Einböck

FUSION FARMING FARM POWER by Einböck

SET-UP INSTRUCTION:
CAMERA STEERING SYSTEM ROW-GUARD

Operating instruction
& spare parts
www.einboeck.at/en/help

Practical handbooks
www.einboeck.at/en/know-how

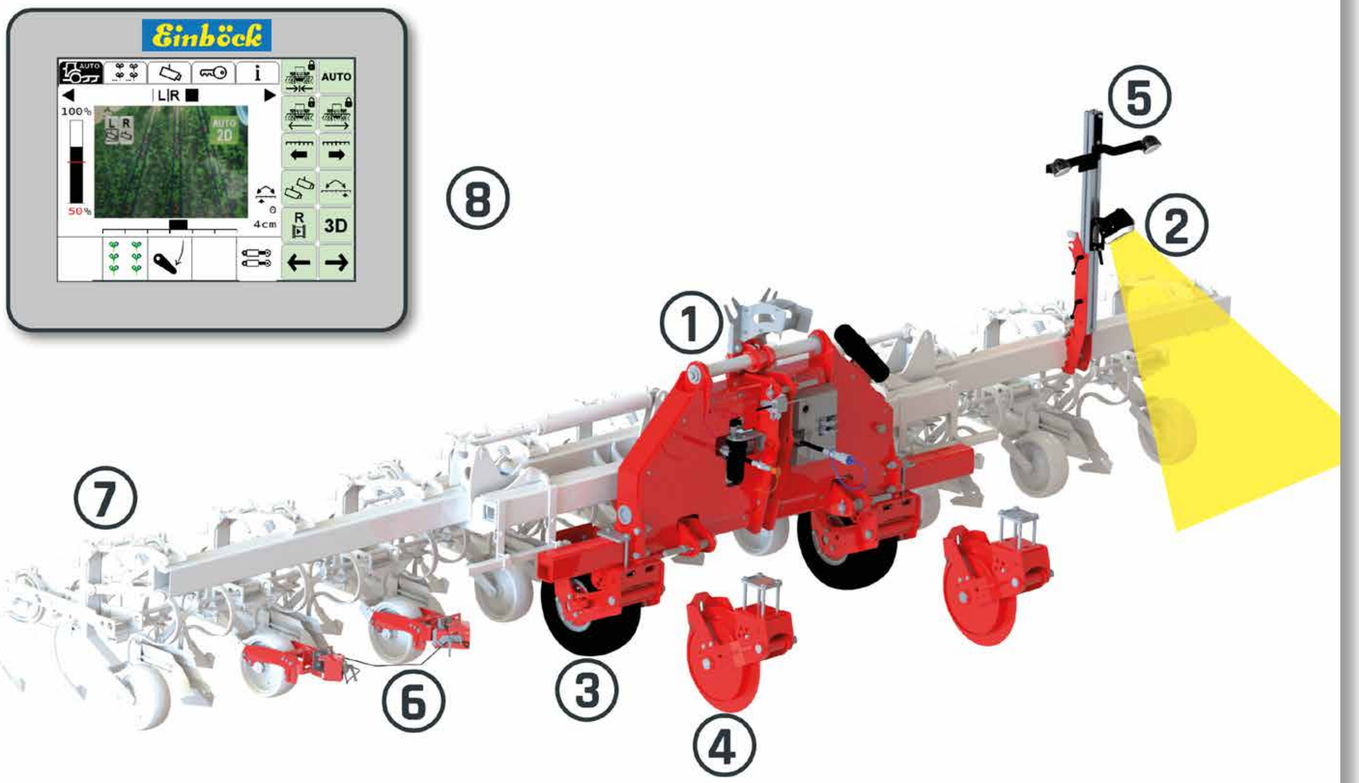
EPAN.EINBOECK.AT/EN

6150-K000-EN

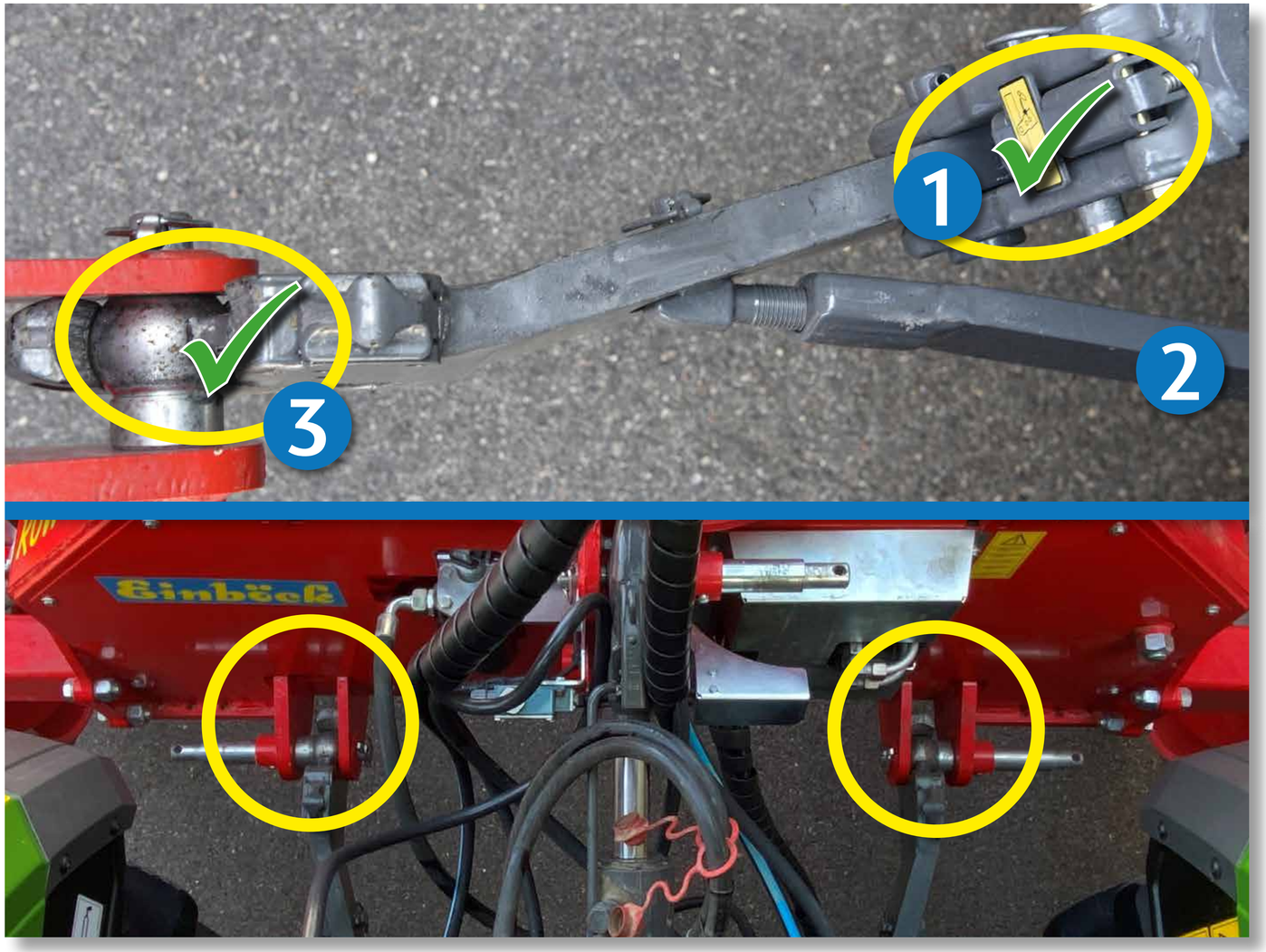
CONTENT

CONTENT

5. WORKING WITH THE ROW-GUARD 47-53

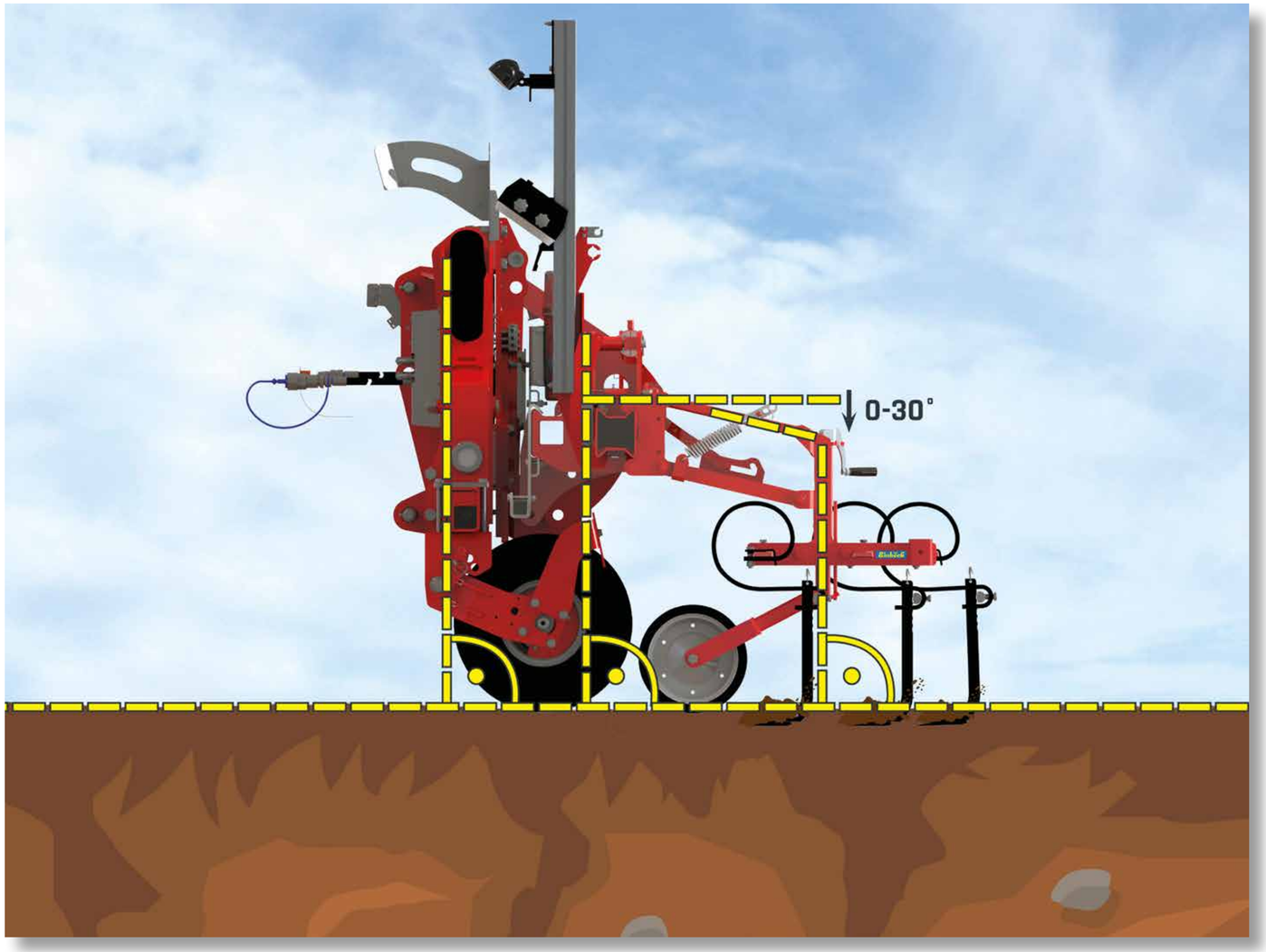


1. Sideshift frame
2. Camera
3. Rubber stabilizing wheels
4. Metal stabilizing wheels
5. LED-lights
6. Mechanical feeler
7. Any row crop cultivator
8. Terminal



1. **Underlinkage arms** should be free to ensure a vertical movement = better leveling of the row crop cultivator in uneven soil.
2. **Underlinkage arms** in horizontal direction should be fixed! Linkage between the tractor and the sideshift frame.
3. Fixation without any possible movement between the bolt and the ball. If necessary use spacers

» Also the row crop cultivator has to be mounted without any possible movement

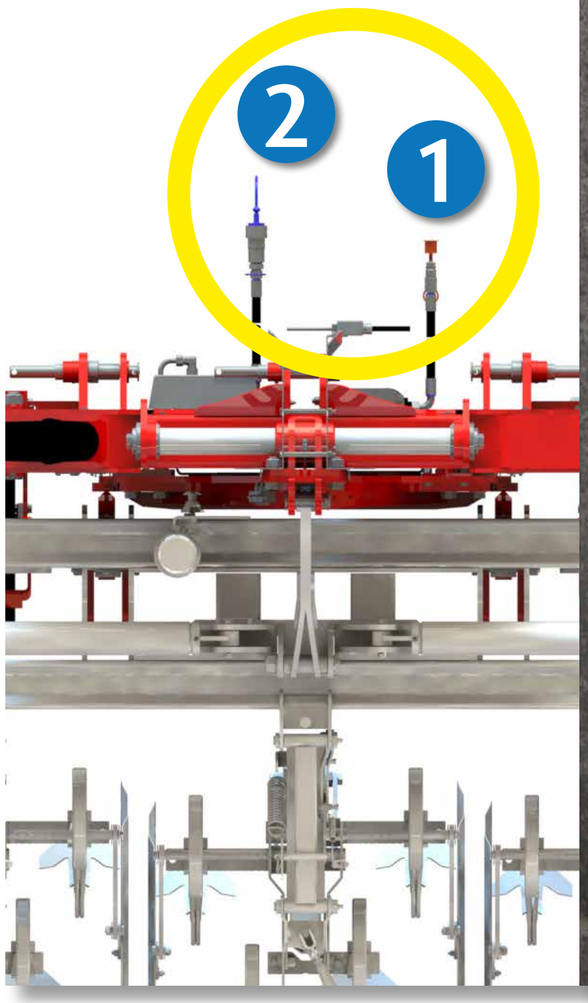


» Adjust the **lenght of the upper link** so the sideshift frame and the row crop cultivator with it´s elements are in a 90° angle to the surface

» **Height of the stabilizing wheels** and the sideshift frame
- Working at it´s best when the parallelograms are 0-30° dropping

» Adjust the track width of the stabilizing wheels to the tractor track

» Adjust the upper link sensor of the ROW-GUARD so, releasing the sensor just before soil contact.

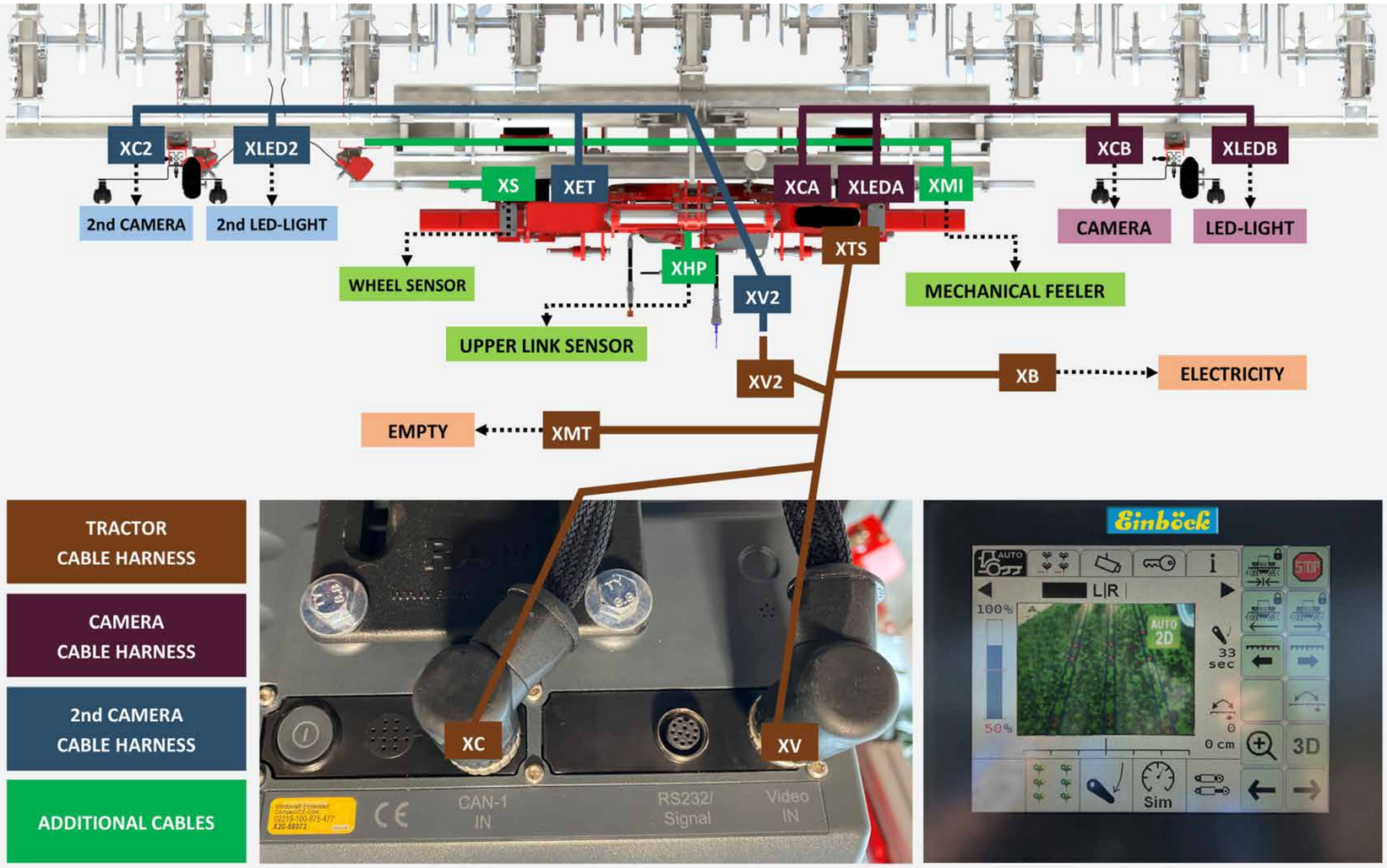


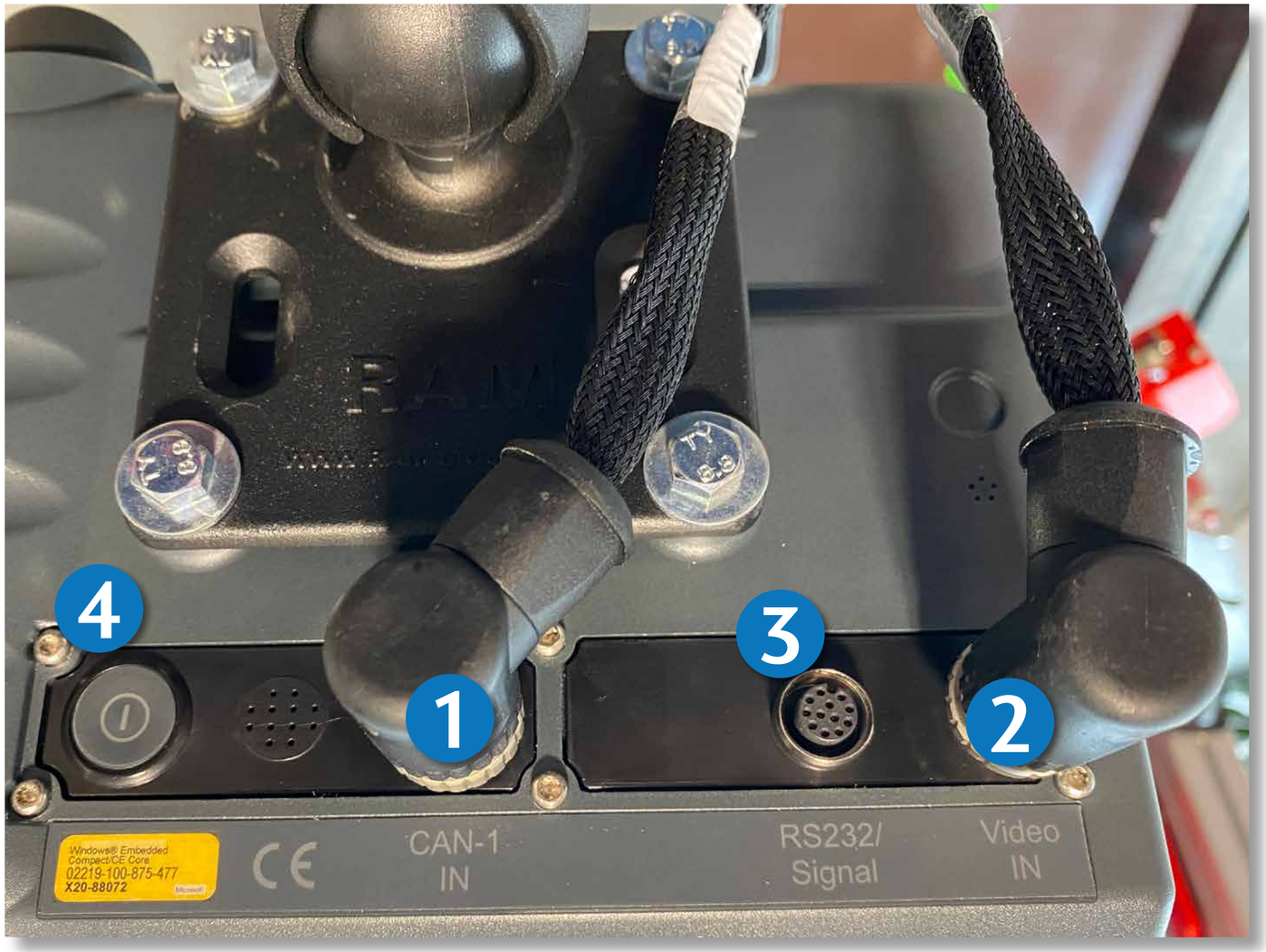
1. RED marked hydraulic hose for constant oil flow
2. BLUE marked hydraulic hose for pressureless return to the oiltank of the tractor

» Oil flow to be reduced to **approx. 15-20 l/min**

» The camera has to be mounted like in the picture. Mount the cable on the lower plug down at the end of the camera. The cable has to drop down.

» Take care about the position of the cable when pugging in like seen in the picture


XC2
XLED2
XS
XET
XCA
XLEDA
XMI
XCB
XLEDB
2nd CAMERA
2nd LED-LIGHT
CAMERA
LED-LIGHT
XTS
XHP
XV2
WHEEL SENSOR
MECHANICAL FEELER
UPPER LINK SENSOR
XV2
XB
ELECTRICITY
EMPTY
XMT
TRACTOR CABLE HARNESS
CAMERA CABLE HARNESS
2nd CAMERA CABLE HARNESS
ADDITIONAL CABLES
XC
XV
CAN-1 IN
RS232/ Signal
Video IN
Einböck
L|R
100%
50%
AUTO 2D
33 sec
0 cm
3D
Sim
STOP



1. XC CAN terminal plug
2. XV videosignal plug
3. 7-pole cable plug (optional)

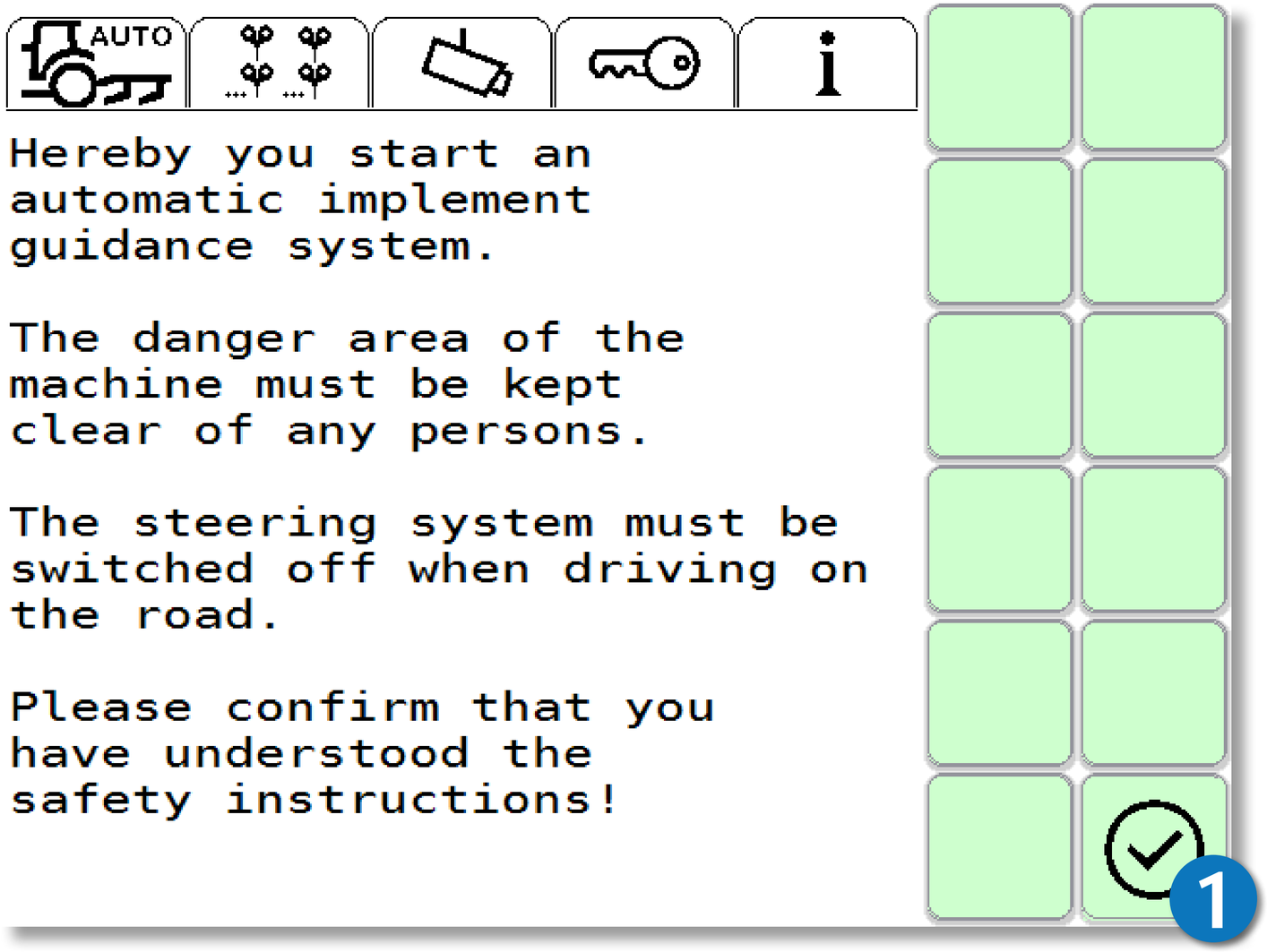
» Connect tractor cable with the machine cable

» 3 – pole power supply plug

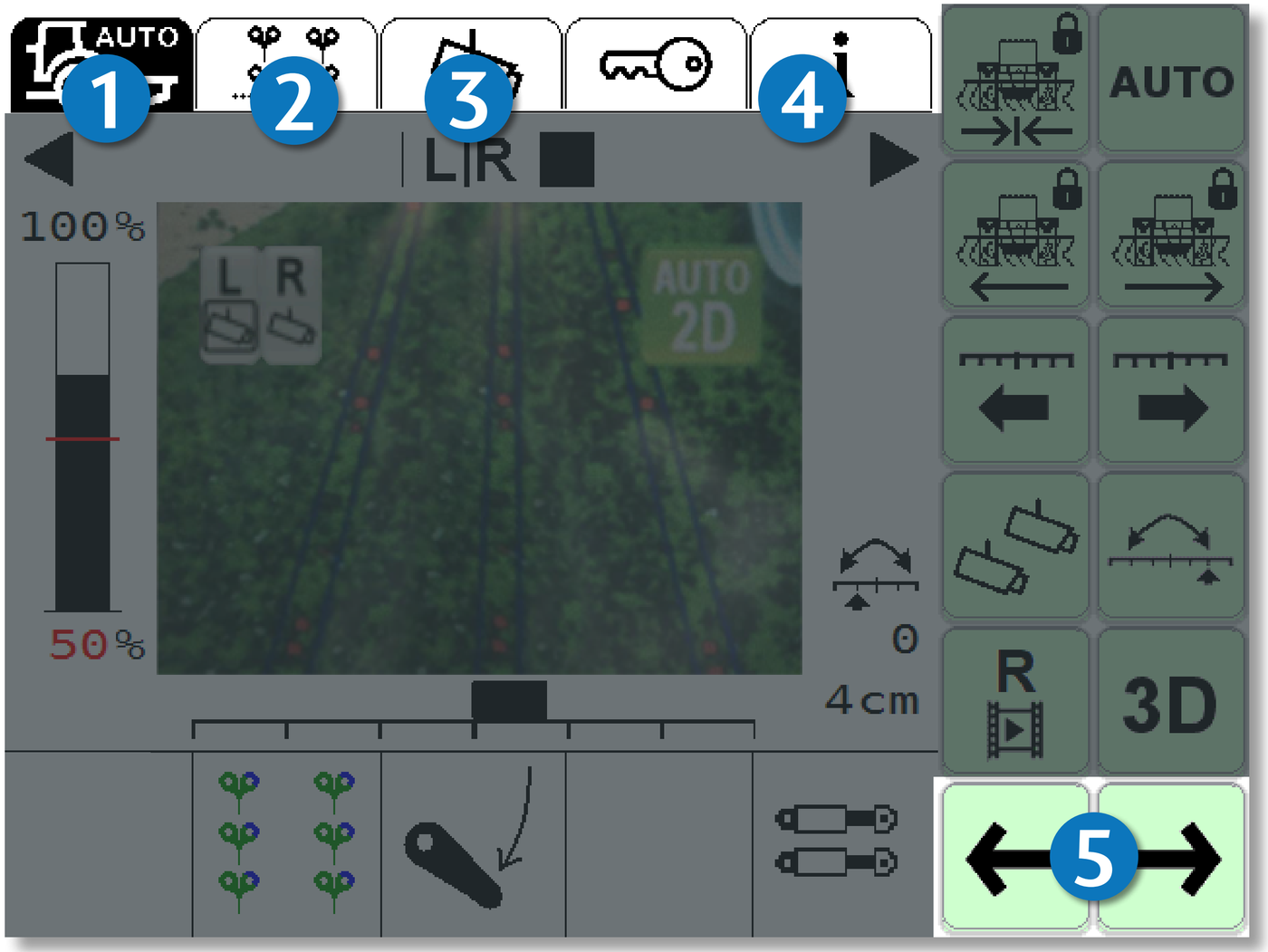
» Check all cable connections for tight fit (upper link/wheel sensor/camera cable/LED lights)

» **ATTENTION:** Double screwing plugs

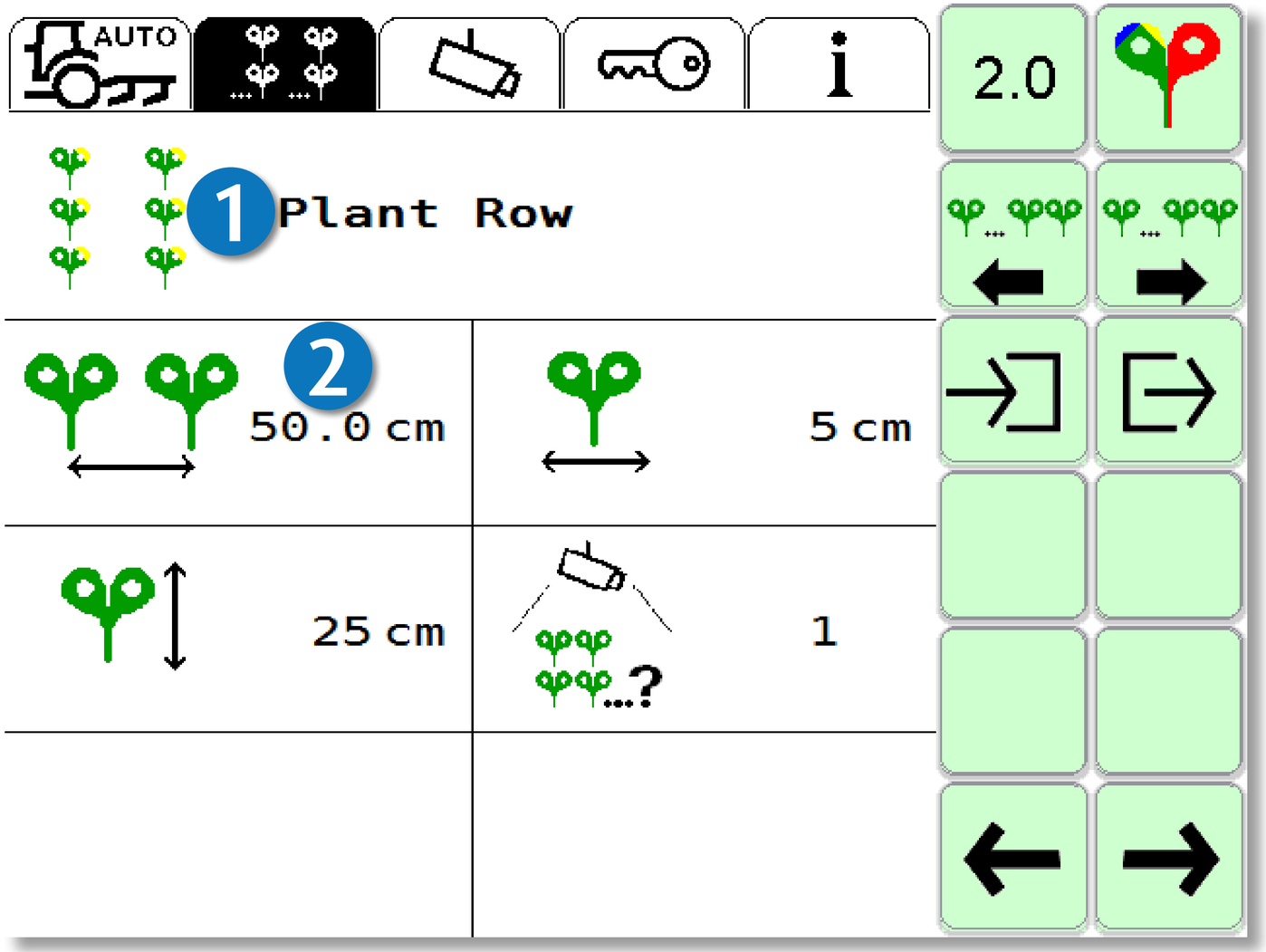
4. **ON/OFF-Button**
   Start the terminal with the on/off button on the backside of the terminal



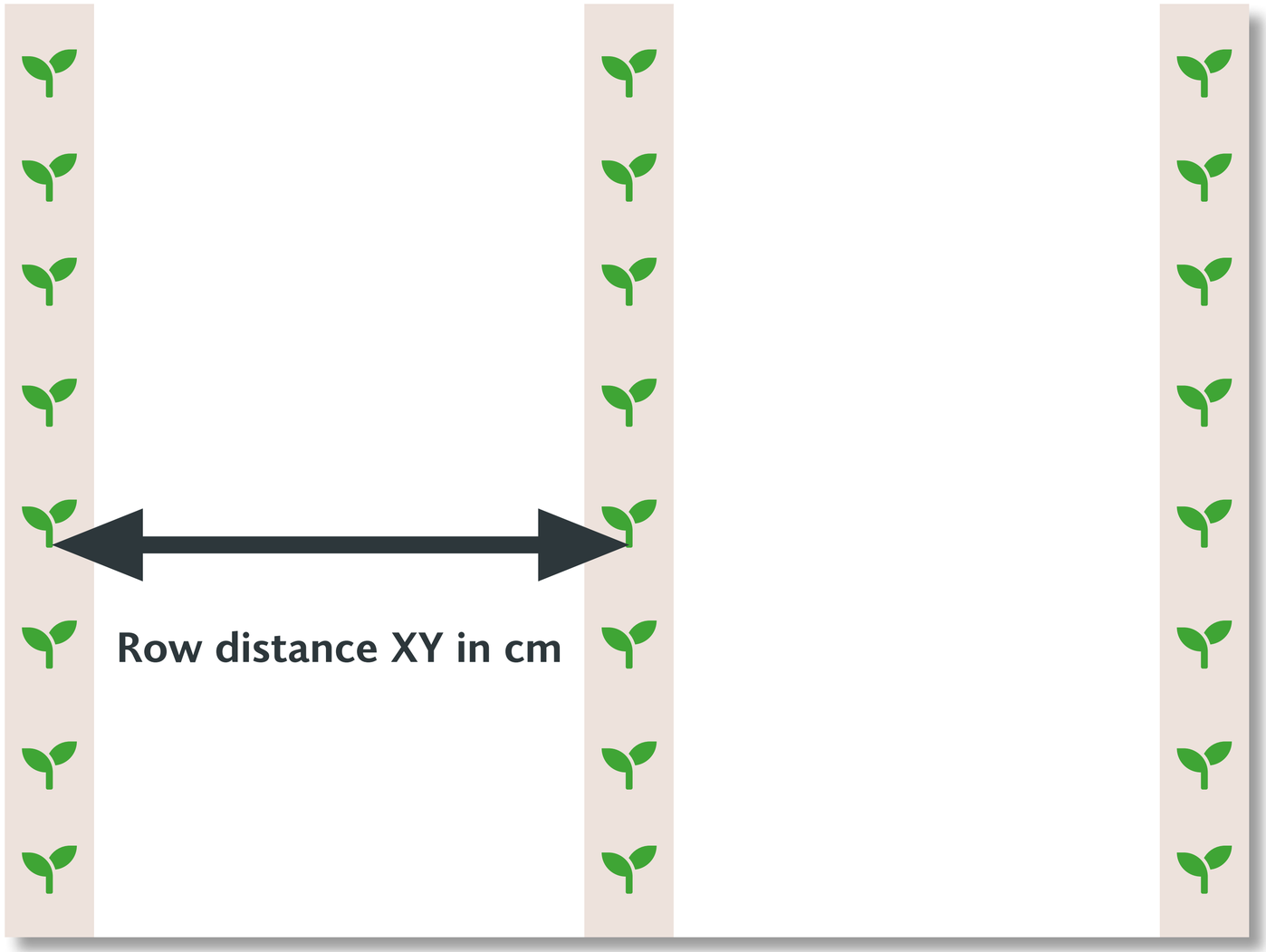
1. Wait for this start information and accept. Afterwards the main menu will open.



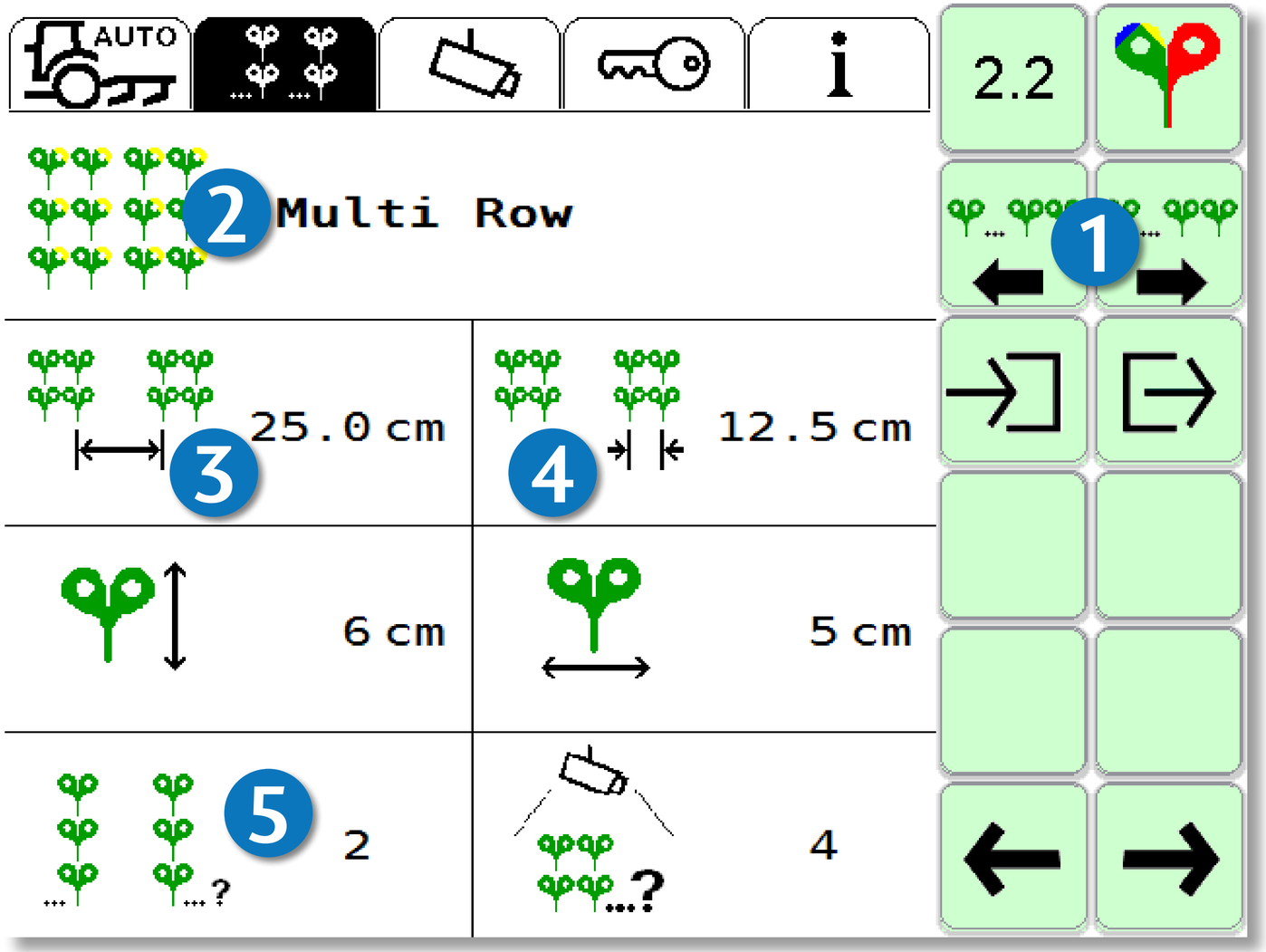
1. **Work menu (appears at the start):**
   Working on the field
2. **Plant settings:**
   Settings of all plant parameters
3. **Camera menu:**
   Setting of the camera
4. **Infomations menu**
5. **Switching menus**



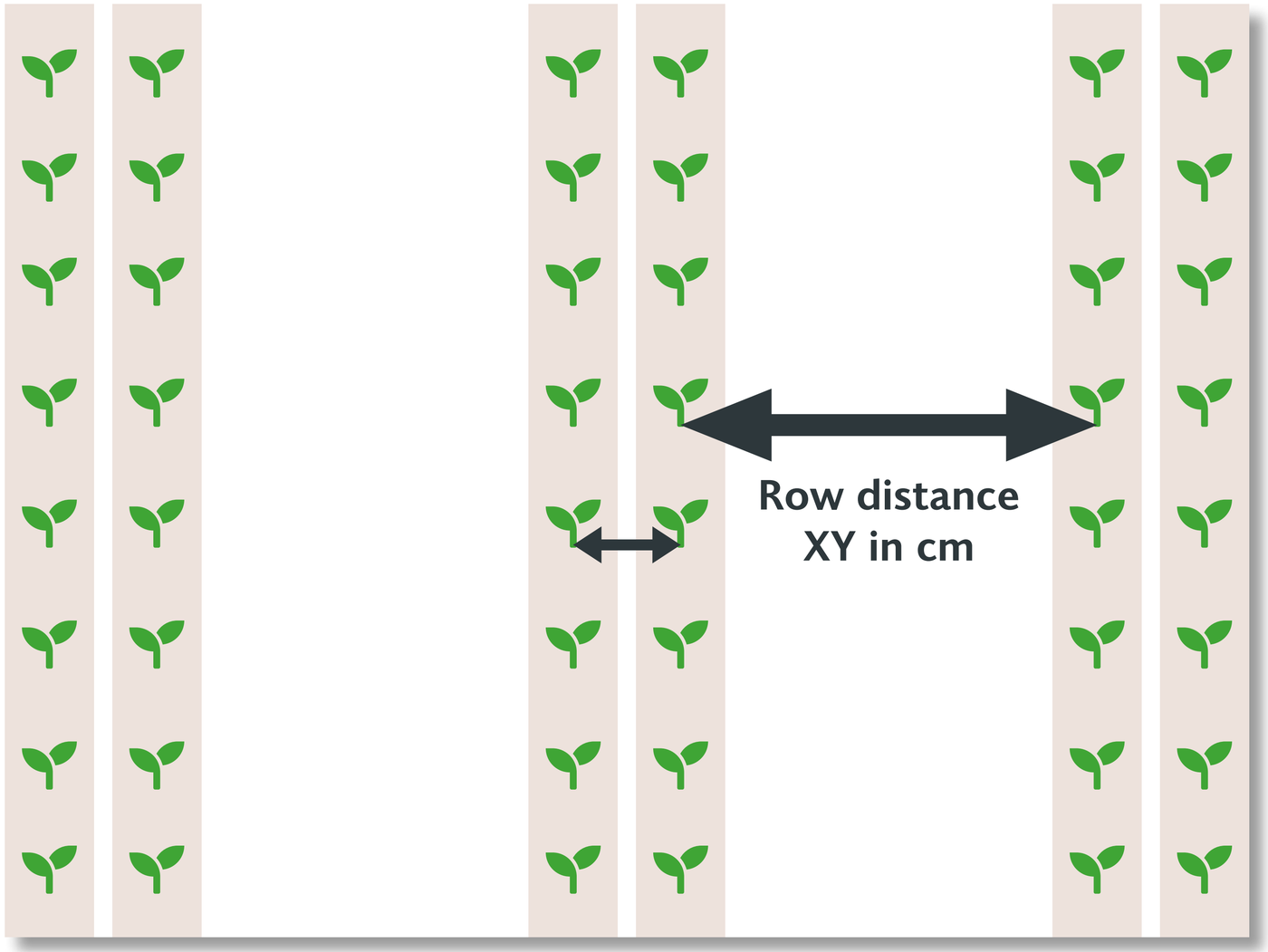
1. Current row settings:
   Plant row is a single row here (standard)
2. Set the row distance between the plant rows



- e.g. 75 cm at corn; 45 cm at soya, 50 cm at sugar beets, 25 cm at grain
- Control the correct row distance
- Measure the row distance (from center to center). This has to be the same as when seeded.



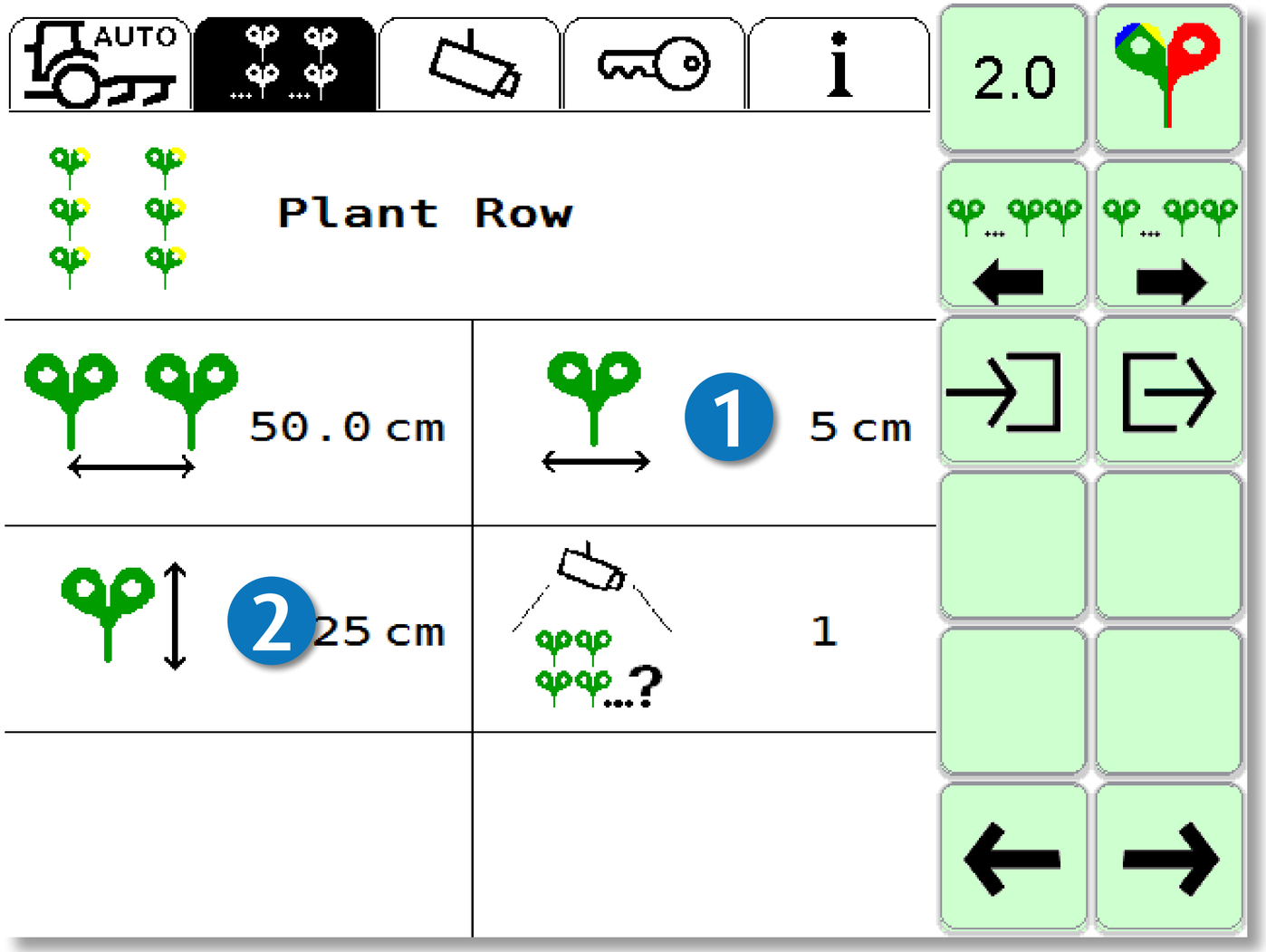
1. Switch from single to multiple row
2. Display row setting single or multiple
3. Row distance of multiple row
4. Row distance of double row in mulitple row spacing
5. Number of rows per multiple row



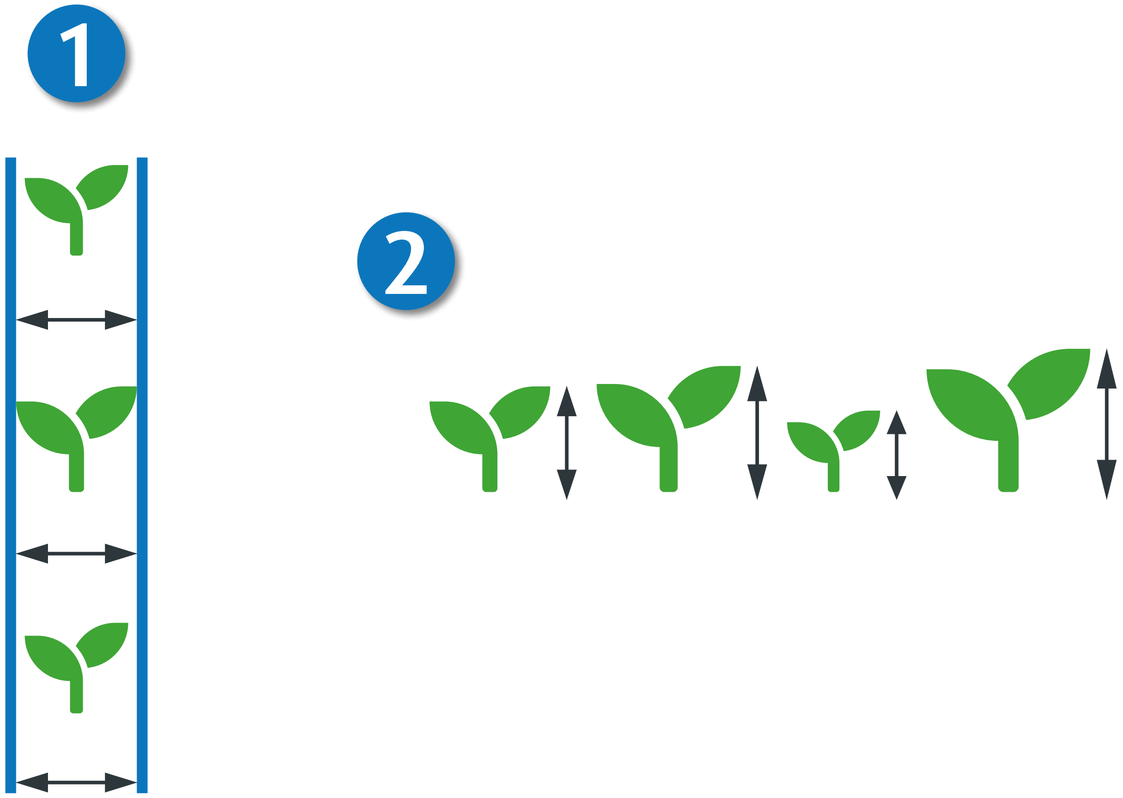
» Multiple row
e.g. grain with a double row of 15 and 45 cm

» Control the correct row spacing

» Measure the row spacing from center to center. This should be the same as when seeded.

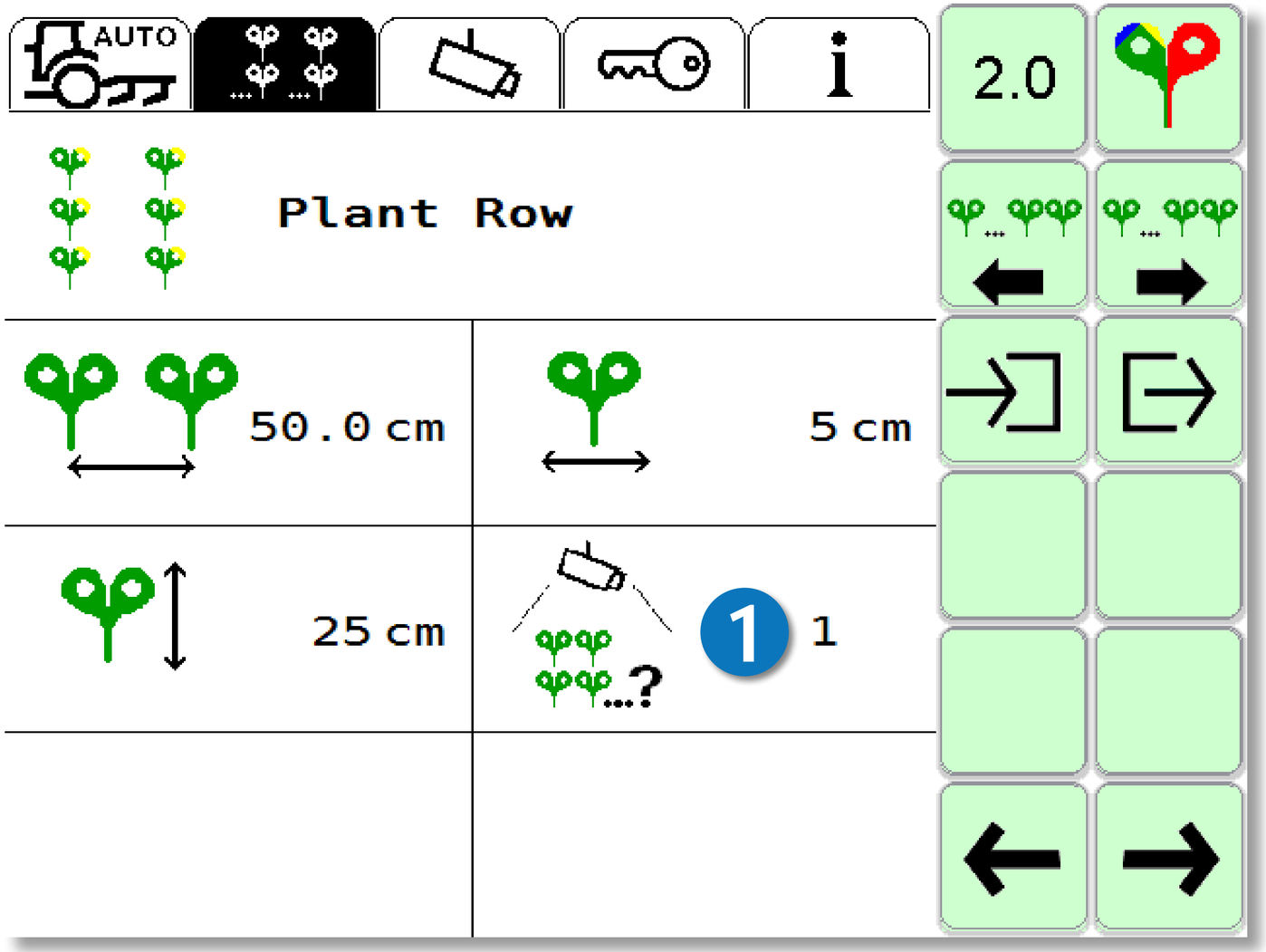


1. Set plant width
2. Set plant height

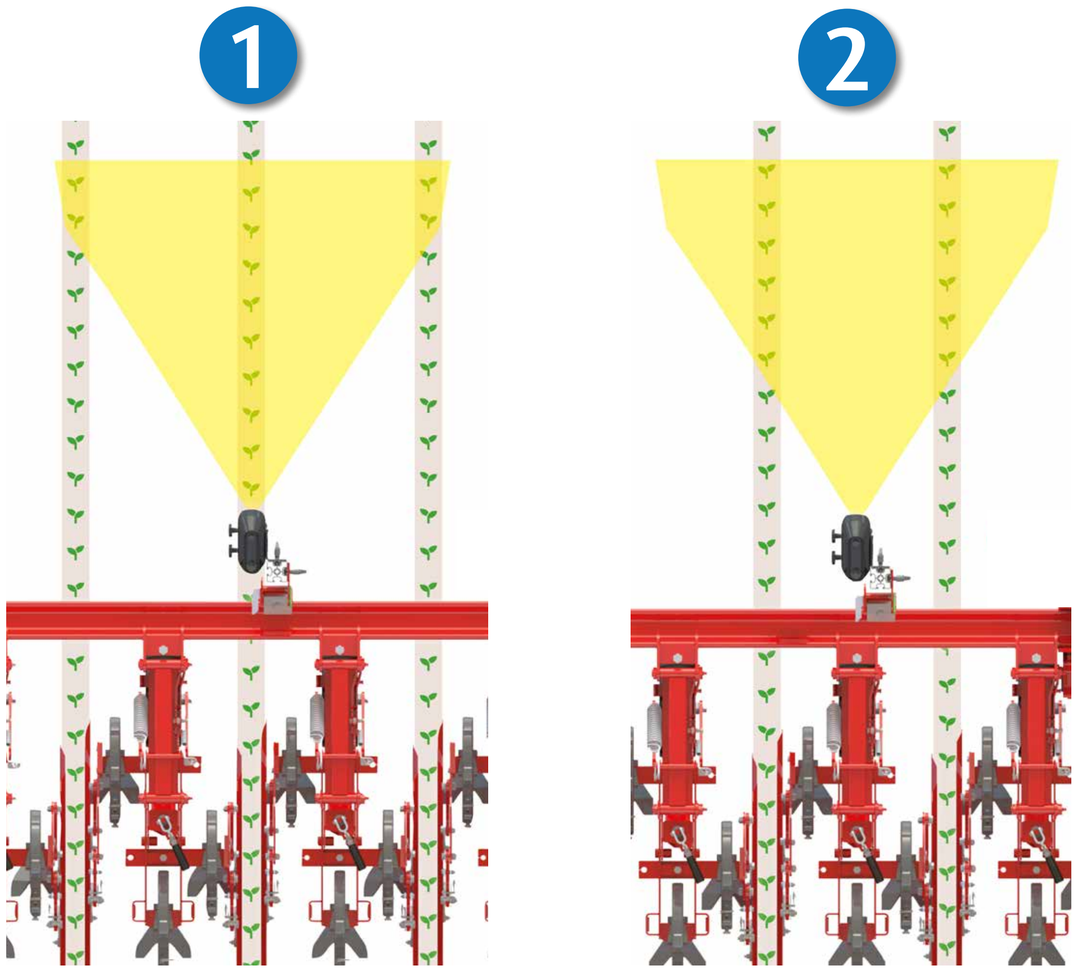


1. **Plant width:**
   Choose the width so the plant in the live video is clearly between the blue control lines. The leafs should not cross the blue lines. On the other hand the blue lines shouldn´t have too much space between the leafs.

2. **Plant height:**
   Measure a few plants and take the medium value for the setting.

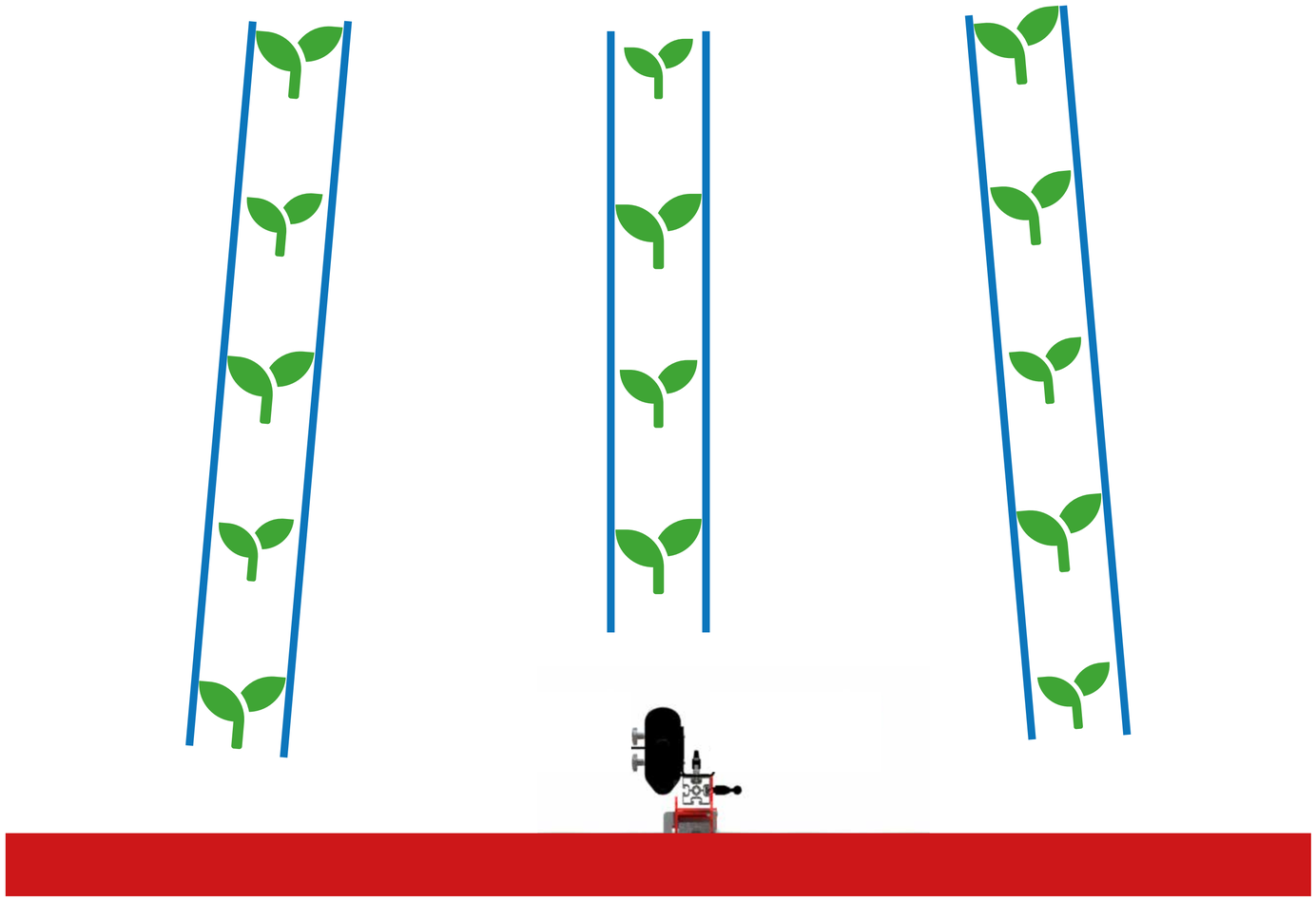


1. Number of rows in the camera view



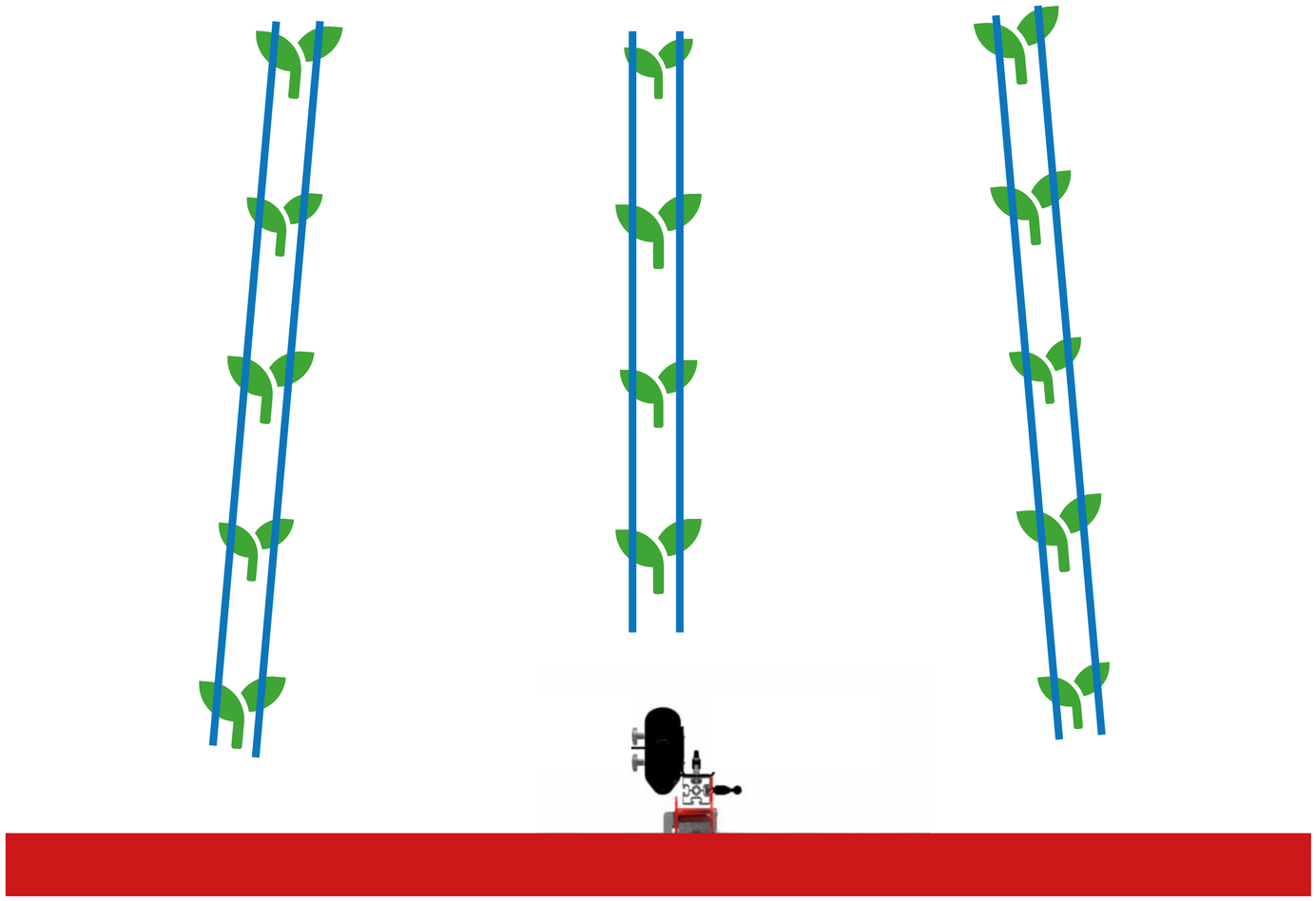
1. Number of rows in the camera view:
   Odd 1, 3, 5: Here the camera has to be mounted directly over the row. (except CS-TWIN).
2. Number of rows in the camera view:
   Even 2, 4: Here the camera has to be mounted exactly inbetween two rows. (except CS-TWIN).

» **Recommended setting:**
75 cm corn = 2 rows;
50 cm beets = 3 rows;
25 cm grain = 5 rows;



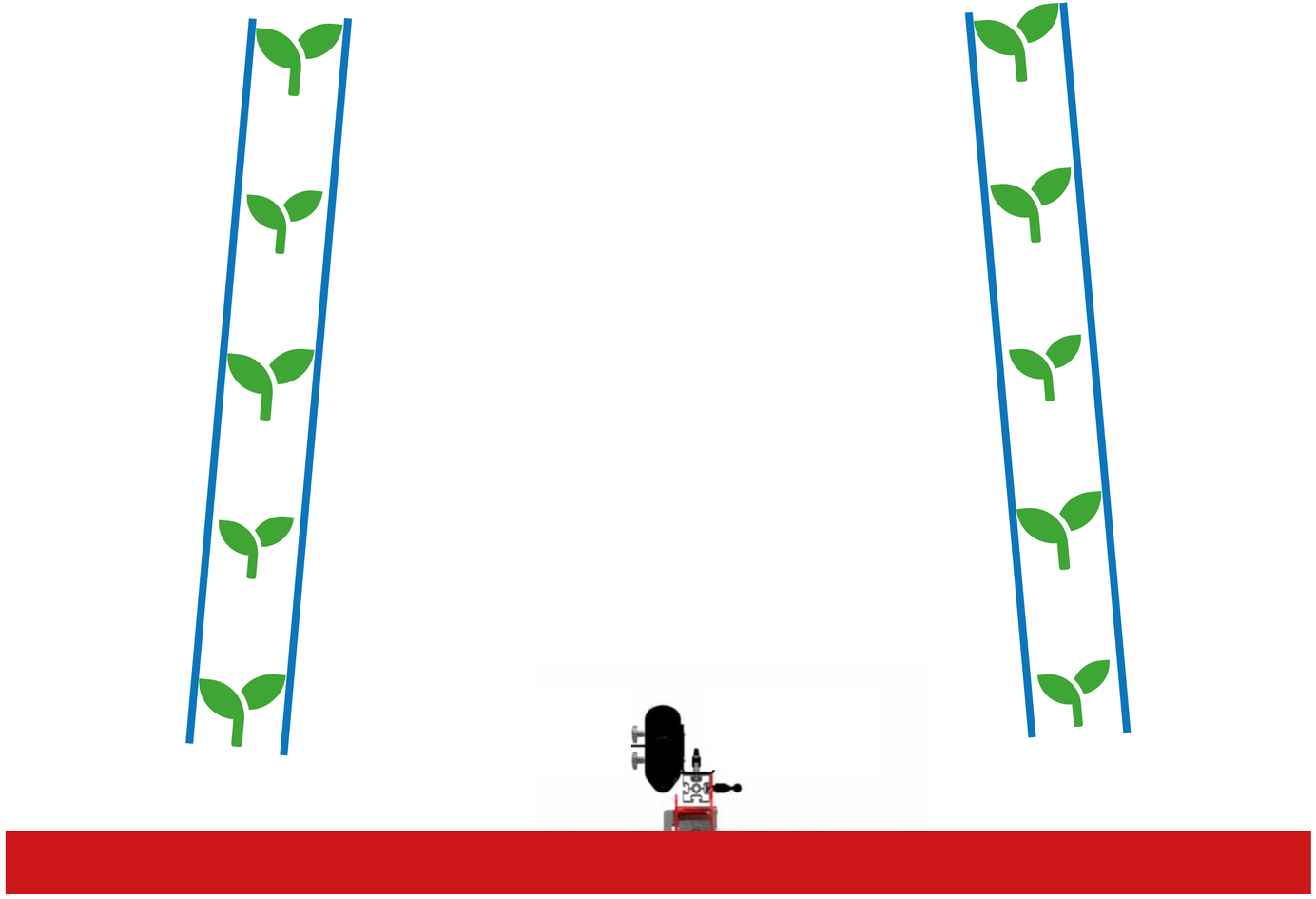
» **CORRECT**

» The blue lines of the camera have to be clearly over the row.



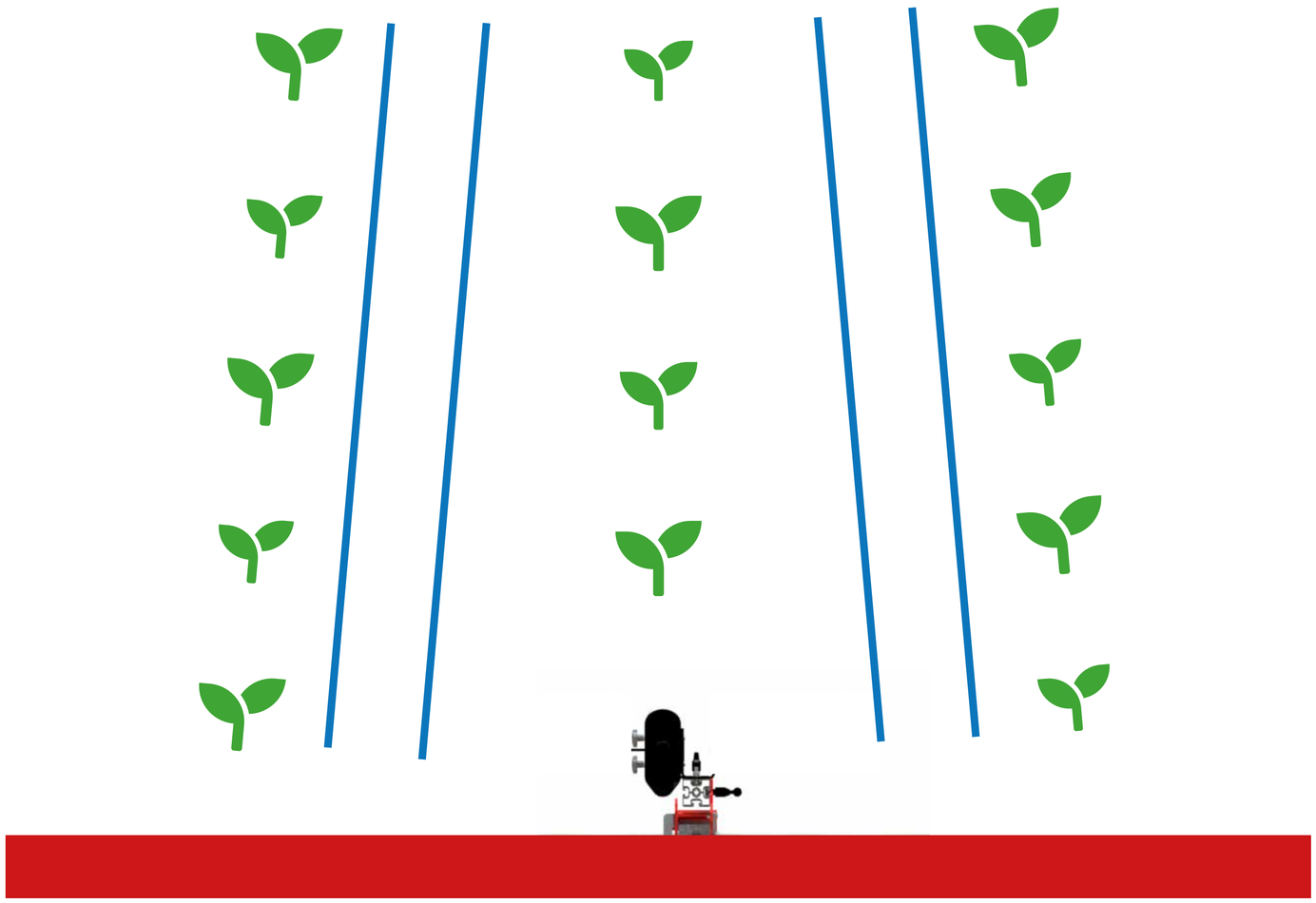
» **INCORRECT**

» The blue lines of the camera have to be clearly over the row.



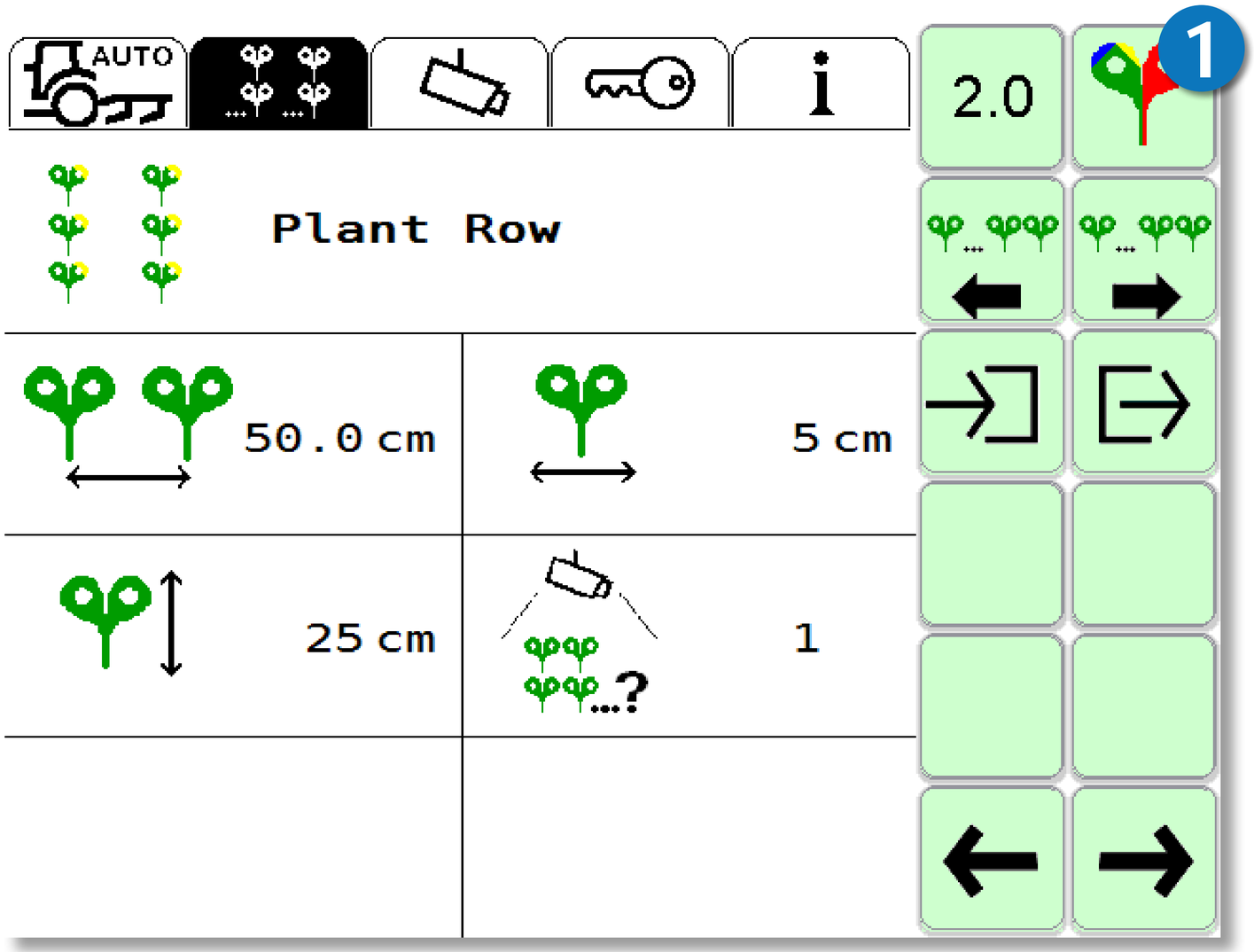
» **CORRECT**

» The blue lines of the camera have to be clearly over the row.

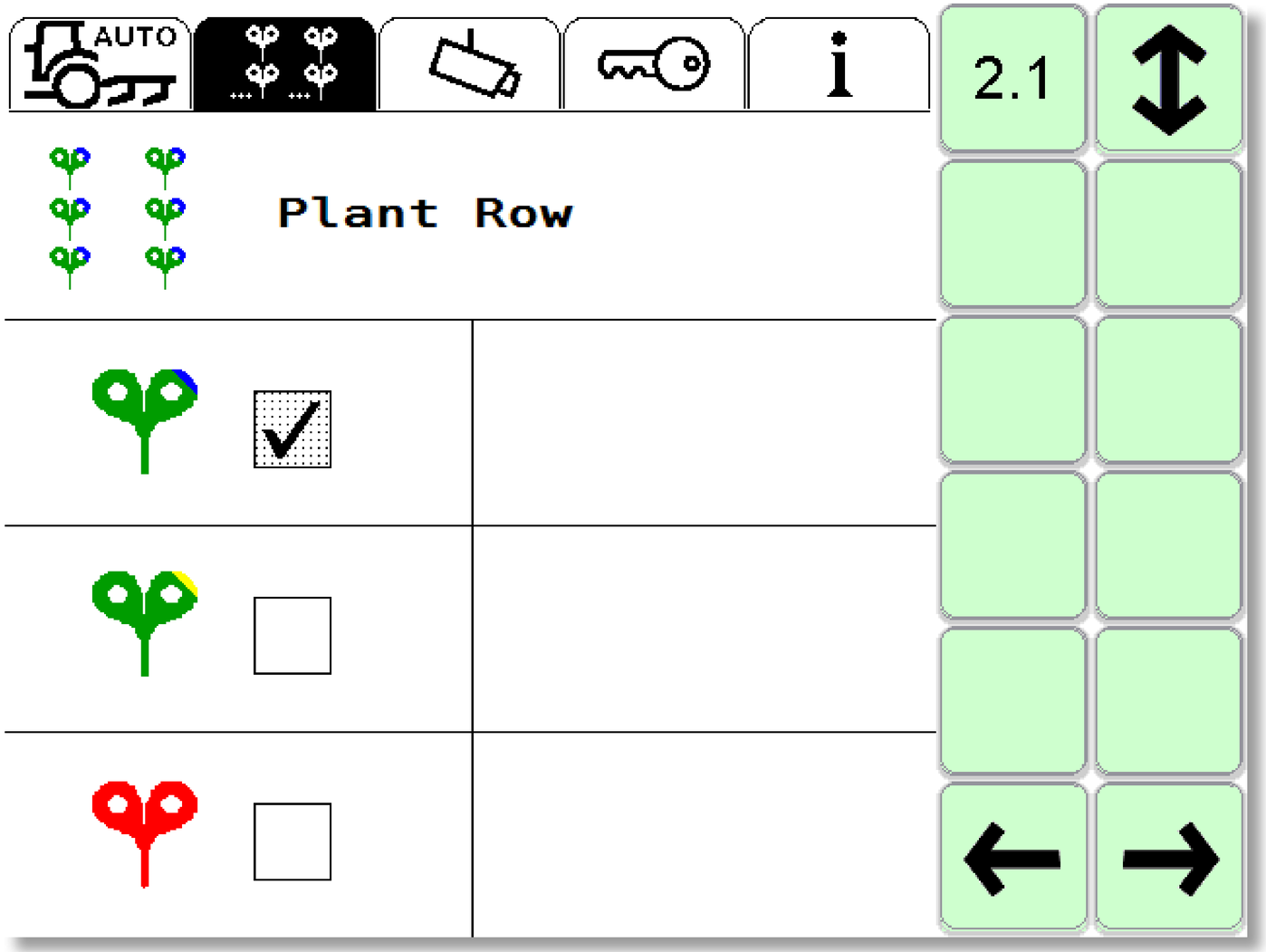


» **INCORRECT**

» The blue lines of the camera have to be clearly over the row.

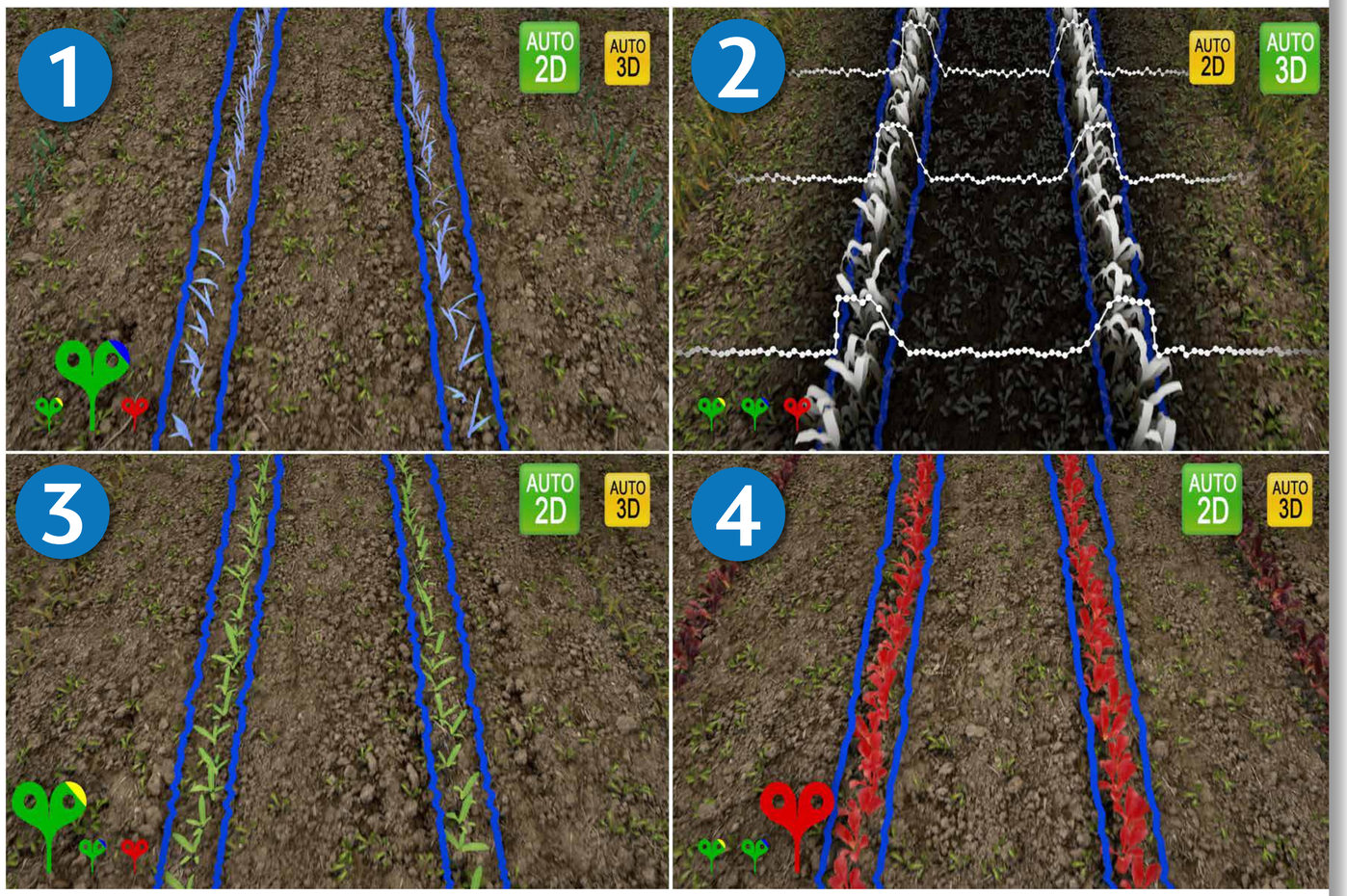


1. Choose the colour



» The different colour schemes have an influence on the image quality. If the quality is switching very often you can choose between different options and try to increase the quality in this way.

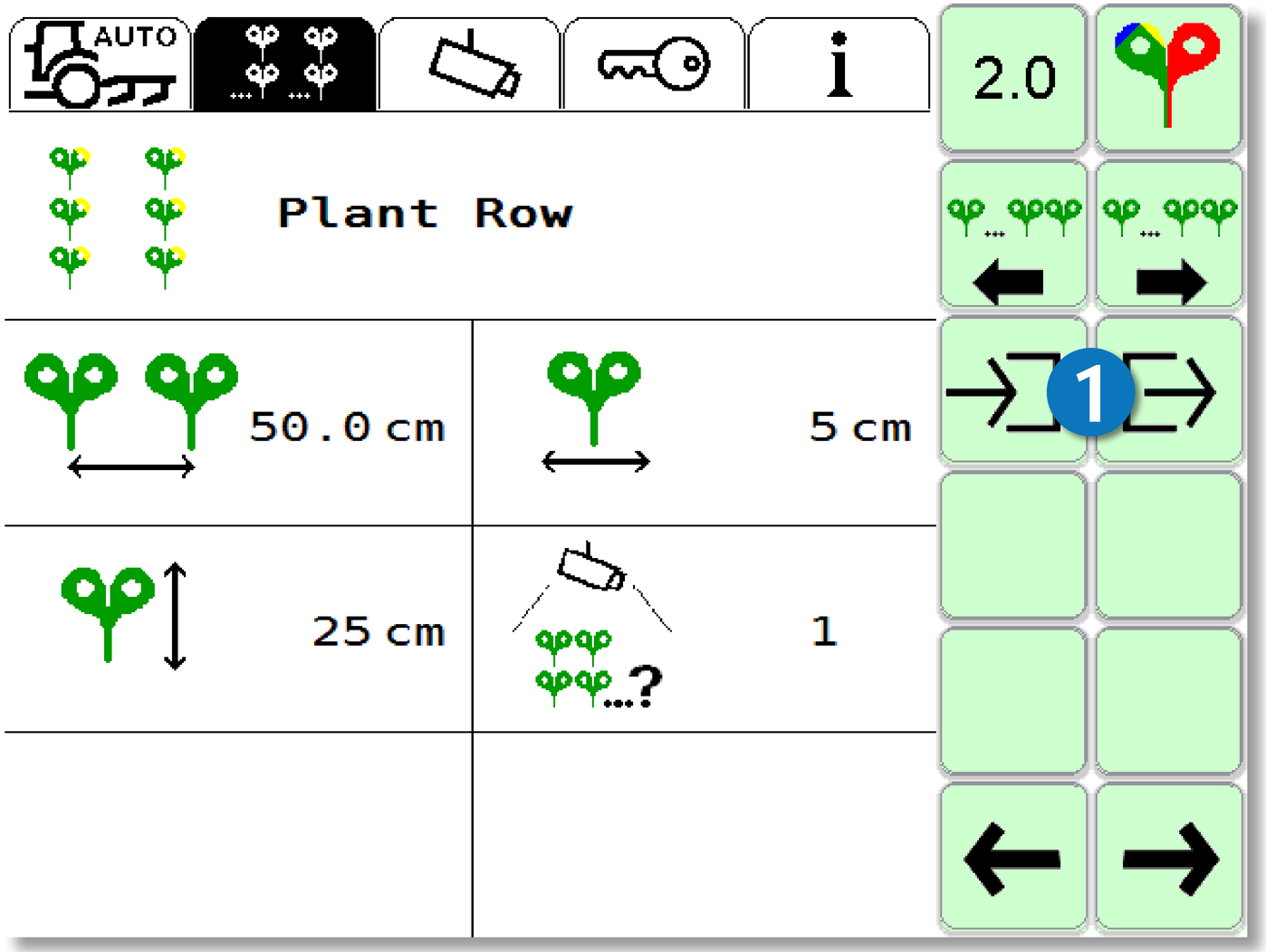
» **Examples:**
corn =green/yellow
soya = green/blue
grain = green/yellow & green/blue
Special crops = red



» Not too many colour options should be activated at the same time. Combinations can help but only these which are really neccessary. Red mostly helps in special crops.

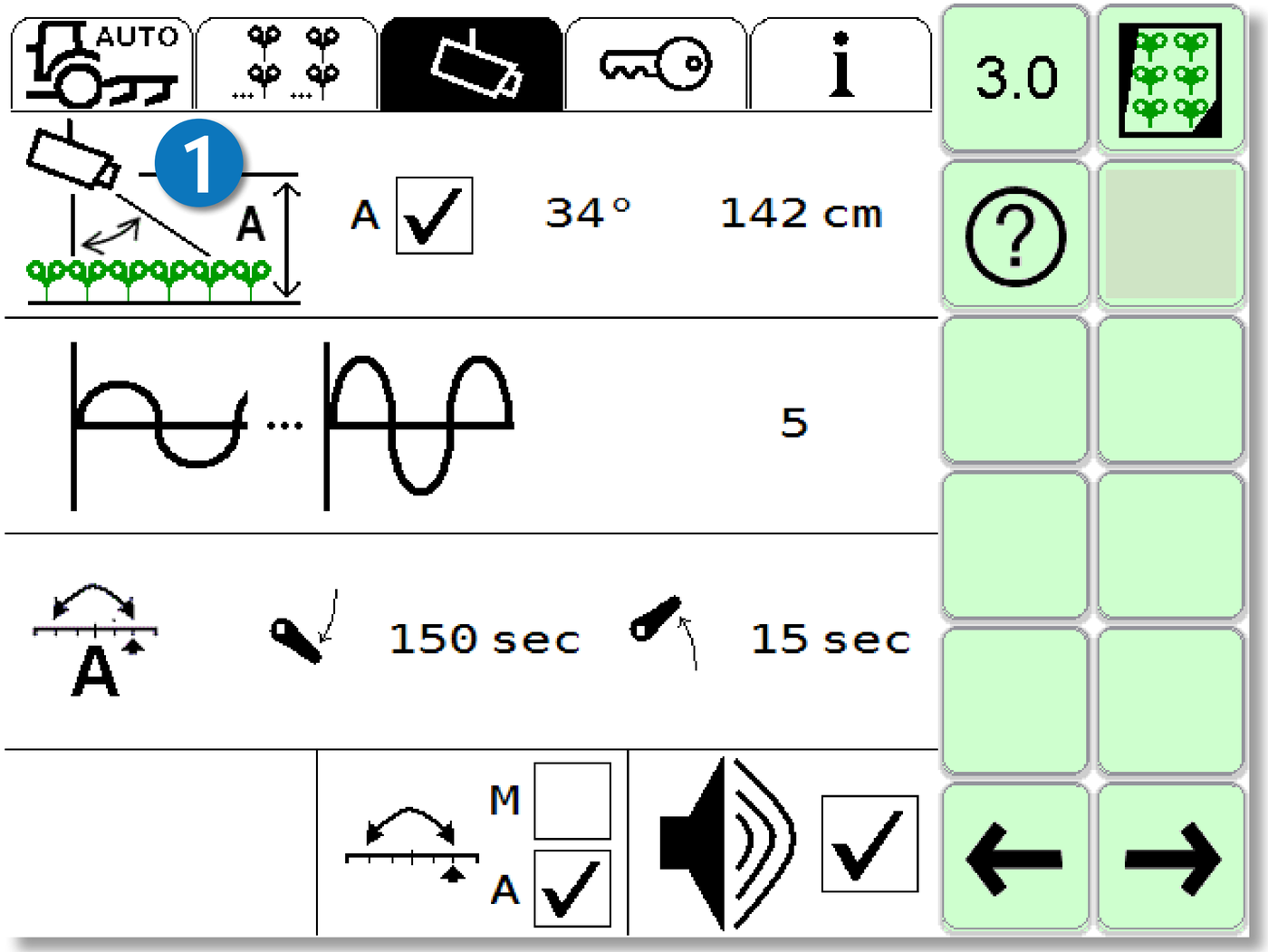
1. **Settings:**
   green/blue and 2D
2. **Settings:**
   3D (without additional colour)
3. **Settings:**
   green/yellow and 2D
4. **Settings:**
   red and 2D

» **Recommended settings:**
green/blue & green/yellow



1. **Save** and **load** the plant settings

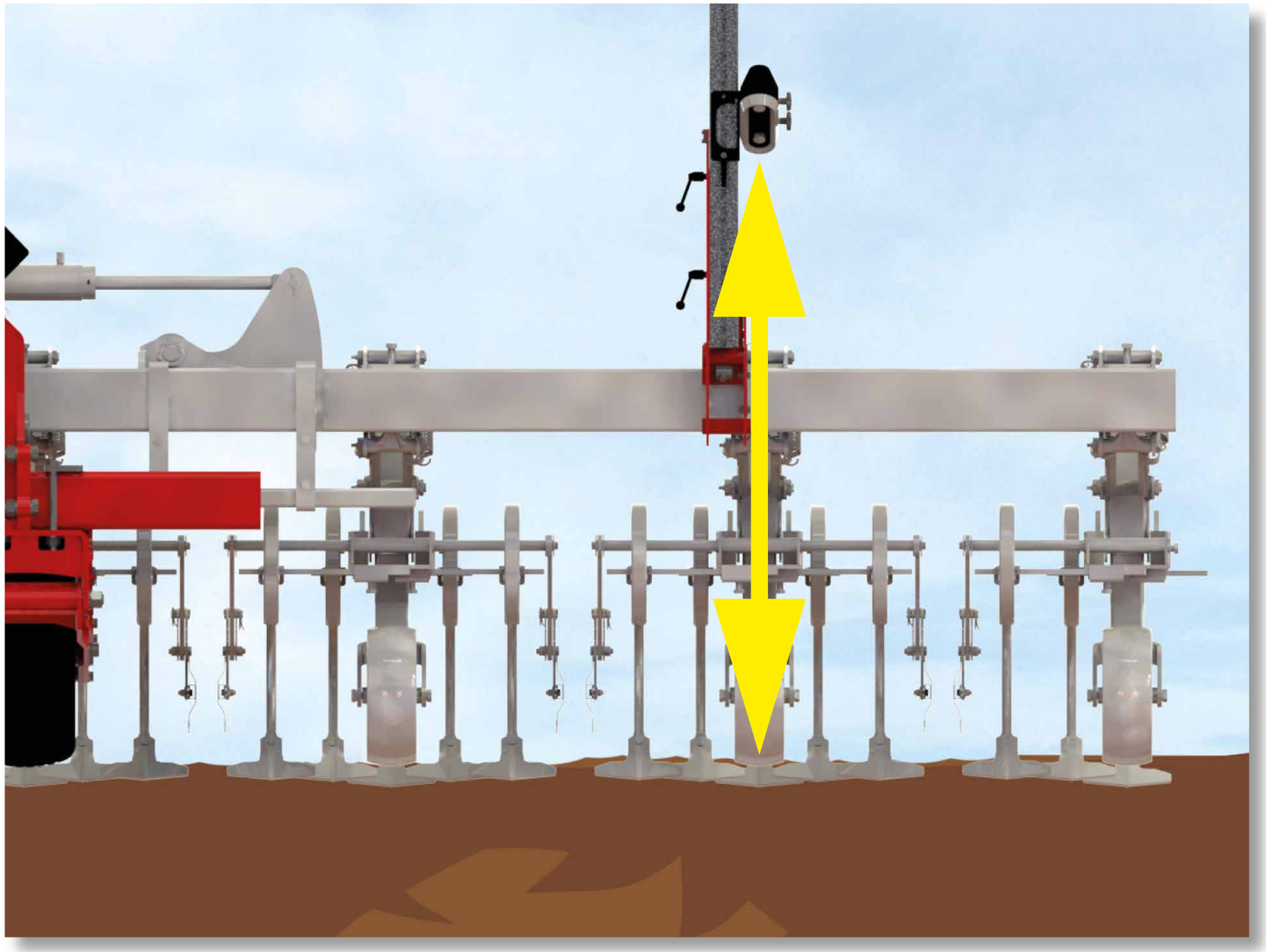
   The chosen parameters of a setting can be saved here.



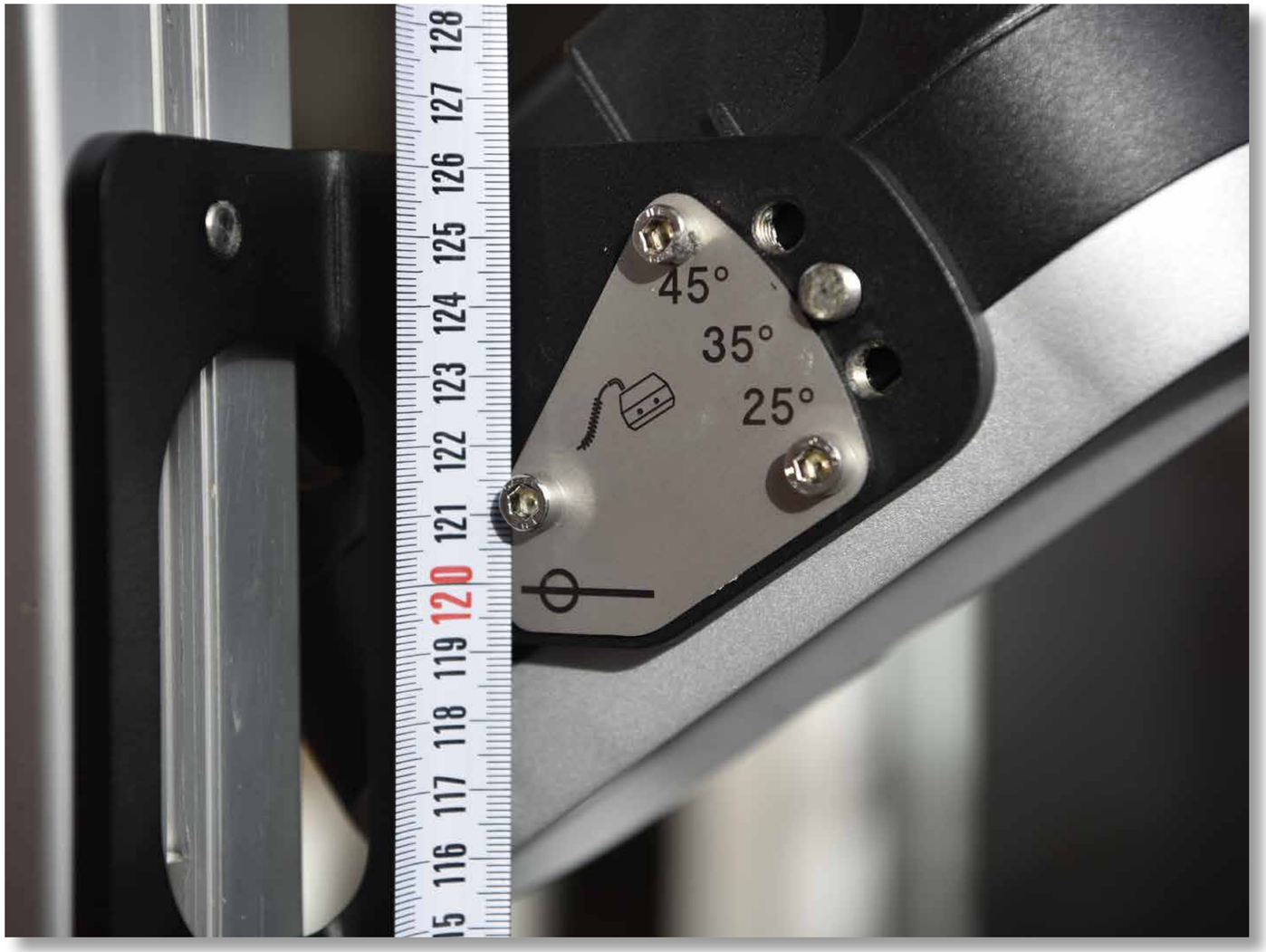
1. Setting camera angle and height

A ☑ = Automatic recognition

A ☐ = manual recognition of camera heigth and angle

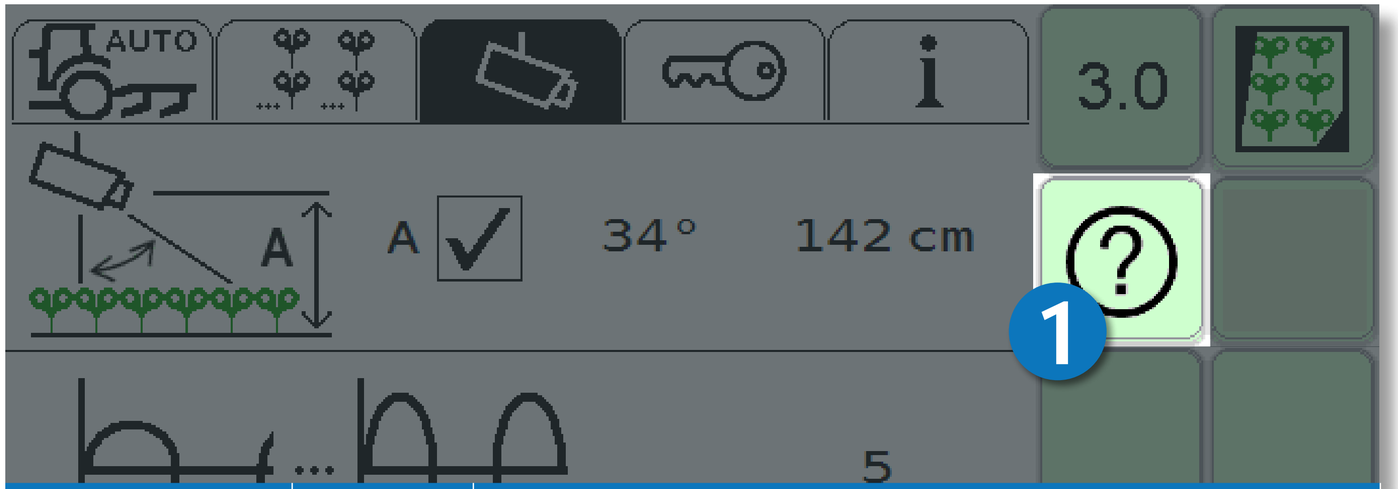


- **Recommendation camera angle: 35°**
- **Recommendation camera height:**
  see table for different camera positions
- **Basically:**
  low camera height = bigger angle big camera height = lower angle



» Manual setting of camera height and angle are recommended when conditions are tricky.

» The camera height is measured from the surface to the mark seen in the picture.

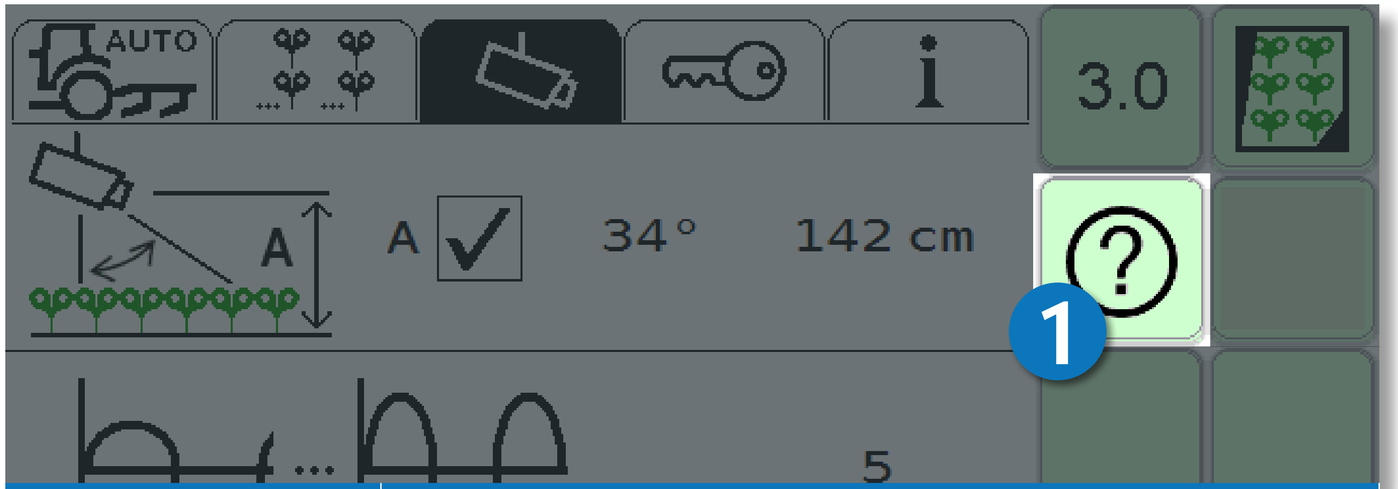


Row distance/ Seeding distance in cm	Number of rows	Recommended minimal camera height (cm) ± 10 cm	
		Small plants row-Ø and height < 10 cm	Big plants, row-Ø and height > 10 cm
12,5 (e.g. grain)	5	100	≥ 120
12,5	6	110	≥ 130
25 (e.g. weath)	3	100	≥ 130
25	4	120	≥ 150
25	5	140 [1)]	≥ 170
37,5 (e.g. soya)	2	90	≥ 130
37,5	3	120	≥ 160
50 (e.g. beets)	2	100	≥ 150
50	3	140 [1)]	≥ 190
75 (e.g. maize)	2	120	≥ 190

[1)] **Plant diameter ≥ 3 cm**

1. **Table of recommedations** for camera positions:
   Number of rows

» The table is adapted automatically to the plant parameters in the settings.

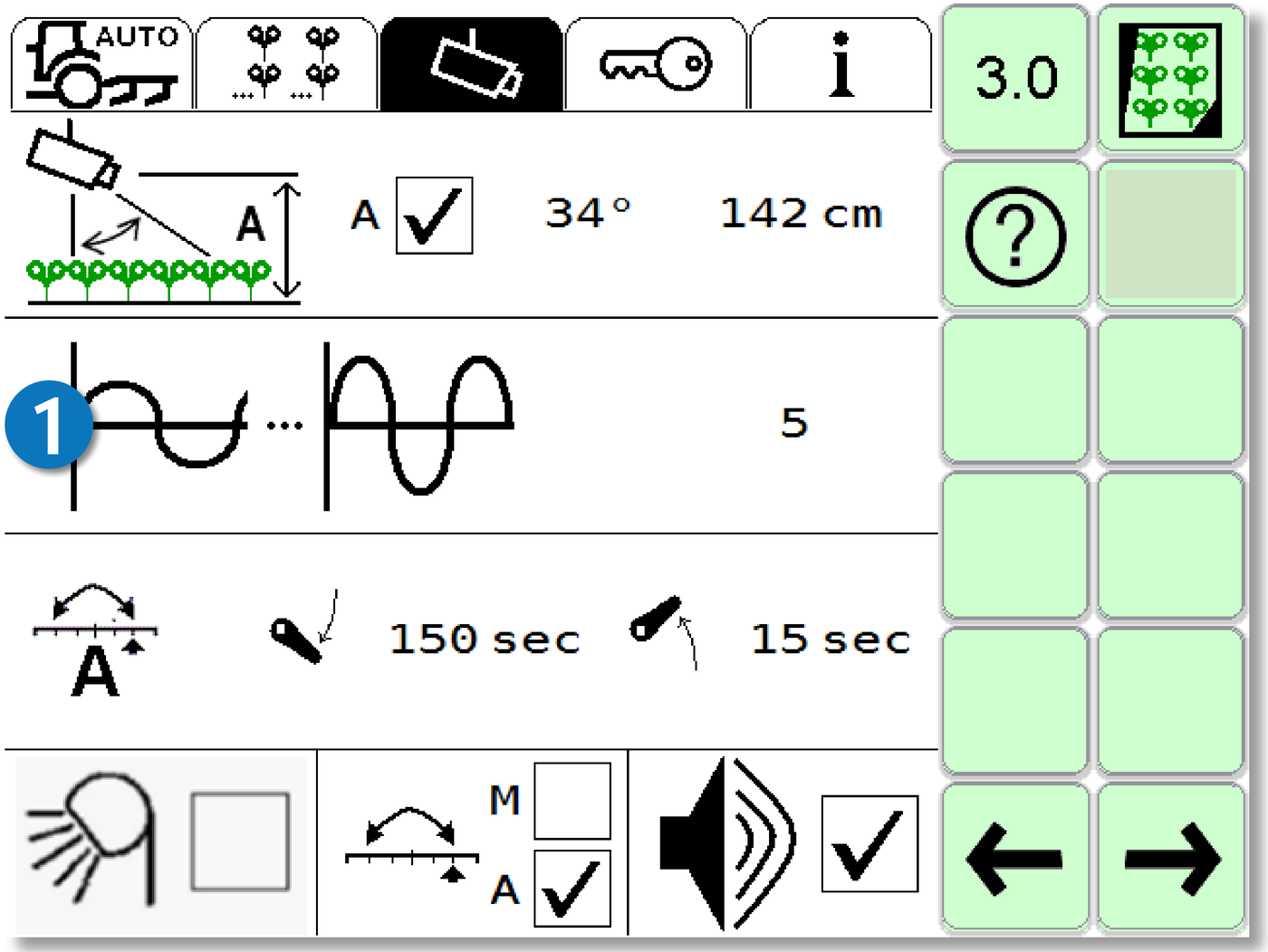


Plant height/ and plant-Ø in cm	Recommended minimal camera (in cm) height if only one plant row is recognized	
	2D-mode	3D-mode
1 [1)]	50	80
2	53	83
5	55	85
10	60	90
20	70	100
40	90	120
60	110	140
80	130	160

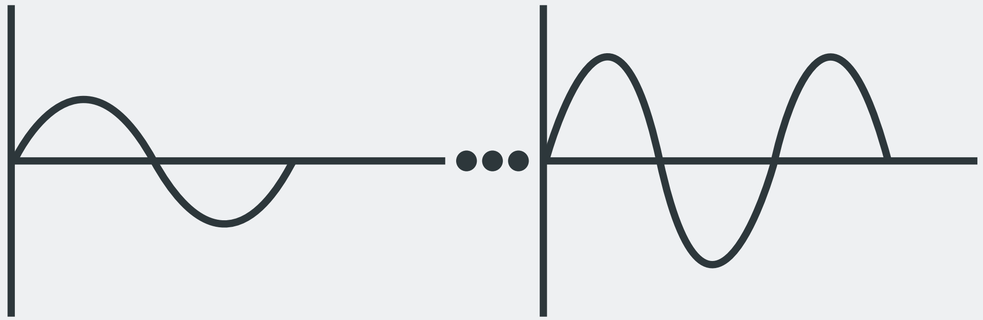
[1)] Valid for CULTI-CAM Professional

1. **Table of recommedations** for camera positions:
   One row

» The table is adapted automatically to the plant parameters in the settings.

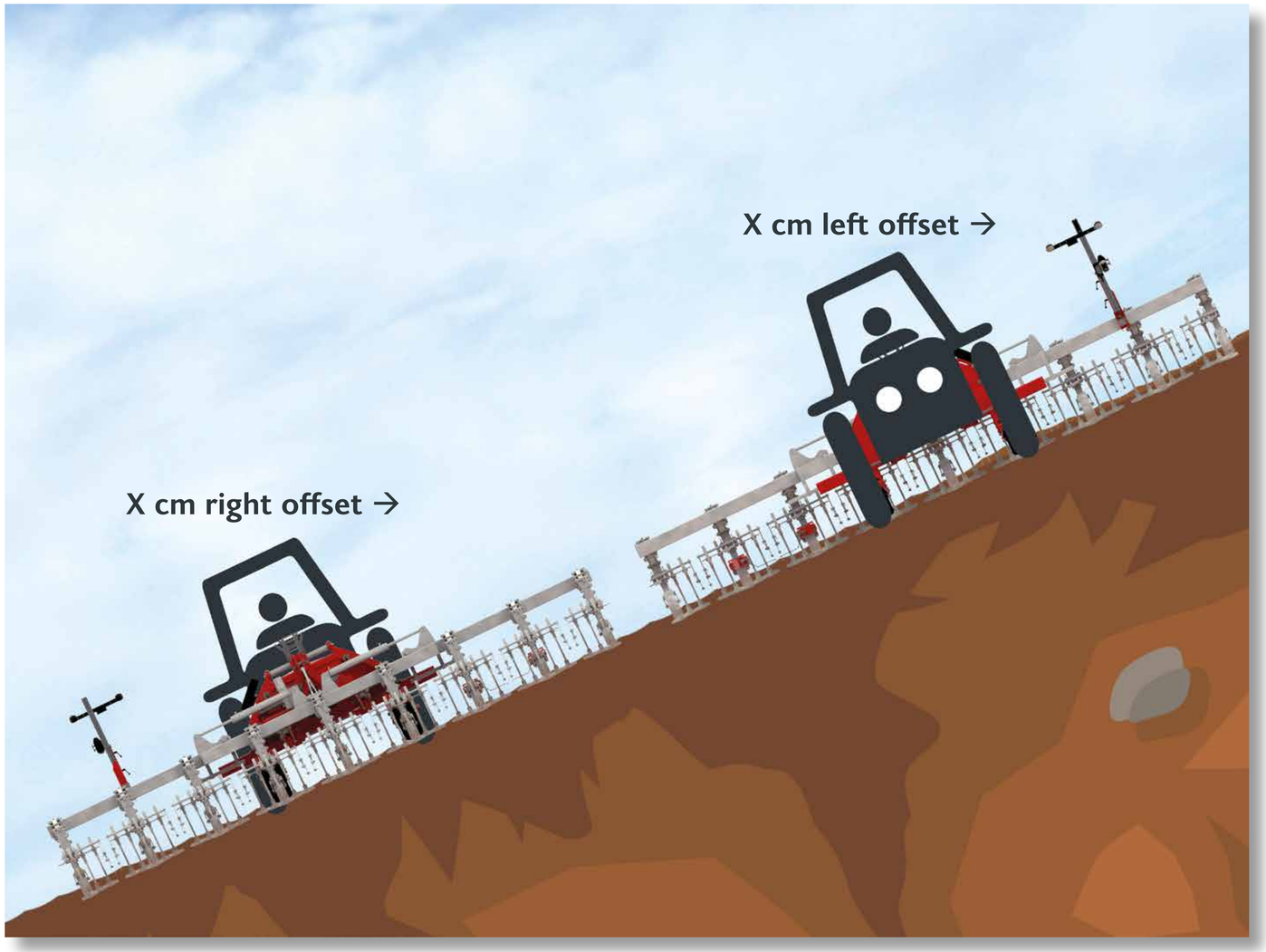


1. Sensitivity



» Display and Entry: Sensitivity of the sideshift frame from value 1 (inert) to value 9 (quick)

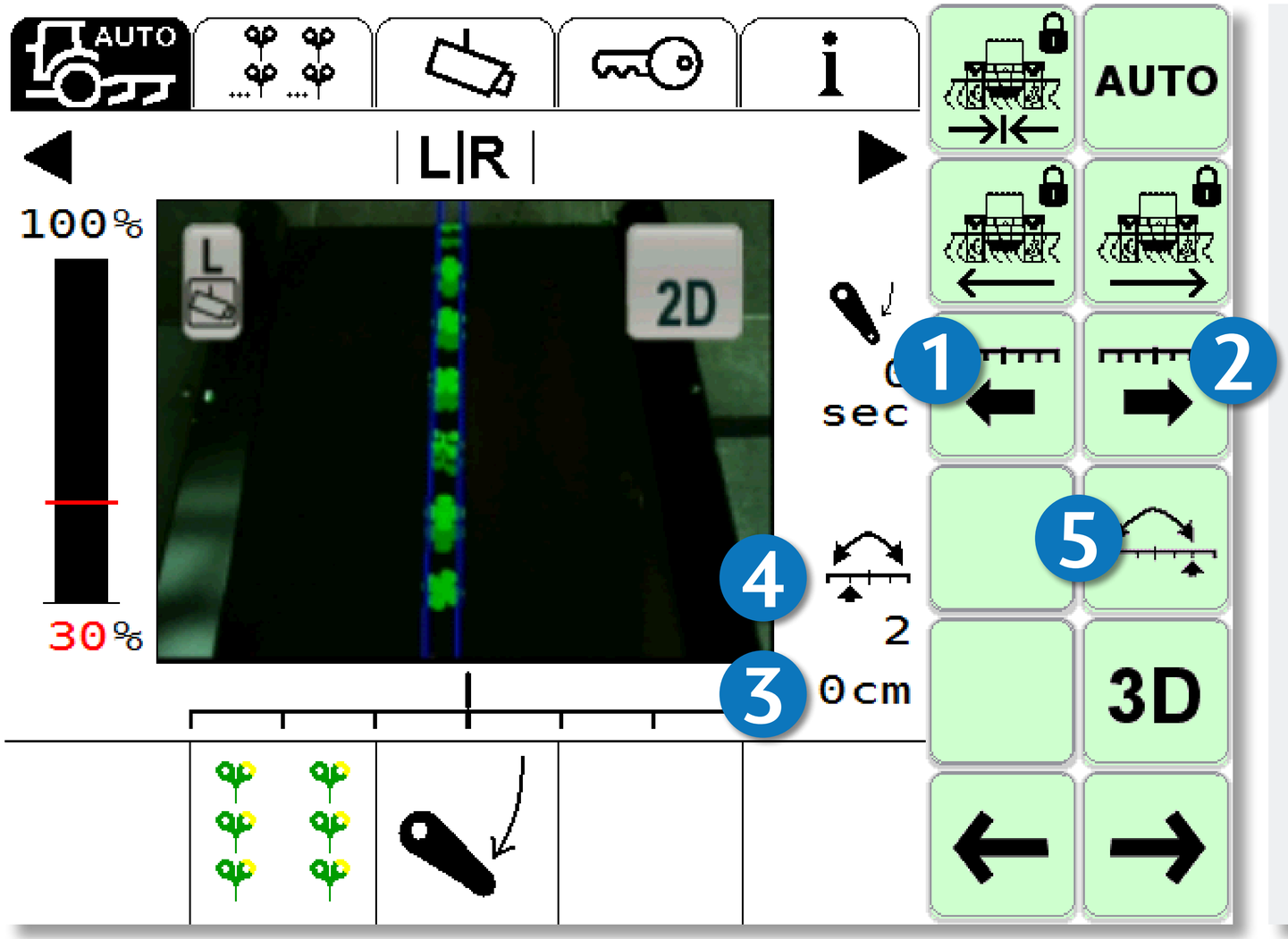
» Recommendation = 5



» On hilly fields a certain offset has to be choosen. Depending on conditions the offset needs to be changed frequently.

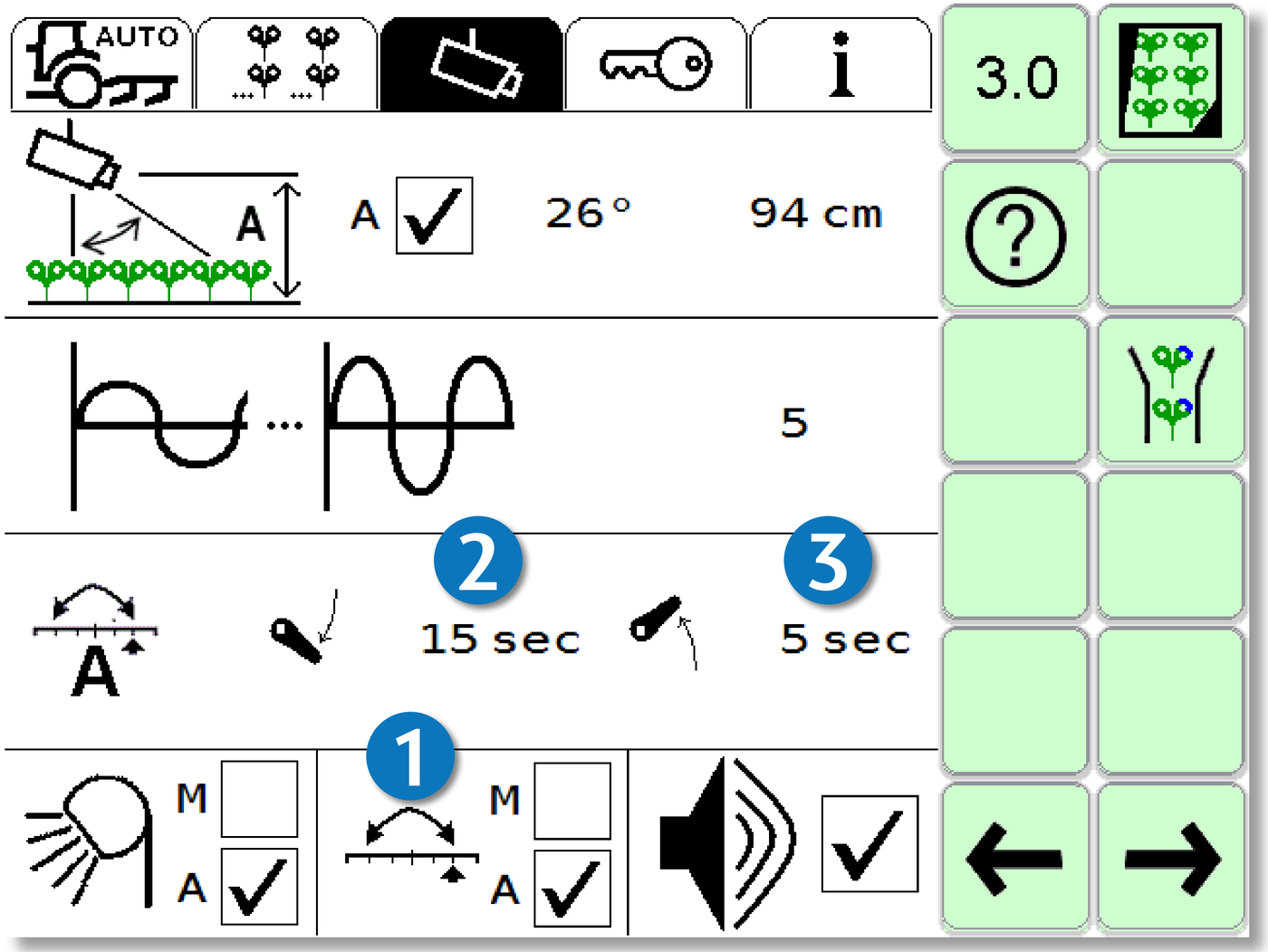
» On flat and even fields no offset is required.

» On fields where the row crop culitvator is drifting down left, a right offset is required.



The offset is set in the main menu. Two different values can be stored.

1. Modify offset – towards the left
2. Modify offset – towards the right
3. Offset in cm (actual value)
4. Offset in cm (stored value)
5. Alternate between actual and stored value

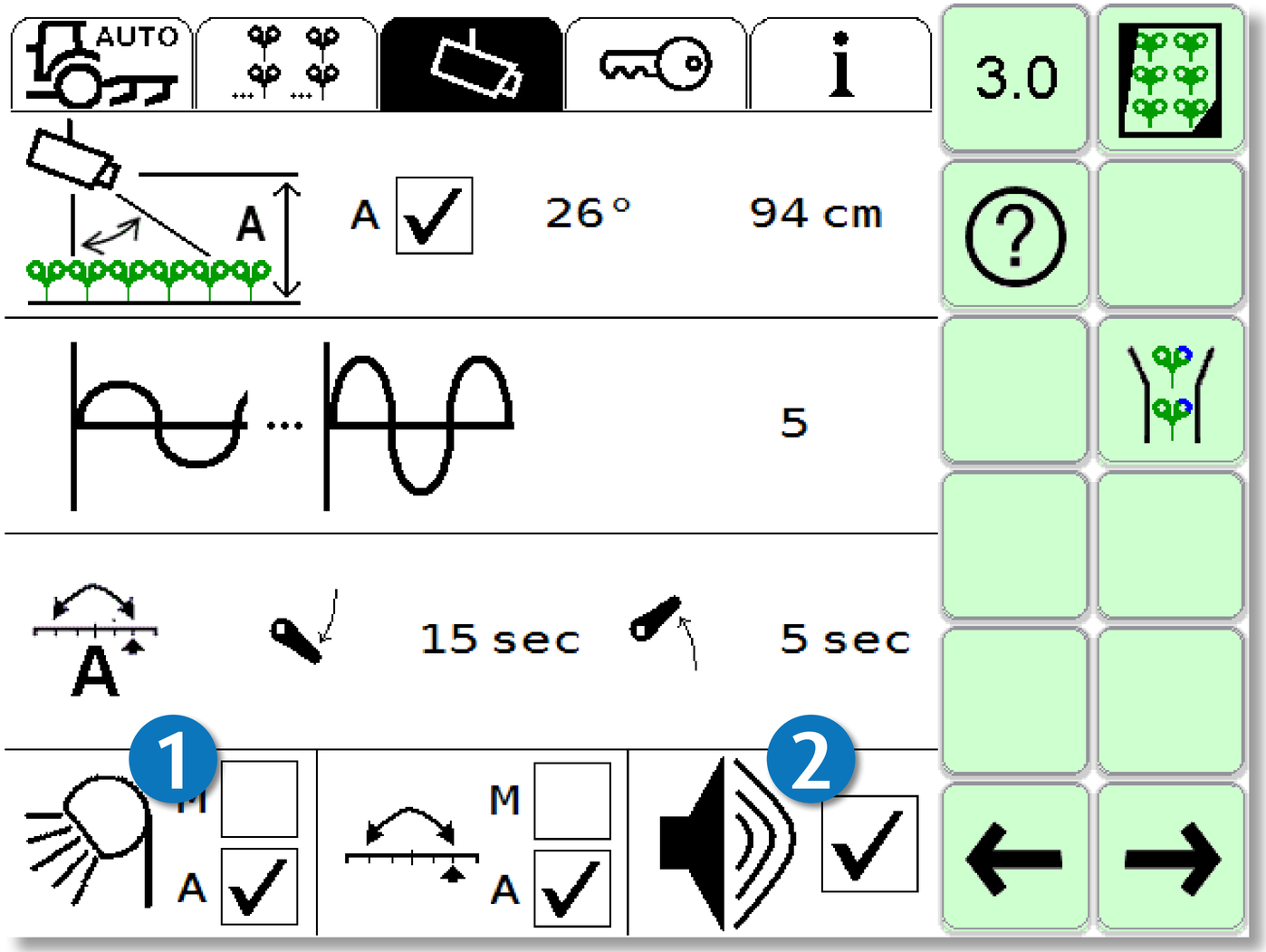


1. Alternate offset mode
   - manual (see precedent page)
   - automatic

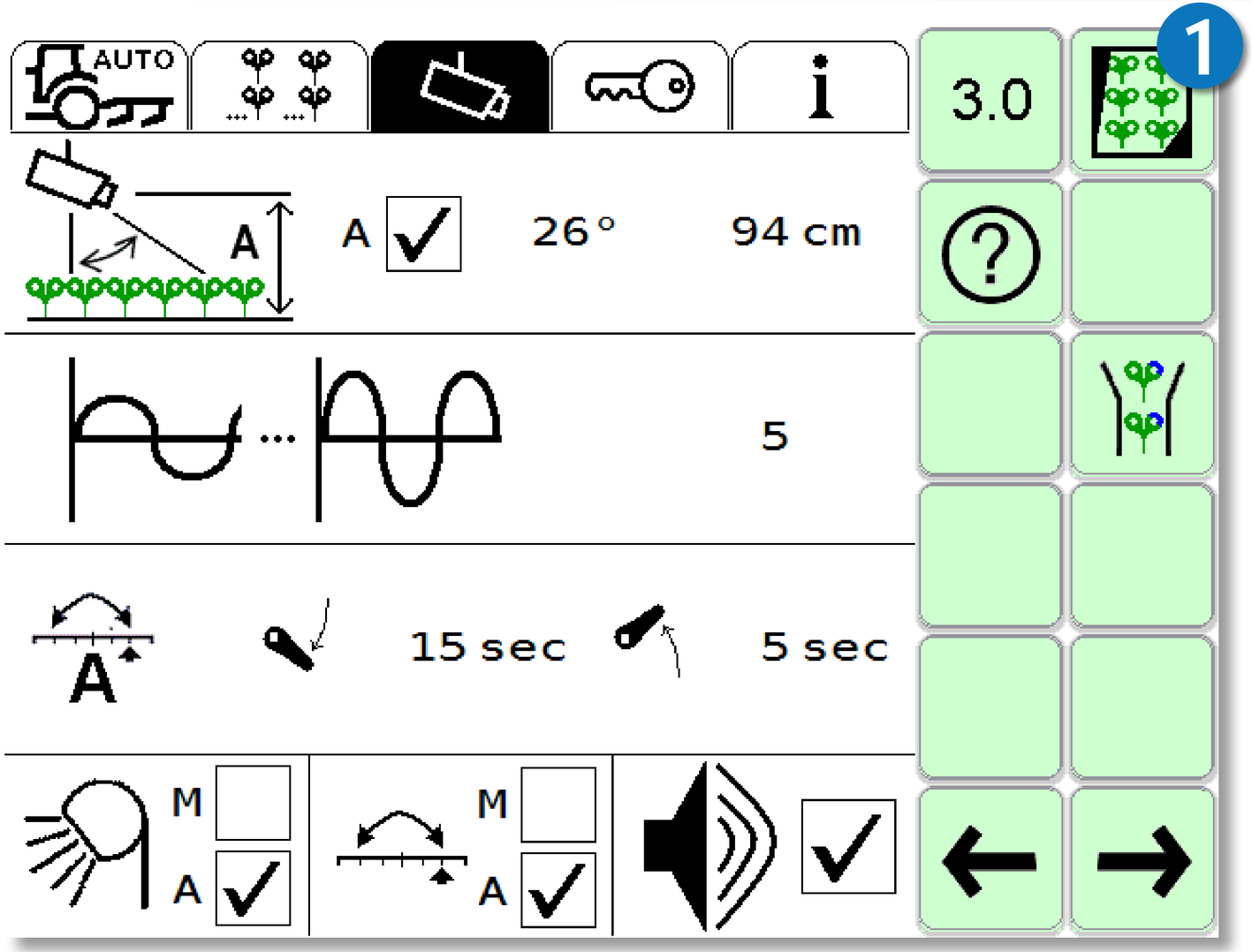
Neccessary for automatic:

2. **Time for lowering -** Display and Entry: minimal time, the machine has to be in working position before the automatic offset change is active.
3. **Time of lifting -** Display and Entry: minimal time, the machine has to be lifted when turning at the headland, for the automatic offset to do the change.

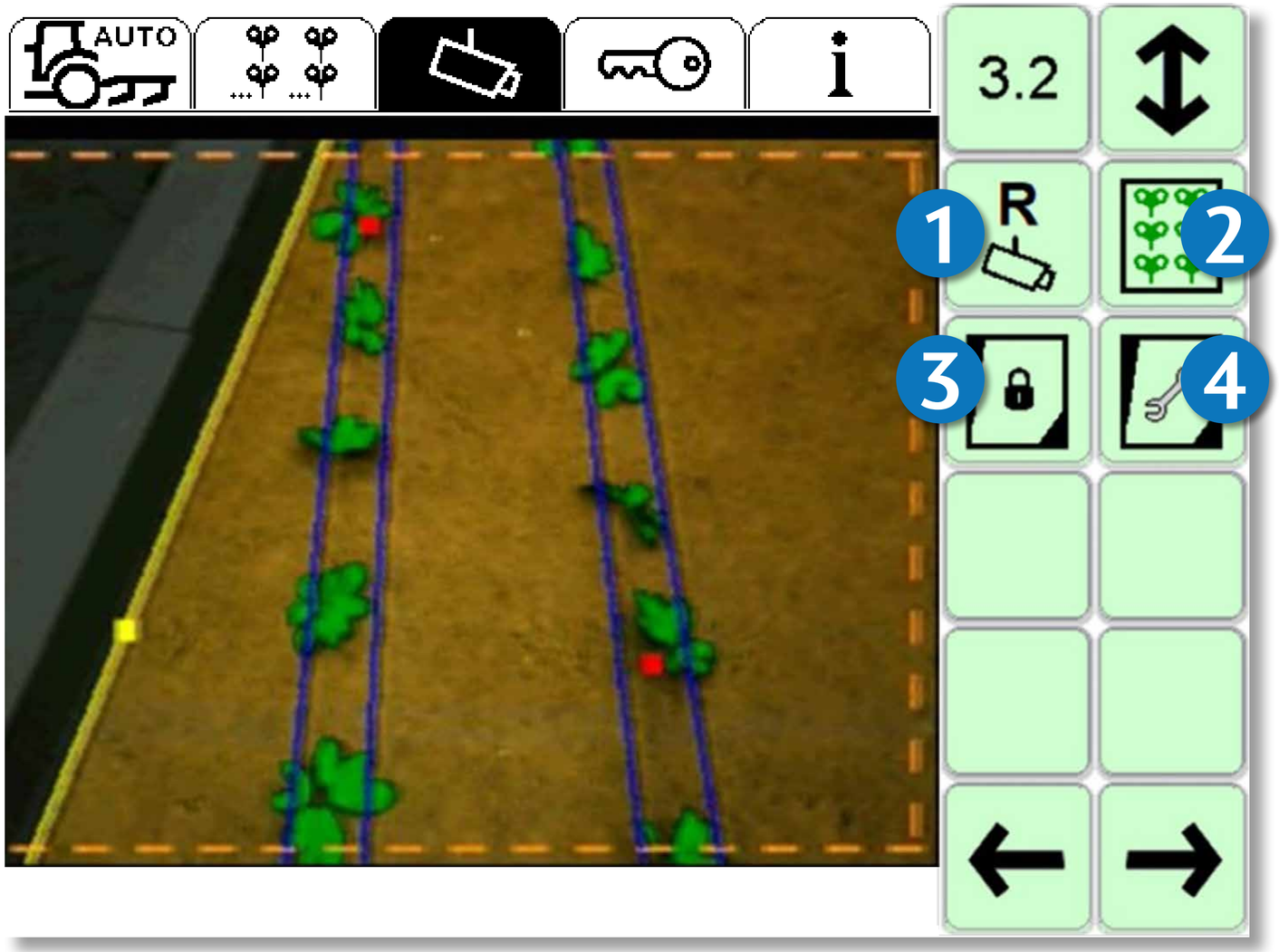
» **The value of offset (in cm) is changed in the main menu**



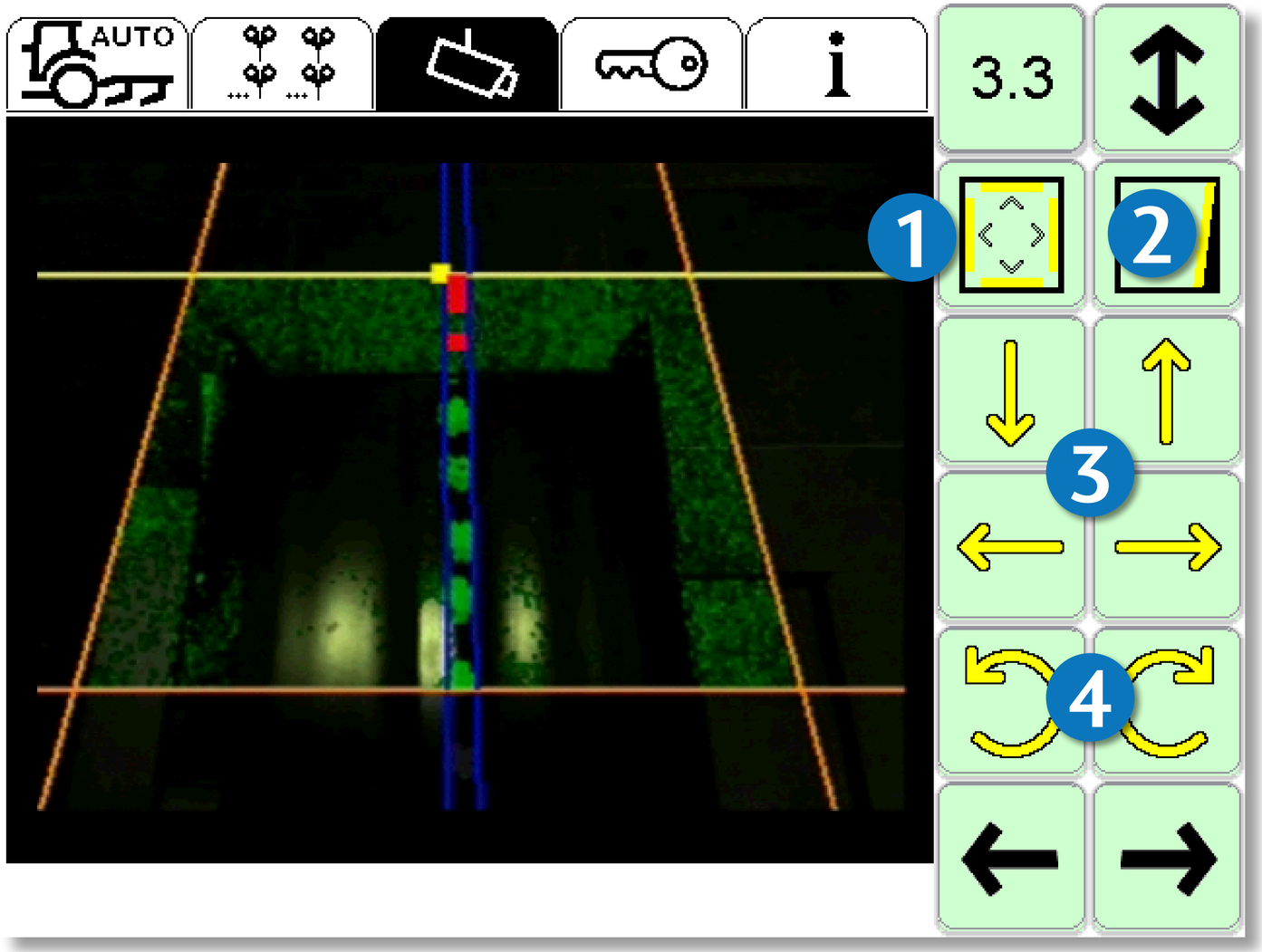
1. **Light** On/Off:
   M: Manual mode: Light is switched on or off by pressing the button.
   A: Automatic mode: If activated, the light switches on or off depending on the brightness of the surroundings.
2. **Alarm** On/Off



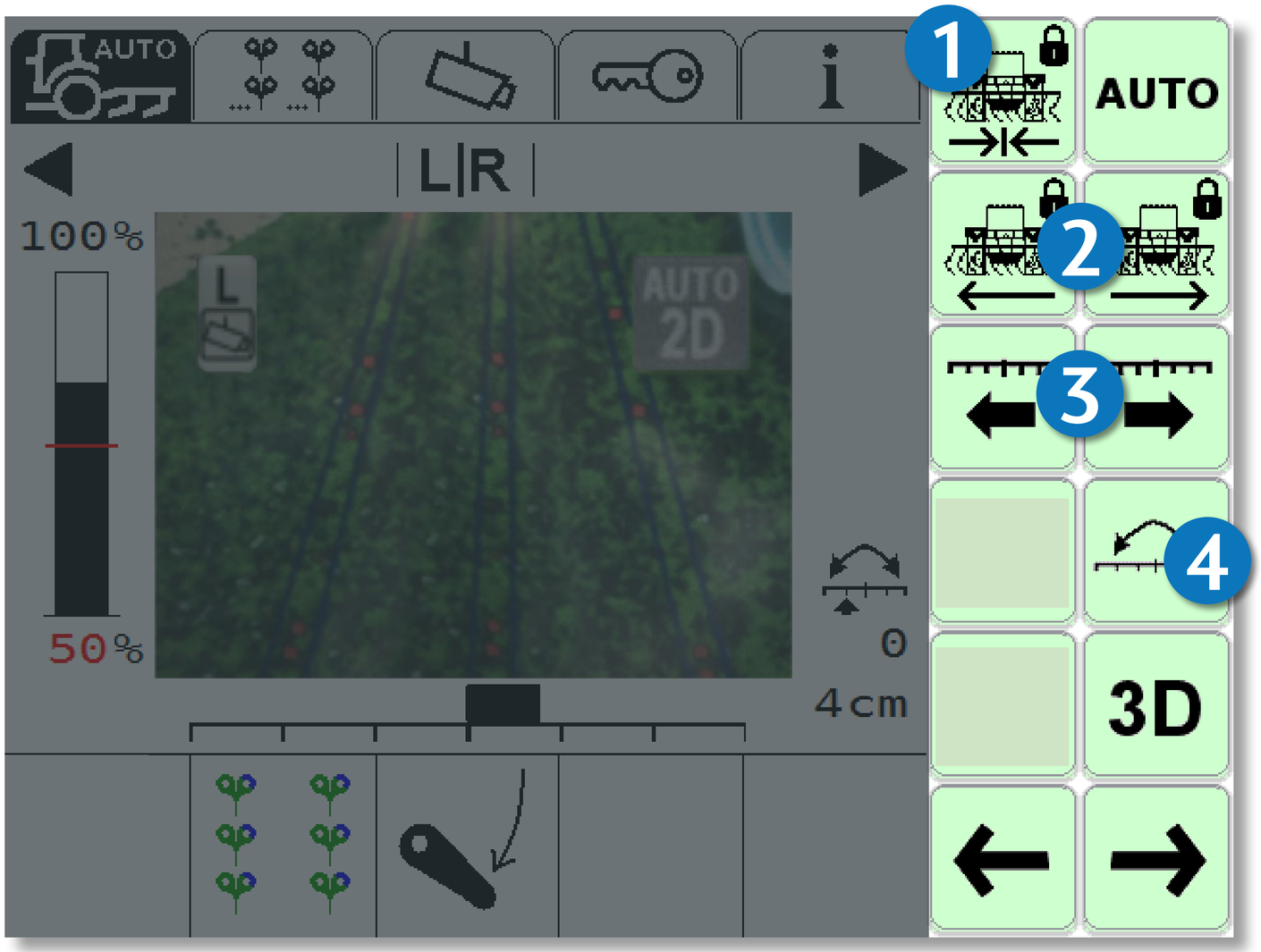
1. **Image-Masking:**
   Cutting the camera view e.g. if tractor wheels or parts of machines are disturbing the image.



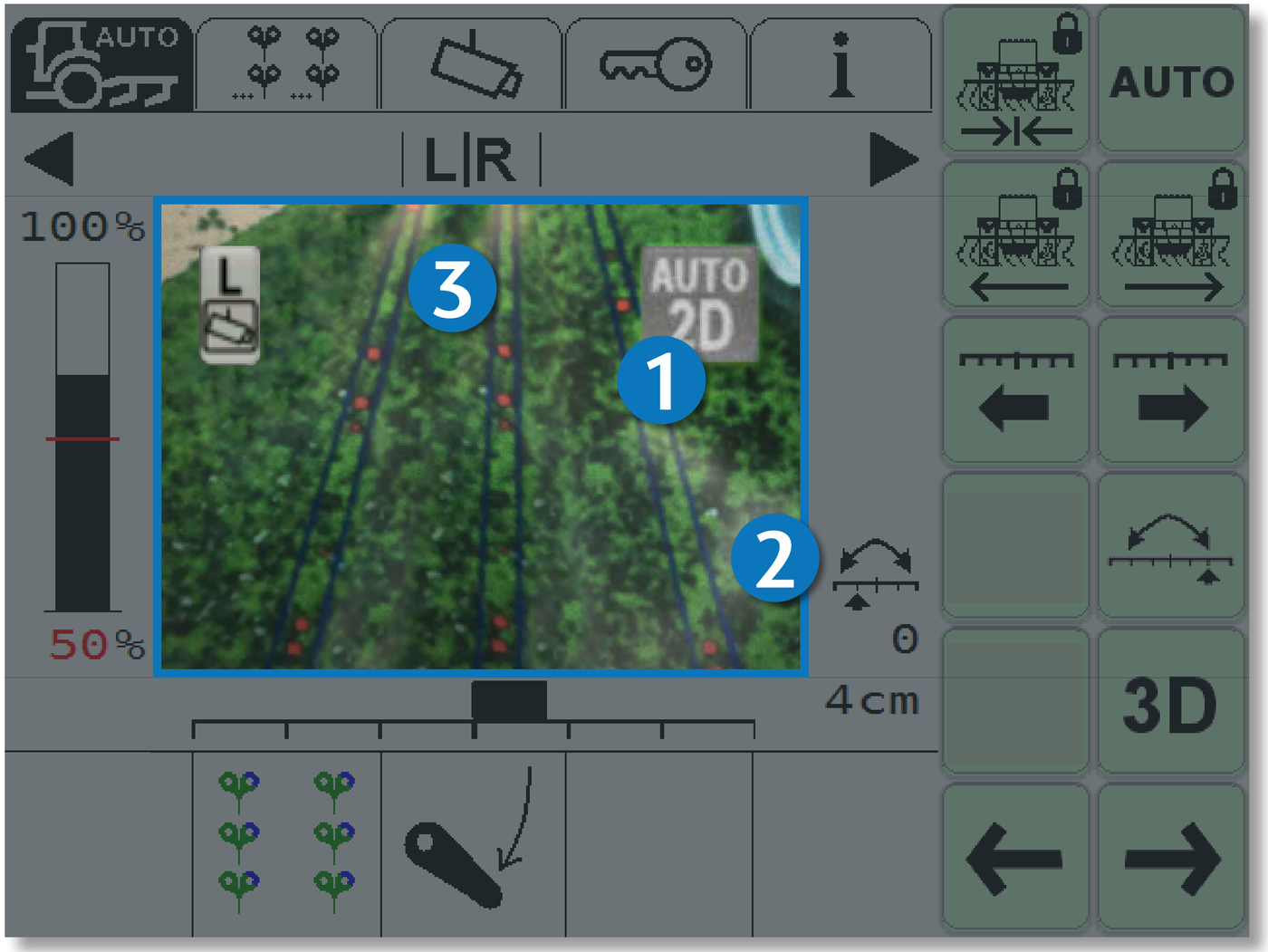
1. **Selection camera (right/left)**
   optional only in 2 camera mode
2. **Image-Masking deactivated:**
   With a tap, the Image-Masking is on now. The mask can be adjusted now.
3. **Mask focused on the ground (lock):**
   With a tap the mask is fixed to the camera. (double arrow appears)
4. **Settings:**
   With a tap the setting for cutting the image is opened.



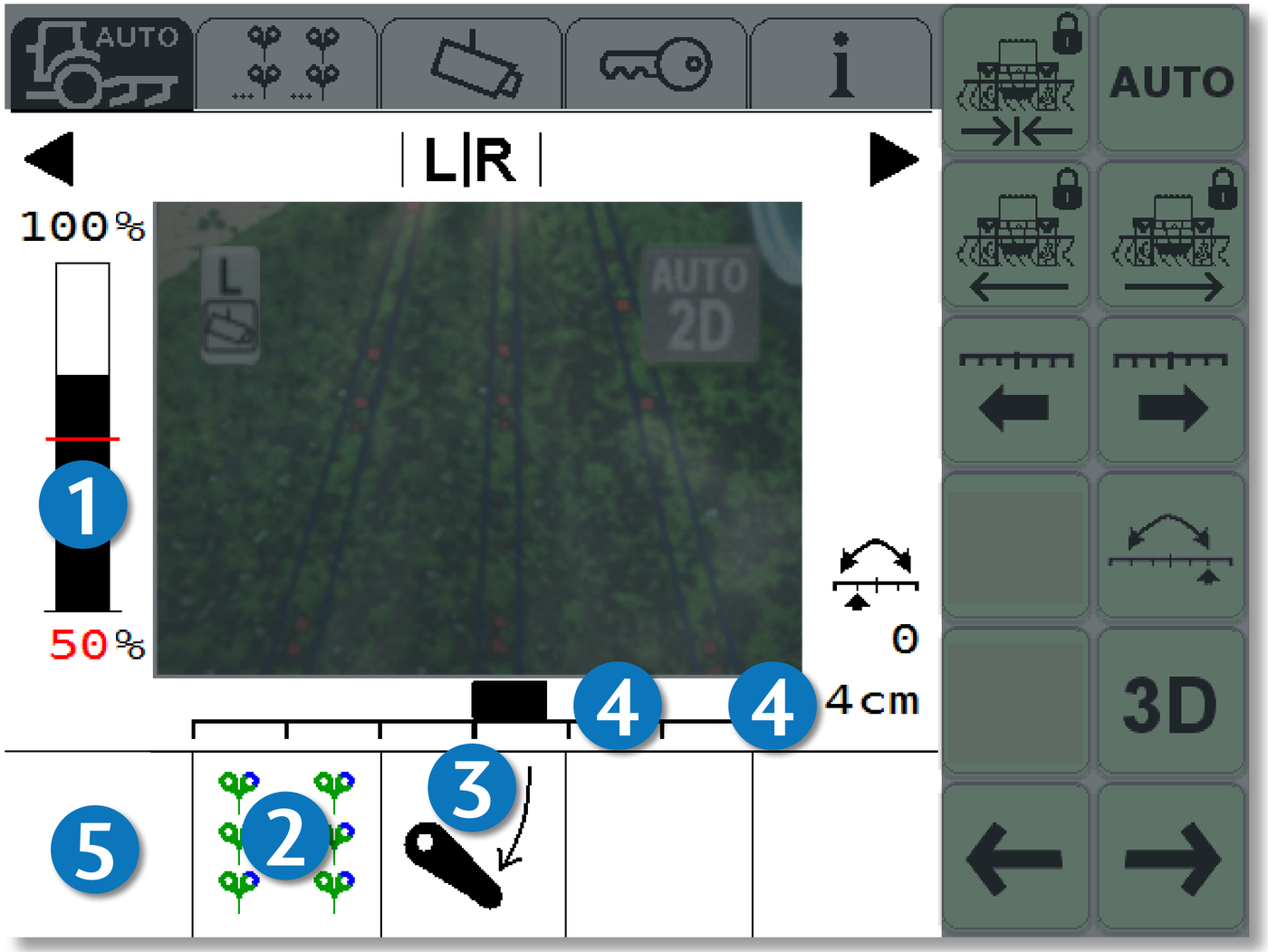
1. **Reset the lines:**
   Lines will be reset to the usual positions.
2. **Choose active line:**
   With a tap the line which is choosen for cutting can be changed. The line which is active for masking will appear as yellow.
3. **Pushing the lines into direction:**
   The line will be pushed, so the image is getting bigger or smaller.
4. **Rotating the line:**
   The lines can be rotated with these arrows. The angle can be changed here.



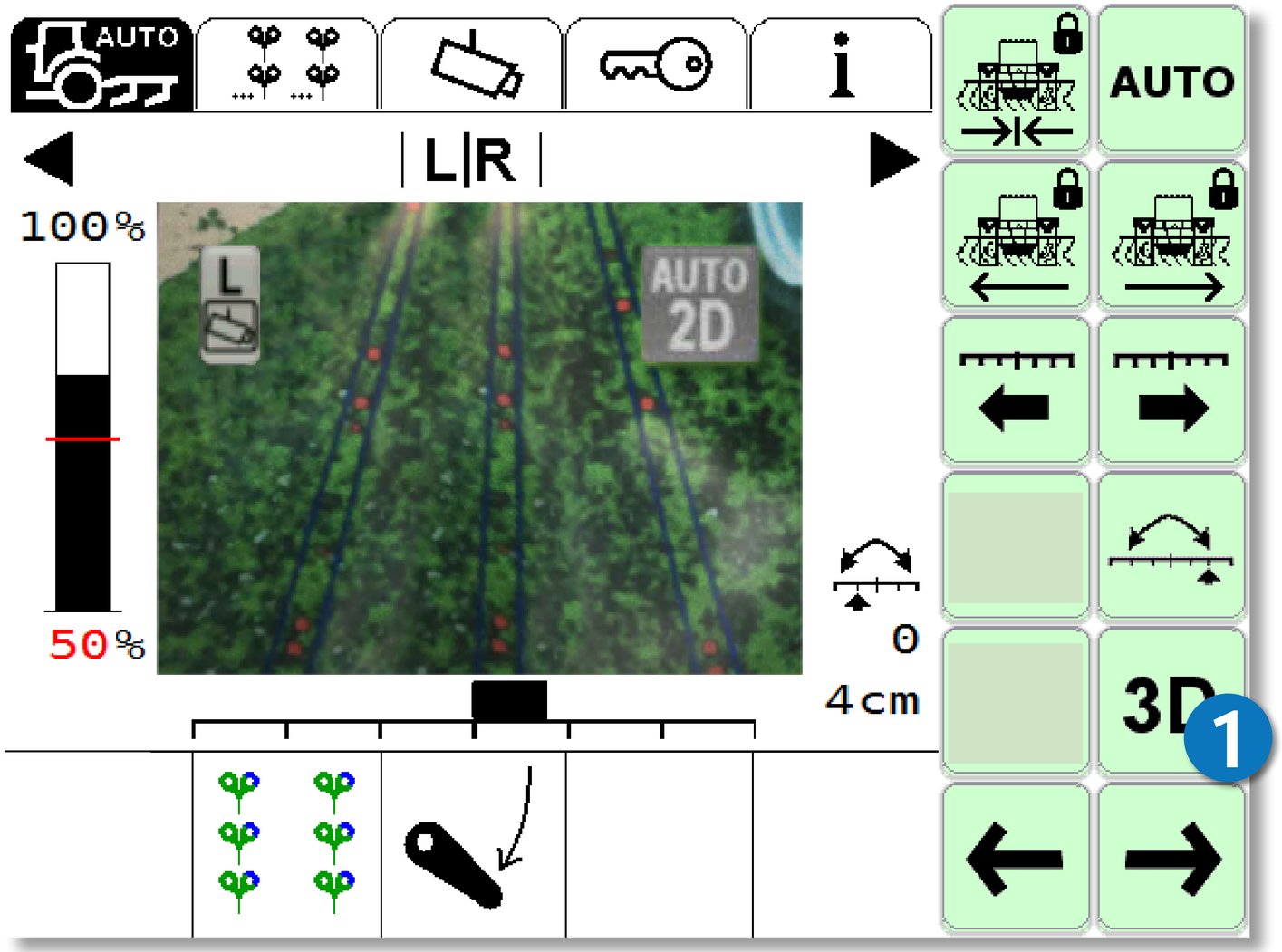
1. Middle position of the sideshift frame (double click to activate)
2. Manual shifting to the left or right (double click to activate)
3. Set offset left and right (in cm)
4. Change offset manually



1. Display if 2D- or 3D-mode is active
2. Integrated video monitor
3. To enlarge the video monitor tap in



1. Quality of the camera signal lowest value should be at least 30 %.
   Changing value with tapping on the number of percentage
2. Choosen plant row and coulor settings (single or multiple)
3. Position of the machine
   (lowered or lifted)
4. Choosen offset
5. Error messages
   To update the error messages, the page must be changed with the arrow keys (no auto updating).

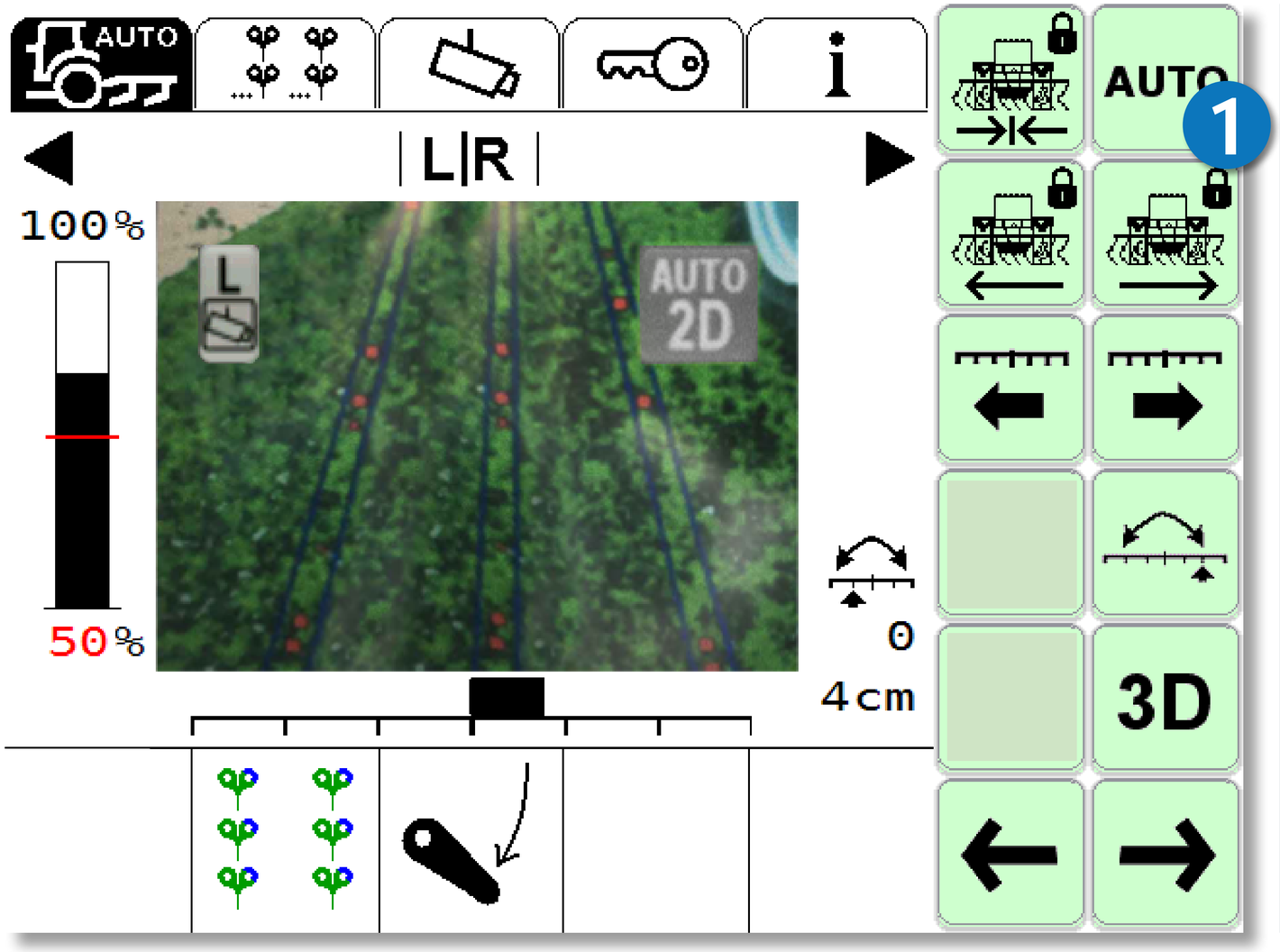


1. **3D-mode**

» The 3D mode should only be used in emergency when weeds are fully covering the surface.

» With a tap the 3D mode is activated.

» The crop has to be at least 10 cm bigger then the weeds!

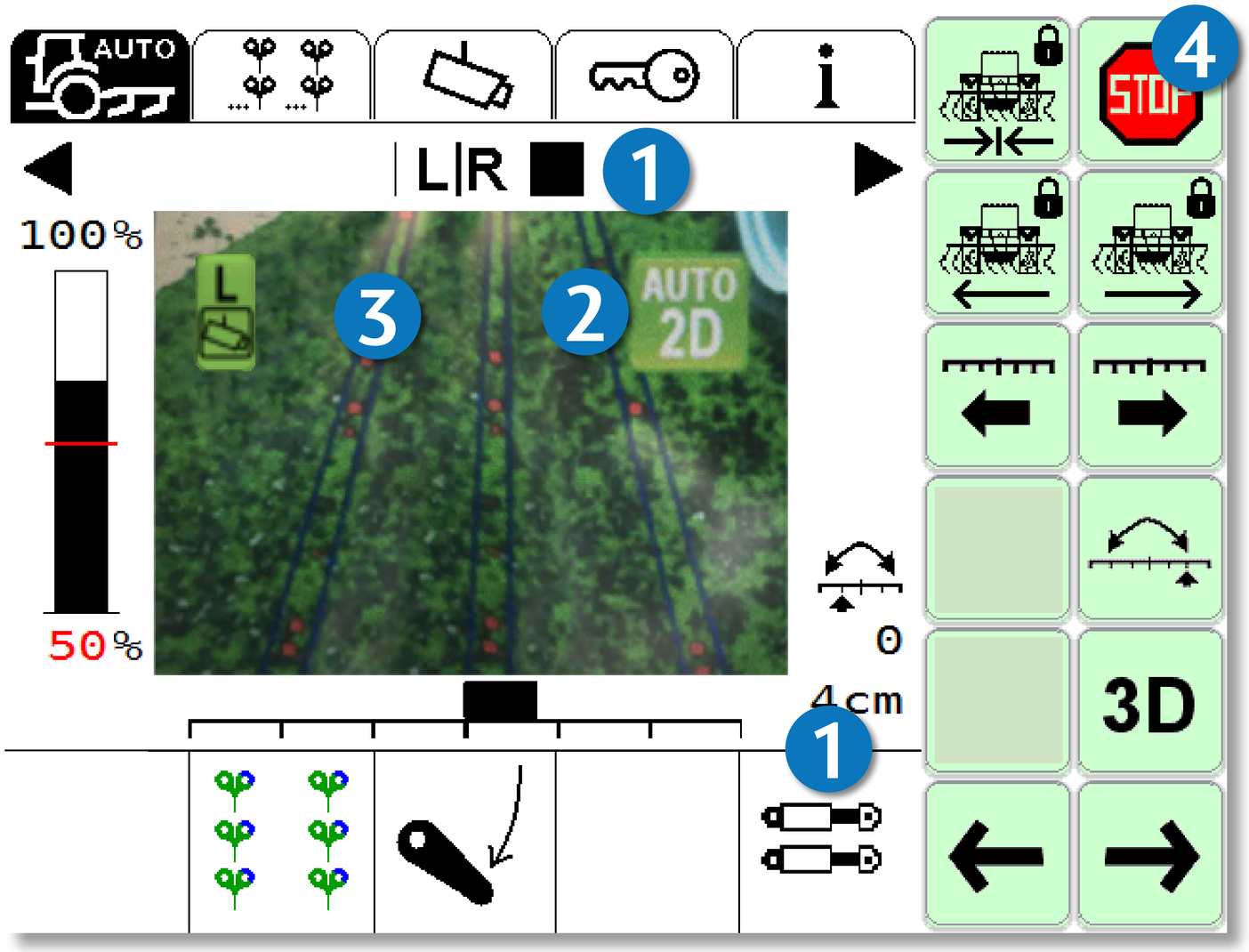


» Activate tractor hydraulics with a constant oil flow of **max. 15-20 l/min**

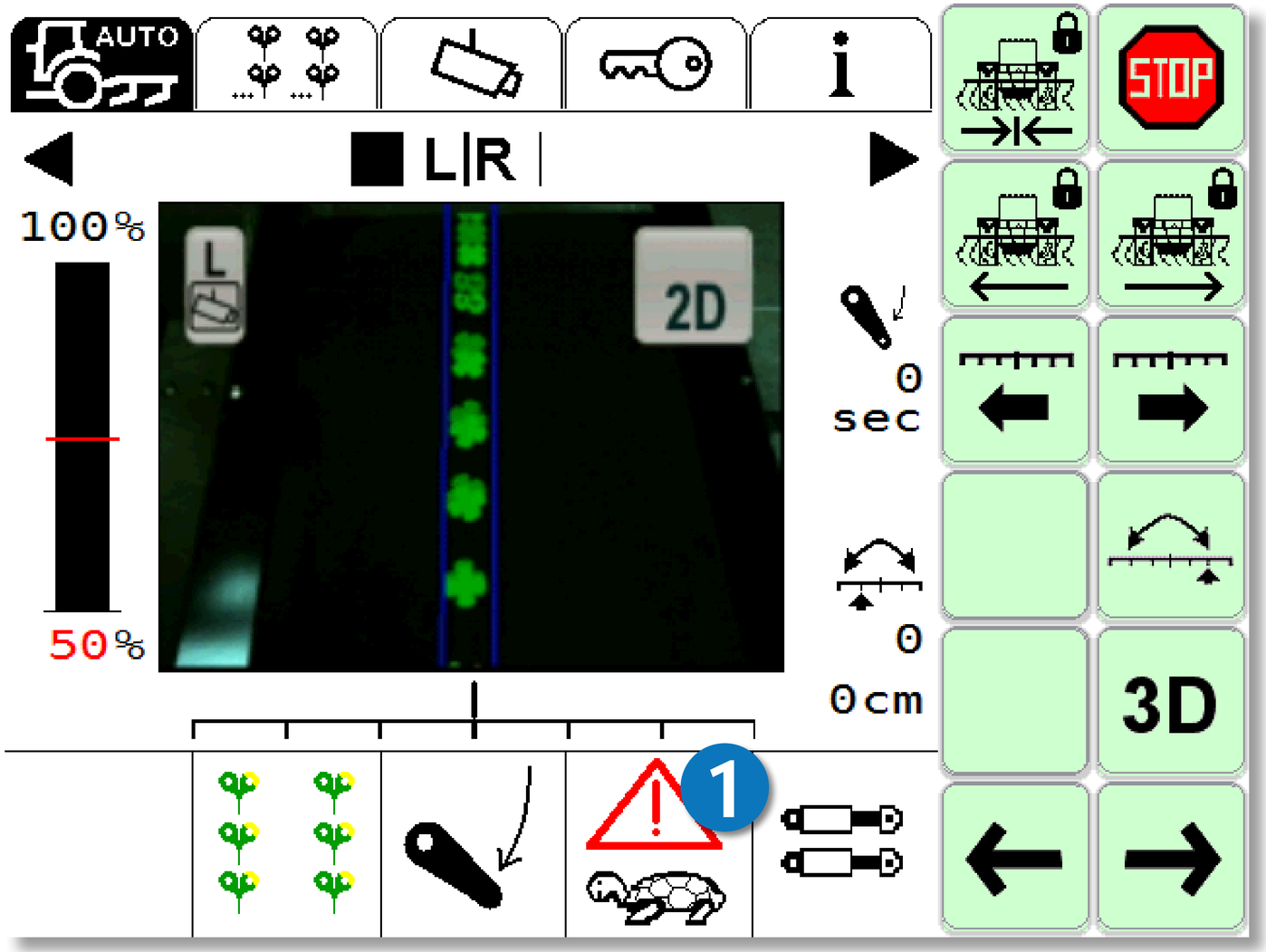
1. Start the system

» Start driving and lower the machine.

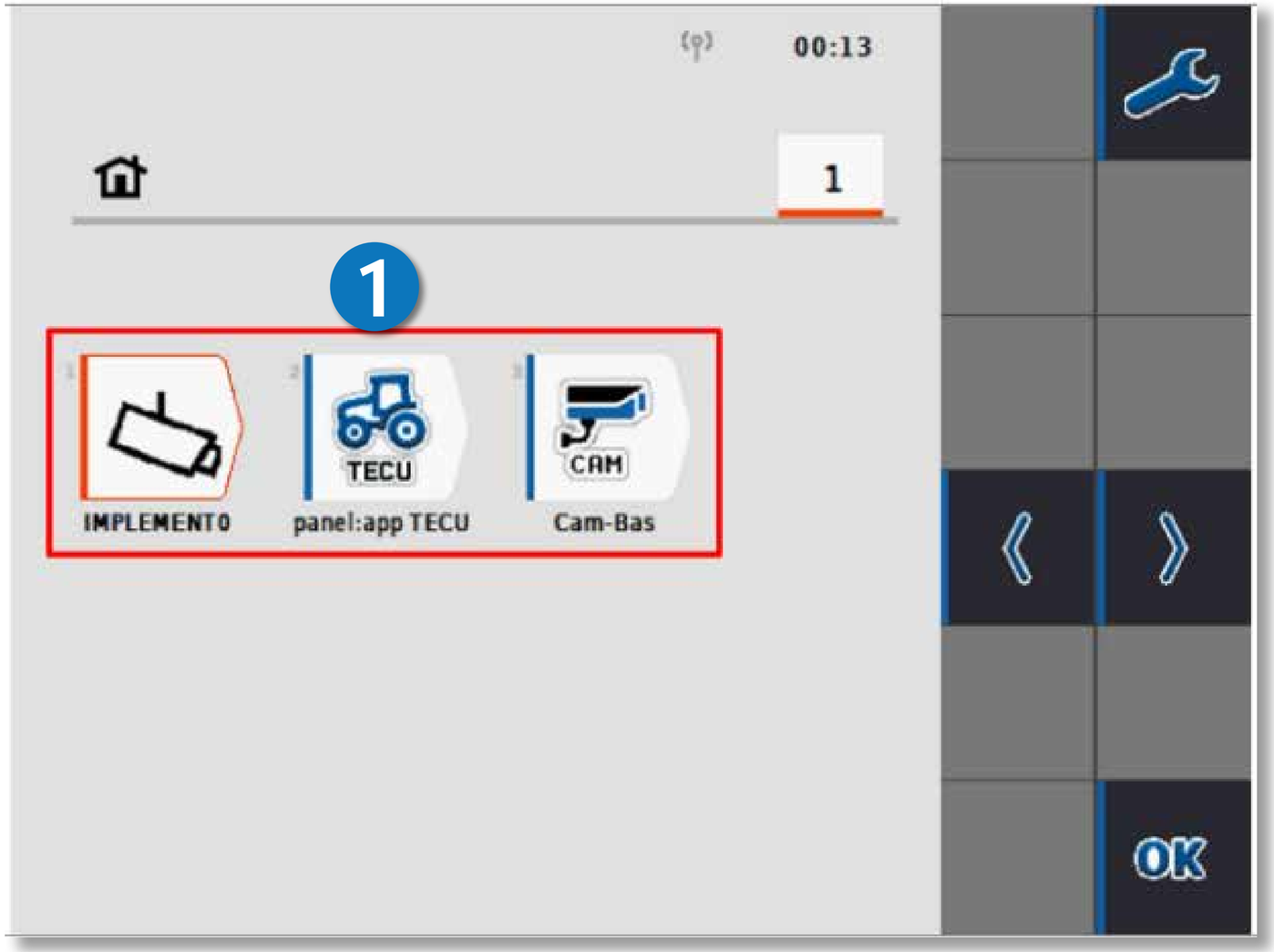
Lower the ROW-GUARD with the hoe until the stabilising wheels rest entirely on the soil. About **20 % of the weight** of the ROW-GUARD with hoe should be supported by the **lower links**. This prevents the stabilising wheels sinking too much into the ground.



1. **Status autom. steering:**
   flashing: steering is active, but not moving
   cylinders are moving: autom. steering is active and is moving
2. **2D / 3D symbol in video monitor:**
   grey = system deactivated
   yellow = system activated but with bad recognition
   green = system activated, plants are recognized
3. **Camera symbol in video monitor:**
   grey/yellow/green = same as point 2
4. **Stopping the system**

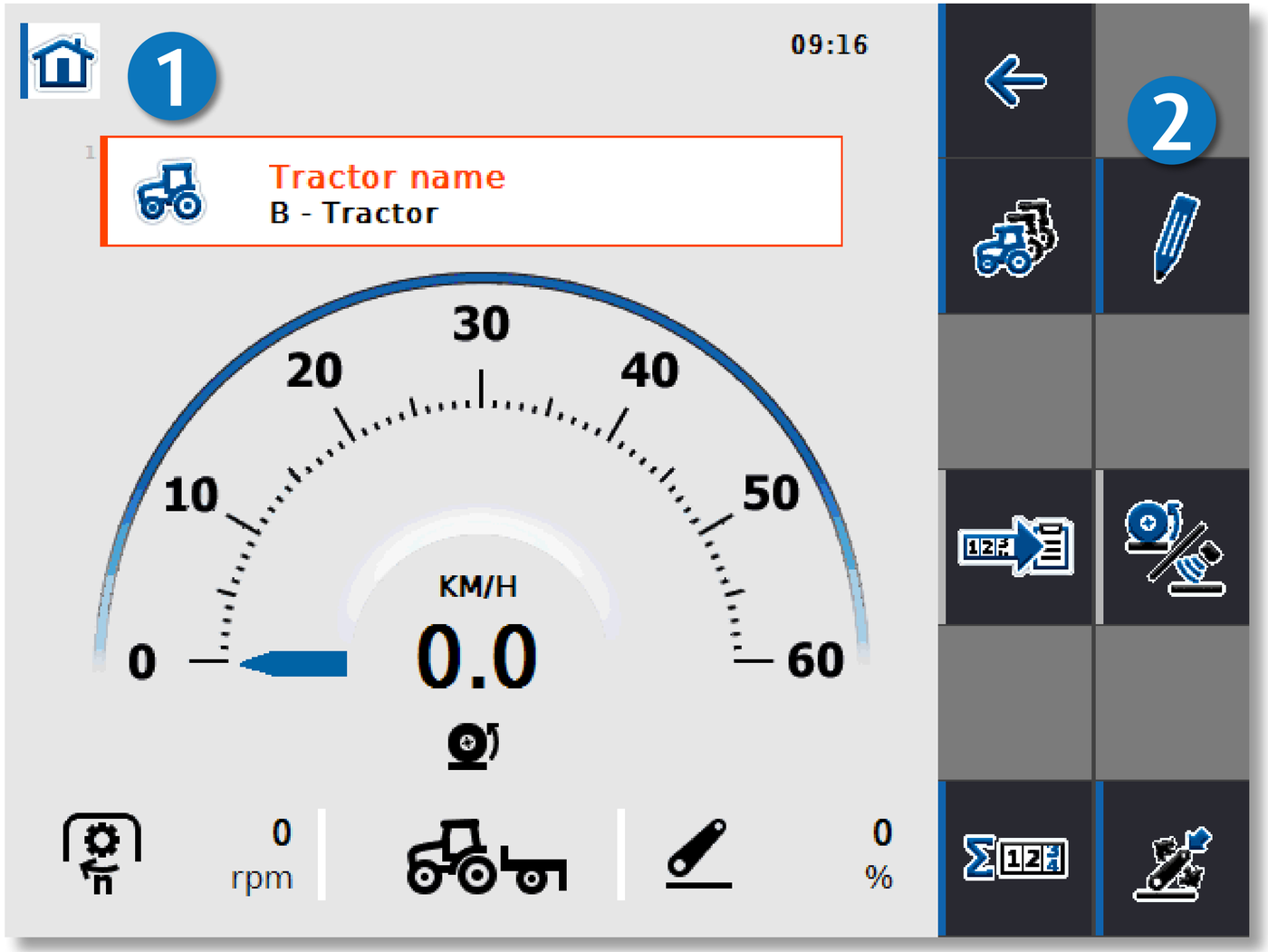


- Wheel sensor mounted on stabilizing wheels
- The wheel sensor has to send a signal so the ROW-GUARD can move.
- No signal = error **(1)**
- Wheel sensor has to be adjusted so the metal screw can receive a signal → the control lamp on the sensor has to shine

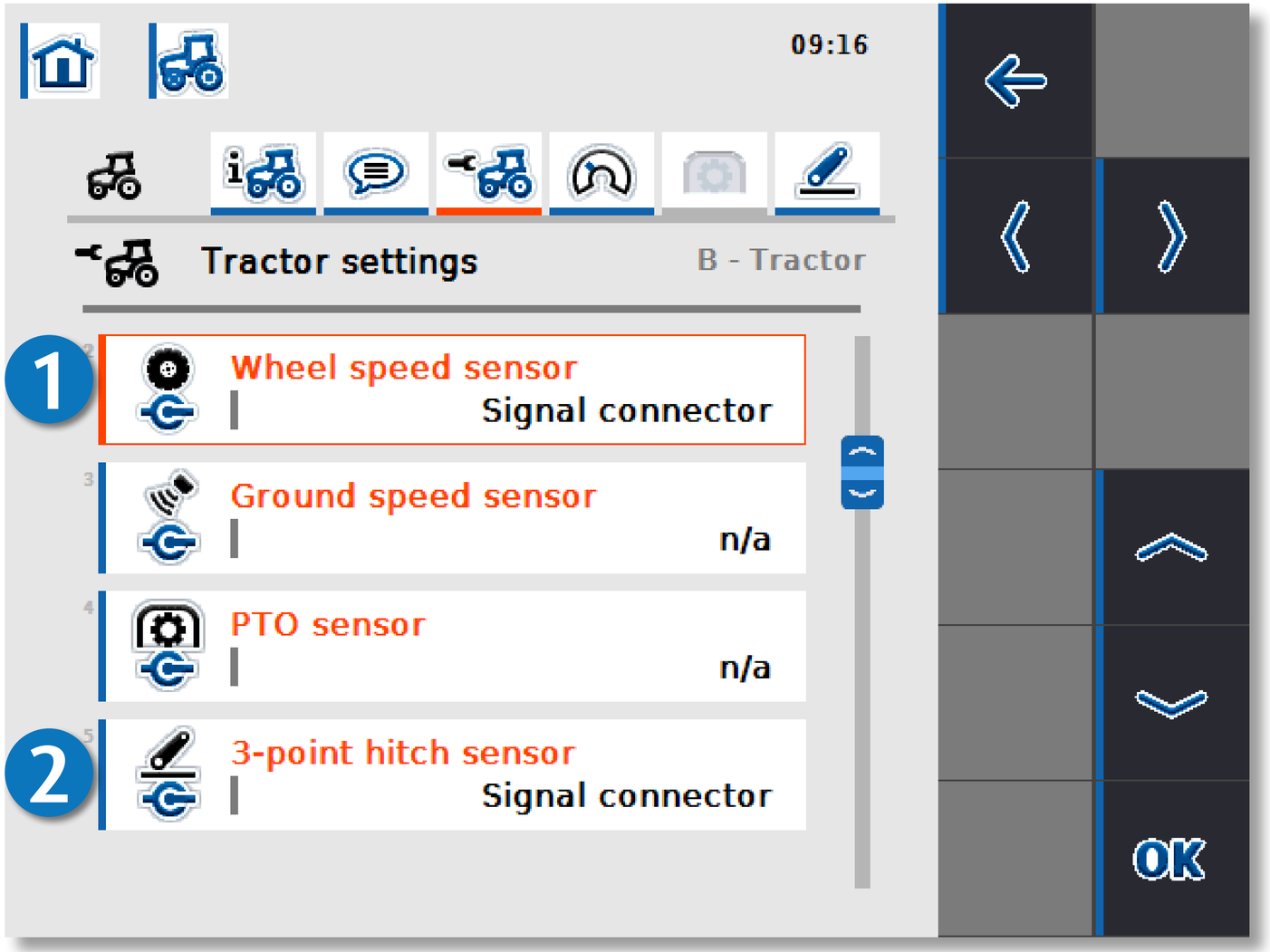


Swipe from bottom to top on the screen and call the main menu.

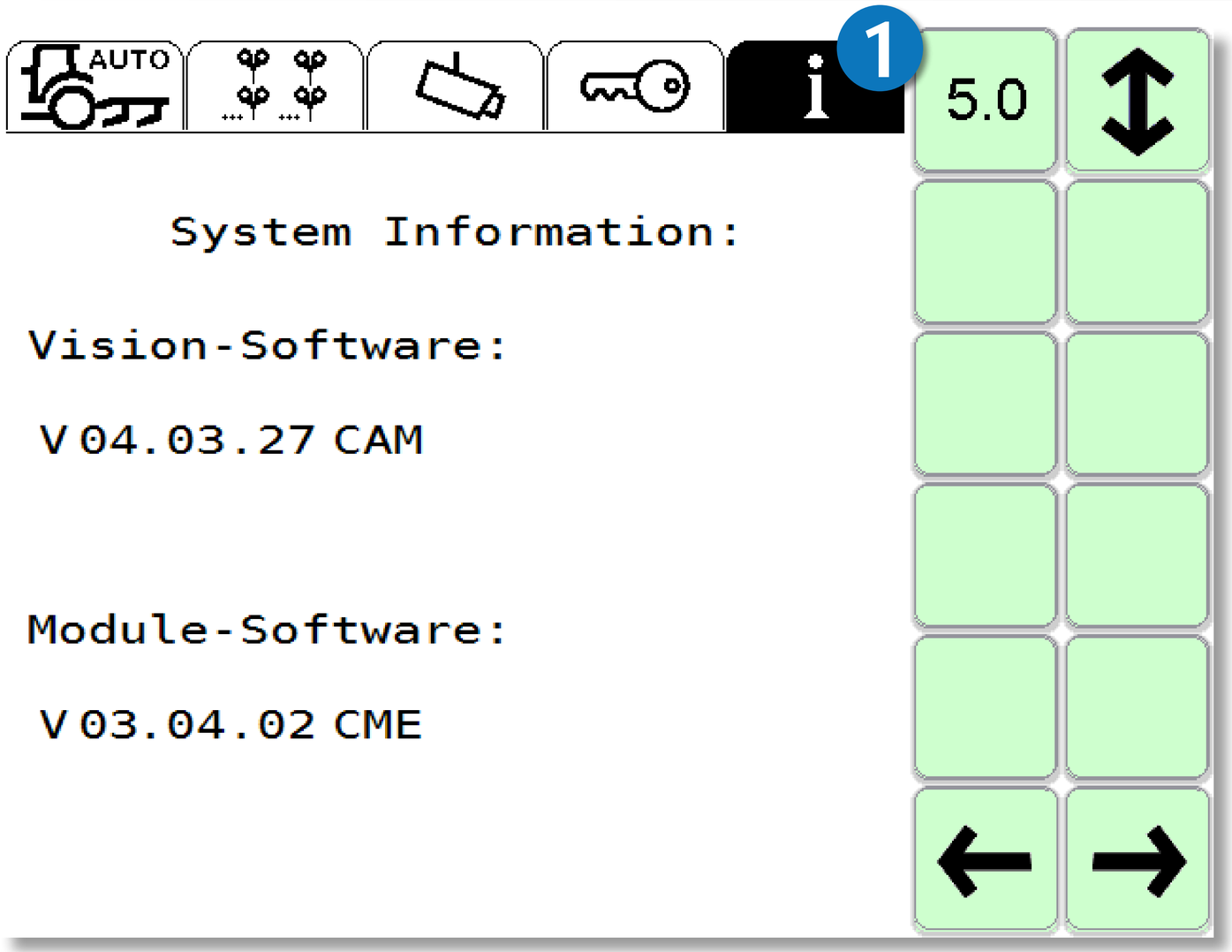
1. **Tractor-ECU:**
   Push the button in home screen, to get to the menu



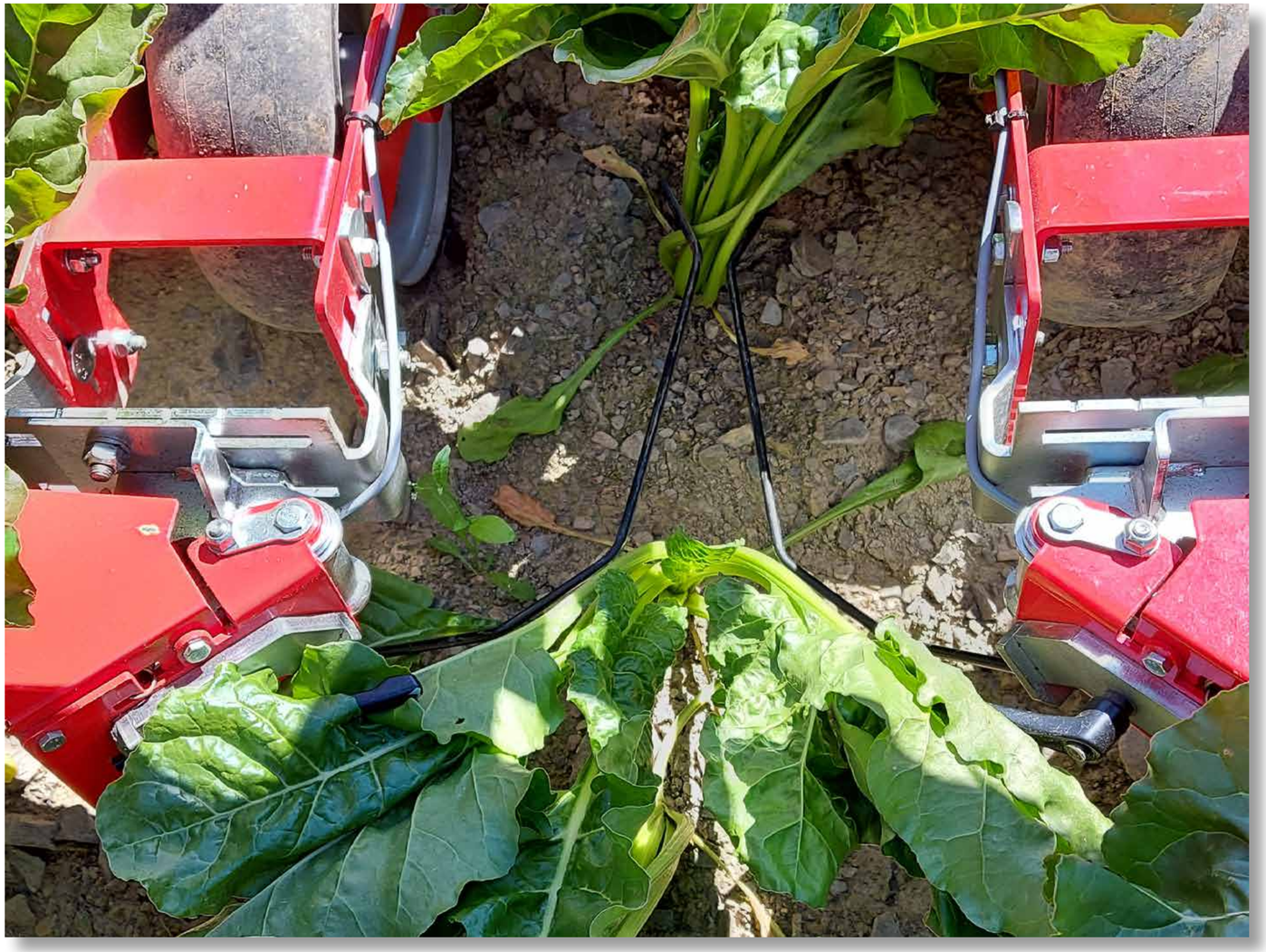
1. **Choose device:**
   A-hitched machine:
   Speed and upper link signal is coming from the machine (wheel sensor)
   B-Traktor:
   Speed and upper link signal is coming from the tractor (7-pole plug)
2. **Edit:**
   Edit the active tractor profile



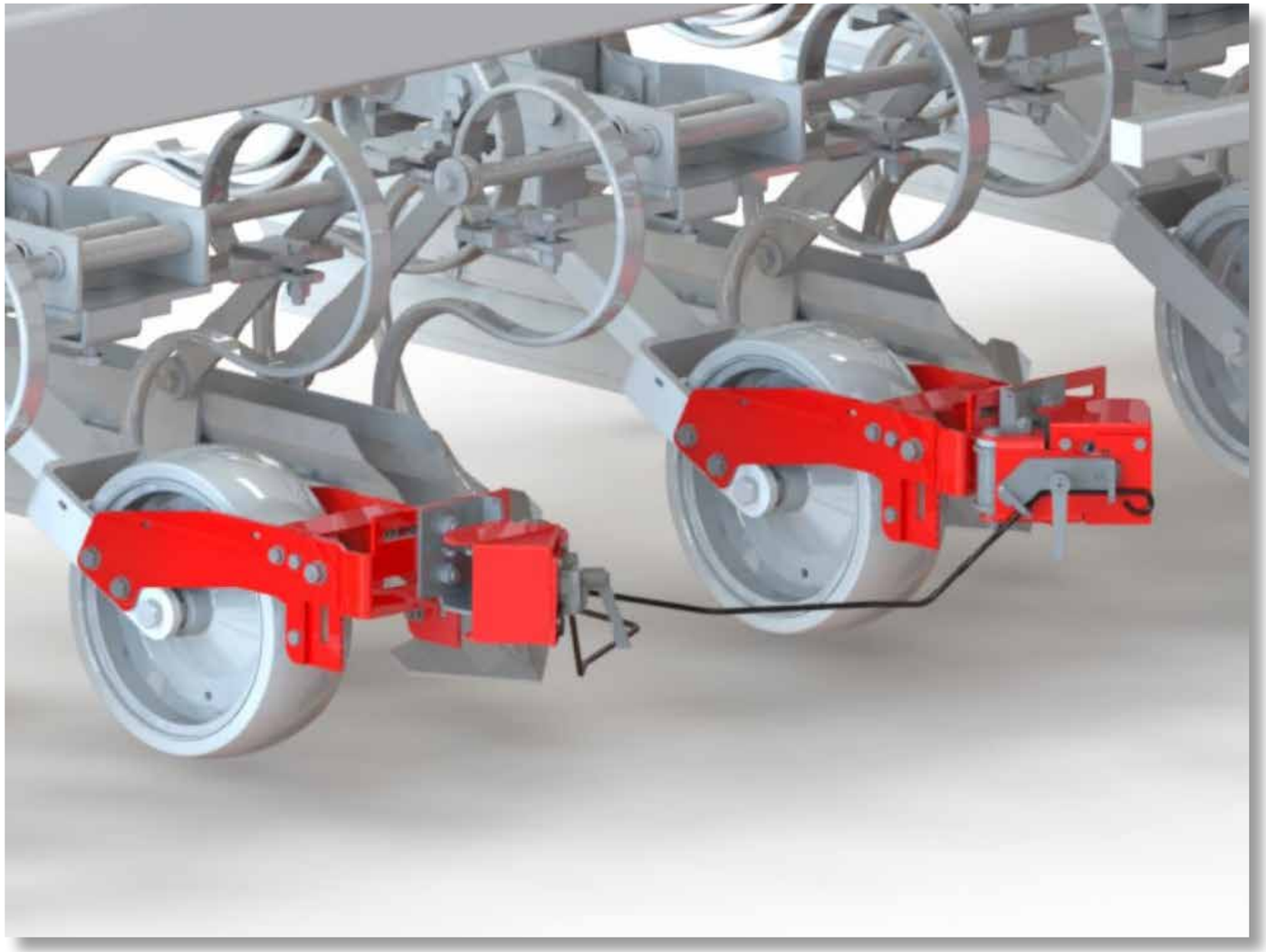
1. **Wheel sensor:**
   Choose signal plug
2. **Upper link sensor:**
   Choose signal plug



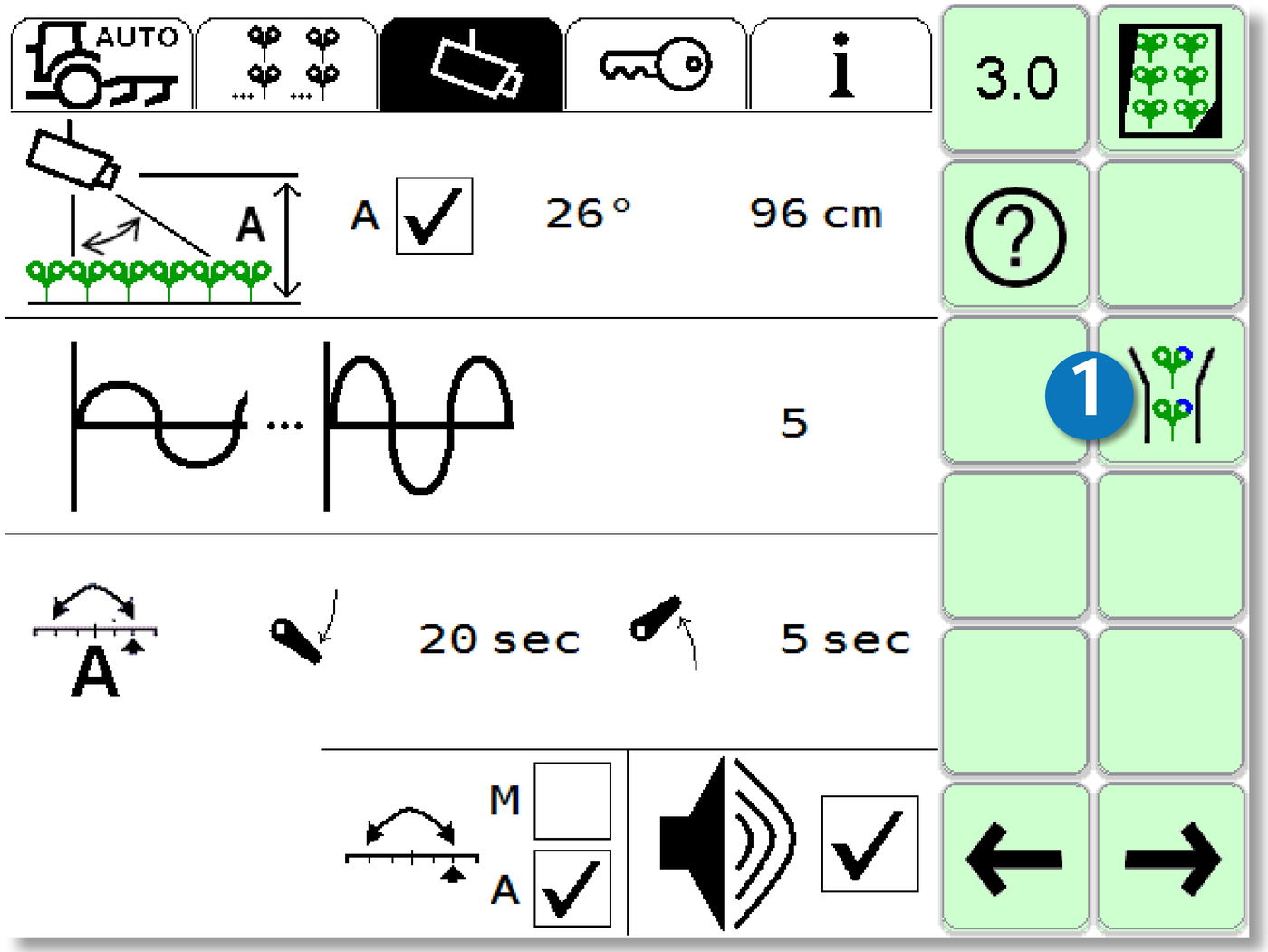
1. The software version is seen in the info menu



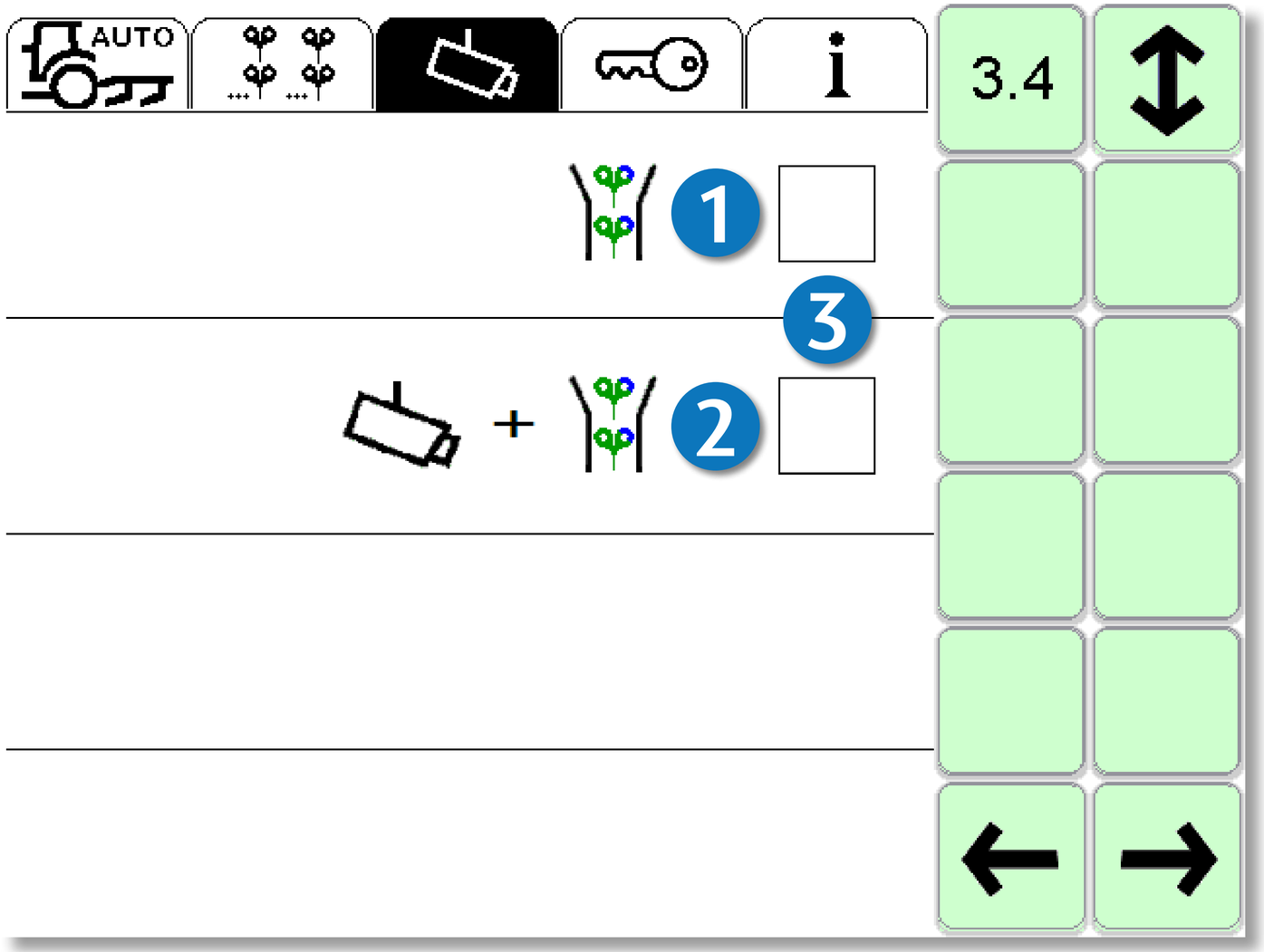
» **Adjust mechanical feeler:**
The feelers have to run just a few cm over the surface.



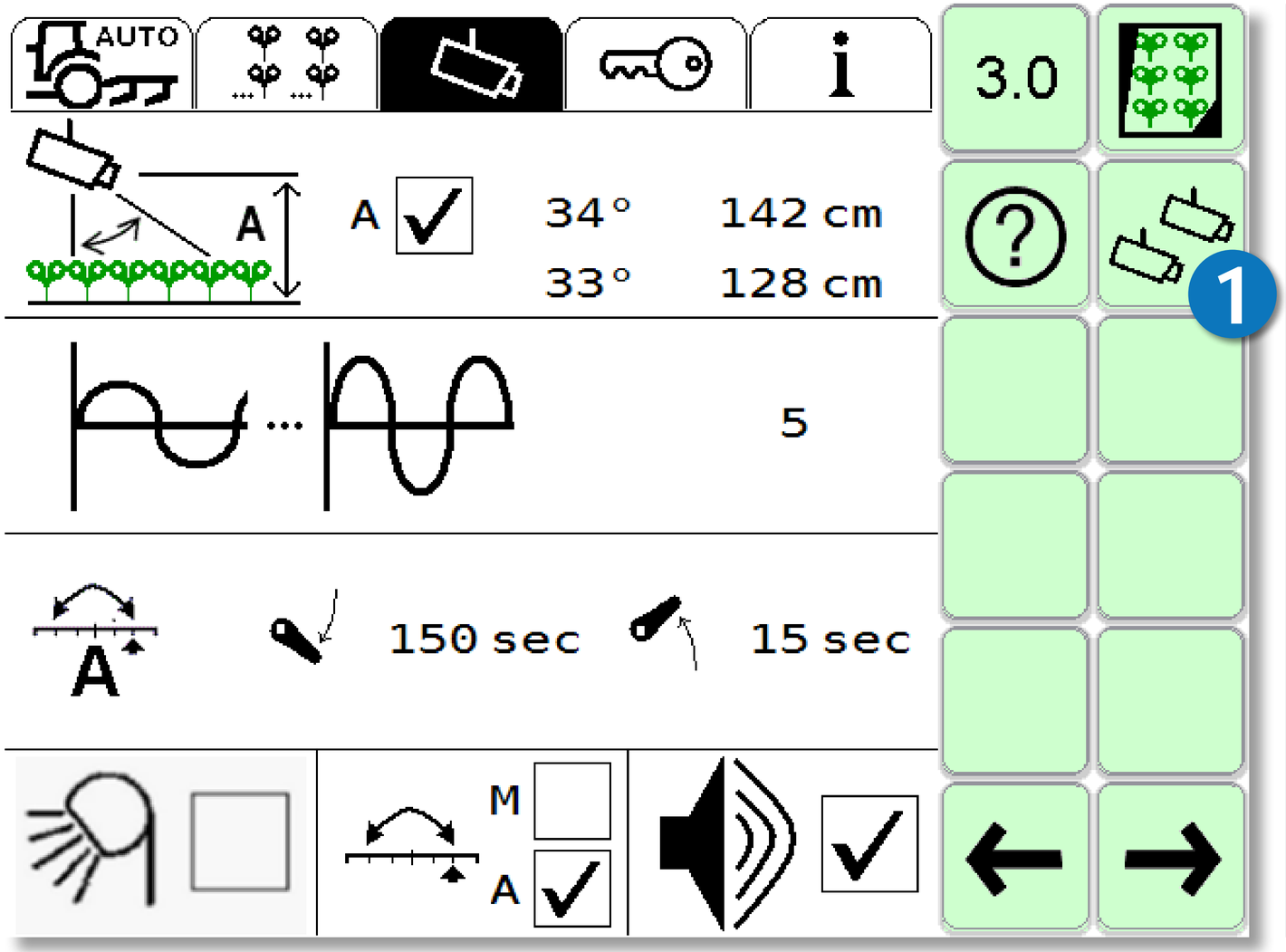
» **Activation of row-feeler:**
The row feeler has to be connected to the plug provided for this purpose (XMI, see chapter 1). Further activate the feeler on the terminal.



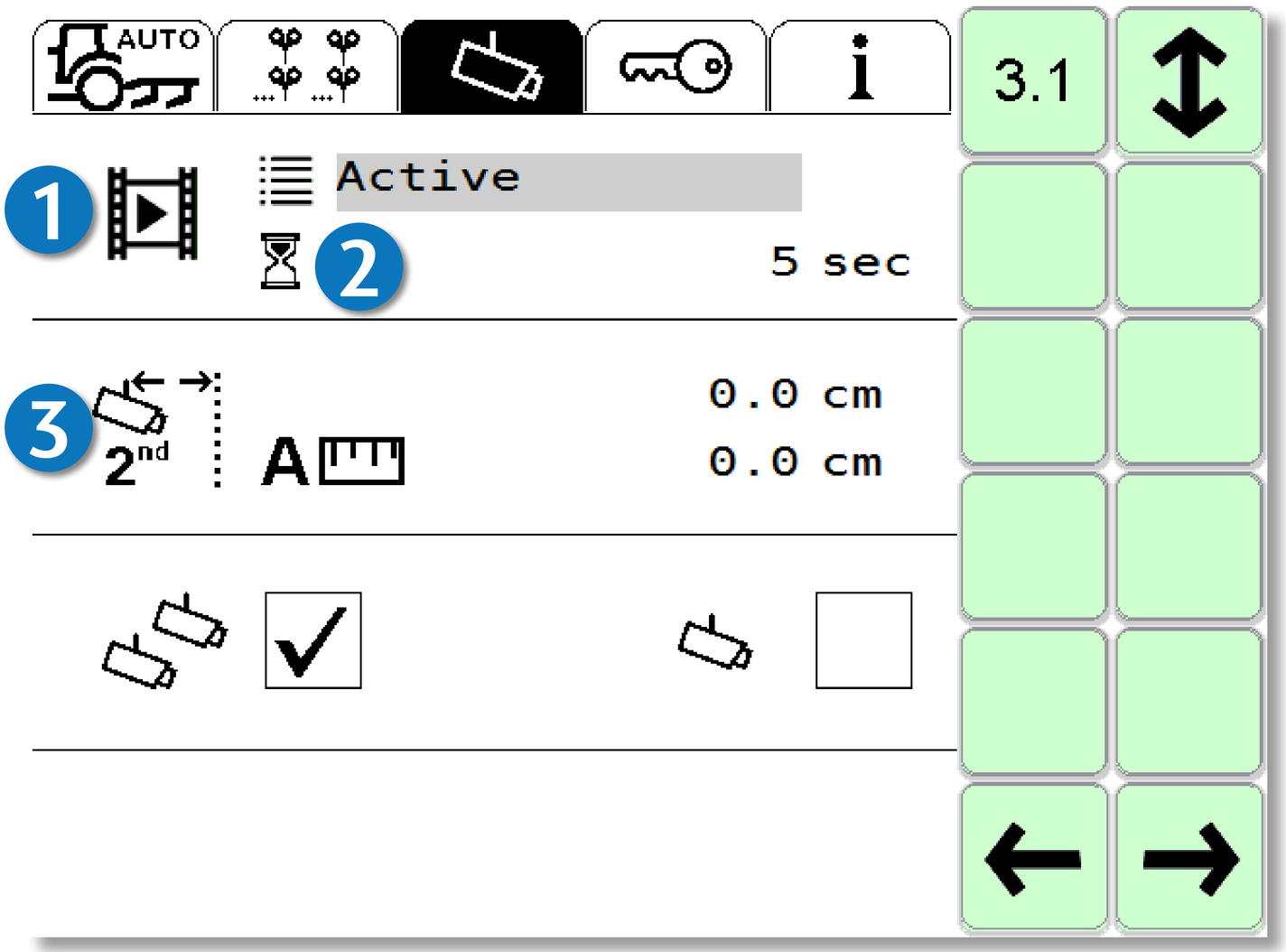
1. The row feeler can be activated/disactivated in the camera menu.



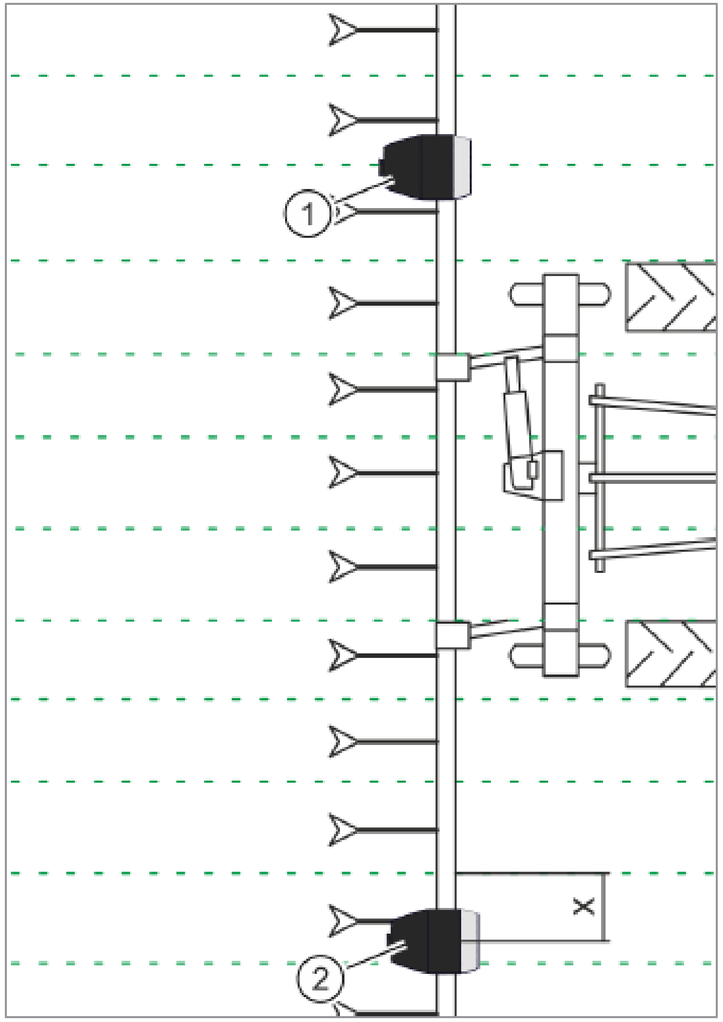
1. **Row feeler activated**
   The camera is disactivated – the hoe is guided only by the row feelers
2. **Camera and row feeler activated**
   Both systems are activated. If the row feeler is applied, its signal is prioritized to the camera signal.
3. If no case is selected, the **row feeler is disactivated**.



1. Settings second camera



1. **Activate video:**
   Choose between: Timer (Interval), Active (Camera video with the better signal) and User (manual).
2. **Interval:**
   Neccessary when Timer is choosen – the time until the video image changes.
3. **Mounting offset of the second camera:**
   Here the offset in comparison to the main camera is adjusted. (see next page)

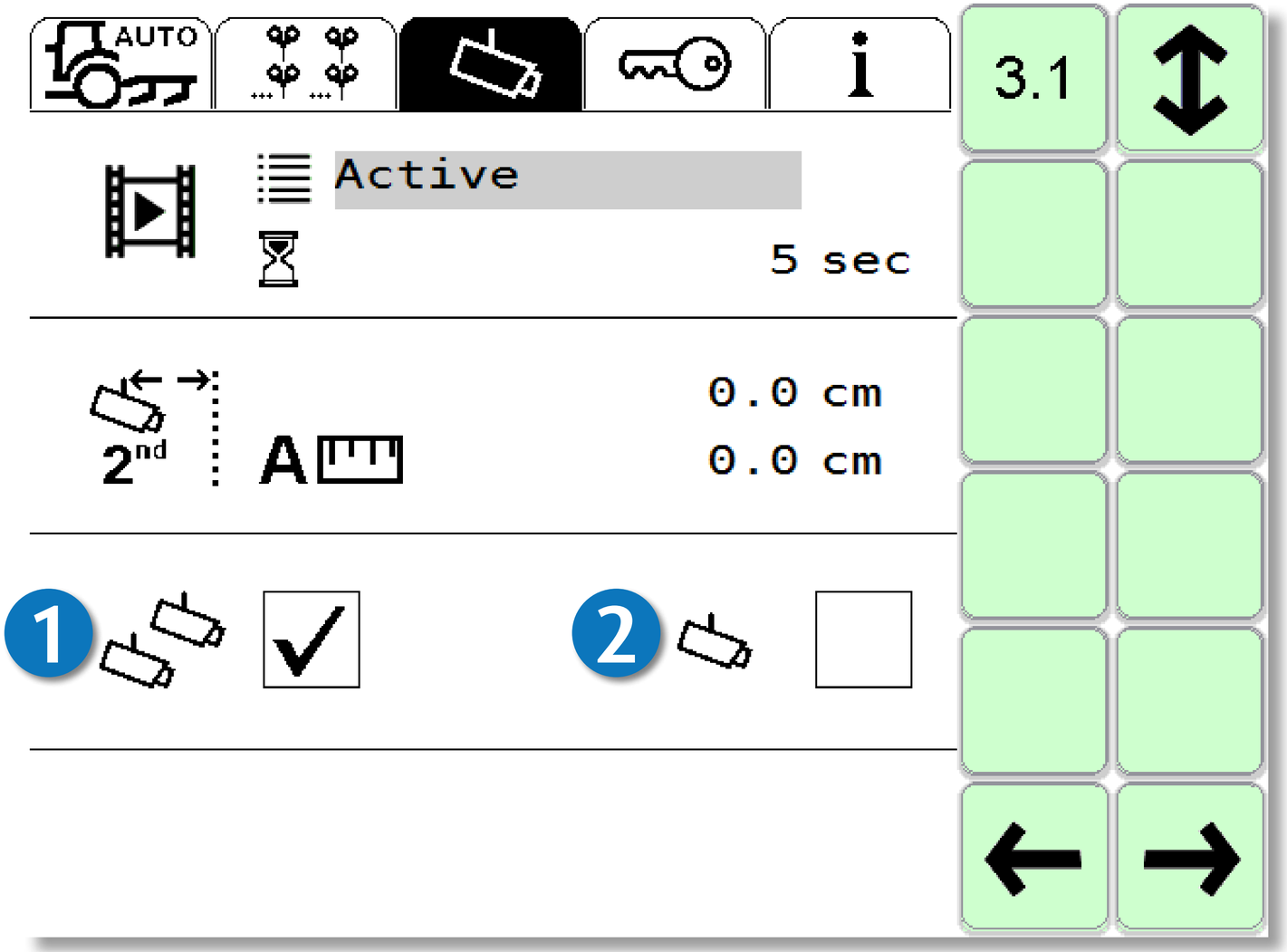


Offset mounting of the second camera:

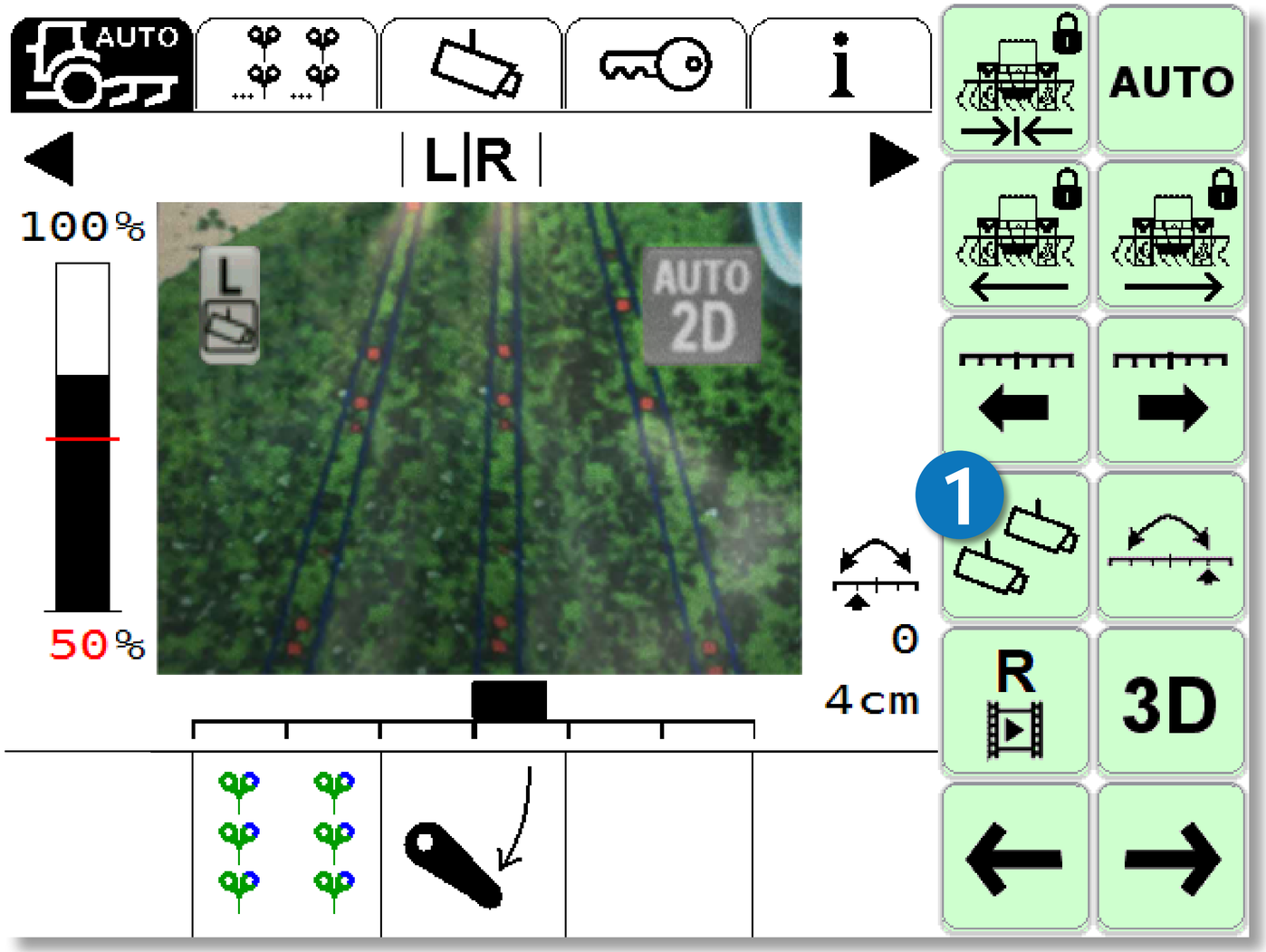
» Basically, the second camera must be positioned exactly like the first camera.

» If that is not possible, an offset must be entered.

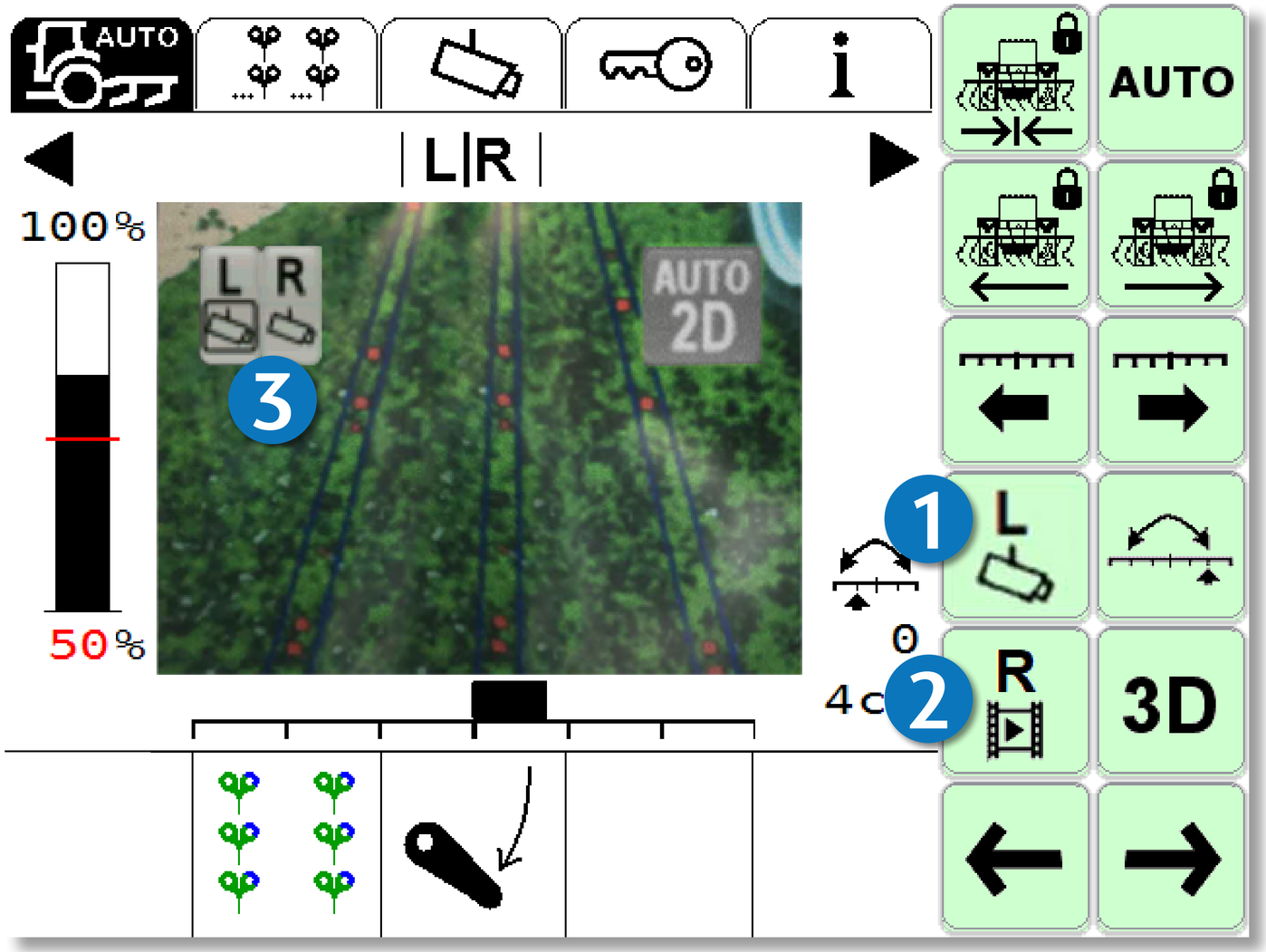
» Value X = offset of the second camera to the right side. (e.g. 14 cm)



1. **2-camera mode:**
   Choose 2-camera mode,
   active when starting the system
2. **1-camera-mode:**
   Choose 1-camera mode



1. **Switch to dual camera**



1. **Switch to left/right camera**
2. **Switch the video:**
   Switch between which video should be shown on the screen
3. Active video screen