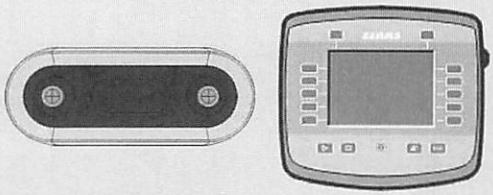
CLAAS



CULTI CAM

Reference manual

SERVICE & PARTS

Table of contents

1 To this operator's manual
1.1 Notes on the manual 5

2 Safety
2.1 Safety rules 8
2.2 Safety instructions in this manual 13
2.3 Safety devices 14

3 Product description
3.1 Overview and method of operation 15
3.2 Optional equipment 46
3.3 Identification plates and identification number 51

4 Operating and control elements
4.1 COMMUNICATOR II 54
4.2 CULTI CAM 59

5 Technical specifications
5.1 COMMUNICATOR II 68
5.2 CULTI CAM 69

6 Preparing the product
6.1 General Information 71
6.2 Prior to operation 73
6.3 Mounting 74
6.4 CULTI CAM 81

7 Operation
7.1 Driving on the road 92
7.2 Switching COMMUNICATOR II on/off 93
7.3 Programmable COMMUNICATOR II keys 95
7.4 COMMUNICATOR II ISOBUS settings 96
7.5 COMMUNICATOR II terminal settings 97
7.6 Fieldwork 102

8 Faults and remedies
8.1 Overview of faults 111

9 Maintenance
9.1 General Information 114
9.2 Maintenance Information 115

10 Service
10.1 General Information 116

11 Placing out of operation and disposal
11.1 General Information 117

12 Technical terms and abbreviations
12.1 Terms and explanations 119

Index..... 121

1 To this operator's manual

1.1 Notes on the manual

160060-001

1.1.1 General instructions

This Operator's Manual is the original Operator's Manual. In the texts below, this is referred to as the Operator's Manual.

This Operator's Manual serves exclusively for information of the implement producers using the OEM components. It may be used as a basis for preparing a documentation for end customers without CLAAS branding. This Operator's Manual may be passed on to trained retailers and service staff, but not to end customers. The end customer documentation (User Manual) and preparation of any required language versions of this documentation are the responsibility of the implement producer selling the OEM components with his implements to retailers and end customers.

159313-001

1.1.2 Validity of manual

This manual applies to the following system / components:

Designation	CLAAS part number
CLAAS CULTI CAM	(X.X.X)

Designation	Software version	
	from	to
CLAAS UBM module	02.08.03 CME	—
CLAAS Camera MK4	03.00.01 CAM	—

139097-003

1.1.3 Handling of manual

Text and illustrations

The photos and graphics in this manual apply to all product variants. Differences are indicated by notes underneath the particular illustration.

Wherever possible, text passages apply to all product variants and have been kept concise. Differences are indicated by intermediate headings.

The different types of text can be easily distinguished from each other by their formatting. The following different formats are used:

921-002

Formatting	Meaning	Description
Description	Descriptive text	Further information about the topic.
– Procedure instruction	Process	Processes which must be carried out in succession.
Result	Result	Result of the processes carried out.

Document structure based on subassemblies

As far as the contents permit, the chapters of this manual are structured according to subassemblies. The structure of these subassemblies is the same in all chapters.

Different product groups have different document structures based on subassemblies. CLAAS always takes care to keep these document structures based on subassemblies identical in any documents.

Search and find

The wanted subject can easily be found with the recurring subassembly structure, using the table of contents or the header line of this manual.

In addition, the index of this manual is a useful tool for finding specific subjects. The index can be found on the last pages of this manual.

Directional specifications

Direction indications such as front, rear, right and left always apply to the direction of travel. In illustrations, the direction of travel is indicated by a travel direction arrow where necessary.

148447-001

1.1.4 Symbols and notes

Symbol	Meaning
	Warnings that must absolutely be observed.
	Information on the economic use of the product.
	Environmental notes providing information on environmental protection.
	Reference to page or documentation containing further information.
*	Optional equipment.
–	Procedure instruction.

Symbol	Meaning
	Grease the grease points with multi-purpose grease.
	Grease the grease points with lubricating oil.

160061-001

1.1.5 Equipment

The Operator's Manual describes all models, series equipment and optional equipment of your product available at the time of final editing of this Operator's Manual.

There may be country-specific deviations. Please remember that your product may not be equipped with all functions described. This also refers to safety-relevant systems and functions.

For this reason, the equipment fitted on your product may deviate in some descriptions and figures.

Please contact the machine manufacturer if you have any questions regarding equipment and operation.

123153-002

1.1.6 Technical specifications

Technical specifications, dimensions and weights are non-binding. Technical specifications are subject to modification in the course of technical development, and all errors and omissions are excepted.

921-002

2 Safety

2.1 Safety rules

159315-001

2.1.1 Particularly important

In addition to the instructions contained in this operator's manual, also observe the general safety and accident prevention regulations.

17407-003

DANGER!

Failure to observe safety precautions.

Risk of death or serious injury.

- Read and follow the Operator's Manual and in particular the safety instructions prior to putting the product into operation. This applies to all persons using, servicing, maintaining or inspecting the product or the machine.

17368-002

DANGER!

Use of spare parts, accessories and additional equipment not inspected or approved by CLAAS.

Reduced vehicle functionality and decreased driving and working safety.

No liability will be accepted for damage resulting from the use of components not made or approved by CLAAS.

- Use original spare parts, accessories and ancillary equipment.

151201-001

DANGER!

As the driver, you are responsible for safe machine operation even when machine steering is automatic.

Death or serious injury.

- For this reason, always be attentive and watchful.
- When driving with automatic steering systems, always observe the complete terrain and working range.

DANGER!

Operating the machine with the automatic control system.

Death or serious injury.

- Do not use the automatic control system for driving on roads.
- Only use the automatic control system for its intended purpose.
- No persons may be within a 50 m radius when the automatic control system is switched on.
- Always check the terrain for obstacles, even when the automatic control system is switched on.
- Only allow work on the automatic control system to be performed by authorised service centres.

151200-001

DANGER!

Unexpected machine movements.

Death or serious injury.

- The product must be switched off when travelling on roads and must not be switched on.

149722-001

CAUTION!

Switching off the terminal during work.

All the machine's control functions fail.

- Never switch off the terminal during work.

124866-001

2.1.2 Qualification of drivers and maintenance personnel

Only people who meet the following requirements may be commissioned with operating or performing work on the machine. They must:

- Have reached the legal minimum age
- Be physically and mentally fit and
- Have the appropriate skills and training

The machine operator is responsible for this. All relevant country-specific regulations must also be observed.

Testing, adjustment and repair work may only be performed by authorised specialist personnel.

159320-001

2.1.3 Intended use

The CLAAS CULTI CAM system is an additional/ optional item of equipment, and is designed exclusively for fitting on machines approved by the manufacturer. Machines equipped with the CLAAS CULTI CAM system may only be used for their intended specialist purpose and in accordance with the acknowledged code of agricultural practice (intended use).

Any use outside this scope of application is improper use and the manufacturer cannot be held liable for resulting losses; this is the sole responsibility of the user. You may request specific information about the intended use regarding special cases from your implement manufacturer.

The CLAAS CULTI CAM is suitable and intended for shifting the implement laterally and automatically while driving on fields.

The CLAAS CULTI CAM steers by means of different row structures (plant row and multiple rows). The signals are processed in the CLAAS CULTI CAM and then used for controlling the implement.

The system must be switched off whenever driving on public roads and farm roads.

The system may only be fitted, used, maintained and repaired by persons who are familiar with the system and have been instructed in the functional hazards when working with the system.

The intended use also includes adhering to the implement manufacturer's fitting instructions and to the instructions in the Operator's Manual, as well as to all operating, maintenance and servicing conditions stipulated by the manufacturer.

Maintenance and repair work to be carried out by the manufacturer must be carried out by the implement manufacturer selling the OEM components along with his implements to retailers and end customers.

The relevant accident prevention regulations and other generally recognised regulations on safety, occupational medicine and road traffic regulations must be observed both by users and the owner.

Any unauthorised modifications made to the CLAAS CULTI CAM system exclude the manufacturer from any liability for resulting damage.

2.1.4 General safety and accident prevention regulations

- In addition to this manual, always observe the Operator's Manual of the implement.
- Observe the general safety and accident prevention regulations.
- Always comply with local traffic regulations when driving on public roads!
- Clothing worn by the fitter must be close-fitting. Avoid wearing loose clothing!
- Prevent fires by keeping the implement clean!
- Carry out work underneath the raised implement only after supporting it safely.
- Refit guards after completing maintenance and repair work!

123241-001

2.1.5 Hydraulic accumulators

49910-001

DANGER!

Liquids under high pressure.

Liquids penetrate the skin and cause serious injuries.

- Only have authorised workshops carry out work on the hydraulic system.

120750-001

2.1.6 First aid measures

In the event of contact with substances hazardous to the health as a result of:

Breathing in

- Give the person fresh air and consult a doctor depending on his or her symptoms.
- Remove the person from the danger area.

Contact with the eyes

- Rinse the eyes thoroughly with large amounts of water for several minutes. Consult a doctor if required.

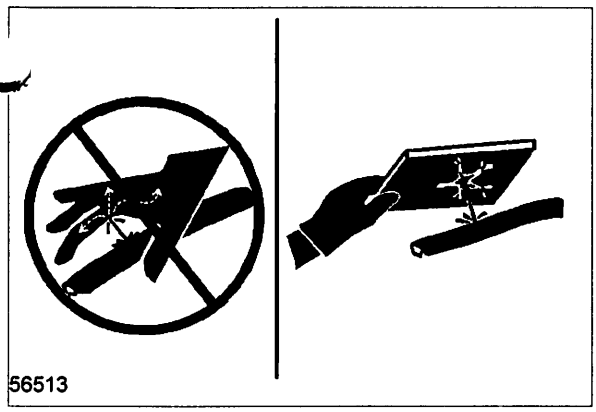
Contact with the skin

- Wash thoroughly with large amounts of water and soap; remove contaminated, saturated clothing immediately; consult a doctor in the event of skin irritation (reddening, etc.).

Swallowing

- Do not induce vomiting; consult a doctor immediately.

2.1.7 Danger of injury due to hydraulic liquid



740-001

1

162426-001

DANGER!

Liquids under high pressure.

Liquids penetrate the skin and cause serious injury.

- Work on the hydraulic system may be carried out only by the implement manufacturer.
- Check hoses and other hydraulic system components at regular intervals.
- Search for leaks with a piece of wood or cardboard.
- Ensure that the oil jet will not be directed towards the body.
- Replace any damaged hoses and components.
- Replace all hoses 6 years after the date of manufacture at the latest.

4186-003

DANGER!

Incorrect handling of injuries caused by hydraulic fluid.

Death or serious injury.

Even a pinhead-sized hole can lead to serious injuries.

- If any hydraulic fluid penetrates the skin or eyes, the injury should be treated immediately by a medical specialist.

921-002

2.2 Safety instructions in this manual

124230-001

2.2.1 Identification of warning and danger signs

In the present document, we have provided all texts concerning your safety and product safet with the signs below. Please pass on all safety rules to any other users of the machine as well.

9-001

DANGER!

Nature and source of danger

Consequences: death or serious injury

– Countermeasures

11-001

WARNING!

Nature and source of danger

Consequences: injuries

– Countermeasures

13-001

CAUTION!

Nature and source of danger

Consequences: material damage

– Countermeasures

16-001

Note!

Nature and source of information

Consequences: enhanced machine economy or easy assembly

– Measures

18-001

Environment!

Nature and source of danger

Consequences: damage to the environment

– Countermeasures

2.3 Safety devices

158399-001

2.3.1 Safety instructions for starting the terminal

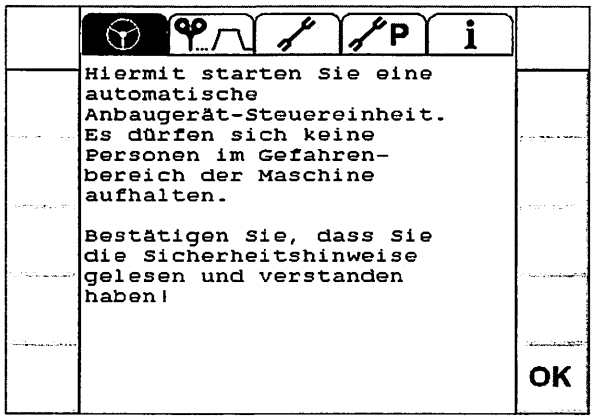
When starting the terminal, a safety message appears.

- Read and observe the safety message on the terminal.
- Read and observe the safety instructions in this Operator's Manual.

OK

- Press a key when you have understood the safety message.

The steering system can now be used.



180422-001

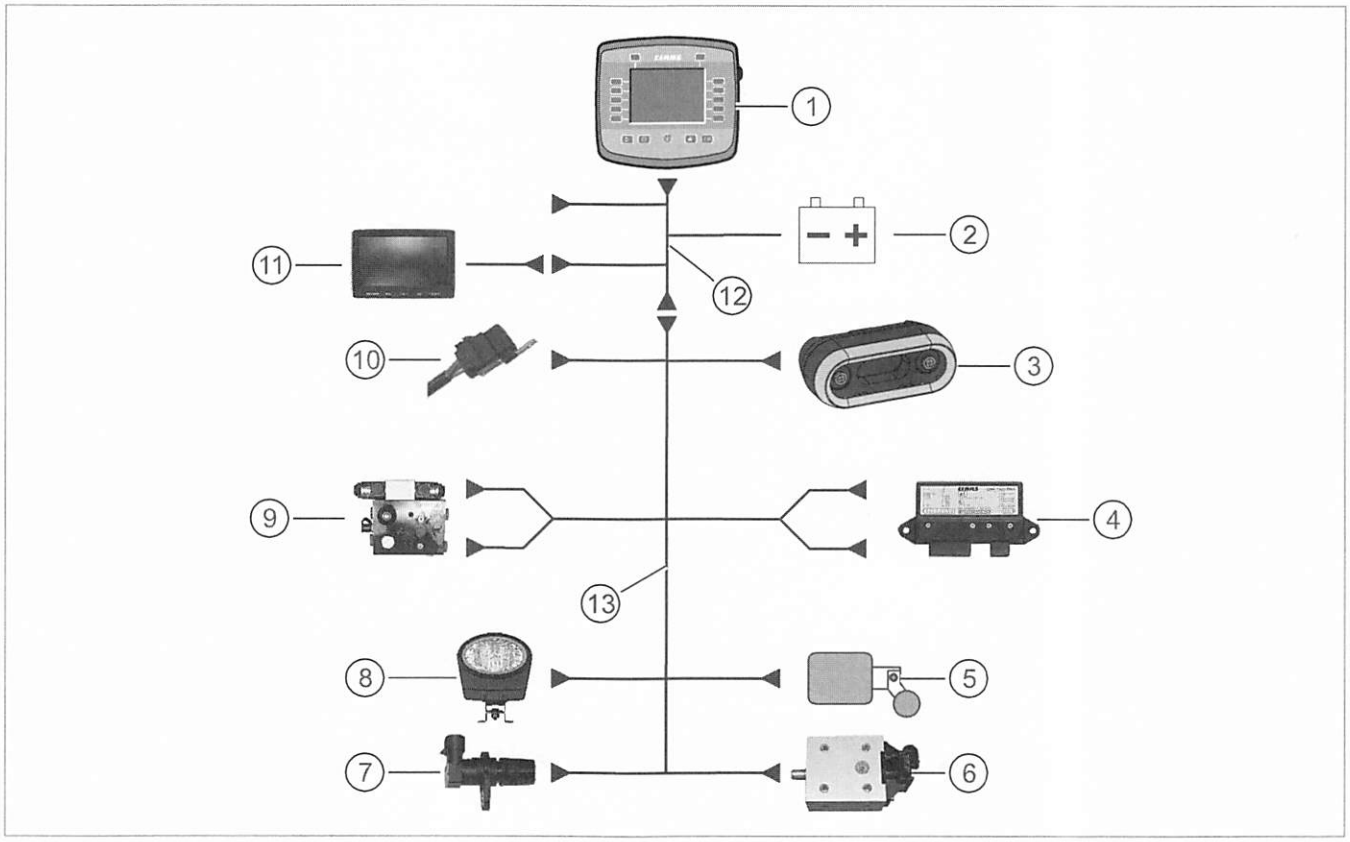
2

3 Product description

3.1 Overview and method of operation

158396-002

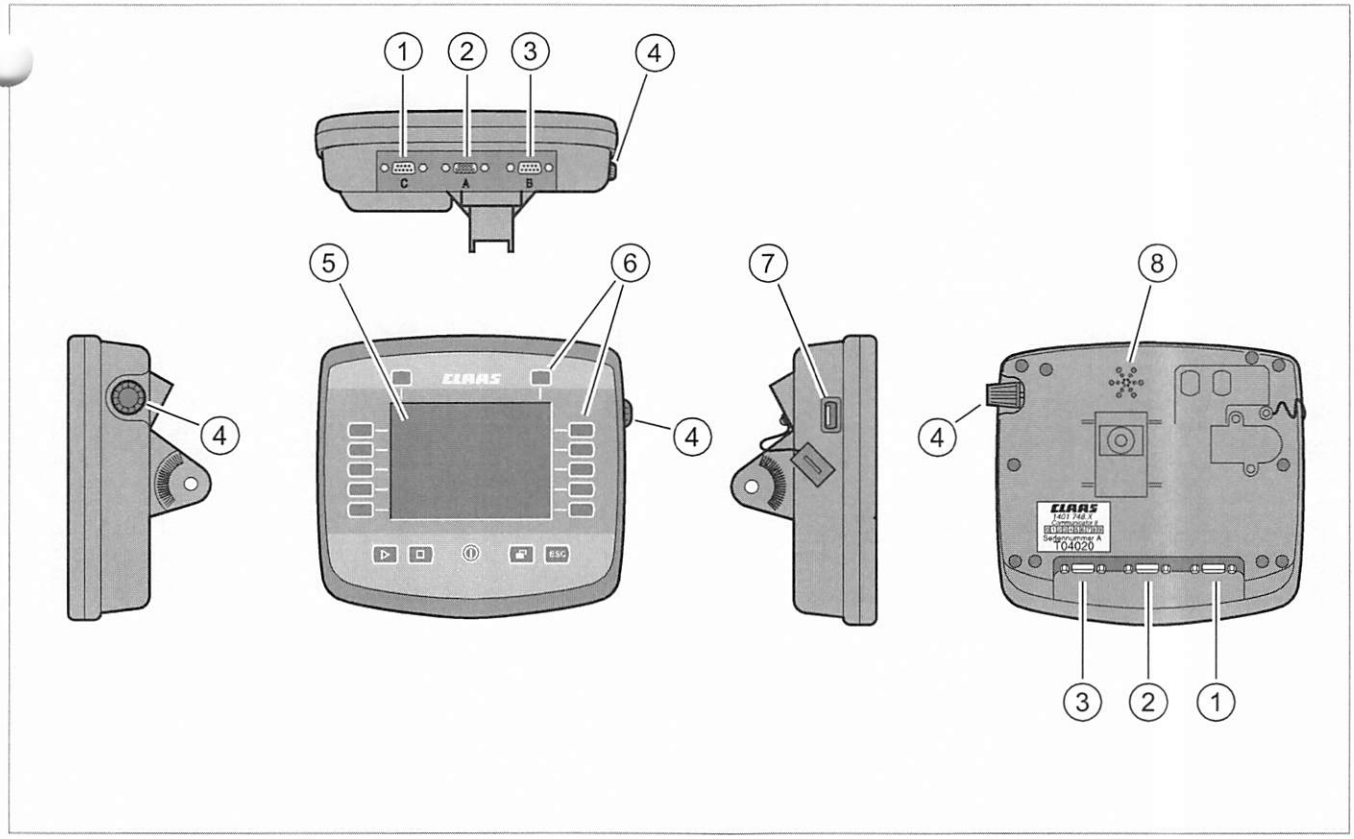
3.1.1 Overview of CULTI CAM



181332-001 **3**

	Designation
1	CLAAS COMMUNICATOR II (terminal) Page 16
2	Machine battery
3	Camera Page 17
4	UBM module (control unit) Page 19
5	Working position switch Page 19
6	Steering angle sensor Page 21
7	Travel speed sensor Page 20
8	Xenon light Page 49
9	Steering valve Page 21
10	Relay
11	Video monitor Page 46
12	Tractor wiring loom Page 23
13	Main wiring loom Page 22

3.1.2 Overview of COMMUNICATOR II



166672-001 **4**

	Designation
1	Connection C (spare)
2	Connection A (power supply and data bus)
3	Connection B (travelling speed signal of tractor)
4	Select wheel
5	Screen
6	Function keys
7	USB port
8	Loudspeaker

The CULTI CAM is operated using the COMMUNICATOR II terminal.

The COMMUNICATOR II is an ISOBUS terminal conforming to ISO standard 11783. Certification by AEF is scheduled.

The COMMUNICATOR II terminal program is an independent application and saved in the memory of the COMMUNICATOR II. The terminal program cannot be deleted.

The camera does not conform with ISOBUS. The ISOBUS functions of the terminal are therefore not used.

The terminal needs no service. It should be stored in a dry place.

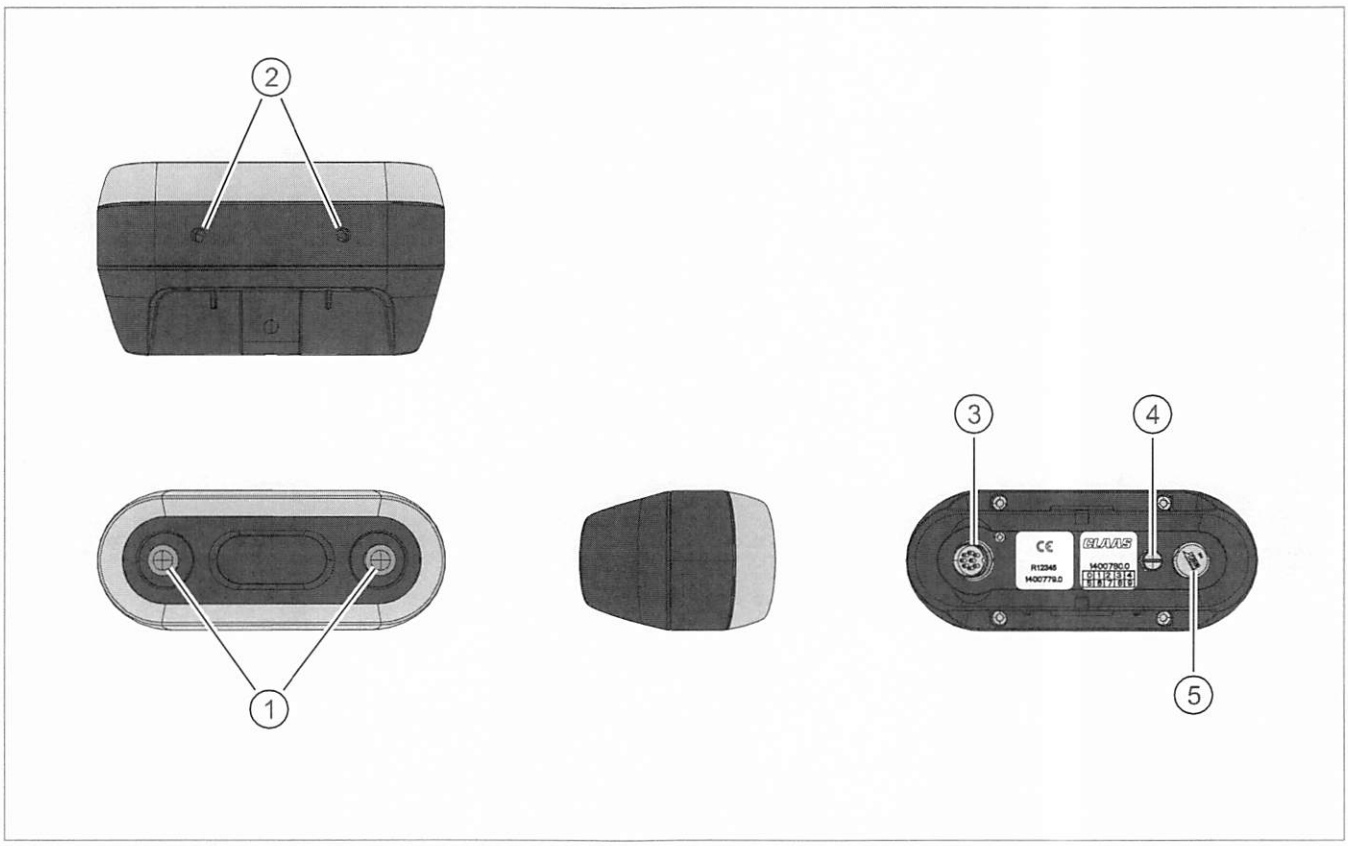
Backward compatibility

The system can also be operated with the predecessor COMMUNICATOR I terminal. In that case, a software version supporting this terminal must be used.

Designation	Software version	
	from	to
CLAAS UBM module	02.08.03	—
CLAAS COMMUNICATOR I	02.05.06	02.06.06

158406-002

3.1.3 Overview of camera



Camera MK4 (00 1402 414 1) 181044-001 **5**

	Designation
1	Optical lenses
2	Fastening holes
3	Connection for camera cable

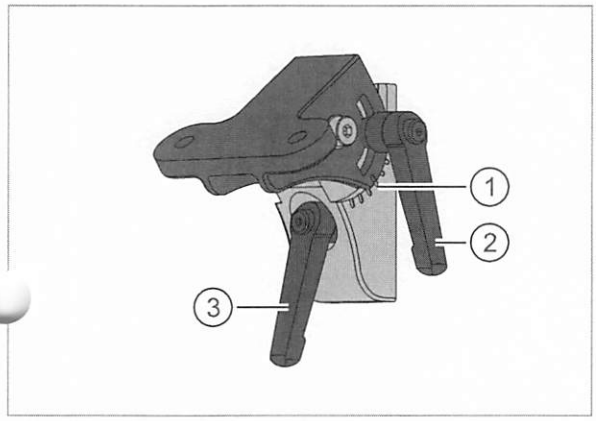
	Designation
4	USB port
5	Drying

The camera serves as a sensor for automatic implement guiding.

Backward compatibility

The system can also be operated with the predecessor camera MK3. In that case, a software version supporting this camera must be used.

Designation	Software version	
	from	to
CLAAS UBM module	02.08.03	—
CLAAS Camera MK3	02.04.02	



Bracket with adjusting function (00 1400 184 0) 182001-001

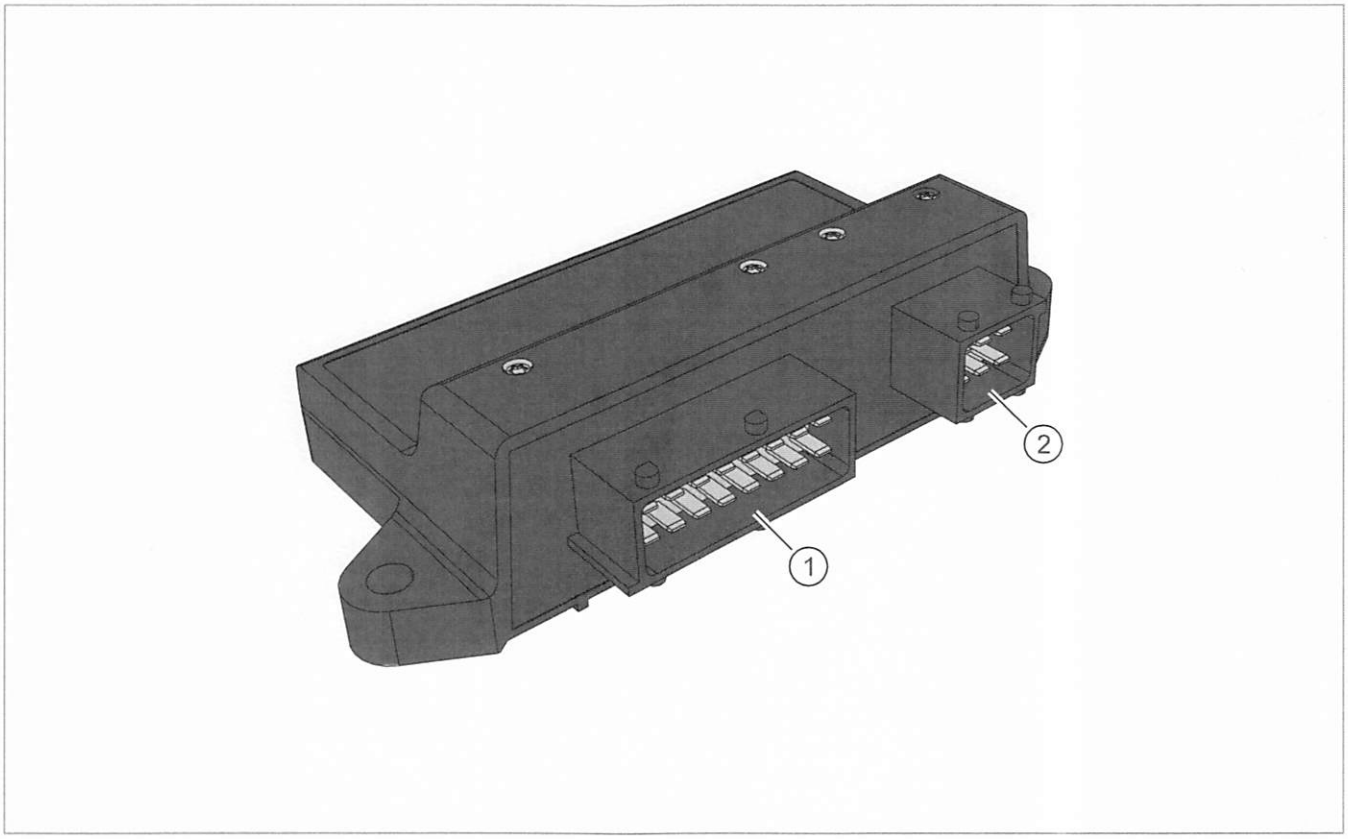
	Designation
1	Graduation for adjusting and reading the camera angle (colour markingPage 77)
2	Angle adjustment toggle bolt
3	Height adjustment and fastening toggle bolt

This bracket serves not only for fastening the camera, but also for adjusting the angle and the height. For camera adjustments, see the "Adjusting the camera" chapterPage 74.

6

921-002
158409-001

3.1.4 Overview of UBM module



UBM module (00 1401 119 1) 181069-001 **7**

	Designation
1	Connection 1: Signals from the sensors
2	Connection 2: CAN Bus, power supply

The UBM module contains the system software. It provides the connection between the individual system components.

The module is protected against rain and dust.

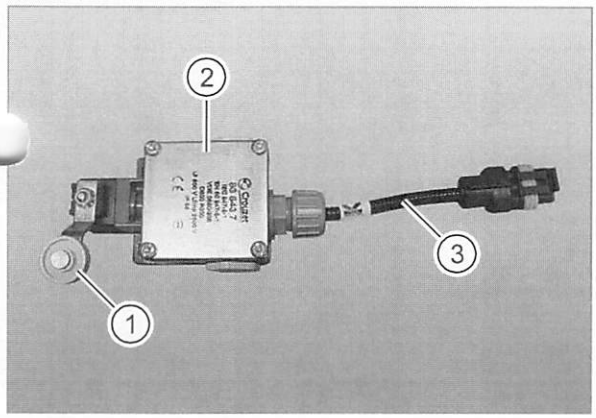
151641-002

3.1.5 Overview of sensors

Working position switch

The "Working position switch" informs the UBM module if the implement is raised or lowered (in working position). The switch is closed when the implement is lowered.

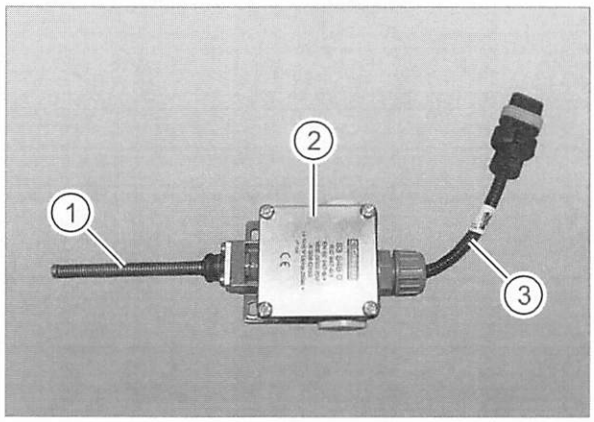
The switch is mechanically actuated. There are two options as shown below.



00 1402 238 0 184185-001

	Designation
1	Actuation by a roller
2	Switch
3	Connecting cable with connector

8



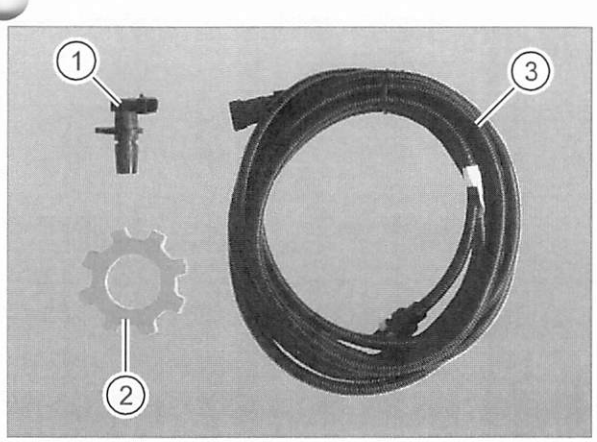
00 1402 239 0 184184-001

	Designation
1	Actuation by a steel spring
2	Switch
3	Connecting cable with connector

Extension cable: Page 49

9

Travel speed sensor



00 0011 810 0 180958-001

	Designation
1	Travel speed sensor
2	Cam switch
3	Cable for travel speed sensor

Every time one of the metal teeth passes by the sensor, a pulse is generated. This is used for calculating the travel speed. To enable correct travel speed calculation, the sensor must be calibrated first. See "Calibration" chapter Page 81.

10

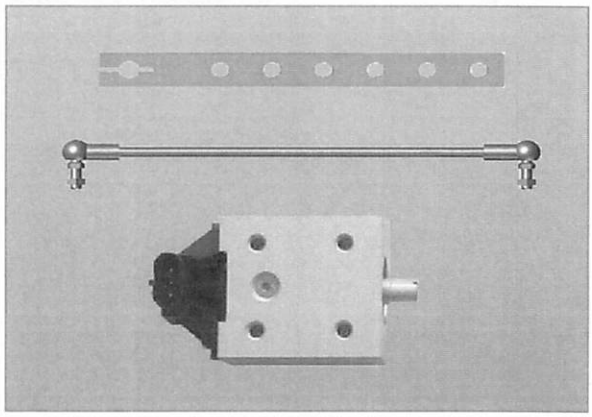
The cam switch is available in different sizes and with the following inside diameters:
35 mm (00 0018 744 0)
40 mm (00 0018 769 0)
45 mm (00 0018 770 0)
50 mm (00 0018 771 0)
55 mm (00 0018 772 0)
60 mm (00 0018 773 0)

Extension cable: Page 49

Steering angle sensor

The steering angle sensor detects the position of the hydraulic cylinder on the implement. The measured value is then compared with the current position on the field. Correct calibration of the steering angle sensor is a pre-condition. See "Calibration" chapter Page 82.

Extension cable: Page 49

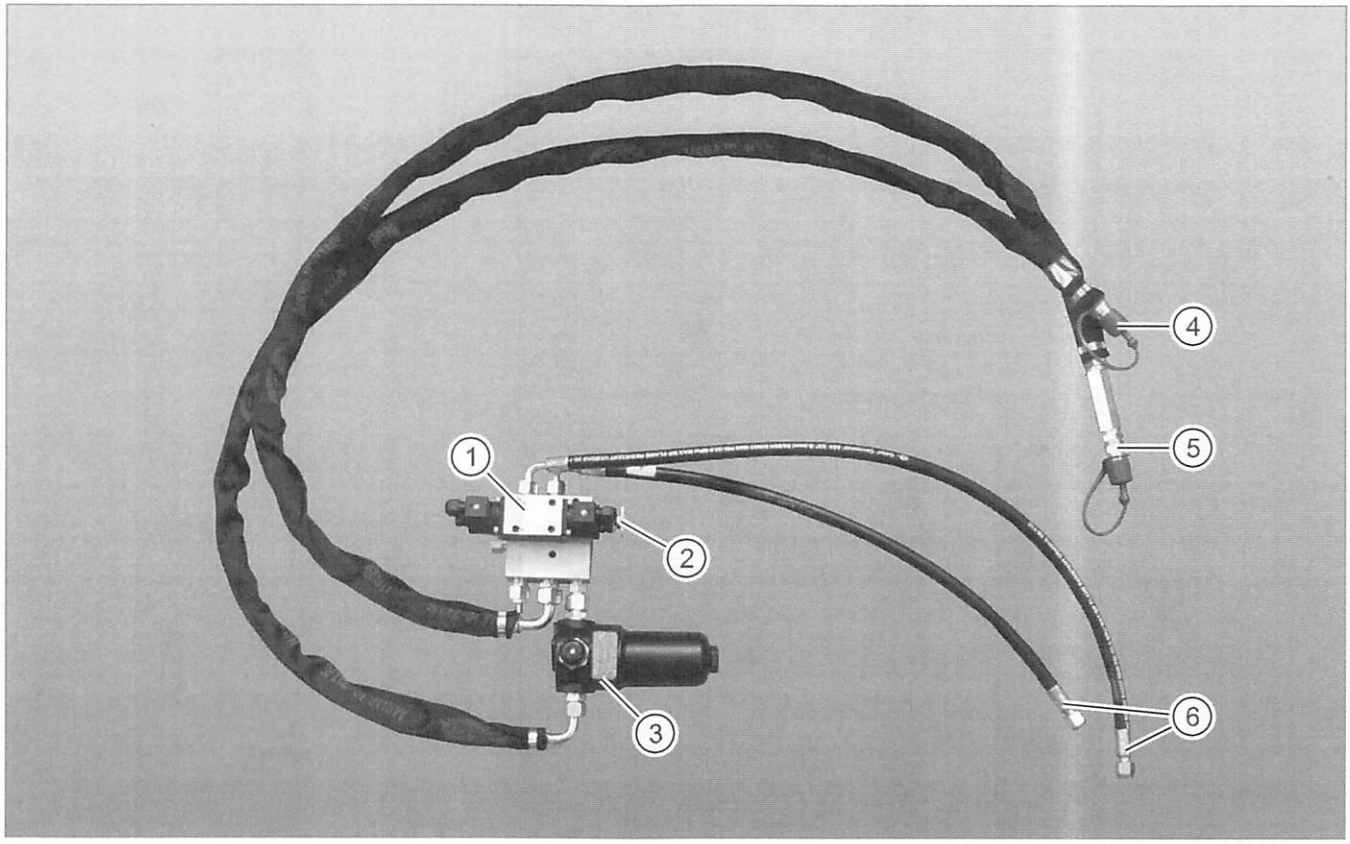


00 0019 439 0 180943-001

11

151643-001

3.1.6 Overview of hydraulic system



00 1404 747 0 184181-001

12

	Designation
1	Valve block
2	Flow rate setting wheel
3	Filter
4	Hydraulic line (connection P)
5	Hydraulic line (connection T)
6	Hydraulic lines to the steering cylinder

921-002

The valve controls the implement position. The flow rate must be set manually.

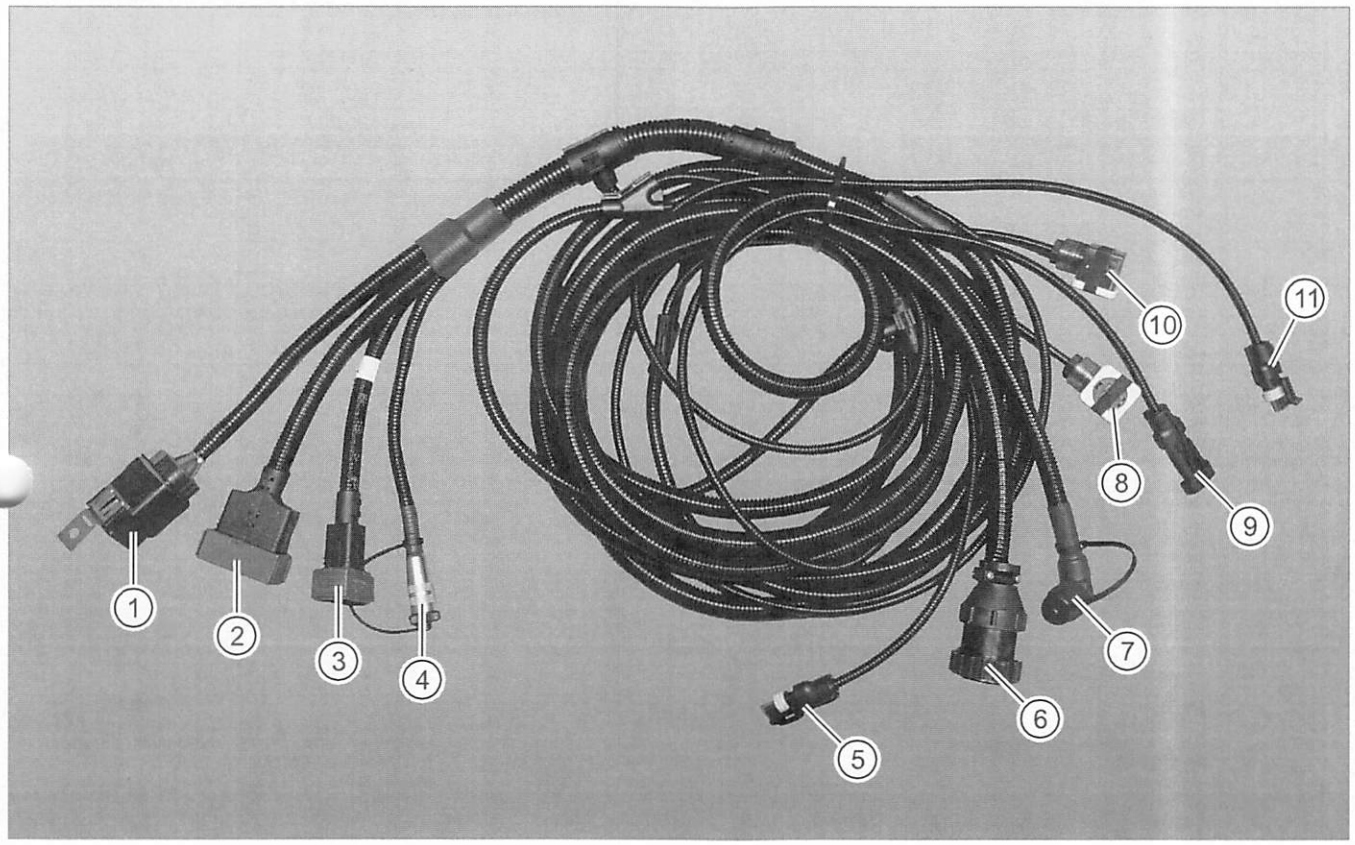
The shipping package includes all necessary hydraulic system components (hoses, filter, valve).

158474-001

3.1.7 Overview of cables

The CULTI CAM is connected electronically by two wiring looms. The main wiring loom is fitted on the implement and connects with all components fitted there. The second wiring loom is fitted on the tractor.

Main wiring loom



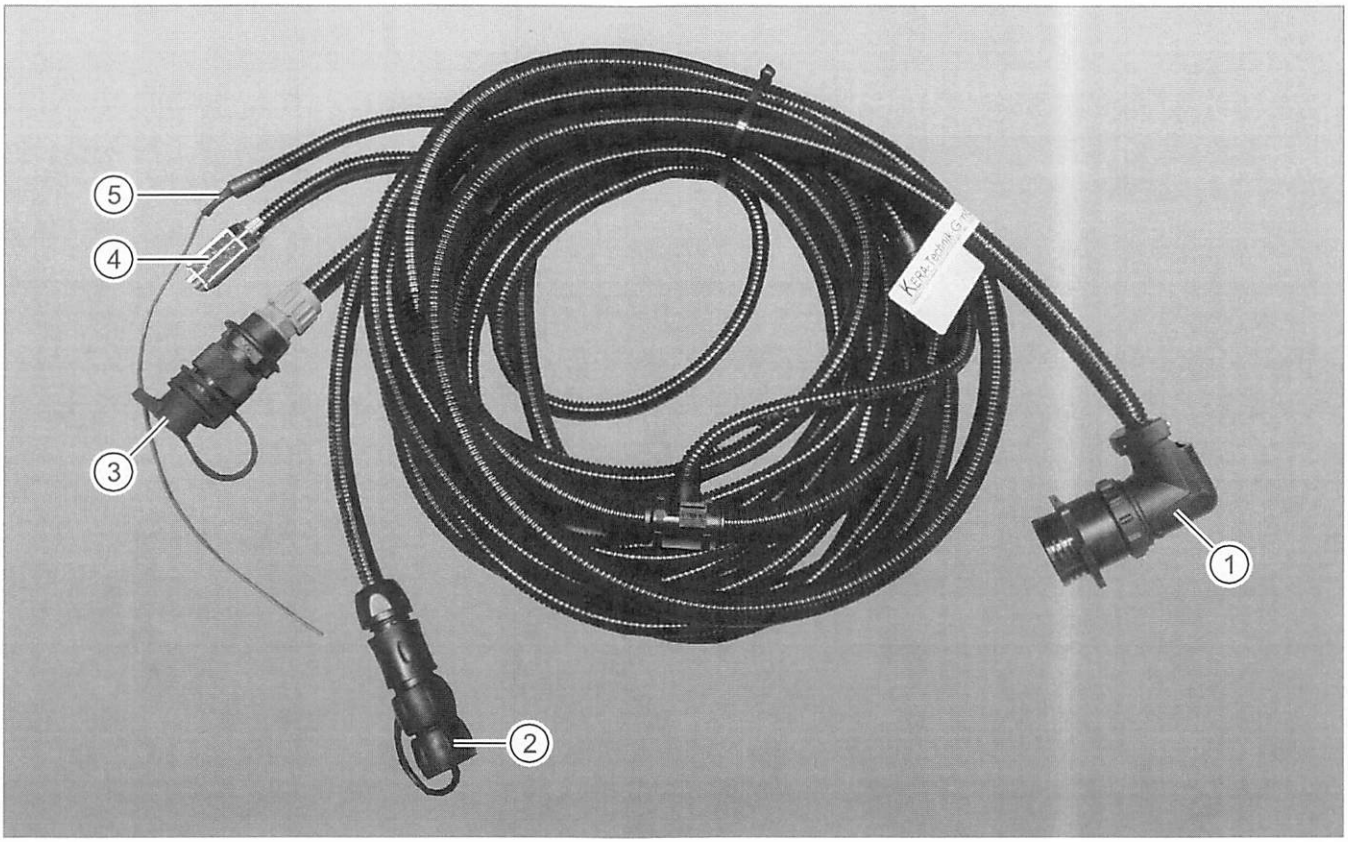
00 1400 196 0

184179-001 **13**

	Designation
1	RE, Relay
2	UA, UBM module connection
3	UB, UBM module connection
4	D, diagnosis connection via CAN Bus
5	SC, Steering angle sensor connection
6	T, plug connector with tractor wiring loom.
7	K, camera connection
8	VL, Valve connection

	Designation
9	SA, Working position switch connection
10	VR, Valve connection
11	F, travel speed sensor connection

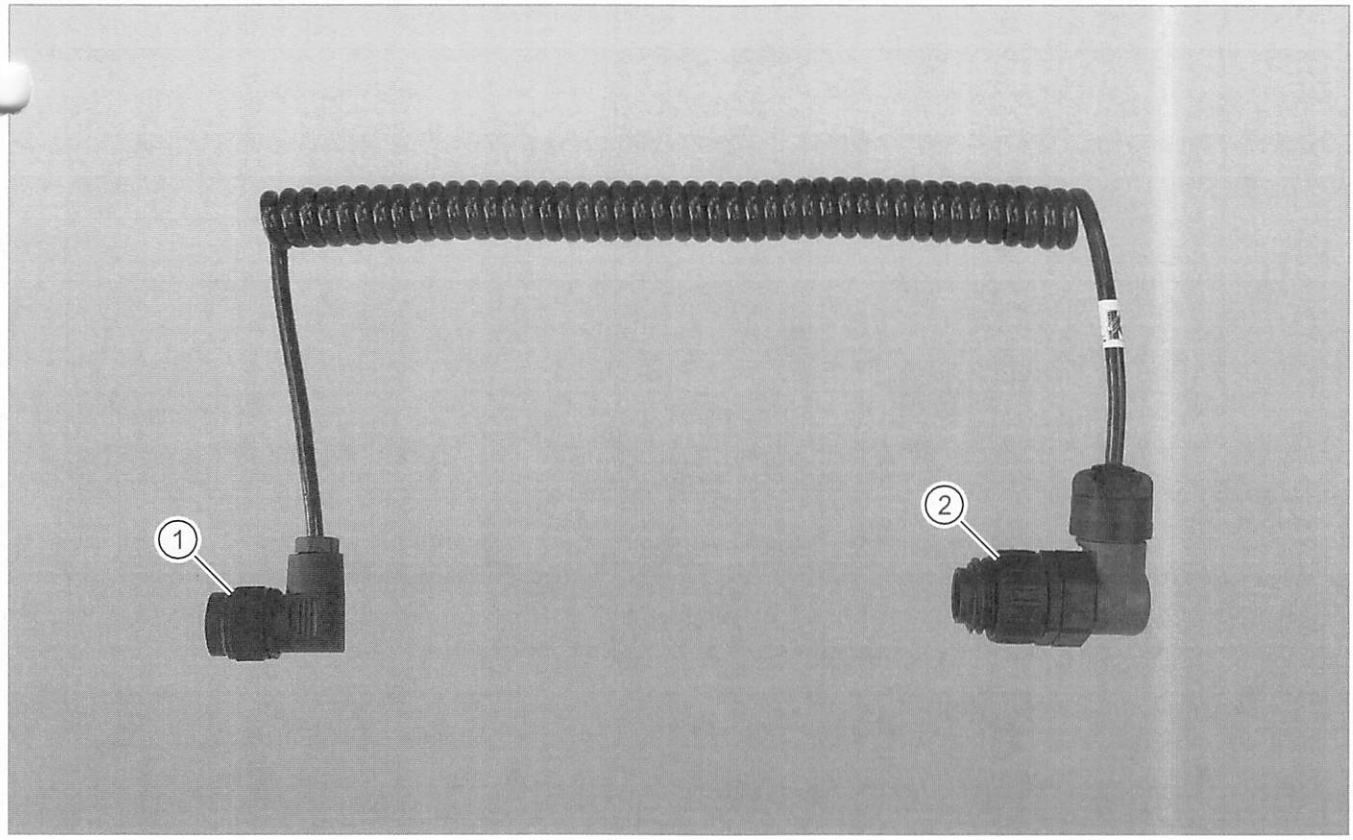
Tractor wiring loom



00 1400 195 0 184180-001 **14**

	Designation
1	T, plug connector with main wiring loom.
2	D, Video monitor connection
3	B, Battery connection
4	C, COMMUNICATOR II terminal connection
5	Xenon light control line connection

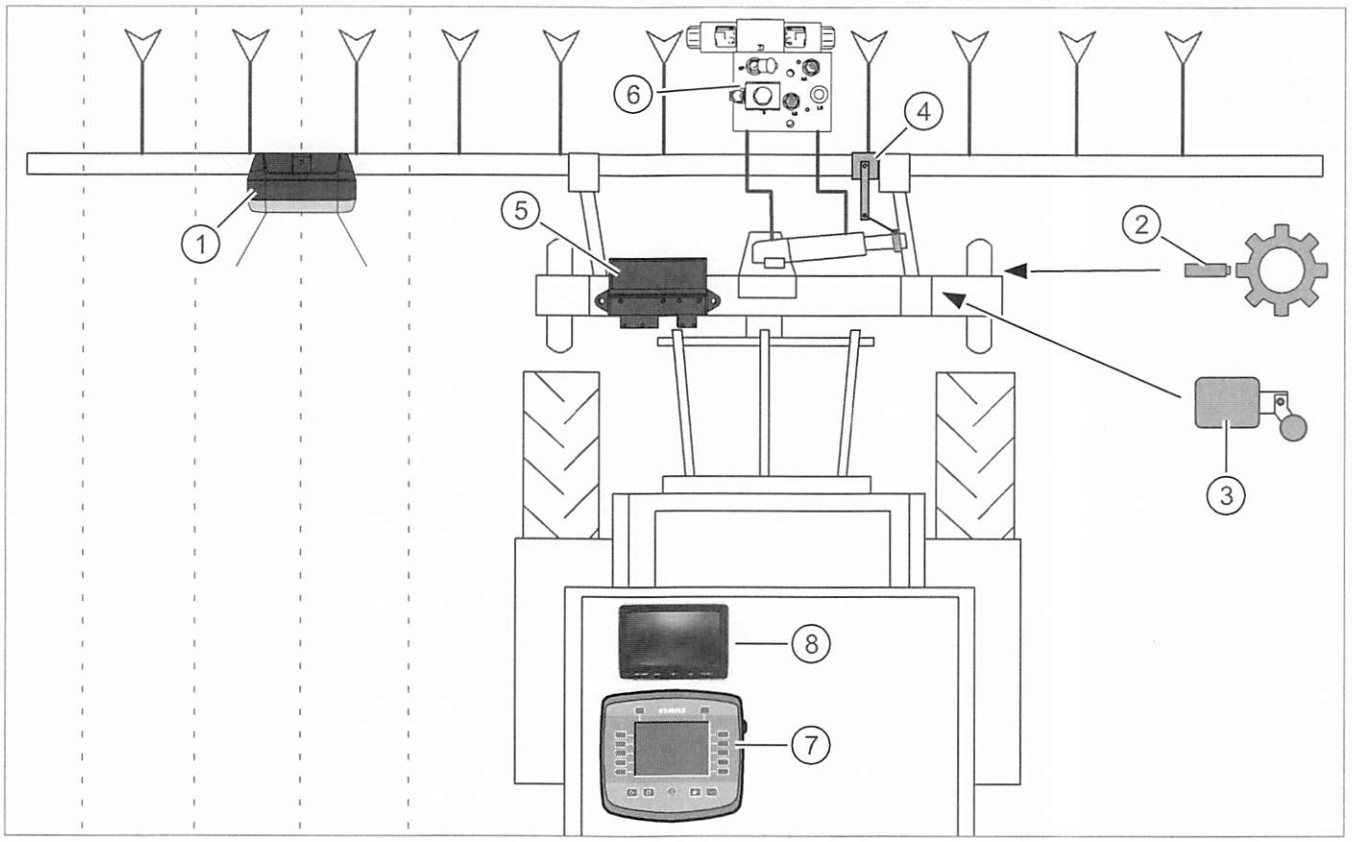
Camera connecting cable



00 1402 626 0 189122-001 **15**

	Designation
1	A, camera connection
2	B, plug connector with main wiring loom.

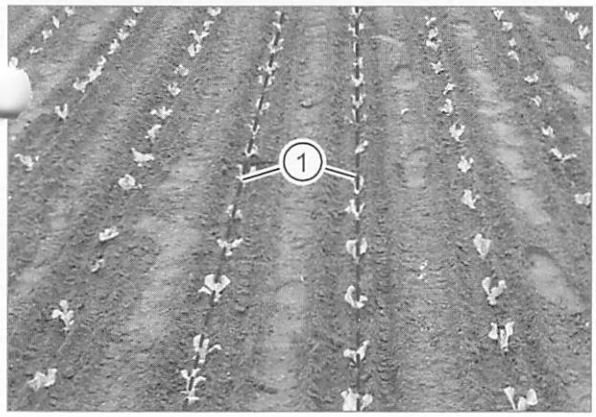
3.1.8 Function of CULTI CAM



181102-001 **16**

Function	Designation
Detection	The camera (1) distinguishes between the ground and plant rows by means of their colours. It converts the evaluated signal into CAN Bus data a transmits it to the UBM module (5). The travel speed sensor (2) measures the current travel speed of the machine and transmits an electric signal to the UBM module (5). The "Working position switch" (3) reports to the UBM module (5) if the implement is lowered or raised. The steering angle sensor (4) reports the implement position to the UBM module (5).
Processing and controlling	The UBM module (5) processes the signals from the different system components and transmits corresponding electric signals to the steering valve (6).
Steering	The steering valve (6) is controlled electrically by the UBM module (5) and steers the implement by hydraulic force. The steering angle sensor (4) detects the implement position and returns a corresponding signal (0.5 V - 4.5 V) to the UBM module (5).
Display and adjustments	The COMMUNICATOR II (7) displays the parameters and serves for adjusting the system. The driver can watch the rows and the plants detected there on the video monitor (8). He can therefore react to any deviations very quickly.

921-002



182330-001

Visual principle

The camera processes the image and identifies plants by their colour. The image created in this way is evaluated by the control unit.

After the individual plants have been identified, the system searches for accumulations of plants forming structures (rows). If there is no sufficiently large number of plants to form a clear row, this row can of course not be detected. Heavy weed infestation can also result in failure to detect plant rows.

The system calculates centre lines through the detected plant rows (1). The current implement position is compared with the plant rows and a correction is made if necessary by means of the electronically controlled hydraulic valve.

159772-002

3.1.9 Possible applications and pre-conditions

Automatic control is possible for the applications listed below:

- Row of plants
- Multiple row

To achieve this, the following travel speeds and properties of the field structure must be respected.

Travel speed

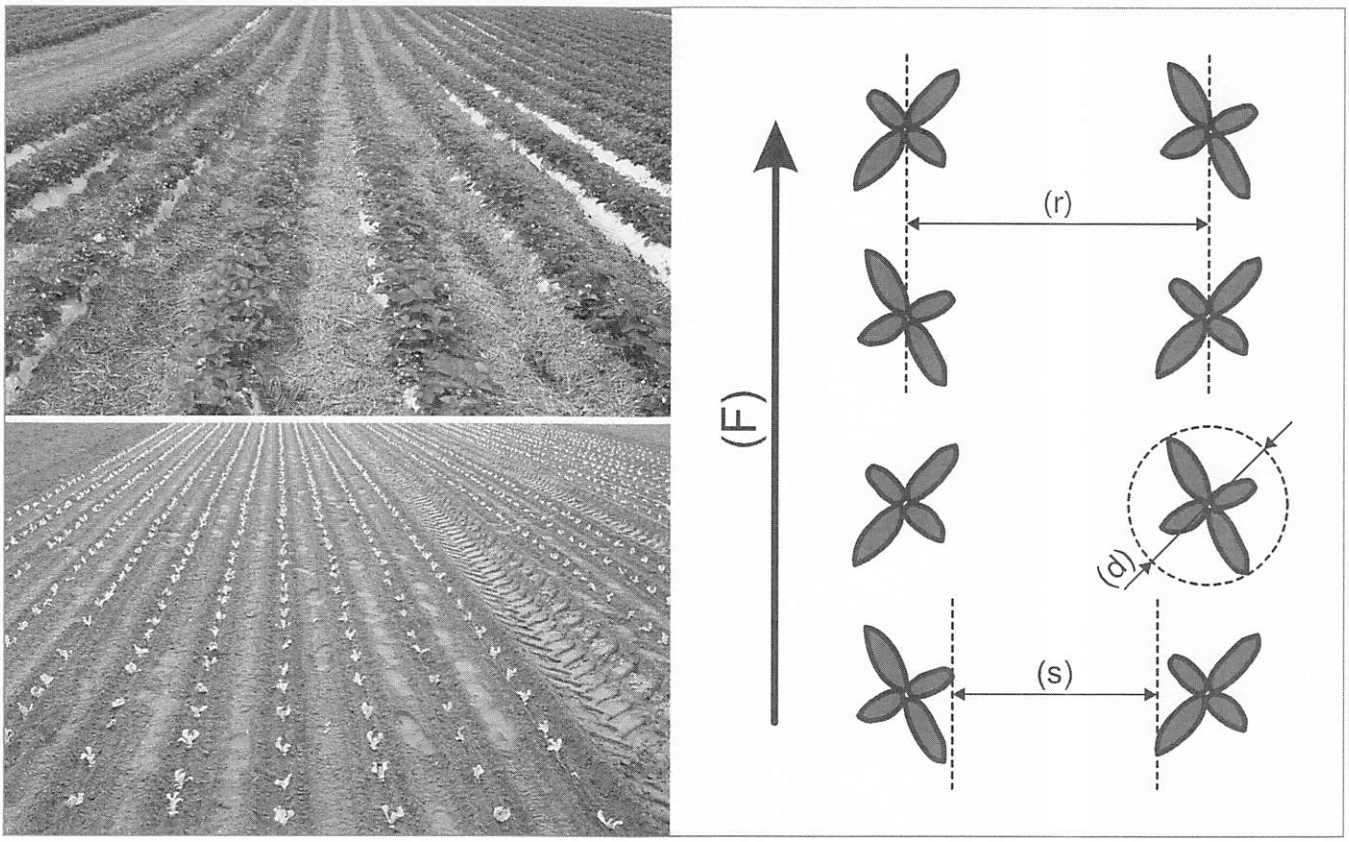
	Travel speed
Minimum	0.05 km/h
Maximum	25 km/h

The maximum speed specified in the table is the top speed permitted by TÜV. The maximum fieldwork speed is usually clearly below this level. It depends on different factors:

- Structure
- Terrain
- Implement
- Weather conditions
- Light conditions

These factors also influence the signal quality Page 29.

Pre-conditions for row of plants



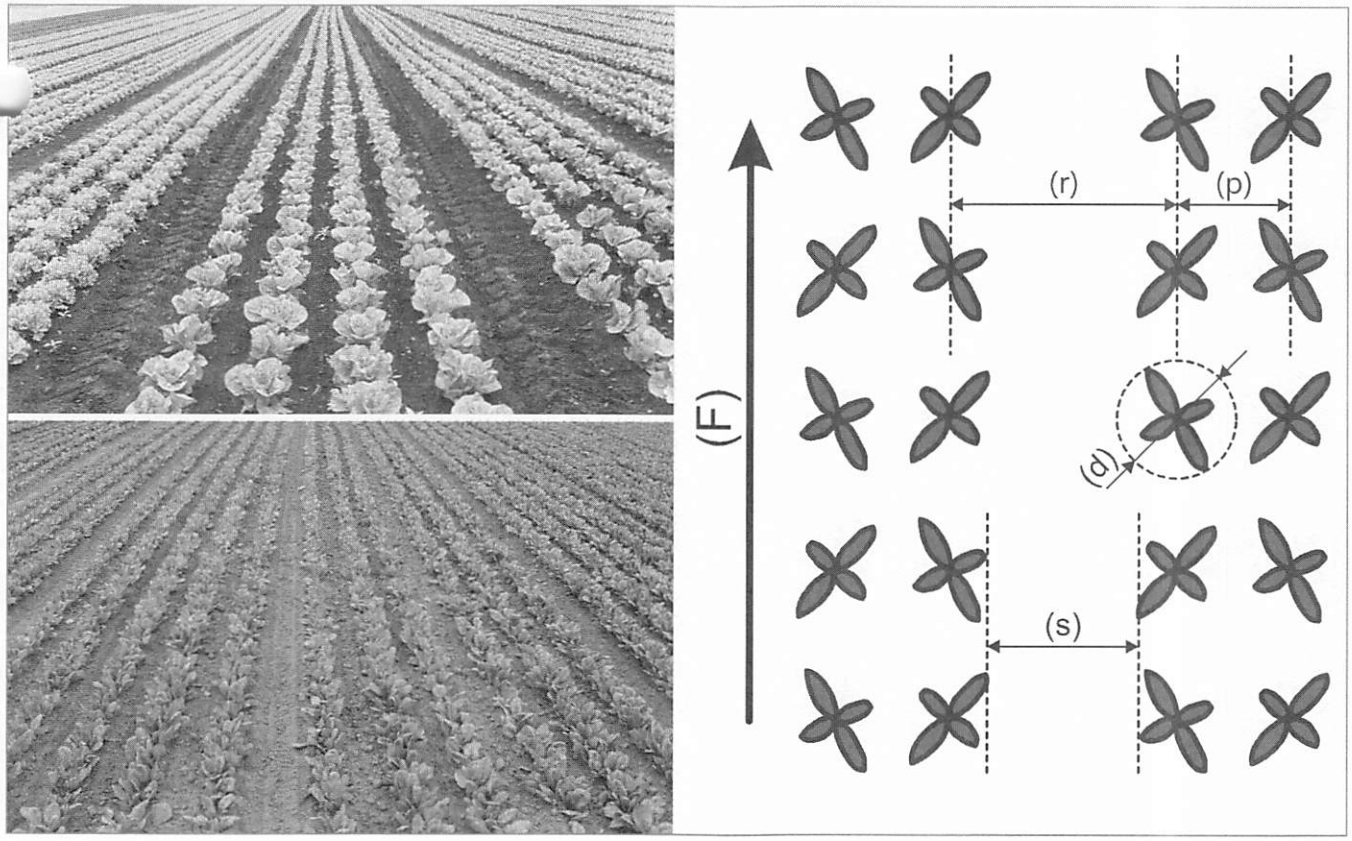
Plant rows

169312-001 **18**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	15 cm	none
Diameter of plants	d	4 cm	*
Width of visible uncovered soil area between the rows	s	5-10 cm	none
Direction of travel	F		
Colour of plants		Green	
Colour of ground		Brown, black	
* Depending on "r" and "s".			

921-002

Pre-conditions for multiple row



Multiple rows

169313-001 **19**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	15 cm	75 cm
Diameter of plants	d	4 cm	*
Row spacing in multiple row	p	3 cm	25 cm
Width of visible uncovered soil area between the rows	s	5-10 cm	none
Direction of travel	F		
Colour of plants		Green	
Colour of ground		Brown, black	
* Depending on "r" and "s".			

151644-002

3.1.10 Accuracy and signal quality

This chapter explains factors that influence the accuracy and the signal quality of the system.

Accuracy

The fault of the check signal of the visual system is 10 mm (0.4"). The control system fault and the play of the fixture on the tractor which varies with every make are added to this value.

A typical fault value at slow speed is 25 mm (1"). The system fault increases as the travel speed rises.

Signal quality

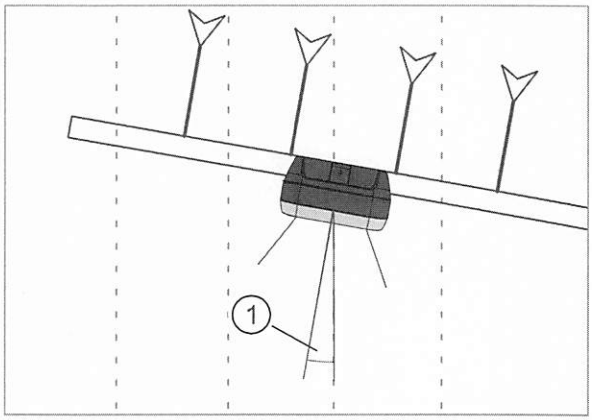
Signal quality is decisive for if and how precisely the automatic control can work. It can be read on the operating terminal.
Page 107

In addition, a threshold value can be set below which the automatic control system is to be deactivated.
Page 86

Different factors influence the signal quality. These factors are explained below.

Hilly terrain

When working in hilly terrain, the implement tends to slip downhill. However, the camera remains in a central position above the plant row. As long as the driver steers the tractor as parallel as possible to the plant rows, the camera can keep the implement in the right position.



181933-001

If this is not possible and the implement slips so that it twists relative to the plant rows, the camera angle also changes automatically (1). The rows can no longer be properly detected. In this case, the camera must be positioned as closely as possible to the tools (knives, shovels, blades).

The system can influence the implement position exclusively, but not the angle with the plant row.

In order to avoid excessive slipping of the tractor/ implement combination, sufficient dimensioning of the tractor is essential.

The "Dual Offset" function supports you when working in hilly terrain.
Page 109

Curves

The CULTI CAM function during cornering is limited. When the curve radius is too small, the camera is not able to detect the rows.

Effects occurring in curves such as implement shifting or twisting cannot be compensated by the system.

Dust

Under normal working conditions, the camera is not affected by dust because it is fixed at the implement front and faces downward.

However, to ensure flawless camera function, the glass should be wiped off at regular intervals.

In extreme cases when even the human eye can no longer detect plant rows in the visible range of the camera, the camera will not be able to deliver a valid signal either. The visible range of the camera is around 2 m x 2 m.

Moisture

There may be no water drops in front of the lens. If this happens, wipe them off with a cloth.

Weed

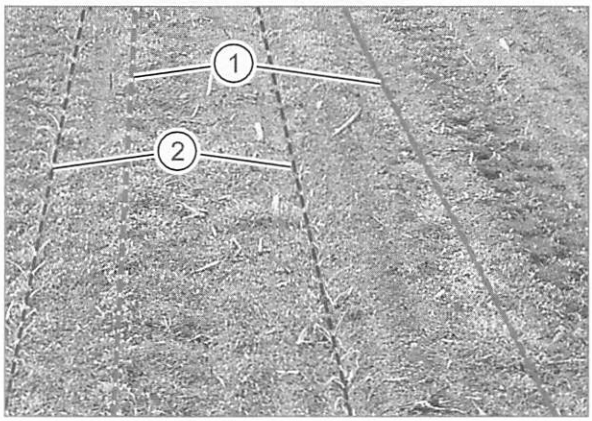
Weed infestation can interfere with the system. The decisive question is how heavy the infestation is and if it is uneven or even.

As long as the plant rows can be clearly distinguished from the weed, weed is not a problem. If this is not the case and the plant rows are rather difficult to detect or if the weed infestation forms regular rows that the camera might confuse with the plant rows, there are problems.

182341-001

21

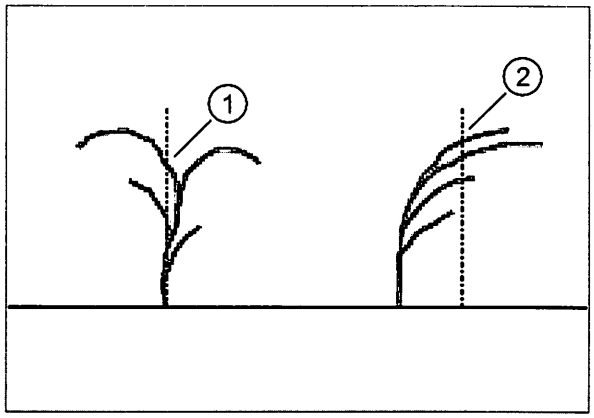
The picture shows a clear row structure despite weed infestation. This situation is not a problem.



181939-001

22

This picture shows how weed forms its own row structure (1). The weed rows are easier to detect than the plant rows (2). This condition may cause problems if the camera detects the wrong rows.



181934-001

Wind

The plants in a plant row are moved by the wind. Starting at a certain plant height, i.e. roughly 20 cm (8"), this motion can influence the system function. The figure shows the position where the camera detects the plant row in calm (1) and in wind (2). A position shift can be clearly seen. This is because the system always positions the plant row in the centre of the detected plants.

In this case, the driver must intervene and compensate the implement offset manually using the terminal.

23 The "Dual Offset" function supports you when working in strong winds.
Page 109

Colour

The CULTI CAM can identify shades of green. External influences may discolour the plants. These plants may then no longer be identified.

Very bright ground or major accumulations of bright stones may cause problems. It may occur that the plants can no longer be distinguished from the ground.

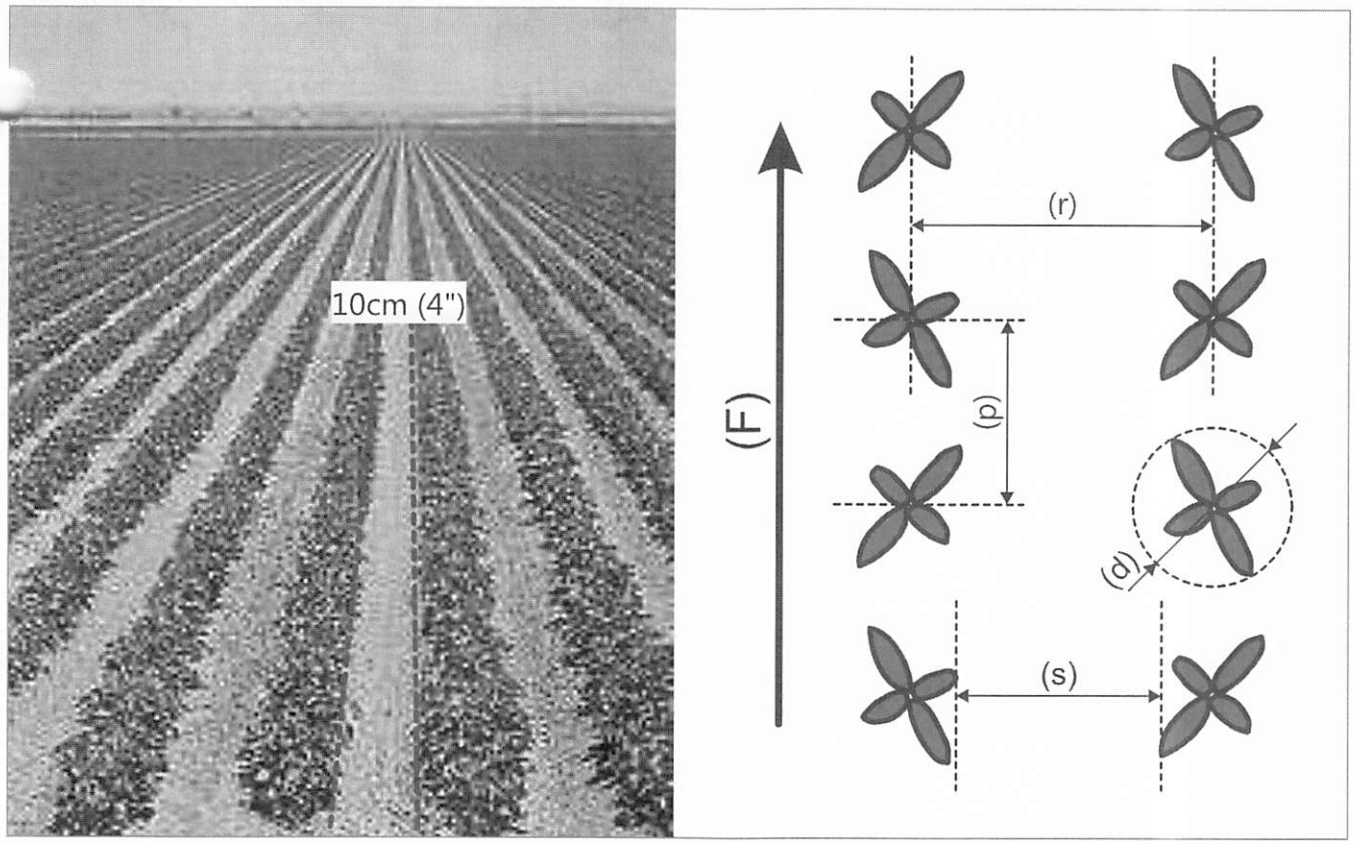
158748-001

3.1.11 Plant pre-conditions

This chapter lists some examples where positive experience has been gathered with the CULTI CAM. Information regarding specific settings is provided.

The chapter contains recommendations concerning row spacing, plant spacing, plant sizes and further information.

Cotton

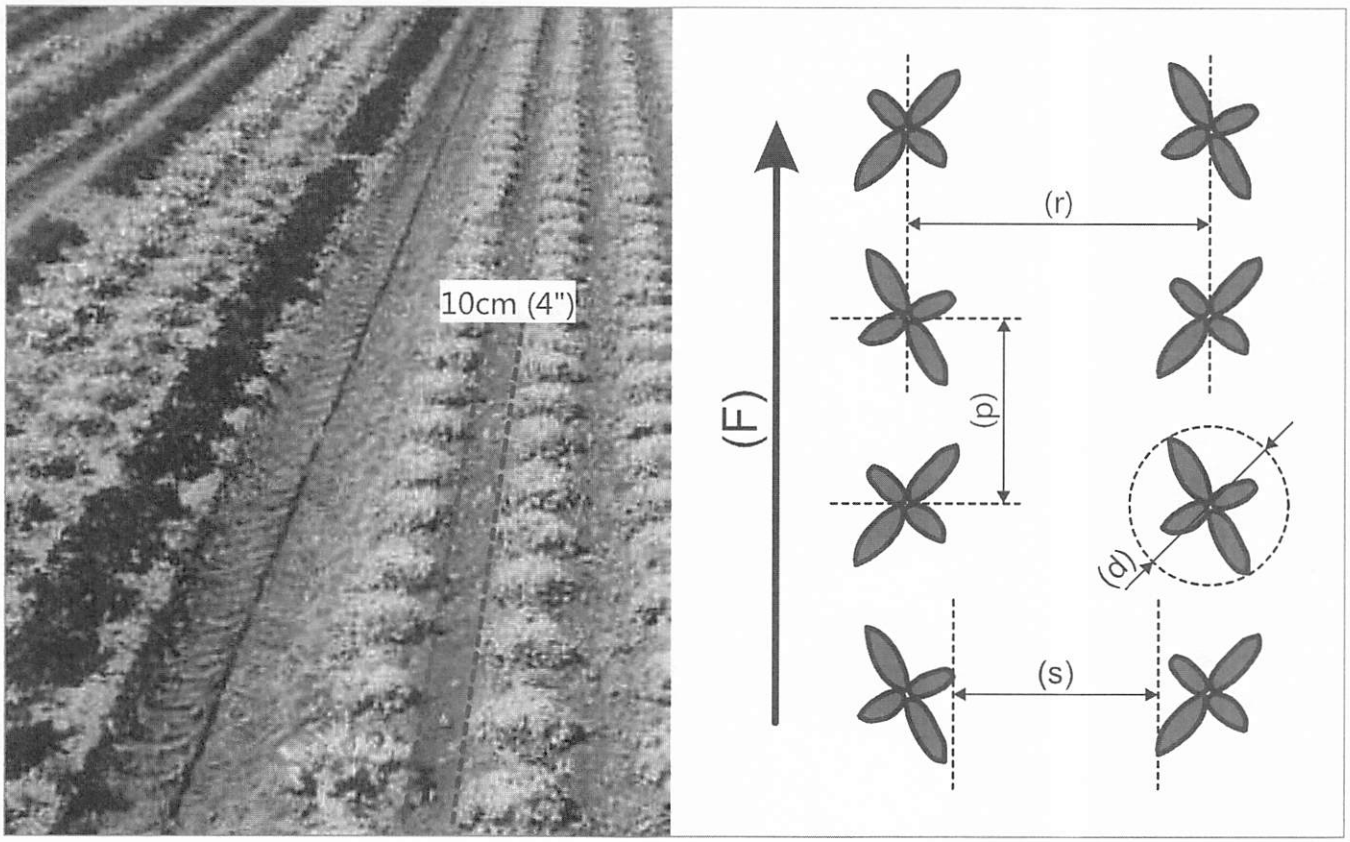


Cotton

182314-001 **24**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

Green salad

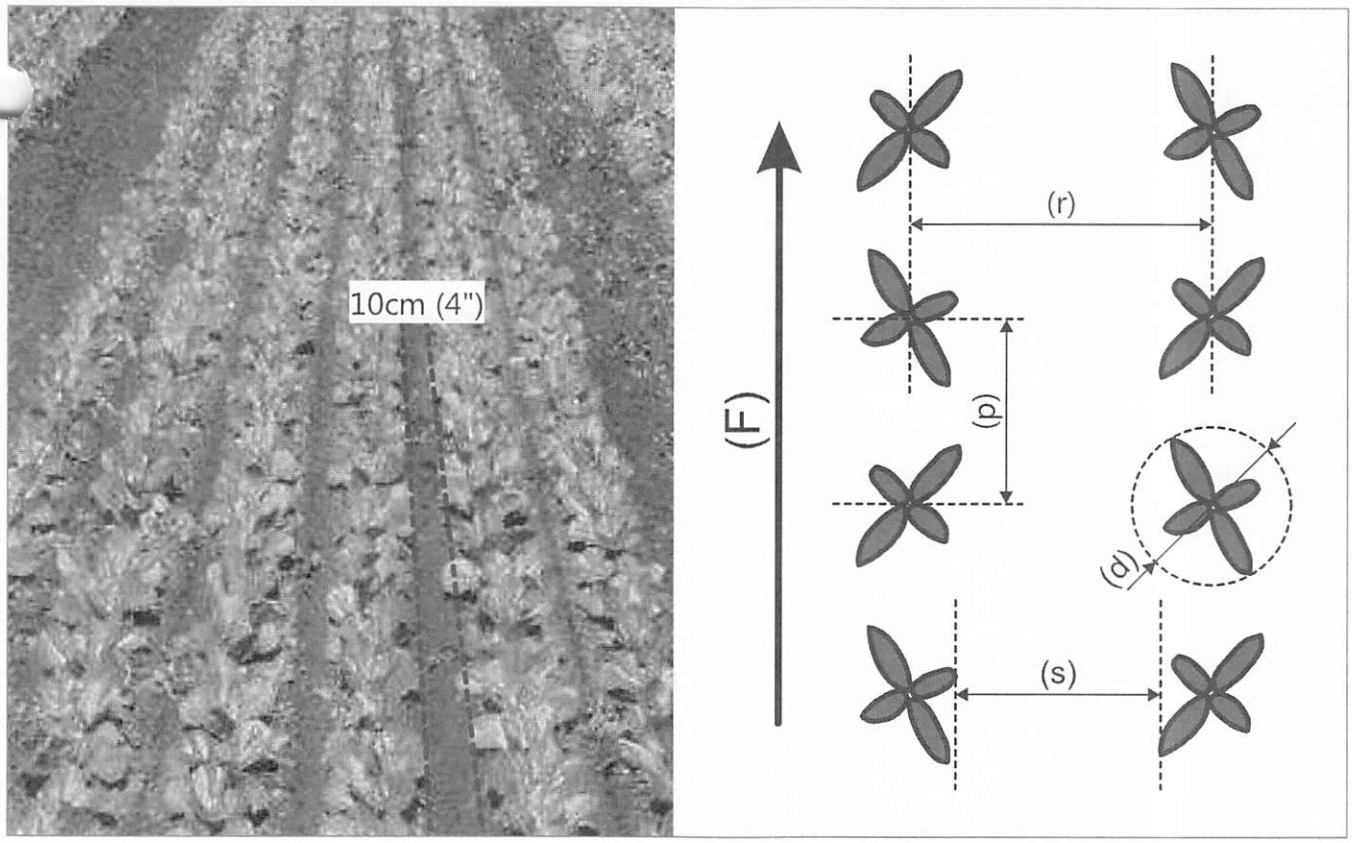


Green salad

182315-001 **25**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

Lettuce

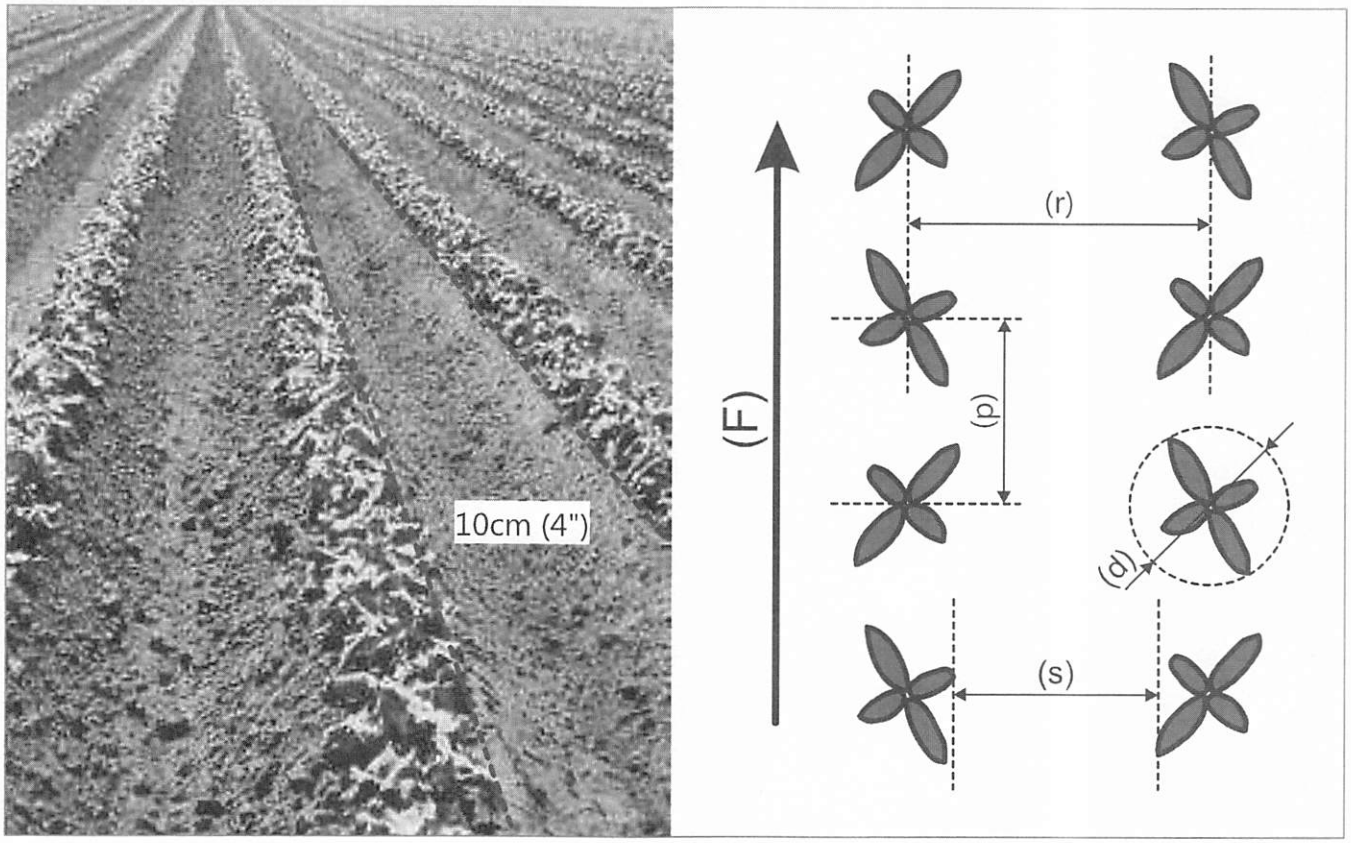


Lettuce

182317-001 **26**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

Cauliflower

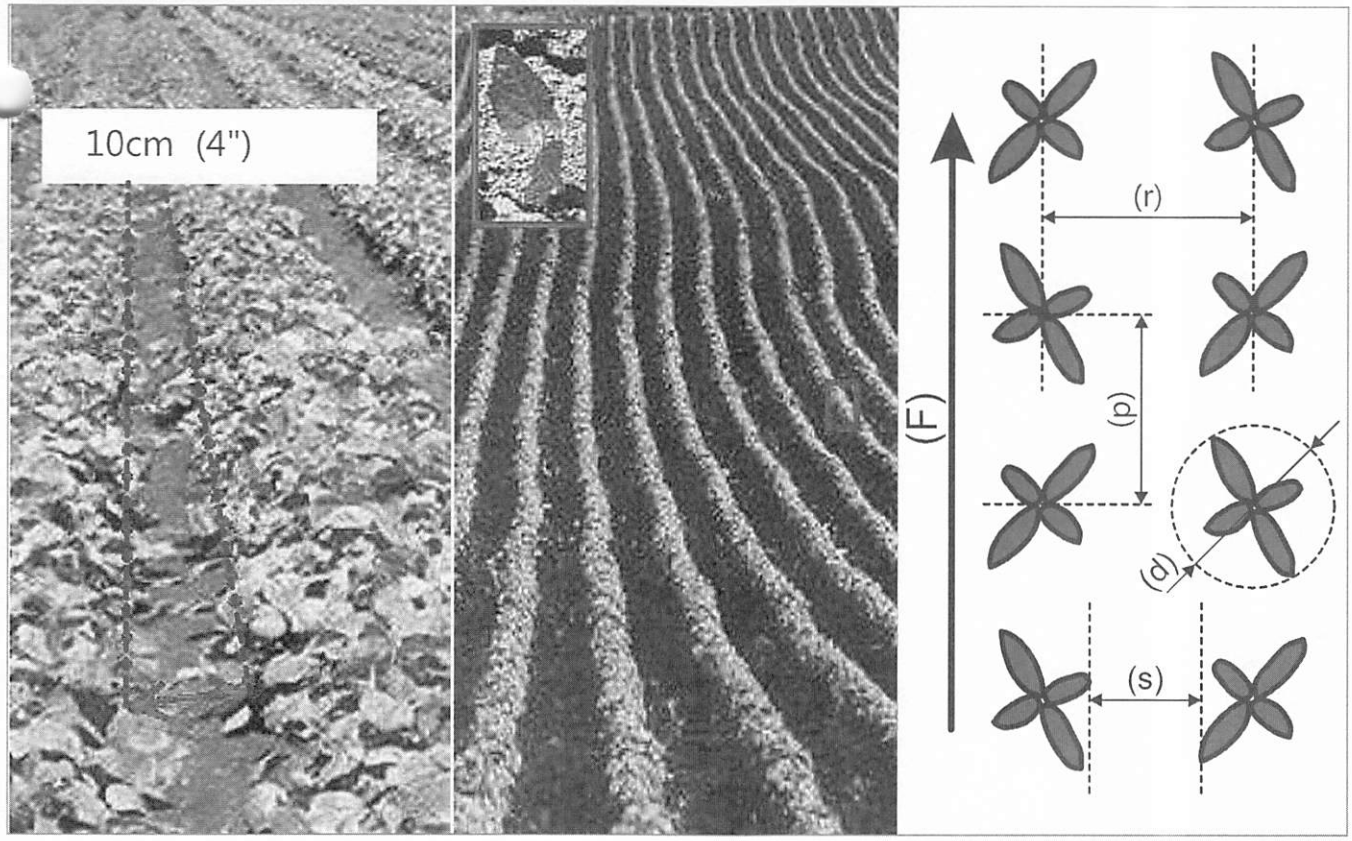


Cauliflower

182308-001 **27**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	5 cm (2")	-*
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	
* When planting cauliflower in one row per bed, there is no maximum plant size.			

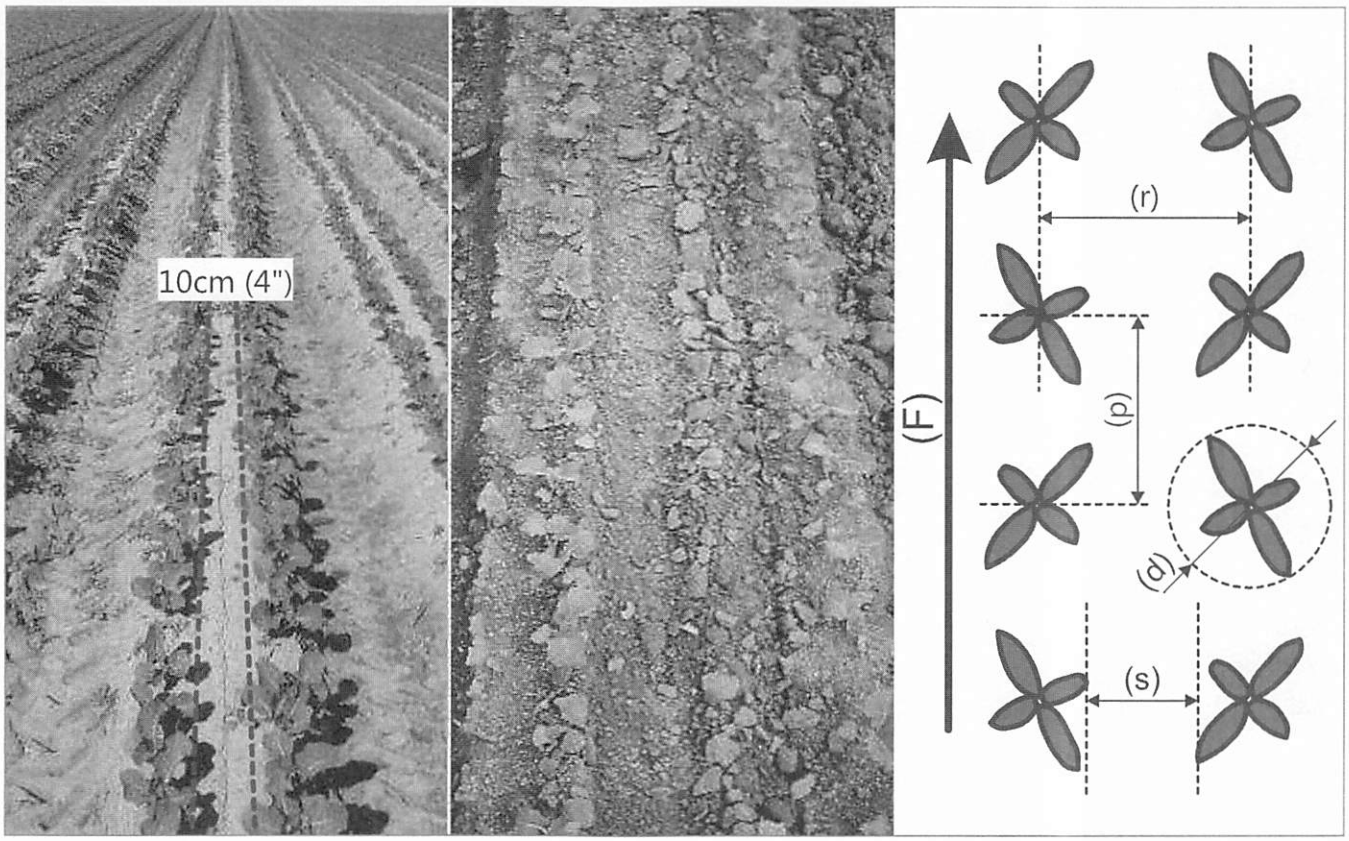
Beans



Beans 182306-001 **28**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

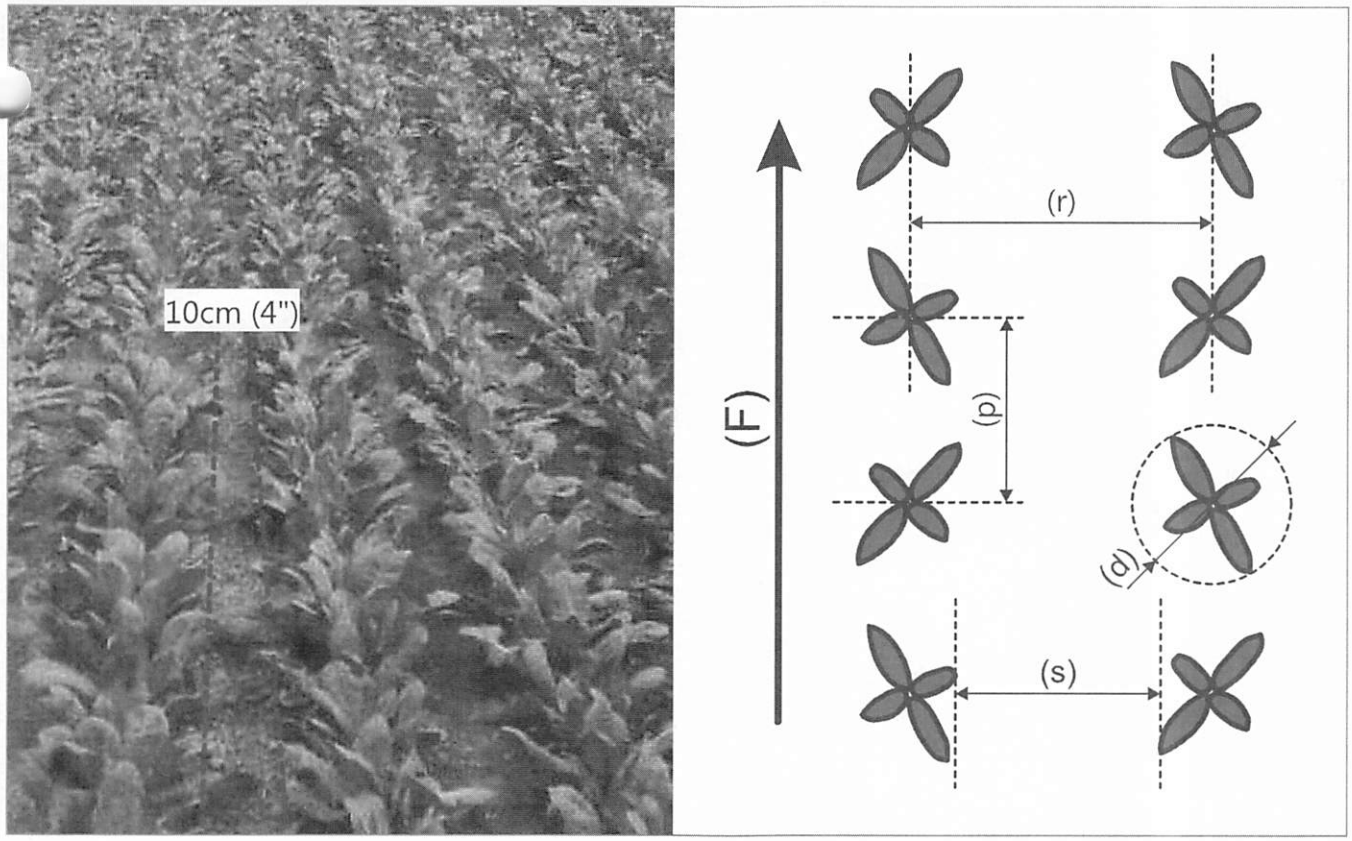
Broccoli



Broccoli 182307-001 **29**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	5 cm (2")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

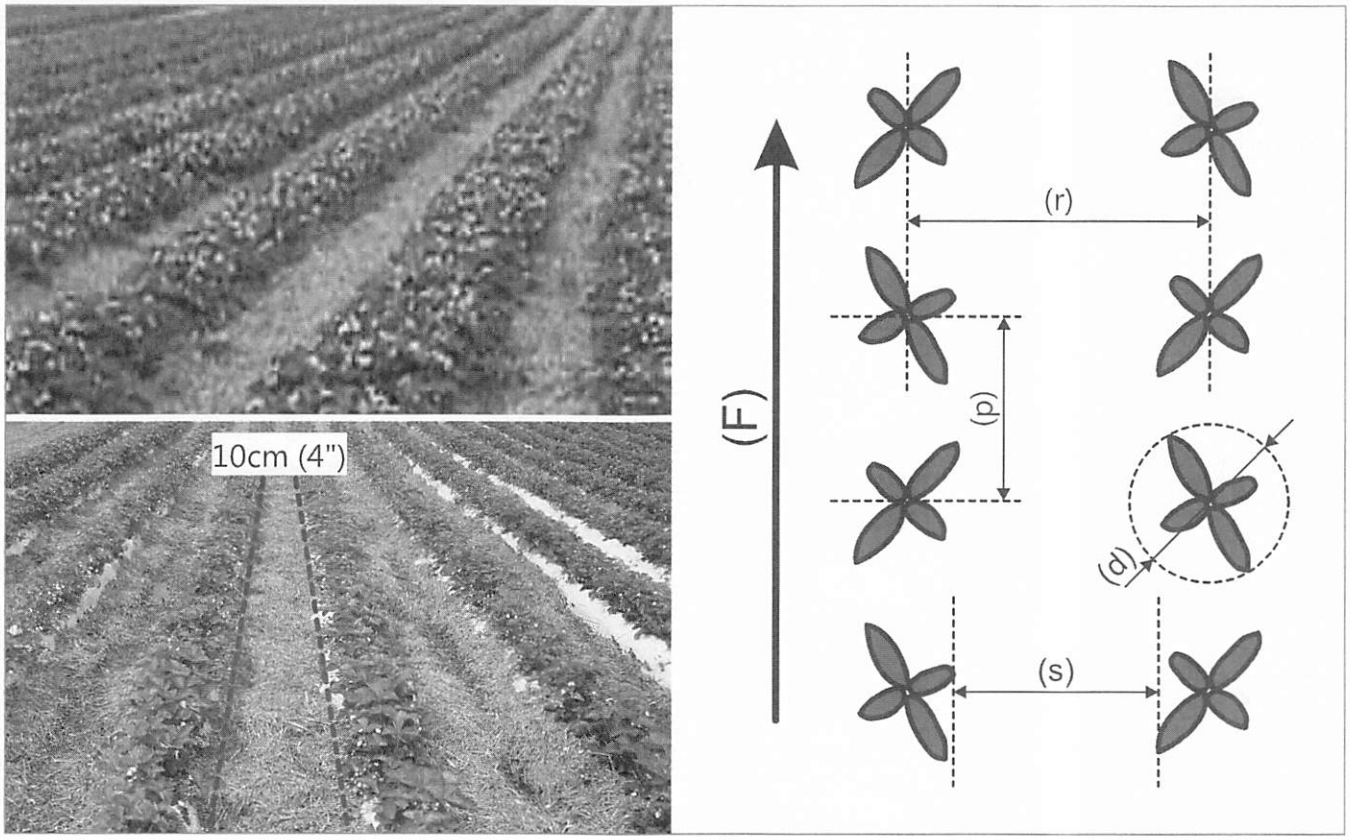
Witloof chicory



Witloof chicory 182311-001 **30**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

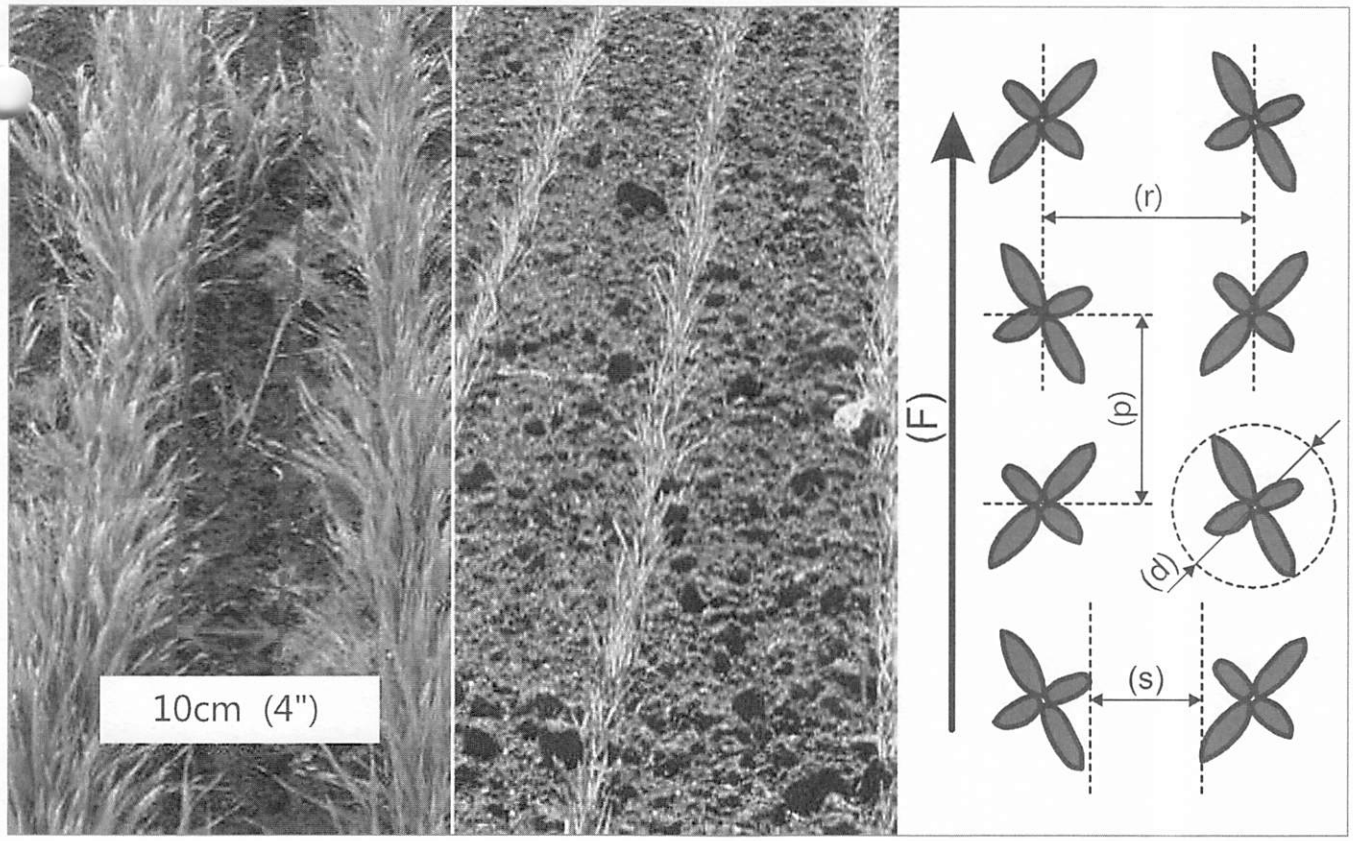
Strawberries



Strawberries 182321-001 **31**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	5 cm (2")	-
Plant spacing	p	-	60 cm (24")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

Grain



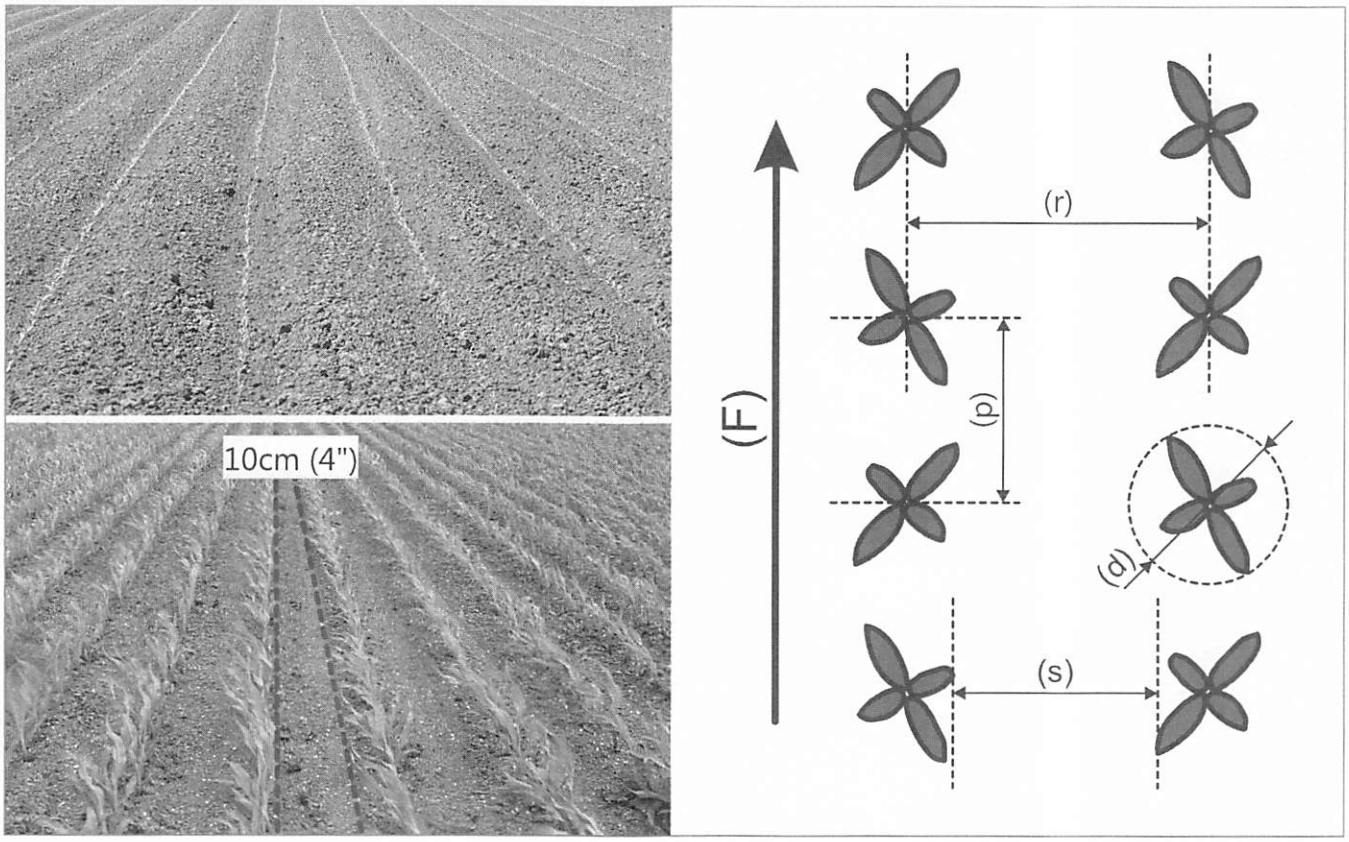
Grain

182309-001 **32**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	2 cm (3/4") or 5-10 cm (2"-4") *	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	
* High grain plants have enough green surface.			

Grain is susceptible to wind.
Page 31

Maize



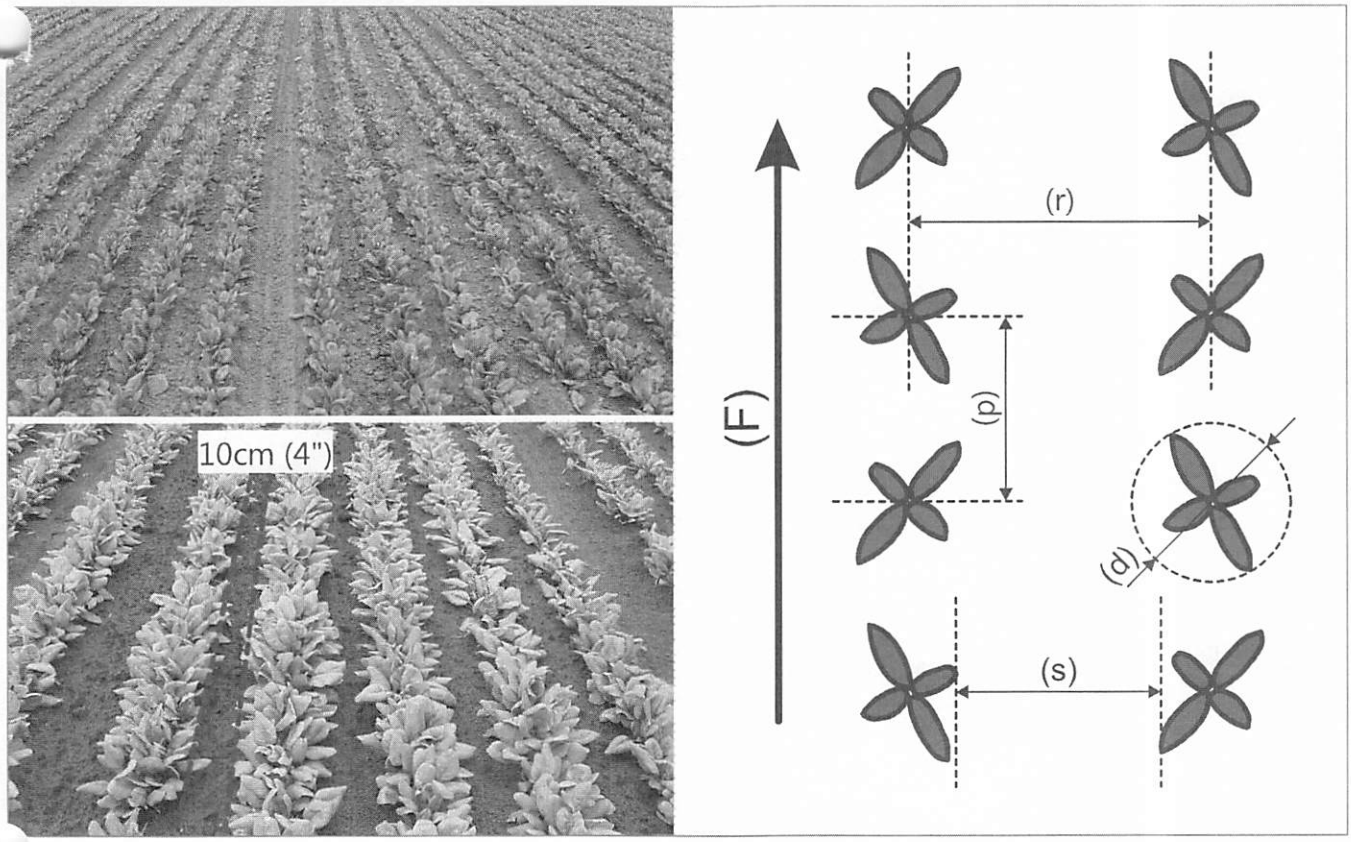
Maize

182313-001 **33**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12") or 5 cm (2") *
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	
* High maize plants have enough green surface.			

Maize is susceptible to wind and plant discolourations.
Page 31

Spinach



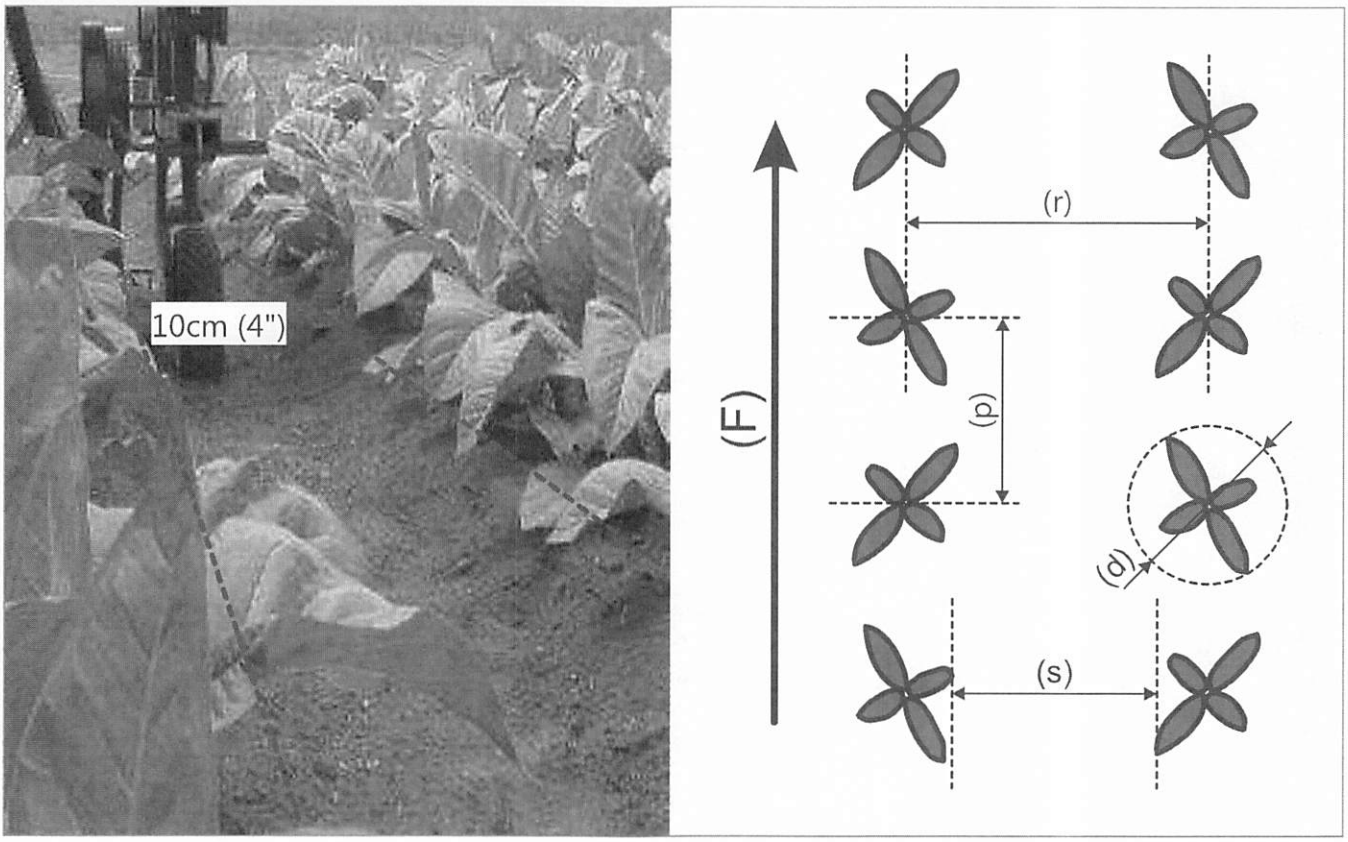
Spinach

182320-001

34

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

Tobacco

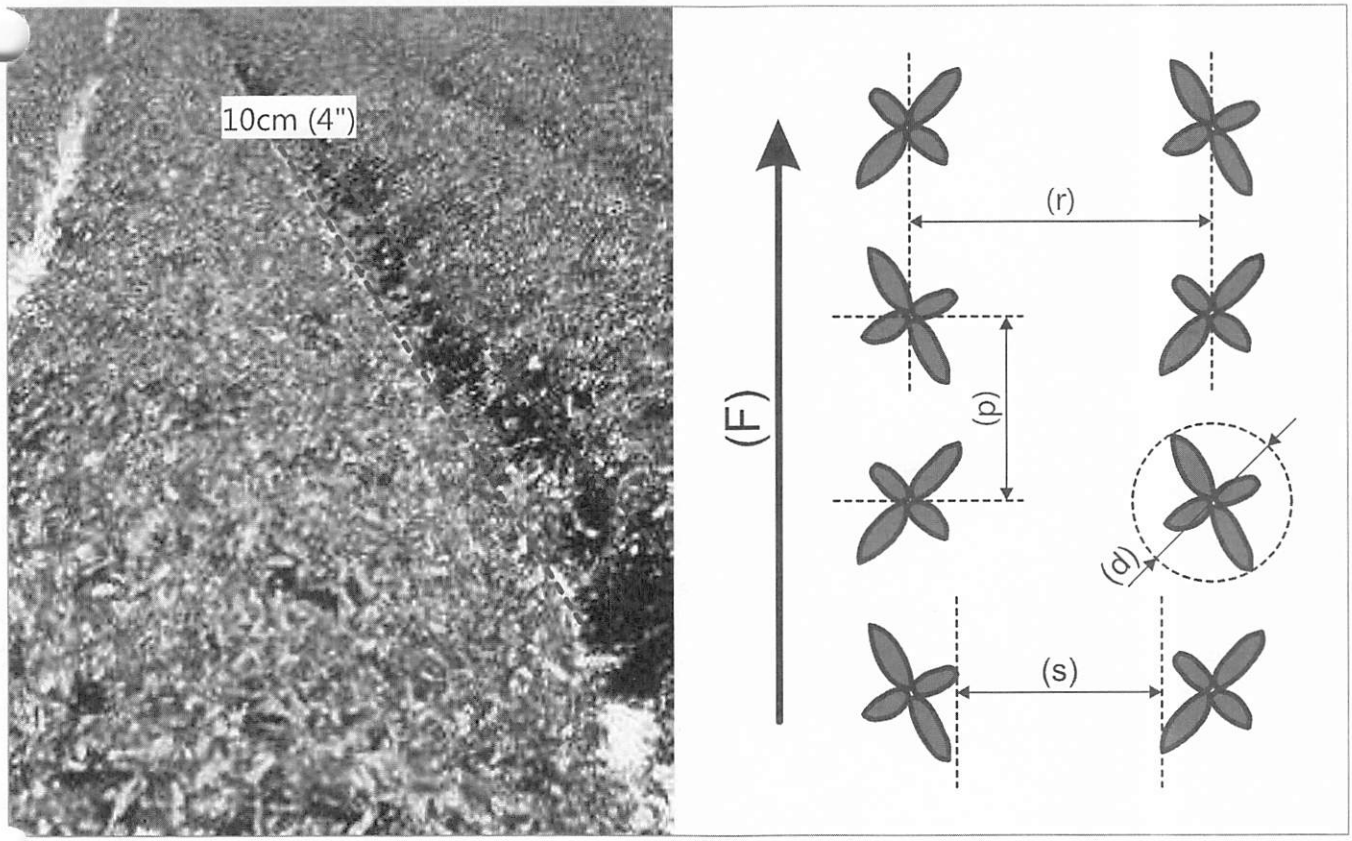


Tobacco

182323-001 **35**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	5 cm (2")	-
Plant spacing	p	-	45 cm (18")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

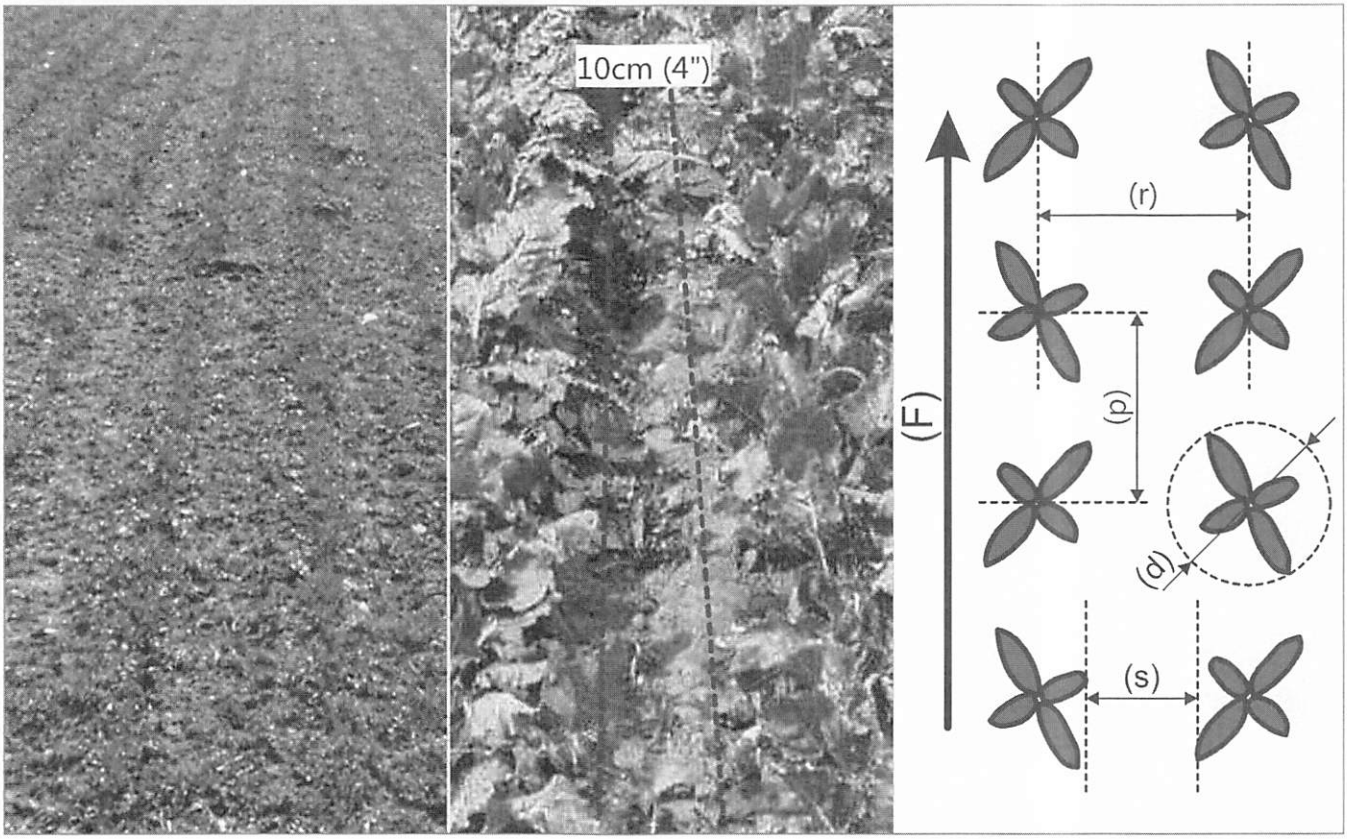
Tomatoes



matoes 182325-001 36

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	5-10 cm (2"-4")	-
Plant spacing	p	-	60 cm (24")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

Sugar beets



Sugar beets 182322-001 **37**

Designation	Abbreviation	Dimension min.	Dimension max.
Row spacing	r	25 cm (10")	-
Diameter of plants	d	4 cm (1 3/4")	-
Plant spacing	p	-	30 cm (12")
Visible uncovered ground surface between the rows	s	10 cm (4")	-
Direction of travel	F		
Colour of plants		Green	

921-002

3.2 Optional equipment

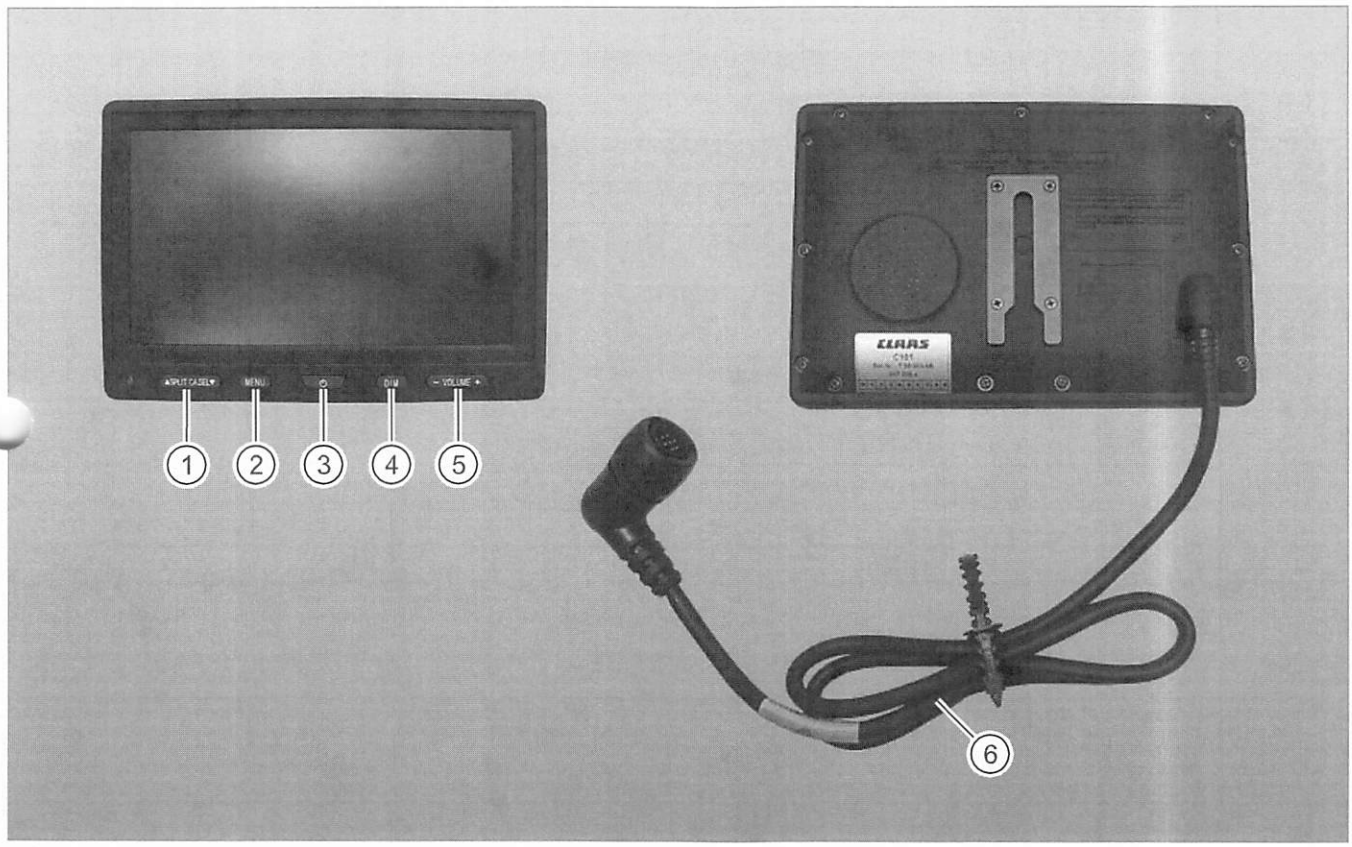
139952-003

3.2.1 Optional machine equipment

This Operator's Manual describes all models, series equipment and optional equipment of the machine available at the time of final editing of this Operator's Manual. There may be country-specific deviations. The machine may not be equipped with all functions described. This also refers to safety-relevant systems and functions.

158733-001

3.2.2 Video monitor

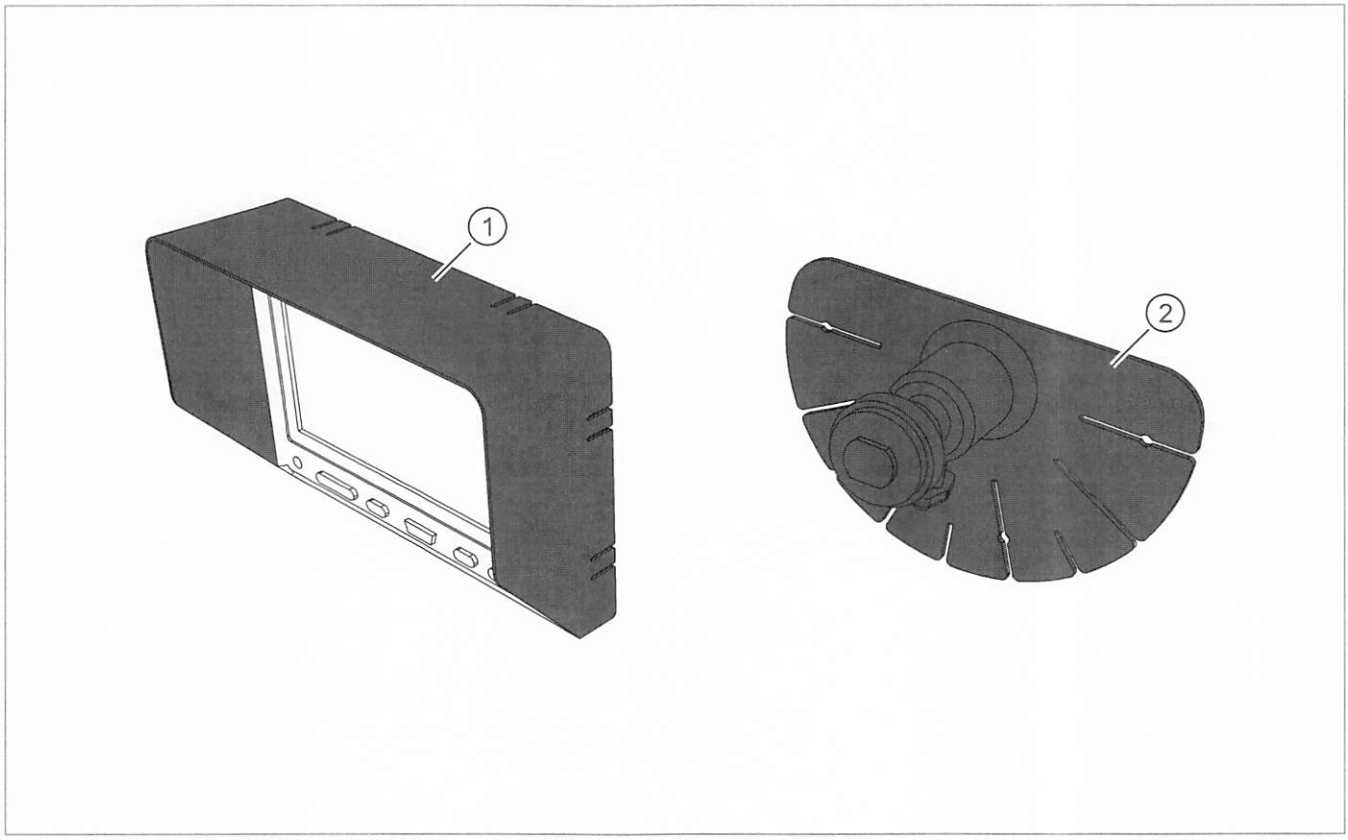


00 0017 015 1

181169-001

38

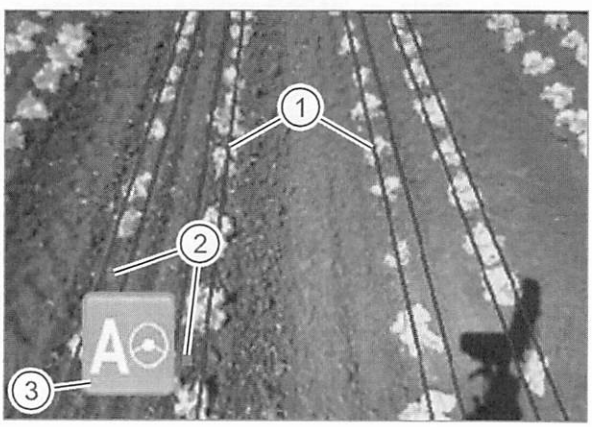
	Designation
1	Key for changing the video channel
2	Menu key
3	On/off key
4	Dim / brightness key
5	Volume key
6	Connecting cable with connector



188603-001 **39**

	Designation
1	Sunshield (00 0017 210 0)
2	Bracket (00 0014 010 0)

The sunshield and the bracket are included in the shipping package of the optional "Video monitor" equipment.



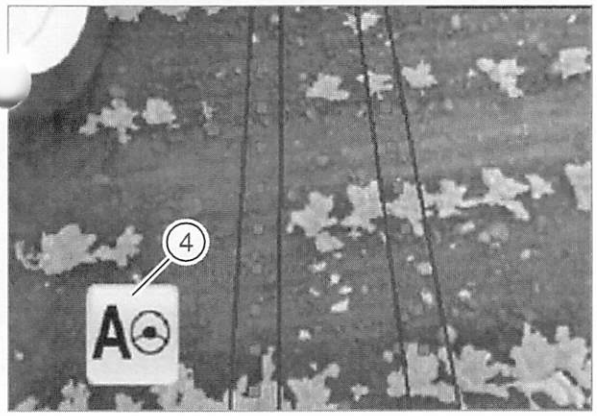
188822-001

40

Function

Green and yellow colours are shown on the video monitor, anything else is shown in grey.

On the video monitor, the plant row positions are marked by blue lines (1). You have to define the positions of the lines by making settings in the "Application settings" menuPage 103.
Red dots (2) mark points where the plant row is not detected. As soon as the plant row is detected again, the red dots disappear from the picture.



188824-001

41

Symbols on the video monitor indicate the status of the automatic control unit.

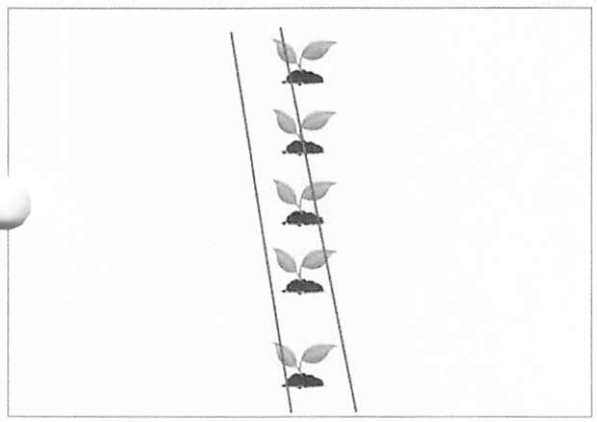
(3) = Automatic control unit is activated.
(4) = Automatic control unit is activated, but cannot perform control action because there is no valid signal.

With the automatic control unit deactivated, no symbol is displayed on the video monitor.

Invalid signal

When the plant row is outside the created lines, the system will not work due to insufficient settings.

The figures show some examples of deviations resulting in malfunctions.



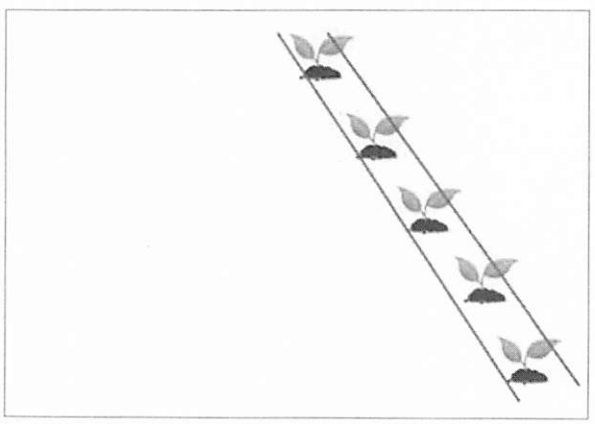
188828-001

42

When the plant row crosses the created lines, compare the camera angle with the pre-set angle in the software and correct if necessary.

Valid signal

When the plant rows are within the created lines, the application is correctly set.

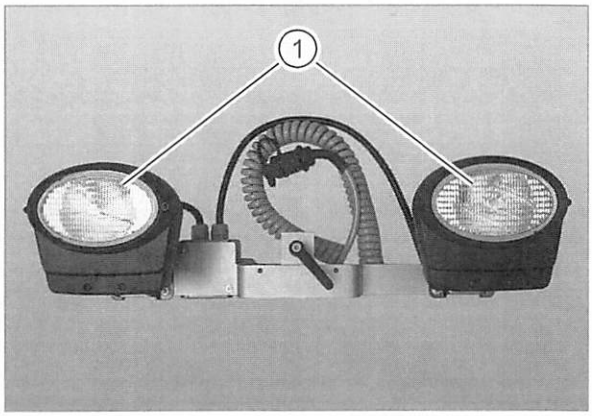


188830-001

43

3.2.3 Xenon light

The Xenon light (1) illuminates the sight range of the camera when working in darkness. It can be switched on and off on the terminal. Page 102



Xenon light 181386-001

44

158497-001

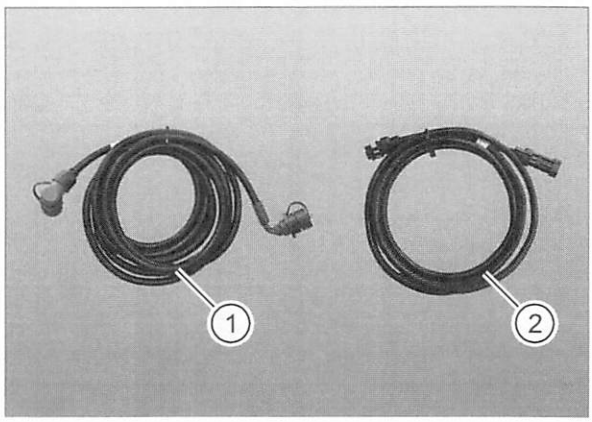
3.2.4 Extension cable

Various extension cables are available for the CULTI CAM.

(1) = Camera extension cable (00 1400 283 0).

(2) = Sensor extension cable:

- 2.5 m (00 0018 495 0)
- 5 m (00 0018 496 0)
- 10 m (00 0018 497 0)



186134-001

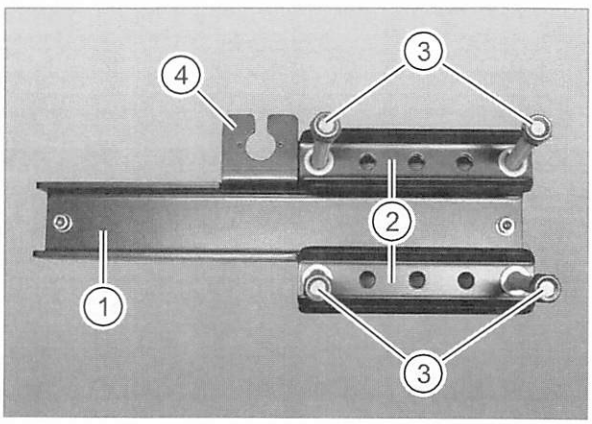
45

159796-001

3.2.5 Bracket

Aluminium section bracket

The bracket shown is available for mounting the camera.

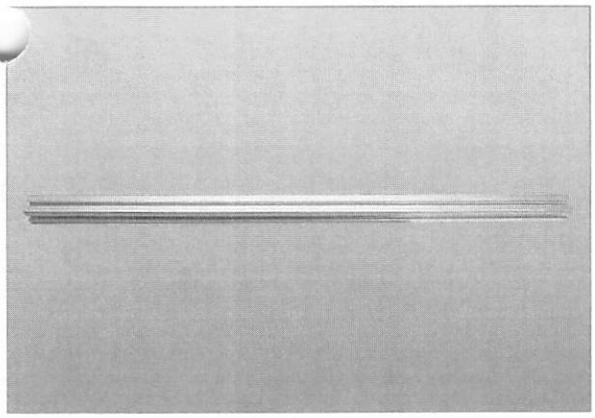


00 1402 781 0 184182-001

46

	Designation
1	Bracket
2	Clamps
3	Mounting bolt, nuts, washers
4	Cable holder

Aluminium section



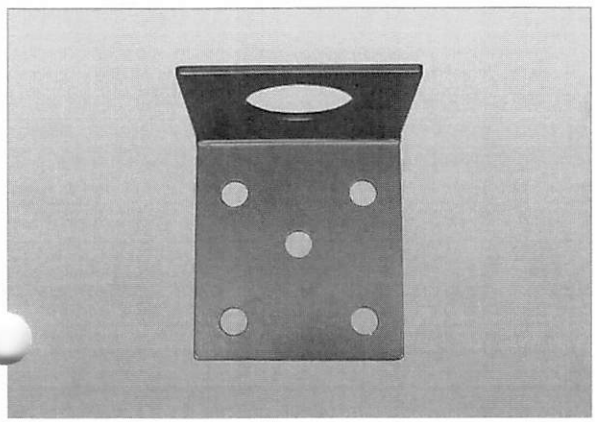
184183-001

47

Aluminium sections are available in different lengths:

Length	Part no.
39 cm	00 0018 868 0
100 cm	00 1400 254 0

Connector bracket



00 0018 908 0

184186-001

48

The bracket shown can be fastened on the tractor. It serves as a fixed connection point for the two wiring looms.

3.3 Identification plates and identification number

139098-002

3.3.1 Spare parts and technical questions

Please indicate the identification no. every time when ordering spare parts and for all technical questions:

- CLAAS part number
  and
- Software version / versions

This is necessary as otherwise incorrect spare parts may be delivered.

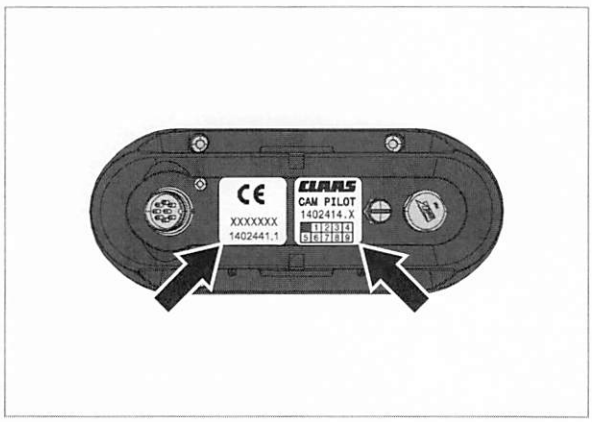
The identification no. can be found on the respective identification plate.

The identification no. of the software can be found in the respective menu.

158808-001

3.3.2 Position of identification plate

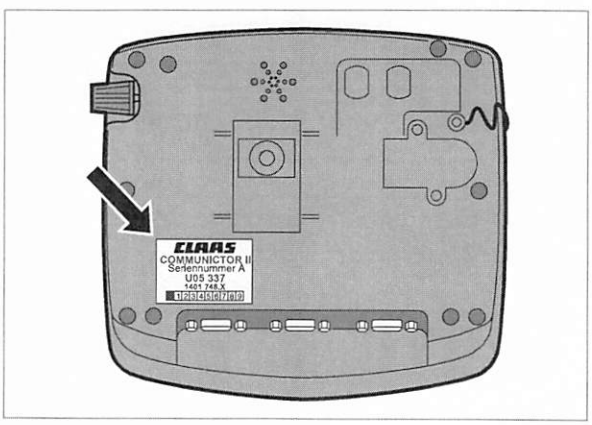
Camera identification plate



Camera, rear 181213-001

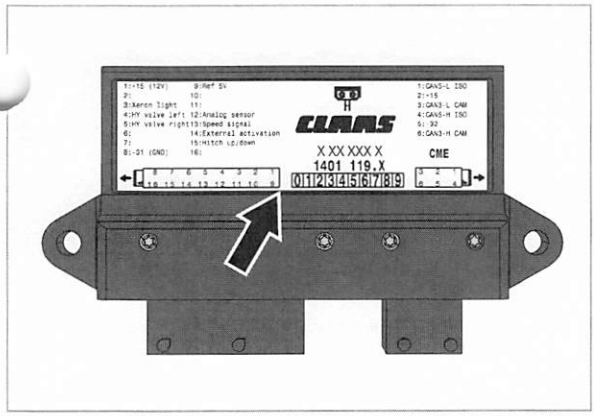
49

COMMUNICATOR II identification plate



COMMUNICATOR II, rear 166711-002

50



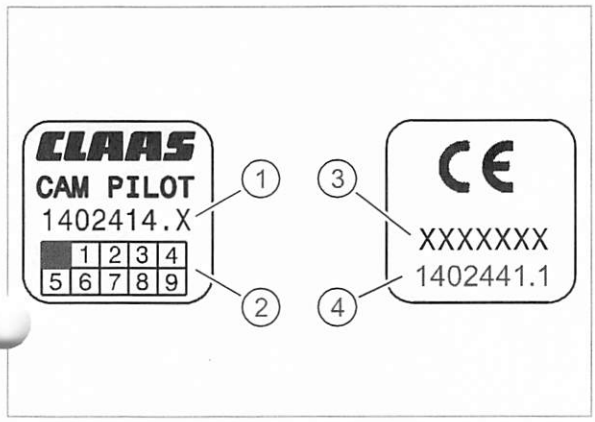
UBM module, top side 168266-001

UBM module identification plate

51

160822-001

3.3.3 Explanation of camera identification plate



188612-001

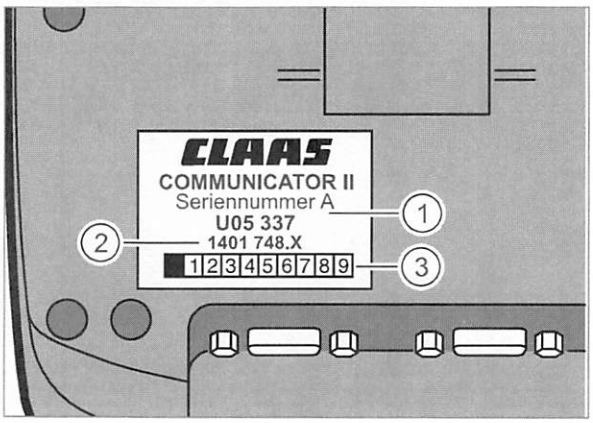
	Designation
1	CLAAS part no. of camera with software
2	CLAAS part no.: last digit (index "X") Raising the index is identified by blackening the obsolete digits, e.g. in case of a software update.
3	Serial number
4	CLAAS part no. Camera hardware

52

Software version:
Page 70

149069-003

3.3.4 Explanation of COMMUNICATOR II identification plate



165294-002

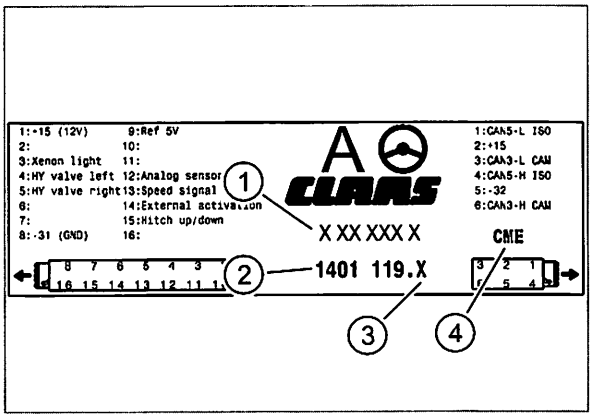
	Designation
1	Serial number
2	CLAAS part number
3	CLAAS part no.: last digit (index "X") Raising the index is identified by blackening the obsolete digits, e.g. in case of a software update of the terminal program.

Software version:

53

Page 101

3.3.5 Explanation of UBM module identification plate



184204-001

	Designation
1	Serial number
2	CLAAS part number
3	CLAAS part no.: last digit (index "X") The index is raised e.g. in case of a software update.
4	Designation of module

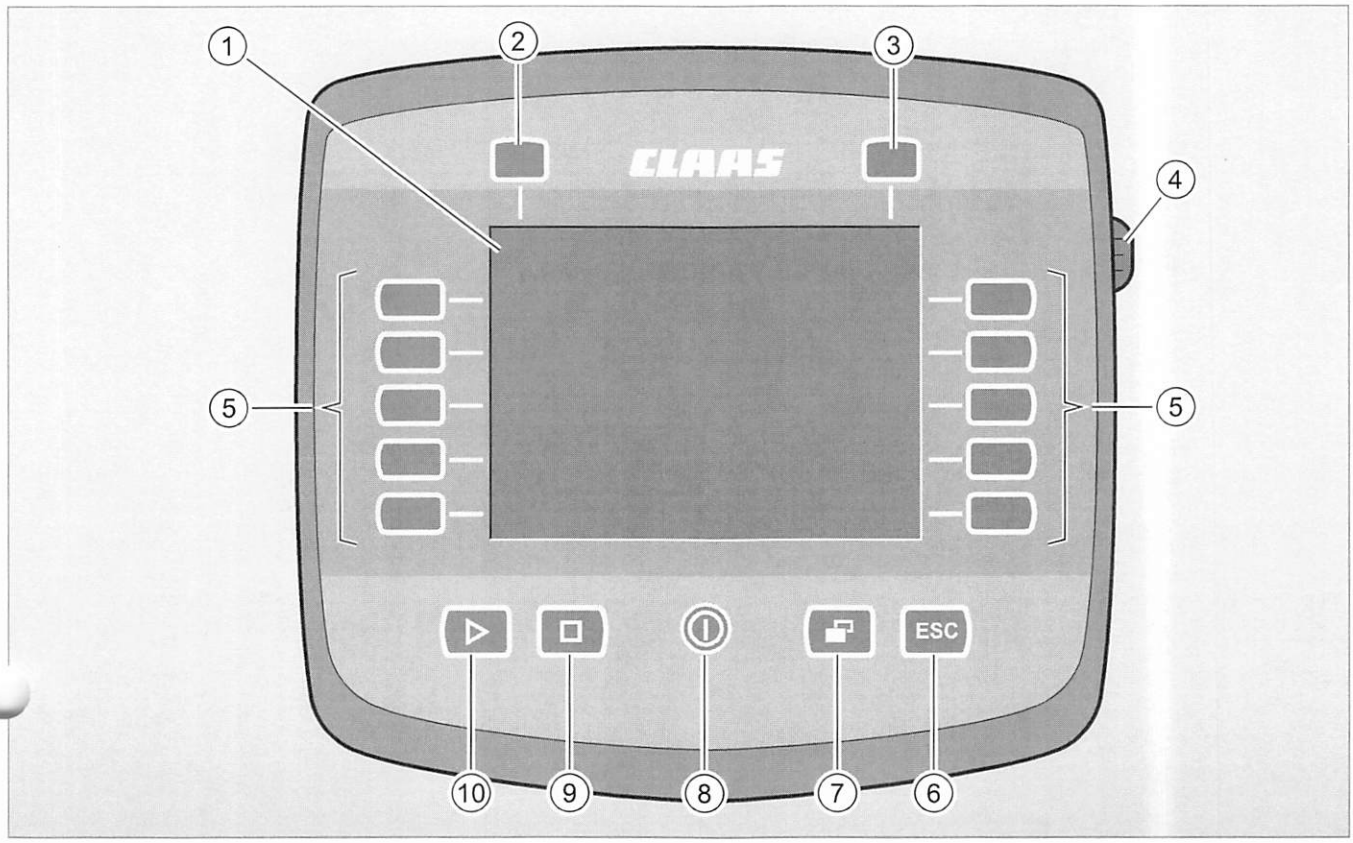
54 Software version:
Page 70

4 Operating and control elements

4.1 COMMUNICATOR II

149105-001

4.1.1 Terminal



165344-001 **55**

	Designation	Operation
1	Monitor	
2, 3	Function keys	No function.
4	Select wheel	Rotating: Select menu item, function or value. Pushing: Show item frame/selection list, confirm input.
5	Function keys	The function depends on the symbols displayed (softkeys).
6	Key	Cancel current input, return to the submenu, return to the main menu, call up the application selection list for the applications.
7	Key	Cancel current input, switch applications.
8	Key	Switch on/off.
9, 10	Programmable function keys	The function is whatever has been assigned to the key.