CONTROL BOX
EasyControl

OPERATOR MANUAL



PLEASE READ CAREFULLY BEFORE COMMISSIONING!

Translation of the original operating manual

Version: 1.0 EN; item number: 00605-3-001053

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1 IDENTIFICATION OF THE IMPLEMENT

The control box can be clearly identified based on the serial number. The serial number can be found on the rear of the Control Box or in the main display menu under the image of the pneumatic seeder.

NOTE!
In cases of inquiries or warranty claims, please always tell us the serial number and software version of your control box.

1.1 INTENDED USE

The EasyControl Control Box may only be used to control a Pneumatic Seeder (PS 120-1600 incl. Fertiliser Editions), Multi-Metering System (MDG/MDC, MDP) or two Multi-Metering Systems (2x MDG, 2x MDC). Please also observe the operating manual for your Pneumatic Seeder / Multi-Metering System.

Do **not** use the EasyControl Control Box to control other implements.

2 SERVICE

Please contact our service address in the following cases:

- If you still have questions regarding the handling of this implement despite the information provided in this operating manual
- For questions regarding spare parts
- To order maintenance and servicing work

Service address:

APV - Technische Produkte GmbH
ZENTRALE
Dallein 62
A-3753 Hötzelsdorf
AUSTRIA

Telephone: +43 2913 8001-5500
Fax: +43 2913 8002
E-mail: service@apv.at
Web: www.apv.at

3 WARRANTY

Please check the control box/device for any transport damage immediately upon receipt. Later claims regarding transport damage can no longer be considered.
Based on the invoice, we grant a six-month factory warranty starting on the date of initial operation. This warranty is applicable for cases of material or construction faults and does not include parts that are damaged by normal or excessive wear.

The warranty expires

- if damage is caused by external forces (e.g. opening of the control box).
- if the prescribed requirements are not met.
- if the implement is modified, expanded or equipped with third-party spare parts without our permission.

4 SCOPE OF DELIVERY

4.1 SCOPE OF DELIVERY AND ATTACHMENT



1	EasyControl Control Box incl. RAM-C ball head
2	Power supply cable (permanenty installed)

Adjust the Control Box with its RAM C retention arm so that you can read the display optimally.

Figure 1

CAUTION!
If possible, do not roll up the cable into a coil!

4.2 ELECTRICAL CONNECTION



Connect the installed cable from the Control Box directly to the 3-pin standard socket on the tractor.

The fuse (30A) is located approx. 20 cm after the 3-pin plug of the cable.

Stow the excess cable in the driver's cab to avoid pinching.

The connection diagram can be found in the operating manual for your seeder / Multi-Metering System.

Figure 2

CAUTION!
The 12 volt power supply must NOT be connected to the socket for the cigarette lighter!

After use of the implement and for road transport, the control box must be disconnected again (for various safety-related reasons).

CAUTION!
If these instructions are not observed, damage may be caused to the control box!

If your tractor does not have a standard socket, it can be retrofitted with a cable set (see chapter 11 Accessories).

CAUTION!
If your battery is charged by a charger that is in "Start" operating mode, there can be voltage peaks! These can cause damage to the electrical system of the control box if it is also connected when the battery is being charged!



1	**7-pin plug (signal socket)** • Speed signal • Linkage signal
2	**3-pin plug** • Connection to the 3-pin socket (power cable) • Cable including 30 A fuse
3	**21-pin plug** • Connection to the seed drill (implement cable)

Figure 3

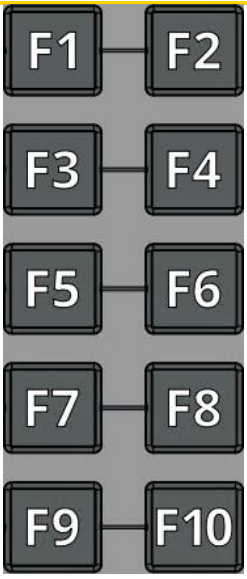
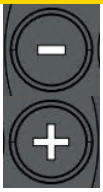
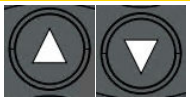
The different types of sensors are explained in more detail in chapter 6.3.4. They are available as accessories upon customer request (see chapter 11 Accessories).

4.3 CONTROL BOX



1	Graphic display

Figure 4

Button	Designation	Function
	On/Off button	Switches the implement on and off. Press and hold the button until the graphic appears on the display.
	Function buttons	Controls the respective function on the terminal. A more detailed description can be found under Point 6.
	Plus/minus buttons	To change parameters (spread rate, speed, working width, etc.) and to navigate in the menu or the keyboard.
	Arrow buttons Up arrow button (▲) Down arrow button (▼)	Navigates through the menu points.
	OK button	Confirms the selection.

5 INITIAL OPERATION

5.1 GENERAL INFORMATION ON THE CONTROL BOX

5.1.1 STATUS BAR

The status bar is located in the upper area of the display, which is shown in every menu:



Figure 5

Description of the display elements

1 On the left in the status bar, the current menu is shown. In this case, it is the Work menu.

2 In the middle of the status bar, there is the APV logo. In case of errors, the logo is replaced by the corresponding error or warning message.

3 On the right side of the status bar, there is the symbol for the current working position or the current position of the mounted implement.



The mounted implement is in working position.



The mounted implement is not in working position.

Section 6.3.4 describes how the position or the utilised signal of the working position is changed.

5.1.2 STOP BUTTON

The STOP button can be found in every menu. This button executes a general STOP of all motors.

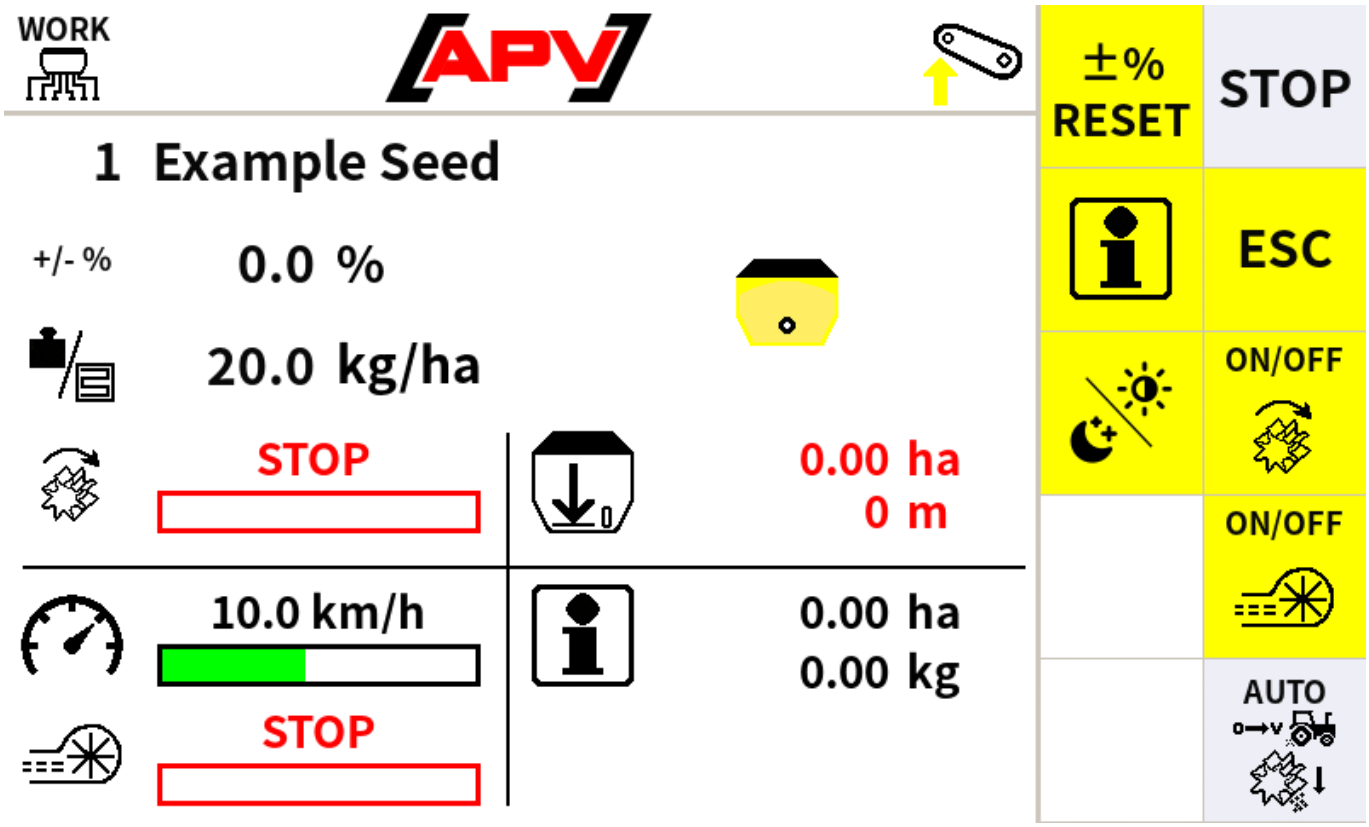


Figure 6

Description of the button functions



Grey: no actuators are switched on.



Red: motors are switched on and can be stopped with this button.

5.2 BASIC SETTINGS MENU

For initial operation or when pressing and holding the Set button in the Start menu for five seconds (see also Point 6.1), the basic settings for the utilised seeder must be entered (e.g. settings for the implement and fan type, seeding shaft motor, language, units, etc.).

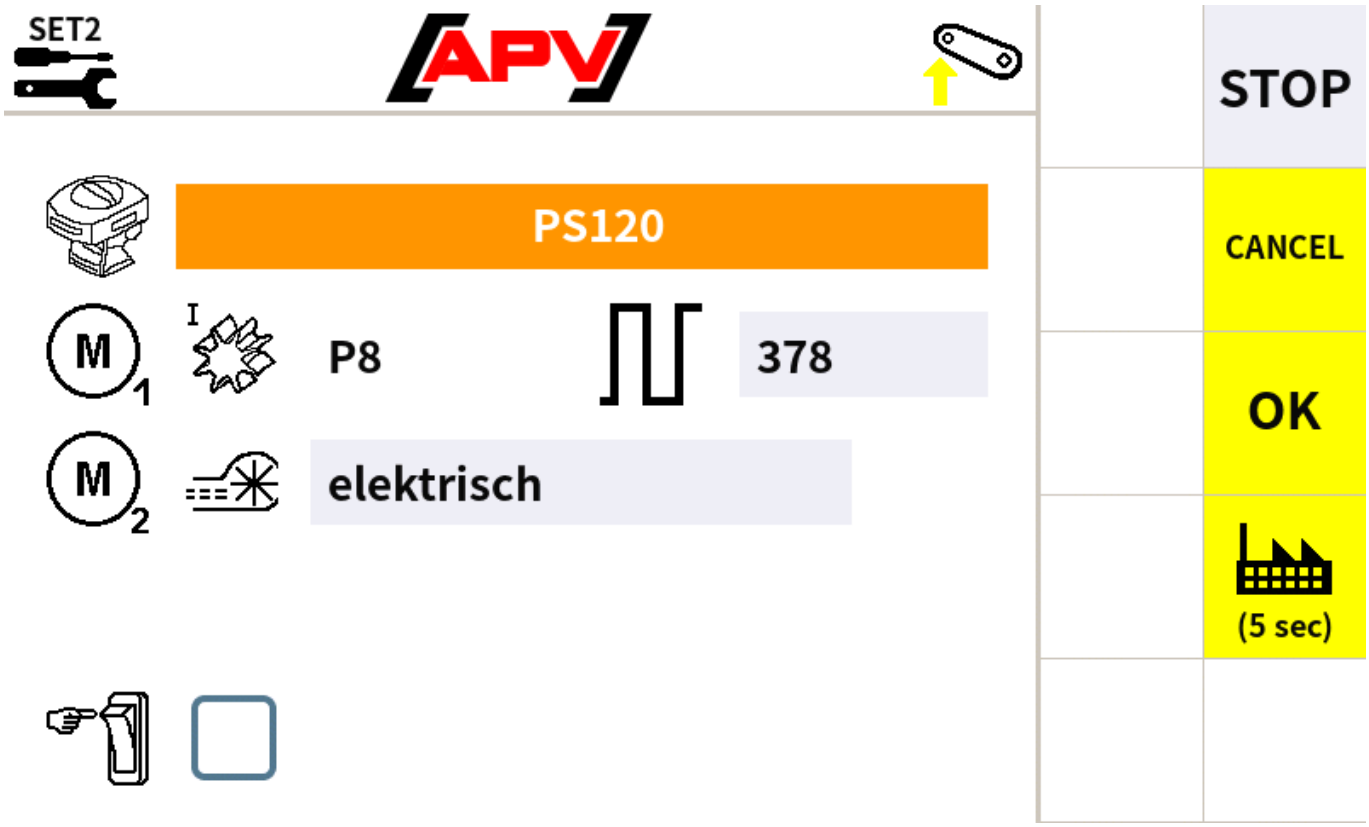


Figure 7

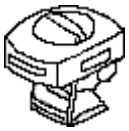
Description of the button functions

CANCEL — The Basic settings menu is exited without saving the modified settings.

OK — The Basic settings menu is exited and the modified settings are saved. When the settings have been changed, the Control Box will be restarted.

(5 sec) — By pressing and holding this button for 5 seconds, a factory reset is performed, i.e. all of the settings are reset and the Basic settings menu is called up again. The corresponding implement must then be set there again.

Description of the display elements



Selection of the implement type. The following selections are available:
PS120, PS200, PS300, PS500, PS800, PS1600, MDP, MDG, MDC, 2xMDG and 2xMDC. Check the sequence.
If "2x" is written in front of an implement designation, two implements are controlled.
Note: When the correct implement is selected, nothing may be changed in the settings for the "Seeding shaft motor", "Number of pulses per revolution", "Fan" and "Fan speed sensor".



Seeding shaft motor and its number of pulses per revolution. For implement types with two seeding shaft motors, a second motor is displayed. These cannot be changed.

Note: when selecting the implement type and the seeding shaft motor, the default values are automatically displayed.
The following default values are stored:

- P8 motor (installed in PS120 – PS500, MDx): 378
- P17 motor (installed in PS800 – PS1600): 1024

CAUTION!
The default values (pulses per revolution) for the motors may not be changed!



Selection of the existing PS fan. The following selections are available: electric fan, electric fan PLUS, hydraulic/external fan or no fan (OFF).



When using a hydraulic fan, you must select whether a sensor is installed on the PS for fan monitoring (speed sensor).



Setting whether a calibration button is installed on the implement (available as an accessory).

TIP!
Depending on the selected settings, not all of the points will be requested. The settings can be changed retroactively, as described under Point 5.2.

NOTE!
When opening the Basic settings menu, all actuators are switched off.

6 MENU STRUCTURE

6.1 START MENU

This screen appears after the control box has started up. From here, the different menus can be called up.

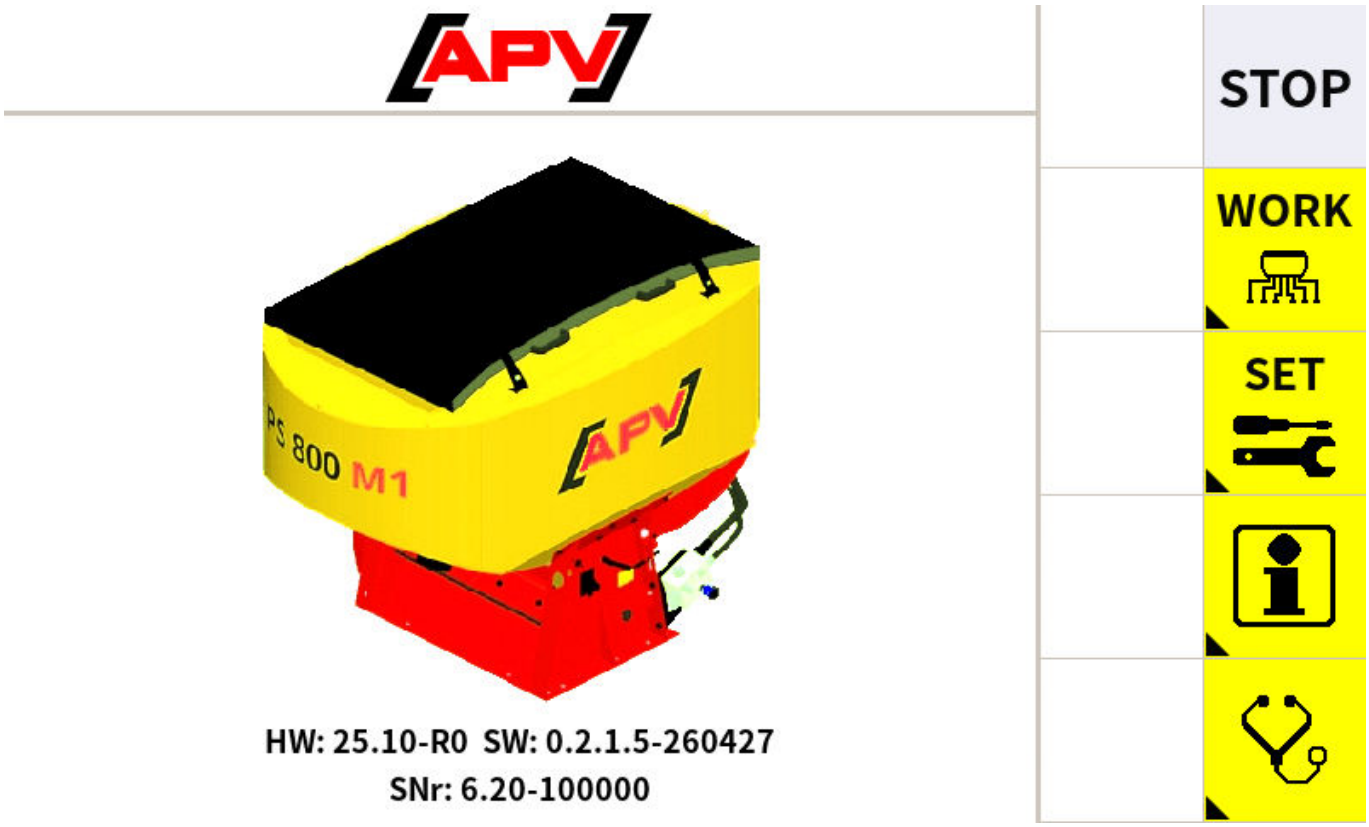


Figure 8

Description of the button functions:



In the Work menu, all of the important information for field operation is displayed. Here, the motors can be switched on or off and information such as the forward speed, working position, and seeding shaft speed is displayed. The Work menu is described in more detail under Point 6.2.



The implement settings are entered in the Set menu. Here, a calibration test is performed, the seed is selected or the forward speed is calibrated. The Set menu is described in more detail under Point 6.3.

If the button is pressed and held for 5 seconds, the Basic settings menu is called up. Here, basic settings can be entered (e.g. motor type or fan type). The Basic settings menu is described in more detail under Point 5.2.



In the Info menu, the area and hour counters are displayed. The Info menu is described in more detail under Point 6.4.

In the Diagnostic menu, the switching states of the sensors, the supply voltage and the power consumption of the motors are shown. The Diagnostic menu is described in more detail under Point 6.5.

6.2 WORK MENU

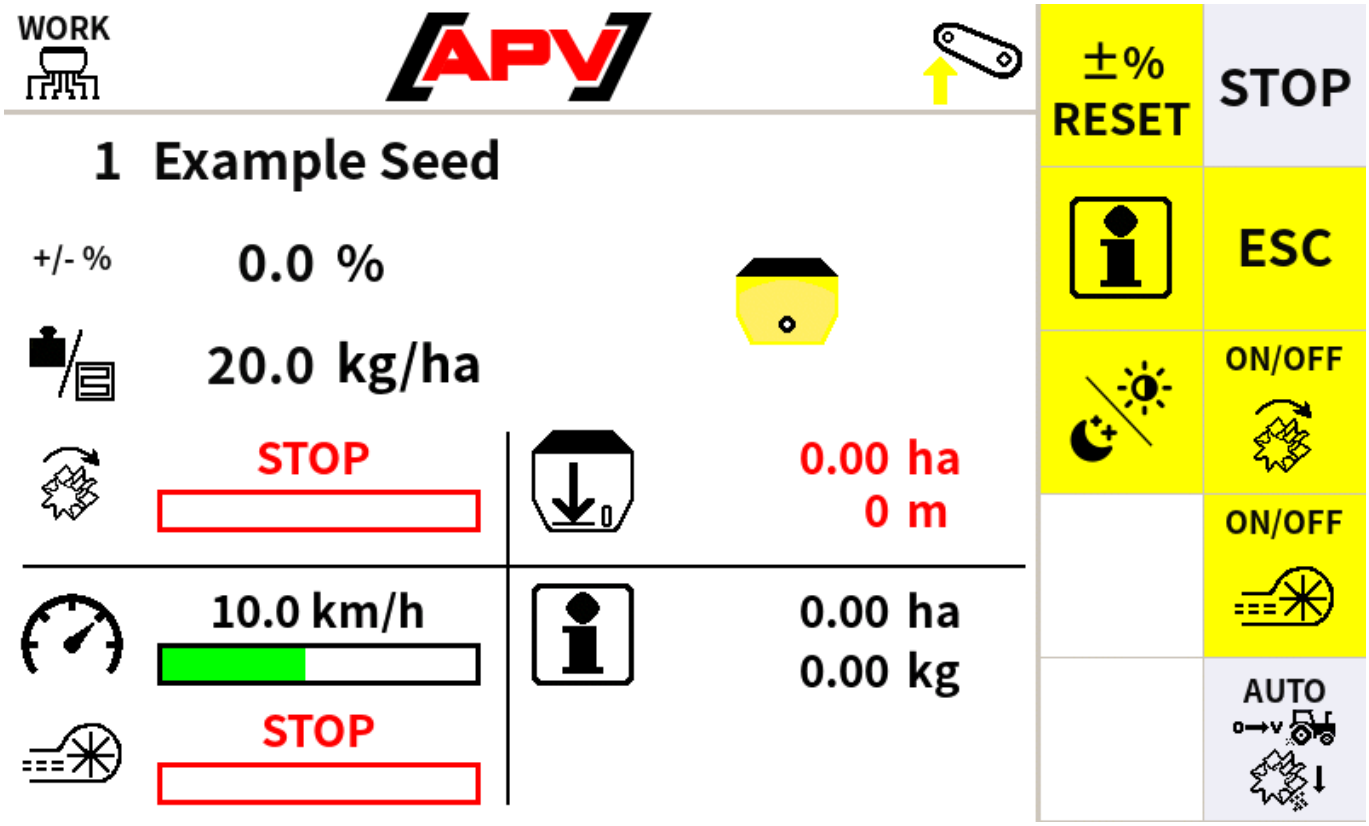


Figure 9

Description of the button functions



With the +% button, the spread rate can be increased during operation in 5% increments, up to a maximum of 95%.



With the -% button, the spread rate can be reduced during operation in 5% increments, down to a minimum of 95%.



With the ESC button, you go back one menu level, in this case, to the Start menu.



With the Info button, the Seed info menu for the currently selected seed is shown. The Seed info menu is described in more detail under Point 6.3.1.2.





With this button, the seeding shaft can be switched on or off.
If an electric fan is installed, it will start running automatically. Only then does the seeding shaft start rotating.

When the seeding shaft is activated, it is coloured green.





With this button, the electric fan can be switched on or off. If an electric fan is not installed, this button is hidden.

When the fan is activated, it is coloured green.



With this button, the pre-metering can be started.
Press and hold the button and the seeding shaft will rotate at the forward speed set in the pre-metering menu. When the button is released, the current forward speed is used again to regulate the seeding shaft.
This allows you to avoid gaps in the seeded area at the beginning of the field or when standing still on the field.



With the +/- %RESET button, the spread rate can be set back to the value determined during the calibration test.



This button is used to switch between day and night mode. The settings for this point can be made in Point 6.3.8.

If the implement type 2xMDC or 2xMDG is selected in the basic settings (see Point 5.2), an extended Work menu is available. It is described under Point 7.

Description of the display elements



Display of the currently selected seed, including the number in the seed library.



Display of the currently set change to the spread rate.

NOTE!
The spread rate can be both increased and reduced by 95%. Due to the non-linearity between an increase in the speed and the spread rate, it can no longer be guaranteed that the spread rates will be correct afterwards.
<u>Recommendation:</u> Change the spread rate by a maximum of approx. 50%, if the spread rate should be precisely maintained.
Different spread rates for the same seed type can be saved in the seed library.



Yellow-brown: according to the fill level sensor, the hopper is full.



Red: according to the fill level sensor, the hopper is empty.
Settings for the fill level sensor are described under Point 6.3.2.



Display of the currently set spread rate.

NOTE: a valid calibration test must have been performed beforehand to be able to display a value.



Display of the current seeding shaft speed in %.
If the seeding shaft is switched off, STOP is displayed and the frame is coloured red. If the required seeding shaft speed cannot be reached, the bar is coloured yellow and an alarm is issued (see Point 7 for error messages).
If the seeding shaft is blocked (implement is lifted or forward speed is 0), the frame is coloured orange.



Display of the calculated still possible remaining area/remaining distance.
For the calculation, the fill quantity of the hopper must be entered in the Set menu (see Point 6.3.2).



Display of the current forward speed.
The black mark shows the forward speed set during the calibration test. If the forward speed becomes too high or too low, so that the required speed for the seeding shaft can no longer be maintained, the bar is coloured red and an alarm is issued (see Point 7 for controller messages).



Display of the seeded area and the spread quantity for each seed type.



Display of the current fan speed.
The black mark shows the set speed.
When using an electric fan, the speed is displayed in %. When using a hydraulic fan, the speed is displayed in rpm.
If the set speed limits are exceeded or undercut, the bar turns red and an alarm is issued (see Point 7 for controller messages).
Detailed information for setting the fan speed or the speed limits is provided under Point 6.3.7.

6.3 SET MENU

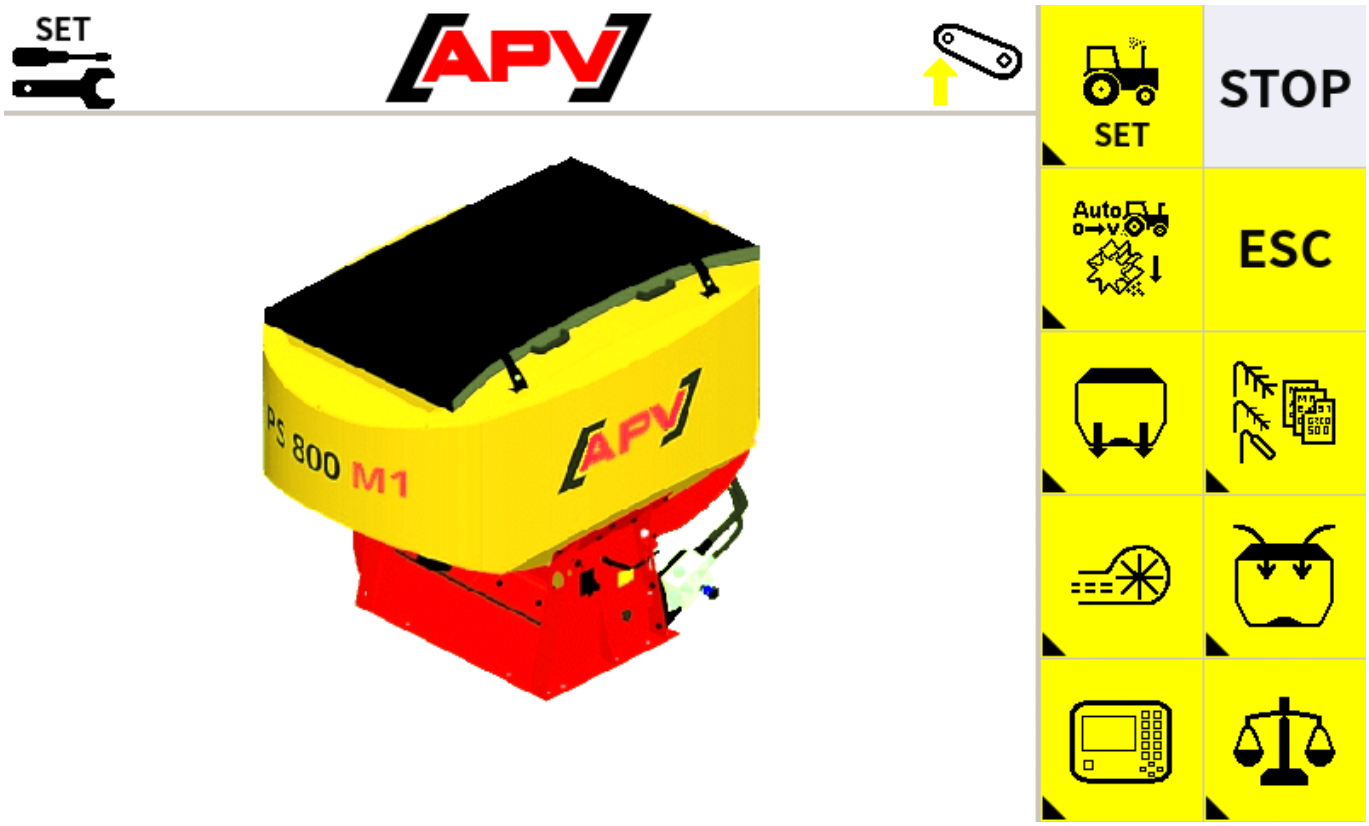


Figure 10

Description of the button functions

Pre-metering menu: here, in addition to setting the pre-metering speed, you can also set whether and for how long automatic pre-metering should be performed. The Pre-metering menu is described in more detail under Point 6.3.5.

With the ESC button, you go back one menu level, in this case, to the Start menu.

Empty hopper menu: here, the hopper(s) can be emptied.
The Empty hopper menu is described in more detail under Point 0.

Seed library: here, a seed type already saved can be selected or a new seed type can be created.
The seed library is described in more detail under Point 6.3.1.

Fan menu: here the rotational speed of the electric fan can be set. When using a hydraulic fan with speed sensor, the alarm limits can be set here.
The Fan menu is described in more detail under Point 6.3.7.



Fill menu: the fill quantity can be entered here. This can be used to calculated the possible remaining distance/area for display in the Work menu.
The Filling menu is described in more detail under Point 6.3.2.



Calibration menu: in the Calibration menu, in addition to the desired spread rate, the forward speed, the working width, the utilised seeding shaft and the desired calibration time are set. Afterwards, the correct seeding shaft speed is determined. The calibration test is always performed for the currently set seed type.
The Calibration menu is described in more detail under Point 6.3.3.



Tractor settings menu: here, the source for the forward speed and the working position can be selected and calibrated. Moreover, a signal when changing the working position can be selected and deselected.
The Tractor settings menu is described in more detail under Point 6.3.4.



Terminal menu: here, the language, the units (metric / imperial) and the brightness in day or night mode can be set. The Terminal menu is described in more detail under Point 6.3.8.

6.3.1 SEED LIBRARY

In this menu, all of the saved seed types are listed. Seed types can be created and saved by means of a calibration test (see Point 0).

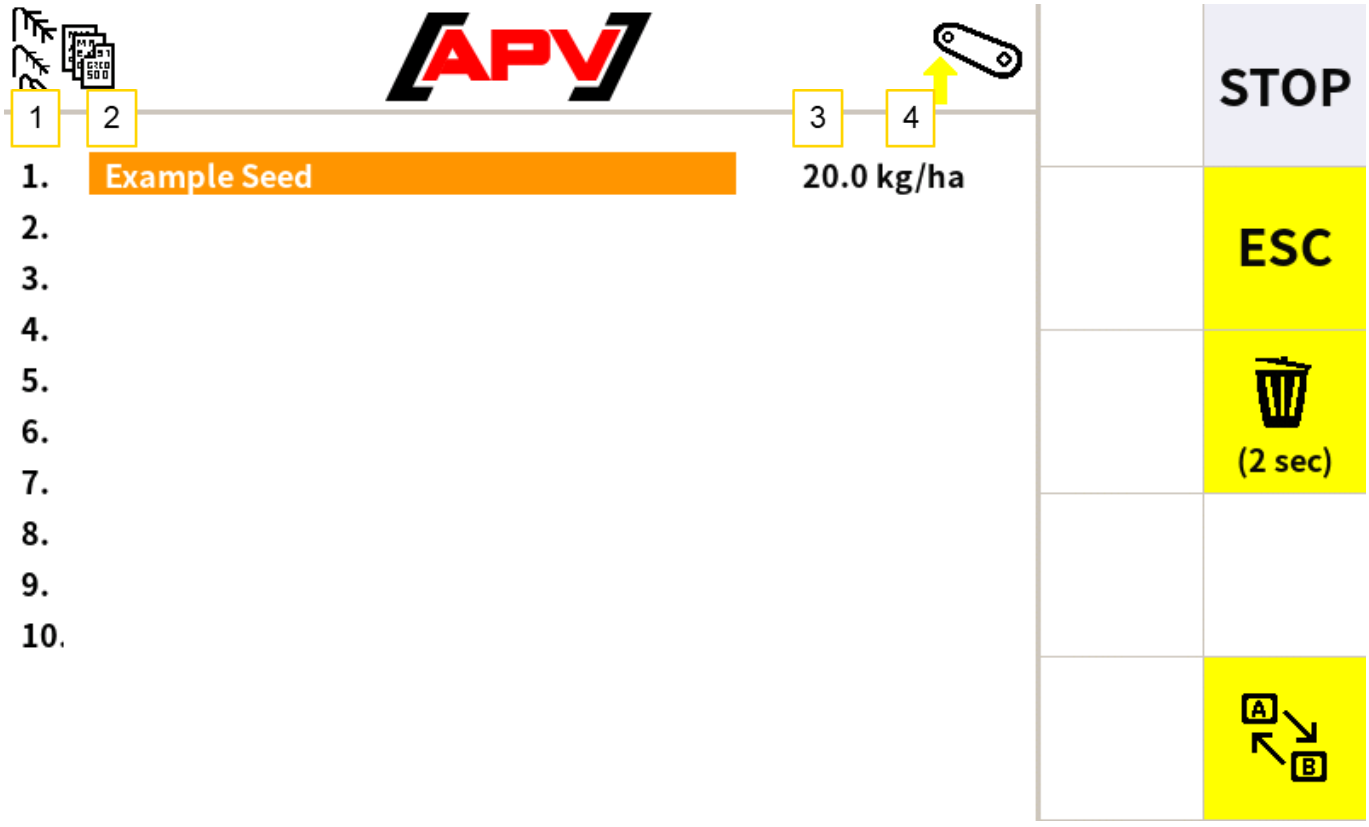
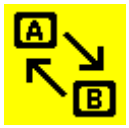


Figure 11

Description of the button functions



With the ESC button, you go back one menu level. In this case, to the Set menu.



This button is used to change to the second page of the seed library.

Description of the display elements

1	Memory location
2	Seed name
3	Spread rate
4	Unit (kg/ha, grains/m^2, l/ha)

6.3.1.1 SEED MENU

In this menu, all set parameters that were saved at last use of the seed type are displayed.

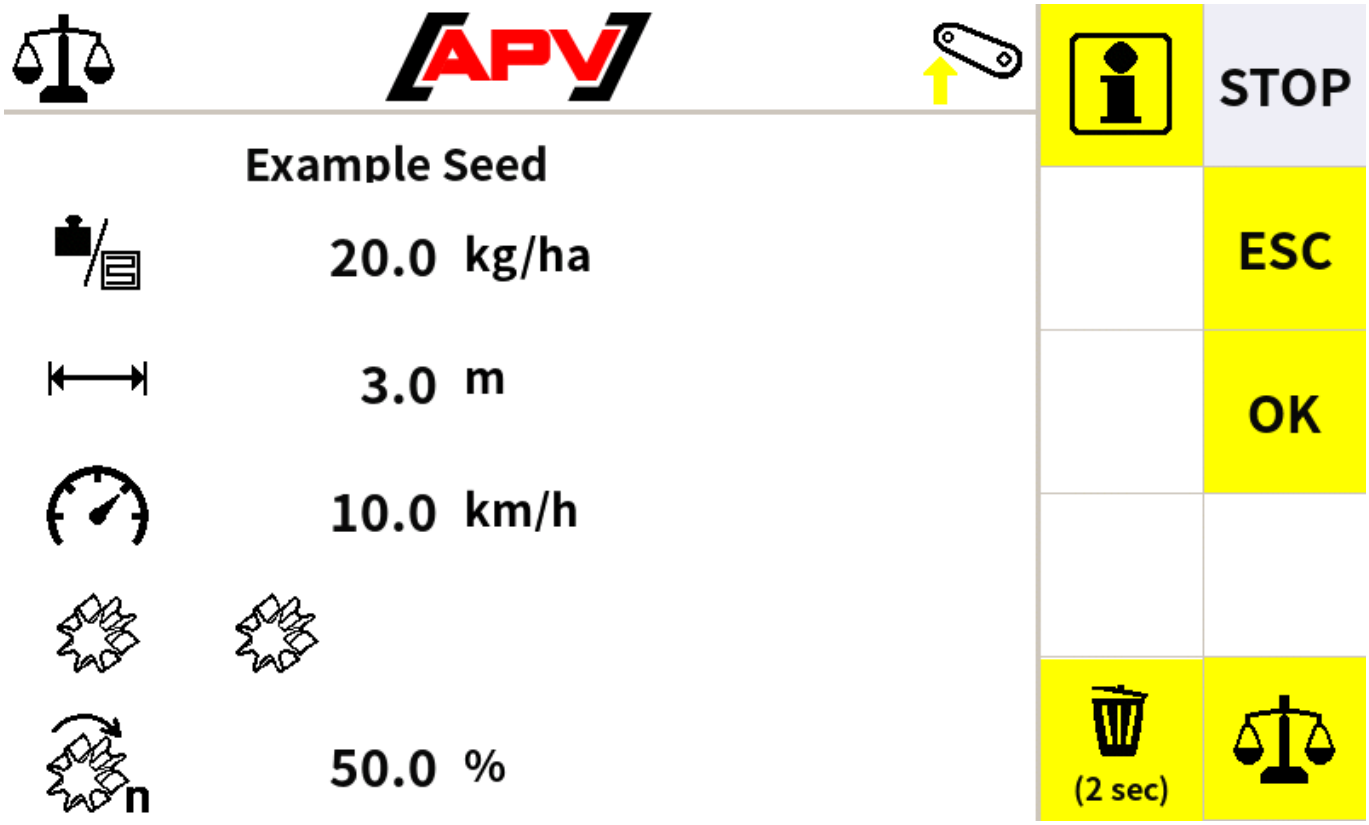


Figure 12

Description of the button functions



This button takes you to the Seed info menu. There, the seeded area, hours, spread quantity, and area output is displayed.
The Seed info menu is described in more detail under Point 6.3.1.2.



With the ESC button, you go back one menu level, in this case, to the seed library.



With the OK button, the seed type is applied and you go to the Work menu.
The Work menu is described in more detail under Point 6.2.



By pressing and holding this button for two seconds, the seed type is deleted and you switch to the seed library.
The seed library is described in more detail under Point 6.3.1.

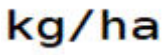


With this button you go to the Calibration menu. There, the parameters can be changed and a new calibration test can be performed.
The Calibration menu is described in more detail under Point 6.3.3.

Description of the display elements



Display of the number and the seed name.



Display of the spread rate in kg/ha or grains/m².



Display of the working width of the implement.



Display of the working speed.



Display of the utilised seeding shaft.



Display of the calculated seeding shaft speed in %.

6.3.1.2 SEED INFO MENU

This menu shows seed type-specific trip counters and total counters.

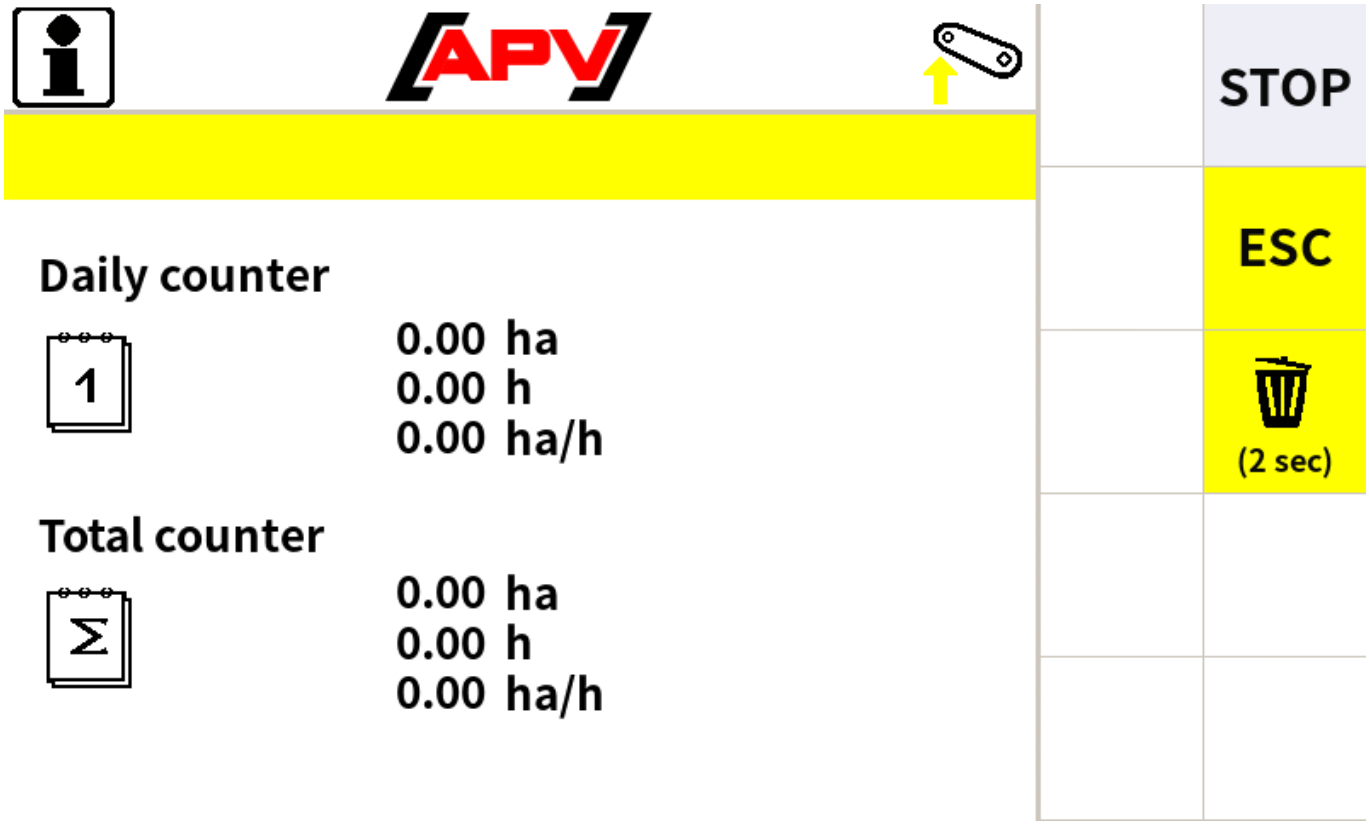


Figure 13

Description of the button functions

ESC — With the ESC button, you go back one menu level, in this case, to the Seed menu.

(2 sec) — With the Delete button, the trip counter is reset to 0.

Description of the display elements

Tageszähler
1 0.00 ha
0.00 h
0.00 ha/h

Display of the trip counter.
The trip counter can be reset by pressing and holding the Delete button (for 2 seconds).

Summenzähler
Σ 0.00 ha
0.00 h
0.00 ha/h

Display of the total counter.
The total counter can only be set to 0 by deleting the seed type.

6.3.2 FILL MENU

Here, the current hopper fill level can be entered. This forms the basis for the calculated possible remaining distance/quantity that is displayed in the Work menu (see Point 6.2).

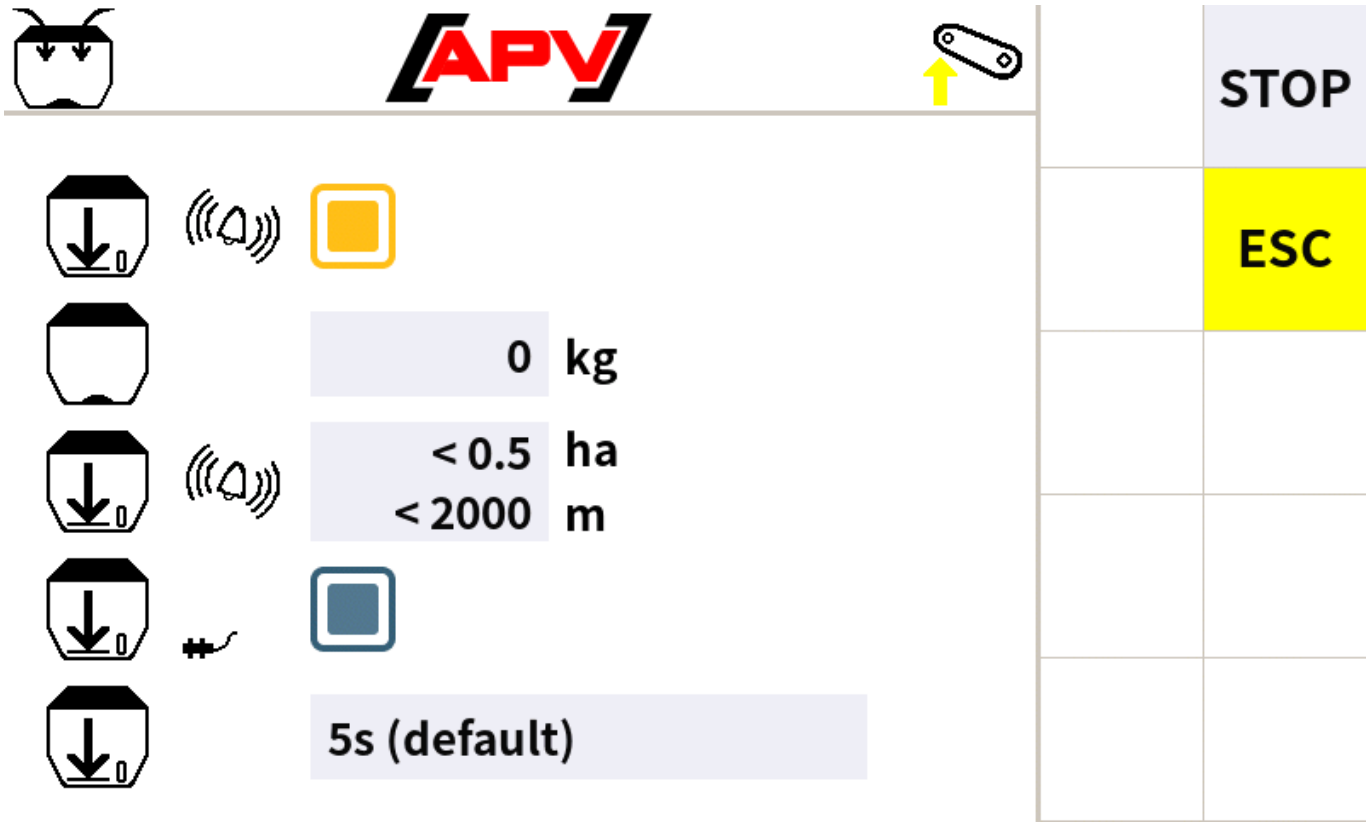


Figure 14

Description of the button functions

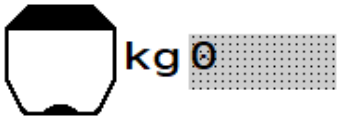
ESC

With the ESC button, you go back one menu level. In this case, to the Set menu.

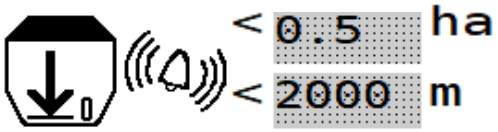
Description of the display elements



Here, the calculation of the remaining area/distance can be switched on and off.



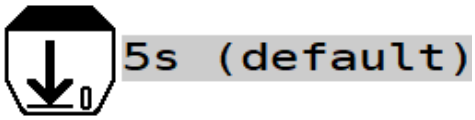
Here, the current fill quantity of the hopper can be entered or displayed.



Here, you can set the calculated still possible remaining area/distance at which the fill level message should appear.



Here, the output of the warning message for the fill level sensor can be activated or deactivated.



Here, the delay for the fill level sensor message after the sensor is no longer covered with seed can be set.

6.3.3 CALIBRATION MENU

In this menu, the parameters required for the calibration test are entered.

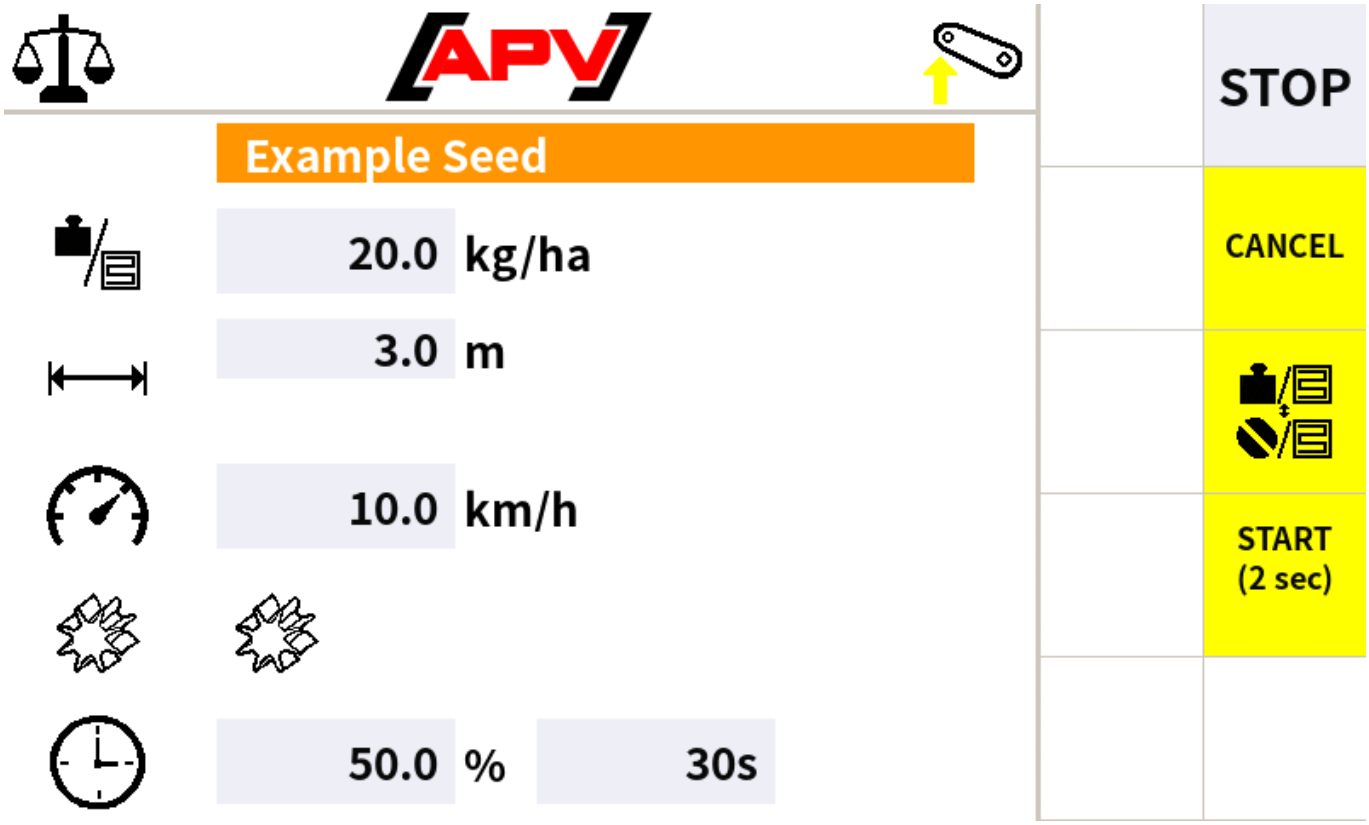


Figure 15

Description of the button functions



With this button, you go back one menu level. Either to the Set menu, the seed library or the Seed menu, depending on where you entered the Calibration menu from.



Here, you can select whether the calibration test is performed in kg/ha or grains/m².

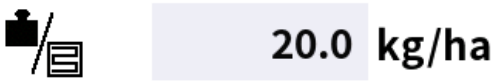


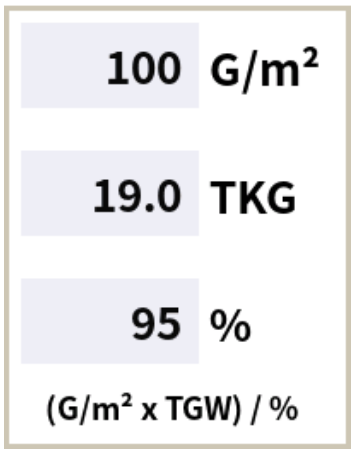
By pressing and holding the Start button (for 2 seconds), the calibration test is started.

Description of the display elements



Here, the current number in the seed library as well as the name of the seed type are shown. If a name has not yet been assigned, the seed type can be named or renamed here.





Here, the desired spread rate in kg/ha is set.

If you want to perform the calibration test in seeds/m², you must set the desired number of grains per square meter, the thousand grain weight and the germination capacity.



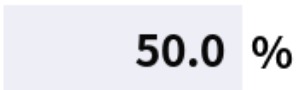
Here, the working width of the mounted implement is set.
Note: deduct any overlaps from the working width!



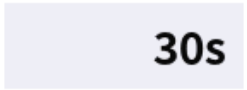
Here, the forward speed is set. If you are working with a speed sensor, the average working speed is entered.



Here, the utilised seeding shaft is set. This is saved in the seed library along with the seed type.
When calling up the seed type again, it must be ensured that the stored seeding shaft is used again; otherwise, the calibration test must be repeated.



Here, the seeding shaft speed for the calibration test can be set. A seeding shaft speed of 50% is assumed per default.



Here, the desired calibration time (0.5 min, 1 min or 2 min) or area (1/40 ha, 1/20 ha, 1/10 ha) can be set. When selecting an area, the calibration time will be automatically calculated and displayed.

When using a calibration button (available as an accessory), this point is hidden.

CAUTION!
If values are changed in the Calibration menu, a new calibration test must be performed.

TIP!
For small seed types (e.g. canola, phacelia, poppy, etc.), a calibration time of 2 minutes is recommended. For larger seed types (e.g. wheat, barley, peas etc.), a calibration time of 0.5 minutes is enough.

6.3.3.1 CALIBRATION TEST RESULTS PAGE

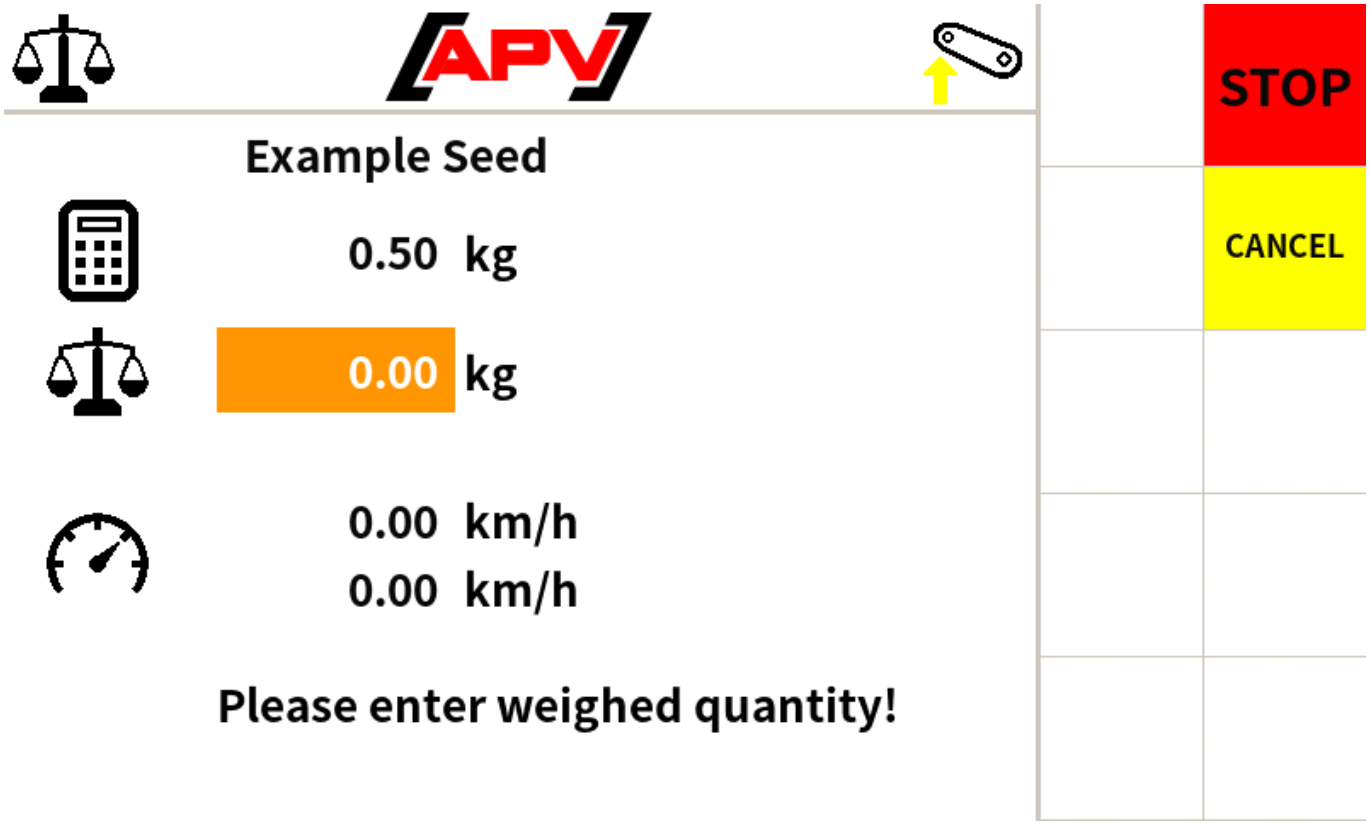


Figure 16

Description of the display elements

Here, the calculated spread rate is shown.

Here, the weight determined for the calibrated seed is entered.

Here, the minimum and maximum calculated working speed will be shown.

6.3.3.2 PERFORMING A CALIBRATION TEST

During the calibration test, the suitable seeding shaft speed is determined for the selected settings (see Point 6.3.3).

NOTE!
A proper calibration test is important, as it is the only way to ensure that your desired spread rate is achieved.

The calibration test must be performed as follows:

1. The calibration button (see Figure 17) is pressed. The button can be found directly in the Set menu or in the Seed menu when selecting a seed type.
2. The settings described under Point 6.3.3 are entered.
3. The hopper is filled with sufficient seed.



Figure 17: calibration button

CAUTION!
It must be ensured that there is enough seed in the hopper of the seeder for the calibration test. The results would be falsified if the hopper runs out of seed during the calibration test.

4. The calibration lid of the seeder is removed and a calibration bag or a suitable container is placed on the seeder (here, the operating manual for the seeder must be observed).
5. The start button (see Point 6.3.3) is pressed and held for 2 seconds – the calibration test results page (see Point 6.3.3.1) will be shown automatically.
6. **Without calibration button:** the seeding shaft starts turning, the calculated spread rate (see Point 6.3.3.1) starts counting up.
   With calibration button:
   - The control box waits until the calibration button is actuated. The message "Actuate calibration button!" appears on the screen.
   - The calibration button is actuated at least until the calculated quantity is greater than 0.2 kg. If this weight is not reached, the following message appears: "Low calibration quantity. Longer calibration time recommended!" more reliably. In this case, the calibration test can be resumed by pressing the calibration button again.
   - When the calibration button is pressed, the seeding shaft starts turning, and the calculated spread rate (see Point 6.3.3.1) starts counting up.
7. Calculation of the spread rate is automatically stopped as soon as the set calibration time has expired or when the calibration button is released.
8. The calibrated seed is weighed and the determined weight is entered in the input box highlighted in grey on the calibration test results page (see Point 6.3.3.1).

CAUTION!
The weight of the calibration bag or calibration box must be deducted!

9. After the entry, the information "Calibration successful, confirm calibration test with "OK"", which is confirmed with the OK button.

   The seeding shaft will be then be calibrated to the entered value. The Control Box now calculates the seeding shaft speed resulting from the settings and the entered weight as well as the minimum and maximum working speed.
   If the calculated seeding shaft speed is within the possible motor speeds, the calibration test was successful.
   If the calculated seeding shaft speed is outside of the possible motor speeds, the following message is displayed, depending on the range.
   - "A finer seeding shaft is required! Repeat recommended!"
   - "A coarser seeding shaft is required! Repeat recommended!"

Change the seeding shaft accordingly and repeat the calibration test.
If you do not have a suitable seeding shaft, contact Customer Service.

If the message "Repeat calibration test" is shown, the deviation between the calculated spread rate and the weight of the calibrated seed is greater than 20 %.
In this case, the calibration test must be repeated to ensure the correct spread rate.
To do so, the displayed calibration test button is pressed, the calibration test must be repeated according to Point 0. The Control Box then automatically readjusts the seeding shaft speed to correct the deviation.
If the calibration test should not be successful even after multiple attempts, the cause of error can be found under Point 8.

10. After pressing the OK button, the seed details are shown (see Figure 18, the display elements are explained in Point 6.3.1.1). If the calibration test was successful, all of the settings are already saved at this time.

11. To switch to the Work menu, confirm with the OK button. If you want to go to the seed library, press the ESC button.

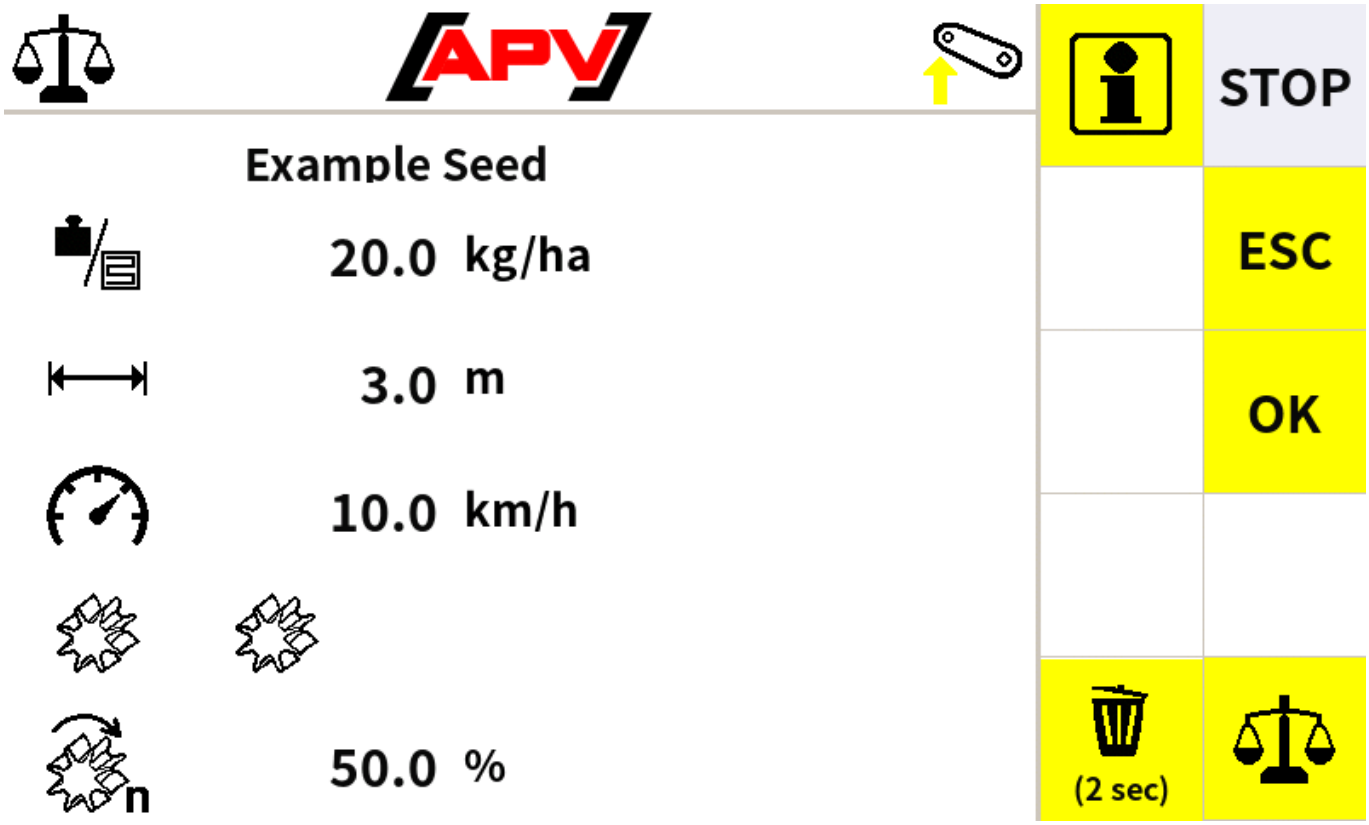


Figure 18

CAUTION!
After the calibration test, the seeding shaft speed should be at least 10% and at most 100%. The seeding shaft can be regulated down to 7.5%, however, there can be uneven seed distribution at these low speeds (checkerboard pattern). To achieve a higher seeding shaft speed, the corresponding seed wheels must be used.

NOTE!
Any change to the saved calibration parameters requires repetition of the calibration test.

6.3.4 TRACTOR SETTINGS MENU

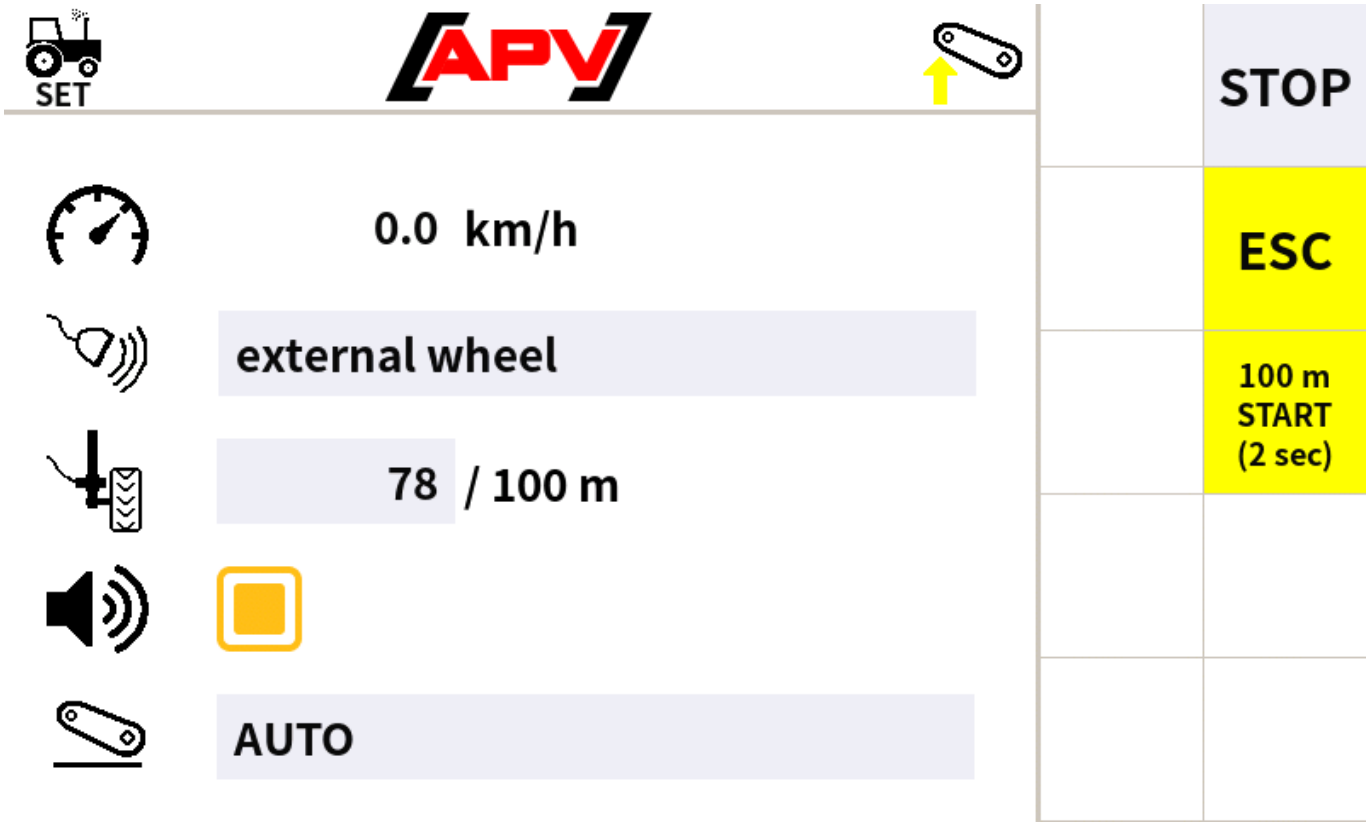


Figure 19

In this menu, the source for the forward speed and the working position signal can be set. External speed sensors (wheel, radar or GPS sensor, 7-pin signal socket) can be calibrated. When using a speed sensor, it is necessary to calibrate the forward speed (except with the GPS sensor), since the seeding shaft speed is regulated based on the forward speed.

Description of the button functions



With the ESC button, you go back one menu level. In this case, to the Set menu.



By pressing and holding this button (for 2 seconds), the 100-meter calibration test is started. The following INFO appears: "Drive for 100 m, then press 100 m STOP". This button only appears when the speed source is set to external radar/GPS or external wheel.



The 100 m Stop button appears as soon as the calibration test was started.
By pressing this button (for 2 seconds), the 100-metre calibration test is terminated and the value is saved. If the value is admissible, the message "Calibration successful, value accepted" appears, otherwise, the message "Calibration invalid, original value restored" appears.

Description of the display elements



Displays the currently measured forward speed.
If "N/A" is displayed, the selected speed signal is not available.



Displays the currently set speed source. The following parameters can be set:

- AUTO: with this speed setting, the Control Box automatically searches for an existing speed signal. The following sequence applies when searching for a speed signal: actual DIN signal, theoretical DIN signal, wheel sensor and radar/GPS.
- Actual DIN signal: the speed is taken from the 7-pin signal socket of the tractor. The actual speed is used for this.
- Theoretical DIN signal: the speed from the 7-pin signal socket is also used here, but the theoretical speed according to DIN standard 9684-1 is used here.
- External wheel: the speed is taken from a wheel sensor for this, which is installed on the implement.
- External radar/GPS: the speed is taken from a radar or GPS sensor for this, which is installed on the implement.
- Simulated: the speed is adopted from the speed set in the calibration test.



Displays the current calibration value for the wheel, radar or GPS sensor. This symbol only appears when the speed source is set to external radar/GPS, external wheel, actual_v or theoretical_v.



Shows whether an acoustic signal is activated or not when the working position is changed.



Shows the current working position source. The following parameters can be set:

- AUTO: the working position signal is taken from a working position sensor that is installed on the implement.
- AUTO: the working position signal is taken from a working position sensor that is installed on the implement. In doing so, the input is inverted.
- Not available: a working position signal is not available. The working position is always assumed to be "In operation".

6.3.4.1 PERFORMING THE CALIBRATION TEST

There are two methods for calibrating the speed signal of the sensors:

- Manual calibration.
- Automatic calibration over a travelled distance of 100 metres.

Manual calibration

If the pulses per 100 metres for the respective sensor are known, this value can be directly entered under the calibration value symbol.



Figure 20: calibration value

Automatic calibration

With automatic calibration, the calibration value is determined automatically while driving a distance of 100 metres.

The procedure is as follows:

1. A straight distance of 100 metres is measured. The beginning and end of this distance are marked.
2. The tractor is positioned precisely at the beginning mark, e.g. front axle exactly over the mark.
3. The Tractor settings menu is selected.
4. The 100 m Start button is pressed and held for 2 seconds.
5. As soon as the message "Drive 100 m, then press 100 m STOP" appears, start driving. The control box now counts the pulses coming from the sensor.
6. Drive the tractor to the end mark, e.g. once more precisely with the front axle over the mark.
7. As soon as the tractor comes to a stop, the 100 m Stop button is pressed and held for 2 seconds.
   If the calibration was successful, the message "Calibration successful, value accepted" will be displayed. The calibration value is now saved.
   If the calibration was not successful, the message "Calibration invalid, original value restored" is shown and the original value is set (see Point 7 for possible causes of error).
8. The calibration must be tested by driving the tractor over a distance and comparing the speed displayed on the Control Box with that of the tractor.
   If the speeds do not match, the calibration test must be repeated.



Figure 21: Tractor settings menu



Figure 22: 100 m Start button



Figure 23: 100 m stop button

6.3.5 PRE-METERING MENU

In this menu, you can enter the settings for pre-metering. For pre-metering, as soon as a speed of 0.1 km/h or faster is driven, the set speed is used to regulate the seeding shaft. This allows you to avoid gaps in the seeded area (e.g. at the beginning of the field or when standing still on the field).

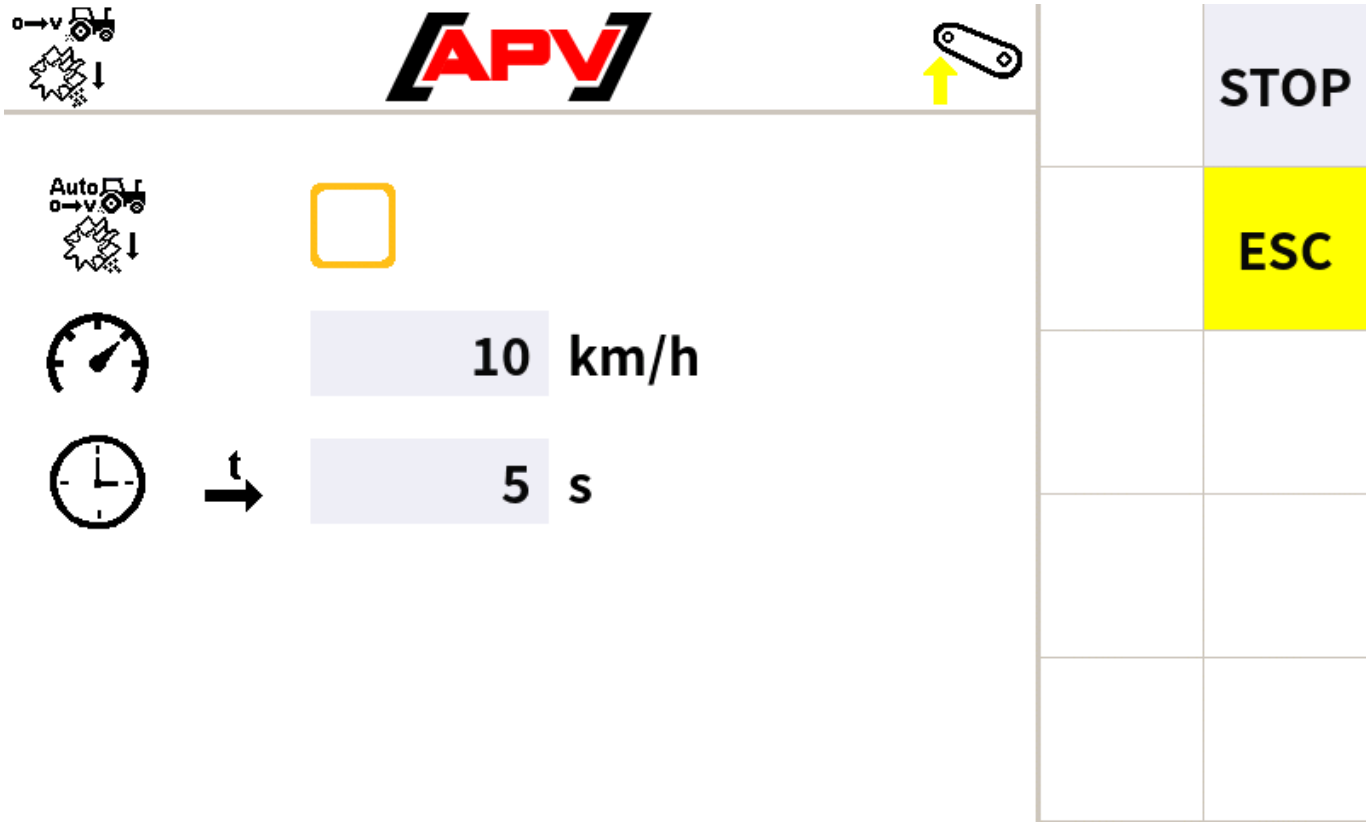


Figure 24

Description of the button functions

ESC

With the ESC button, the entries are confirmed and you go back one menu level; in this case, to the Set menu.

Description of the display elements

Auto

Here, the automatic pre-metering can be activated.
When it is activated, every time the implement is lowered at the beginning of the field (during the transition of the implement into working position), pre-metering is started with the set speed for the set duration.

10 km/h

Here, the speed at which the pre-metering should be performed is set. This speed is also used for manual pre-metering.

t 5 s

Here, the time during which the automatic pre-metering should run is set.

6.3.6 EMPTYING THE HOPPER

In this menu, the residual seed can be emptied out of the hopper.

CAUTION!
CAUTION: before emptying, the calibration lid must be removed and the calibration bag must be attached (see operating manual for the seeder). Otherwise, the hoses can get blocked!



Figure 25

Description of the button functions



With the STOP button, emptying is terminated and you remain on the same screen.



With the ESC button, the emptying is terminated and you automatically go back one menu level; in this case, to the Set menu.



If this button is pressed and held for 2 seconds, the emptying procedure is started and the seeding shaft rotates at 100%.

If the implement type 2xMDC or 2xMDG is selected in the basic settings (see Point 5.2), an extended Empty hopper menu is available. It is described under Point 0.

Description of the display elements



Indicates that the emptying procedure has been started.

If your implement is also equipped with a calibration button, the message "Actuate calibration button!" appears. When the calibration button is then actuated, the seeding shaft rotates at full speed.

6.3.7 FAN MENU

6.3.7.1 ELECTRIC FAN / ELECTRIC FAN PLUS

In this menu, the rotational speed of the electric fan can be set.

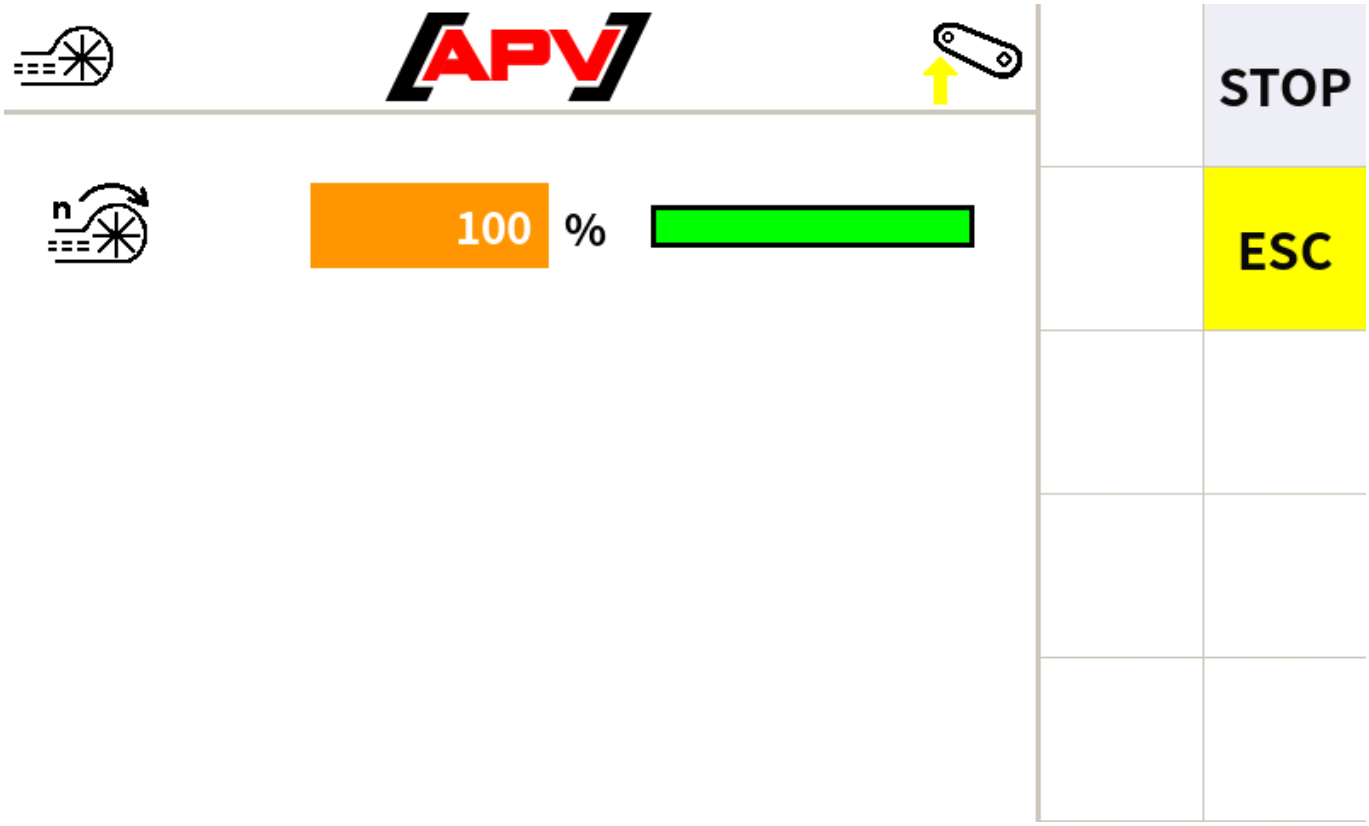


Figure 26

Description of the button functions



With the ESC button, you go back one menu level. In this case, to the Set menu.

Description of the display elements



Here, the desired speed for the electric fan can be set.
The fan speed must be selected according to the seeder operating manual. The setting range is between 20% and 100%.

6.3.7.2 HYDRAULIC FAN

In this menu, various settings can be entered for the hydraulic fan. The number of pulses from the speed sensor and the speed limits for the hydraulic fan can be set.

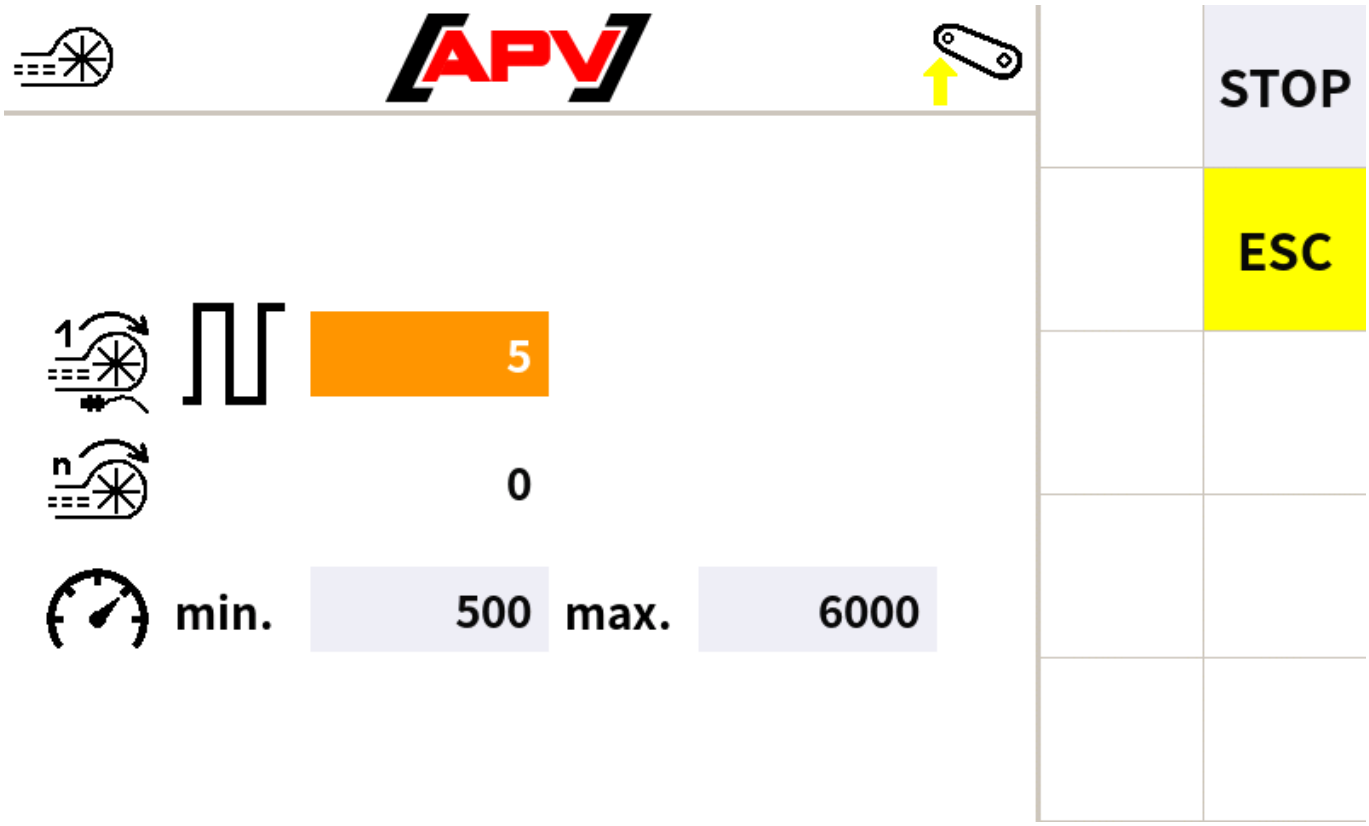


Figure 27

Description of the button functions



With the ESC button, you go back one menu level. In this case, to the Set menu.

Description of the display elements

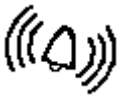


Here, the number of pulses sent by the fan speed sensor per revolution can be set. The number of pulses must be selected according to the conversion instructions for the sensor.

The default value is 5 pulses per revolution. More detailed information on this can be found in the operating manual / conversion instructions for the respective seeder.



Display of the current fan speed.





Here, the speed and the alarm limits for the hydraulic fan can be set. If you enter 0 revolutions per minute for "min.", the error message "Fan speed too low!" will be deactivated.

NOTE: the speed itself can only be adjusted through the oil quantity, directly on the tractor or on the hydraulic block of the seeder! Here, you must proceed as described in the seeder operating manual.

6.3.8 TERMINAL MENU

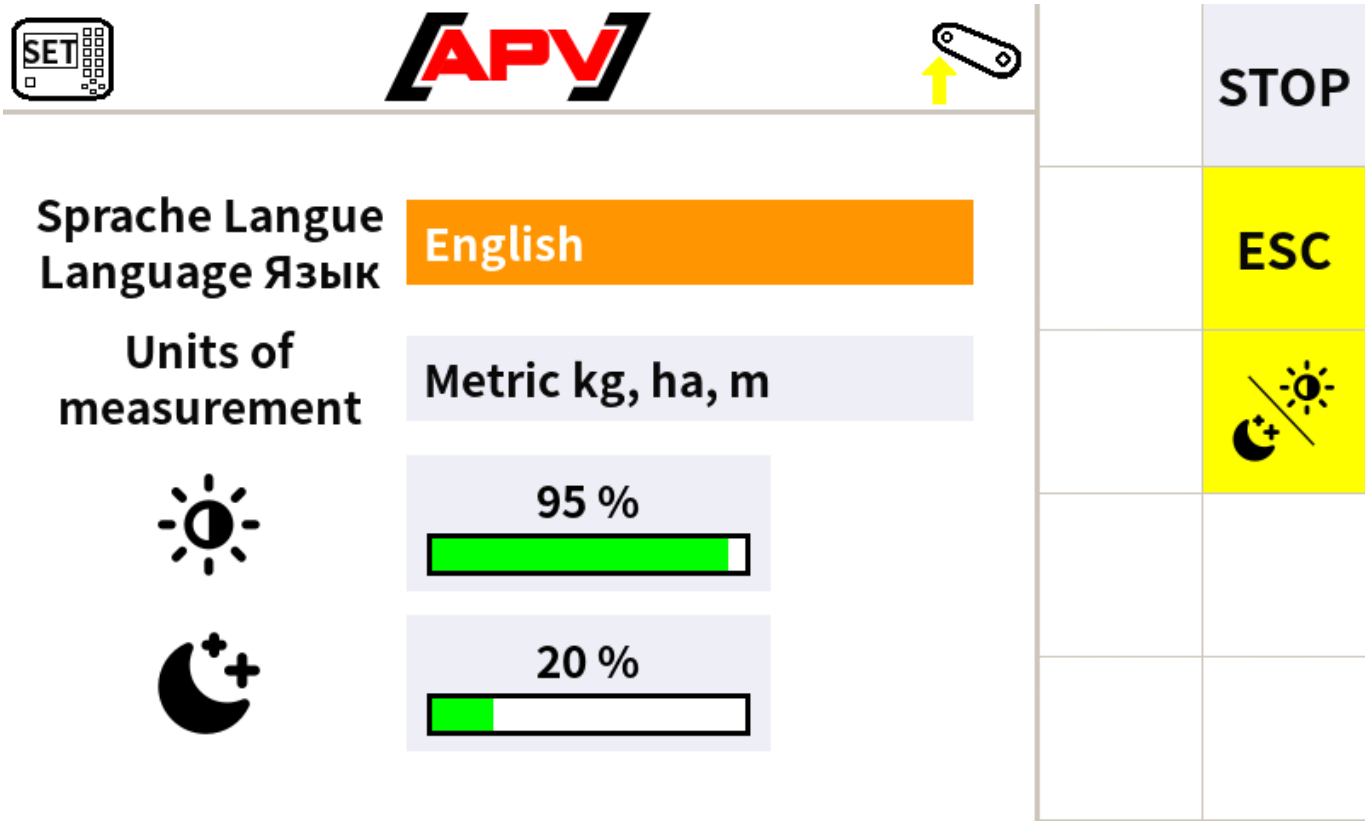


Figure 28

In this menu language, units of measure, brightness and sound volume can be set.

Description of the button functions



With the ESC button, you go back one menu level. In this case, to the SET menu.



The Day/Night button can be used to test the Day/Night mode.

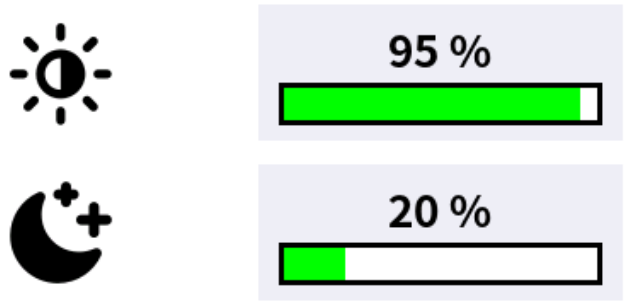
Description of the display elements



Here, the desired language can be set.



Here, you can set the measuring units you want to use. You can choose between metric units (kilograms, hectares, metres) and imperial units (pounds, acres, feet).



The brightness of the display can be set here.

6.4 INFO MENU

In this menu, 3 different trip counters and a total counter are displayed. The trip counters can be reset individually.

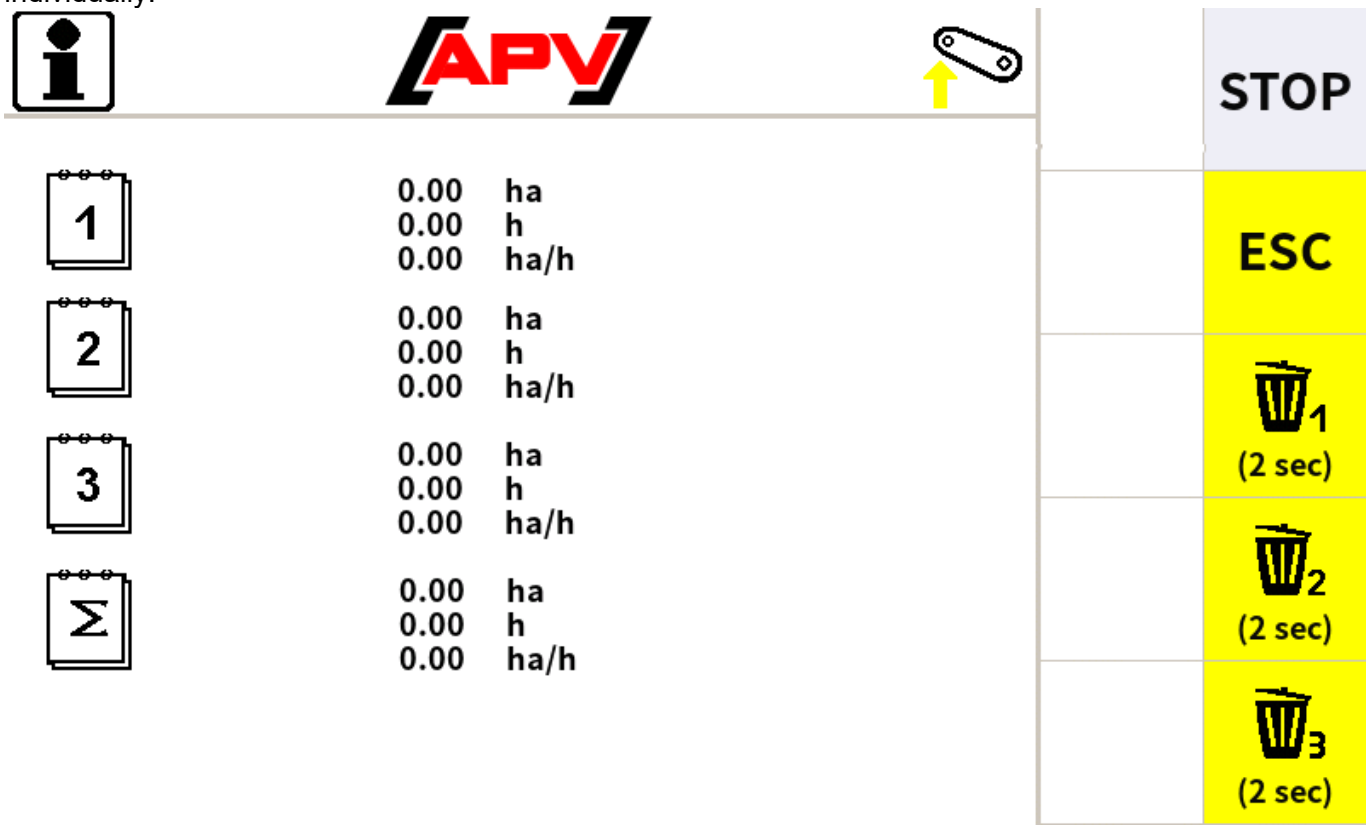


Figure 29

Description of the button functions



With the ESC button, you go back one menu level; in this case, to the Start menu.



By pressing and holding the Delete button for 2 seconds, the respective day counter is reset to 0.

Description of the display elements



The trip counters show the worked area, the operating hours, and the area output since the last reset.



The total counter shows the total worked area, the total operating hours, and the average area output of the control box.

TIP!
The trip counters can be used e.g. for the respective field or day or the respective year.

6.5 DIAGNOSTIC MENU

In this menu, all of the important information for Customer Service is displayed. This includes the switching states of the sensors, the supply voltage, and the power consumption of the motors.

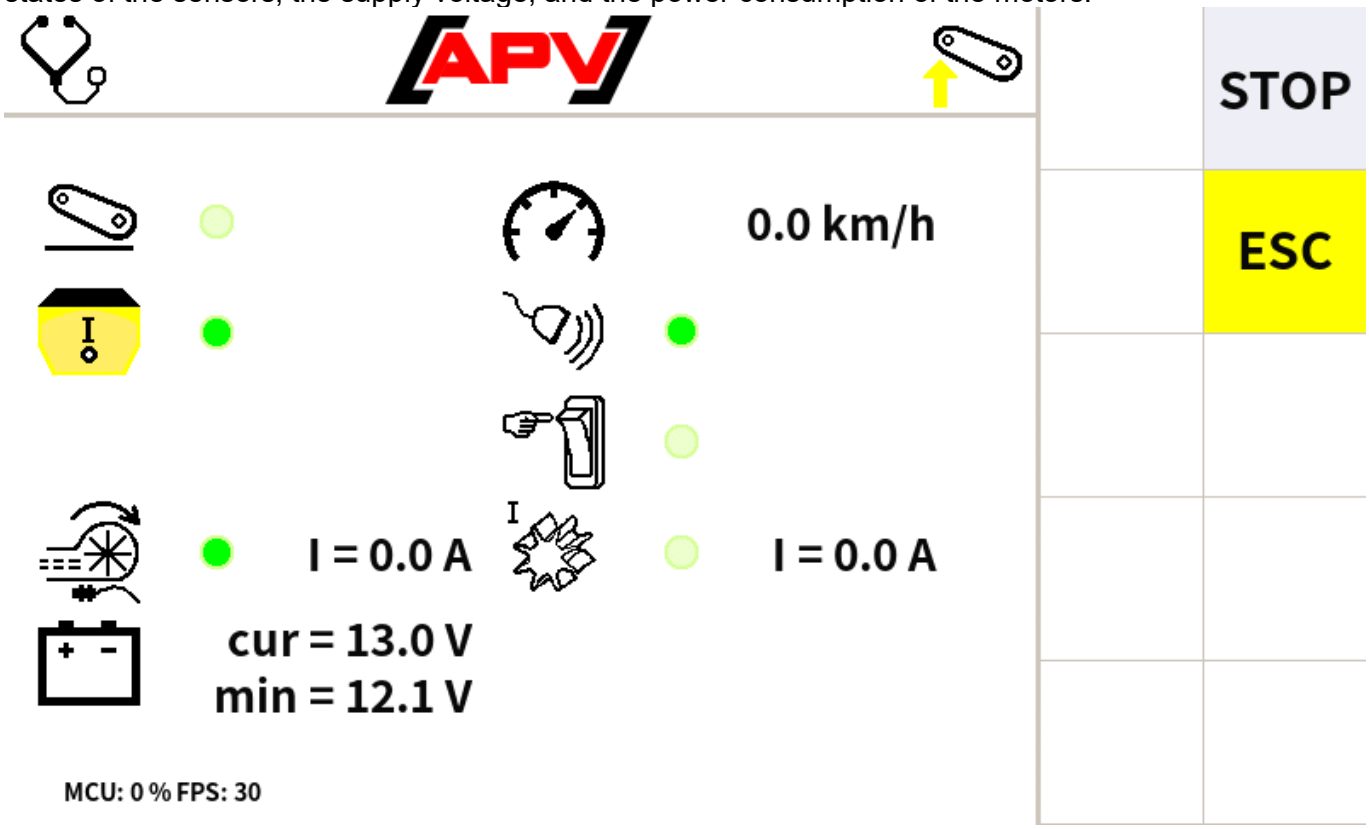


Figure 30

Description of the button functions



With the ESC button, you go back one menu level; in this case, to the Start menu.

Description of the display elements

Switching states of the individual sensors:



Linkage sensor input



Fan speed sensor input



Fill level sensor input



Calibration button input

Information on the speed sensors:



Current forward speed.
If "N/A" is displayed, the selected speed signal is not available.



If a wheel, radar or GPS sensor input is used to determine the forward speed, this point is coloured green.

Measured voltage and the currents:



cur = 13.0 V
min = 12.1 V

Here, the supply voltage measured on the Control Box and the minimum supply voltage since the start are displayed.



I = 0.0 A

Here, the current of the seeding shaft motor measured by the Control Box is displayed. For the 2xMDC and 2xMDG implement type, two displays are shown here.



I = 0.0 A

Here, the current of the fan measured by the Control Box is displayed. With a hydraulic fan, the current display is not shown.

7 SPECIAL FEATURES FOR 2XMDG AND 2XMDC

If 2xMDG or 2xMDC is configured, both one seed type and two different seed types can be spread.

7.1 SPREADING OF TWO SEED TYPES

In the Work menu, each seeding shaft can be assigned to its own seed. In this case, a calibration test must be performed for each seed type beforehand.

It must be ensured that the same working width is entered for both seed types. When two different seed types are being spread, the total working width of the implement must always be entered. If this is not the case, the message "Working widths inconsistent!" will be shown.
If the settings are still not changed, the larger entered working width will be automatically adopted for both seed types and used for spreading the seed. If the difference is large, it can cause the metering unit to operate outside of the normal operating range!
For this reason, it is recommended to set the same working width for two seed types that are spread together.

7.1.1 WORK MENU

The Work menu is already described under Point 6.2. For the implement types 2xMDC and 2xMDG, this menu has been extended. Under this point, only the changed or new buttons and their functions are described.

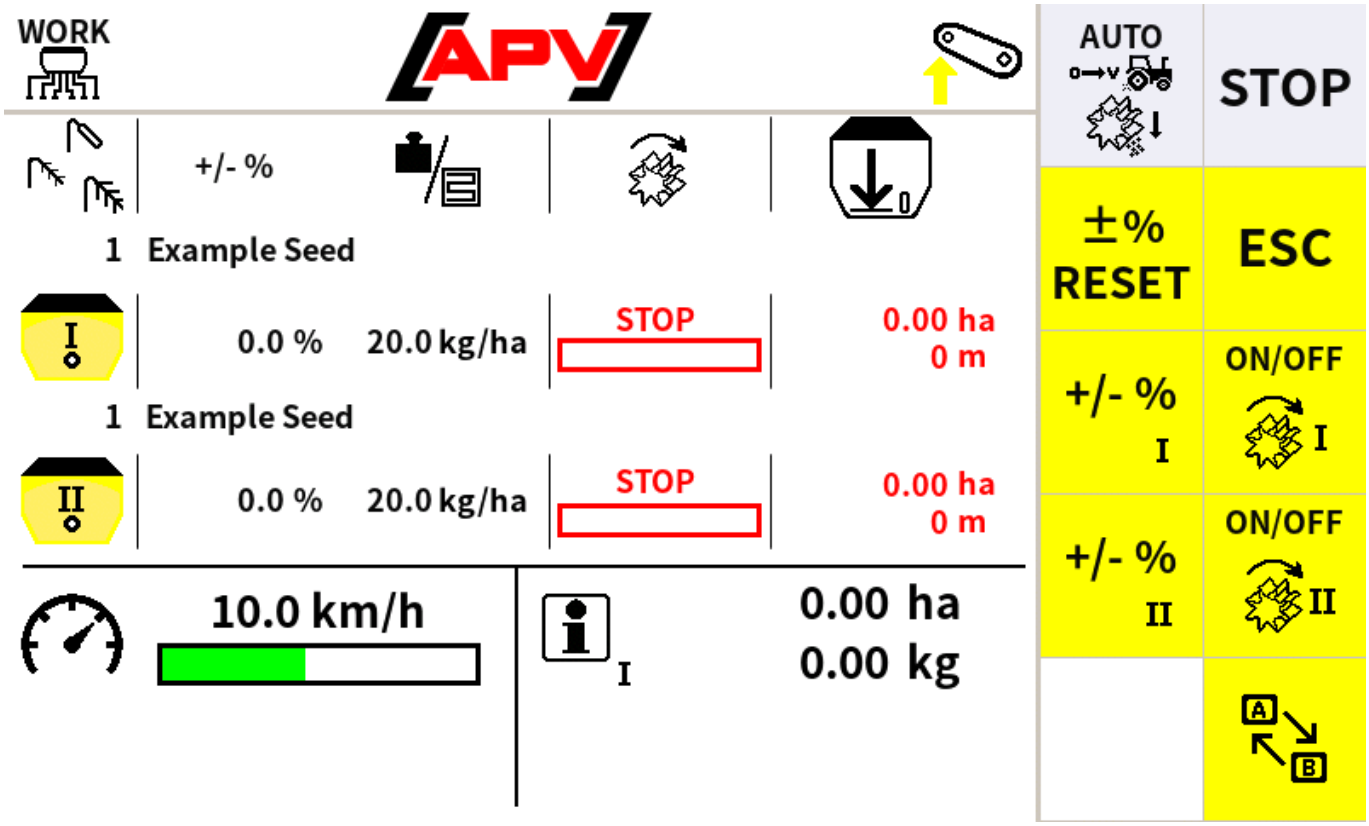
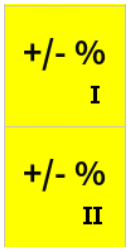


Figure 31

Description of the button functions



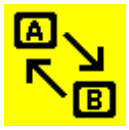
In the Work menu, these two buttons can be used to select the seeding shaft on which the spread rate should be increased. The spread rate can then be changed with the plus and minus buttons on the Control Box. When it is actuated, the button turns green and remains active until it is actuated again.





With this button, the respective seeding shaft can be switched on or off.
If an electric fan is installed, it will start running automatically. Only then does the respective seeding shaft start rotating.

When the respective seeding shaft is activated, it is coloured green.



With this button, the Info buttons as well as the button for switching between day and night mode are shown. When it is pressed again, the display goes back to the screen shown in Figure 31



With the 100 % button, the spread rates for both seeding shafts can be set back to the value determined during the calibration test. (If both seed types have the same working width)

7.2 SPREADING OF ONE SEED TYPE

Per default, the seed type that is stored for the first seeding shaft is also stored for the second seeding shaft. Both seeding shafts are shown, which can be switched on and off separately.

7.2.1 CALIBRATION MENU

A working width is entered for the calibration test. It must be ensured that half the total working width of the implement is entered for the calibration test. Here, attention must be paid to the arrangement of the hose system of the implements. For one seed type, the spread rate must be observed according to the arrangement of the implements. Are the implements installed beside each other or above each other.

NOTE!
When changing between one seed type and two seed types, the calibration test needs to be checked again.

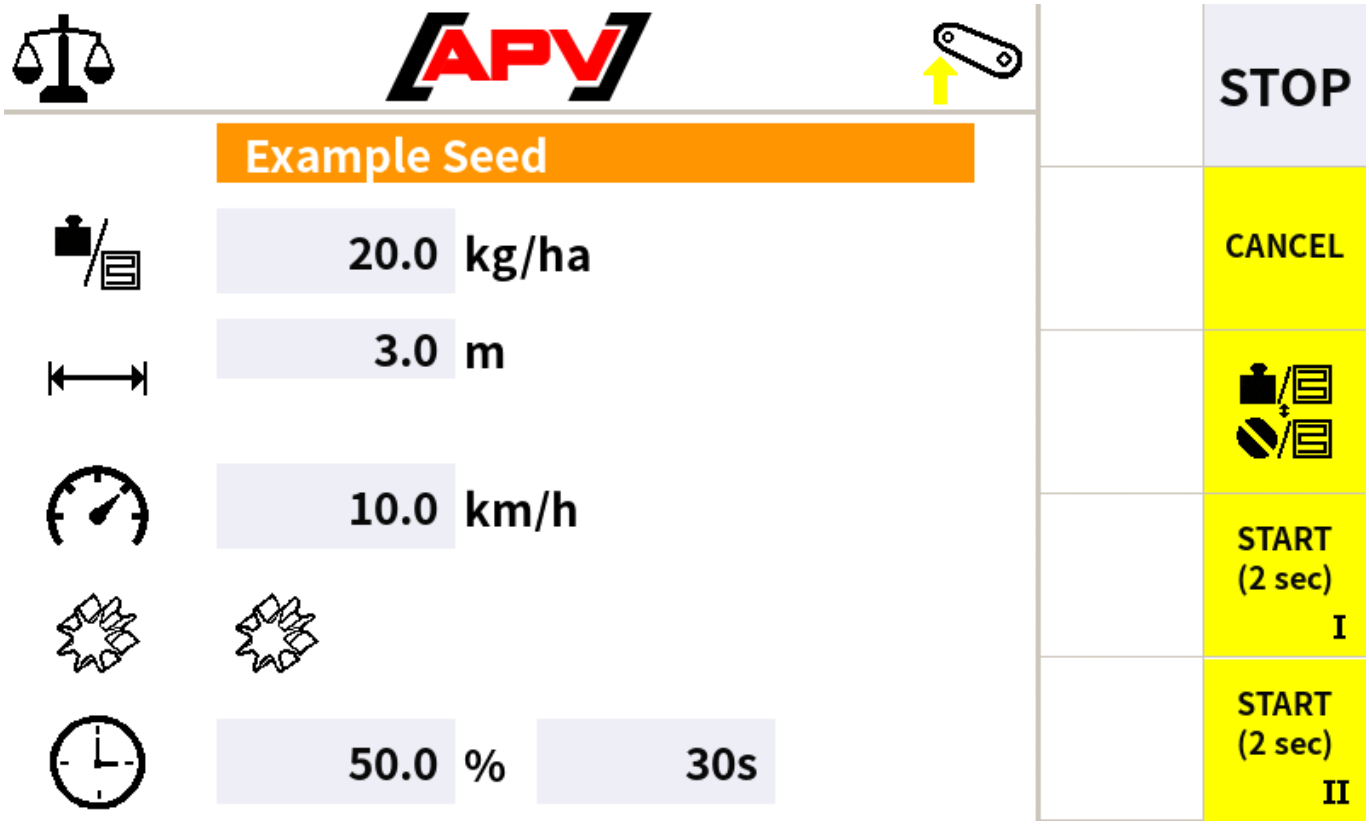


Figure 32

7.3 EMPTYING THE HOPPER

The Empty hopper menu is described under Point 0. For the implement types 2xMDC and 2xMDG, this menu has been extended. Under this point, only the changed buttons and their functions are described.

CAUTION!
Before emptying, the calibration lid must be removed and the calibration bag must be attached.

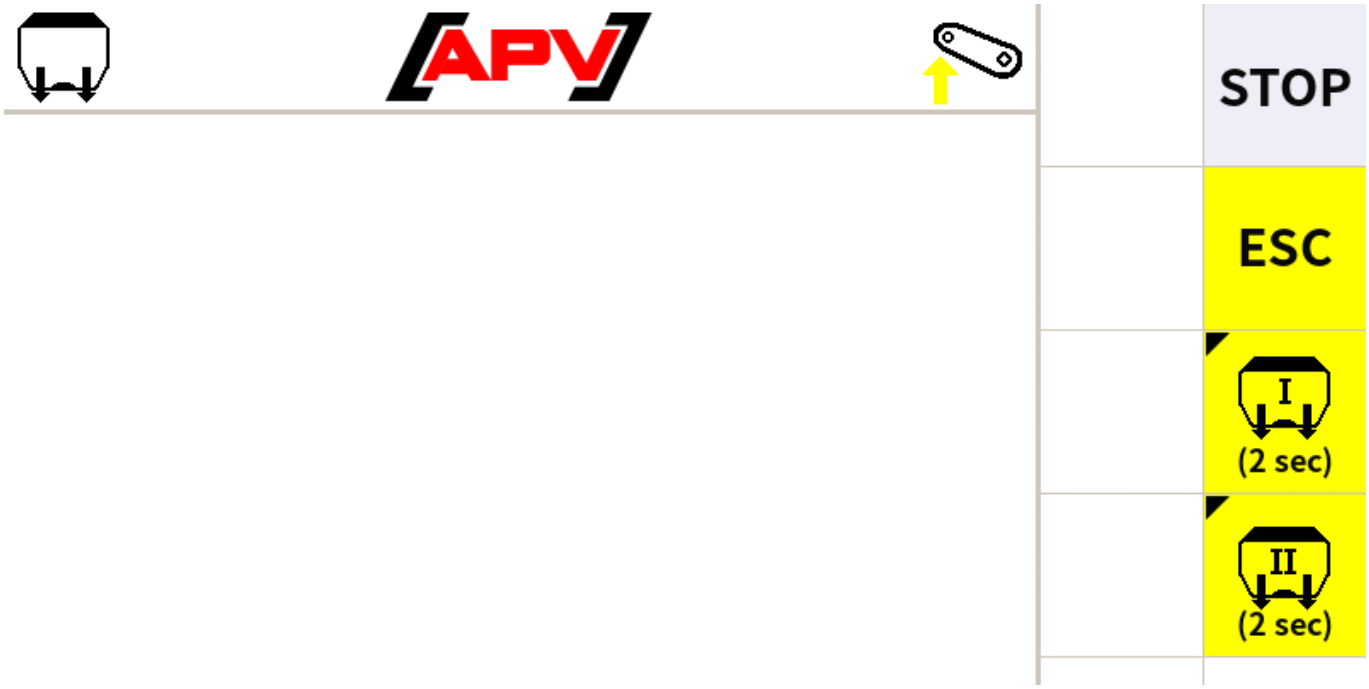


Figure 33

Description of the button functions



If one of these buttons is pressed and held for 2 seconds, the emptying procedure is started for the respective seeding shaft and it rotates at 100%. It is possible to empty both implements at the same time.

7.3.1 FILL MENU

The Fill menu was described under Point 6.3.2. For the implement types 2xMDC and 2xMDG, this menu has been extended. Under this point, only the changed buttons and their functions are described.

It is possible to store a hopper fill level for implement 1 and implement 2. This forms the basis for the calculated possible remaining distance/quantity that is displayed in the Work menu (see Point 7.1.1). Likewise, the two fill level sensors can be activated or deactivated.

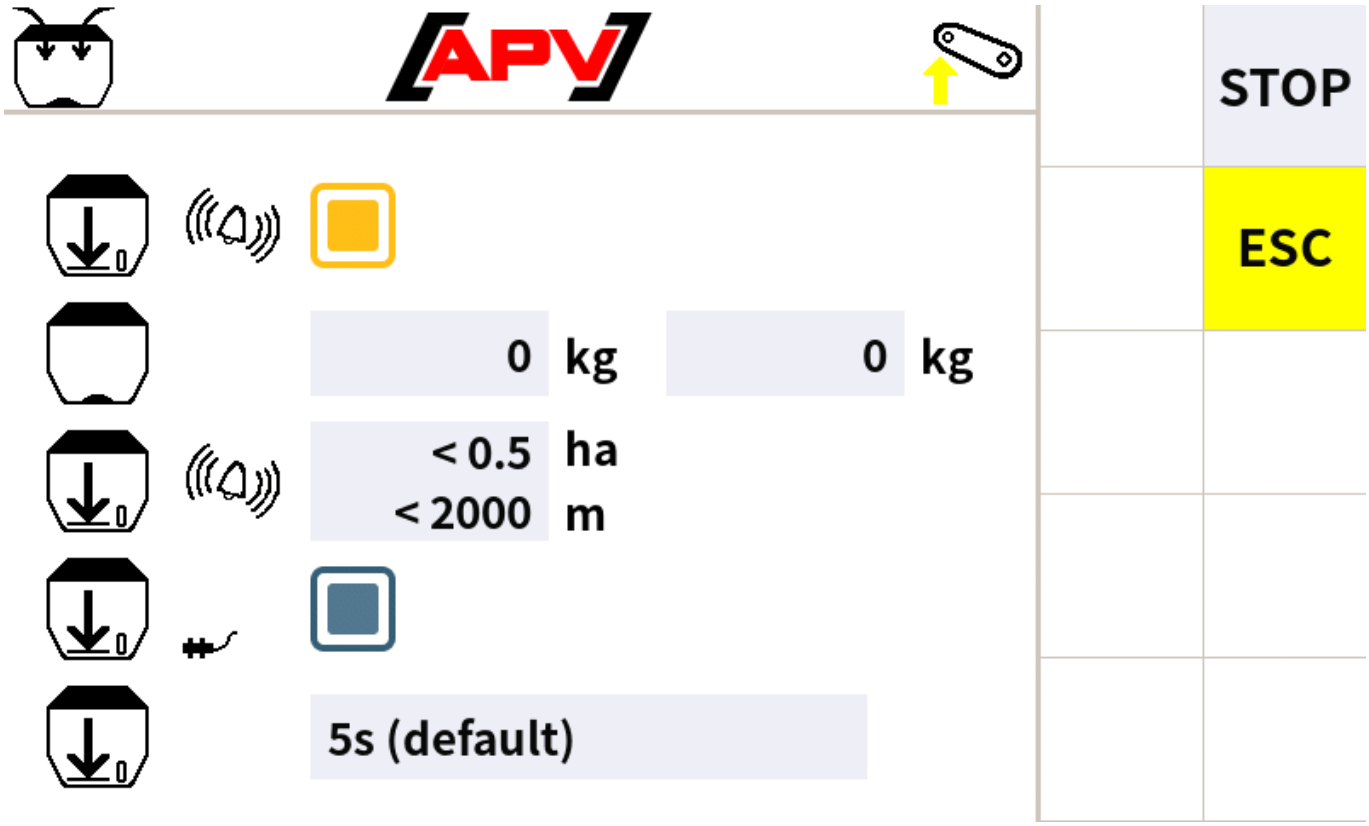


Figure 34

8 CONTROLLER MESSAGES

8.1 SUPPRESSING / ACKNOWLEDGING MESSAGES

An acknowledgement button appears simultaneously with a message, which can be used to suppress messages for a specific period of time:



By pressing the OK button, messages are acknowledged/deleted as soon as the error has been rectified.



By pressing the Snooze button, the messages are suppressed. But they are still shown in the status bar.
The Snooze button is not available for all messages, because a STOP of all actuators is performed in case of critical errors.

8.2 WARNINGS

Display	Cause	Solution
Internal VCC (5V) not OK!	The internal control voltage is below a minimum value.	• Send the Control Box to Customer Service.
Battery voltage too low!	The supply voltage is below 10 V.	• Minimise consumers (e.g. work floodlights). • Check the battery. • Check the cabling. • Check the plugs. • Check the alternator.
Battery voltage too high!	The supply voltage is too high.	• Check the alternator.
Hopper I/II almost empty!	Is displayed as soon as the fill level sensor is not covered with seed for longer than the time set under Point 6.3.2.	• Refill seed. • Adjust the sensor (position further down). • Increase the delay time for the message.
Metering drive out of control range!	The specified/required seeding shaft speed cannot be maintained.	• Use larger/coarser seed wheels to reduce the speed. • Use smaller/finer seed wheels to increase the speed. • Adjust the speed • Reduce the spread rate
Tractor speed too high!	The forward speed is too high and the seeding shaft can no longer readjust.	• Reduce the forward speed. • Use larger/coarser seed wheels. • Use more seed wheels on each outlet. • Reduce the spread rate.

Display	Cause	Solution
Tractor speed too low!	The forward speed is too low and the seeding shaft can no longer readjust.	• Increase the forward speed. • Use finer seed wheels. • Use fewer seed wheels on each outlet. • Increase the spread rate.
Searching for GPS signal Maintain speed (10.00 km/h)!	There is no GPS signal and the seeding shaft is switched on	• Maintain the prescribed forward speed. The forward speed that was selected for the previously performed calibration test is always shown.
Searching for GPS signal!	There is no GPS signal.	•
Fan speed too high!	The speed of the hydraulic fan is higher than the upper limit set in Point 6.3.7.	• Reduction of the speed of the hydraulic fan. • The pulses per revolution parameter is set incorrectly, see Point 6.3.7.
Inconsistent working width!	The working widths for the two seeding shafts in implement type 2xMDx are different.	• Repeat the calibration test with the correct working width (both the same)

8.3 ERRORS

Display	Cause	Solution
Operating voltage not OK!	• The supply voltage is below 8 V. • Excessive voltage fluctuations.	• Minimise consumers (e.g. switch off the work floodlights). • Check the battery. • Check the cabling. • Check the plugs. • Check the alternator.
Motor is overloaded (seeding shaft I)! Motor is overloaded (seeding shaft II)!	• A seed shaft is not able to rotate. • The motor has been strained too long at its limits!	• Switch off the control box! • Remove any foreign objects or similar from the seeding shaft or the agitator. • Switch off the agitator (with well-flowing seed). • Remove 1-3 spacing discs from the seeding shaft. • Check the set motor type. • Check the idling motor for proper function. • Refer to the seeder operating manual

Display	Cause	Solution
Motor is overloaded (blower fan)!	• The electric fan is being strained too long at its limits.	• Switch off the implement and check if there are objects blocking the fan or preventing it from rotating properly. • Check whether the calibration cover is installed, and if all of the seeding hoses are connected.
Motor overloaded (spreading plate)!	• The spreading plate is not able to rotate. • The motor is being strained too long at its limits.	• Switch off the implement and check if there are foreign objects or similar that prevent the spreading disc from rotating properly.
Motor overloaded (pump)!	• Short circuit on the pump	• Check the connections
Error (fan)!	• Only with electric fan Plus: • Is displayed when the implement cable is not connected or the cabling is faulty. • Overload (E2 or E1 on the motor module).	• Check the cabling. • Check the plug on the motor module. • Read the error message on the motor module (motor overloaded or motor not connected) and fix the error according to the seeder operating manual.
Fan speed too low!	Only with hydraulic/external fan: • Seeding shaft I AND/OR II active. • The fan speed is below the minimum speed.	• Switch on the hydraulic fan. • Increase the fan speed. • The pulses per revolution parameter is set incorrectly, see Point 6.3.7.2. • The fan speed limit was incorrectly set, see Point 6.3.7.2.
Motor not connected (seeding shaft I)! Motor not connected (seeding shaft II)!	Is displayed when the implement cable is not connected or the cabling is faulty.	• Check the cabling.
Motor not connected (fan)!	The motor is connected and not overloaded, but still does not rotate.	• Check the clamp connections on the spreader. • Contact Customer Service
Motor not connected (spreading plate)!	The cables are not or not properly connected.	• Check the cables and plugs.
Motor not connected (pump)!	The pump's safety switch is being triggered by overpressure in the system.	• Reduce pressure in the system: larger nozzles, install more outlets. • Check for blockage and eliminate if necessary

Display	Cause	Solution
No motor speed (seeding shaft)!	Power consumption at the motor, but no feedback that it is rotating.	• Check the terminal connections on the seeder (especially the ENC encoder). • Contact Customer Service.
No motor speed (fan)!	The motor is connected and not overloaded, but still does not rotate.	• Check the clamp connections on the spreader. • Contact Customer Service.
No motor speed (spreading plate)!	The motor is connected and not overloaded, but still does not rotate.	• Check the clamp connections on the spreader. • Contact Customer Service.
No motor speed (pump)!	The flow sensor connection (blue) is not or not properly connected	• Check the cabling. • Reduce speed. • Increase the spread rate. • Smaller nozzles. • Fewer outlets.
Short circuit on the sensor lines!	• The sensor supply lines are overloaded. • A short circuit occurred.	• Check the cables for damage and short circuits.

9 PROBLEM SOLVING

Problem	Cause	Solution
The seeding shaft rotates when the implement is lifted!	• Wrong linkage signal. • Linkage signal is not available.	• Invert the linkage signal on the control box, see Point 6.3.4. • Reposition the linkage sensor.
The seeding shaft does not rotate when the implement is in working position!	• Seeding shaft is not switched on. • Forward speed is 0. • No linkage signal.	• Switch on the seeding shaft, the seeding shaft must be switched on by pressing the button one time at the beginning. • Check the settings for the speed sensor – see Point 6.3.4. • Check the speed sensor. • Check the linkage sensor.
A fill level sensor is installed, but does not transmit!	• No signal from the fill level sensor. • The fill level sensor is deactivated, see Point 6.3.2.	• Adjust the sensitivity of the fill level sensor (bolt on the rear side of the sensor). • Reposition the fill level sensor. • Check the terminal strip and cable.
Fill level sensor is constantly transmitting!	• Poor sensor setting. • Poor sensor position.	• Adjust the sensitivity of the fill level sensor (bolt on the rear side). • Reposition the fill level sensor. • Deactivate the fill level sensor, see Point 6.3.2.
No speed signal!	• Wrong speed signal was selected.	• Select a different speed signal • Check the settings for the speed sensor – see Point 6.3.4.
No linkage signal!	• Linkage sensor was not detected.	• Check the signal source and change if necessary. • If external linkage sensors are equipped, check them. • Magnet sensor: the sensor and magnet must be precisely opposite to each other when in working position or in lifted position.
A forward speed of 0.0 km/h is displayed or it keeps jumping back to 0.0 km/h!	• Wrong or non-existing speed signal was selected.	• Check the speed settings (Point 6.3.4).

Problem	Cause	Solution
Spread rate in kg/ha or grains/m² is not being displayed!	• A valid calibration test was not performed. • Values were retroactively changed in the Calibration test menu.	• Perform a calibration test. • Load the seed type again from the library.
Spread rate is too high or too low!	• Wrong speed. • Linkage sensor switches during operation. • Seed properties have changed.	• Check the hectare counter on the control box! • Check the speed! • Calibrate the speed sensor (not required for GPS sensor). • Check the linkage sensor. • Perform a calibration test. • Reduce the fan speed for the hydraulic fan.

10 SOFTWARE UPDATE

For a software update, please contact Service at APV, the contact data can be found under Point 1.1.

11 ACCESSORIES

11.1 7-PIN SIGNAL CABLE

With the 7-pin signal cable, a connection from the tractor to the control box can be established. In this case, the control box receives 3 signals from the tractor (DIN 9684 standard). The forward speed [km/h] and the linkage signal (working position) will then be transmitted from the tractor to the control box. It is shown on the control box. The seed quantity is now automatically regulated by regulating the speed of the seeding shaft. As a result, the desired seed quantity per hectare is always maintained, even if the driven speed deviates slightly from the defined speed.
The control box takes care of all procedures for the operator, such as the controlling during the working process. Thanks to the lifting unit signal, no manual operation on the control box is required when turning. On some tractors, the lifting unit signal is inverted. In this case, set the speed signal to AUTO inverted. See chapter 6.3.4.



Figure 35

Order number: 00410-2-289
Cable length: 1.5 m
Connection: 7-pin plug on the Control Box

NOTE!
The signal socket is not completely assigned by all tractor manufacturers, even if it is installed in the cab.

11.2 EXTENSION CABLE

This cable serves as an extension cable between the APV implement and the EasyControl Control Box.

The extension cable is available in three lengths: 2 m, 5 m and 14 m.

Order number: 00410-2-283 (2 m), 00410-2-284 (5 m) and 00410-2-285 (14 m)



Figure 36: Symbolic image

NOTE!
If extension cables are used, the electrical power of the fan and the seeding shaft drive can be reduced!
For this reason, extension cables should always be avoided!

11.3 CURRENT LIMITS

The following limits must be observed according to the standards:
3-pin socket of the tractor: 25 A

APV implement	Power consumption	
	Typical [A]	Maximum [A]
PS 120-500 electric fan	23	29
PS 120-500 electric fan PLUS	37	49
PS 120-500 hydraulic fan	5	9
PS 800-1600	10	15
1x MDC / MDG	7	9
2x MDC / MDG	14	18
MDP	23	29

NOTE!
The currents can vary widely depending on the layout, hose length, seed type and spread rate.

11.4 CALIBRATION BUTTON FOR PS

The calibration button is integrated directly in the terminal strip of the PS and is installed on the implement with the integrated magnets. As a result, the calibration test and emptying of the hopper can be performed directly on the implement.



Figure 37

Connection: terminal strip

Order number: 00410-2-185

11.5 FILL LEVEL SENSOR FOR PS

The fill level sensor triggers an alarm on the EasyControl when there is not enough
seed in the hopper.



Figure 38

Connection: terminal strip

Order number: 04000-2-441

11.6 LINKAGE SENSOR CHASSIS

Through this sensor, the seeding shaft of the PS can start and stop rotating automatically when lifting and lowering the implement.



Figure 39

Connection: 3-pin plug on the side of the PS.

Order number: 00410-2-293

11.7 LINKAGE SENSOR TOP LINK

Through this sensor, the seeding shaft of the PS can start and stop rotating automatically when lifting and lowering the implement.

Connection: 3-pin plug on the side of the PS.

Order number: 00410-2-294



Figure 40

11.8 LINKAGE SENSOR PULL SWITCH

Through this sensor, the seeding shaft of the PS can start and stop rotating automatically when lifting and lowering the implement.

Connection: 3-pin plug on the side of the PS.

Order number: 00410-2-292



Figure 41

11.9 LINKAGE SENSOR HYDRAULIC SYSTEM

The sensor can be installed in an existing hydraulic system on an implement (e.g. chassis cylinder). Function: actuation by a change in pressure in the hydraulic system. The rotation of seeding shaft is then automatically started or stopped.

Connection: 3-pin plug on the side of the PS.

Order number: 00410-2-291



Figure 42

11.10LINKAGE SENSOR INDUCTIVE

For installation on moving parts on the headlands; Function: Contactless, can detect metal. The rotation of seeding shaft is then automatically started or stopped (invertible).

Connection: 3-pin plug on the side of the PS.

Order number: 00410-2-290



Figure 43

11.11 ACCESSORIES KIT FOR GPSa SENSOR MX

The GPSa sensor transmits the current vehicle speed to the EasyControl Control Box.

Connection: 3-pin plug on the side of the PS.

Order number: 00410-2-311



Figure 44

NOTE!
The sensor does not function if there is complete GPS shadowing.

11.12 ACCESSORIES KIT FOR RADAR SENSOR MX 35

The radar sensor transmits the current vehicle speed to the EasyControl Control Box. The radar sensor works on almost any substrate (e.g. soil, sand, pavement, etc.).

Connection: 3-pin plug on the side of the XD.

Order number: 00410-2-312



Figure 45

11.13 ACCESSORIES KIT FOR INDUCTIVE WHEEL SENSOR MX

The wheel sensor transmits pulses to the EasyControl Control Box, which then calculates the speed. The wheel sensor must be installed on a feeler wheel.

Connection: 3-pin plug on the side of the XD.

Order number: 00410-2-295



Figure 46

11.14 EXTENSION CABLE FOR SENSORS

The sensors must be connected to the plug on the PS with an extension cable. The following versions are available for this.

Connection: 3-pin plug on the sensor and PS.

Order number:

- 00410-2-287 2 m
- 00410-2-298 3 m
- 00410-2-299 4 m
- 00410-2-288 5 m



Figure 47

11.15 SENSOR ADAPTER

Is required when existing sensors (e.g. from Control Box 5.2) should be reused.

Connection: 12-pin plug for connecting the old sensors and 3-pin plug for connection to the PS.

Order number: 00410-2-319



Figure 48

11.16 SPLITTER AHDP APV APV

Is required when two MDCs or two MDGs should be operated simultaneously.

Connection: 21-pin AHDP socket for connection to the Control Box. Two AHDP plugs for connection to the AHDP implement cable of the implement.

Order number: 00410-2-319



Figure 49

12 CONNECTION DIAGRAMS

12.1 PS 120 – PS 1600

Electric fan / electric fan PLUS:

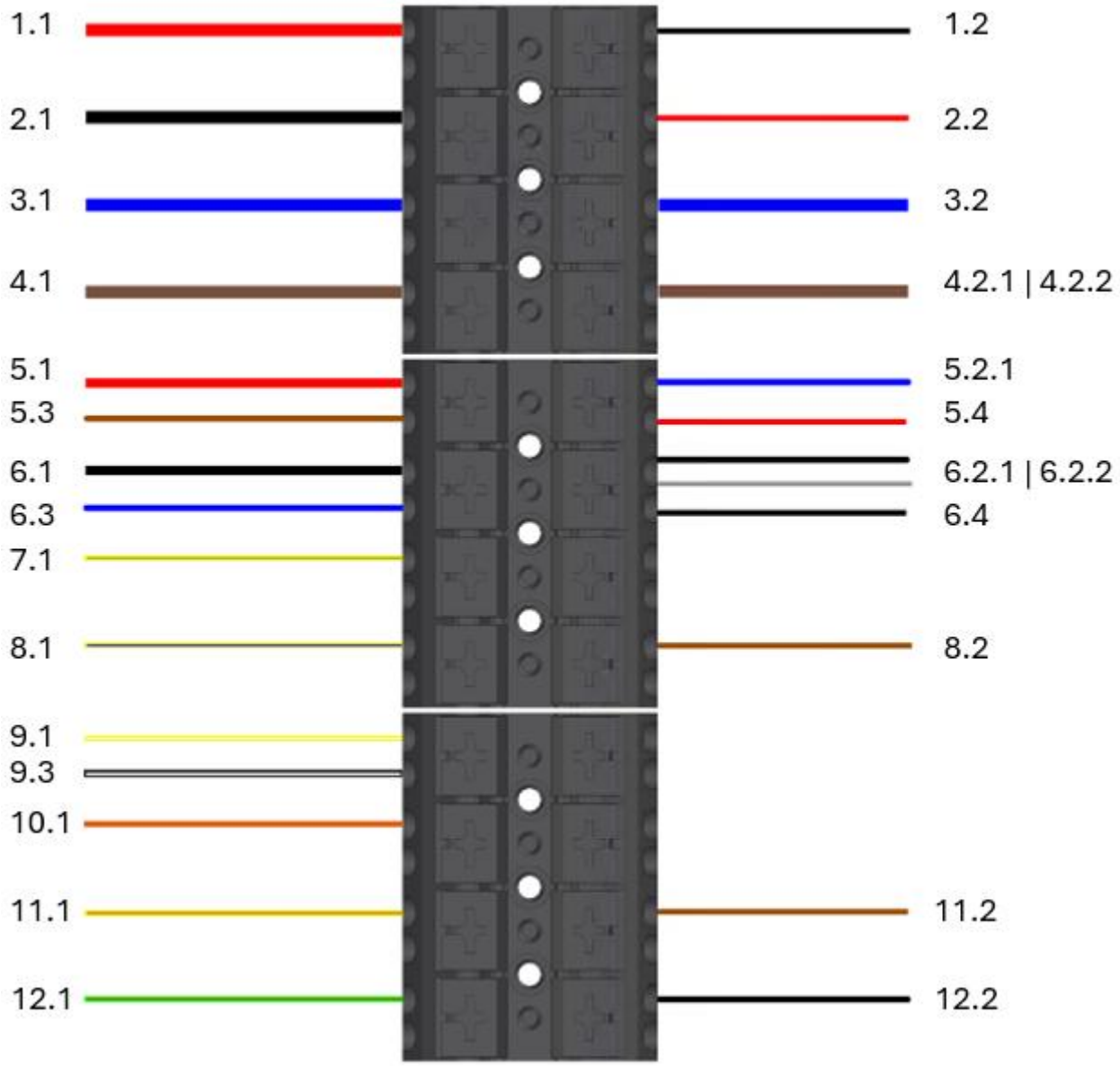


Figure 50

Hydraulic fan:

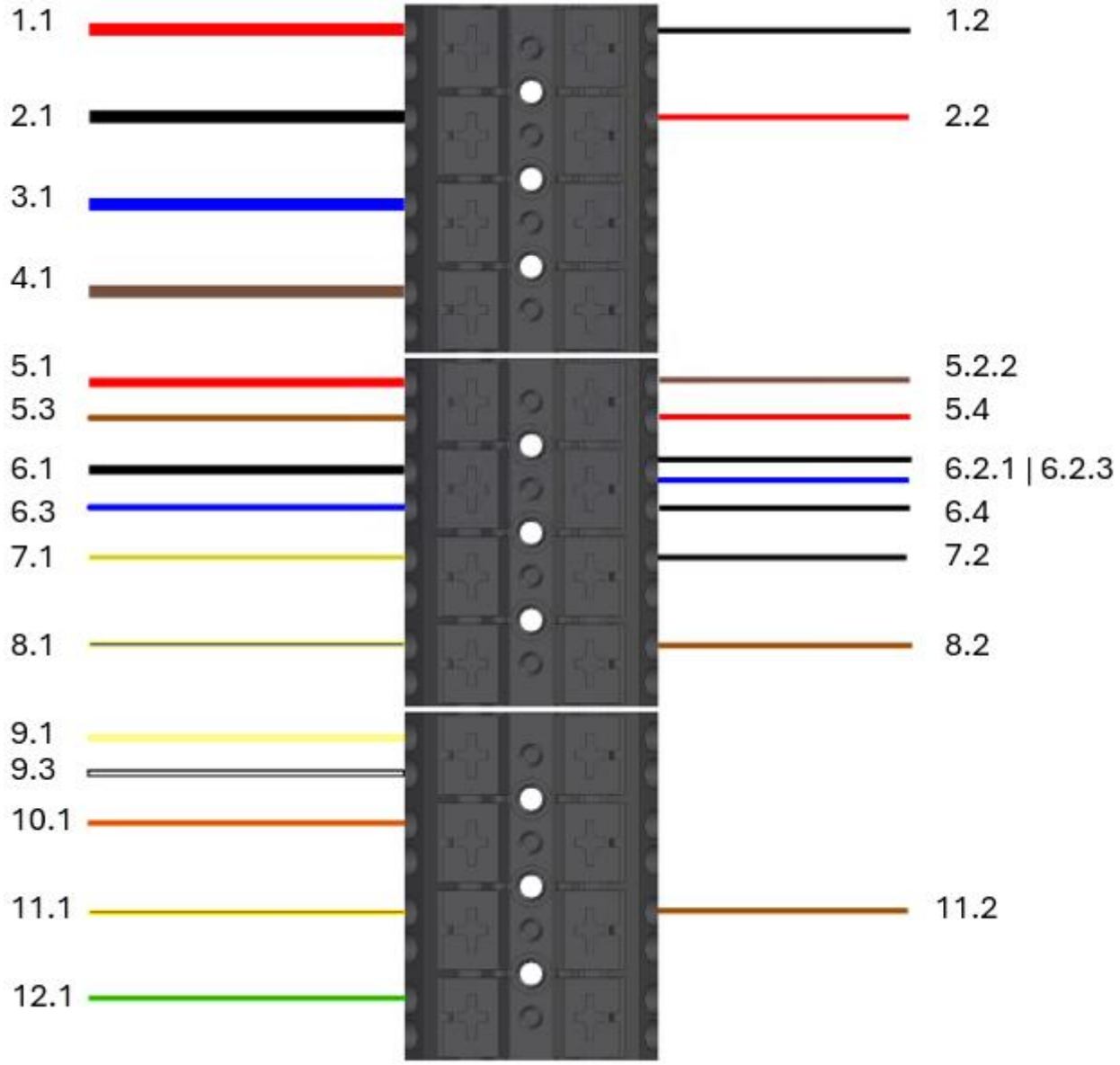


Figure 51

Number	Description	Colour	Cross-section (mm^2)	Function
1.1	Implement cable	Red	4	Seeding shaft PWM
1.2	Seeding shaft motor	Black	1.5	
2.1	Implement cable	Black	4	Seeding shaft earth
2.2	Seeding shaft motor	Red	1.5	
3.1	Implement cable	Blue	4	Fan PWM
3.2	Fan	Blue	4	
4.1	Implement cable	Brown	4	Fan earth
4.2.1	Fan	Brown	4	
4.2.2	Motor module	Brown	0.5	
5.1	Implement cable	Red	1.5	Sensor plus
5.2.1	Motor module	Blue	0.5	
5.2.2	Fan speed sensor	Brown	0.34	
5.3	Fill level sensor	Brown	0.34	
5.4	Encoder	Red	0.34	
6.1	Implement cable	Black	1.5	Sensor ground
6.2.1	Calibration button	Black	0.75	
6.2.2	Motor module	Grey	0.5	
6.2.3	Fan speed sensor	Blue	0.34	
6.3	Fill level sensor	Blue	0.34	
6.4	Encoder	Black	0.34	
7.1	Implement cable	Grey-yellow	0.75	Fan status input
7.2	Fan speed sensor	Black	0.34	
8.1	Implement cable	Blue-yellow	0.75	Calibration button input
8.2	Calibration button	Brown	0.75	
9.1	Implement cable	White-yellow	0.75	Fill level sensor input
9.3	Fill level sensor I	White	0.34	
10.1	Implement cable	Orange	0.75	Slave module release
11.1	Implement cable	Brown-yellow	0.75	Seeding shaft 1 speed input
11.2	Encoder	Brown	0.34	
12.1	Implement cable	Brown-green	0.75	Seeding shaft 2 speed input
12.2	Encoder	Brown	0.34	

Stripping length: 10 mm

12.2 MDP – MDC/MDG

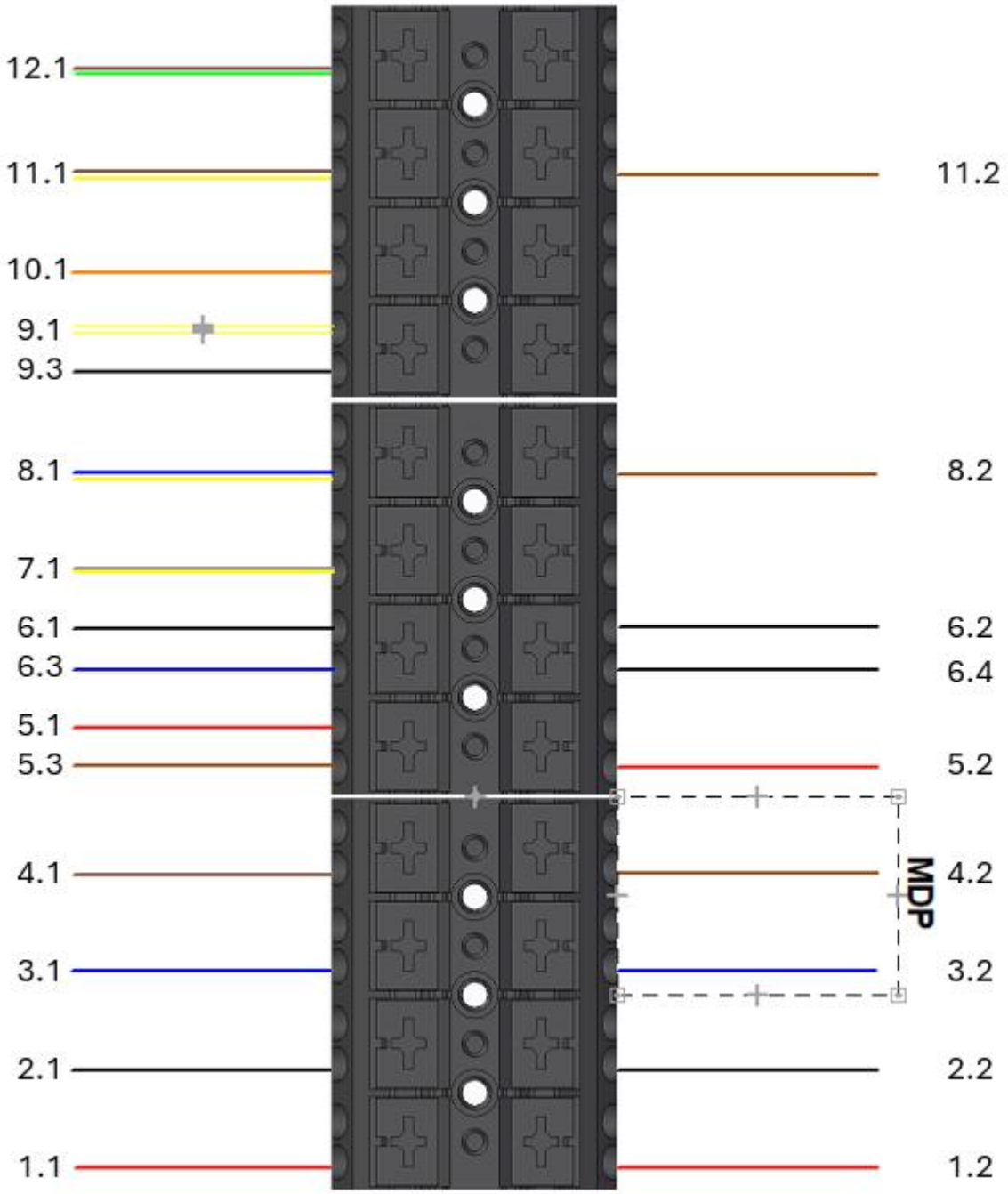


Figure 52

Number	Description	Colour	Cross-section (mm^2)	Function
1.1	Implement cable	Red	4	Seeding shaft PWM
1.2	Seeding shaft motor	Red	1.5	
2.1	Implement cable	Black	4	Seeding shaft earth
2.2	Seeding shaft motor	Black	1.5	
3.1	Implement cable	Blue	4	Fan PWM
3.2	Spreading plate	Blue	4	
4.1	Implement cable	Brown	4	Fan earth
4.2.1	Spreading plate	Brown	4	
5.1	Implement cable	Red	1.5	Sensor plus
5.2	Encoder	Red	0.34	
5.3	Fill level sensor	Brown	0.34	
6.1	Implement cable	Black	1.5	Sensor ground
6.2	Calibration button	Black	0.75	
6.3	Fill level sensor	Blue	0.34	
6.4	Encoder	Black	0.34	
7.1	Implement cable	Grey-yellow	0.75	Fan status input
8.1	Implement cable	Blue-yellow	0.75	Calibration button input
8.2	Calibration button	Brown	0.75	
9.1	Implement cable	White-yellow	0.75	Fill level sensor input
9.3	Fill level sensor I	Black	0.34	
10.1	Implement cable	Orange	0.75	Slave module release
11.1	Implement cable	Brown-yellow	0.75	Seeding shaft 1 speed input
11.2	Encoder	Brown	0.34	
12.1	Implement cable	Brown-green	0.75	Seeding shaft 2 speed input

Stripping length: 10 mm

NOTES

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