

Operating manual

PlanMatic



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Legal notice

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Technical documentation

Machine designation:

PlanMatic 1.4 Basic
Part no.: 54550

PlanMatic 2.0 Basic
Part no.: 54548

PlanMatic 1.4 PRO
Part no.: 54549

PlanMatic 2.0 PRO
Part no.: 54547

Information on the operating manual:

This operating manual is a translation of the original German version. The original German version is the authoritative document.

Version: 05/2026 Rev. 1

Subject to technical changes

The manufacturer reserves the right to make changes to the machine and operating instructions as part of ongoing technical development, provided that this does not affect the guaranteed characteristics.

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1. CE Declaration of conformity

In accordance with the EC Machinery Directive 2006/42/EC, Annex II 1. A.

Manufacturer:

Optimas Maschinenfabrik GmbH

Industriestrasse 12

Germany – 26683 Saterland-Ramsloh

Person established within the Community authorized to compile the technical documentation:

R. Kufelt

Optimas GmbH

Industriestr. 12

Germany - 26683 Saterland

Product designation:

Optimas PlanMatic Basic

Optimas PlanMatic Pro

Type: Grading machine

It is hereby expressly declared that the machine complies with all relevant provisions of the following CE Directives.

2006/42/EG

Directive 2006/42/EC of the European Parliament and of the Council of May 17, 2006, on machinery and amending Directive 95/16/EC (recast)

The following standards and technical specifications were used:

EN ISO 12100 (2010)

Safety of machinery – General principles for design – Risk assessment and risk reduction

EN 60204-1 (2018 + A1: 2025)

Safety of machinery – Electrical equipment of machines – Part 1: General requirements

EN ISO 4413 (2010)

Fluid power—General rules and safety requirements for hydraulic systems and their components

Saterland, May 15, 2026

Location, Date



Sascha Brinkmann

2. General information

This user manual contains important information for the safe and proper operation of the Optimas PlanMatic grader, as well as the versions with or without hydraulic functions.

The instructions contained in this manual are intended to prevent hazards and ensure safe operation throughout the product's service life. This requires that all persons working with the product have read and understood the contents of this manual.

The information, technical data, and illustrations are current as of the date of publication. We reserve the right to make changes in the interest of technical progress, which may affect the design and operation of the product.

Before beginning any work, ensure that you have the most current version of the documentation.

2.1 Warranty

The warranty period for the device is 12 months from the date of purchase.

Optimas warrants that the PlanMatic is free from material and manufacturing defects for a period of one year.

In the event of a warranty claim, Optimas or an authorized service center will, at its discretion, repair or replace all defective parts covered by the warranty at the manufacturer's facility or at the respective place of performance.

Any necessary travel costs and per diem expenses for service calls outside the place of performance will be billed to the customer at the applicable rates.

Excluded from the warranty are damages caused by improper use, incorrect operation, or unauthorized interventions— including those by third parties.

The use of the Optimas PlanMatic does not relieve the user of the obligation to verify the measurement results using suitable additional measuring equipment.

No liability is assumed for damage resulting from measurement errors, incorrect settings, or operating errors on the part of the user, to the extent permitted by law.

3. Safety

3.1 Safety principles

Most accidents during operation, maintenance, or repair result from failure to observe basic safety rules. Dangerous situations can often be identified and avoided in advance. This requires safety-conscious behavior on the part of all persons involved. The product may only be operated, maintained, or repaired by persons who:

- have received appropriate training,
- possess the necessary technical expertise,
- are familiar with the applicable safety regulations.

Improper operation, inadequate maintenance, or unprofessional repairs can result in serious or fatal injuries as well as property damage.

3.2 Safety and warning instructions

Safety and warning notices are used on the product and in this manual to draw attention to hazards. These notices are structured as follows:

	Danger	<u>Danger to life!</u> Indicates a hazard. If not avoided, it will result in death or serious injury.
	Warning	<u>Dangerous Situation!</u> Indicates a dangerous situation. If not avoided, it may result in injury or property damage.
	Prohibition	<u>Prohibited!</u> Indicates a prohibition. If not observed, death, serious injury, or property damage will result.
	Caution	<u>Caution!</u> Risk of crushing your hands.

Additional instructions for preventing property damage are marked as **NOTE**.

3.3 Residual hazards and operator responsibility

The device is intended for commercial use. The operator is obligated to comply with applicable regulations regarding occupational safety, accident prevention, and environmental protection.

In particular, the operator must:

- conduct a risk assessment for the area of use,
- prepare the necessary operating instructions,
- define responsibilities for installation, operation, maintenance, and cleaning,
- ensure that personnel are trained and follow these instructions.

Despite the device's safety-compliant design and compliance with relevant standards, residual risks cannot be completely ruled out during operation. These risks may occur in particular during:

- intended use,
- foreseeable misuse,
- maintenance and repair work.

The operator and operating personnel must take these residual risks into account and implement appropriate protective measures.

Hazards	Possible consequences	Protective measures
Mechanical hazards: unexpected movements of the cutting edge, pinch and shear points on moving components (e.g., shield, side flaps, attachments)	Crushing, serious injuries, and even fatal injuries	Maintain a safe distance from all moving parts, avoid staying in the danger zone, secure the machine before leaving (lower the cutting edge, shut down the system)  
Hydraulic hazards: escaping hydraulic oil under high pressure, sudden movements due to pressure fluctuations or line defects	Injection injuries (pressurized hydraulic oil), burns from hot oil, uncontrolled machine movements	Inspect hydraulic lines regularly; relieve pressure before performing maintenance; use only suitable and approved components 
Electrical hazards: faulty electrical connections, damaged cables	Short circuits, control system failure, uncontrolled movements	Check electrical connections regularly; use only trained personnel; replace damaged components immediately 
Hazards from automatic operation: Risk from uncontrolled movements	Unexpected movements of the cutting edge, risk to persons in the work area	Keep the hazard zone clear; completely shut down the machine before leaving
Hazards due to operating conditions: Working on sloped surfaces, unstable or insufficiently load bearing surfaces, restricted visibility	Loss of control over the carrier vehicle, tipping or slipping, collisions	Observe permissible operating limits, adjust driving style, secure the work area
Risks during maintenance and servicing: unintentional activation of the system during maintenance work	Serious injuries from moving parts	Completely shut down the machine before work, disconnect power sources (hydraulics, electrical), secure against restart

3.4 Special hazard warnings



Warning

Use of spare parts

The use of non-approved spare parts can result in malfunctions, damage to the product, and serious or fatal injuries. Only use original spare parts or technically equivalent parts.



Warning

Automatic movements!

When automatic control is activated, the cutting edge of the device may move unexpectedly.

This can result in serious injury to persons in the danger zone.

- Turn off automatic mode before leaving the machine
- Always lower the cutting edge to the ground
- Keep the danger zone clear



Warning

Staying in the danger zone

Working under raised components poses a risk of death due to unexpected movements.

- Never step under raised cutting edges or attachments
- Maintain a safe distance from the area of movement



Warning

Working on sloped terrain

On ramps or sloped surfaces, there is a risk of losing control of the carrier vehicle.

- Observe the maximum permissible slope
- Adapt your driving style to the terrain



Warning

Hot surface on the hydraulic block

The hydraulic block and other hydraulic components can become very hot during operation. Touching them can cause burns.

- Do not touch hot surfaces
- Allow the machine to cool down before performing maintenance or repair work
- Wear appropriate protective gloves

There is a risk of burns if you touch hot surfaces!

3.5 Intended use

The product is designed and constructed exclusively for the intended use described here.



Danger

Dangerous situation!
Danger due to improper use!

The Optimas PlanMatic is an attachment for wheel loaders, skid-steer loaders, telescopic loaders, and comparable carrier vehicles. The carrier vehicle must be suitable for the weight of the PlanMatic as well as the operational loads that occur. The permissible load capacity and stability of the carrier vehicle must be observed.

The system is intended exclusively for:

- Creating and profiling sub-grade surfaces in earthworks, road construction, and paving
- Controlling the cutting edge in terms of height and tilt
- Optional: Support for grading work via sensor systems (e.g., laser, ultrasonic, tilt sensors)
- Control of hydraulic functions (depending on the model)

The product is intended for use on construction sites and in comparable work environments. The product is not approved for use on public roads!

Intended use requires:

- Mounting on a suitable and approved carrier vehicle
- Compliance with all technical connection requirements (particularly hydraulic and electrical supply)
- Operation exclusively by trained and qualified personnel
- Compliance with all instructions in this operating manual

3.6 Foreseeable misuse

Any use that goes beyond or deviates from the intended use is considered improper.

In particular, the following applications are prohibited:

- Use of the device as a lifting or transport device for persons or loads
- Presence of persons in the danger zone of moving components
- Operation with unsuitable or non-approved carrier vehicles
- Operation with defective or deactivated safety devices
- Use outside the intended operating conditions (e.g., extreme inclines, unsuitable surfaces)
- Use without sufficient visibility of the work area

The manufacturer is not liable for damage resulting from improper use.

3.7 Unauthorized modifications

The product is designed and constructed exclusively for the intended use described here.



Prohibition

Unauthorized modifications to the product or the use of any homemade attachments endanger life and limb and are therefore strictly prohibited!

3.8 Operating limits

The product may only be operated within the following limits:

- Compliance with the permissible operating parameters of the carrier vehicle
- Operation only when the carrier vehicle has sufficient stability
- Compliance with the permissible terrain gradient as specified by the carrier vehicle manufacturer
- Use only with compatible sensor and control systems

The permissible technical specifications (e.g., voltage, hydraulic pressure, dimensions) must be observed.

3.9 Personnel requirements



Caution

Dangerous situation!

Risk of injury if personnel are not sufficiently qualified!
Improper handling can result in serious personal injury and property damage.
Therefore, have all work performed only by qualified personnel.

The operating manual specifies the following qualifications for various areas of work.

- Trained person

has been instructed by the operator regarding the tasks assigned to them and the potential hazards associated with improper behavior.

- Qualified personnel

is capable, based on their professional training, knowledge, and experience, as well as their knowledge of the relevant regulations, of performing the assigned tasks and independently recognizing and avoiding potential hazards. Only persons who can be expected to perform their work reliably are authorized to work.

Persons whose reaction times are impaired, e.g., by drugs, alcohol, or medication, are not permitted.

3.10 Personal protective equipment

To minimize any remaining risks, the following personal protective equipment is recommended:

- Safety shoes,
- Work gloves (during maintenance),
- Protective clothing (3D jacket)



4. Technical specifications

4.1 General technical specifications

Parameters	1.4 Basic	2.0 Basic	1.4 PRO	2.0 PRO
Equipment type	Grader (attachment)			
Application	Earthworks, road construction and paving			
Weight	640 kg	750 kg	670 kg	780 kg
Base width	1.4 m	2.0 m	1.4 m	2.0 m
Working width	2.0 m	2.6 m	2.0 m	2.6 m
Working width (optional)	2.3 – 2.6 m	2.9 - 3.2 m	2.3 - 2.6 m	2.9 - 3.2 m
Cylinder stroke	200 mm	300 mm	200 mm	300 mm
Accuracy	± 0,4 cm			

4.2 Electrical specifications

Parameters	Value
Operating voltage	DC 12 V
Current consumption (max.)	15 A

NOTE

Power is supplied via the carrier vehicle. The connection requirements of the carrier vehicle must be observed.

4.3 Hydraulic specifications

Parameters	Value
Min. operating pressure	120 bar
Max. operating pressure	300 bar
Max. flow rate	120 l/min
Hydraulic connection	depending on equipment configuration and carrier vehicle
Return	pressure-less return, if required

NOTE

The hydraulic supply is provided by the carrier vehicle. The requirements for the hydraulic supply depend on the equipment configuration and the carrier machine used.

The required operating pressure of at least 120 bar must be maintained to ensure proper system function. If the pressure falls below the minimum, malfunctions or uncontrolled movements may occur. The maximum operating pressure of 300 bar must not be exceeded. Exceeding this limit can cause damage to hydraulic components and lead to dangerous situations.

4.4 System components

Depending on the model, the system can be operated with the following components:

- Laser systems
- Ultrasonic sensors
- Tilt sensors
- 3D control

The combination of components depends on the specific system configuration.

4.5 Mechanical features

- Replaceable undercut blade
- Side flaps (Basic: mechanically adjustable or Pro: hydraulically adjustable)
- Hydraulic dump shovel (optional)
- Quick-change device for carrier vehicle (optional)

4.6 Note on technical specifications

The values provided apply to standard versions of the product. Deviations may occur due to:

- different equipment variants
- optional components
- Customer-specific modifications

We reserve the right to make technical changes as part of product development.

5. Product description

The core components of the system are the control unit, the regulation unit and the respective sensors used.

5.1 Control unit

- 1 = Offset right
- 2 = Sensor selection: Height/tilt right/left
- 3 = Offset left
- 4 = Automatic mode indicator, left (active: green LED on)
- 5 = Manual mode indicator, left (active: yellow LED on)
- 6 = LED height indicator, left (Up/down: yellow LEDs, Center: green LED)
- 7 = Set set-point left
- 8 = Automatic side shift left (active: yellow LED on)
- 9 = Proportional joystick with
blue - Automatic/manual switch
green - Switch 0 position
yellow - Manual operation of ALS or
hydraulic dump shovel (optional)
- 10 = Open/close hydraulically adjustable side flaps
- 11 = Automatic mode indicator, right (active: green LED on)
- 12 = Manual operation indicator, right (active: yellow LED on)
- 13 = LC display
- 14 = LED height indicator, right (Up/down: yellow LEDs, Center: green LED)
- 15 = Set set-point right
- 16 = Automatic mode side pre-selection right and/or left
- 17 = Automatic side shift, right (active: yellow LED on)
- 18 = ON/OFF + SETUP
- 19 = Toggle switch ALS



5.1.1 [1] + [3] Offset right or left

Use the [1] or [3] buttons to set the set-point of the respective active sensor or to shift it from the original reference (center or zero point):

- Set the set-point for the transverse tilt
- Set the (offset) height for the laser receiver or ultrasonic sensor

The adjustment increment for the height value is 1 millimeter or 0.1%. Pressing and holding the up arrow key increases the offset value, and holding the down arrow key decreases it.

5.1.2 [2] Sensor selection: right/left height and/or tilt sensor

Pressing the [2] button multiple times selects the sensors that are to be used for automatic control. These are represented by symbols on the right or left edge of the LC display [13]:

- Right: height sensor + Left: height sensor, or
- Right: height sensor + Left: tilt sensor, or
- Right: tilt sensor + Left: height sensor

5.1.3 [4] + [5] or [11] + [12] Automatic/ manual mode indicator left/right

On each side of the LC display there are two LEDs for the Automatic/Manual mode (A/M) indicator. The green LEDs [4] or [11] light up in automatic mode, the yellow LEDs [5] or [12] light up in manual mode. The side(s) for automatic mode is preset using the A/M button [16]. Switching between manual and automatic mode is done using the blue button on the joystick.

5.1.4 [6] + [14] LED height indicator right/left

The LED indicators [6] and [14] show whether the cutting edge of the grading blade is at the target height. The middle green LED lights up.

If too little material is removed, the upper yellow LEDs light up; if too much material is removed, the lower yellow LEDs light up.

5.1.5 [7] + [15] SET: Set set-point right/left

Use the [7] or [15] buttons to set a reference height or tilt (zero point). Some sensors have additional settings that are also controlled with these buttons.

Pressing both buttons simultaneously decouples the right and left sides from each other. This is indicated by an open chain in the first line of the display. To couple the two sides, press both buttons simultaneously again. A closed chain appears in the first line of the display.



5.1.6 [8] + [17] SSL/SSR: Automatic side shift right/left

Ultrasonic scanners with three or more sensor heads can usually detect both the height and the lateral distance above a string or tension wire. Pressing the SSL/SSR buttons [8] or [17] activates the automatic side shift. The yellow LED lights up. If the side flaps are hydraulically adjustable, they are now automatically opened or closed so that the distance to the string or tension wire remains constant. Pressing the [8] or [17] buttons again deactivates the automatic function.

5.1.7 [9] Joystick

The proportional joystick [9] is used to manually control the hydraulic functions. The sensitivity and direction can be adjusted.

The blue button turns the automatic height control on and off.

The green button activates the 0 position.

The yellow button controls the hydraulic folding bucket (optional).

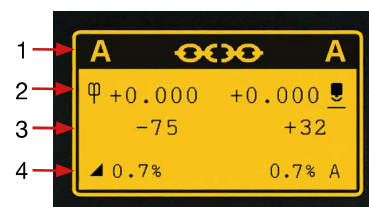
5.1.8 [10] Toggle switch for hydraulically adjustable side flaps right/left

The toggle switches [10] are used to manually open or close the hydraulically adjustable side flaps. The left switch controls the left flap. Tilting to the left opens the side flap; tilting to the right closes it. Similarly, the right toggle switch controls the right flap: tilting to the right opens the flap; tilting to the left closes it. When the switch is in the center position, the side flap is locked in place.

5.1.9 [13] Backlit LC display

The lines display the following:

1. Automatic mode for the right, left, or both sides: The capital letter A or M appears in the right or left corner, respectively. It also indicates whether the sensors are linked or not (chain symbol).
2. Symbols for the sensors currently active for control, as well as the set-points for height and tilt
3. Actual sensor readings
4. Transverse slope value on the left and longitudinal tilt value on the right in %



5.1.10 [16] Page pre-selection for automatic mode right and/or left

Pressing the [16] key multiple times selects the control side(s) for automatic operation. The capital letter A appears in the left and/or right corner of the first line of the LC display.

For the ALS option, the button must be held down longer to turn the automatic function off and then back on.

5.1.11 [18] Setup On/Off switch

Pressing the [18] button turns on the controller. A beep sounds. After initialization and a self-test, the controller is ready for normal operation.

Pressing the [18] button again opens the SETUP menu. Here, the user can set various parameters. Saved machine data and configurations can be loaded or restored.

Pressing the [18] button again briefly returns the system to normal operating mode.

Pressing and holding the [18] button for more than 3 seconds turns off the entire control system. The display confirms this with "Goodbye".

5.1.12 [19] Toggle switch ALS

If the automatic longitudinal slope control (ALS) option is installed, the tilt angle can be adjusted in 0.1% increments using the toggle switch [19].

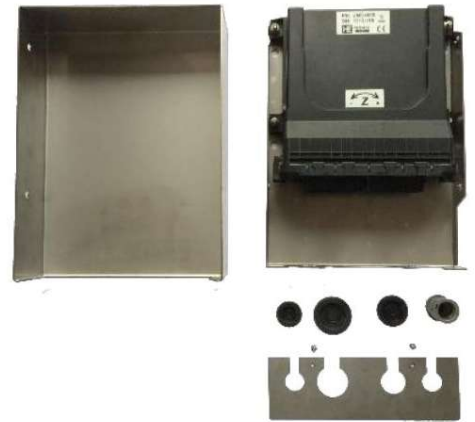
5.2 Controller (Control device)



Basic
Two-channel controller



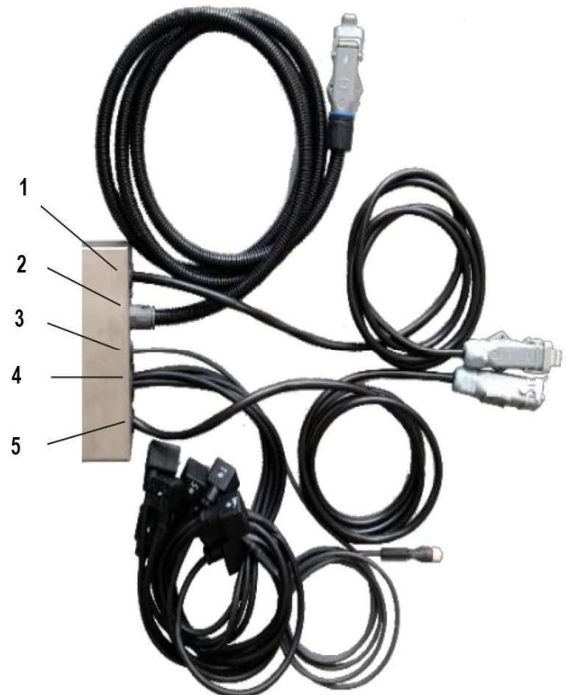
Standard
Multi-channel controller



Stainless steel protective housing
for controller

Controller outputs

- 1 = Height sensor, right side
- 2 = Power supply and control unit (cabin)
- 3 = Output for external tilt sensor
- 4 = Output for hydraulic valves
- 5 = Height sensor, left side



6. Installation and commissioning

Before commissioning the Optimas PlanMatic, ensure that all plug connections as well as the height and tilt sensors are connected. The device is designed for 12 volts. A voltage converter is required for 24-volt carrier devices.



Warning

Make sure that no persons are in the danger zone of the cutting edge. Always turn off the automatic function before leaving the machine. Place the cutting edge on the floor.

6.1 Maximum return pressure 50bar

The permissible return pressure must not exceed 50 bar. If this value is exceeded, a pressureless return on the carrier vehicle is required. A pressure gauge is installed in the return line to monitor the return pressure.



NOTE

The pressure-less return must be installed by the operator!

6.2 Installation

Before mounting the PlanMatic on the carrier vehicle, perform the following steps:

- Turn off the carrier machine
- Turn on the ignition on the carrier machine
- Depressurize the lines

The PlanMatic can then be installed:

- Mount the plate to the carrier vehicle
- Connect the hydraulic hoses
- Connect the electrical cables
- Plug the connector into the 12-V socket
- Connect the control unit

6.3 Powering on

Press the setup button [18] until a beep sounds and all LEDs light up. The system turns on. The display shows the product name and manufacturer. The Optimas PlanMatic then checks which sensors are connected. The detected sensors are shown on the display using small icons.

The sensors are selected using button [2] (see Section 6.6).

6.4 Diagnostic function

The control box outputs error codes and error messages to assist with troubleshooting system errors. Error messages appear on the LC display. Acknowledgment of the error message must be confirmed using the blue button on the joystick [9].

6.5 Offset buttons

The function of the offset buttons [1] or [3] depends on the selected sensor type (button [2] sensor selection: height or transverse slope sensor, right and/or left).

6.5.1 Transverse slope

If the transverse slope sensor is selected, the offset button is used to set the value for the desired tilt. The value and direction of the tilt are shown on the display as a percentage. If no transverse slope sensor is connected, a question mark (?) is displayed.

6.5.2 Height sensor

If a height sensor (laser or ultrasonic receiver) is used, an offset from the zero position is set using the offset keys [1] or [3].

6.6 Sensor selection

Press the [2] key to access the menu for selecting the sensors that are to be used for automatic control.

-  Transverse slope sensor
-  Laser receiver
-  Ultrasonic receiver (measurement above the ground)
-  Ultrasonic receiver (measurement above the string)
- 3D** Use 3D monitor
- ?** Sensor not found

Pressing the button again exits the menu.

6.7 Page selection for automatic mode

The [16] button selects automatic mode for the control side(s).

After power-up, the left and right sides are enabled for automatic control. Pressing the button disables automatic control on the left side; the right side remains active. Pressing it again disables the right side; the left side is active again. Pressing the [16] button once more re-enables both sides for automatic control.

Button [16]	After power-on	Press once	Press 2 times	Press 3 times
Left	Automatic	Manual	Automatic	Automatic
Right	Automatic	Automatic	Manual	Automatic

The blue button on the joystick [9] is used to turn the enabled side on and off for automatic guidance mode.

6.8 Setting the set-point for height and tilt

Briefly pressing the [7] + [15] buttons sets the set-points relative to the reference for the sensor selected on the right and left, respectively.

6.9 Joystick

By default, moving the joystick forward or backward raises or lowers the grader blade. The speed at which the cylinders move during manual operation can be set individually for each function. The direction in which the cylinder moves can also be set individually.

The blue button on the joystick turns automatic mode on and off. Pressing the green button automatically moves the blade to the center position. The yellow button is often unassigned, but can be configured so that additional functions (such as the hydraulic dump shovel, ALS) can be controlled with the joystick.

7. Setup

7.1 Setup menu

The setup menu is divided into two access levels:

NORMAL MODE

In normal mode, the operator of the carrier vehicle can change settings. Only the parameters required for working with the product are accessible. All parameters required for setting up and calibrating the product are locked. Additionally, the stored machine data records cannot be modified or overwritten.

EXPERT MODE

In expert mode, settings should only be adjusted by authorized service personnel or by highly experienced users who have received special instruction and training. With this permission level, you can change all control parameters.



Warning

Incorrect settings can damage the machine or the control system, and cause property damage and/or personal injury to third parties. Neither the manufacturer nor the distributor assumes liability for unauthorized interventions or attempts to change settings or calibrations on one's own initiative.

Expert mode is not described further in this operating manual. For assistance, please contact *Optimas* Service.

To enter the setup menu in normal mode:

Briefly press the [15] button for normal operation.
The display shows: NORMAL MODE



After about two seconds, the machine name is displayed.
The user is now in the OP200 setup menu and can navigate through the menu using the joystick.



7.2 Setup menu: Navigating with the joystick

The joystick is used to navigate through the setup menu and to change parameters.

Move the joystick up or down:

- Select menu item
- Set, change, or select a parameter

Move the joystick to the left:

- Cancel, do not save changes

Move the joystick to the right:

- Confirm, save change

7.3 Setting the operating mode

Independent Offset mode

In independent offset mode, the offset button [3] affects only the left side and the offset button [1] affects only the right side of the control.

A	OPTIMAS	A
Operating mode Indep. Height		

Coupled Offset mode

In coupled offset mode, two identical height sensors must be connected. The offset buttons [3] and [1] affect both the left and right sides of the control simultaneously. The height offset from the left and right height sensors is always the same.

A	OPTIMAS	A
Operating mode Coupled Height		

If button [2] is set to tilt sensor, the system automatically switches to independent height.

Automatic coupling

In automatic coupling mode, the system automatically detects whether two laser sensors are selected. In this case, the coupled offset mode is automatically activated. For other configurations of active sensors, the independent offset mode is automatically set.

A	OPTIMAS	A
Operating mode Automatic coupling		

7.4 Valve speed

Use the Valve Speed menu to set the operating speed of the automatic blade movement. The valve speed for the height and tilt sensors can be set independently of each other.

Height

Select the height sub-menu to set the operating speed for all height sensors. Confirm your selection.

A	OPTIMAS	A
Valve speed Height		

A value between 1% and 100% can be set for the operating speed.

A	OPTIMAS	A
Input Height 70%		

Tilt

Select the tilt sub-menu to set the operating speed for the transverse slope sensor. Confirm your selection.

A	OPTIMAS	A
Valve speed Slope		

A value between 1% and 100% can be set for the operating speed.

A	OPTIMAS	A
Input Slope 50%		

If the operating speed is set too high (high value), the blade will not settle. It will constantly move up and down.
If the operating speed is set too low (low value), long waves will form in the sub-grade. The hydraulics are regulating too slowly.

NOTE

The correct setting of the valve speed also depends on the condition of the machine (play in the joints) and the material being installed. The fastest working speed can be achieved with height sensors.

7.5 Tolerance

In the tolerance menu, the dead band of the control system is set. This setting is predefined and does not need to be changed. If the cutting edge is within the set tolerance, the machine's hydraulics are not activated.

The tolerance can be set between 0.5 mm and 50 mm.
If a value of 10 mm is set, the cutting edge may move within ± 5 mm.

The LEDs [6] + [14] light up green when the cutting edge is within the set tolerance.

NOTE

If the tolerance is set too low, the blade will constantly move up and down. This increases wear on the hydraulics and the machine. It also increases fuel consumption.



7.6 Audio

In the audio menu, the audio signal is turned on and off. If audio is enabled, an audible signal sounds, for example, when the laser receiver no longer detects the laser beam or the ultrasonic receiver exceeds its operating range.



7.7 Step size

The step size determines the adjustment increments for height and tilt. The settings are configured separately for:

- Height in mm
- Tilt in %

The set step sizes must not be changed, as they are tailored to the machine configuration.

7.8 Restore

The Optimas PlanMatic can store up to 46 machine data sets.
The "Restore" menu is used to load a data set from the data storage into the working memory.

To do this, select one of the 46 available data sets and confirm it.

A copy of this data set is loaded into the working memory. The data in the working memory is retained even when the system is turned off.

The data sets are typically saved after installation, setup, and calibration of the Optimas PlanMatic for the respective grading blade.



7.9 Information

Here you will find information on:

- Control unit software
- Serial number
- Operating hours in automatic and manual mode
- Operating voltage (12V)

8. Optional additional functions

8.1 Working with transverse slope

The PlanMatic Pro is supplied with a tilt sensor. In tilt mode, the transverse slope of the cutting edge is controlled using this sensor.

If you want to control the transverse slope with the left cutting edge, press the [2] button once to select the sensor. The symbol appears in the left corner of the first line on the display. In this case, the left side controls the transverse slope and the right side controls the height. The height is controlled via a height sensor; see sections 8.2, 8.3, and 8.5.

If, on the other hand, you want to control the transverse slope with the right cutting edge, press the [2] button for sensor selection twice. The symbol appears in the right corner of the first line on the display. The right side now controls the transverse slope. The left side is controlled via a height sensor; see sections 8.2, 8.3, and 8.5.

Procedure:

1. Turn on the control unit using button [18]. Both LEDs [5] and [12] for manual operation must be lit.
2. Press the [2] button once to select the side for transverse slope in the "Sensor selection" menu. The corresponding symbol appears on the display.
3. Press button [2] to exit the sensor menu.
4. If only the transverse slope of the cutting edge is to be controlled automatically, press button [16] for "Side Preselection – Automatic mode" once or twice. The display will show "A" on the left or right, while the "M" symbol for manual mode is visible in the other corner.
5. If both the transverse slope and the height are to be controlled automatically, an "A" must appear in both corners of the top row of the display. If not, press the [16] key until the desired result is displayed. The height is automatically controlled via a height sensor; see sections 8.2, 8.3, and 8.5.
6. Adjust the transverse slope using the offset arrow keys [1] or [3] for the left or right side, respectively. The tilt value is displayed as a percentage. The direction of the tilt is indicated by a small symbol to the left or right of the tilt value on the second line of the display.
7. Move the machine into the working position.
8. Activate automatic mode using the blue button on the joystick. The LEDs [4] and [11] indicate that the system is operating in automatic mode.



Caution

Incorrect settings can cause violent blade movements. Keep a safe distance from other objects and people. Watch out for people in the danger zone!

9. Grade a small area using the set tilt and check the result.
10. At the end of the work, turn off the system by pressing and holding the ON/OFF/SETUP button [18] for more than 3 seconds. The current settings are saved and can be used again the next time the system is turned on.



Caution

Turn off the system when leaving the machine!

8.1.1 Changing the slope

If the machine turns 180 degrees, the direction of the transverse slope must also change, e.g., from +2.0% to -2.0%. Pressing the SET button [7] or [15] reverses the transverse slope (left or right).

8.2 Working with the laser receiver



Caution

When using laser systems, follow the safety and operating instructions provided by the laser manufacturer!



This additional function is available with the PlanMatic Basic and Pro.

There are laser receivers with and without zero-point offset. The latter have a fixed (rigid) center. With linear receivers featuring zero-point offset, however, the target height (zero, center) can usually be shifted across the entire receiving window at the given resolution, i.e., any offset (height offset) can be set. **However, the following describes the procedure using two laser receivers without zero-point offset.**

To ensure that the machine operates at the target height, the blade/cutting edge must be positioned relative to a known height reference (a height mark or height stake) with respect to the laser plane.

Procedure:

1. Set up the rotary laser and the laser receivers. Turn on the laser and configure it according to the required application (grade, slope, axis alignment).
2. Turn on the control unit using the [18] button.
3. Press the [2] key once to select the page for the laser sensor in the "Sensor Selection" menu. The corresponding symbol appears on the display. Both LEDs [5] and [12] for manual operation must be lit.
4. Check whether an "A" for automatic operation is preselected on the right and left in the top row of the display; if necessary, press the [16] button several times to preselect both sides for automatic operation. If only one side of the cutting edge is to be controlled, use the [16] button to activate only the side that is to be controlled automatically. The other side is then controlled manually.
5. Position the cutting edge under the right or left laser receiver at the target height (height mark/height stake).

NOTE

For the best possible accuracy, set the grader blade to the target height in the working position. The working tool should rest on the ground as much as possible and be at the same height as the machine's track or wheels.

6. Slide the left or right laser receiver up or down until the center is reached and indicated by a green LED bar. Secure the laser receiver.
7. Transfer the height measurement of the laser receiver to the second one. Both laser receivers must be the same distance from the cutting edge.
8. Move the machine into the working position. The laser receivers must be within the reception range (the LEDs on the height display are lit).
9. Activate automatic mode using the blue button on the joystick. The LEDs [4] + [11] indicate that the system is operating automatically.



Caution

Incorrect settings can cause violent shield movements. Keep a safe distance from other objects and people. Watch out for people in the danger zone!

10. Grade a small area at the set height.
11. Switch the system back to manual mode.
12. Check the graded area with a measuring rod and handheld receiver.

**Caution**

Turn off the system when leaving the machine!

13. If the surface is not yet within the tolerance range, the rotary laser can be adjusted to the correct height using the crank stand, or both laser receivers can be mechanically moved by the same amount.

NOTE

Linear laser receivers offer a clear advantage in this application. When using them, you can set the correct height from the cab (i.e., shift the zero point) and also use the offset arrow keys to define a new reference height if there is too much material in front of the blade and it needs to be moved aside first. You do not need to leave the cab to set the new reference height (and you also do not need a crank tripod for the rotary laser).

14. At the end of the work, turn off the system by pressing and holding the ON/OFF/SETUP button [18] for more than 3 seconds. The current settings are saved and can be used again the next time the system is turned on.

8.3 Working with the ultrasonic sensor

**Caution**

When using ultrasonic systems, the safety and operating instructions from *Leica* must be followed!



A wide variety of sensor combinations can be used with the PlanMatic Pro. Since not all variations can be described in this manual, this chapter explains the configuration with **left-side transverse slope and right-side ultrasonic scanner**.

Ultrasonic sensors with at least three transducers are capable of both measuring the distance to the string or the ground and providing signals for lateral guidance over the string. This allows, for example, the hydraulically adjustable side flaps of a grading blade to be automatically maintained at the desired lateral distance from the string.

When using these MultiSonic sensors, you must select the operating mode for the ultrasonic scanner:

- String: Both the height relative to the string and the lateral distance from it are measured. If the implement has hydraulically adjustable side flaps that allow you to control the TriSonic laterally, the ultrasonic sensor's lateral direction is controlled so that it is always positioned centrally above the string.
- Ground: Only the height relative to the ground (graded road surface, gutter, curb) is scanned.

Procedure:

1. Turn on the control unit using the [18] button.
2. Press the [2] button once to select the sensor. Select the transverse slope sensor for the left side and the ultrasonic sensor for ground or string measurement. In the second line of the display, the symbol for transverse slope appears on the left and the symbol for the ultrasonic sensor on the right. Both LEDs [5] and [12] for manual mode must be lit.
3. Check whether an "A" for automatic mode is preselected on the right and left in the top row of the display; if necessary, press the [16] button several times to preselect both sides for automatic mode.

4. The working height can be adjusted in two ways:
- » via zero adjustment: This involves setting the height difference between the sensor and the cutting edge to zero. To do this:
 - Position the right cutting edge at the working height
 - Press and hold the right SET button [15] for more than three seconds. The “SonicTracer” menu appears.
 - The display first shows “Wait ...” and then “OK” for confirmation.
 - » via manual working height adjustment: To do this:
 - Raise the grader blade to working height,
 - confirm this height by briefly pressing the SET button. The TriSonic measures the height and displays it on the screen (top line).

After setting the target height, the TriSonic has a fixed control tolerance of +/- 7cm. It will then no longer react to objects located outside the working area, e.g., the head of the guide bar.

5. If the grading blade is not at working height, it can be adjusted—after zero calibration—using the Offset buttons [1] + [3]. The target height is the distance between the cutting edge and the string/surface.
6. Set the value for the transverse slope to the desired angle using the left offset arrow key [3].
7. Move the machine to the working position. The string or scanning surface must be within the reception range of the ultrasonic sensor (the LEDs on the height display are lit).

NOTE

You can use the automatic side-shift function when working with the TriSonic sensor over a string and have hydraulically adjustable side flaps on the grader blade. This function causes the side flaps to open and close automatically, maintaining a constant lateral distance from the string. The automatic side-shift function is activated by pressing the Side-Shift Left (SSL) button [8] or the Side-Shift Right (SSR) button [17]. The corresponding yellow LED lights up. To deactivate, press SSL/SSR again; the LED turns off.

8. To automatically control the height of the grader blade, press the blue button on the joystick. The green LEDs [4] + [11] indicate that the system is operating in automatic mode.



Caution

Incorrect settings can cause violent blade movements. Keep a safe distance from other objects and people. Watch out for people in the danger zone!

9. Grade a small area at the set height.
10. Switch the system back to manual mode.
11. Check the leveled area.



Caution

Turn off the system when leaving the machine!

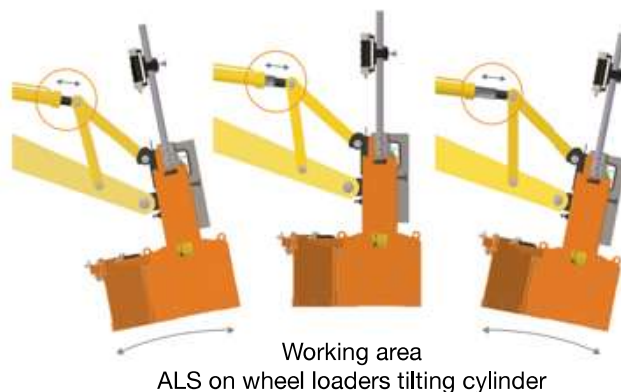
12. If the grade is not yet within the tolerance range, use the right offset arrow keys [1] to correct the height. The slope is adjusted using the left offset arrow keys [3].
13. At the end of the work, turn off the system by pressing and holding the ON/OFF/SETUP button [18] for more than 3 seconds. The current settings are saved and can be used again the next time the system is turned on.

8.4 Working with the Automatic Longitudinal Slope Control (ALS)

The Automatic Longitudinal Slope Control (ALS) is an optional extension of the PlanMatic Pro. The ALS is designed to automatically maintain the preset longitudinal slope of the grader during operation. This produces a continuously level and clean subgrade without the operator having to constantly readjust the tilt position manually. Automatic control is achieved via a longitudinal slope sensor in conjunction with the hydraulic tilt function of the carrier vehicle or the optional hydraulic tilting device.

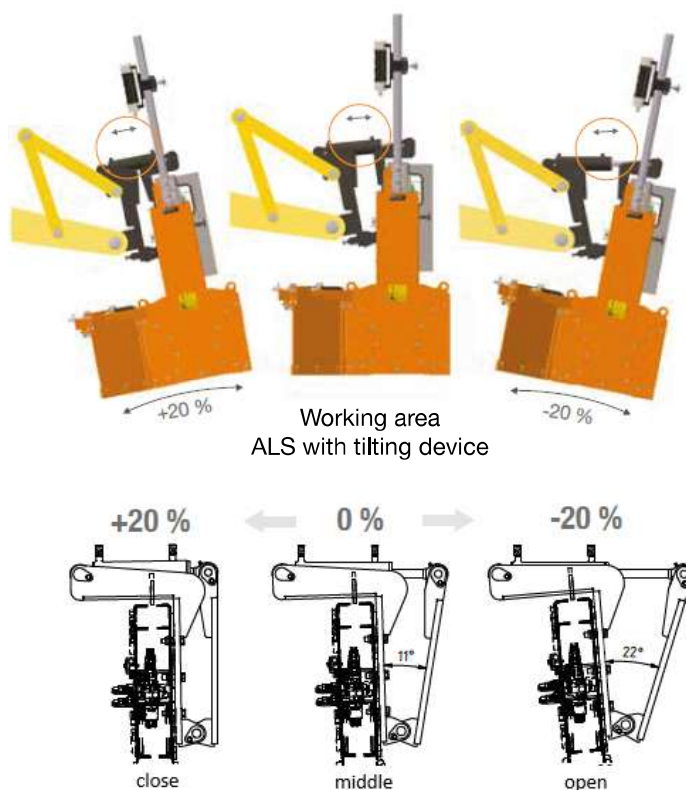
1. ALS via the carrier vehicle's tilting cylinder

Control is performed directly via the carrier vehicle's tilting cylinder. The available control range depends on the carrier vehicle used.



2. ALS via hydraulic tilting device

Control is performed via Optimas hydraulic tilting device on the PlanMatic.



Procedure:

1. Turn on the control unit using the [18] button.
2. Press button [2] once to select the sensors. Select the sensors for both sides. The corresponding symbols will appear. Both indicator lights [5] and [12] for manual mode must be illuminated. The system automatically detects the built-in ALS. A letter "A" appears next to the inclination value in the fourth line of the display.
3. Check whether an "A" is preselected for automatic mode on both the left and right sides in the top line of the display. If necessary, repeatedly press button [16] to select both sides for automatic operation.
4. Press the blue button on the joystick. Automatic mode is activated; the target longitudinal slope value is highlighted in black.
5. If the PlanMatic is operated manually, the target value is not highlighted in black.
6. To change the target value, move the toggle switch [19]. The target value will be highlighted in black while being adjusted.
7. To deactivate the ALS, press and hold the A/M button [16] for 2 seconds. The „A“ next to the value disappears.
8. To reactivate the ALS, press the A/M button [16] again.

NOTE:

Operation without active ALS is not recommended.

9. Grade a small area using the selected slope and check the result.
10. When work is completed, switch off the system by pressing and holding the ON/OFF/SETUP button [18] for more than 3 seconds. The current settings are retained and can be reused the next time the system is switched on.

**Caution**

Turn off the system when leaving the machine!

**Warning**Unexpected movements in automatic mode

When ALS is activated, the product may move automatically. This can cause serious injury to people within the danger zone.

- Keep the danger zone clear
- Maintain a safe distance from moving parts
- Deactivate automatic mode before maintenance or adjustment work
- Always lower the cutting edge to the ground

**Warning**Malfunction due to incorrect settings

An incorrectly adjusted longitudinal slope can result in uncontrolled machine movements or unsatisfactory work results.

- Check the slope setting before starting work
- Change settings only when the machine is safely stationary

8.5 Working with 3D machine control



Caution

When using the 3D machine control system, the safety and operating instructions provided by *Leica* must be observed!



The PlanMatic Pro can optionally be equipped with a *Leica* 3D machine control system. The 3D control system enables automatic and precise control of the product based on digital terrain models.

The components of the 3D control system communicate with the Optimas machine control system and automatically regulate the position of the cutting edge.

NOTE

When working with the 3D control system, use of the Automatic Longitudinal Slope Control (ALS, see section 8.4) is recommended.



Warning

Unexpected machine movements

In automatic mode, the 3D control system may cause the grading attachment to move automatically.

- Keep the danger zone clear
- Maintain a safe safety distance
- Deactivate the system before maintenance work
- Always lower the cutting edge to the ground

Incorrect settings or inaccurate terrain data can lead to uncontrolled movements or poor work results.

8.6 Extensions

The working width can be adapted to suit the construction site conditions. Available working widths:

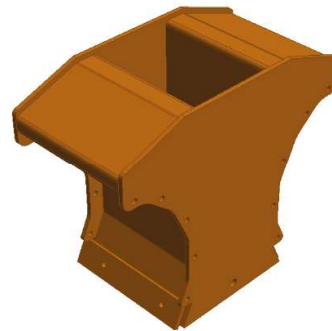
- 2.30m
- 2.60m

By extending the hydraulic side flaps, a working width of up to 3.20 m is possible.

To ensure that the cutting edges of the PlanMatic and the extensions are at the same height, make sure that the PlanMatic is positioned on a level surface when installing the extensions.

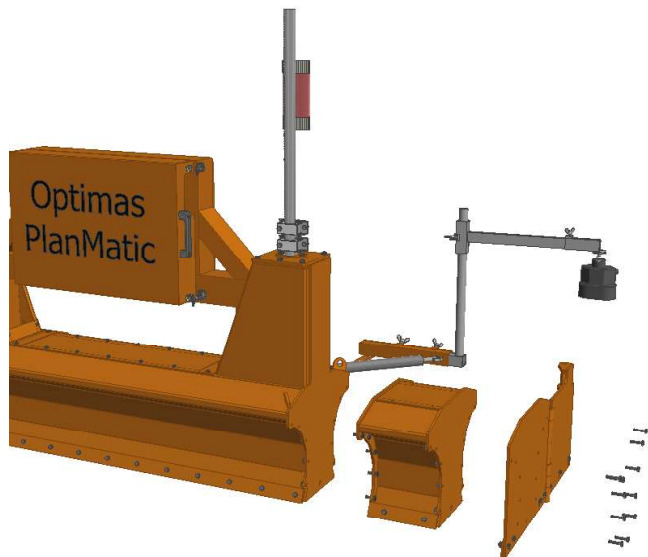


150mm
Part No. 54528

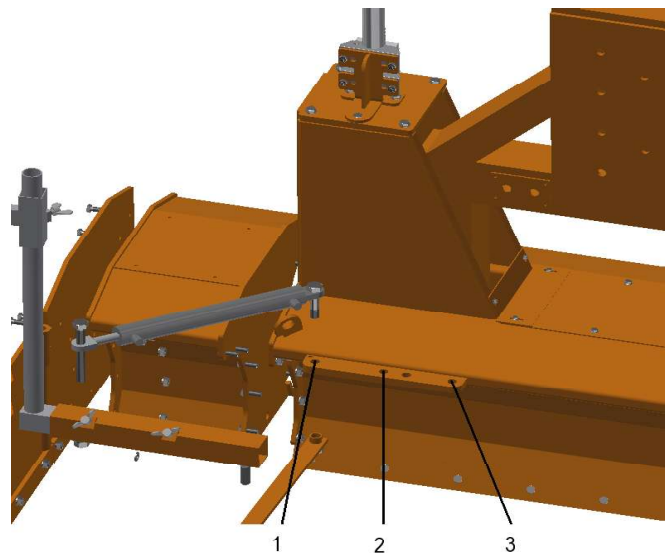


300mm
Part No. 54529

8.6.1 Installing the extensions



Bolting



Cylinder connection
1. for 300mm extension
2. for 150mm extension
3. without extension

9. Decommissioning, transport and storage

9.1 Decommissioning

Before decommissioning, the PlanMatic must be parked on a level, load-bearing surface and secured against unintentional movement.

Decommissioning may only be carried out by trained personnel.

Procedure:

- Park the PlanMatic completely
- Deactivate the automatic function
- Switch off the carrier vehicle
- Depressurize the hydraulic system
- Disconnect the power supply
- Secure the machine against accidental start-up



Warning

Residual energy in hydraulic systems

Hydraulic systems may remain pressurized even after shutdown. Unintended release of hydraulic oil or sudden movements can cause injury!

- Completely depressurize the hydraulic system before carrying out any work
- Disconnect hydraulic lines only when the system is pressure-free



Warning



Hot oil in hydraulic systems

- Allow the machine to cool down before decommissioning
- Wear suitable protective gloves

Contact with hot surfaces may cause burns!

9.2 Transport

Transport may only be carried out by trained personnel.

The PlanMatic may only be transported using suitable lifting and transport equipment. During transport, all applicable national load-securing regulations and the permissible load capacities of the lifting equipment used must be observed.

Before every transport operation, ensure that

- the machine is secured against unintended movement
- all movable parts are in a safe position,
- no loose objects are present.



Fig. 1: Transport of the PlanMatic

9.2.1 Transport by lifting equipment

The PlanMatic is equipped with a designated lifting eye for lifting with a crane or similar lifting equipment (see Fig. 1, Item 1).



Warning

Danger from falling loads

When lifting and transporting suspended loads, there is a risk of injury from falling or swinging loads.

- Never stand beneath suspended loads
- Use only suitable and approved lifting gear
- Observe the load capacity of the crane and lifting equipment (minimum 1.5 t)
- Lift the machine slowly and without jerking movements

Before lifting, ensure that all lifting gear is properly attached and secured.

9.2.2 Transport by vehicle

For transport on trailers or transport vehicles, the designated lashing eyes must be used (see Fig. 1, Item 2).



The PlanMatic is equipped with a total of four lashing eyes for load securing. The machine must be secured in such a way that

- sliding or shifting is prevented,
- tipping movements are eliminated,
- no hazards arise during transport.

The lashing equipment used must be suitable for the weight of the machine and free from damage.

9.3 Storage

The PlanMatic must be stored in a dry and clean environment, protected from weather conditions.

Permissible storage temperature: -10°C bis +40°C.

Direct exposure to moisture and the formation of condensation must be avoided.

For long-term storage, the following measures are recommended:

- Clean the machine
- Seal all hydraulic connections
- Protect electrical connectors from moisture
- Apply a corrosion protection coating to exposed metal surfaces
- Secure the machine against tipping over

9.4 Recommissioning after storage

After an extended storage period, the machine must be inspected to ensure it is in proper working condition before being returned to service.

Particular attention should be paid to the following:

- Hydraulic hoses and connections
- Electrical wiring and connectors
- Fastening elements
- Moving components and wear parts

Any damaged or worn components must be replaced before commissioning the machine.

9.5 Disposal

At the end of its service life, the PlanMatic must be disposed of properly and in accordance with the applicable national environmental and waste disposal regulations.

Before disposal, all operating fluids and environmentally hazardous substances must be completely removed and disposed of separately.

Disassembly may only be carried out by qualified personnel.

The following operating fluids and components must be collected separately and disposed of in accordance with the applicable regulations:

- Hydraulic oil
- Oil-contaminated components
- Electrical and electronic components
- Cables and connectors



Warning

Environmental hazard

Hydraulic oil must not be allowed to enter the soil, waterways, sewage system, or the environment!

10. Maintenance

Regular maintenance and servicing are essential for the safe and trouble-free operation of the PlanMatic. Maintenance and repair work may only be carried out by trained and qualified personnel.

Before beginning maintenance work:

- Park the machine safely
- Lower the cutting edge
- Deactivate all automatic functions
- Switch off the carrier machine
- Depressurize the hydraulic system
- Secure the machine against accidental startup



Warning

Unexpected movements

Unexpected movements of hydraulic components may occur during maintenance and repair work.

- Perform work only on a depressurized hydraulic system
- Secure the machine against being switched on unintentionally
- Maintain the required safety distances



Warning

Hot surfaces

Hydraulic components can become very hot during operation.

Allow the machine to cool down sufficiently before carrying out any work on the hydraulic system!

10.1 Daily service

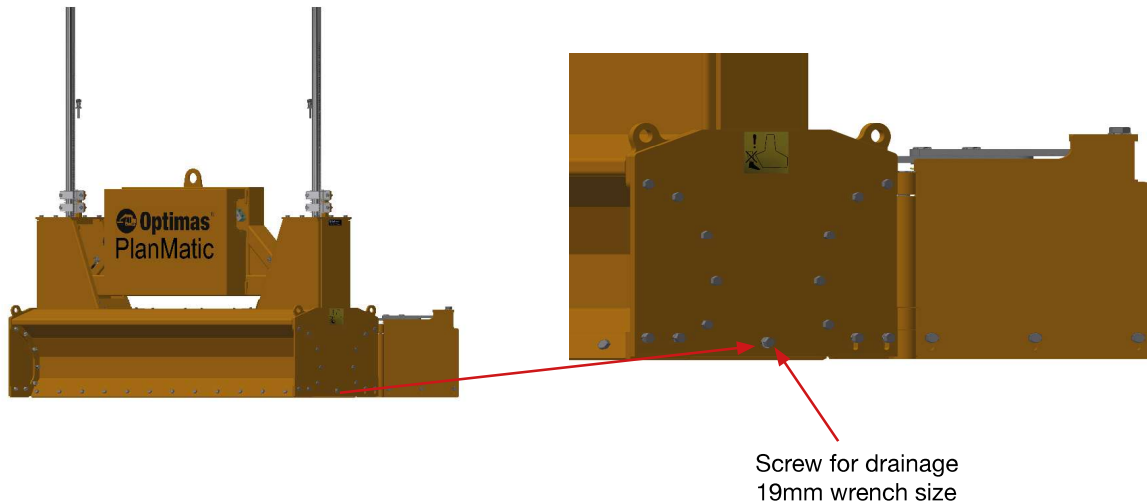
Before each use, the following items must be checked:

- Hydraulic hoses and connections for damage, leaks, and signs of abrasion
- Electrical cables and connectors for damage, secure seating, and corrosion
- Moving components for wear, damage, and unrestricted movement
- Sensors and control components for contamination, secure mounting, and proper function

Any defects identified must be rectified before further use of the machine.

10.2 Water drainage

To drain any water that may have accumulated inside the housing, remove the lowest hexagon-head screw (19 mm wrench size) located in the center. Once the accumulated water has drained out, reinstall the screw to protect the inside of the housing from sand and other contaminants.



Before extended periods of inactivity and whenever there is a risk of frost, the water must be drained from the housing. Residual water may cause frost damage and malfunctions.

10.3 Hydraulic system maintenance

The hydraulic system must be inspected regularly to ensure it is in proper working condition. Particular attention should be paid to:

- Hydraulic hoses
- Screw fittings
- Cylinders
- Valves
- Pressure gauges

Damaged or worn components must be replaced immediately. Only technically equivalent or approved replacement components may be used. See also the Optimas spare parts lists.

Regardless of their external condition, it is recommended that hydraulic hoses be replaced no later than 6 years after manufacture. The relevant date is the manufacturing date marked on the hydraulic hose assembly.

All applicable national regulations and guidelines concerning hydraulic hose assemblies must be observed.

10.4 Wear parts

Worn parts must be replaced in a timely manner.

10.5 Electrical system maintenance

Maintenance work	Scope of inspection	Interval	Performed by
Visual inspection of electrical cables	Check for damage, chafing, crushing, and loose wiring	Daily before operation	Operating personnel
Inspection of plug connections	Check for secure fit, corrosion, and damage	Weekly	Operating personnel/ Qualified personnel
Inspection of power supply, fuses, control unit, and sensor cables	Check of supply voltage and all cables, proper condition of fuses, functional test of control elements	Monthly	Qualified personnel

NOTE

Maintenance work may only be performed with the power supply turned off. Damaged components must be replaced immediately. Repairs to the electrical system may only be performed by qualified personnel!



Warning

Danger from electrical voltage

Damaged electrical wiring or improper work on the electrical system can lead to malfunctions or dangerous situations.

- Work on the electrical system must be performed only by qualified personnel
- Disconnect the power supply before beginning work
- Replace damaged wiring immediately

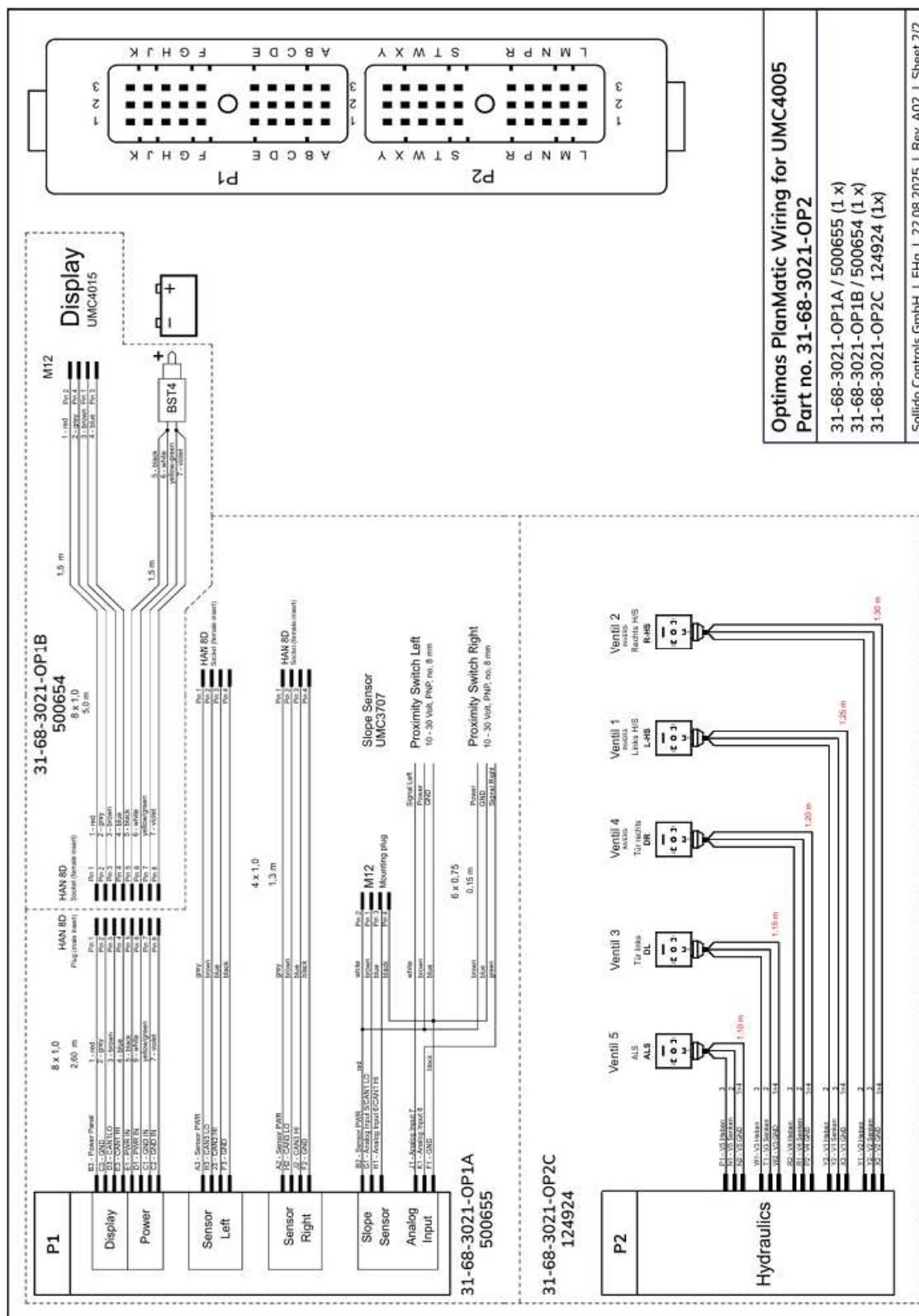
10.6 Maintenance intervals

Maintenance work	Interval	Performed by
Visual inspection of the hydraulic system	Daily	Operating personnel
Lubrication of cylinders with <i>Wocken</i> W9900G500 long-life grease	Weekly	Operating personnel
Inspection of bolted joints	Weekly	Operating personnel
Inspection of the wear parts	Weekly	Operating personnel
Replacement of hydraulic hoses	no later than 6 years	Trained personnel
Inspection of Sensors	Daily	Operating personnel
Inspection of the electrical system	Monthly	Qualified personnel

11. Error messages and malfunctions

E1	Operating voltage
E2	Overcurrent
E3	CAN bus error
E4	RS485 bus error
E5	Control unit
E6	Operator unit
E7	Valve error
E10	Check dimensions

12. Circuit diagrams



Optimas PlanMatic Wiring for UMC4005

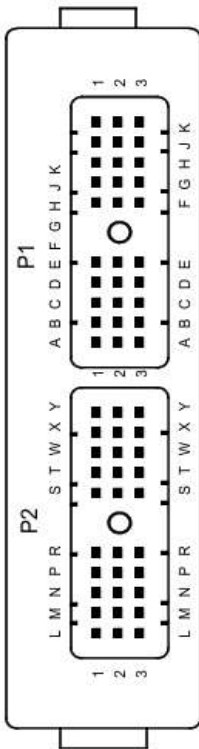
Part no. 31-68-3021-OP2

31-68-3021-OP1A / 500655 (1 x)

31-68-3021-OP1B / 500654 (1 x)

31-68-3021-OP2C 124924 (1x)

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Power • E1 - PWR IN • D1 - PWR IN • C1 - GND IN • C2 - GND IN	Left Sensor • A3 - Sensor PWR • K3 - Analogue input C • J3 - CAN1 HI • H3 - CAN1 LO • G3 - Analogue input D • F3 - GND	Right Sensor • A2 - Sensor PWR • K2 - Analogue input A • J2 - CAN2 HI • H2 - CAN2 LO • G2 - Analogue input B • F2 - GND	Hydraulic valves Type: 2 coils • Y3 - output 1 Raise • Y2 - output 2 Lower • X3 - GND for output 1+2 • Y1 - output 3 Raise • X1 - output 4 Lower • X2 - GND for output 3+4 • W1 - output 5 Raise • T1 - output 6 Lower • W2 - GND for output 5+6 • R2 - output 7 Raise • R1 - output 8 Lower • P2 - GND for output 7+8 • P1 - output 9 Raise • N1 - output 10 Lower • N2 - GND for output 9+10 • M1 - output 11 Raise • L1 - output 12 Lower • M2 - GND for output 11+12 • L2 - output 13 Raise • L3 - output 14 Lower • M3 - GND for output 13+14 • S1 - output 15 Raise • S2 - output 16 Lower • T2 - GND for output 15+16	Display • B3 - Power operating unit • C3 - GND • D3 - CAN3 LO • E3 - CAN3 HI	Analogue inputs • B1 - Drucksensor (HIGH) • E2 - Drucksensor (LOW) • G1 - Analogue input 1 / CAN3 LO • H1 - Analogue input 2 / CAN3 HI • J1 - Analogue input 3 • K1 - Analogue input 4 • F1 - GND	PVG32 - Danfoss Type: PVEH or PVES • N3 - PVG32 output 1 • P3 - PVG32 output 2 • R3 - PVG32 output 3 • S3 - PVG32 output 4 • T3 - PVG32 output 5 • W3 - PVG32 output 6	Slope sensor • B2 - Sensor PWR • F1 - GND • G1 - Analogue input 1 / CAN1 LO • H1 - Analogue input 2 / CAN1 HI		Pin assignment UMC4005	REV: B01 Date: 15.03.24 Fha Solido Controls GmbH Sheet: 12
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