Profi-Speed

Operation

When the control unit is switched on, a display test is carried out at the beginning, all the LEDs and segments of the displays are active. The currently stored setting of the sowing parameters from the calibration test is then displayed. After displaying the sowing parameters, the control unit is in the idle state. The sowing process can now be started from this state. It is also possible (only!) to change to the calibration test and the parameter menu from this state.

To start the sowing process, press the ***Seeder button*** briefly. The ***LED flashes quickly*** while the fan is running up. As soon as the control unit is ready for sowing, the ***LED flashes slowly***, the fan is now running.

With linkage sensor: The actual sowing process is started via the linkage signal as soon as it changes to the lowered position. Now the speed of the sowing shaft is guided depending on the speed signal and the ***Led lights up***. The upper display shows the current sowing shaft speed. The lower display shows the currently driven speed. As soon as the linkage signal changes to raised, the seed shaft is stopped again.

Without linkage sensor: The seed shaft runs as soon as a driven speed is displayed.

Pressing the ***Seeder button*** briefly again ends the sowing process. The fan continues to run for a certain time while the ***LED flashes quickly***.

After that, the control unit is in the idle state again.

Calibration

Switch to the calibration test by pressing and holding the ***Program button***. As soon as the calibration test is active, the red LED (Prog) and the LED next to the speed display light up. The respective LED next to the display indicates which of the two values is being adjusted with the ***+ and - buttons***. To change between the values, briefly press the ***Program button***. Pressing and holding the ***Program button*** exits the programming mode and the new sowing parameters are saved.
The parameter in the lower display is the ***reference speed (vref).*** The calibration test is carried out at this speed. It is therefore advisable to select a speed as high as the desired working speed. The parameter in the upper display is the ***application rate in kg/ha*** to be applied.

If both values are set to the desired value, a ***calibration test*** can be started. To do this, press the ***Seeder button*** briefly. The calibration test can be carried out with or without an active fan (-> see parameter P004, standard setting without fan). A calibration time can also be selected. (-> see parameter P003, standard setting 60 seconds) The calibration test ends after the calibration time. However, this can also be ended beforehand by pressing the ***Seeder button*** briefly.
After the time has expired, the LED of the ***Seeder button*** flashes. The display at rpm jumps to the kg that has run down. This value must now be corrected to the weighed kg (1.00 = 1.00 kg). Briefly press the ***Program button*** to confirm the value. If you now press the ***Seeder button*** briefly again, a second calibration test starts immediately. The calibration test can be repeated as often as desired in this way. To save the settings and exit the calibration test, press and hold the ***Program button***.
If you want to interrupt the calibration test, switch the control unit off and on again with the main switch. The values are not saved.

The following ***ranges*** are possible:

Reference speed: 3 … 25km/h

Application rate: 5 … 300 kg/ha

Changing of output amount

To change just the output amount for the calibrated seed press and hold the ***Program button***. It is the same way as you start the calibration test. Change the output amount (kg/ha) in the upper display. Press and hold the ***Program button***. The control unit is in the idle state again.

Errorcodes

The control unit monitors the operating voltage and the current consumption of the motors. In the event of an error, these lead to the display of corresponding error codes, which are summarised here. An error is shown in the upper display and begins with "E".

Errorcode	Description	Note
E001	Operating voltage error	Voltage too high or too low
E002	EEPROM-error	Defect or SW problem
E003	Overcurrent fan	Fan current too high or driver error
E004	Overcurrent seeder motor	Motor current too high or driver error
E005	Undercurrent fan	Fan current too low, not plugged in, cable breakage
E006	Control deviaton seed shaft	Speed deviation at sowing shaft too high, encoder cable not plugged in, maximum speed reached
E007	External fan current error	Fan current too high or too low. This Error occurs just in connection with the fan control panel (optional)

Error codes may occur during the calibration test. Before each calibration test, the control unit calculates the expected results of the settings. If a value deviates too far, the following error codes may be displayed (e.g. when changing from a very small application rate to a very large application rate).

Errorcode	Description	Note
E101	Calibration error	Mit den aktuellen Einstellungen ist die berechnete Abdrehmenge zu niedrig. Abdrehzeit, vref oder Parameterwert P007 erhöhen.
E102	Calibration error	Mit den aktuellen Einstellungen ist die berechnete Abdrehmenge zu hoch. Abdrehzeit, vref oder Parameterwert P007 verringern.
E103	Calibration error	Mit den aktuellen Einstellungen ist der berechnete Kalibrierwert (=Parameterwert P007) außerhalb des möglichen Bereichs Abdrehzeit oder Parameterwert P007 ändern.
E104	Calibration error	Mit den aktuellen Einstellungen kann die berechnete Drehzahl nicht erreicht werden. Abdrehzeit, vref oder Parameterwert P007 ändern.

Parameter-Menu

To change to the parameter menu, press and hold the ***Program and + button*** simultaneously. The upper display shows the parameter number (e.g. P001) and the lower display shows the parameter value. To change to the next parameter, press the ***Program button*** briefly. The ***+/- buttons*** are used to set the respective value. Press and hold the ***Program button*** to exit the parameter menu and save the values.

List of parameters:

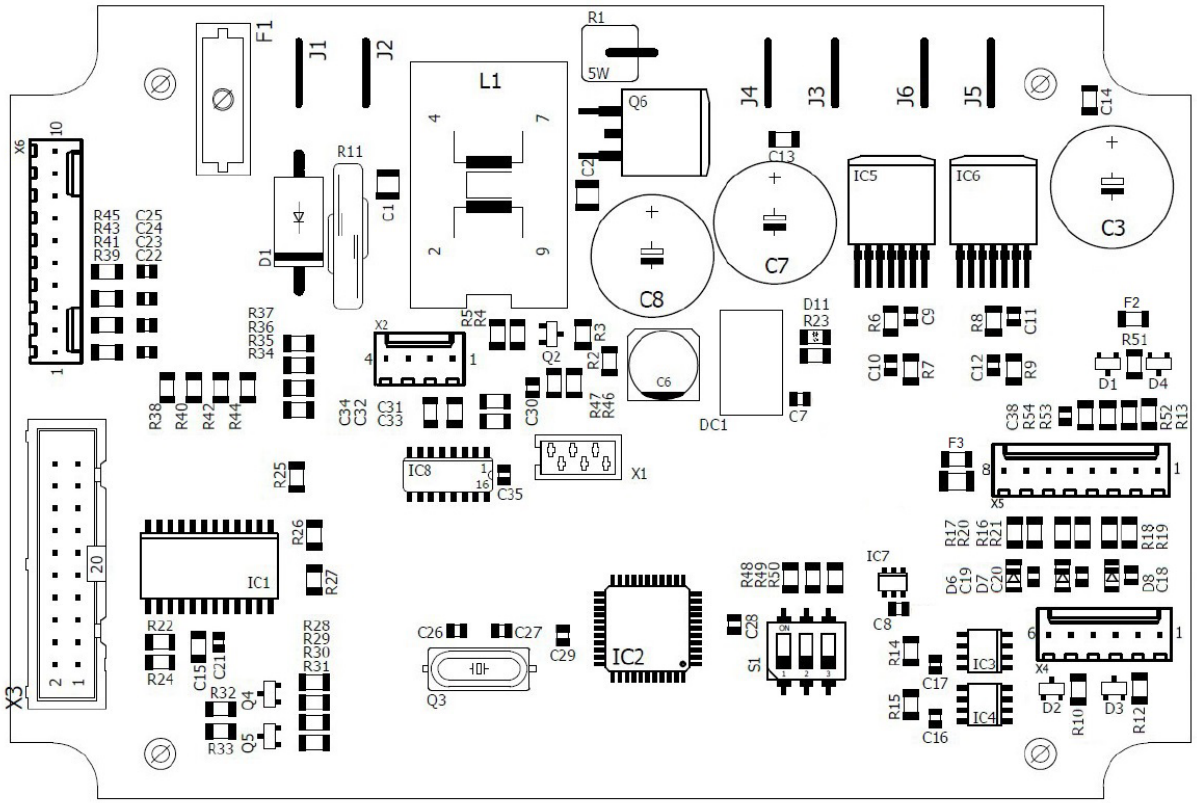
P001: Pulses per meter (PPM) for speed measurement in pulses/meter, (Range: 3,00 … 300,0)
P002: Activate speed-dependent control (1: active, 0: fixed with vref from calibration)
P003: Time duration of calibration in seconds, (Range: 5 … 600)
P004: Switch fan on/off during calibration (1: on, 0: off)
P005: Invert logic of linkage sensor (1: inverted, 0: normal)
P006: Working width in m. (e.g. 3.00 = 3m), (Range: 0,50 … 20,00)
P007: Calibration value of calibration in g/rev (e.g. 117.0 = 117.0 g/rpm), (Range: 5,0 … 990,0)
P008: Calibration mode (1: fine, 0: rough)
For 0.3 - 5kg weighed seed, set the mode to "fine".
For 5 - 300 kg weighed seed, set the mode to "rough"

Programming driving speed

If the pulses per metre are known, the value can be entered directly at parameter P001. Otherwise, the value can also be determined automatically as follows:
Switch to the parameter menu and display P001.
- Press the ***Seeder button*** briefly, the value jumps to 0.
- Drive 100m (measure beforehand), the speed does not matter. The value runs up on the display, the pulses are counted and converted to PPM.
- Stop and press the ***Seeder button*** briefly again.
- The value is now determined and can be entered directly in the future (e.g. when changing vehicles).
The value is saved by pressing and holding the ***Program button***.

Control board

Here is an over view plan of the control board. The electrical connections and the configuration switches are described below.



Leistungsanschlüsse (Flachstecker):

J1	+12V
J2	GND
J3	Fan +
J4	GND / Fan –
J5	Seed roll motor +
J6	Seed roll motor –

Signalanschlüsse:

X1	Programming connector
X2	RS-232 (for development)
X3	Display
X6	Control panel

X4	Anschluss Signalsteckdose PNP (NPN)	
	X4-1 +12V Signalsteckdosen	(+12V)
	X4-2 GND	(GND)
	X4-3 Signal Hubwerk	(+12V)
	X4-4 GND	(Signal Hubwerk)
	X4-5 Signal Geschwindigkeit	(+12V)
	X4-6 GND Signalsteckdose	(Signal Geschw.)

X5	Anschluss Encoder Säwellenmotor	
	X5-1	
	X5-2	
	X5-3	
	X5-4	
	X5-5 +12V Encoder	
	X5-6 Kanal A	
	X5-7 Kanal B	
	X5-8 GND Encoder	

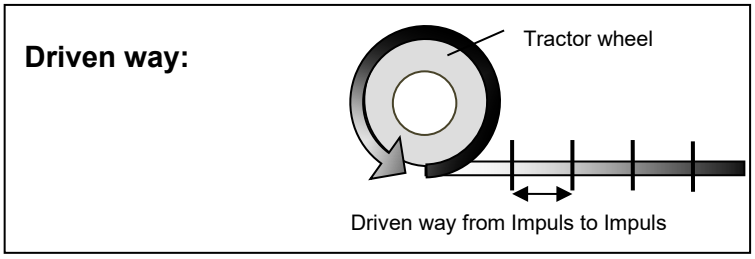
Konfigurationsschalter (S1):

S1-1	Without function	
S1-2	Fan connection:	0: internal, 1: external with relay
S1-3	External fan control:	0: active, 1: deactive

SENSORS:

The speed sensor reacts to metal.
Sensor diameter: 12mm, max. switching distance: 4mm.
To be able to measure the speed, the sensor needs impulses (e.g. screw heads). The screw heads can be glued on a roller or on the inner rim of the tractor (e.g. with super glue). The speed is given in mm/pulse. The distance travelled between pulses must be a value of min. 1 to max. 300.

Calculate the number of screw heads needed as follows:
For example: Your wheel/roller has an outer diam of 2m. The circumference (diameter x 3.14 = circumference) is 6.28m = 6280mm. The max. distance from impulse to impulse must be less than 300. So in this case (6280/300=20,93) we need **at least 21 signals**. Better are min. 40 signals. The signals can be mounted in any radius. Note that the sensor switches off between the signals.



Checking the pulses/signals: Check the signals before the first use.
Attention! The sensor must count each signal (light on) (fig. 1) and switch off between all signals (light off) (fig. 2).


Abb. 1: Light on!

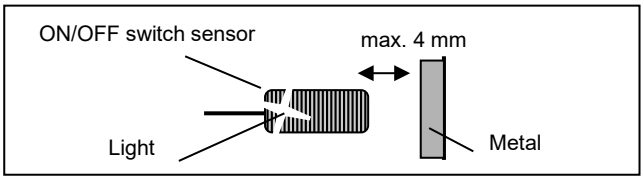

Abb. 2: Light off!

Troubleshooting:

1. If the light does not shine, the distance to the metal may be too great. (max. 4mm).
If the light shines continuously, the distance from pulse to pulse is too small. Mount the impulses in a larger radius.

Mounting option speed sensor:

The ON/OFF switch sensor stops the seeding shaft as soon as there is no metal opposite and switches the seeding shaft on as soon as there is metal opposite. It is possible to change the logic of the ON/OFF switch sensor. See parameter P005.
Sensor diameter: 12mm; max. switching distance: 4mm.
You can check whether the sensor has contact. If the sensor has metal opposite, the light on the sensor must light up. If the metal opposite is gone, the light goes out.



Mounting option ON/OFF switch sensor:

The sensors are identical in construction.
The sensor cables on the control unit are connected differently.
The sensor cable with the **red marking** is the cable for the **ON/OFF switch sensor**.
The sensor cable **without marking** is the cable for the **speed sensor**.

Connection wit low-level hopper sensor and PROFI-SPEED control unit

Connection plan TP ÖKO-AIR with PROFI-SPEED