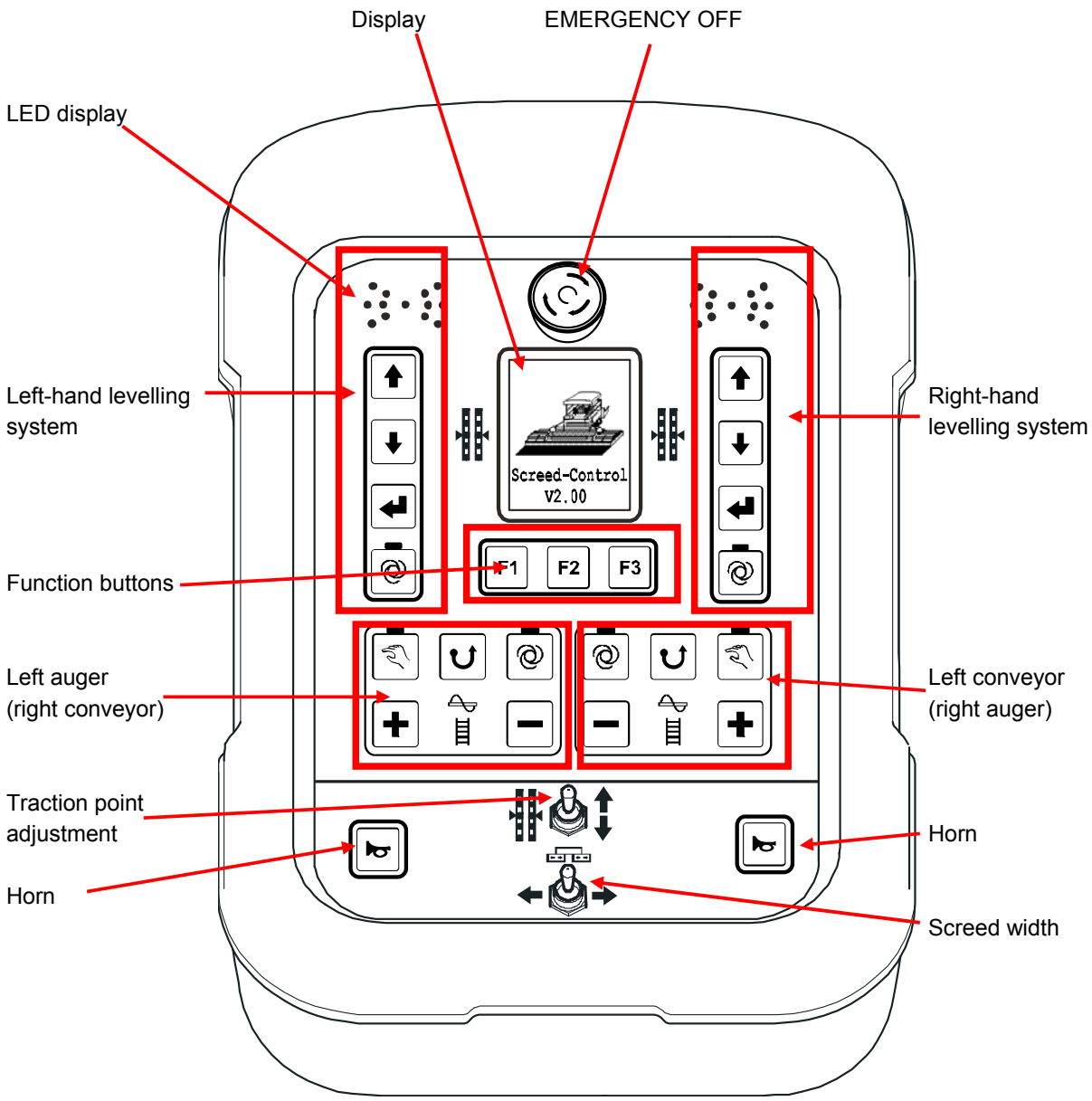
6.1 Description of the remote control

These instructions describe the operation of the Dynapac remote control and therefore the central component of the system. An understanding of basic operation of the remote control is required in the sections dealing with the operation of the individual sensors.

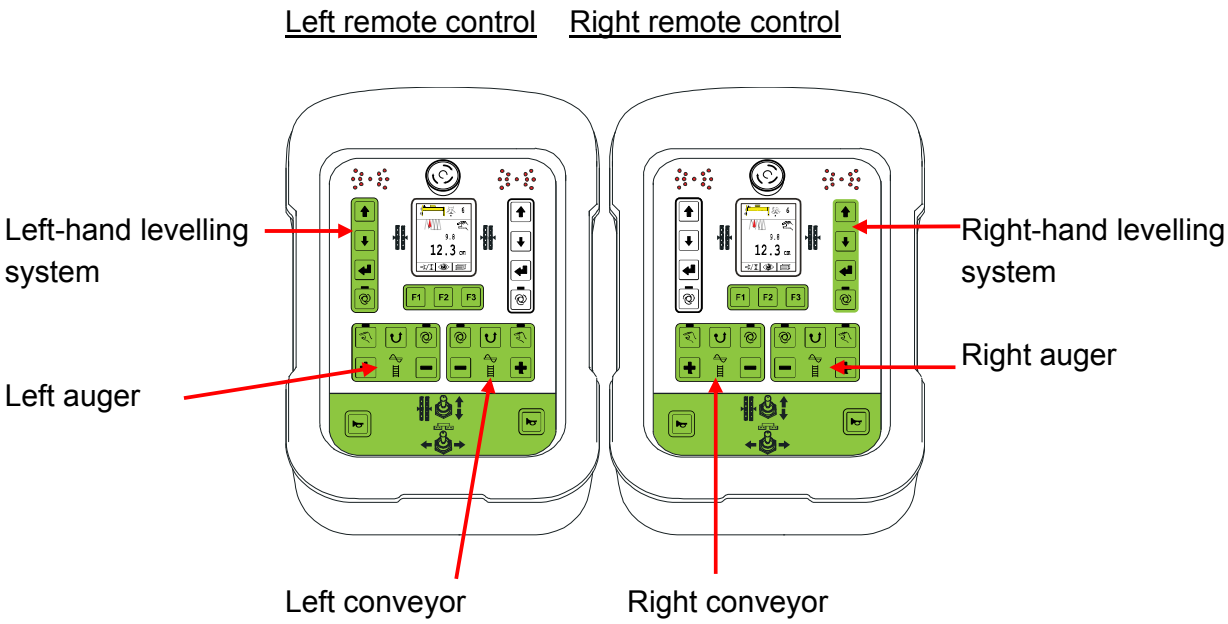


The remote control contains all buttons required to operate the system, a few function lamps and a 3.5" TFT display, from which the current status of the system can be read off at any time.

6.1.1 The controls and displays, operating modes



The remote control's keypad has different functions depending on the side into which it is plugged. The function blocks marked in the following, in particular, differ in this case.

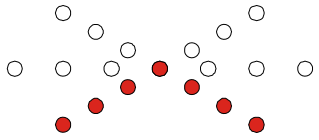
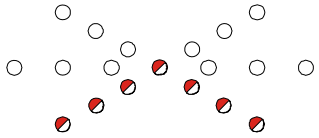
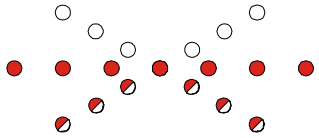
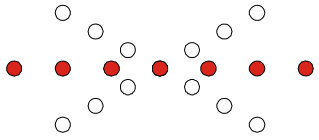
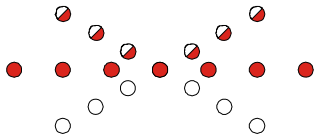
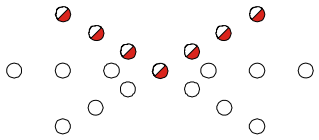
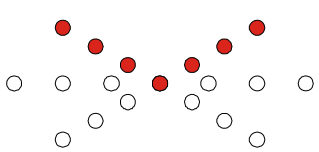


6.1.2 Emergency stop switch

By actuating the emergency off switch, the emergency off chain is interrupted and the higher-level control system automatically ensures the implementation of safety shut-off.

6.1.3 The LED display

The LED arrow serves to visibly indicate the status of the relevant actuated valve output to the operator. The LED arrow is a particularly useful display when the operator is located a great distance away from the remote control and in strong sunlight.

LED arrow display	Control variance	Controller output
	Large control variance	RAISE controller output constantly on
	Medium control variance	RAISE controller output runs through cycle with large pulse width
	Small control variance	RAISE controller output runs through cycle with small pulse width
	No control variance	Controller outputs not activated
	Small control variance	LOWER controller output runs through cycle with small pulse width
	Medium control variance	LOWER controller output runs through cycle with large pulse width
	Large control variance	LOWER controller output constantly on

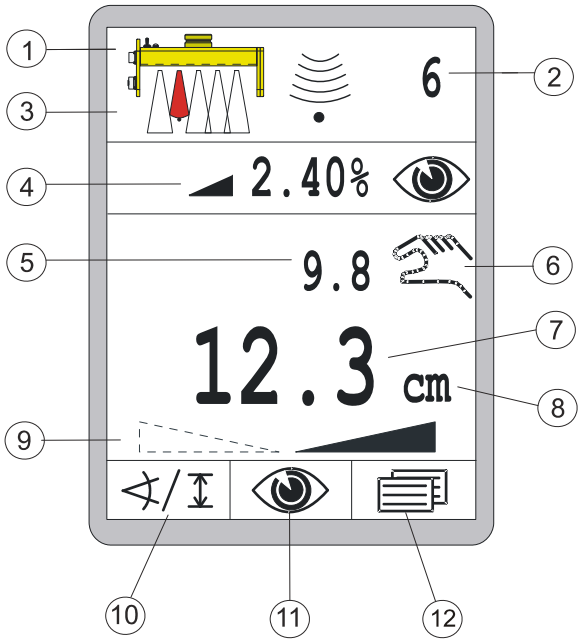
Legend: ○ = LED is off ◔ = LED flashes ● = LED is on

If all of the LED arrow's LEDs flash simultaneously, a malfunction is present. Often, these malfunctions do not involve genuine defects but indicate an attempt to operate the vehicle under impermissible conditions.

6.1.4 The 3.5" colour display

During normal operation, the sensor type selected for the relevant control circuits and its nominal and actual values are displayed on the large 240 (W) x 320 (H) pixel, backlit colour display.
Selection options and parameters are displayed here in the various menus or system notes and configuration and setting instructions are provided.

Example of the operating window when working with the Sonic-Ski® plus:



1) Currently selected sensor
2) Set sensitivity of the currently selected sensor
3) Position of the cable beneath the sensor (with Sonic-Ski® plus cable only)
4) Configurable info line
5) Value currently measured by the sensor (actual value)
6) Currently selected operating mode:
   = manual mode
   = automatic mode
   = locking is active
7) Set value to which the machine is to be regulated (nominal value)
8) Physical measurement unit of the currently selected sensor
9) Direction of the lateral slope (with the digital slope sensor only)
10) Function of button F1 (here: calling up sensor selection)
11) Function of button F2 (here: calling up the view menu)
12) Function of button F3 (here: calling up the user menu)

The active sensor's actual value (5) and nominal values (7) are shown with prefixes, the nominal value additionally with a physical unit of measurement (8).
The prefix indicates whether this involves a positive or a negative numerical value.

Only the negative prefix, i.e. " - " appears on the display!

The lateral slope direction arrows only appear if the digital slope sensor has been selected as the active sensor. The slope direction of the displayed arrow is the prefix for the digital slope sensor value (left slope or right slope). Both arrows only appear simultaneously together with the display "0.0%".

The resolution and the physical unit of measurement for the displayed values can be set in the configuration menu - separately for distance sensors and slope sensors.

6.1.5 The levelling system operating buttons

A few buttons are sufficient to operate the basic control functions.

Up button & down button

In automatic mode, the up button and the down button are used to change the nominal control value.

In manual mode, the corresponding valve output is actuated during the time in which the relevant button is pressed.

In the menus, these serve to select menu items or to set parameters.

Enter button

The enter button is used to set the nominal value to the actual value and/or to carry out calibration to zero.

In the menus, it serves to confirm the relevant menu item which has been selected.

Auto button

The auto/manual button serves to switch between manual and automatic operating modes.

Manual mode

In "manual" operating mode, the screed is moved directly using the up/down buttons on the remote control.

The function LED integrated into the button is off in manual mode.

Automatic

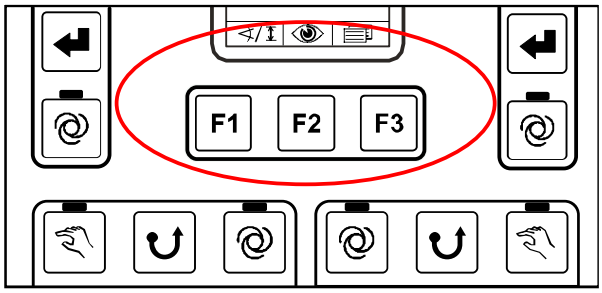
In "automatic " operating mode, the screed's nominal value is changed using the up/down buttons on the remote control.

If comparison of the measured actual value and the set nominal value results in a difference, the remote control independently actuates the outputs with the aid of the higher-level control system until this difference has been compensated.

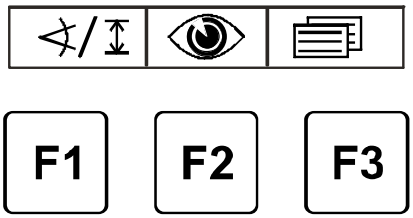
The function LED integrated into the button lights up in auto mode.

6.1.6 Operating buttons F1-F3

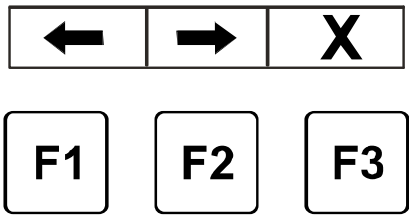
Depending on the window or menu in which you are currently located, function buttons F1 to F3 have different assignments.
Their relevant function is clearly described using a symbol above them in the display, making navigation in the individual menus clear and simple.
A blank text field above a function button means that this has no function in the current menu.



In the operating window, the buttons have the following functions:
Function of button F1 (here: calling up sensor selection)
Function of button F2 (here: calling up the view menu)
Function of button F3 (here: calling up the user menu)



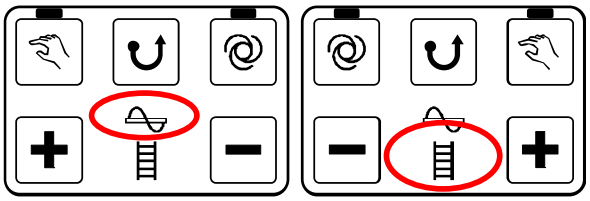
Button assignment in the operating window …



… and in the user menu

6.1.7 The auger and conveyor operating buttons

As has already been described, two identical functions blocks, which are merely distinguished by a backlit symbol in the centre of the relevant button block, are available for controlling the auger and the conveyor.



Otherwise, operation of the auger and conveyor control system is completely identical.

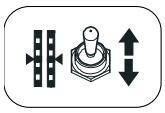
Manual button:
The MANUAL button switches the auger or conveyor drive to manual mode.
In this case, the auger or the conveyor runs at maximum speed.
The function LED integrated into the button indicates to the user that this mode is currently active.
The button is pressed again for deactivation.
Activation of manual mode additionally ends any AUTO mode which may previously have been active.

Reverse button:
The REVERSE button switches the auger or conveyor drive to so-called "reverse" mode, i.e. the auger or the conveyor runs in the opposite direction in this case.
Reverse mode is only maintained as long as the button is kept depressed, and ends automatically on releasing the button.

Auto button
The AUTO button switches the auger or conveyor drive to auto mode.
In this case, the auger runs at a speed proportionate to the sensor distance.
The function LED integrated into the button indicates to the user that this mode is active.
The button is pressed again for deactivation.
Activation of auto mode additionally ends any manual mode which may previously have been active.
If the "auger" or "conveyor" display menu is not active at the point in time at which the button is pressed, the menu is automatically started.

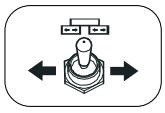
The plus and minus buttons:
In automatic mode, the plus button and the minus button are used to change the nominal control value.
If the "auger" or "conveyor" display menu is not active at the point in time at which the button is pressed, the menu is automatically started.

6.1.8 Traction point adjustment toggle switch



The screed can be moved to the desired working position using the toggle switch.
In manual mode, the toggle switch moves the traction point in the relevant direction of actuation.
The toggle switch has no function in automatic mode.

6.1.9 Screed width toggle switch (left and right)



The screed width on the left- and right-hand sides can be shifted using the toggle switch.

6.1.10 The horn operating button

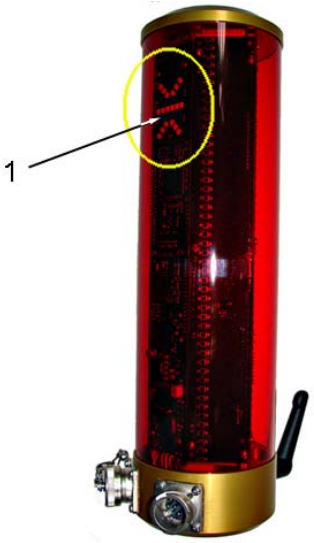
An acoustic signal is sounded by actuating the horn.

6.2 The display elements of the prop. laser receiver

The laser receiver is equipped with an LED arrow (1) - similar to that on the remote control.

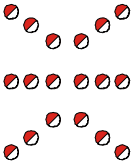
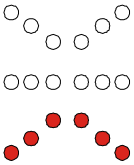
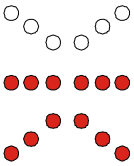
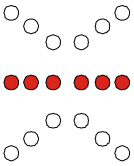
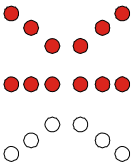
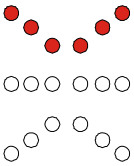
Depending on the operating mode to which the remote control to which it is connected is set, the function of the laser receiver LED arrow differs.

In "manual" operating mode, it serves as a positioning aid; in "automatic" operating mode, it indicates the status of the valve outputs.



Displays of the prop. laser receiver in the manual mode“

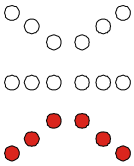
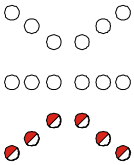
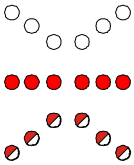
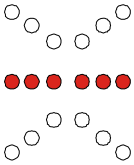
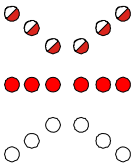
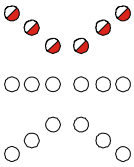
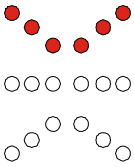
In "manual" operating mode, the laser receiver LEDs are used to indicate to the operator how the sensor has to be shifted so that the laser beam hits the reception area centrally.
They serve as a positioning aid.

Display	Variance	Action
	No laser beam hits the receiver;	
	The laser beam hits the receiver above the centre;	Shift the laser receiver or mast up;
	The laser beam hits the receiver max. 2 cm above the centre;	Shift the laser receiver or mast up slightly;
	The laser beam hits the receiver centrally;	
	The laser beam hits the receiver max. 2 cm below the centre;	Shift the laser receiver or mast down slightly;
	The laser beam hits the receiver below the centre;	Shift the laser receiver or mast down;

Legend: ○ = LED is off ◪ = LED flashes ● = LED is on

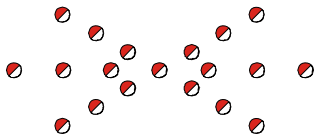
Displays of the prop. laser receiver in the automatic mode

In "automatic" operating mode, the laser receiver's LEDs are used to make the status of the relevant, actuated valve output visible to the operator.
They now work in-line with the LED arrow on the remote control.

Display	Control variance	Controller output
	Large control variance	RAISE controller output constantly on
	Medium control variance	RAISE controller output runs through cycle with large pulse width
	Small control variance	RAISE controller output runs through cycle with small pulse width
	No control variance	Controller outputs not activated
	Small control variance	LOWER controller output runs through cycle with small pulse width
	Medium control variance	LOWER controller output runs through cycle with large pulse width
	Large control variance	LOWER controller output constantly on

Legend: ○ = LED is off ◪ = LED flashes ● = LED is on

6.3 Malfunction displays



= LED flashes

If all of the LED arrow's LEDs flash simultaneously on the remote control, a malfunction is present.
Often, these malfunctions do not involve genuine defects but indicate an attempt to operate the vehicle under impermissible conditions.
Information on malfunction rectification can be found in the description of work with the various sensors and in the section entitled "Help in the event of malfunctions".

6.4 Levelling system operating modes

Manual mode
In "manual" operating mode, the screed is moved directly using the up/down buttons on the remote control.

Automatic
In "automatic " operating mode, the nominal value for the relevant control circuit is changed using the up/down buttons on the remote control.
If comparison of the measured actual value and the set nominal value results in a difference, the remote control independently actuates the outputs until this difference has been compensated.

Flashes

Semi-automatic [1]
In "semi-automatic " operating mode, the nominal value for the relevant control circuit can be changed using the up/down buttons on the remote control.
However, the screed is not actuated, as the outputs are locked in this operating mode.

Locked
In "locked" operating mode, the higher-level control system has locked all control circuits.

[1] This operating mode occurs when the higher-level control system has deactivated regulation, e.g. when the vehicle is stationary, or if the optional operating variant with semi-automatic mode has been activated in the parameter menu (also see next page).

6.5 Levelling system operating variants

In the basic configuration set by the manufacturer, operation of the remote control can be set to three different variants. This operation then differs as follows:

6.5.1 Standard operation

In **"automatic"** operating mode, nominal value adjustment using the up/down buttons is carried out in **1 mm** steps as long as the relevant button remains depressed.
In this case, the screed is moved by the control system as specified.
The changed nominal value is shown on the display.

By simultaneously pressing the enter button together with the up button or the down button, the displayed nominal value can be changed without influencing the position of the screed.

6.5.2 Operation with semi-automatic

In **"semi-automatic"** and **"automatic"** operating modes, nominal value adjustment using the up/down buttons is carried out continuously in **1 mm** steps as long as the relevant button remains pressed.
In **"semi-automatic"** operating mode, the screed is not initially actuated, as the outputs are locked in this operating mode.
If the system is switched from "semi-automatic" operating mode to **"automatic"** operating mode, the outputs are released and the screed is moved by the control system as specified.
The changed nominal value is shown on the display in both operating modes.

By simultaneously pressing the enter button together with the up button or the down button, the displayed nominal value can be changed without influencing the position of the screed.

Switching between the "manual", "semi-automatic" and "automatic" operating modes is carried out in sequence using the auto/manual button.

6.5.3 Operation with auto zeroing

In **"automatic"** operating mode, the nominal value is adjusted by **2 mm** in the corresponding direction each time the up or down button is pressed.
In this case, the screed is moved by the control system as specified.

After 5 seconds, the value on the display is automatically accepted as the zero point, i.e. the nominal value and the actual value are both set to 0.0.

The description of operating the different sensors in these instructions is based on standard operation of the remote control.
Specific differences in the operating variants (such as e.g. the additional "semi-automatic" operating mode or the different step size during nominal value adjustment) have no influence on the principle operating procedure.

6.6 Special levelling system functions

6.6.1 Direct menu changeover

Definition

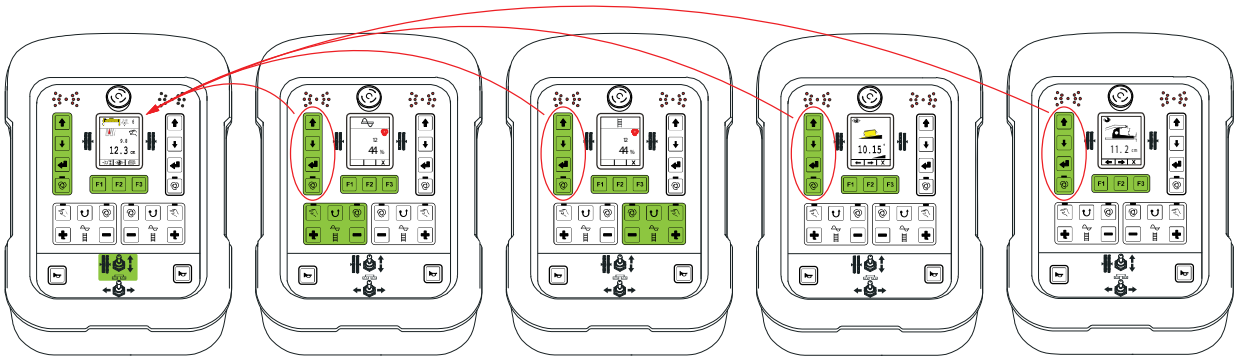
Levelling system operation is usually required during paving.
If the remote control is not set to the operating window for the levelling system, the currently displayed menu must first be ended by pressing button F3.
Alternatively, a 2nd variant is available for switching the display to the levelling system operating window.
By pressing any levelling system button assigned to the side, the display immediately switches to the levelling system menu.

Precondition

This type of direct switching to the levelling system menu only functions in the case of one of the following menus:

- **Auger**
- **Conveyor**
- **Lateral slope display**
- **Layer thickness display**

If the remote control is set to the one of the specified menus, the display is switched to the levelling system operating window by pressing any levelling system button.



E.g. direct return in the case of the left remote control.

To avoid undesired changes to the levelling system during this changeover, this first push of a button only ever leads to a return.
After switching to the operating window, the buttons have their described levelling system functions again.

Exception: "auto button":

Each time it is pressed, the auto/manual button always switches directly between the two manual and automatic modes.

6.6.2 Cross operation

Definition

Cross operation refers to "crossover operation" of the levelling system. This special operating variant enables the levelling system on the other side of the screed to be "remotely controlled". The advantage of this is that the operator does not have to move to the other side of the screed to operate the opposite side (e.g. traction point adjustment, nominal value change, …).

Precondition

Cross operation is based on the "direct menu changeover" described above, i.e. both remote controls must be set to one of the following menus:

- **Levelling**
- **Auger**
- **Conveyor**
- **Lateral slope display**
- **Layer thickness display**

If one of the remote controls is set to a different menu, cross operation does not function.

Modes

Cross operation can be enabled from the dashboard in various modes.

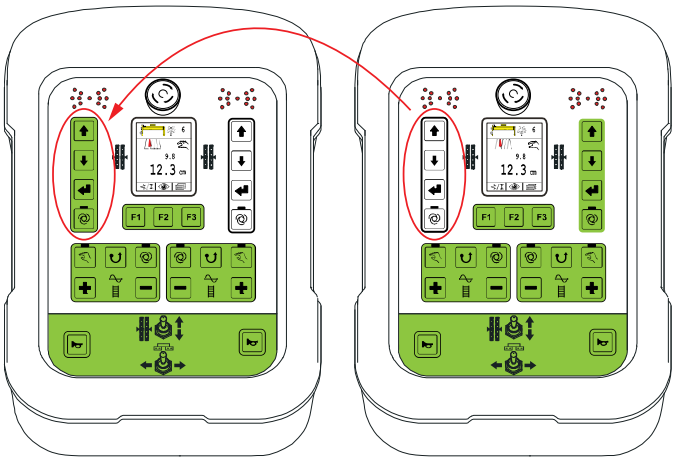
0 no cross operation possible
1 only display on the other side
2 display and operation on the other side
3 simultaneous display of both sides

Mode 0:
No cross operation is possible in this mode.

Mode 1&2:
In mode 1, it is only possible to show the display for the other side, while in mode 2 direct operation is also possible.
As mode 1 and mode 2 differ just in this one point, the following description refers to mode 2:

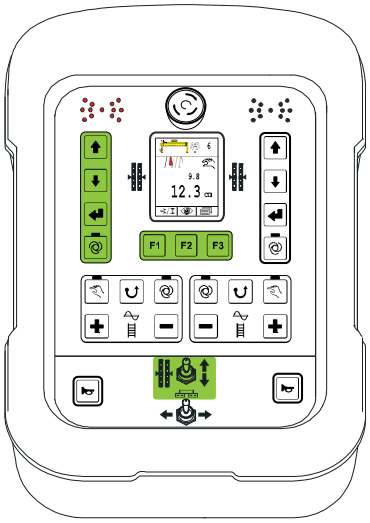
The following example describes how the right-hand remote control remotely controls the left-hand remote control - cross operates it.

Cross operation in the opposite direction is carried out in-line with this.

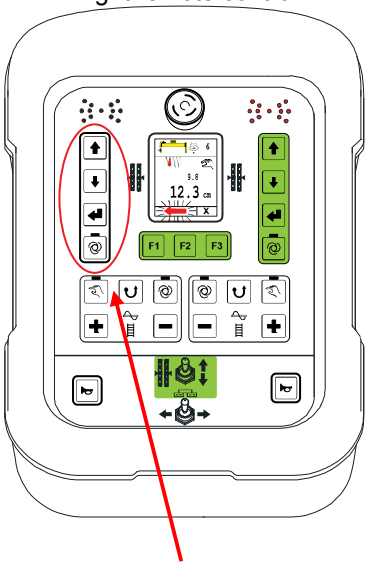


Switching the display over:

Left remote control



Right remote control

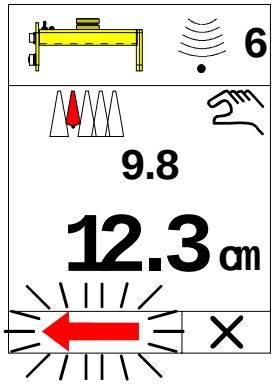


If, under the above described preconditions, any button on the left levelling system block is pressed, the right remote control's display switches to the levelling system on the left-hand side.

I.e. the display now shows the sensor used on the other side plus its actual and nominal values.

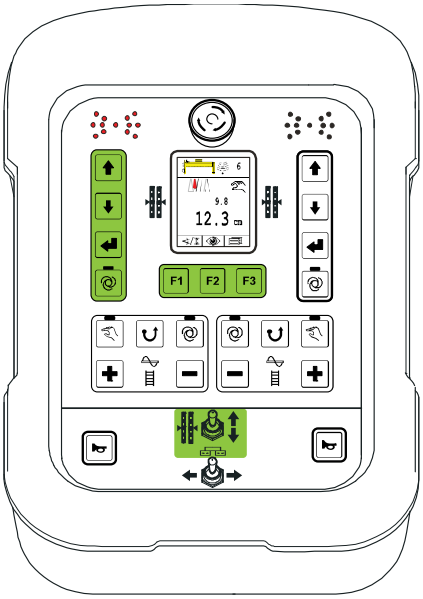
To avoid undesired changes to the levelling system during this changeover, this first push of a button only ever leads to the activation of cross operation. The buttons only have their described levelling system functions again after switching to the operating window on the other side.

To prevent confusion from occurring during operation, a red, flashing arrow appears in the display during active cross operation, pointing to the other, "cross operated" side.

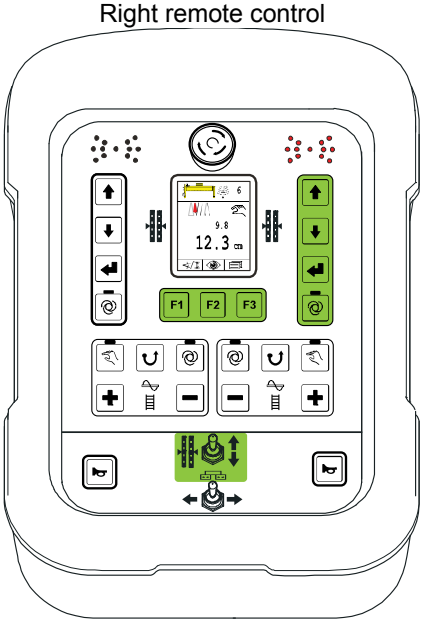


Ending cross operation:

Left remote control



Right remote control



- If the levelling system operating window on the left remote control is exited, this automatically leads to the cancellation of cross operation.
  I.e. switching to the auger, conveyor, etc. menu immediately leads to cancellation.

- Ends automatically after 5 sec.
  If no button on the left levelling system button block is actuated within this time, cross operation ends itself automatically due to safety reasons.
- Press button F3 (cancellation).
- Press any button on the right levelling system button block.
- Press any button on the conveyor button block.
- Press any button on the auger button block.

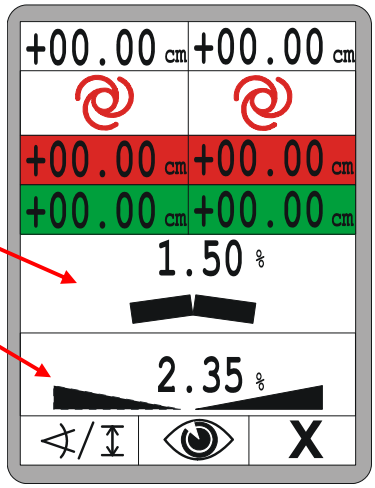
On completion of cross operation, the flashing arrow disappears and the display again shows the values for the right-hand side.

Mode 3:

In this mode, both sides of the levelling system are displayed at the same time.
It is also possible to operate both sides in parallel.

In addition, the crowning slope is also displayed. (If the corresponding sensors are present in the system).

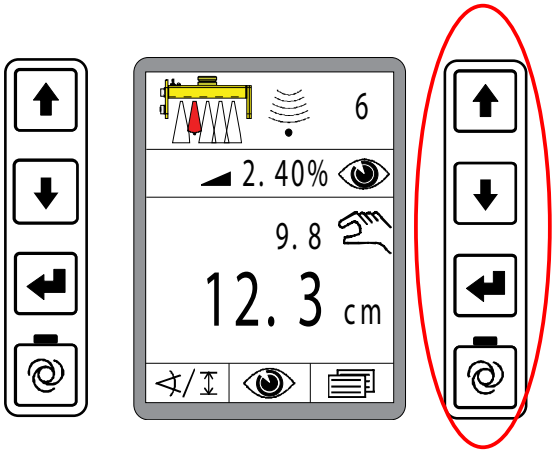
The only way to return to the working menu is by pressing F3 (cancellation).
In contrast to mode 2, there is no automatic time reset.



The display for two separate control circuits is described below in greater detail.

6.6.3 Display of 2 separate control circuits

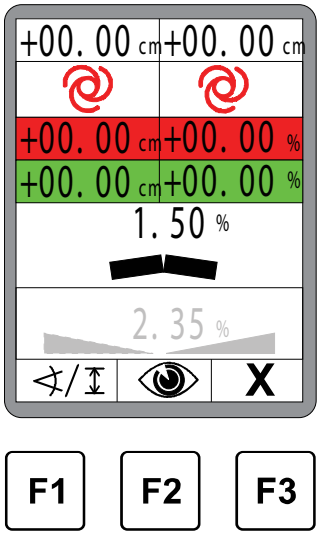
Press any button for the "other" side to activate the menu with 2 control circuits.
Pressing the first button for actuation does not bring about any adjustment.



The user can configure the working menu with the display of two control circuits.

The "current" side is always configured with the levelling system.

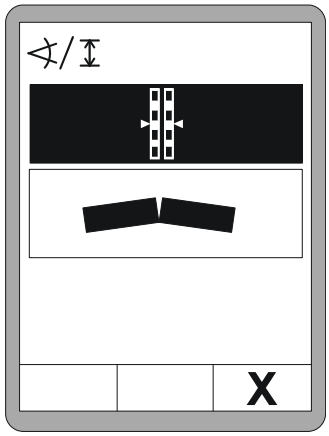
The "other" side can be configured with F1 e.g. with levelling or with the control circuit for the crowning, as when making the sensor selection.



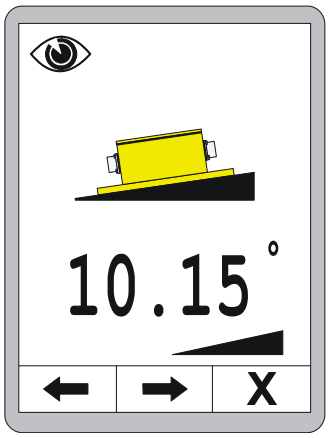
F1 selects the second control circuit (levelling or crowning).

Levelling of the "other" side is the default setting.

The current side is always fixed.

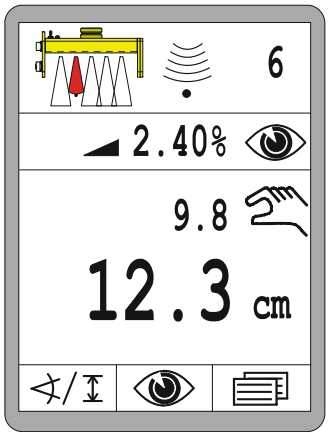


Press F2 to go to the view menu.



The various windows in the view menu are described in detail in point "8.7 View menu".

Press F3 to end the two-column visualisation and go back to the normal working menu.



As well as activating the second control circuit by pressing any button of the "other" side as described above, the display of 2 separate control circuits can also be activated directly from the crowning (see 8.8 Crowning menu).

7 Installation and initial commissioning

General

Installation of the hardwired components, assembly of the brackets for the various sensors and initial system commissioning are carried out by the manufacturer.
The manufacturer has already adapted the controller parameters to the vehicle's valves and hydraulic system.

7.1 Safety instructions

Installation and initial commissioning of the product is carried out only by the manufacturer's staff or by authorised representatives of the manufacturer.

CAUTION!

Danger due to incorrect installation and initial commissioning!
Unauthorised vehicle conversions due to the installation of the product and mistakes during installation may impair the function and safety of the vehicle, therefore leading to hazardous situations or material damage.

Therefore:
- Have installation and initial commissioning carried out exclusively by personnel with the required qualifications.
- Observe the vehicle manufacturer's instructions!
  If insufficient instructions are available, contact the vehicle manufacturer prior to installation.
- On completion of the work, immediately reinstall or reactivate safety and protective facilities which have had to be removed or deactivated for installation.

8 Operation in general

General

The descriptions contained in this section are intended to guide you when operating the product as operating or production equipment. This includes

- Safe operation of the product
- Exploitation of the possibilities offered by the product
- Economical operation of the product

8.1 Safety instructions

The product may only be operated by trained persons.

Basic information

WARNING!

Danger due to improper operation!

Improper operation may lead to severe personal injury or material damage.

Therefore:
- Have the product operated exclusively by personnel with the required qualifications.
- Carry out all operating steps in accordance with the information contained in these operating instructions.

Only use the product for the purposes specified in the section entitled "Proper use".

8.2 Initial steps

The chapter entitled "Initial steps" contains information on switching the system on and a description of sensor selection.

Before switching on

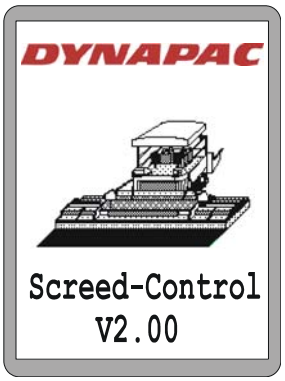
Visually inspect the remote control, the sensors and the cables each time before switching on.
Check all system components for obvious damage, and to ensure that the connection cable connections are securely seated and correctly installed.
Make sure that no persons or objects are located in the area of the screed or other moving parts when switching on.

8.2.1 Switching on

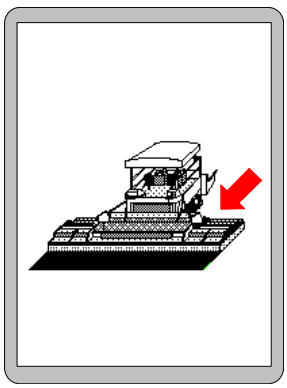
Switch on the supply voltage.

The activation message initially appears for approx.4 seconds.

If any button is pressed during the activation message, the version number of the software appears on the remote control display for approx. 4 seconds.



The side recognition is then shown for approx. a further 4 seconds. The side recognition indicates the side of the screed into which the remote control is plugged.
If any button is pressed during the activation message, the version number of the software appears on the remote control display for approx. 4 seconds.

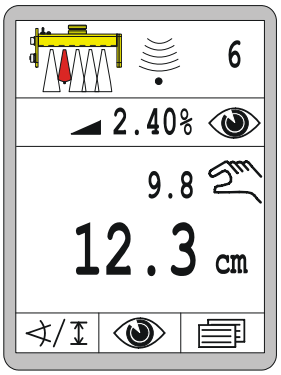


Note on side recognition:

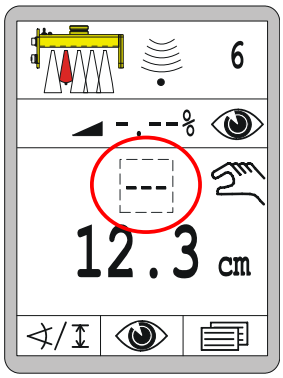
Correct side recognition is important for error-free interaction of the two remote controls, left and right.

Therefore: • *Make* sure *that side recognition takes place correctly when starting up the system.*

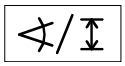
If the sensor with which work was last carried out is connected again, the view in the display then switches to the operating window



If the sensor which was last used has been changed over or disconnected, the remote control indicates this with the symbol shown below in the operating window.
When switching on, it should be pointed out to the user that the sensor is no longer available.
Select another sensor or check why the sensor is no longer available.



8.2.2 Sensor selection

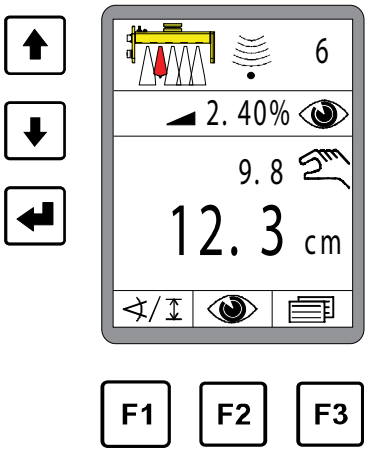


If the sensor which was last used has been exchanged for a different sensor or several sensors are perhaps connected to one side at the same time, the sensor desired for the relevant operation can be selected in "Sensor selection".
Sensor selection is only available in "manual" operating mode.

The active sensor is changed as follows:

Call-up:

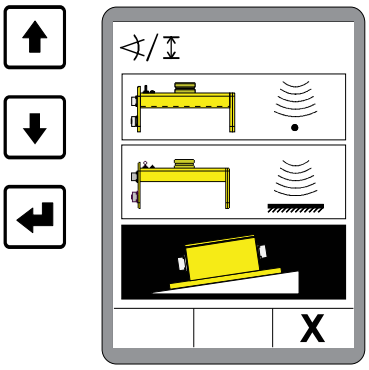
Press function button F1 (⊲/↧) in the operating window.



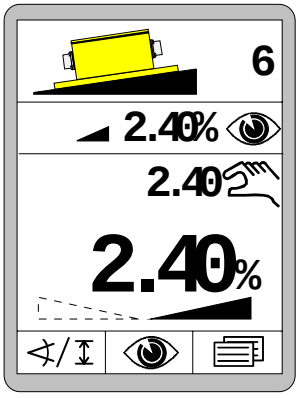
- The sensor selection window opens.
- The ⊲/↧ symbol appears at the top left of the window.

Select another sensor using the up/down buttons. If more sensors than fit in the display are connected, the system automatically scrolls forwards.

- The selection has a black background.
- Confirm the selection with the enter button.



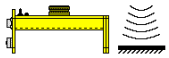
The new sensor is ready to operate.

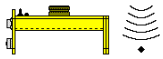


Overview of sensor symbols

The following sensors are available when the system is fitted with the maximum equipment:

No sensor


Sonic-Ski® plus *SKIS-1500* in ground sensing


Sonic-Ski® plus *SKIS-1500* in cable sensing


Digi-Slope Sensor *SLOS-0150*


Digi-Rotary Sensor *ROTS-0300*

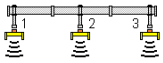

Dual-Sonic Sensor *DUAS-1000*


Prop. laser receiver *LS-3000*

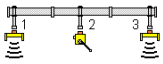

5-channel laser receiver


Prop. laser receiver with Power Mast *ETM-900*

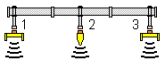
5-channel laser receiver with Power Mast *ETM-900*



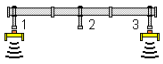
Big Sonic-Ski® from *SKIS* / *SKIS* / *SKIS*



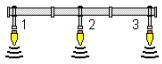
Big Sonic-Ski® from *SKIS* / *ROTS* / *SKIS*



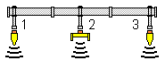
Big Sonic-Ski® from *SKIS* / *DUAS* / *SKIS*



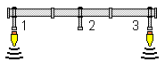
Big Sonic-Ski® from *SKIS* / *n.c.* / *SKIS*



Big Sonic-Ski® from *DUAS* / *DUAS* / *DUAS*



Big Sonic-Ski® from *DUAS* / *SKIS* / *DUAS*

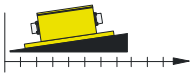


Big Sonic-Ski® from *DUAS* / *n.c.* / *DUAS*

3D GNSS

3D TPS

3D GNSS/TPS Slope


Travel-dependent slope control

8.3 Modification

For sensor exchange, set-up work or work on the sensors, always switch the remote control to "manual" operating mode.

8.4 Switching off

Due to safety reasons, the remote control is always initially switched to "manual" operating mode on switching off, even if "automatic" operating mode was switched on when the system was switched off.
Nevertheless, always switch the remote control to "manual" operating mode when leaving the vehicle.
During long work breaks and at the end of work, the voltage supply must be disconnected and the system removed or reliably secured to prevent reactivation.

8.5 Auger menu

Different operating modes are available for the auger drive's control system.
The Screed Control System described in these instructions uses a material sensor to determine the distance from the material and monitors all button operations on the corresponding keypad block.
These two sets of information are transmitted to the higher-level control system, where they are processed. Overall control in the various modes is also carried out by this higher-level system.

The various modes will nevertheless be described in the following.

8.5.1 MANUAL control system

- In this mode, the auger is actuated at full speed.
- The manual button has 2 functions:

Resting function

- Turning the manual button briefly activates the mode.
- A green function LED integrated in the button shows the user that this mode is currently active.
- Activating the manual mode also terminates any hitherto active automatic mode.
- The manual button is pressed again for deactivation.
- Activation of the AUTO mode also ends manual mode.

Button function

- If the manual button is pressed and held, the auger only runs for as long as the button is held. If the button is released again, the auger stops automatically.

Display

- The manual mode does not need its own separate display message.

8.5.2 AUTO control system with material sensor

Function

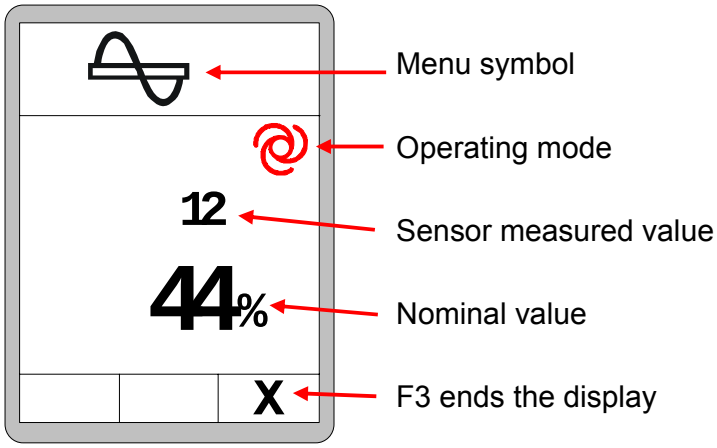
- A material sensor mounted on the side board measures the distance up to the material conveyed by the auger.
- In AUTO operating mode, the control system's objective is to keep this distance constant so that sufficient material is always available in front of the screed.
- To achieve this, the actual value measured by the sensor is constantly compared with the input nominal value. The difference between these two values is the so-called control variance.
- The auger is actuated proportionate to the calculated control variance.

Switching on

- This mode is activated by pressing the AUTO button.
- The green function LED integrated into the button indicates to the user that this mode is currently active.
- Activation of AUTO mode additionally ends any MANUAL mode which may previously have been active.
- The nominal value can be changed using the "+" and "-" buttons.

Display

- The display only switches automatically to the auger window when the +/- buttons are pressed.
- When the auto button is pressed, no display appears.



Switching off

- The AUTO button is pressed again for deactivation.
- Activation of MANUAL mode also ends AUTO mode.
- The green function LED in the button is off.

8.5.3 AUTO control system without material sensor

Function

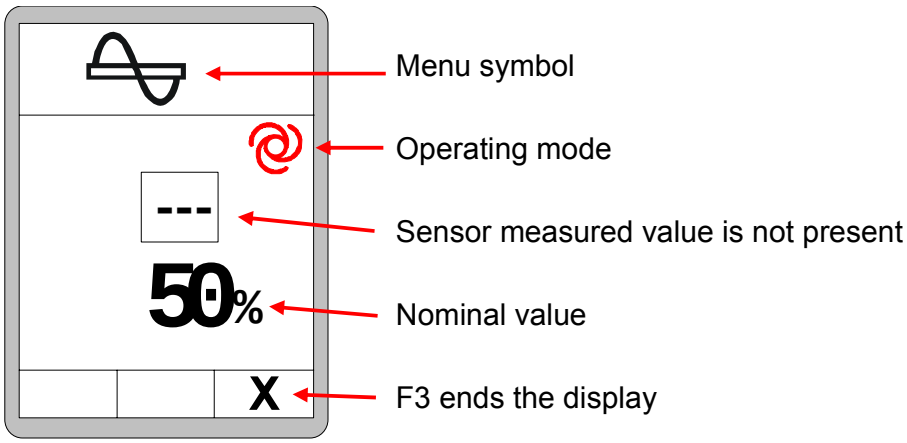
- If no material sensor is connected, AUTO mode has a slightly different function.
- In this case, the auger always rotates at a constant speed.
- This speed can be adjusted via the nominal value.

Switching on

- This mode is activated by pressing the auto button.
- The green function LED integrated into the button indicates to the user that this mode is currently active.
- Activation of the AUTO mode additionally ends any MANUAL mode which may previously have been active.
- The nominal value can be changed using the "+" and "-" buttons.

Display

- The display only switches automatically to the auger window when the +/- buttons are pressed.
- When the AUTO button is pressed, no display appears.



Switching off

- The AUTO button is pressed again for deactivation.
- Activation of MANUAL mode also ends AUTO mode.
- The green function LED in the button is off.

8.5.4 Reverse control system

Function

- In this mode, the auger is actuated at full speed in the reverse direction.

Switching on

- This mode is activated by pressing the "reverse" button.
- Reverse mode is only maintained as long as the button is kept depressed, and ends automatically on releasing the button.

Display

- The manual mode does not need its own separate display message.

Switching off

- The button is simply released for deactivation.

8.6 Conveyor menu

Different operating modes are available for the conveyor drive's control system.
The Screed Control System described in these instructions monitors all button operations on the corresponding keypad block.
This information is transmitted to the higher-level control system, where it is processed. Overall control in the various modes is also carried out by this higher-level system.

The various modes will nevertheless be described in the following.

8.6.1 MANUAL control system

- In this mode, the conveyor is actuated at full revs.
- The MANUAL button has 2 functions:

Resting function

- Turning the MANUAL button briefly activates the mode.
- A green function LED integrated in the button shows the user that this mode is currently active.
- Activating the MANUAL mode also terminates any hitherto active AUTO mode.
- The MANUAL button is pressed again for deactivation.
- Activation of the AUTO mode also ends the manual mode.

Button function

- If the MANUAL button is pressed and held, the conveyor only runs for as long as the button is held. If the button is released, the conveyor stops automatically.

Display

- The MANUAL mode does not need its own separate display message.

8.6.2 AUTO control system with material sensor

Function

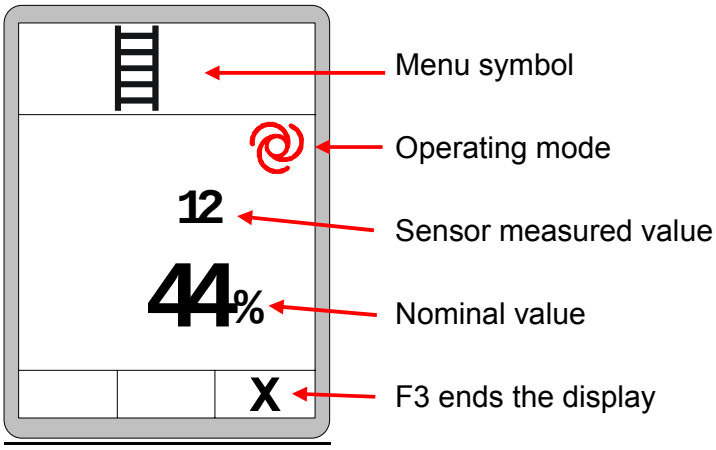
- A material sensor mounted above the conveyor measures the distance up to the material conveyed by the conveyor.
- In AUTO operating mode, the control system's objective is to keep this distance constant so that sufficient material is always available in front of the screed.
- To achieve this, the actual value measured by the sensor is constantly compared with the input nominal value. The difference between these two values is the so-called control variance.
- The conveyor is actuated proportionate to the calculated control variance.

Switching on

- This mode is activated by pressing the AUTO button.
- The green function LED integrated into the button indicates to the user that this mode is currently active.
- Activation of the auto mode additionally ends any manual mode which may previously have been active.
- The nominal value can be changed using the "+" and "-" buttons.

Display

- The display only switches automatically to the conveyor window when the +/- buttons are pressed.
- When the auto button is pressed, no display appears.



Switching off

- The AUTO button is pressed again for deactivation.
- Activating the manual mode also ends AUTO mode.
- The green function LED in the button is off.

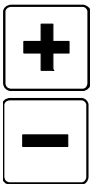
8.6.3 AUTO control system without material sensor

Function

- If no material sensor is connected, AUTO mode has a slightly different function.
- In this case, the conveyor always runs at a constant speed.
- This speed can be adjusted via the nominal value.

Switching on

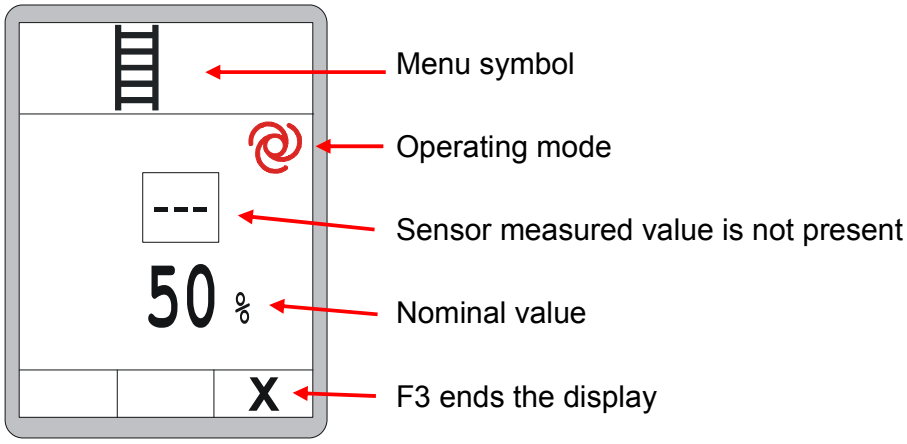
- This mode is activated by pressing the auto button.
- The green function LED integrated into the button indicates to the user that this mode is currently active.
- Activation of the AUTO mode additionally ends any MANUAL mode which may previously have been active.



The nominal value can be changed using the "+" and "-" buttons.

Display

- The display switches automatically to the auger window when the +/- buttons are pressed.
- When the AUTO button is pressed, no display appears.



Switching off

- The AUTO button is pressed again for deactivation.
- Activating the MANUAL mode also ends AUTO mode.
- The green function LED in the button is off.

8.6.4 Reverse control system

Function

- In this mode, the conveyor is actuated at full speed in the reverse direction.

Switching on

- This mode is activated by pressing the "reverse" button.
- Reverse mode is only maintained as long as the button is kept depressed, and ends automatically on releasing the button.

Display

- The MANUAL mode does not need its own separate display message.

Switching off

- The button is simply released for deactivation.

8.7 View menu

Whilst working with any sensor, the measured values of other connected sensors can be viewed without interrupting the control system.

The view menu is always available, irrespective of whether the levelling system is set to "manual" or "automatic" operating mode.

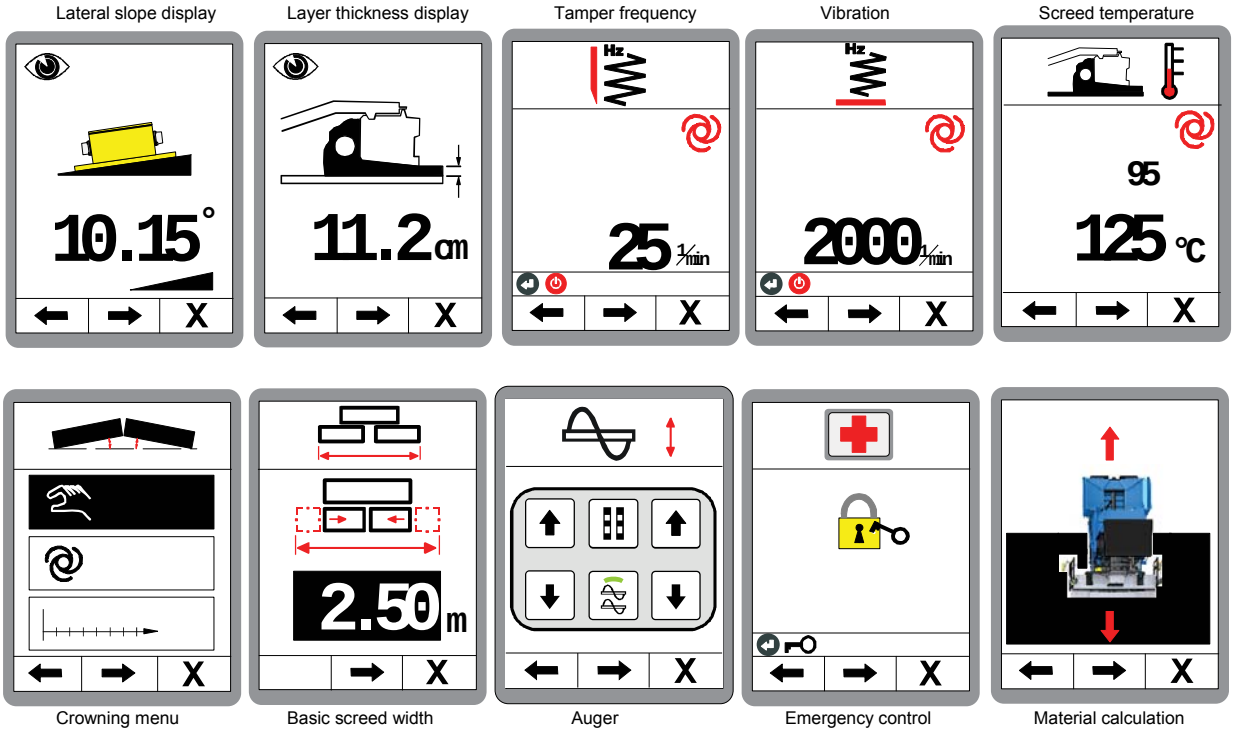
The various windows in the view menu appear as follows:

Call-up:

Press function button F2 () in the standard view.

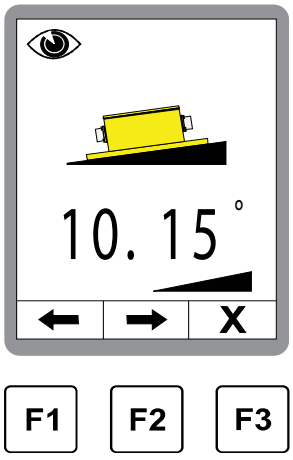
All of the windows in the display menu are described in greater detail below.

Brief overview of the view menu:



The view menu contains many different menus organised consecutively.
Press F1 to go directly to the menus at the end of the list.

<u>Lateral slope display:</u>
The first window shows the current lateral slope.
(Only if a slope sensor is available)



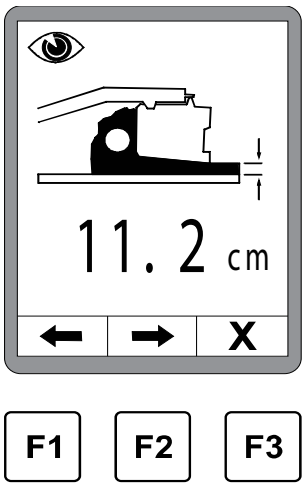
<u>Navigation in the menu:</u>
Navigate through the view menu using function buttons F1 (⬅) and F2 (➡).

<u>End menu:</u>
Press function button F3 (**X**) to exit the view menu.

F1 **F2** **F3**

Layer thickness display:

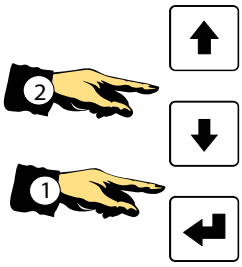
This window appears only if the layer thickness has been activated, and the corr. Sensors are connected.
(See also 8.11.1 Configuration menu)

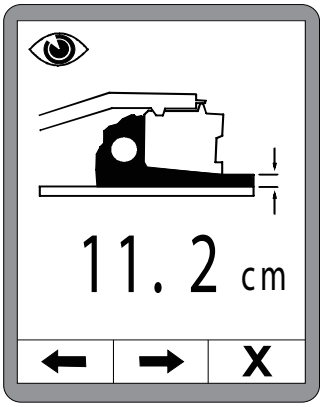


Quick adjustment of the layer thickness display:

Adjustment of the displayed layer thickness as following:

1.) Press and hold ENTER key, and
2.) to adjust the value in parallel with the UP / DOWN buttons.

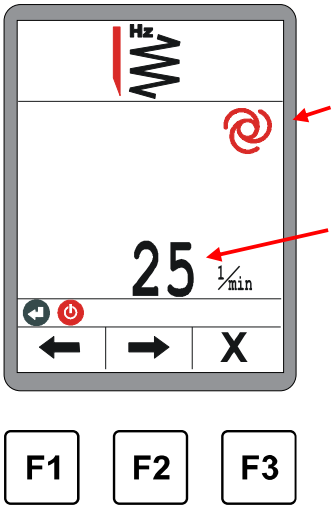




Tamper frequency:
The nominal value can be changed using the up/down buttons.

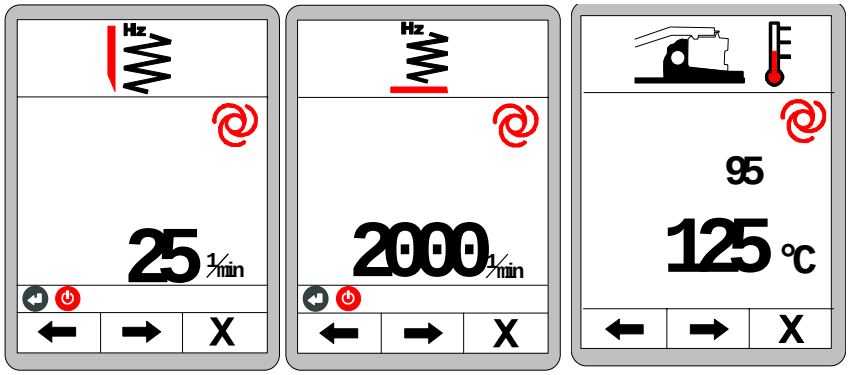
The ENTER button changes over the operating mode of the control circuit.
(Manual <---> Automatic)

ATTENTION! Press any button to accept the adjusted settings.



The other windows in the view menu (tamper frequency and vibration) have the same structure.
The operating mode cannot be changed over in the menu for screed temperature.

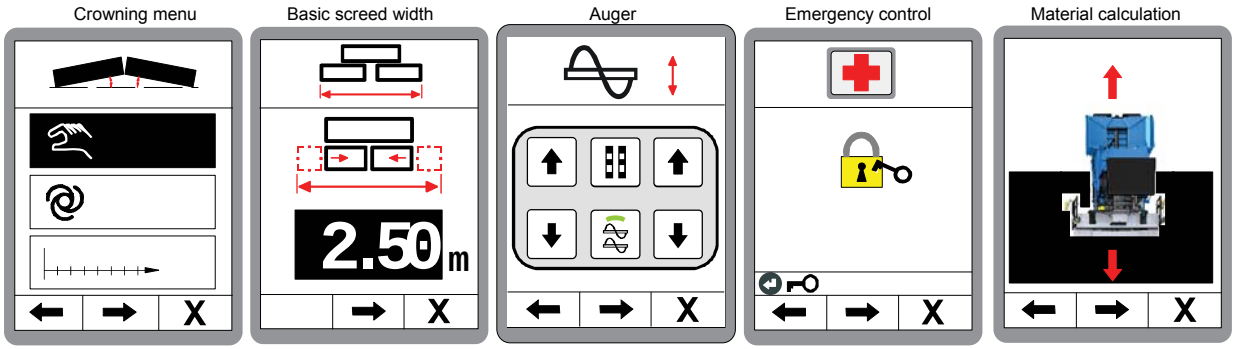
Tamper frequency Vibration Screed temperature



The other menus following on after the crowning menu are fundamentally different and therefore described separately.

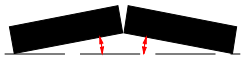
Other menus in the view menu:

Crowning menu Basic screed width Auger Emergency control Material calculation



The following section describes the menus for the crowning, base screed width and for the auger; more information about the emergency control and material calculation can be found in chapters 10 and 11.

8.8 Crowning menu

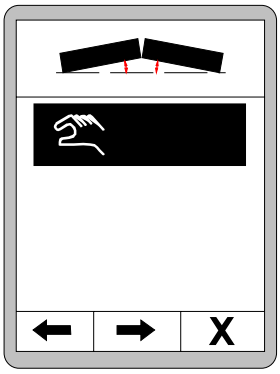


Crowning control can be carried out in 3 different operating modes.

- Manual adjustment
- Auto adjustment
- "Travel-dependent" adjustment

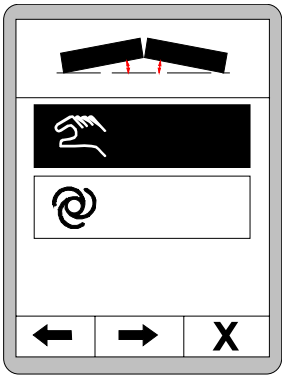
The selection menu has a differing structure to take account of the fact that the auto adjustment and the travel-dependent adjustment can only be activated under certain conditions.
The selection menu may appear as follows:

Only manual adjustment can be selected in the menu.



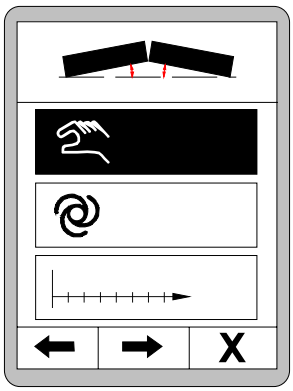
Function:
Manual adjustment involves direct adjustment of the crowning at the push of a button.

If a crowning sensor is connected, auto adjustment can also be selected.



Function:
Auto adjustment automatically adjusts the crowning to a previously input slope.

The 3rd menu item, "travel-dependent" adjustment, can also be selected with a connected crowning sensor and the travel information transmitted by the vehicle.



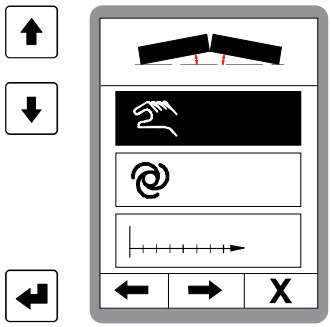
Function:
"Travel-dependent" adjustment controls the crowning step-by-step over an input distance.

8.8.1 Manual control system

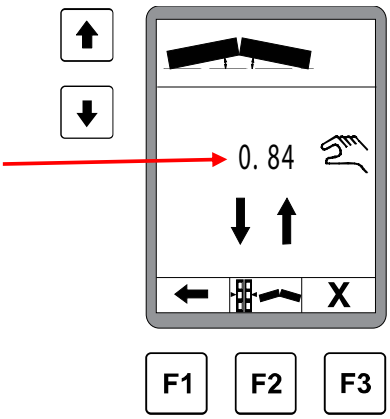
Navigate to the crowning in the view menu.

Select manual adjustment using the up/down buttons.

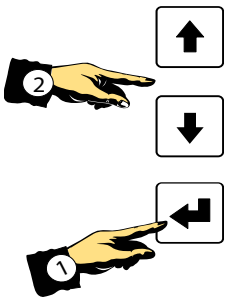
Confirm the selection with the enter button.



ATTENTION!
The crowning is adjusted directly by pressing the up/down buttons!
If a crowning sensor is present, the currently measured value is shown.



Special function crowning - actual value reset:
The crowning sensor must always be calibrated when putting into operation (initial installation or when replacing the sensor).
Even so, when the screed is under load it is still possible for it to adjust to a value that deviates somewhat from the calibration.
The displayed actual value can be adjusted to correct this offset.
To this end, adjust the actual value to the correct setting, using the two up/down buttons (2) while holding the input button (1).



If no crowning sensor is available, no current value is displayed.

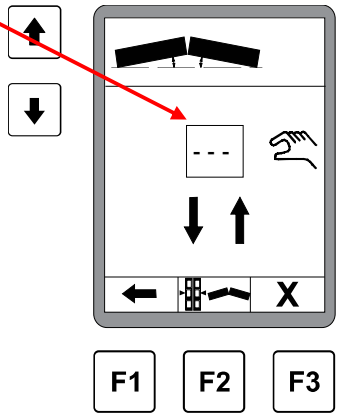
Crowning adjustment can still be carried out using the up/down buttons.

Press function button F1 to return to the crowning selection window.

Press function button F2 to activate the display with 2 control circuits.

Here it is possible to show the crowning control and levelling at the same time.

Press F3 to cancel the process and to return to the main menu.

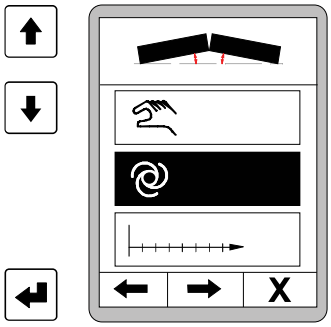


8.8.2 Auto crowning adjustment

Auto adjustment can only be selected if a sensor is available.

Select auto adjustment using the up/down buttons.

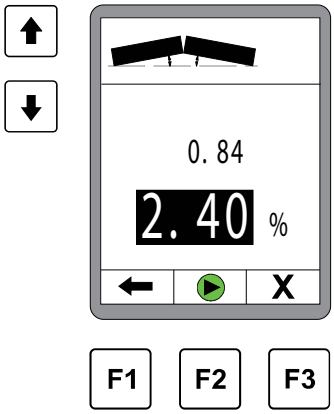
Confirm the selection with the enter button.



Use the up/down buttons to set the nominal value to the desired crowning slope.

Function button F3 can be used to cancel the process at any time.

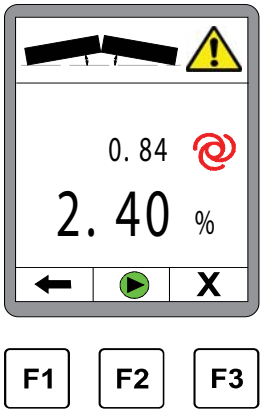
Press button F2 to start adjustment …



… the window for the security prompt appears.

Adjustment to the previously set nominal value only takes place when start button F2 is pressed again.

ATTENTION!
The crowning is now adjusted directly to the set value by the control system!

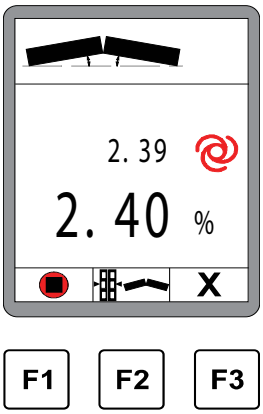


Press the stop button F1 to cancel the control.
F2 activates the display with 2 control circuits.

Here it is possible to show the crowning control and levelling at the same time.

Press function button F3 to exit the crowning menu for the main menu.

In this case, the activated function continues to run in the background. Once the input slope is reached, the function ends itself automatically.

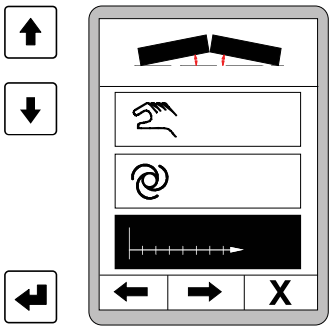


8.8.3 Travel-dependent adjustment

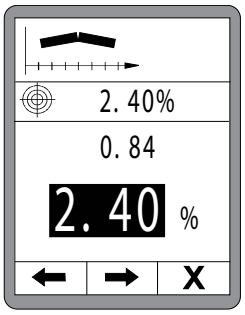
Select "travel-dependent" adjustment using the up/down buttons.

"Travel-dependent" adjustment can only be selected if travel information is available on the bus and the crowning sensor is present.

Confirm the selection with the enter button.



Use the up/down buttons to enter the nominal value for the desired crowning slope.
(This target crowning slope is also displayed in the info line).

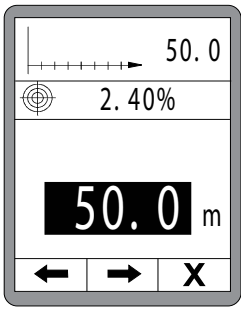


Press button F2 …

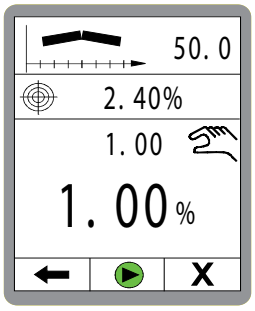
… the travel input window opens.

Use the up/down buttons to enter the distance to which the crowning is to be switched.

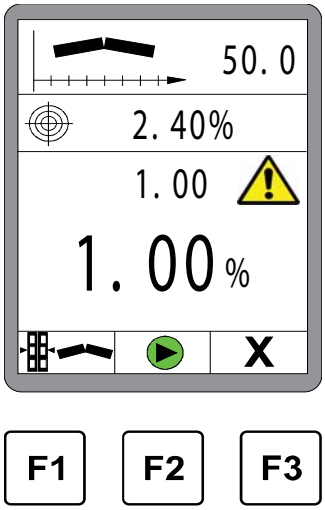
Press F2 again to go to the crowning menu.



F1 = cancellation
F2 = start - Go to Security check
F3 = exit the crowning window to the main menu



Security check:
Only when the start button F2 is pressed again, the travel-dependent roof profile control is activated.



F1 = Change the display with 2 control circuits
F2 = Start
F3 = Exit the crowning window to the main menu

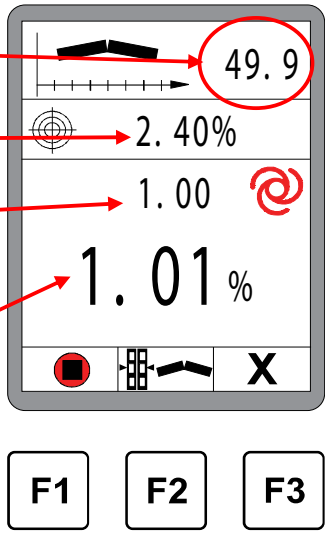
The travel-dependent crowning control is active.
Press the stop button F1 to cancel the control.

During travel-dependent adjustment, the remaining distance to be covered is displayed in the header.

Display of the target value to the end

Currently measured actual value

Nominal value currently calculated for the present position. (Gets gradually closer to the target value when moving forwards.)



F1 = cancellation
F2 = change to display with 2 control circuits
F3 = exit the crowning window to the main menu
(while the activated function continues.)

If the entered distance has been covered (nominal value = target value), the function ends automatically.

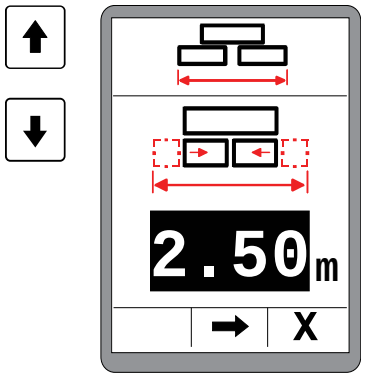
8.9 Basic screed width

This menu is used for input of the basic screed width.
If the system is equipped with screed width measurement, the width entered here together with the two measured Vario screed widths results in the total working width.
To proceed, first retract the screed completely and then measure the total width (= basic screed width + extension parts)

Change values:
Change the brightness with the up/down buttons.

Navigation in the menu:
Navigate through the user menu using function buttons F1 (⬅) and F2 (➡).

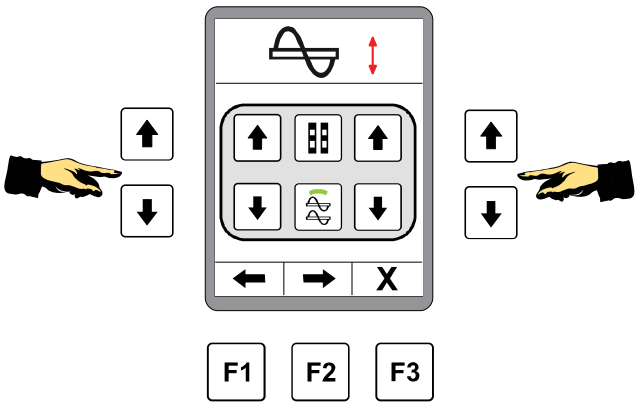
End menu:
Press function button F3 (**X**) to leave the menu.



8.10 Auger height adjustment

This menu is used to raise and lower the auger.

The left auger can be raised or lowered using the up/down buttons of the left button block.
The right up/down buttons are used to raise or lower the right auger.
Navigation in the menu:
Navigate through the menu using function buttons F1 (⬅) and F2 (➡).
End menu:
Press function button F3 (**X**) to leave the menu.



8.11 User menu

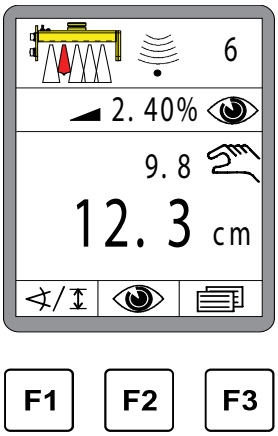
Important parameters and setting options for adapting the remote control and for the behaviour of the control system are summarised in the user menu.

The user menu is available in both "manual" operating mode and "automatic" operating mode.

The following generally applies to operation in the user menu:
Value settings are accepted by pressing any function button.
A selection is accepted directly by pressing the enter button.

Settings are changed as follows in the user menu:

Press function button F3 ( ) in the standard view.

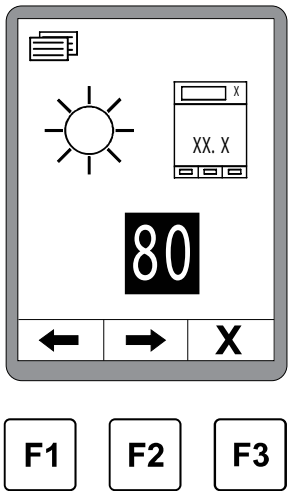


Display brightness:
The first window shows the display brightness setting.

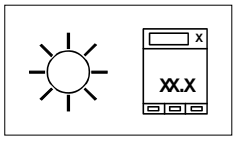
Change values:
Change the brightness with the up/down buttons.

Navigation in the menu:
Navigate through the user menu using function buttons F1 (⬅) and F2 (➡).

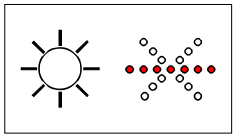
End menu:
Press function button F3 (**X**) to leave the menu.



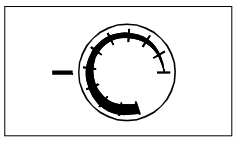
The other windows in the user menu include:



Display brightness
The brightness of the display backlighting can be set to ensure that the display remains clearly legible even in the event of unfavourable light conditions.



LED arrow brightness
The luminance of the LED arrow can also be individually adapted.



Sensitivity
The "sensitivity" parameter defines how quickly and aggressively the levelling system reacts to a variance.
The setting range extends from 1 (low sensitivity) to 10 (high sensitivity).
The numerical values conceal a sensible combination of the "dead band" and prop band" parameters determined in a long series of tests.
The value tables can be found on the following page.
The sensitivity value must be set separately for distance and slope sensors, and is subsequently automatically loaded when a sensor is switched.

If the remote control operates too erratically in automatic mode, the sensitivity of the corresponding remote control must be reduced. If the remote control operates too sluggishly in automatic mode, the sensitivity must be increased accordingly.

In the basic settings, the setting can be changed in such a way that the concealed "dead band" and "prop band" parameters are shown instead of the "sensitivity" parameter. These can then be individually adapted by trained personnel.

Sensitivity tables for the various sensors:

Sensors

- **Sonic-Ski® plus**
- **Big Sonic-Ski®**
- **Dual sonic sensor,**
- **Prop. laser receiver**
- **Power mast with laser receiver**

Sensitivity	Dead band (mm)	Prop band (mm)
1	5.0	18.0
2	4.0	16.0
3	3.6	14.0
4	3.4	12.0
5	3.0	10.0
6	2.4	8.0
7	2.0	6.0
8	1.6	5.0
9	1.2	4.0
10	1.0	3.0

Sensors

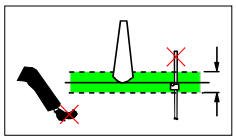
- **Digital rotary sensor**

Sensitivity	Dead band (mm)	Prop band (mm)
1	4.0	18.0
2	3.4	16.0
3	3.0	14.0
4	2.4	12.0
5	2.0	10.0
6	1.4	8.0
7	1.0	6.0
8	0.8	5.0
9	0.6	4.0
10	0.4	3.0

Sensors

- **Digital slope sensor**

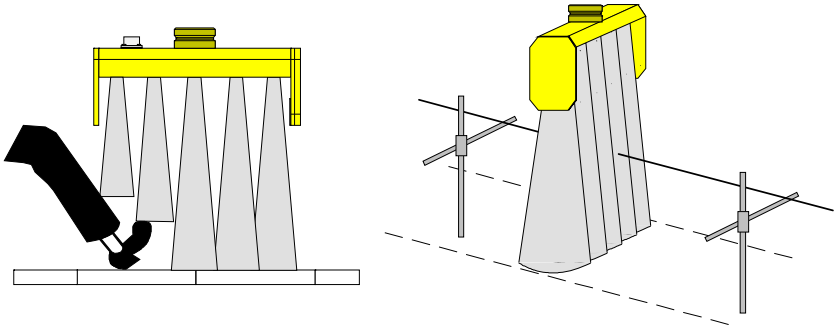
Sensitivity	Dead band (%)	Prop band (%)
1	0.40	1.60
2	0.30	1.40
3	0.20	1.20
4	0.14	1.00
5	0.10	0.80
6	0.06	0.60
7	0.04	0.50
8	0.02	0.40
9	0.02	0.30
10	0.00	0.20



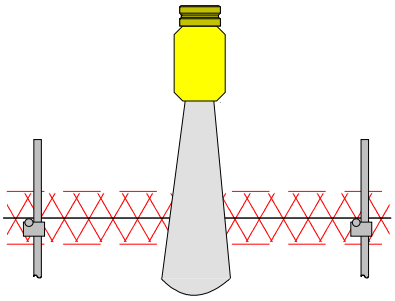
Control window

This menu item is only shown when a distance sensor is currently selected as the active sensor, as it only has an effect on this sensor type.

Transient changes in a sensor's measured value may occur due to diverse reasons. Causes may include both inattentiveness on the part of the operating personnel (obstacles in an ultrasonic sensor's sound beam, driving over a cable bracket, etc.) and technical faults (reference cable torn, etc.).

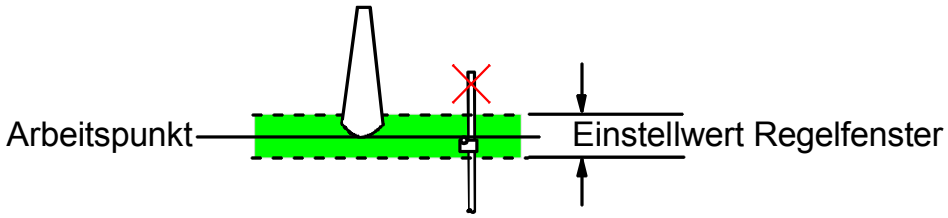


To avoid these undesired measuring errors and the vehicle's resulting, extreme control actions, the measured values of all distance sensors can be placed into a so-called "control window".



If a control variance which occurs is greater than the range set here, this variance is recognised as an error.
In this case, the warning symbol "Measured value outside of control window" appears on the display, the entire LED arrow flashes and hydraulic cylinder actuation is shut-off.

The size of the control window, which is positioned symmetrically around the working point, can be set.
Depending on which physical unit of measurement has been set for distance measurement, the setting is carried out in steps of 0,1cm, 0,1inch or 0,01feet.
The adjusted value for the control window describes the entire area around the working point, i.e. for an input of e.g. 6cm, the control window covers an area of "+/- 3cm" around the working point.



Working point **Control window set value**

The control window function can be called up.
To do this, adjust the value until "--.--" appears on the display instead of a numerical value.

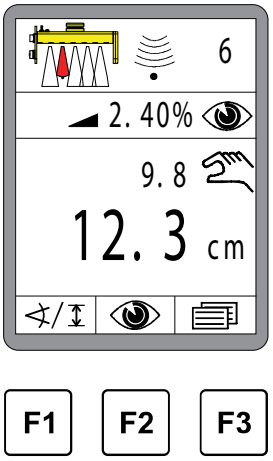
Hydraulic system data record
If the remote control is to be used on different vehicles, hydraulic system parameter settings can be stored by trained, specialist personnel for up to X different vehicle types (the maximum possible number of hydraulic system records may be limited in the system's basic settings).
The saved settings can then be loaded for the relevant vehicle using this menu item.

Changing the hydraulic system data record exerts a direct influence on the control system. It may be the case that your vehicle's control system does not operate or only operates inadequately with another data record – therefore, only change it if you are absolutely certain.
If the hydraulic system data record is changed whilst the system is set to "automatic" operating mode, it automatically switches to "manual" operating mode.

8.11.1 Configuration menu

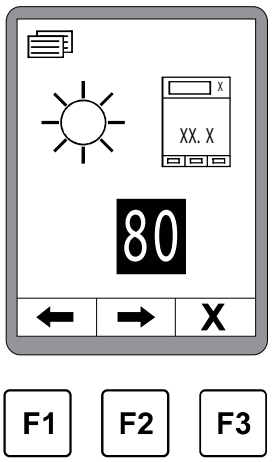
The configuration menu forms part of the user menu.
Here, the sensors' physical units of measurement and the appearance of the operating window are defined and the layer thickness display is configured if necessary (if possible due to the sensor constellation).

Press function button F3 (🗐) in the standard view.



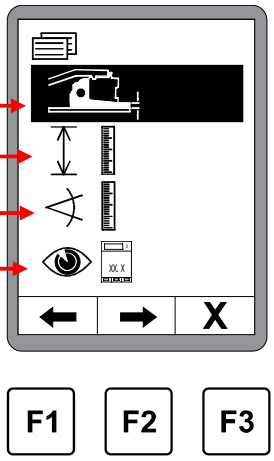
Navigate through the user menu using function buttons F1 (⬅) and F2 (➡) ...

… and switch to the configuration menu.

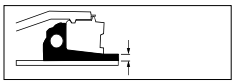


Selectable configurations include:

- Layer thickness display
- Units of measure for distance measurement
- Units of measure for slope measurement
- Configuration of the operating windows



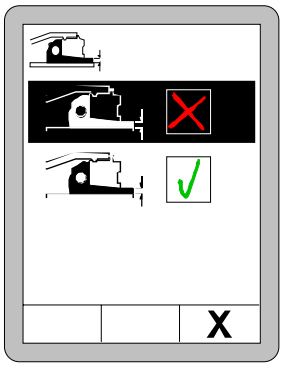
Select the menu item using the up/down buttons.
Confirm the selection with the enter button.



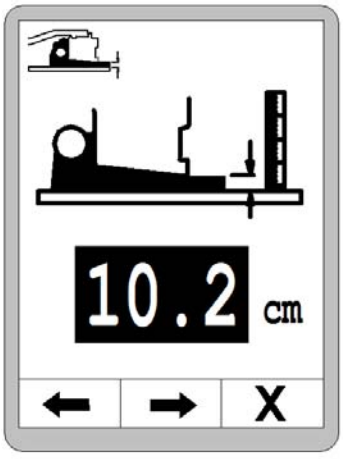
Layer thickness display

The configuration menu's layer thickness display item is only shown if a layer thickness display is at all possible in the display menu due to the current sensor constellation on the CAN bus.

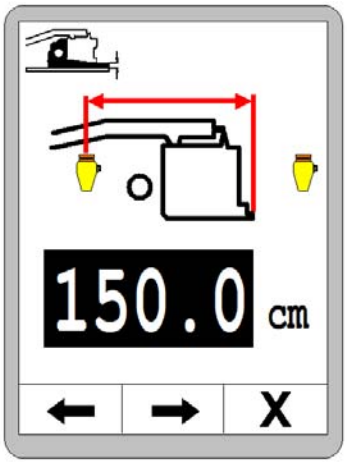
First define whether you would like to activate or deactivate the layer thickness display.



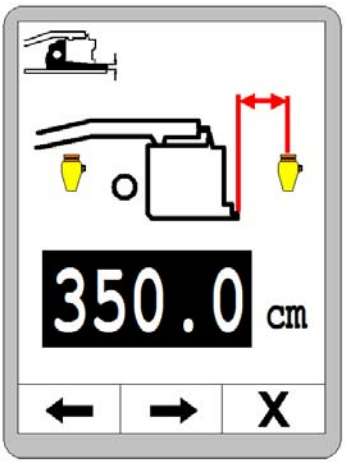
If the layer thickness display has been activated, entering the following parameters is vital for correctly calculating the value:



Currently measured layer thickness.

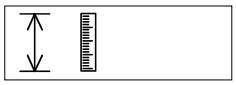


Distance from the rear edge of the screed to the centre of the first sensor.



Distance from the centre of the first sensor to the centre of the second sensor.

Check the layer thickness display during operation and optimise the first parameter "Currently measured layer thickness" if necessary.

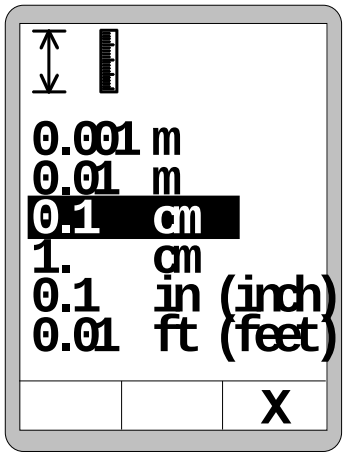


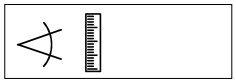
Units of measure for distance measurement

Select the resolution and the physical unit of measurement for the distance measurements from the available alternatives.
The selection made here applies to all distance measurement sensors.

Select the desired unit of measurement using the up/down buttons.

Confirm the selection with the enter button or press function button F3 (**x**) to leave the user menu.



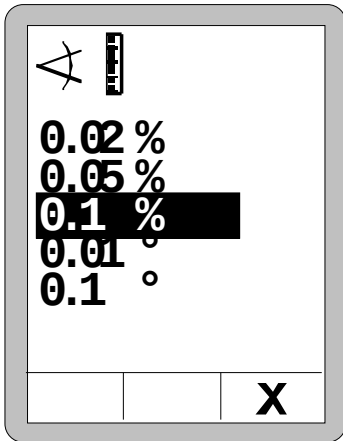


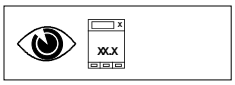
Unit of measurement for slope measurement

Select the resolution and the physical unit of measurement for the slope measurements from the available alternatives.
The selection made here applies to all slope measurement sensors.

Select the desired unit of measurement using the up/down buttons.

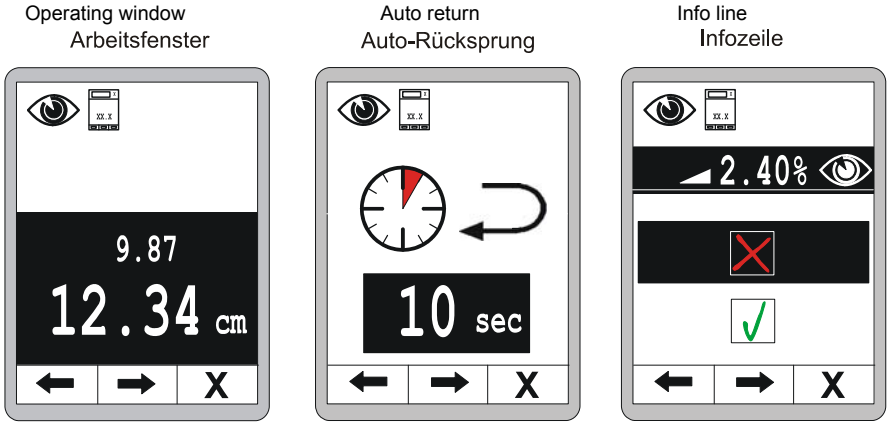
Confirm the selection with the enter button or press function button F3 (**x**) to leave the user menu.





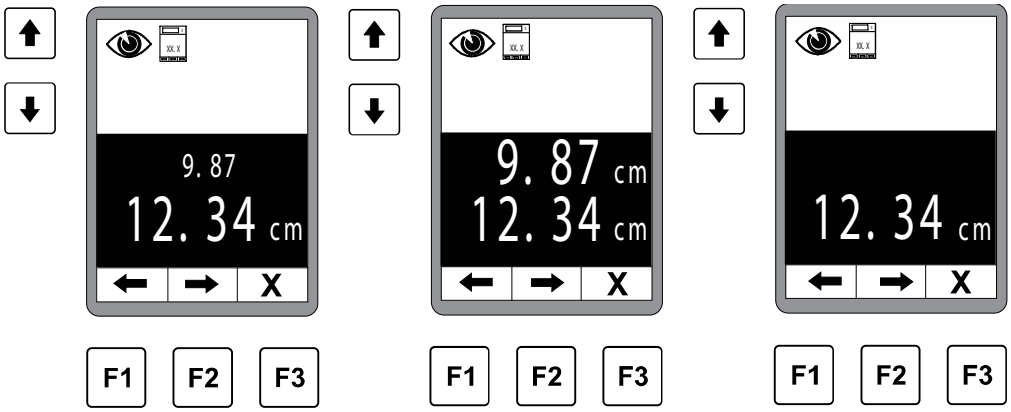
Configuration of the operating windows

The following windows can be customised by the user:



Operating window:

Use the up/down buttons to select the appearance of the operating window from the available alternatives; i.e. the forms for showing the actual value and nominal value.



<u>Standard view</u>
- Actual value small
- Nominal value large

<u>Alternative view</u>
- Actual value large
- Nominal value large

<u>Classic view</u>
"Manual" operating mode
= actual value only
"Automatic" operating mode
= nominal value only

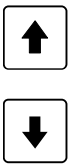
Use F1 and F2 to navigate.

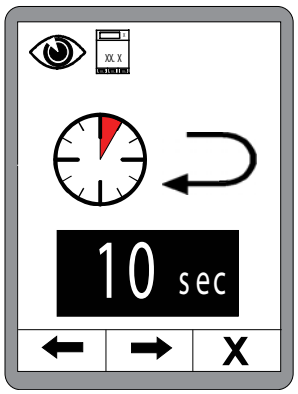
After configuring the operating window, press F2 to go to the next configuration setting.

Auto return:
The next configuration menu can be used to adjust a timed return from the submenus to the main menu.
The range is 0 - 10 sec.

0 = no return
>0 = return time

The default setting is 5 sec.

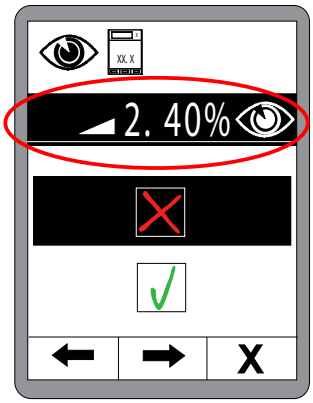




Info line:
Press F2 to go to the next configuration setting, the info line.

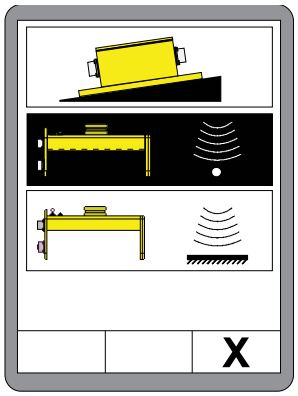
The info line offers additional information to be shown in the normal working menu.

Use the up/down buttons to activate or deactivate the info line.
(default = active)



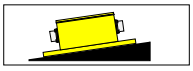
Once you have activated the info line, select the additional information that you want displayed from the following selection menu.

Here is an overview of the variables that can be selected for the info line.

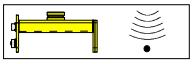


Overview info line

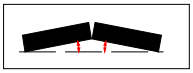
You can select the following values for the info line:



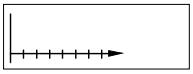
Actual value of the digital slope sensor (= default)



Actual values of all other currently connected sensors, e.g. Sonic-Ski®

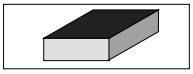


Actual crowning measurement
(if sensor present)

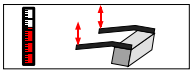


Distance covered by the vehicle

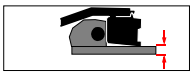
Material planning - quantity of material still required



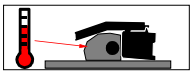
Material calculation - quantity of applied material



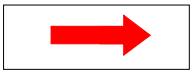
Actual traction points value
(if sensor present)



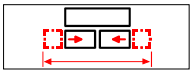
Actual coat thickness measurement
(if sensors present and activated)
Depending on the coding of temperature sensors per a separate temperature measurement for left and right, or the same value is displayed on the remote controls.



Actual material temperature
(if sensor present)



Actual value of the levelling sensor currently active on the other side. (if sensor present)



Actual value of the screed width. (if sensor present)

9 Levelling system operation

9.1 Working with the digital slope sensor

9.1.1 Installation and set-up

The digital slope sensor is mounted between the traction arms on the crossbeam slightly downstream of the screed.
Four securing holes are provided for installation on the sensor's mounting plate.
(Refer to the section entitled "Technical data" for an illustration of the housing).
The plug connections must be freely accessible to enable the connection cable to be connected easily. Please also note the paving direction (FWD/arrow in direction of travel).

9.1.2 Actual value reset

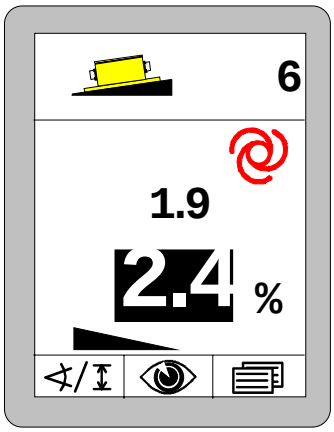
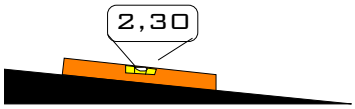
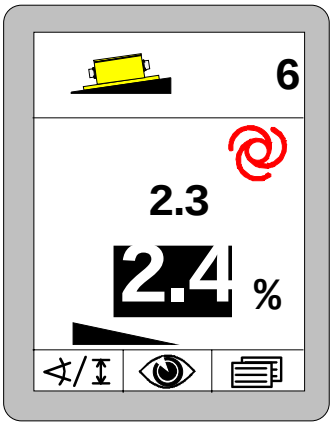
Definition

On installation, the digital slope sensor should be mounted parallel to the lower edge of the screed. As this is not always 100% possible in practice, however, and an offset occasionally remains, the sensor is then reset in the system.
After determining the "offset" between the measured value and reality, the digital slope sensor then reflects the precise slope of the screed. This is referred to as actual value reset.

Actual value reset must first be carried out on commissioning the digital slope sensor.
For optimal working results, the actual value display must be checked and, if necessary, corrected at regular intervals.
Actual value reset must generally be carried out again if …

- *the digital slope sensor has been replaced*
- *the digital slope sensor's installation position has been changed*
- *Mechanical changes have been carried out on the screed or its mounting.*

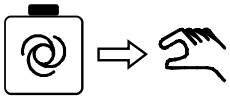
The following text describes how the numerical value of a set nominal slope specification is reset to the actual value of the result when working in automatic mode.

Step 1	Step 2	Step 3
The system is set to automatic mode. In our example, the control system is operating with a nominal value specification of 2.4%.	The working result is measured using a highly-accurate, digital spirit level. According to the illustration below, this determined actual value is only effectively 2.30%.	Press and hold down the enter button, and the displayed value is corrected to the actual value (2,30%) determined in 2 using the UP/DOWN buttons.
		
Repeat steps 1 to 3 if necessary until the set nominal value and the paved slope are identical to each other.		

For optimal working results, the actual value display must be checked and, if necessary, corrected at regular intervals.
Actual value resetting must generally be carried out again if the digital slope sensor has had to be replaced or its installation position changed, or if mechanical changes have been carried out on the screed or its mounting (e.g. mechanical adjustment of the screed positioning angle on the paver finisher).

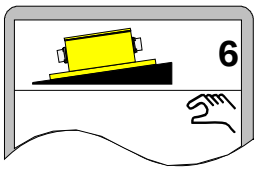
9.1.3 Controlling with the digital slope sensor

1) Use the auto/ manual button to switch the controller to "manual" operating mode.

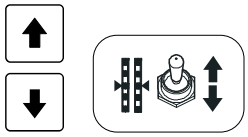


2) Select the *digital slope sensor* as described.

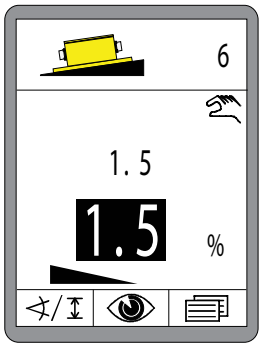
- The sensor symbol and the symbol for "manual" are shown on the display.



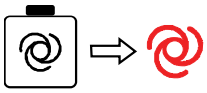
3) Move the screed to the working position using the up/down buttons or the toggle switch on the remote control.



4) Press the enter button.
The nominal value has a black background and the current actual value is taken over as the nominal value.

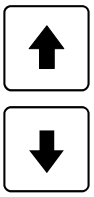


5) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

6) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.2 Calibration to zero

Definition

Before working with the different distance sensors is described over the next few pages, the term calibration to zero must first be explained at this point.

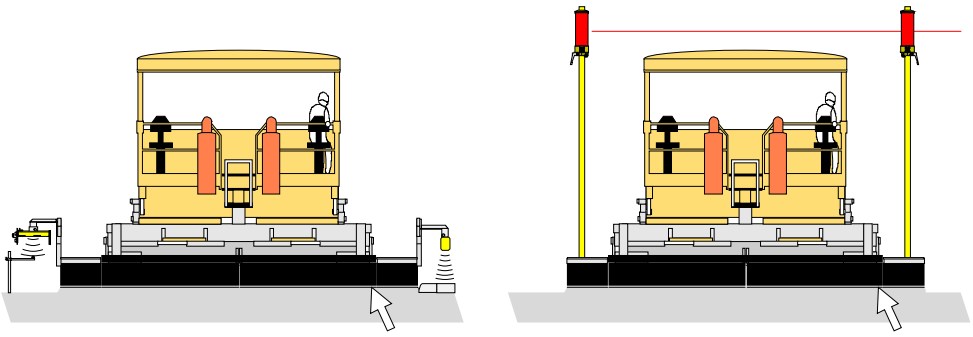
During each new operation or whenever a distance sensor has been installed or reinstalled, its current measured value should be calibrated to zero.
This informs the system of the distance sensor's current installation height above the reference and simultaneously offers a clear reference for all subsequent nominal value specifications.
This process is referred to as **calibration to zero**.

Preparation

To do this:

1) Manually move the lower edge of the screed to calibration height; i.e. to the level which is significant for the subsequent operation (level of the layer to be paved) and set your traction points to the desired height.

2) Position the distance sensor(s) above the reference.
If working with laser receivers, shift these using the integrated positioning aid in such a way that the laser beam hits the centre of the receiver.
Note the specific special features of the various sensors in this case. These special features are described in the section entitled "Installation and set-up" for the relevant sensor.



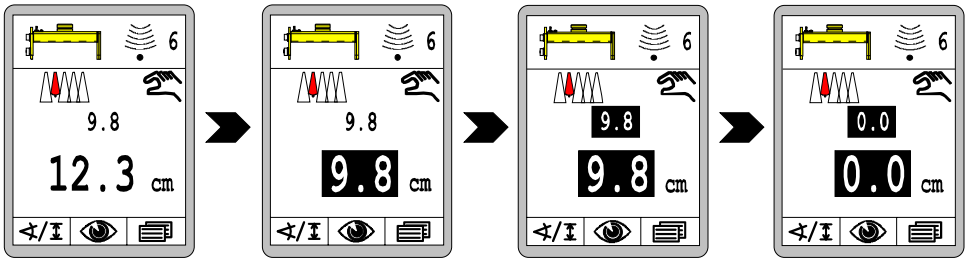
Calibration to zero is only effective for distance sensors. To this end, the remote control *must also be in the manual mode.*

Calibration

Once the screed, traction point and sensor(s) have been set to the calibration height, proceed as follows during calibration to zero:

3) Select the distance sensor to be calibrated from the remote control's sensor selection.

4) Press the calibration button on the remote control and keep it pressed until the actual value and the nominal value initially have a black background on the display and both values change to "0.0" after approx. a further 2 seconds.



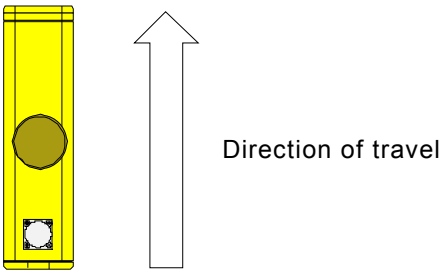
The distance sensor's current measured value (actual value) has been taken over as the nominal value, and the value 0.0 has been assigned to both variables. There is no control variance.

9.3 Working with the Sonic-Ski® plus

9.3.1 Installation and set-up

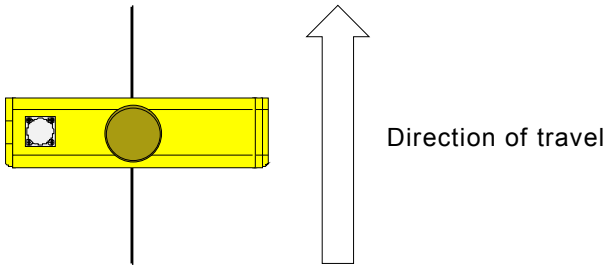
Installation direction for ground sensing

For ground sensing, the Sonic-Ski® plus must be operated longitudinally to the vehicle's direction of travel (mean value formation).

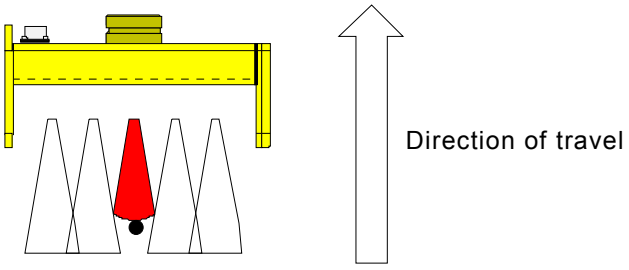


Installation direction for cable sensing

For cable sensing, the Sonic-Ski® plus must be operated transversely to the vehicle's direction of travel. Align the sensor centrally above the cable.



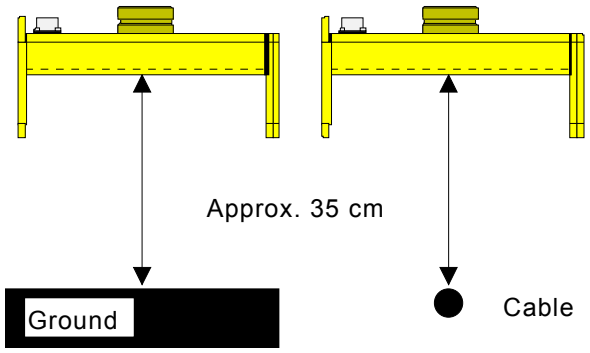
So that the cable is shown for the correct side beneath the Sonic-Ski® plus sensor heads, the sensor must be mounted on both sides as shown in the sensor symbol; i.e. with the connector pointing to the left in each case (viewed in the direction of travel).



The cable is only clearly recognised as a reference as of a diameter of 3 mm.

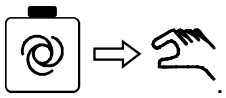
Working area

The optimal working area for the Sonic-Ski® plus with ground and cable sensing lies between 30 cm and 40 cm.
In this range, the actual value shown on the remote control display is constantly on; outside of this range, the display flashes (positioning aid).
The Sonic-Ski® plus should be set to a distance of approx. 35 cm from the reference.



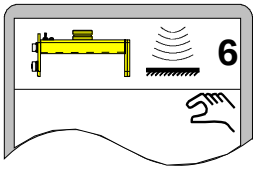
9.3.2 Controlling with the Sonic-Ski® plus in ground sensing

1) Use the auto/manual button to switch the controller to "manual" operating mode.

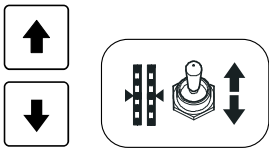


2) Select *Sonic-Ski® plus* sensor *in ground sensing* as described.

- The sensor symbol and the symbol for "manual" are shown on the display.



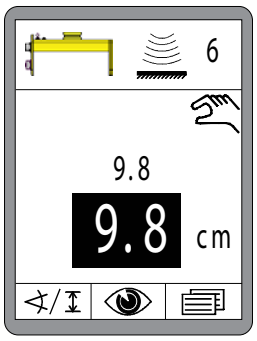
3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



4) Align the sensor above the reference as described in the section entitled "Installation and set-up".

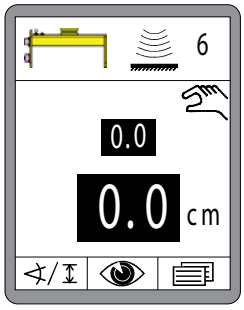
5a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

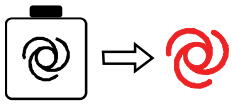


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

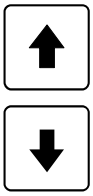


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



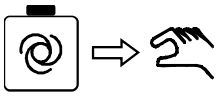
- The controller maintains the screed at the set value.

7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



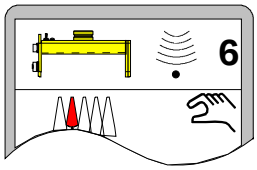
9.3.3 Controlling with the Sonic-Ski® plus in cable sensing

1) Use the auto/manual button to switch the controller to "manual" operating mode.

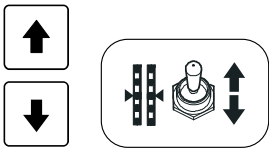


2) Select *Sonic-Ski® plus* sensor *in cable sensing* as described.

- The sensor symbol and the symbol for "manual" are shown on the display.



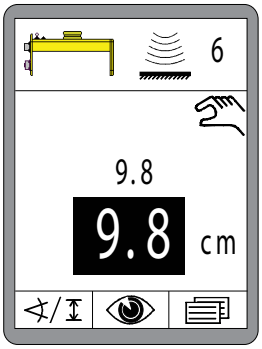
3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



4) Align the sensor above the reference as described in the section entitled "Installation and set-up".

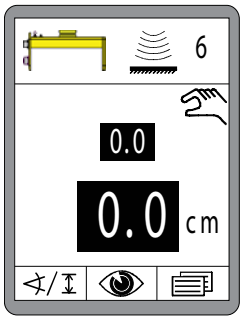
5a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

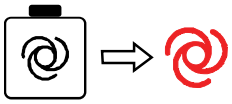


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

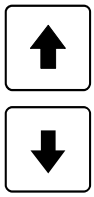


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



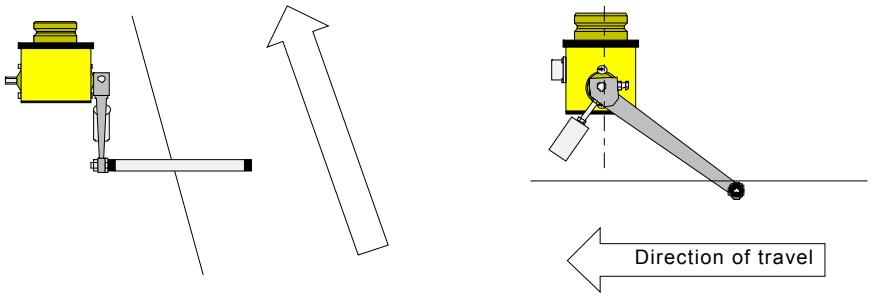
9.4 Working with the digital rotary sensor

9.4.1 Installation and set-up

The digital rotary sensor "drags" the sensor arm with the aid positioned on it behind itself.
Two different aids are available for sensing the various references.
The height of the digital rotary sensor should be set in such a way that the flattened side of its sensor axle is positioned vertically to the reference when the sensing tube or sensing shoe is in contact. This position results in the perfect angle for measured value recording. (See also the following drawings.)

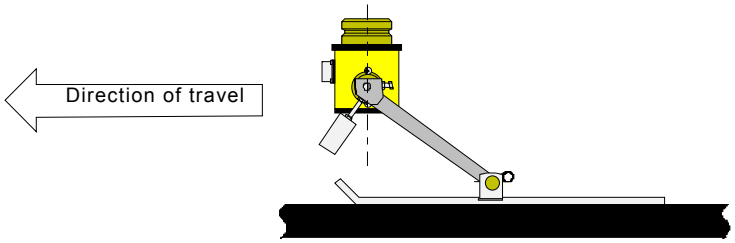
Sensing from the cable

The sensing tube is used for sensing from the cable.
By screwing in or out, set the counterweight so that the sensing tube exercises slight pressure on the cable from above.
If the tension of the cable which is used as the reference is too low, it is possible to guide the sensing tube beneath the cable. To do this, the counterweight must be set so that the sensing tube presses slightly against the cable from below.



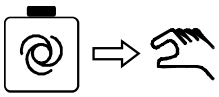
Sensing from the ground

The sensing shoe is used when sensing from the ground.
By screwing in or out, set the counterweight so that the sensing shoe exercises slight pressure on the reference.



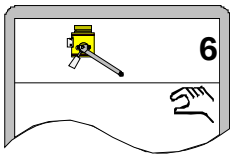
9.4.2 Controlling with the digital rotary sensor

1) Use the auto/manual button to switch the controller to "manual" operating mode.

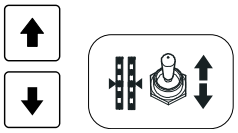


2) Select the *digital rotary sensor* as described.

- The sensor symbol and the symbol for "manual" are shown on the display.



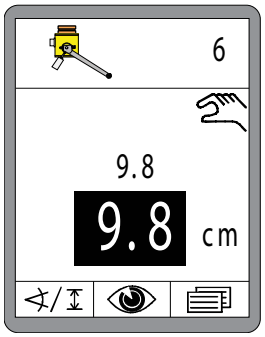
3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



4) Align the sensor above the reference as described in the section entitled "Installation and set-up".

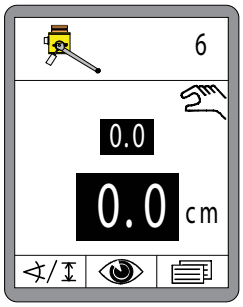
5a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

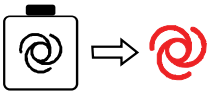


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

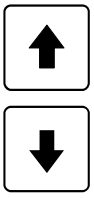


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

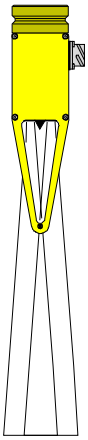
7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.5 Working with the dual sonic sensor

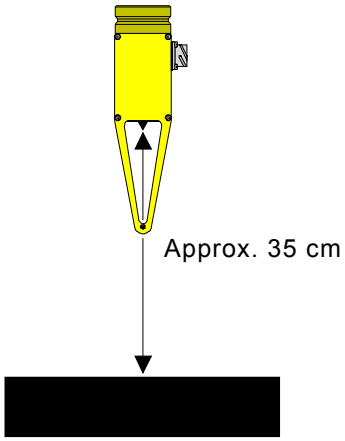
9.5.1 Installation and set-up

The ultrasonic pulses emitted by the dual sonic sensor have more club-shaped characteristics; i.e. the sound beam becomes wider the further it moves away from the sensor.
When working with the dual sonic sensor, clearance of > 20 cm around the sound beam axes must therefore be maintained to reliably avoid interfering reflections throughout the entire specified working area.



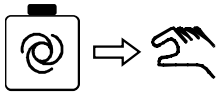
Working area

The optimal working area for the dual sonic sensor lies between 30 cm and 40 cm.
The dual sonic sensor should be set to a distance of approx. 35 cm from the reference.



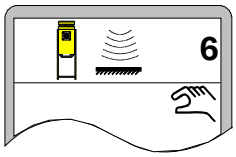
9.5.2 Controlling with the dual sonic sensor

1) Use the auto/manual button to switch the controller to "manual" operating mode.

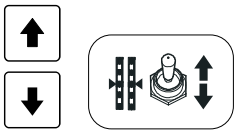


2) Select the *dual sonic sensor* as described.

- The sensor symbol and the symbol for "manual" are shown on the display.



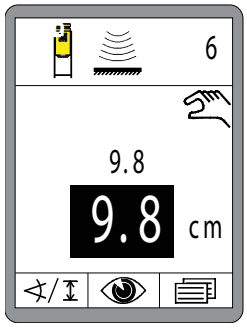
3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



4) Align the sensor above the reference as described in the section entitled "Installation and set-up".

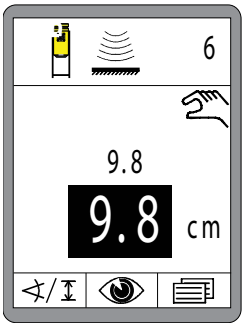
5a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

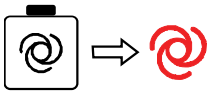


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

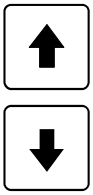


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.6 Working with the Big Sonic-Ski®

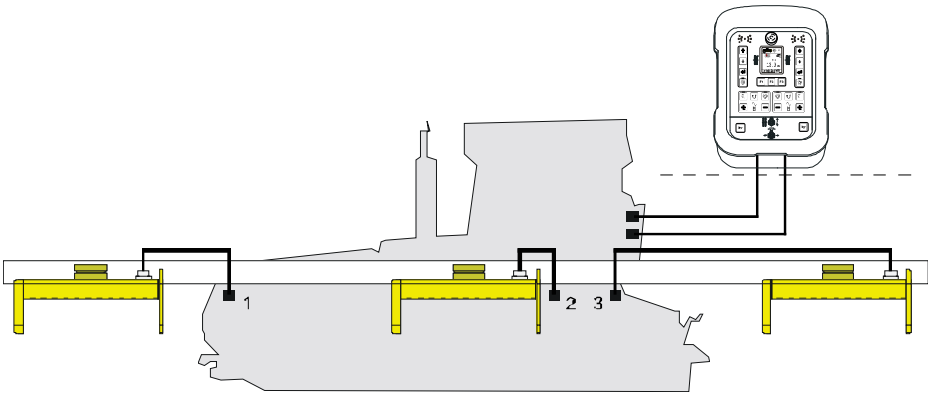
9.6.1 Installation and set-up

Mechanical system

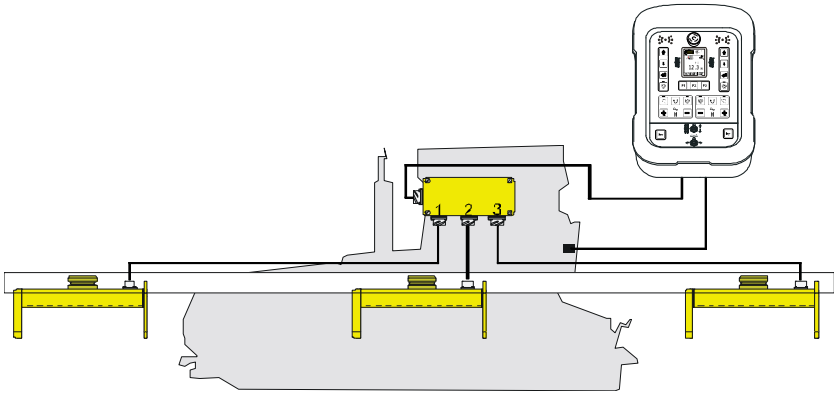
The manufacturer offers installation instructions in which the installation of the Big Sonic-Ski's® mechanical system is exhaustively described. (Also see section "1.5 Other applicable documents" in this regard).

Electrical system

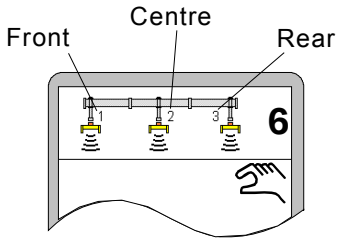
On vehicles with a CAN bus wired in the factory, the connection of 3 sensors to form a Big Sonic-Ski® poses no problem, as correspondingly coded connection plugs are normally provided at the front, in the centre and at the rear of the side wall on these vehicles.



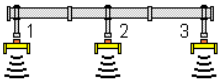
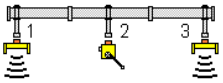
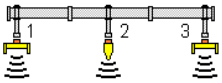
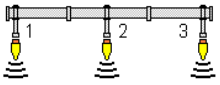
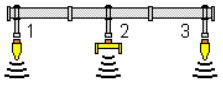
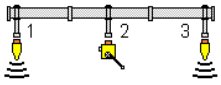
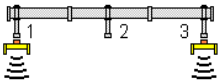
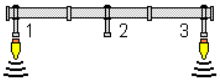
The connection of a Big Sonic-Ski® on a vehicle which is not yet equipped with a factory-wired CAN bus is more complex.
In this case, the 3 sensors are connected to the remote control using a special "Big Sonic-Ski® distributor box" with correspondingly coded connection plugs.



Always connect the front most sensor in the direction of travel to output 1, the centre sensor to output 2 and the rear sensor to output 3 of the "Big Sonic-Ski® distributor box".
The numbering of the sensors in the sensor symbols also refers to this connection sequence.



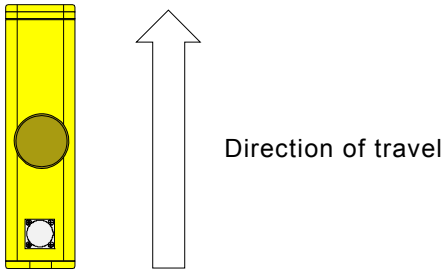
An overview of the permissible Big Sonic-Ski® constellations is again provided in the following.
Only those alternatives which are possible with the currently installed sensors are available for selection in the sensor selection menu.

 *SKIS / SKIS / SKIS*	 *SKIS / ROTS / SKIS*	 *SKIS / DUAS / SKIS*
 *DUAS / DUAS / DUAS*	 *DUAS / SKIS / DUAS*	 *DUAS / ROTS / DUAS*
 *SKIS / n.c. / SKIS*	 *DUAS / n.c. / DUAS*	

Only identical ultrasonic sensors are permissible in positions 1 and 3 - i.e. at the front and rear on the vehicle.

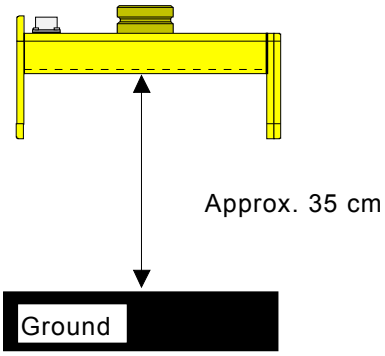
Installation direction of the Sonic-Ski® plus sensors

Only ground sensing is generally possible with the Big Sonic-Ski®. During operation, all Sonic-Ski® plus must therefore be aligned longitudinally to the vehicle's direction of travel (mean value formation).



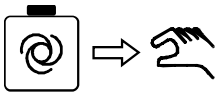
Ultrasonic sensor working area

The optimal working area of the ultrasonic sensors must also be taken into consideration when working with the Big Sonic-Ski®. Each of the ultrasonic sensors which is used should be set to a distance of approx. 35 cm from the reference.



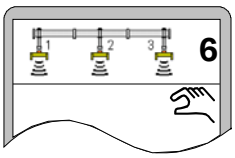
9.6.2 Controlling with the Big Sonic-Ski®

1) Use the auto/manual button to switch the controller to "manual" operating mode.

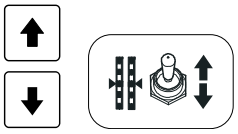


2) Select one of the possible *Big Sonic-Ski®* constellations as described.

- The sensor symbol and the symbol for "manual" are shown on the display.



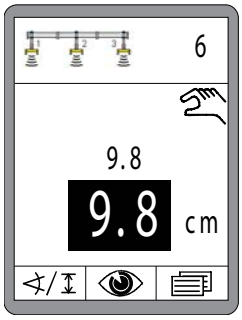
3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



4) Align all of the Big Sonic-Ski® sensors to the reference as described in the section entitled "Installation and set-up".

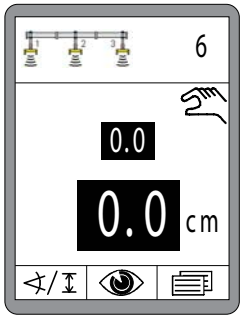
5a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

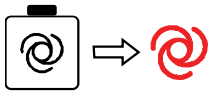


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value <u>and</u> the nominal value initially have a black background.
- The actual value <u>and</u> the nominal value are set to "0.0".

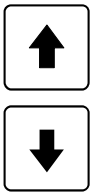


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.7 Working with the prop. laser receiver

9.7.1 Safety instructions

Laser beams

CAUTION!

Risk of eye injury due to laser beams!
Laser transmitters operate with high-intensity light beams. Looking directly into the laser beam may lead to eye injuries.
Therefore:
- Do not look directly into the laser beam.
- Do not point the laser beam into other persons' eyes.
- Operate the laser transmitter clearly above eye level.

Improper installation

CAUTION!

Risk of injury due to improper installation!
Occasionally, laser transmitters and laser receivers have to be installed at heights significantly above ground level. Installation using unsuitable aids may lead to injuries.
Therefore:
- Do not climb on the vehicle or mast.
- Use suitable aids (e.g. stepladders) and implement safety precautions to install the laser transmitter on a tripod and the laser receiver on the mast.

9.7.2 Installation and set-up

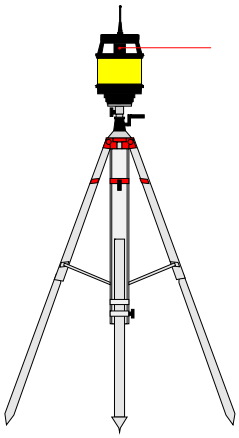
General

The following points should be observed under all circumstances when installing the laser receiver:

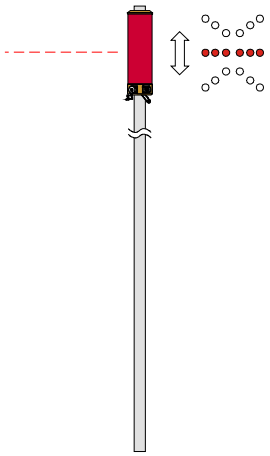
- No obstacles (e.g. cables) may be located in front of the sensor;
- Laser transmitters and laser receivers must always be "clearly visible" to each other;
  Ideally, install both so high that the rotating laser beam is able to shine over the roof of the vehicle.
- No reflective surfaces (e.g. windows, motor vehicle glazing) may be located in the area of the laser beam;
  To minimise the occurrence of reflections, it is advisable to cover the laser transmitter except for the circular cut-out which is actually required.
- The laser transmitter's specified range must not be exceeded (note environmental influences).

Working point

Commission a suitable laser transmitter (wavelength between 600 and 1030 nm) at an adequate height in accordance with its operating instructions.



Position the mast, on which the laser receiver is mounted, vertically.

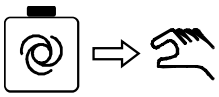


The prop. laser receiver can be moved freely on its mast.
Use the sensor's integrated positioning aid to set the laser receiver up, and move the sensor or the mast so that the laser beam hits the reception area centrally.
(Also see section "6.2 The prop. laser receiver displays" in this regard)
Only in this way can the nominal value subsequently be adjusted over the full range of +/- 14 cm when working.

In principle, the working point can be taken over in any laser receiver position.
Depending on the planned application, this may actually be sensible.
Due to an asymmetrical working point, the available adjustment range in one direction (raise or lower) is increased, whilst the other is reduced by the same extent.

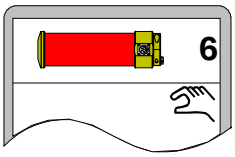
9.7.3 Controlling with the prop. laser receiver

1) Use the auto/manual button to switch the controller to "manual" operating mode.

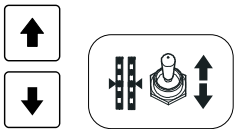


2) Select the *laser receiver* as described.

- The sensor symbol and the symbol for "manual" are shown on the display.



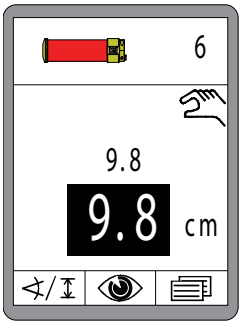
3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



4) Align the laser receiver centrally with the reference as described in the section entitled "Installation and set-up".

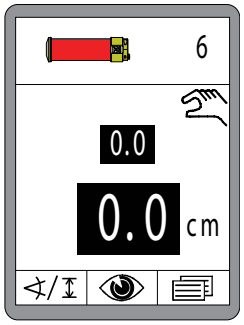
5a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

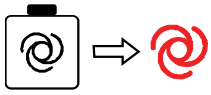


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

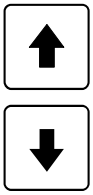


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.8 Working with the power mast and prop. laser receiver

9.8.1 Safety instructions

Electrical current

DANGER!

Danger due to electrical current!

When working with a laser mast or the power mast in the immediate vicinity of electrical systems, e.g. overhead cables or electric railways, a life-threatening risk exists due to electric shock.

Therefore:
- Maintain a sufficient safety distance away from electrical systems.
- If working in such systems is vitally necessary, inform the departments or authorities responsible for these systems prior to carrying out this work and follow their instructions.

Laser beams

CAUTION!

Risk of eye injury due to laser beams!

Laser transmitters operate with high-intensity light beams. Looking directly into the laser beam may lead to eye injuries.

Therefore:
- Do not look directly into the laser beam.
- Do not point the laser beam into other persons' eyes.
- Operate the laser transmitter clearly above eye level.

Improper installation

CAUTION!

Risk of injury due to improper installation!

Occasionally, laser transmitters and laser receivers have to be installed at heights significantly above ground level. Installation using unsuitable aids may lead to injuries.

Therefore:
- Do not climb on the vehicle or power mast.
- Use suitable aids (e.g. stepladders) and implement safety precautions to install the laser transmitter on a tripod and the laser receiver on the power mast.

9.8.2 Installation and set-up

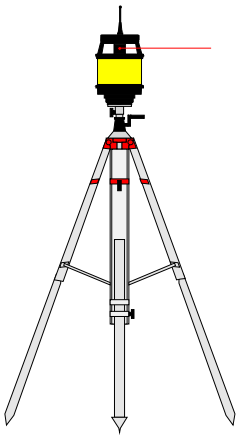
General

The following points should be observed under all circumstances when working with a power mast with a laser receiver mounted on it:

- No obstacles (e.g. cables) may be located in front of the sensor;
- Laser transmitters and laser receivers must always be "clearly visible" to each other;
  Ideally, install both so high that the rotating laser beam is able to shine over the roof of the vehicle.
- No reflective surfaces (e.g. windows, motor vehicle glazing) may be located in the area of the laser beam;
  To minimise the occurrence of reflections, it is advisable to cover the laser transmitter except for the circular cut-out which is actually required.
- The laser transmitter's specified range must not be exceeded (note environmental influences).

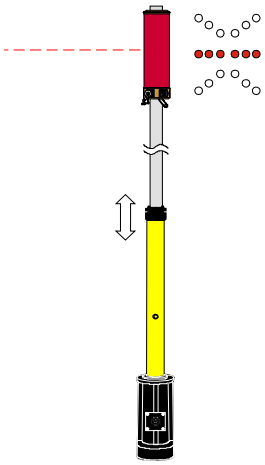
Working point

Commission a suitable laser transmitter (wavelength between 600 and 1030 nm) at an adequate height in accordance with its operating instructions.



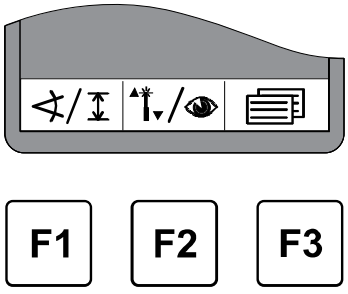
Position the power mast, on which the laser receiver is mounted, vertically.
Turn the laser receiver to a position in which the LEDs of the positioning aid are clearly visible from the remote control.

When working with a power mast, 2 different procedures for setting up the laser receiver are available to the operator.
Both can be carried out comfortably on the remote control.
1) The mast can be moved manually and the laser receiver can be set up using its positioning aid or
2) The laser beam search can be carried out automatically.
(Also see the next section "9.8.3 The mast menu")



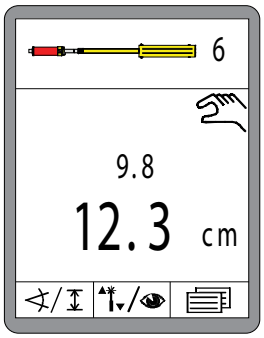
9.8.3 The mast menu

If the power mast with laser receiver is selected as the active sensor, helpful additional functions are available to the user.
These additional functions are called up from the operating window using function button F2.
As long as the power mast with laser receiver is selected, a slightly modified symbol is shown above function button F2 in the operating window, indicating extended operation.



9.8.4 Calling up the mast menu

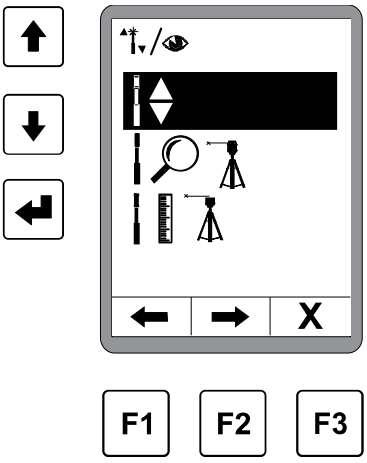
Press function button F2 (↑↓/👁) in the operating window.



The mast menu window opens.
The ↑↓/👁 symbol appears at the top left of the window.

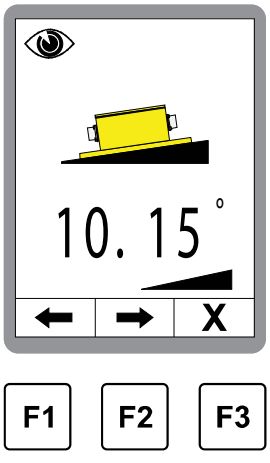
Select the desired menu item using the up/down buttons and confirm the selection using the enter button.

Or …



… use function button F2 (➡) to continue to the familiar view menu with the current measured values for all connected sensors.

The 👁 symbol appears at the top left of the window.

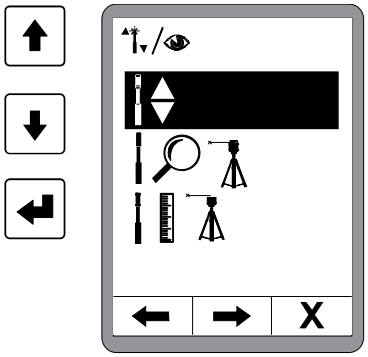


The mast menu functions are described on the next few pages.

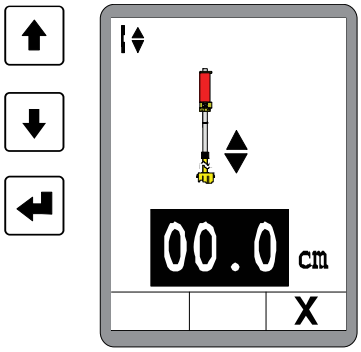
9.8.5 Moving the power mast manually

Select the "Moving the power mast manually" function in the mast menu. The selection has a black background. Confirm the selection with the enter button.

Press function button F3 (**X**) to leave the menu.

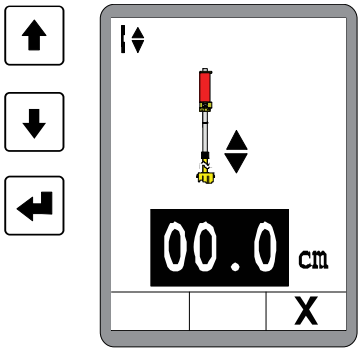


The illustrated window opens.
The l♦ symbol appears at the top left of the window.



Move the mast using the up/down buttons in order e.g. to set the laser receiver up using its positioning aid.

The value shown on the display = mast length



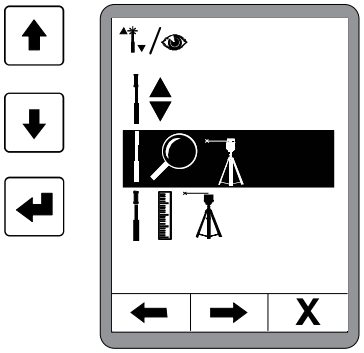
= extend power mast

= retract power mast

Pressing both buttons together automatically retracts the power mast.

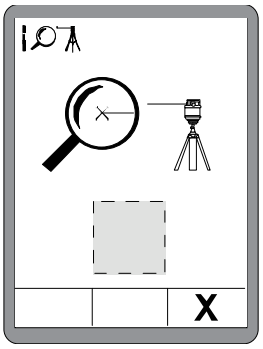
9.8.6 Automatic laser beam search

Select the "Automatic laser beam search" function in the mast menu. The selection has a black background.
Confirm the selection with the enter button.

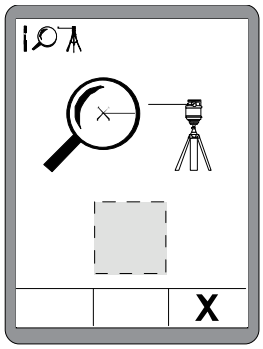


Press function button F3 (**X**) to leave the menu.

The illustrated window opens.
The symbol appears at the top left of the window.



Start the automatic laser beam search using the up/down buttons. The mast stops when the laser beam hits the laser receiver centrally.



= search up

= search down

If both buttons are pressed at the same time, the search is first carried out upwards (automatic search direction switch)

One of the following symbols is shown at the position of the grey rectangle:

 = on call-up

 = whilst searching up

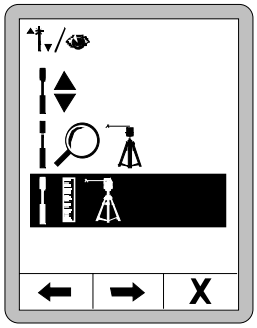
 = whilst searching down

 = laser beam found

 = laser beam not found

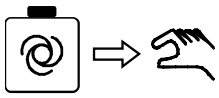
Note on height measurement using the power mast:

The third menu item is used for height measurement with the machine.
As height measurement with the machine makes no sense on the paver finisher, the description of the function is omitted at this point.



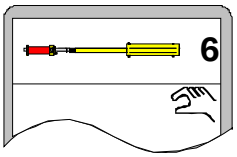
9.8.7 Controlling with the power mast and prop. laser receiver

1) Use the auto/manual button to switch the controller to "manual" operating mode.

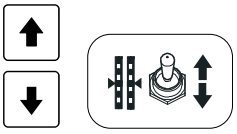


2) Select the *laser receiver* as described.

- The sensor symbol and the symbol for "manual" are shown on the display.

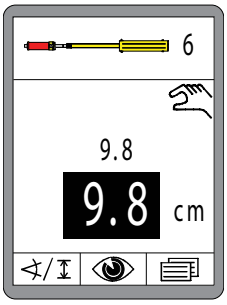


3) Move the screed to the working position for calibration to zero using the up/down buttons or the toggle switch on the remote control.



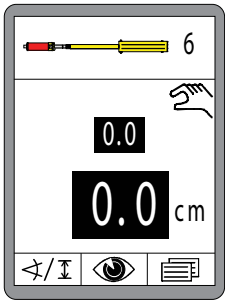
4) Align the laser receiver centrally with the reference as described in the section entitled "Installation and set-up".

5a) Press the enter button. If the laser beam is located in an arbitrary position in the laser receiver's reception area, the power mast is moved in such a way that the laser beam hits the centre of the laser receiver. The nominal value has a black background and the current actual value is taken over as the nominal value.

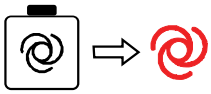


5b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

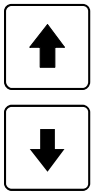


6) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller maintains the screed at the set value.

7) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.9 Working with the 3D TPS

9.9.1 Installation and set-up

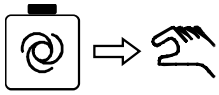
Commission the MOBA 3D TPS system according to its operating instructions.

A description of the installation, wiring and configuration of the system components, ascertaining the vehicle dimensions and entering them in the 3D software, calibration of the mast slope sensor and above all a description of how the 3D software works goes beyond the scope of these operating instructions.

Separate instructions for working with MOBA 3D are available from your dealer.

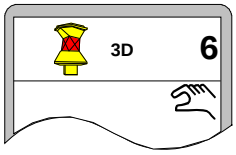
9.9.2 Controlling with the 3D TPS

1) Use the auto/manual button to switch the controller to "manual" operating mode.

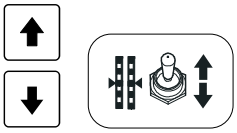


2) Select the *3D TPS* as sensor as described.

- The sensor symbol and the symbol for "manual" are shown on the display.

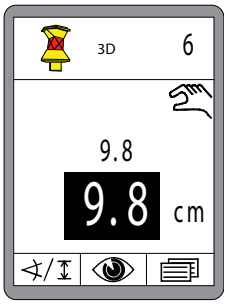


3) Move the screed to the working position for calibration to zero using the up/down buttons on the controller or the operating device on the vehicle.



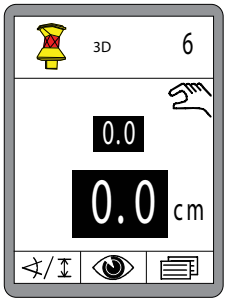
4a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

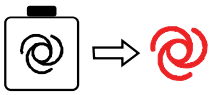


4b) Keep the enter button pressed for approx. 2 seconds.

- The actual value and the nominal value initially have a black background.
- The actual value and the nominal value are set to "0.0".

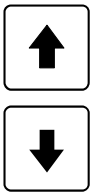


5) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller adjusts the screed to the values stated by the 3D system, depending on the screed position.

6) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.10 Working with the 3D GNSS

*The positioning accuracy of the GNSS*1 signal is limited to the range of just a few centimetres so that 3D GNSS systems are only conditionally suitable for certain applications.*

9.10.1 Installation and set-up

Commission the MOBA 3D GNSS*1 system according to its operating instructions.

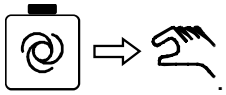
A description of the installation, wiring and configuration of the system components, ascertaining the vehicle dimensions and entering them in the 3D software, calibration of the mast slope sensor and above all a description of how the 3D software works goes beyond the scope of these operating instructions.

Separate instructions for working with MOBA 3D are available from your dealer.

*1 GNSS = Global Navigation Satellite Systems

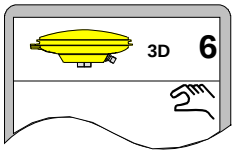
9.10.2 Controlling with the 3D GNSS

1) Use the auto/manual button to switch the controller to "manual" operating mode.

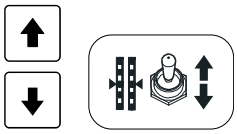


2) Select the *3D GNSS* as sensor as described.

- The sensor symbol and the symbol for "manual" are shown on the display.

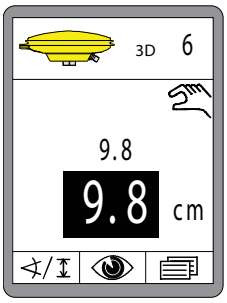


3) Move the screed to the working position for calibration to zero using the up/down buttons on the controller or the operating device on the vehicle.



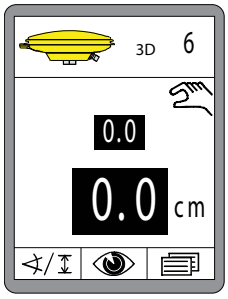
4a) Press the enter button.

- The nominal value has a black background and the current actual value is taken over as the nominal value.

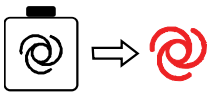


4b) Keep the enter button pressed for approx. 2 seconds.

- The actual value <u>and</u> the nominal value initially have a black background.
- The actual value <u>and</u> the nominal value are set to "0.0".

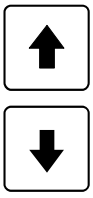


5) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller adjusts the screed to the values stated by the 3D system, depending on the screed position.

6) In automatic mode, the up/down buttons can now be used to change the nominal value to enable corrections to be carried out.



9.11 Working with the 3D slope sensor

The 3D slope sensor is not an additional sensor in the actual meaning of the word.
The digital slope sensor already described above is used to register the actual value of the tool slope. In contrast to the digital slope sensor, when working with the 3D slope sensor the nominal value is not entered manually but defined automatically by the 3D system according to the specific position.
The user cannot adjust the nominal value in the automatic mode.

9.11.1 Installation and set-up

Commission the MOBA 3D system according to its operating instructions.

A description of the installation, wiring and configuration of the system components, ascertaining the vehicle dimensions and entering them in the 3D software, calibration of the mast slope sensor and above all a description of how the 3D software works goes beyond the scope of these operating instructions.

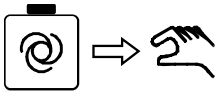
Separate instructions for working with MOBA 3D are available from your dealer.

9.11.2 Actual value reset

The actual value reset synchronises the measured value of the digital slope sensor with the actual slope of the tool.
This synchronisation is necessary for example if the digital slope sensor has not been installed absolutely parallel to the lower edge of the tool.
(see also chapter "9.1.2 Actual value reset")

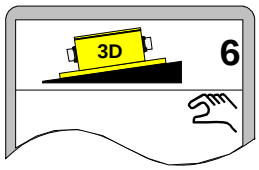
9.11.3 Controlling with the 3D slope sensor

1) Use the auto/manual button to switch the controller to "manual" operating mode.

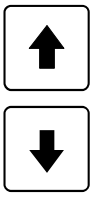


2) Select the *3D slope sensor* as described.

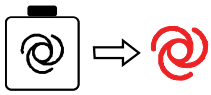
- The sensor symbol and the symbol for "manual" are shown on the display.



3) Use the up/down buttons on the controller to move the screed to the nominal value defined by the 3D system for the current position,



4) Use the auto/manual button to switch the controller to "automatic" operating mode.



- The controller adjusts the screed to the values stated by the 3D system, depending on the screed position.

When working with the 3D slope sensor, the up/down buttons on the controller cannot be used to adjust the nominal value!
To make any adjustments to the slope, firstly the digital slope sensor must be selected as active sensor.

9.12 Travel-dependent working with the digital slope sensor

This is not an additional sensor in the actual meaning of the word
The digital slope sensor already described above is used to register the actual value of the tool slope. In contrast to the digital slope sensor, in travel-dependent working with the digital slope sensor the nominal value is not entered manually but defined automatically by the system according to the covered distance.
The user cannot adjust the nominal value in the automatic mode.

Function:

In addition to the normal lateral slope control (see "9.1 Working with the digital slope sensor"), travel-dependent controlling is also possible with the digital slope sensor. In this case, a required lateral slope is adjusted according to the covered distance. The following section refers to this kind of control as "delta slope control".

If the delta slope sensor is selected during on-going slope control, the slope control operating hitherto continues in auto mode.
After making the selection, the system asks first for the target slope and then for the distance. The target slope is the slope value to be achieved at the end of the entered distance. Delta slope control can begin once these two values have been entered.
On starting the function, the delta value is formed once between the current slope and the target slope. This value now undergoes linear interpolation to the distance.

At the end of the distance, delta slope control finishes automatically and the system changes over to normal slope control, i.e. the target slope is now kept constant.

9.12.1 Installation and set-up

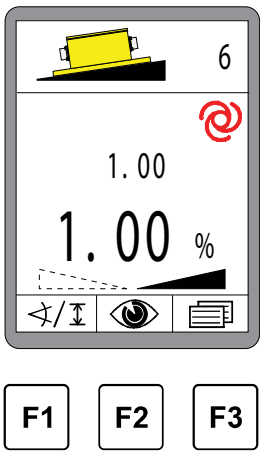
The digital slope sensor is mounted between the traction arms on the crossbeam slightly downstream of the screed.
(for further installation details please also refer to chapter "9.1.1 Installation and set-up")

9.12.2 Actual value reset

The actual value reset synchronises the measured value of the digital slope sensor with the actual slope of the tool.
This synchronisation is necessary for example if the digital slope sensor has not been installed absolutely parallel to the lower edge of the tool.
(see also chapter "9.1.2 Actual value reset")

9.12.3 Controlling with the travel-dependent digital slope sensor

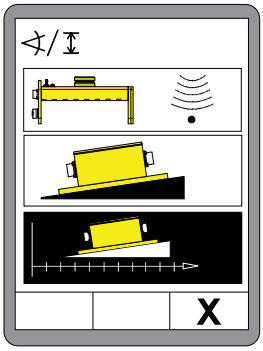
Press F1 (⧖ ↧) to call up the sensor selection menu.



If the normal slope control was active before (as shown on the right), selecting the delta slope sensor does not deactivate the slope control.

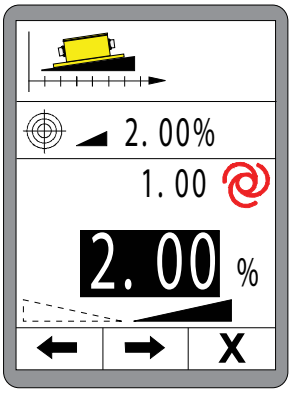
Select the delta slope sensor using the up/down buttons.
If more sensors are connected than fit in the display, the system automatically scrolls forwards.

- The selection has a black background.
- Confirm the selection with the enter button.



Enter the required target slope with the up/down buttons.
(The target slope also appears in the info line).

Press button F2 …

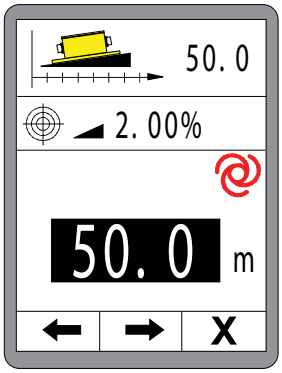


F1 F2 F3

… the travel input window opens.

Use the up/down buttons to enter the distance to which the slope is to be switched.

Press F2 to go to the delta slope menu.

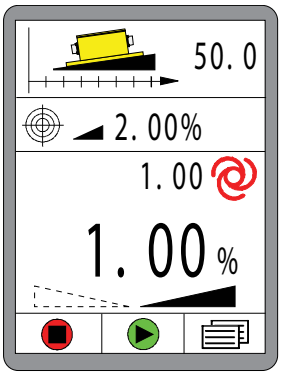


F1 F2 F3

The functions in the delta slope menu are:

F1= cancel
F2= start
F3= change to user menu

Press F2 to activate travel-dependent control (▶).



F1 F2 F3

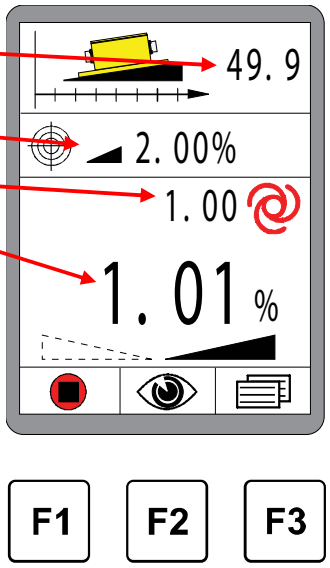
The travel-dependent slope control is active.

During travel-dependent adjustment, the remaining distance to be covered is displayed in the header.

Display of the target value to the end

Currently measured actual value

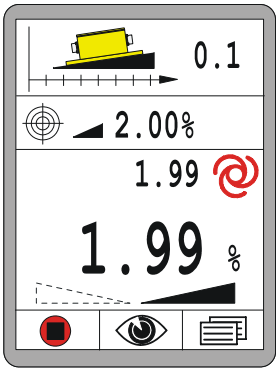
Nominal value currently calculated for the present position.
(Gets gradually closer to the target value when moving forwards.)



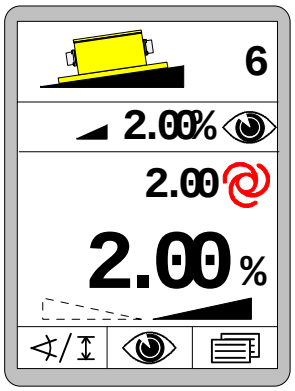
F1 = cancellation
F2 = change to view menu
F3 = change to user menu

Use the auto/manual button
to activate/deactivate the control.

This picture shows delta slope control just before reaching the target.



On reaching the target (travel = 0), the control automatically changes over to normal (travel-independent) slope control. The info line now shows the same value as before.



10 Operating the emergency control

General

The emergency control, also called emergency function, is only intended in the event of possible failure of the operating panel on the control platform.
In this case, it should be possible for the emergency control to activate at least the basic functions of the machine using the remote controls.

The chapter "Operating the emergency control" provides information on activating and using these functions.

With the emergency control, only the button information of the remote controls is sent to the overriding control system and processed there. Overall control in the various modes is also carried out by this higher-level system.

The various modes will nevertheless be described in the following.

Before activation

Please note that on activating the emergency functions, you intervene directly in the control of the machine.

Make sure that no persons or objects are located in the area of the screed or other moving parts when switching on.

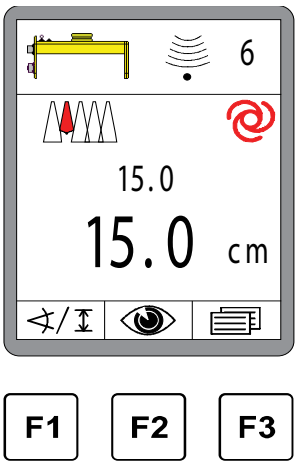
10.1 Activating the emergency control

The emergency functions are the second from last menu in the view menu.

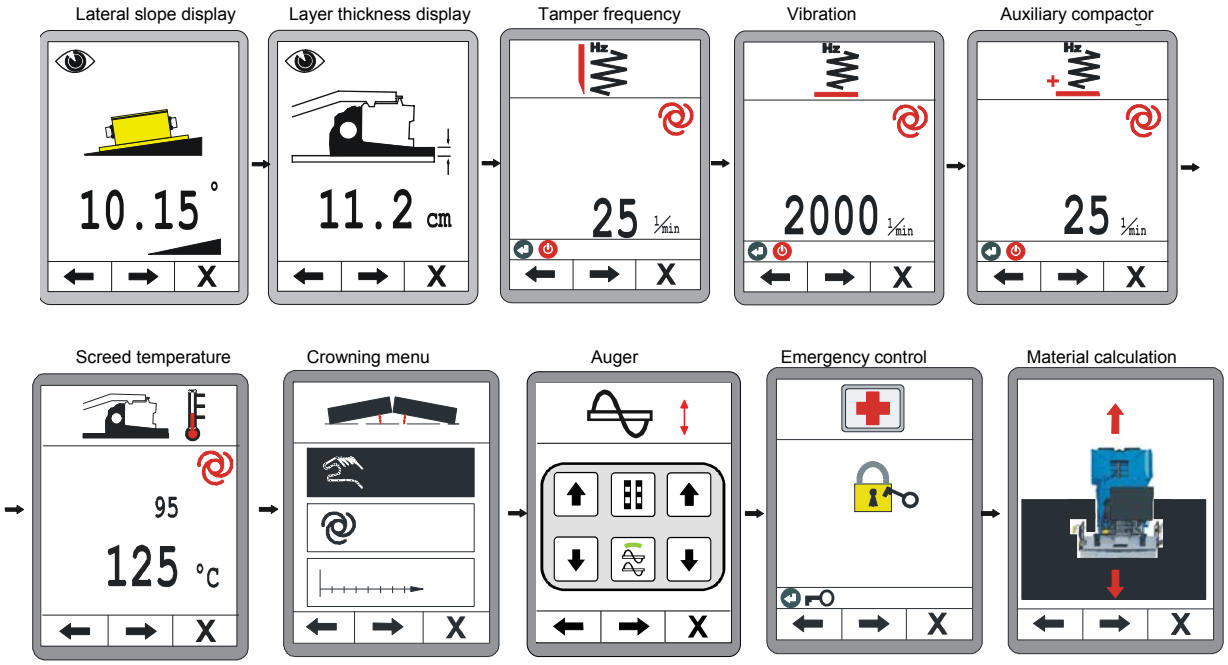
The call-up and structure of the menu sequences are already described in detail in point "8.7 View menu".

Call-up:

Press function button F2 ( ) in the standard view.



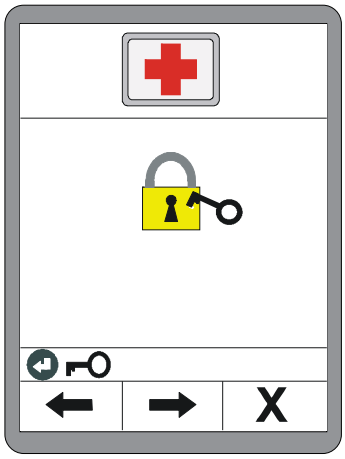
Here again is a brief overview of the view menu.



Activating the emergency functions:
The "Lift auger" menu is followed by the menu for releasing the remote control.

Open emergency functions:
Press ENTER to open the emergency functions.

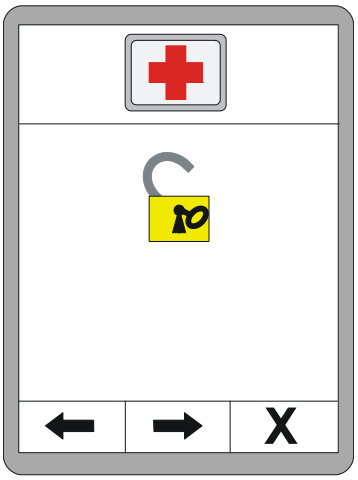
Navigation in the menu:
Navigate through the menu using function buttons F1 (←) and F2 (→).



End menu:
Press function button F3 (**X**) to leave the menu.

Emergency functions opened:

The emergency functions remain open until the vehicle starts up again.

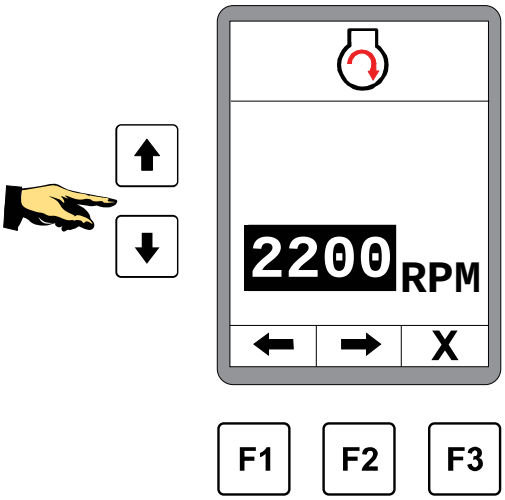


10.2 Functions of the emergency control

Diesel engine speed:
The value can be changed using the up/down buttons.

Navigation in the menu:
Navigate through the menu using function buttons F1 (⬅) and F2 (➡).

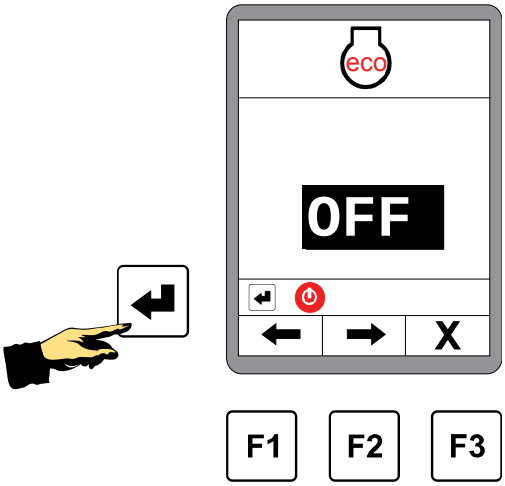
End menu:
Press function button F3 (**X**) to leave the menu.



Vario speed:
The operating mode can be changed with the ENTER button.
(ON < --- > OFF)

Navigation in the menu:
Navigate through the menu using function buttons F1 (⬅) and F2 (➡).

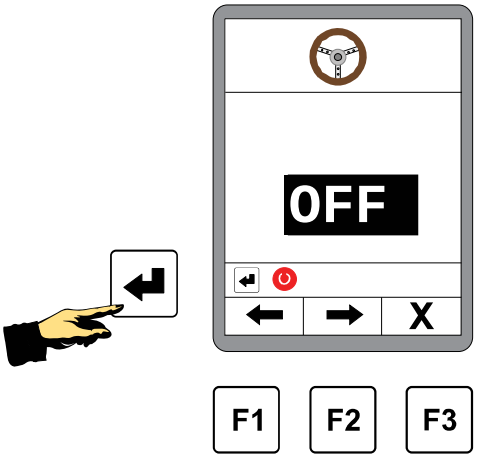
End menu:
Press function button F3 (**X**) to leave the menu.



Automatic steering unit:
The operating mode can be changed with the ENTER button.
(ON < --- > OFF)

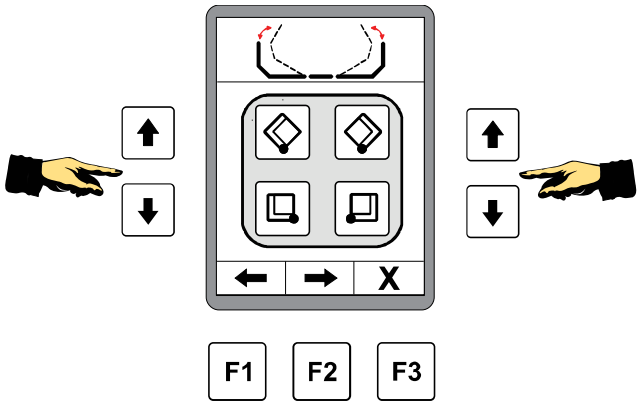
Navigation in the menu:
Navigate through the menu using function buttons F1 (⬅) and F2 (➡).

End menu:
Press function button F3 (**X**) to leave the menu.



Hopper:

The left hopper can be opened or closed using the up/down buttons of the left button block.
The up/down buttons on the right button block open and close the right hopper.



Navigation in the menu:

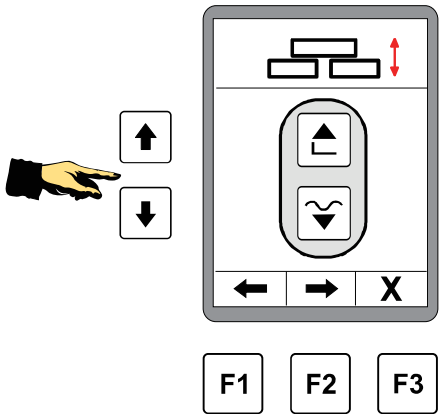
Navigate through the menu using function buttons F1 (⬅) and F2 (➡).

End menu:

Press function button F3 (**X**) to leave the menu.

Screed:

The screen can be raised and lowered with the up/down buttons.



Navigation in the menu:

Navigate through the menu using function buttons F1 (⬅) and F2 (➡).

End menu:

Press function button F3 (**X**) to leave the menu.

11 Material calculation

General

Material calculation is the last menu in the view menu.

The call-up and structure of the menu sequences are already described in detail in point "8.7 View menu".

Function

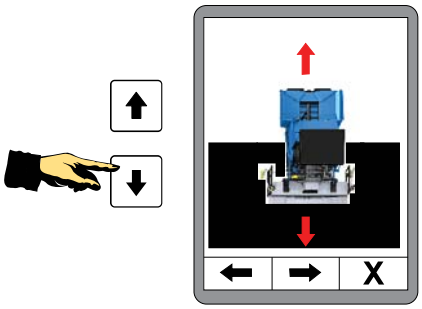
The material calculation menu offers you a choice of the following two functions:

Calculating the applied material
This calculates and displays the total applied material from a starting point that you have to enter.

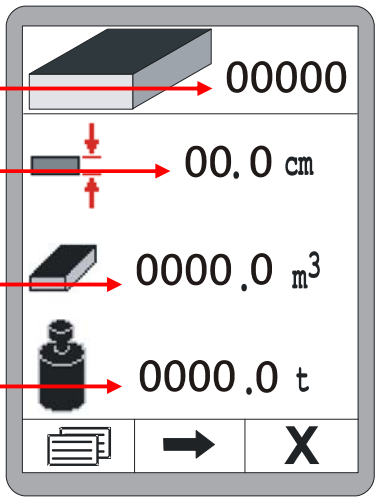
Advance material planning (calculation)
This function calculates the total amount of material still required up to a point in time that you have to enter.

11.1 Calculating the applied material

Use the up/down buttons to calculate the quantity of material already applied.



After making the selection, first the overview page appears.



Covered distance

Entered course thickness

Calculated volume of material

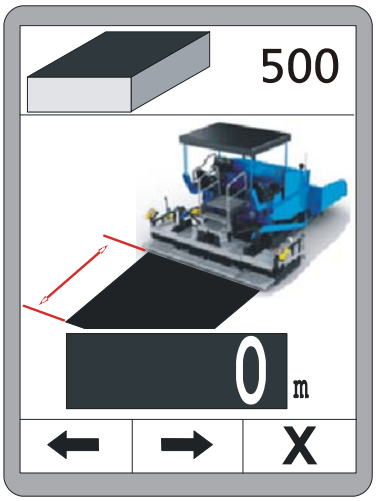
Calculated weight

The values shown here are calculated on the basis of the following values:

- Distance
- Working width
- Course thickness
- Material density

Press F2 to enter these values.

Enter the distance covered from the start or set the value to ZERO by press UP and DOWN at the same time.

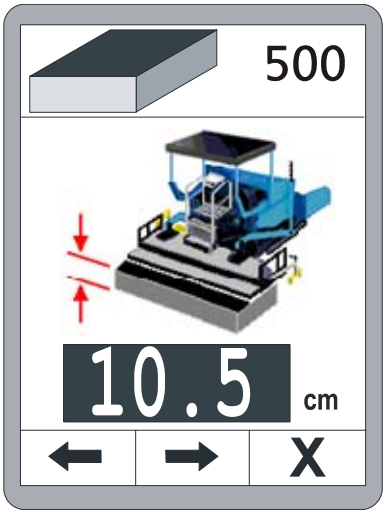


F2 takes you to the next input.

Enter the paved course thickness.

Any measurements for the course thickness available in the system are used for this calculation.

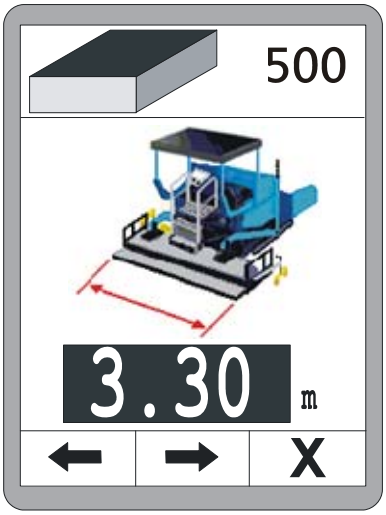
F2 takes you to the next input.



Enter the paved working width (screed width).

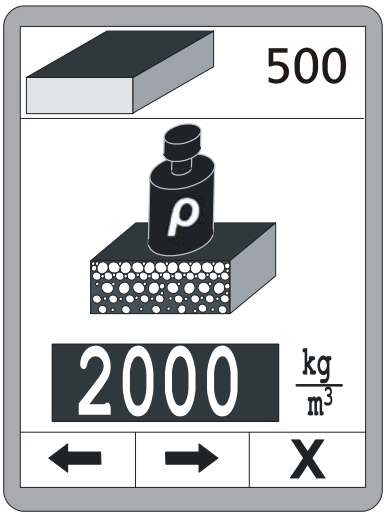
Any measurements for the width available in the system are used for this calculation.

F2 takes you to the next input.

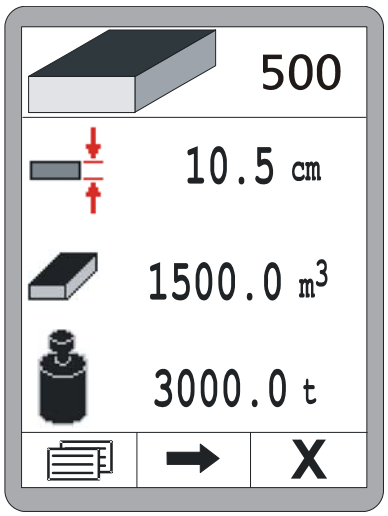


Finally, enter the material density "ρ" to convert the volume into weight.

Press F2 to go back to the overview.

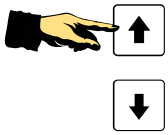


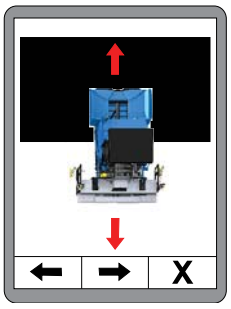
After all values have been entered once, the overview shows the amount of material already applied..



11.2 Advance material planning (calculation)

Use the up/down buttons to calculate the advance material planning.





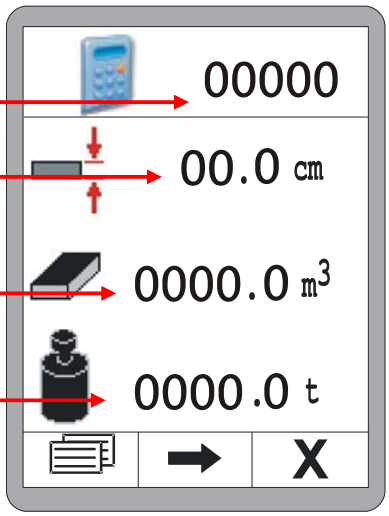
After making the selection, first the overview page appears.

Distance still to be covered

Entered course thickness

Calculated volume of material

Calculated weight

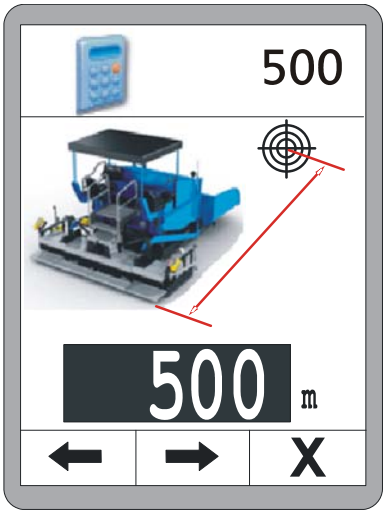


The values shown here are calculated on the basis of the following values:

- Distance
- Working width
- Course thickness
- Material density

Press F2 to enter these values.

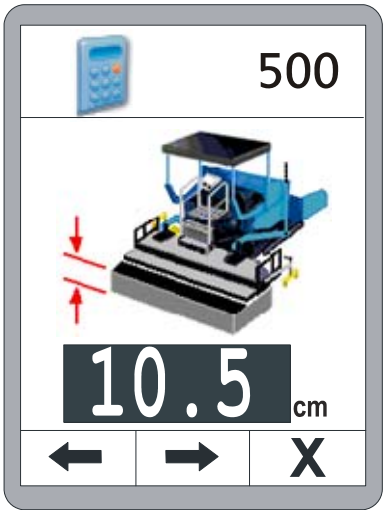
Enter the distance to be covered to the target.



F2 takes you to the next input.

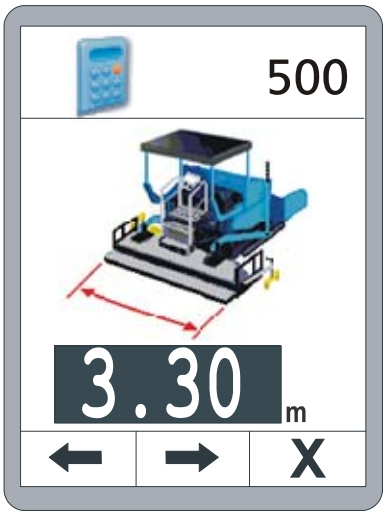
Enter the planned course thickness.

If there are measurements for the course thickness already in the system, the current measurement is frozen in the display when you call up the input window. Now use the up/down buttons to adjust this value to the planned value.



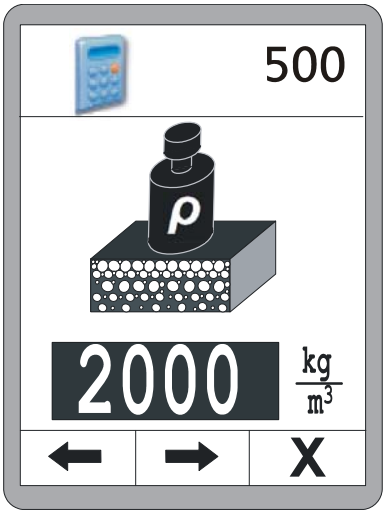
F2 takes you to the next input.

Enter the paved working width (screed width).
If there are measurements for the width already in the system, the current measurement is frozen in the display when you call up the input window. Now use the up/down buttons to adjust this value to the planned value.



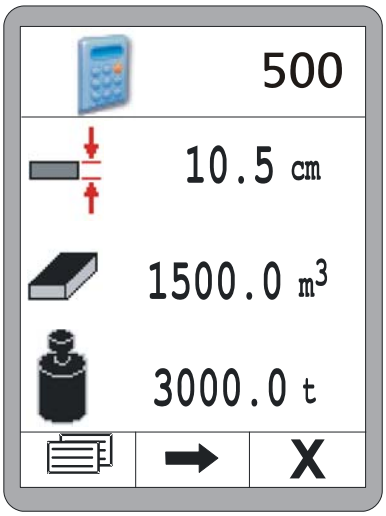
F2 takes you to the next input.

Finally, enter the material density "ρ" to convert the volume into weight.



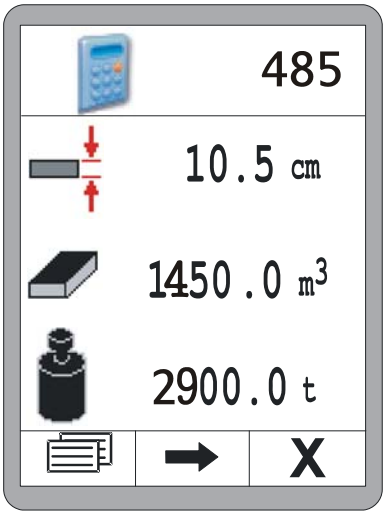
Press F2 to go back to the overview.

After all values have been entered once, the overview shows the amount of material still required.



When the vehicle moves, this automatically reduces the distance shown in the header.

The remaining amount of material still required is updated permanently according to the remaining distance.

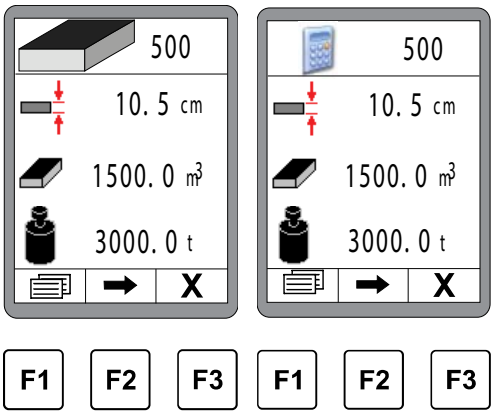


11.3 Changing the units of measurement

The units of the various parameters for advance material planning and for calculating the applied material are always the same.

Press F1(🗐) to go from the overview page to changing the units.

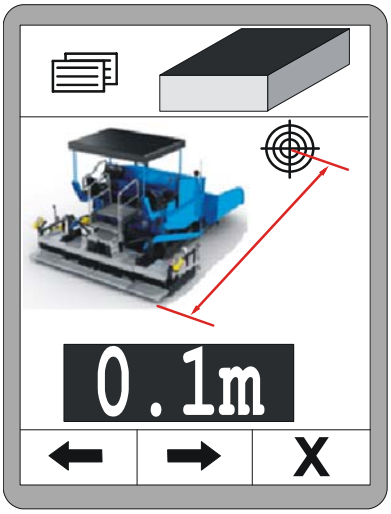
The units can be changed using the up/down buttons.



Changing the units of measurement for the distance.
There is a choice between:

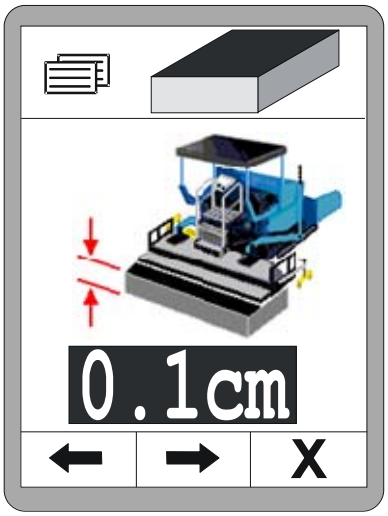
- Meter (m)
- Foot (ft)
- Yard (yd)

F2 takes you to the next input.



Changing the units of measurement for course thickness.
There is a choice between:

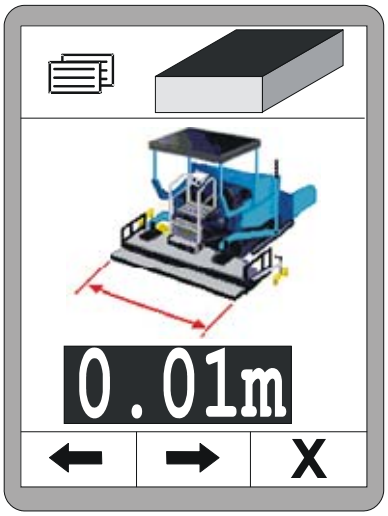
- Centimetre (cm)
- Inch (")



F2 takes you to the next input.

Changing the units of measurement for the paving width.
There is a choice between:

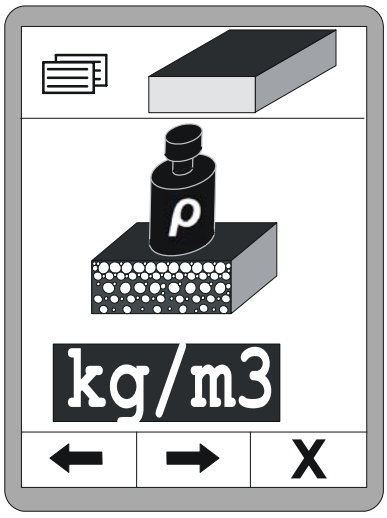
- Meter (m)
- Foot (ft)
- Yard (yd)



F2 takes you to the next input.

Changing the units of measurement for material density
There is a choice between:

- Kilogram/cubic meter (kg/m³)
- Pound/Cubic foot (lb/ft³)
- Pound/Gallon (US) (lb/gal.)
- Pound/Gallon (GB) (lb/gal.)

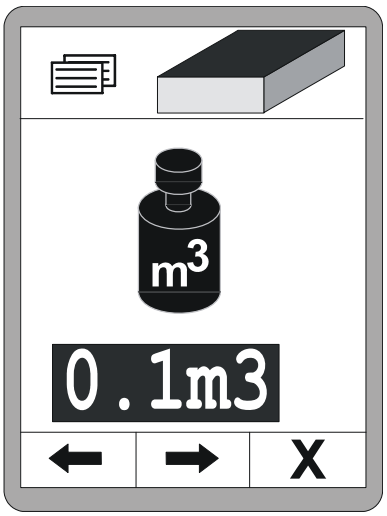


F2 takes you to the next input.

Changing the units of measurement for material volume.
There is a choice between:

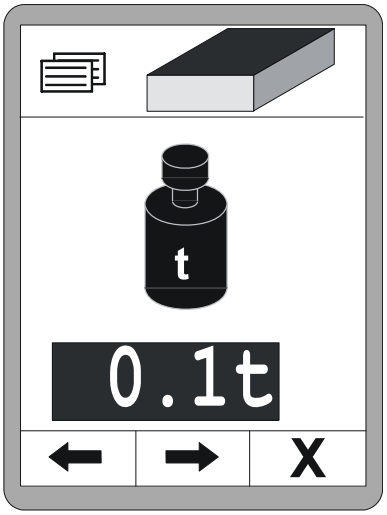
- Cubic meter (m³)
- Cubic foot (ft³)
- Cubic yard (yd³)
- Register ton (reg. tn)

F2 takes you to the next input.



Changing the units of measurement for material weight.
There is a choice between:

- Ton (t)
- Short ton (US) (tn. sh.)
- Long ton (GB) (tn. l.)



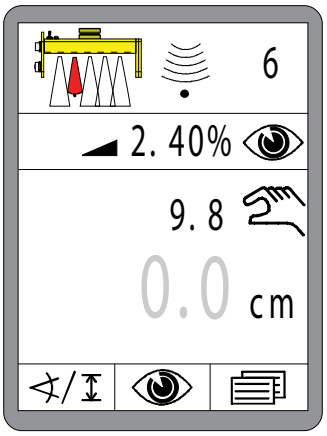
12 External levelling

General

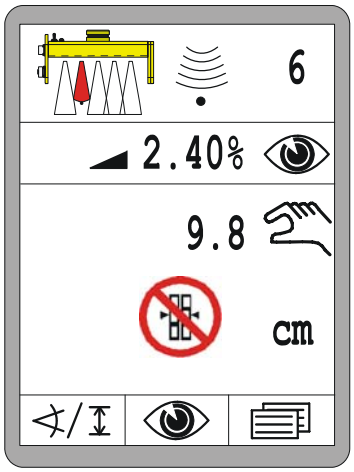
The levelling function is integrated completely in the remote control.
If external levelling is required instead, the system has to be changed over accordingly at the driver's dashboard.

Internal levelling is deactivated for external levelling.
This is shown with a grey nominal value in the working menu.

All other functions are still accessible with function buttons F1 - F3.



If you try to activate internal levelling while external levelling is in progress, the nominal value is replaced with a warning for approx. 3 seconds.



13 Servicing and maintenance

General

The product has been developed for high operating reliability.
Only a minimum of effort is required to maintain the product.
All electronic components are contained in robust housings to avoid any possible mechanical damage.
The devices and the connection cables should nevertheless be checked at regular intervals for possible damage and soiling.

13.1 Safety instructions

Servicing and maintenance work on the product may only be carried out by qualified specialist personnel.

CAUTION!

Risk of injury due to improperly executed maintenance work!
Improper maintenance may lead to severe personal injury or material damage.
Therefore:
- Have maintenance work carried out exclusively by personnel with the required qualifications.
- Ensure sufficient installation space before starting work.
- Pay attention to orderliness and cleanliness at the workplace! Loosely stacked or scattered components and tools are sources of accidents.

13.2 Cleaning and drying

Cleaning work on the product can be carried out by laymen if these adhere to the following specifications.

Devices:

1) Switch off the product;
2) Pour commercially available plastic cleaner onto a soft, lint-free cloth;
3) Clean the surfaces of the devices without pressure;
4) Completely remove the cleaning agent from the devices again using a clean cloth;

Never clean displays using agents which contain abrasive substances. The surface becomes scratched and matte as a result of this, making the display more difficult to read.

Clean and dry the products at a maximum temperature of 40°. Only repackage the equipment again when it is completely dry.

Cables:

The plug contacts and the threads of the plug connections and the cable connections must be kept free of dirt, grease, asphalt and other foreign materials and must be protected against moisture to avoid poor contacts. Blow out soiled connection cable plugs.

13.3 Repairs

Please contact the manufacturer in the event of product damage or wear.

14 Help in the event of malfunctions

General

When working with the remote control, a distinction is made between warning and error messages.

This section provides information on the measures which can or must be implemented if a warning or error message occurs in the system.
In certain cases, the causes of warning messages can be ruled out by strictly adhering to the specifications contained in the operating instructions.
This prevents annoyance and costs caused by unnecessary downtimes.

14.1 Safety instructions

Malfunction rectification on the product may only be carried out by qualified specialist personnel.

For malfunction rectification purposes, always switch the remote control off or, if the voltage supply is required for rectification, switch it to "manual" operating mode.

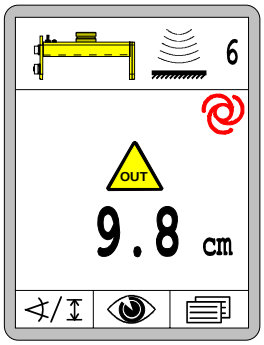
CAUTION!

Risk of injury due to improper malfunction rectification!
Improper malfunction rectification may lead to personal injury or material damage.
Therefore:
- Have malfunction rectification carried out exclusively by personnel with the required qualifications.
- Do not proceed too hastily during malfunction rectification.
- Observe the country-specific, legal safety and accident prevention regulations.

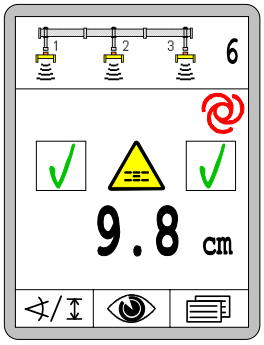
14.2 Troubleshooting and malfunction rectification

Warning messages

Warning messages appear in the operating window at the position of the currently active sensor's actual value.



In the case of sensor combinations (Big Sonic-Ski®, power mast with laser receiver, etc.) a separate warning message is shown for each individual component.



If "automatic" operating mode was active at the time at which a warning message occurred:

- "Automatic" operating mode remains active
- The valve outputs are switched off
- The entire LED arrow flashes

If the cause of the malfunction disappears independently (insect in the measuring range of an ultrasonic sensor, vehicle drives over a pin, etc.), the remote control immediately continues to operate without the operator having to intervene.
If the malfunction remains, the cause must be investigated and rectified.

General:

Cause: The sensor last used has been exchanged or removed;
Remedy: Select another sensor in the sensor selection or check why the sensor is no longer available;

Cause: Positive or negative deviation of the active sensor's measured value from the permissible measuring range or the power mast has reached the upper or lower stop of its mechanical adjustment range;
Control outputs: The outputs are locked in automatic mode;
Remedy: Realign the sensor to the reference;

Cause: The active sensor's control variance is greater than the set control window;
Control outputs: The outputs are locked in automatic mode;
Remedy: Realign the sensor via the reference;

Specifically when working with the laser receiver:

Cause: The laser receiver receives several signals from the laser transmitter due to reflections in its environment;
Control outputs: The outputs are locked in automatic mode;
Remedy: Cover the laser transmitter apart from the actually required circular cut-out;
Remove reflective surfaces (motor vehicle glazing, windows, etc.) from the laser beam's area of influence or cover these surfaces;

Specifically when working with TPS (total station)**:**

Cause: The total station is not installed horizontally;
Control outputs: The outputs are locked in automatic mode;
Remedy: Mount the tripod with the total station so that the air bubble comes to rest in the middle of the spirit level air bubble;

Cause: The battery of the total station is low on charge;
Control outputs: The outputs are still actuated in automatic mode;
Remedy: Press any button to acknowledge the error message;
Replace or recharge the battery;

Cause: Restricted accuracy of the measurement;
Control outputs: The outputs are still actuated in automatic mode;
Remedy: Press any button to acknowledge the error message.
Make sure that the prism is clean and in the direct field of vision of the total station;
Check the distance between total station and vehicle; measuring accuracy can be impaired in the range above 250 m (air flickering) and below 10 m;

Cause: Poor radio link between the total station and the system computer;
Control outputs: The outputs are still actuated in automatic mode;
Remedy: Press any button to acknowledge the error message;
Make sure that there are no metallic screening surfaces between the total station and the system computer;

Specifically when working with GNSS (Global Navigation Satellite Systems)**:**

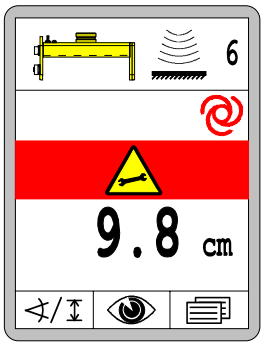
Cause: Restricted accuracy of the measurement; partial shading may possibly result in a poor satellite link;
Control outputs: The outputs are still actuated in automatic mode;
Remedy: Press any button to acknowledge the error message;
Make sure that there is a "clear sky" and that there are no trees, signs, roofs etc. over or in the direct vicinity of the antenna;

Cause: The battery of the base station is low on charge;
Control outputs: The outputs are still actuated in automatic mode;
Remedy: Press any button to acknowledge the error message.
Replace or recharge the battery;

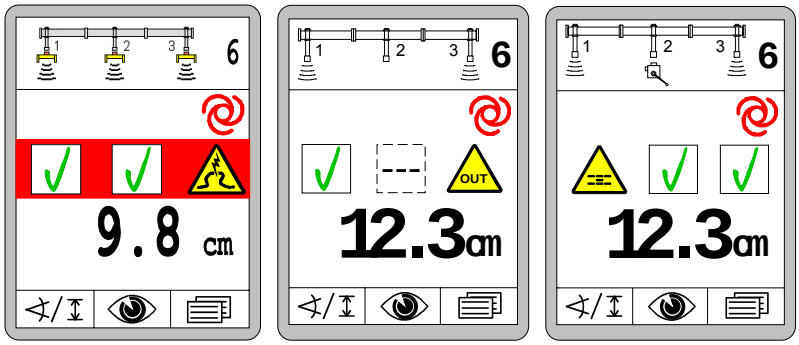
Cause: Poor radio link between basis station and GNSS receiver on the vehicle;
Control outputs: The outputs are locked in automatic mode;
Remedy: Make sure that there are no metallic screening surfaces between the base station and the system computer;

Error messages

Error messages differ from warning messages due to the fact that they are always displayed in combination with the signal colour "red".
In contrast to warnings, which usually only appear temporarily and disappear again automatically, error messages frequently indicate defects.
Like warning messages, error messages appear in the operating window at the position of the currently active sensor's actual value.



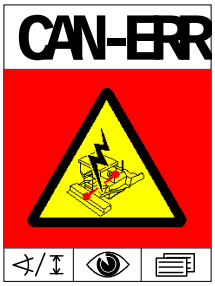
In the case of sensor combinations (Big Sonic-Ski®, power mast with laser receiver, etc.) a separate error message is shown for each individual component.
E.g.



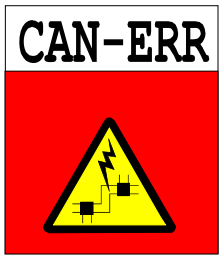
If "automatic" operating mode was active at the time at which a warning message occurred:

- "Automatic" operating mode remains active
- The valve outputs are switched off
- The entire LED arrow flashes

System error messages are shown over the entire display.



Cause: The connection between the Screed Controller and the higher-level control system is interrupted.
Control outputs: No further control signals whatsoever can be transmitted to the tractor.
Remedy: CAN connection must be restored, as continuing to work is otherwise impossible.
Contact the manufacturer;



Cause: An error has occurred in the CAN network;
Control outputs: The outputs are locked in automatic mode;
Remedy: Check all system connection cables for damage;
Contact the manufacturer;

Cause: Data loss has occurred in the memory;
Control outputs: The outputs are locked in automatic mode;
Remedy: Acknowledge the error message with any button and reset the working point and nominal value;
Contact the manufacturer if this occurs repeatedly;

Cause: The temperature in the interior of the remote control approaches the permissible maximum temperature;
Consequence: The device continues to heat up, but switches off automatically on reaching the permissible maximum temperature;
Remedy: Acknowledge the error message with any button - the remote control initially continues to operate as normal;
Prevent further heating (shading, cooling, different installation location, etc.);

Cause: The temperature in the interior of the remote control approaches the permissible minimum temperature;
Consequence: The device continues to cool down, but switches off automatically on reaching the permissible minimum temperature; the display backlighting remains on as a heat source [1];
Remedy: Acknowledge the error message with any button - the remote control initially continues to operate as normal;
Protect the remote control against further cooling;

[1] Note: If the remote control is commissioned at a temperature below the specified operating temperature (also refer to the technical data in this regard), all of the device's LEDs flash. The display backlighting is activated and serves as a source of heat until the display can be activated without risk.

General:

Cause: The connection to the active sensor has suddenly been lost during operation;
Control outputs: The outputs are locked in automatic mode;
Remedy: Check the sensor's connection cable for damage and exchange it if necessary;
Exchange the sensor;

Cause: The active sensor transmits impermissible or contradictory messages or measured values;
Control outputs: The outputs are locked in automatic mode;
Remedy: Unplug the sensor, realign it via the reference and reconnect it;
Exchange the sensor if necessary;

Specifically when working with the power mast:

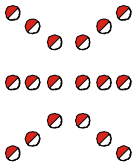
Cause: The power mast is equipped with its own internal measuring - system, with which it can determine how far it is currently extended at any time;
In exceptional situations, the mast may "forget" this current position;
Control outputs: The outputs are locked in automatic mode;
Remedy: Retract the power mast completely once so that it can automatically re-initialise itself in this position;

Cause: Although one of the remote control's outputs is actuated, no current flows to or in the power mast;
Control outputs: The outputs are locked in automatic mode;
Remedy: Check the power mast's connection cable for damage and exchange it if necessary;
Exchange the power mast;

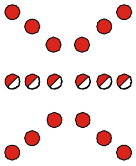
Cause: Although one of the remote control's outputs is actuated, the power mast does not move - the mast is stuck or blocked;
Control outputs: The outputs are locked in automatic mode;
Remedy: Check whether an obstacle is located in the mast's path, the mast is possibly bent or the mast's moving mechanism is severely soiled and therefore blocked;

Specifically when working with the laser receiver:

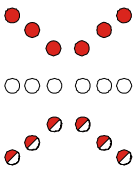
Reflection errors (e.g. due to reflective surfaces or flashing lights on the construction site) are the most frequent malfunctions when working with laser systems.
As a result of this, the laser receiver evaluates the signals sent by the laser transmitter, evaluates them and indicates error situations using its LED display as follows:



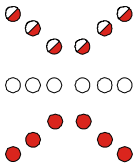
Cause: No laser beam hits the laser receiver;
Control outputs: The outputs are locked in automatic mode;
Remedy: Realign the laser receiver to the laser beam;



Cause: The laser receiver is acyclically hit by laser beams or is hit simultaneously by several laser pulses;
Control outputs: The outputs are locked in automatic mode;
Remedy: Cover the laser transmitter apart from the actually required circular cut-out;
Remove reflective surfaces (motor vehicle glazing, windows, etc.) from the laser beam's area of influence or cover these surfaces;
Check whether a second laser transmitter is in operation in the vicinity;



Cause: Negative deviation from the laser transmitter's specified minimum rotational speed (<10 Hz [revolutions per second]);
Control outputs: The outputs are locked in automatic mode;
Remedy: Increase the laser transmitter's rotational speed if it is equipped with a speed control;
Check the laser transmitter's rechargeable battery / supply voltage;



Cause: Positive deviation from the laser transmitter's specified maximum rotational speed (>20 Hz [revolutions per second]);
Control outputs: The outputs are locked in automatic mode;
Remedy: Reduce the laser transmitter's rotational speed if it is equipped with a speed control;
Remove reflective surfaces (motor vehicle glazing, windows, etc.) from the laser beam's area of influence or cover these surfaces;

Legend: ○ = LED is off ◪ = LED flashes ● = LED is on

Specifically when working with TPS (total station)**:**

Cause: The total station has lost the prism, thus interrupting the direct "view" of the prism;
Control outputs: The outputs are locked in automatic mode;
Remedy: The total station automatically starts target tracking again after measurement was interrupted;
If necessary, the operator has to restart the total station prism search by hand;

Cause: The total station is searching for the prism;
Control outputs: The outputs are locked in automatic mode;
Remedy: Please be patient for a moment; the prism search can take a little time;
If necessary, start the total station extended search;

Cause: An unspecified 3D error has occurred;
Control outputs: The outputs are locked in automatic mode;
Remedy: Please comply with the information about the error given on the total station and system computer displays;

Cause: The total station battery is flat;
Control outputs: The outputs are locked in automatic mode;
Remedy: Replace or recharge the battery;

Cause: The vehicle is outside the project or surface design;
Control outputs: The outputs are locked in automatic mode;
Remedy: Move back into the project or select the surface design belonging to the current position;

Cause: The radio link between the total station and the system computer is interrupted;
Control outputs: The outputs are locked in automatic mode;
Remedy: Check the wiring and the power supply for the radio devices;
Check the LEDs on the total station and on the radio device that visualise the radio link;
Make sure that there are no metallic screening surfaces between the total station and the system computer;

Specifically when working with GNSS (Global Navigation Satellite Systems)**:**

Cause: The missing correction signal means that no valid position is produced by the GPS;
Control outputs: The outputs are locked in automatic mode;
Remedy: Please be patient for a moment; the search for the number of satellites necessary for certain position definition can take a little time;
Please check the age of the last 3D software correction to be received. The correction signal should be received in a cycle once per second;

Cause: The GPS cannot produce a valid position because there are not enough satellites;
Control outputs: The outputs are locked in automatic mode;
Remedy: Please be patient for a moment; the search for the number of satellites necessary for certain position definition can take a little time;
If the error message persists over a longer period of time, please move to part of the construction site with a "clear sky";

Cause: An unspecified 3D error has occurred;
Control outputs: The outputs are locked in automatic mode;
Remedy: Please comply with the information about the error given on the system computer display;

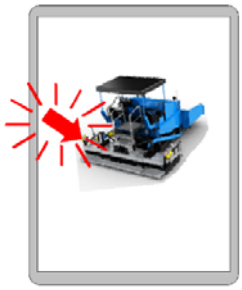
Cause: The base station battery is flat;
Control outputs: The outputs are locked in automatic mode;
Remedy: Replace or recharge the battery;

Cause: The vehicle is outside the project or surface design;
Control outputs: The outputs are locked in automatic mode;
Remedy: Move back into the project or select the surface design belonging to the current position;

Cause: The radio link between basis station and GNSS receiver on the vehicle is interrupted;
Control outputs: The outputs are locked in automatic mode;
Remedy: Check the wiring and the power supply for the radio devices;

Make sure that that the base station is working and that there are no screening metallic surfaces directly in front of it;

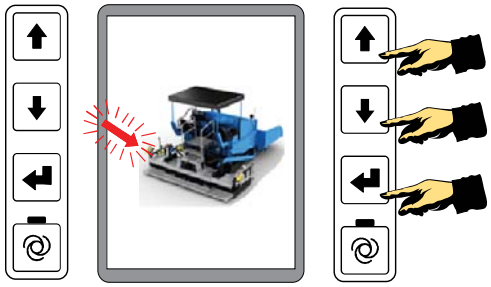
Side recognition error:



Display: The side recognition indicates with a flashing arrow that both remote controls have imported the same side recognition.
Function: The remote controls remain in the error menu, i.e. operation is not possible.
Causes: The lead cable for the remote control or the plug connector to the connection box is damaged or has a loose contact; the connection box issues incorrect side detection.
Remedy: Check the lead cable incl. plug connector for damage and exchange if necessary;
replace the remote control;

Manual side changeover

Manual changeover of the side recognition is possible to finish any ongoing work in the event of this error.



This example shows a remote control fitted on the right which has imported "wrong side recognition".

- On the wrong remote control, press and hold the 3 UP + DOWN + ENTER buttons at the same time until the display goes off.
- The remote control now reboots and then starts up again with the correct side.
- Work can then continue as normal.

The side recognition is re-imported with every start.
In other words, manual side changeover has to be repeated with every restart.

15 Definitions/Glossary

Definition	Definition
Actual value	The actual value measured by a sensor, e.g. the distance of a gap sensor to the reference point or the inclination measured by a slope sensor.
Actuator	Converts control signals into (usually) mechanical work, i.e. movement; e.g. a valve that opens or closes.
Calibration to zero	The value "0.0" is allocated to the current measured value which at the same time is taken to be the nominal value for control.
CAN bus	The CAN bus (**C**ontroller **A**rea **N**etwork) is a system for serial data transfer. It was developed for networking controllers in motor vehicles in order to reduce the cable harnesses (up to 2 km per vehicle) and make data transfer more secure.
Control variance	Difference between nominal and actual value. When making adjustments, the controller moves the actuator so that the measured value of the sensor (actual value) corresponds with the stipulated value (nominal value).
Dead band	A symmetrical area around the working point where there is no activation of the output. It is used to achieve stable behaviour of the screed in the working point.
Max. pulse	Activation pulse defining the maximum permitted working speed of a hydraulic cylinder.
Min. pulse	Minimum activation pulse necessary to move a hydraulic cylinder over the smallest possible distance.
Nominal value	The target variable entered or specified by the user which has been reached and should be sustained by a control circuit.
Offset	A constant systematic error of a variable or measured value (e.g. when the digital slope sensor cannot be fitted absolutely parallel to the lower edge of the screen).
Prop band	Area above and below the dead band with "regulated" activation of the output. The pulse length depends on the control variance.
Working point	Point (gap or inclination) where the actual value and the nominal value are the same and no adjustment takes place.

Parts & Service

Training

We offer our customers training courses on DYNAPAC equipment in our dedicated factory training centre. We hold regular training courses in this training centre as well as courses outside the scheduled hours.

Service

Please contact one of our responsible service outlets if you encounter any operational problems or have enquiries about spare parts.
Our trained, specialist staff will ensure that you receive prompt attention and repairs in the event of any accident or malfunction you may encounter.

Factory Advisory Service

If ever for any reason our dealership network encounters limits to what it is able to do for you, please always feel free to contact us directly.
Our team of technical advisers is on hand to assist you.
gmbh-service@dynapac.com

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