PROFI PILOT

Radio remote control for agriculture

Document version: 0.2
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Implementation: Standard

Version overview

Date	Version	Description
22/01/2020	0.1	Creation
16/07/2020	0.2	General revision

Contents

2 Introduction

The ProfiPilot radio system consists of a transmitter and a receiver. In special cases, a transmitter can also trigger two receivers. Communication is bidirectional.
Thanks to ingenious radio technology, very large distances of several kilometres can be covered, sometimes with no line of sight.
In addition, the receiver has an integrated PLC so that more complex links can be implemented and any inputs/output triggered.

The transmitter has a 7" touch display with a maximum of 28 programmable buttons, which can display response from the receiver. In special cases, you can add an extra side to get an additional 28 buttons.

Depending on the version, the receiver has various relay outputs and inputs for pressure, flow and level sensors, as well as for temperature, alternator, etc.
Individual solutions are implemented quickly and efficiently depending on the requirements.

3 Proper use

The controller may only be used for slurry or water pumps.

This product in this configuration must **NOT** be used for safety-critical applications where a defect or malfunction of the product may endanger persons or cause serious material damage.

4 Foreseeable misuse

1. Use cable cross-sections dimensioned for your consumers to prevent any fire or short circuit.
2. Mount the controller on rubber buffers so as not to reduce the lifespan of the controller.
3. Position the antenna as far as possible from the ground to ensure optimal radio communication.
4. Switch on radio interruption monitoring (see 6.5.5, page 12) so that the pump switches off automatically if the connection is lost.

5 Safety information

The installation, service and settings of the receiver may only be carried out by electrically trained personnel.
It is imperative that all installation and safety standards are adhered to.

Before activation, check the receiver type plate to see if the correct operating voltage is used in terms of power and voltage.

If the control is mounted on a vibrating surface, suitable rubber buffers must be installed according to the weight.

The receiver terminal box may only be opened when there is not current. Never work on the terminals or on the controller under voltage!

If your system has the "blow-out" function, it must be ensured that air CANNOT escape through the intake manifold (flying parts, risk of death due to impact)!

If welding work is carried out on the machine/system, the ProfiPilot must be completely disconnected from the power supply/terminal to prevent possible destruction of the electronics.

The transmitter is NOT waterproof. Protect it from continuous rain or other splashes through water.

The ProfiPilot radio remote control must NOT be used for safety-relevant applications where a defect or malfunction of the product may endanger persons or cause material damage.

6 Transmitter

6.1 Switching it on

The transmitter is switched on by pressing the button on the right side of the transmitter housing. As soon as the transmitter is switched on, the button lights up in blue.

6.2 Switching it off

If you want to switch off the transmitter permanently, you have to press the button on the right side of the transmitter housing for approx. 4-5s. If the switch-off process is successful, a brief message appears on the display indicating that it is shutting down.

6.3 Standby

If you want to put the transmitter in standby mode to save the battery, press the button on the right side of the transmitter housing briefly. The button remains on in blue, but the display is switched off.

6.4 Switching on the radio connection

No radio communication is active after the transmitter has been switched on (see 6.1).
To activate this, you have to switch on button 14 (see Figure 1, page 6). If the message "Everything OK" appears in the status line, a radio connection to the receiver has been successfully established.

6.5 General functions

Figure 1: Transmitter functions

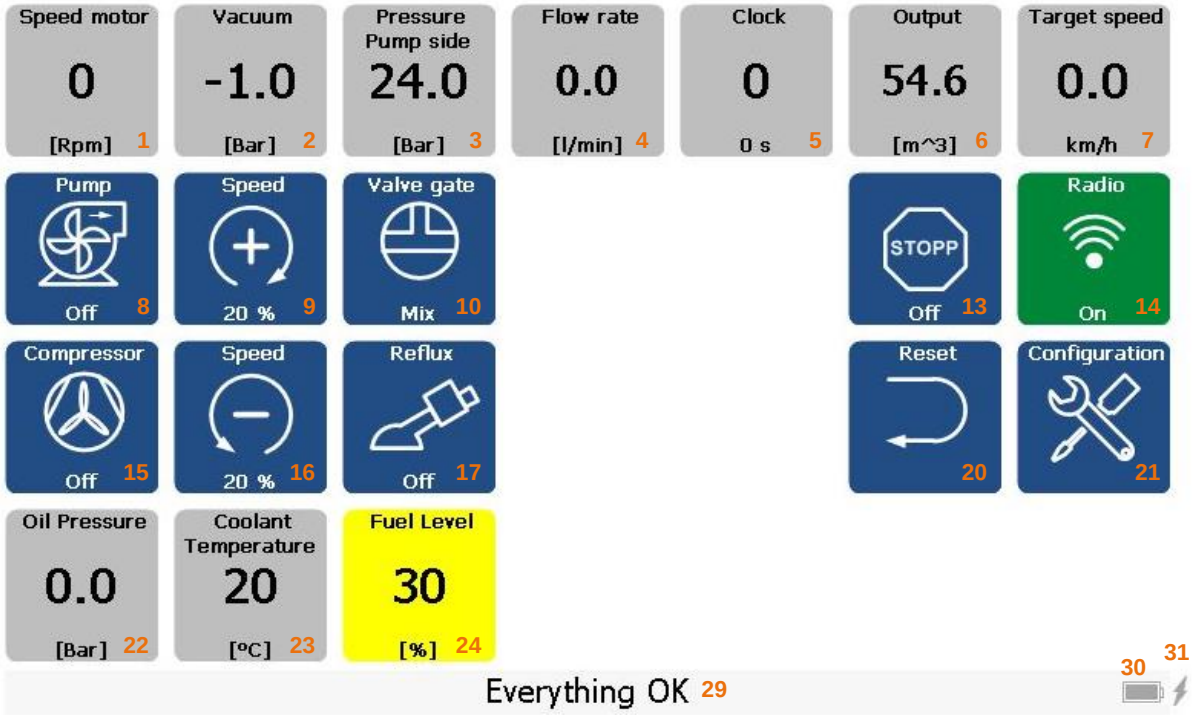


Table 1: Functional description - main page

Button	Function	Description
1	Engine speed	Engine speed display in rpm
2	Vacuum - suction side	Suction vacuum of the pump feed line.
3	Pressure - pressure side	Pump pressure display
4	Flow Pump side	Display of the flow in [l/min] or [m^3/h], which is measured on the pump side. Pressing this button takes you to the setting menu for the flow sensors. See section 6.5.1, page 8.
5	Time	Pressing this button takes you to the hour counter menu (resettable and non-resettable). See section 0, page 9.
5 (optional)	Flow - drag hose side	Display of the flow in [l/min] or [m^3/h], which is measured with the drag hose. This function is only available if the transmitter also has a connector for the additional flow counter. If the system has two flow counters (pump and drag hose), the line can be monitored for leaks and automatically switched off if the difference is too great. If the user already has a flow counter in the tractor/drag hose, the flow can only be measured and displayed with this device.
6	Spreading	Spreading rate in [m^3] based on the flow. Pressing this button takes you to the menu of other spreading counters (resettable and non-resettable). See section 6.5.3, page 10.

7	Driving speed setting	Shows the target driving speed so that you can spread a desired amount of slurry per hectare. If you press this button, you get to the setting menu for calculating the target driving speed. See section 6.5.4, page 11
8	Pump	Switching the pump on/off
9 *	Increasing speed	If you tap the button, the speed increases by 1%. If the button remains pressed, the counter counts up faster and as soon as you release it, the speed is sent to the receiver/pump.
10	Slider for circulation (Mix) or spreading	This slider sends the slurry to the drip hose distributor (spread) for spreading. If the slide is in the (Mix) position, pumping is circulated and there is NO spreading.
13	STOP	If the pump (8) stops immediately, it sets the slide to Mix (10) and reduces the speed to minimum (16).
14	Radio On/Off	This button must be switched on so that there is a radio connection between transmitter and receiver.
15	Compressor	In order to be able to clean the lines after successful spreading, you can have them blow out by starting the compressor.
16 *	Reducing speed	If you tap the button, the speed decreases by 1%. If the button remains pressed, the counter counts down faster and as soon as you release it, the speed is sent to the receiver/pump.
17	Return flow	Opening/closing the return flow
20	Reset	If there is an error, this button can be used to acknowledge the error if it is no longer present.
21	Configuration	Pressing this button takes you to the system parameters menu. See detailed description in section 6.5.5, page 12.
22	Oil pressure of engine	Displays the engine oil pressure
23	Cooler temperature	Displays the engine cooler temperature.
24	Diesel tank level	Displays the level of the diesel tank.
29	Message display	Displays possible error messages. If there is no error and radio connection could be established, "Everything OK" appears. If the mode selector switch on the receiver is "Manual", a message appears on the transmitter stating that the system is in manual mode. In this mode, the pump CANNOT be operated using the radio control.
30	Battery status indicator	Displays the battery charging status in [%]. If the charging status is 5-7%, the battery is actually empty and therefore the transmitter can go off at any time.
31	Charging status	If the "flash" is present, the transmitter is being charged or the charging cable is plugged in.

6.5.1 Flow configuration submenu

If you press the "Flow" button (4), a new window opens, where you have to enter a password first. To change the settings, you have to enter the password "1234". If you do not enter a password, you can only view the settings (A, B, C) and cannot change them.

Figure 2: Flow configuration parameters submenu

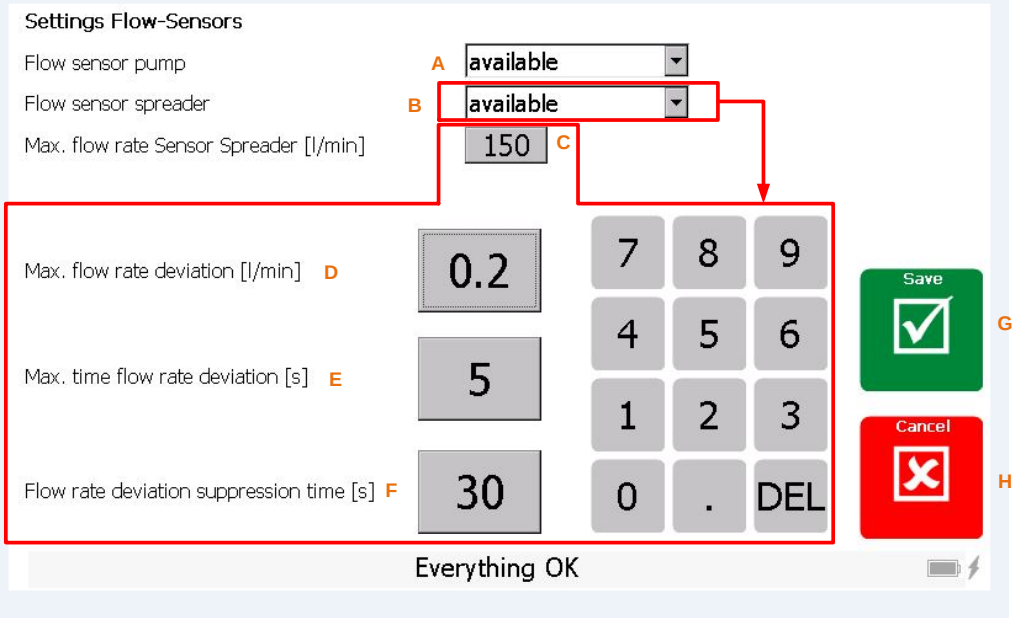


Table 2: Explanation of the flow configuration parameters

No	Function	Description
A	Flow sensor pump → available/not available	If a flow counter is installed on the pump, it can be activated via this function. You can scale the 4…20mA signal from the flow device of the pump in the system settings (see Table 6, page 13, point 5)
B	Flow sensor drag hose → Available/not available	If a flow counter is installed on the drag hose, it can be activated using this function. Then the additional parameter settings C, D, E and F appear
C	Max. flow rate sensor on the drag hose [l/min] or [m^3/h]	Maximum value of the flow sensor (only affects the flow sensor on the drag hose) so that scaling is carried out correctly. This value can be acquired from the flow counter.
D	Max. flow difference [l/min] or [m^3/h]	If this flow difference between the pump and the drag hose is longer than defined in E, an error message is issued and the pump is switched off. There may therefore be a leak or it may take longer to fill the pipes with slurry. In this case, see parameter F.
E	Max. time flow difference [s]	See description D
F	Flow difference suppression time [s]	As long as the line is not filled with slurry, there is a flow difference between the two measuring devices. Depending on the line length, it may take longer to measure the same flow on both measuring devices. During this start time F, the difference is ignored and there is no error message.

6.5.2 Clock/hour counter submenu

If you press the "Clock" button (5), a new window opens in which the stopwatch and the hour counter are displayed.

Figure 3: Clock/hour counter submenu

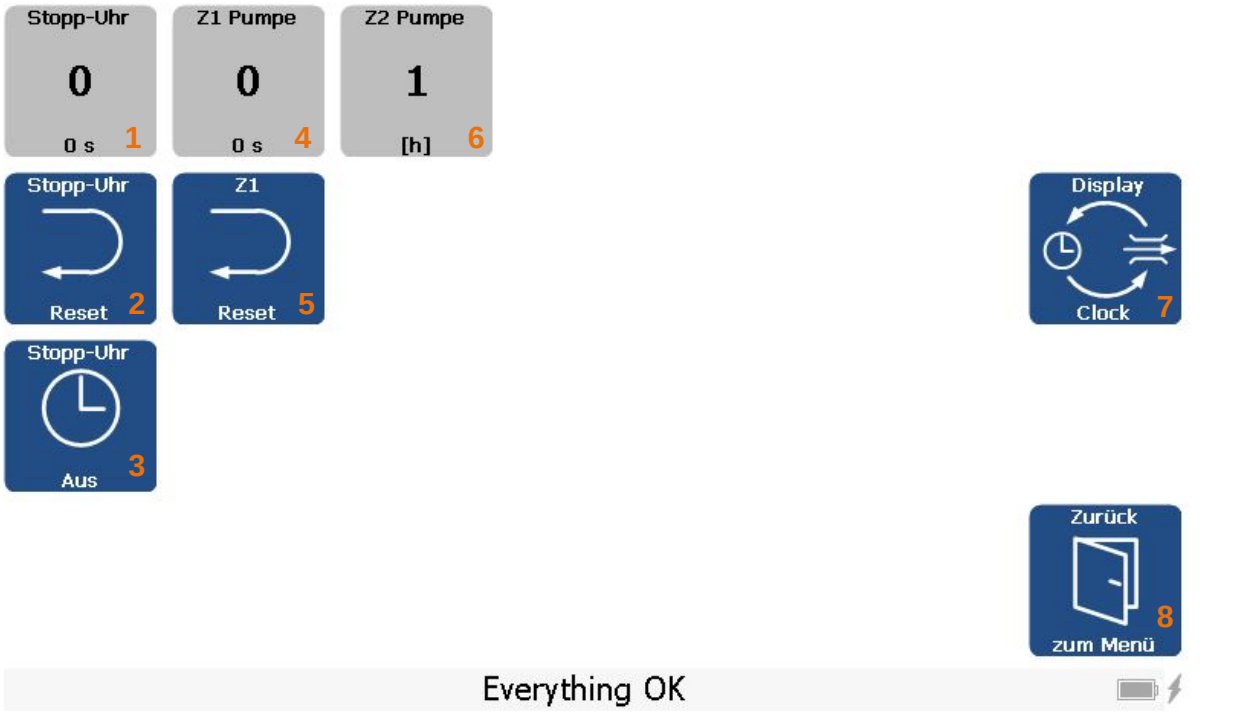


Table 3: Explanation of the Clock/hour counter functions

No	Function	Description
1	Stopwatch	You can start and stop the stopwatch using button 3. Push button 2 to reset the stopwatch. It is used for measurement purposes, for example to record the spreading time for one day.
2	Resetting the stopwatch	See explanation (1)
3	Starting/stopping the stopwatch	See explanation (1)
4	Pump operating hours	Z1 is a resettable operating hours counter of the pump. As soon as the pump is running, the operating time is recorded/increased.
5	Resetting the pump operating hours	To reset the operating hours counter Z1.
6	Total pump operating hours	The operating hours counter Z2 cannot be reset. It records the total operating time of the pump.
7	Switching the clock/flow counter	If the transmitter has two flow counters (one on the pump and one on the drag hose), the second flow counter is also displayed on the main page. However, if the user prefers to have the clock shown on the main page, he/she must press this button 7. This triggers the switchover to show the clock again on the main page.
8	Back to menu	Button to return to the main functions.

6.5.3 Spreading submenu

If you press the "Spread" button (6), a new window opens in which the spreading counters are displayed.

Figure 4: Spreading counter submenu

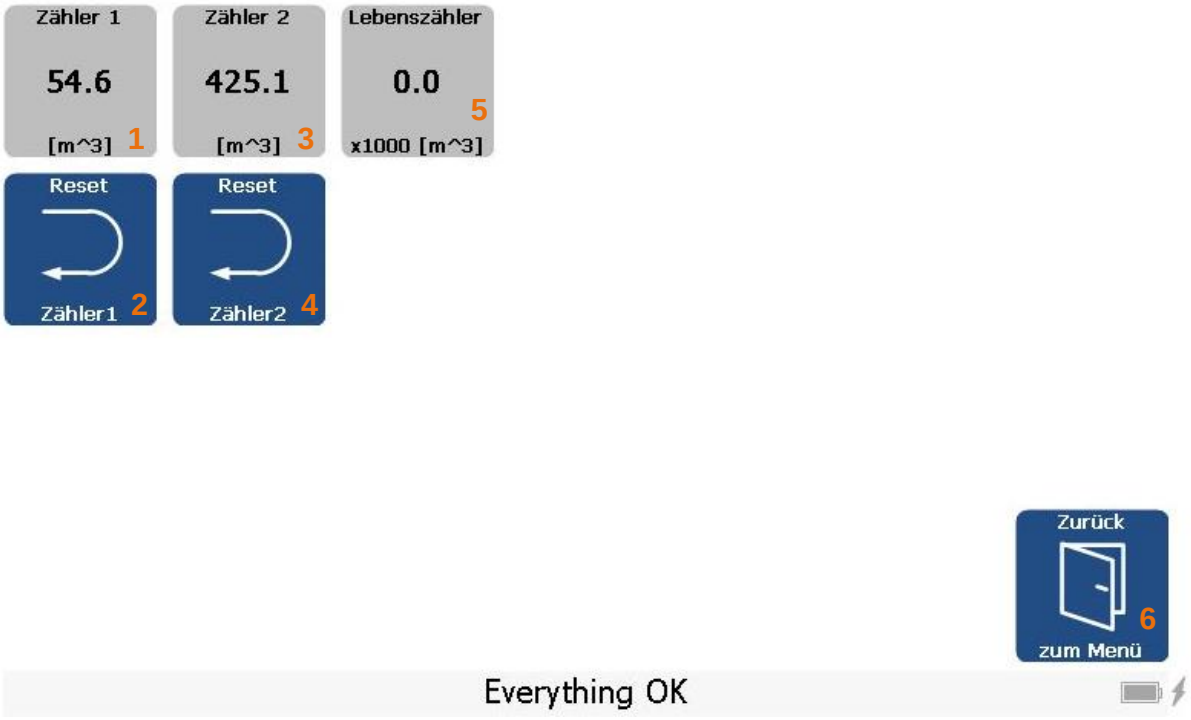


Table 4: Explanation of functions of the spreading counter

No	Function	Description
1	Quantity counter 1	Resettable quantity counter in [m^3]. As soon as the pump is running, the volume is recorded based on the flow.
2	Resetting quantity counter 1	Resetting quantity counter 1 (e.g. customer quantity counter).
3	Quantity counter 2	Resettable quantity counter in [m^3]. As soon as the pump is running, the volume is recorded based on the flow.
4	Reset quantity counter 2	Resetting quantity counter 2 (e.g. daily quantity counter).
5	Life counter	Life counter that cannot be reset. Displays the total amount pumped in 1/1000 [m^3]. For example, if the value is 1, this corresponds to 1 x 1000 = 1000 [m^3].
6	Back to menu	Button to return to the main functions.

6.5.4 Target speed submenu

If you press the "Driving speed specification" button (7), a new window opens for calculating the driving speed so that the corresponding amount of slurry per [ha] can be applied.

Figure 5: Target speed submenu

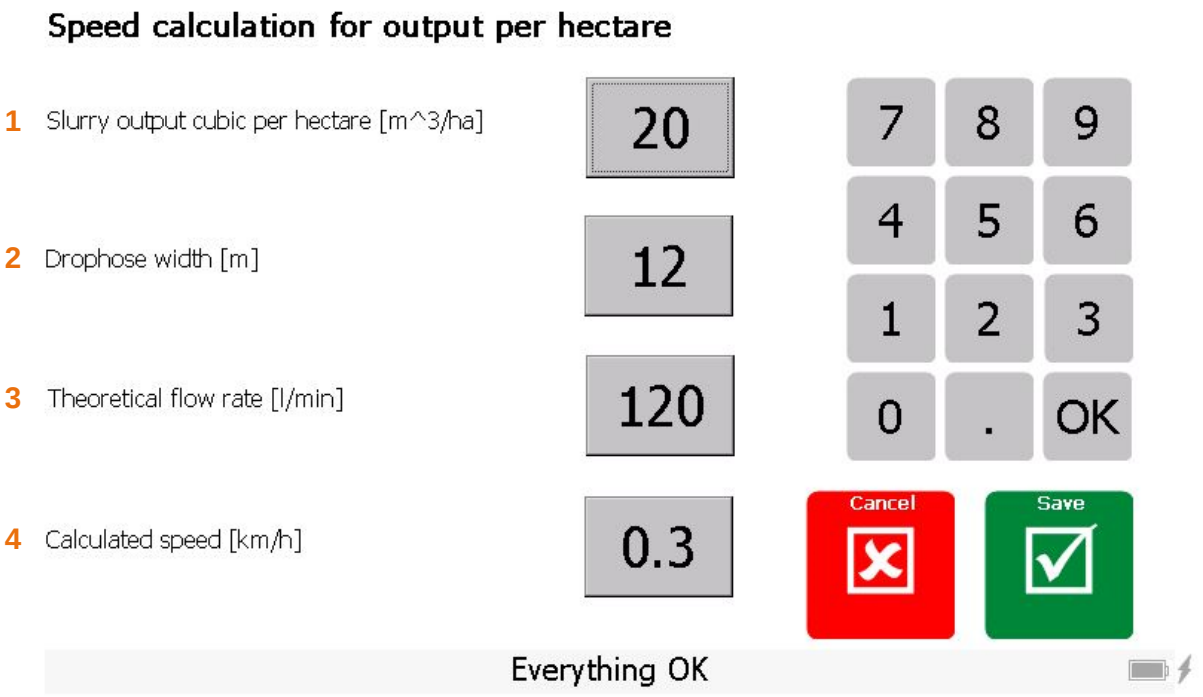


Table 5: Explanation of target speed settings

Button	Function	Description
1	Slurry quantity cubic metres per hectare [m^3/ha]	Entering the desired amount of slurry spread over one hectare.
2	Drag hose width [m]	Entering the drag hose width so that the spreading rate can be calculated.
3	Desired flow rate [l/min] or [m^3/h]	Desired pump output in [l/min] or [m^3/h]. The unit can be changed in the system settings.
4	Calculated driving speed [km/h] or [mi/h]	The driving speed is calculated based on the previous parameters in order to be able to spread the corresponding amount of slurry per hectare. The unit can be changed in the system settings.

6.5.5 Submenu system configuration

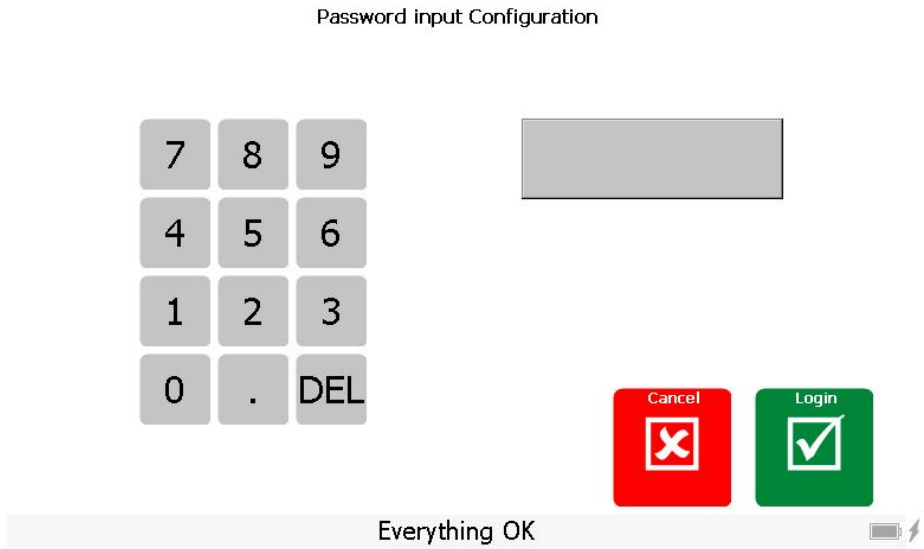
If you press the "Configuration" button (21), a new window opens where you can make the system settings.

Figure 6: System configuration submenu

The language (1), the unit of speed (2) and the unit of flow (3) can be changed quickly and without login. With button (4), you can access the detailed system settings (see Table 6, page 13) and with button 5 you can call up information about the system. This can be helpful in the case of service/support. Use button 6 to return to the operating overview.

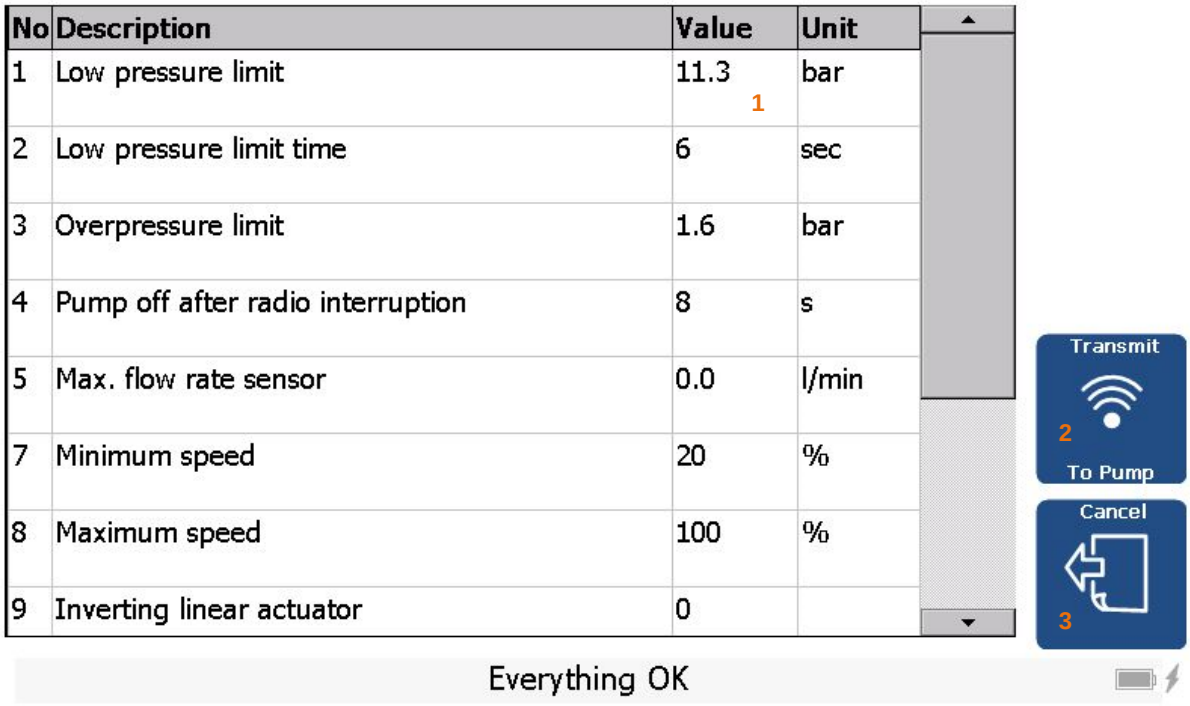
If you press button (4), another window opens, where you will be prompted to enter a password first. If you do NOT enter a password, you can only view and change a limited number of parameters. There are working parameters, some of which have to be adjusted during spreading. With the password "1234", you get authorisation to change all parameters. You can only change parameters in the transmitter and not in the receiver.

Figure 7: Password entry



The parameter list is customer-specific. Depending on the application, different parameters are required. Below you will find the standard parameter list:

Figure 8: Configuration parameters



If you type in a cell of the Value column (1), a number pad opens where you can enter the new parameter value. However, this is only possible if you have logged in with the correct password. If you want to activate the changes, you have to press button (2). The parameters are then transmitted to the pump. If the button (2) appears green, the storage was successful. With button (3), you can discard the changes and return to the main menu.

Table 6: Explanation of configuration parameters

No	Function	Description
1	Negative pressure [bar]	Enter the negative pressure in [Bar]. If this value falls below the set time (see parameter below), an error message is issued and the pump switches off.
2	Vacuum bridging time [s]	Time period in which the pressure may be below the negative pressure without an error message being triggered. If the time is set to 0, negative pressure monitoring is switched off.
3	Overpressure [bar]	If overpressure rises above this set limit, an error message is triggered and the pump is switched off. If the value is set to 0, overpressure monitoring is switched off.

4	Pump off after disconnection [s]	If the receiver does not receive any valid telegrams within this set time, the pump switches off automatically. This is a safety precaution that the pump switches off automatically when radio contact is cut off. If the value is set to 0, monitoring is switched off.
5	Max. flow rate of sensor on the pump [l/min] or [m^3/h]	Maximum value of the flow sensor (only affects the flow sensor on the pump) so that scaling is carried out correctly. This value can be acquired from the flow counter. If the flow meter is connected to the transmitter, the configuration must be carried out according to section 6.5.1, page 8 (by pressing the flow sensor button).
6	Min. pressure value of pressure sensor suction side [bar]	Minimum value of the pressure/vacuum sensor so that scaling is carried out correctly. This value can be found on the vacuum measuring device (type plate).
7	Max. pressure value of pressure sensor suction side [bar]	Maximum value of the pressure/vacuum sensor so that scaling is carried out correctly. This value can be found on the vacuum measuring device (type plate).
8	Min. pressure value of pressure sensor pressure side [bar]	Minimum value of the pressure sensor so that scaling is carried out correctly. This value can be found on the pressure measuring device (type plate).
9	Max. pressure value of pressure sensor pressure side [bar]	Maximum value of the pressure sensor so that scaling is carried out correctly. This value can be found on the pressure measuring device (type plate).
10	Minimum speed [%]	Minimum speed specification in [%]. The user cannot go below this speed.
11	Maximum speed [%]	Maximum speed specification in [%]. The user cannot go above this speed.
12	Inversion of linear engine	0: No inversion. 100% with extended linear engine and 0% with retracted one. 1: Inversion. 100% with retracted linear engine and 0% with extended one.
13	Alternator pole number	Number of alternator poles. Is required for the correct conversion of Hz/rpm.
14	Alternator/engine transmission	Transmission ratio via the V-belt from the engine to the alternator
15	Max. alternator frequency [hz]	Maximum frequency of the alternator
16	Engine pump max. starter time	Maximum starter time in [s]. If the successful start is recognised earlier by the response D+, this process stops early in order to protect the starter. If this time is exceeded, an error message is issued.
17	Max. starter speed	If this value = 0, the starting process takes place according to parameter 16 and this parameter has no effect. If this value is > 0, the starting process ends as successful when the configured speed has been reached. However, an error occurs if the speed of parameter 17 is not reached within parameter time 16.
18	Speed pre-selection during start of engine [%]	If the engine or the pump is started, the speed is set to this value before starting in order to always have a predefined starting speed
19	Engine pump min. oil pressure [bar]	Minimum engine oil pressure. If this value becomes too low, the engine stops and an error message is issued.
20	Max. cooling water temperature [°C]	Maximum allowed cooling water temperature of the engine. If this value becomes too high, the engine stops and an

		error message is issued.
21	Compressor preheating [s]	Preheating time of the compressor starting procedure until the compressor starter is actuated.
22	Starting time of compressor [s]	Constant starting time to start the compressor
23	Return slide for trigger time [s]	Trigger time of the return slide until the end position has to be reached.
24	Slider for trigger time [s]	See description parameter 25
25	Limit switch for slide available	0 = not available, therefore fixed time triggering according to parameter 24) 1 = available, thus limit switch triggering. However, if the limit switches have not been reached within parameter time 24, an error message is issued.
26	Speed for "Mix" slide position	Predefined speed when the user sets the slider to "Mix". Then he/she can make the fine adjustment using the speed buttons +/-. See detailed explanation Figure 16 and Figure 17, page 23 to 24
27	Speed for changeover of slider position to "Distribute"	When changing from mixing to distributing, the speed is first set to this position. See detailed explanation Figure 16 and Figure 17, page 23 to 24
28	Delay of speed change for slide position "Distribute"	Waiting time in [s] after the slider has been switched to the distribute position until the speed is increased to parameter 29. See detailed explanation Figure 16 and Figure 17, page 23 to 24
29	Speed for slide position "Distribute"	Predefined speed when the user sets the slider to "Distribute". Then he/she can make the fine adjustment using the speed buttons +/-. See detailed explanation Figure 16 and Figure 17, page 23 to 24

In order for the parameters to be saved correctly, the receiver and radio communication must be switched on completely.

The values are only saved when the "Send to pump" button (2) has been pressed and it switches to "green".

7 Control with integrated ProfiPilot

7.1 Additional safety instructions

If the control is used outside, it must not be exposed to direct weather influences so as not to reduce its service life unnecessarily. Protect the control from splash water and other environmental influences (canopy or similar).

Check your cable cross-sections for the current drawn and make sure that they are sufficiently large.
Also note the respective protections within ProfiPilot (see diagram).

Before working on the pump, it must be ensured that all hoses are correctly fixed and that only specialists are within a 10 m radius of the pump!

7.2 Operating conditions

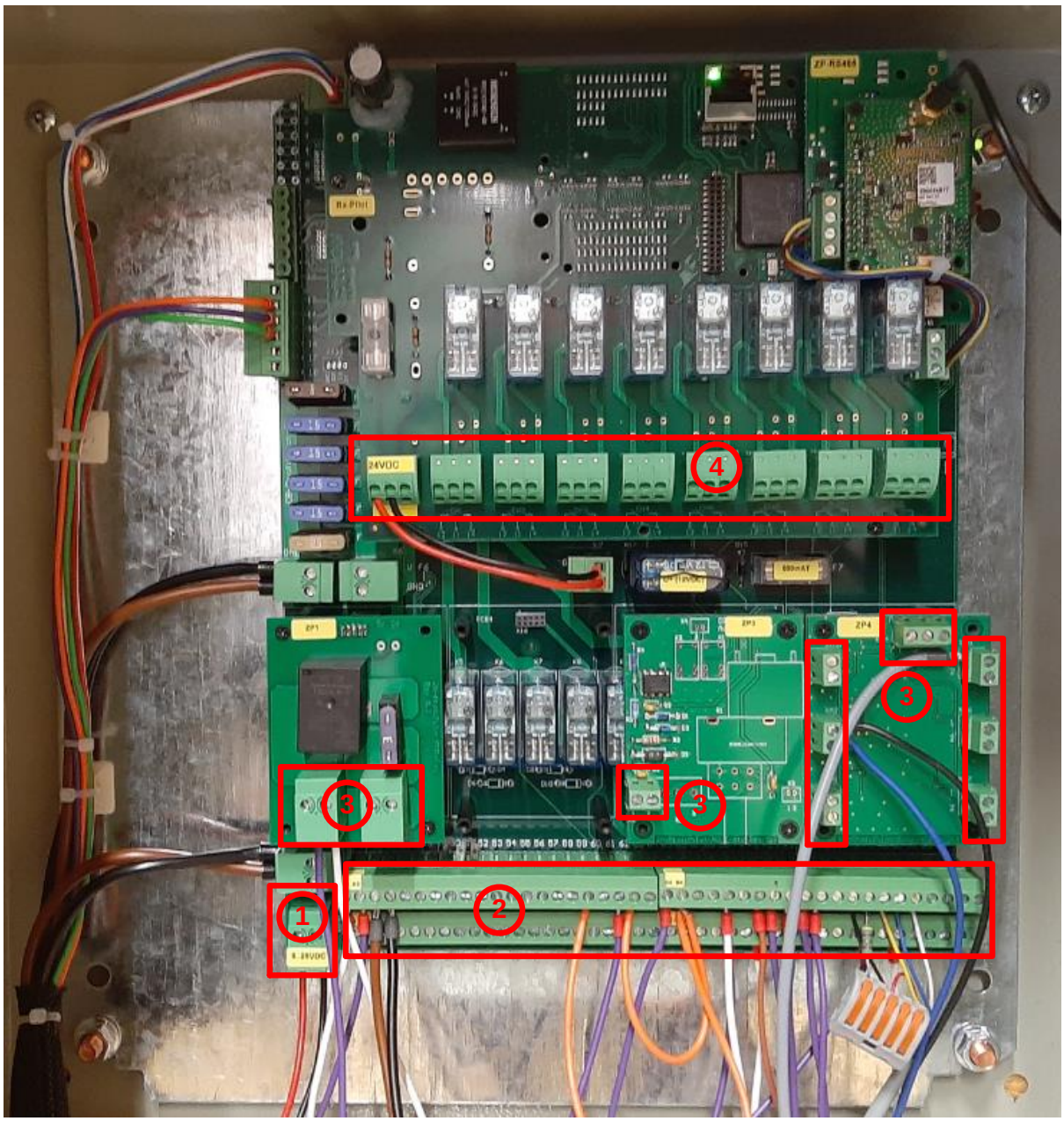
Supply line	8..28VDC/10 mm^2
Back-up fuse max.	30A
Protection class	IP54 (protection against splashes of water on all sides)
Start-up cycles	Do not turn on/off more than 40 times per hour
Operating temperature	-10°C up to +50°C
Relative humidity	< 90% without frost

7.3 Connection

7.3.1 General information

The feed (1) can be loaded with a maximum of 30A. All functions (2) are wired to plug-in terminals (2) and can therefore be connected easily and clearly. The load per relay group is shown in the attached diagram. Depending on the additional option, additional modules (ZP1 ...ZP4) are equipped (3), where appropriate terminals are also available. If the application specifically requires many potential-free contacts, these are available on the terminals (4).

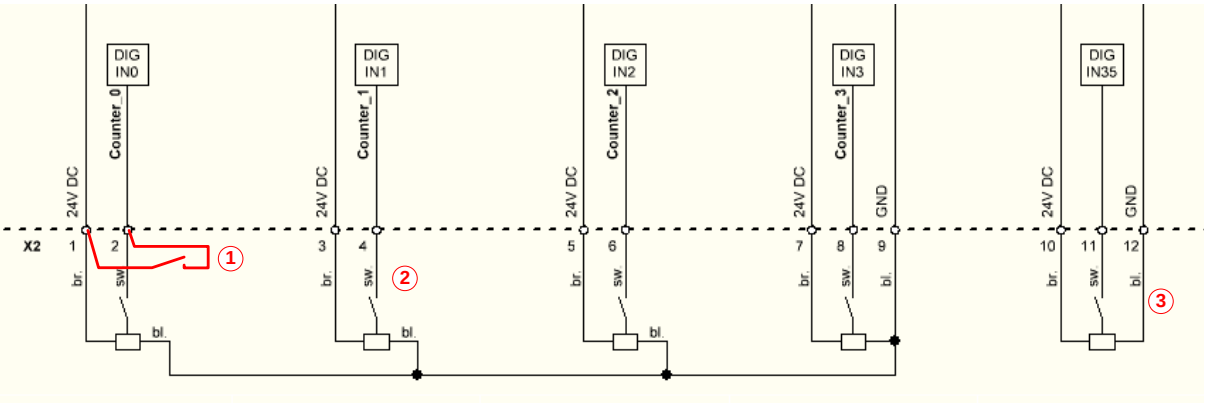
Figure 9: Controller connection and terminals



Never work on the terminals or on the controller under voltage!

7.3.2 Connection of inductive sensors

Figure 10: Connection of digital inputs/counters

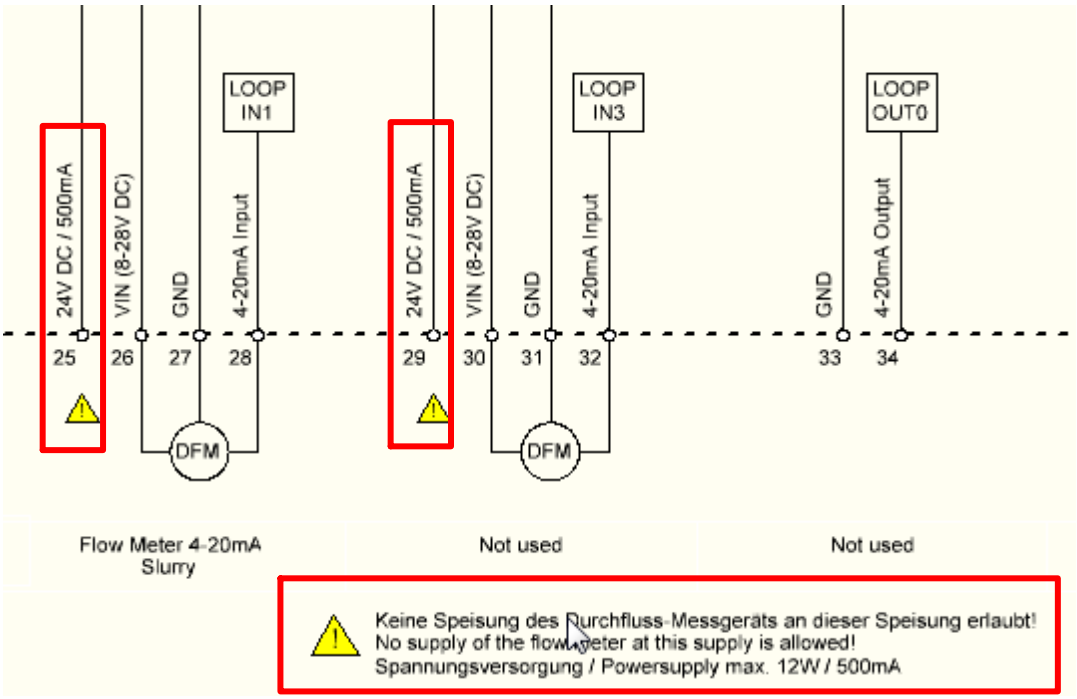


Depending on customer requirements, it is possible to implement a maximum of 4 counter inputs (e.g. for speed measurements). These are marked with Counter_0… 3 in the diagram. Inductive sensors with the associated connection cable from Meier Elektronik AG can be used to make the connection according to the colour scheme br = brown, sw = black, bl = blue (see Figure 10, point 2 or 3).
If it is a simple potential-free contact, connect it according to point 1.

Never connect external voltage to the inputs. This could destroy the device.

7.3.3 Flow sensor

Figure 11: Flow counter connection



Since flow counters require a lot of power, they must not be connected to the internal 24V voltage (destruction of the internal electronics). Select the flow counter supply so that it corresponds to the input voltage (battery voltage).

The input voltage (5A fused) is available at terminals 26 and 30. Connect your flow counter(s) to terminal 26 or 30!

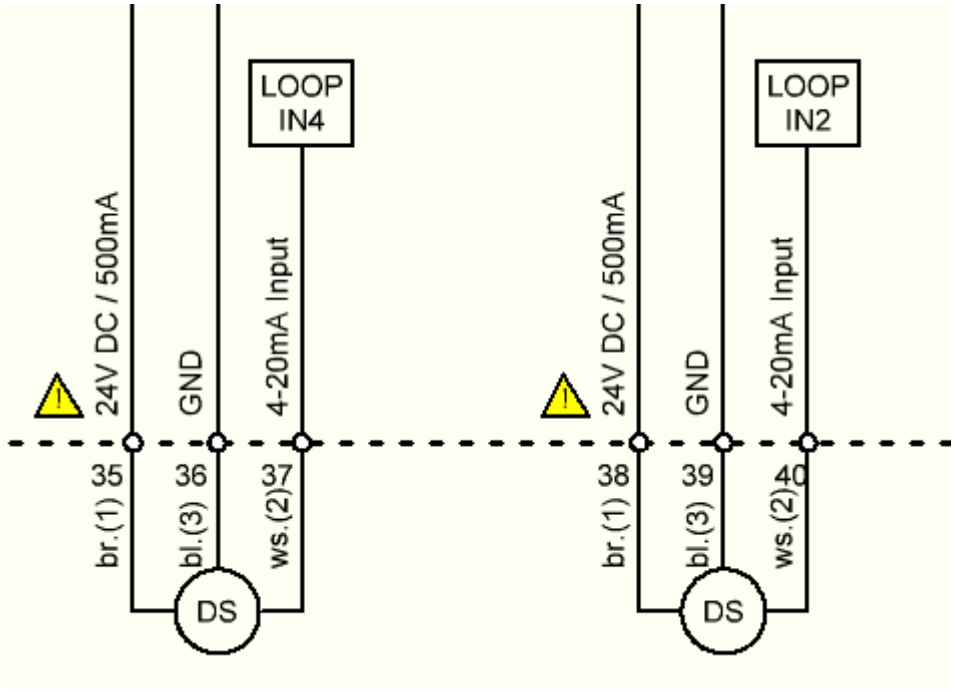
NEVER connect your flow counter to terminals 25 and 29!
This could destroy the electronics, or at least trip the fuse.

The correct scaling of the 4..20mA signal on the flow range must be carried out in the system settings (see Table 6, page 13, point 5).

The maximum flow setting at 20mA must be the same in the ProfiPilot system settings as well as on the flow counter.

7.3.4 Pressure sensor

Figure 12: Connection of pressure/vacuum sensor



If the pressure and vacuum sensors of Meier Elektronik AG are used (type Wikai with display), they can be connected according to the colour scheme br = brown, bl = blue, ws = white.

If other sensors are used, correct scaling of the 4..20mA signal on the pressure range in the system settings must be carried out (see Table 6, page 13).

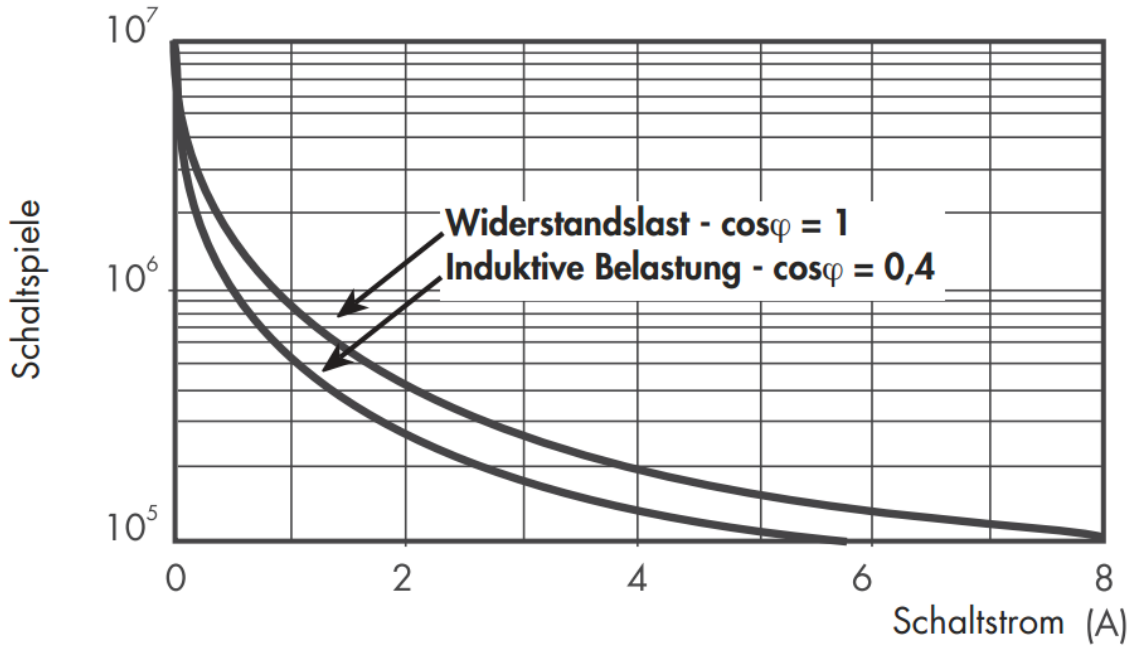
7.3.5 Relay characteristics

The ProfiPilot control is equipped with high-quality relays from Finder (type 40.52). The following table and figure show the characteristics of the relays.

Table 7: Characteristics of relay contacts

Max. continuous current/max. inrush current [A]	8/15
Rated Voltage/(max) switching voltage [V ~]	230/400V
Max. switching capacity AC1 [VA]	2000
Max. switching capacity AC15 (230V ~) [VA]	400
1-phase motor load, AC3 operation (230V ~) [kW]	0.3
Max. switching current DC1: 30/110 / 220V [A]	8/0.3/0.12
Min. switching load [mW, V / mA]	300, 5/5
Standard contact material	AgNi
Mechanical life at DC	20 * 10^6 switching cycles
Electrical life	100 * 10^3 switching cycles

Figure 13: Electrical lifetime at AC



Operate the relays only within this specification in order not to limit the service life. If you need a larger load current, the control can be equipped with 16A relays at the customer's request.

7.4 Operation

Figure 14: Controls

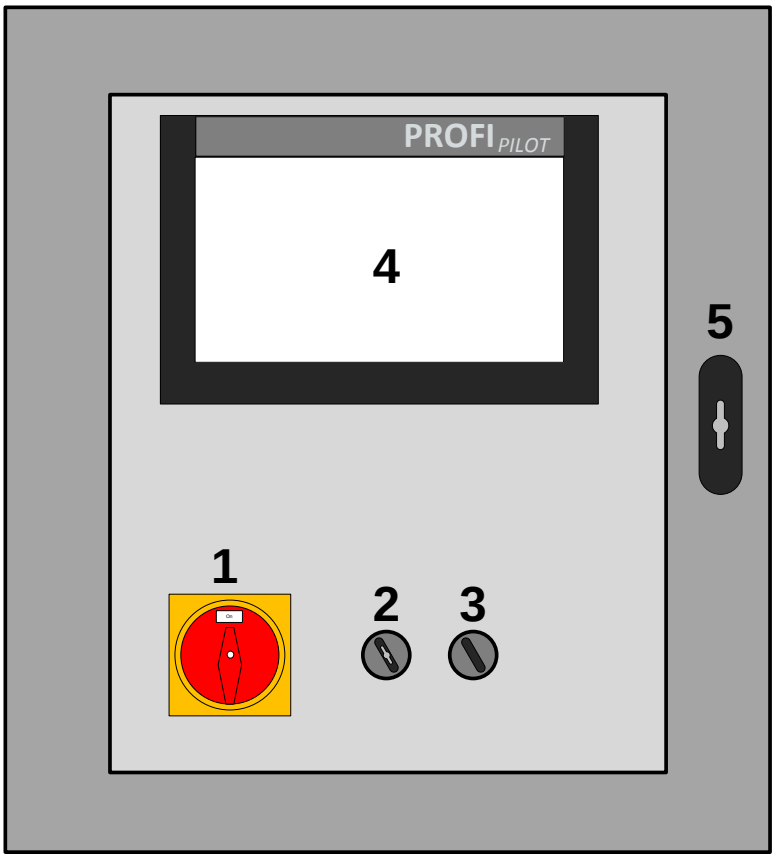


Figure 15: Controls

Number	Function	Description
1	Main switch	Switching on/off the control
2	On/Off operating switch	On/Off switch with key. No functions are carried out in the Off position.
3	Manual/Remote operation selector switch	In the manual position, the functions can be operated manually via the receiver touch display (4). In this position, no commands are accepted by the transmitter. In the Remote position, the functions can only be operated with the remote control.
4	Recipient touch display	Analogue operation as on the transmitter. However, the functions are only released if the operating selector switch (3) is in the manual position.
5	Opening the service door	To access the controls, you have to open the service door. This can be locked with an integrated lock.

7.5 Customer-specific functional processes

The XX customer application with the system YY has the following special functional sequences:

…..

7.5.1 Pump On

1. Pump On button (8) is actuated
2. Gas linear engine moves to the start position according to parameter 18 (see Figure 8, page 13)
3. Then the horn is activated for 5s (only in remote mode)
4. Open the petrol supply valve and start the starters
5. Stop starters when charge control lamp turns off

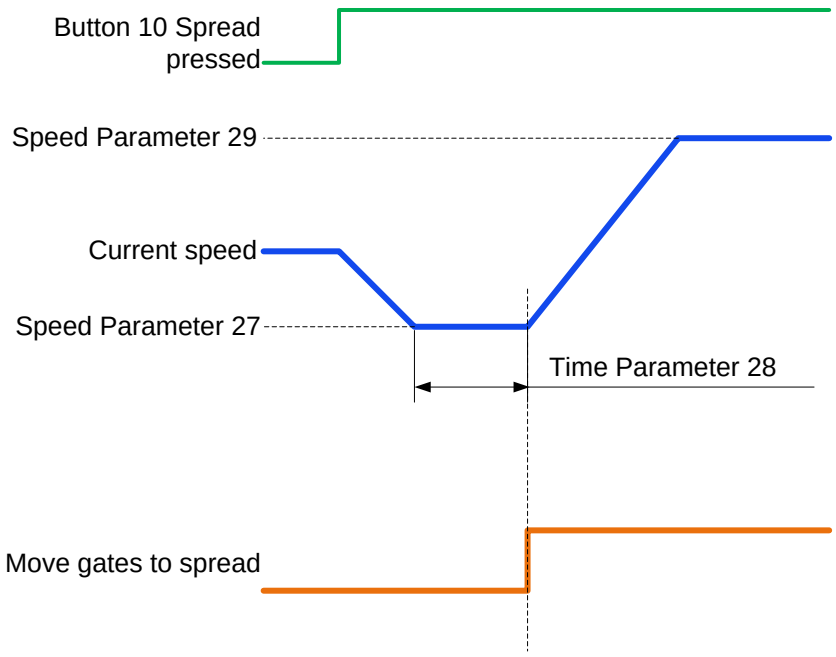
7.5.2 Pump Off

1. Close the petrol supply valve and the engine will no longer receive petrol

7.5.3 Switching the Mix slider → spreading when pump is running

1. The slider button (10) is in the "Mix" position and the pump is running
2. The slider button (10) is actuated
3. The slider/speed is then controlled according to the following figure:

Figure 16: Sequence of slider switch Mix --> Spread

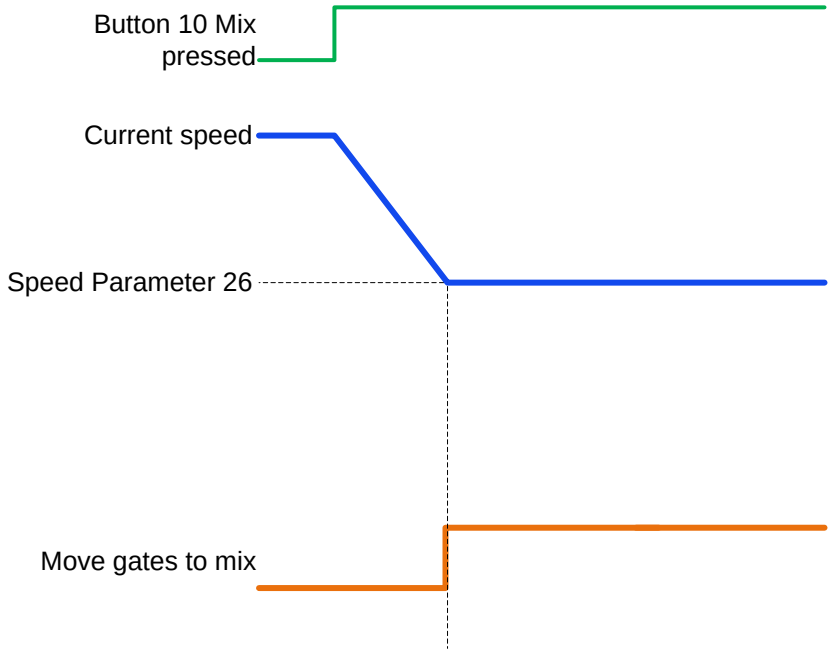


If the pump is not running, the slider is switched without speed operation.

7.5.4 Switching the Spread slider → Mix when pump is running

4. The slider button (10) is in the "Spread" position and the pump is running
5. The slider button (10) is actuated
6. The slider/speed is then controlled according to the following figure:

Figure 17: Sequence of slider switch Spread -> --> Mix



If the pump is not running, the slider is switched without speed operation.

7.5.5 Switching the compressor on/off

1. The compressor button (15) is switched on
2. Preheating of the compressor engine. Preheating according to parameter 21 (see Figure 8, page 13)
3. Compressor on and start pulse. Length of the start pulse according to parameter 22 (see Figure 8, page 13)
4. If you switch off the compressor, the compressor relays are reset

8 Troubleshooting

Error messages may appear in the status list of the touch display. The following list describes the errors:

Table 8: Error messages

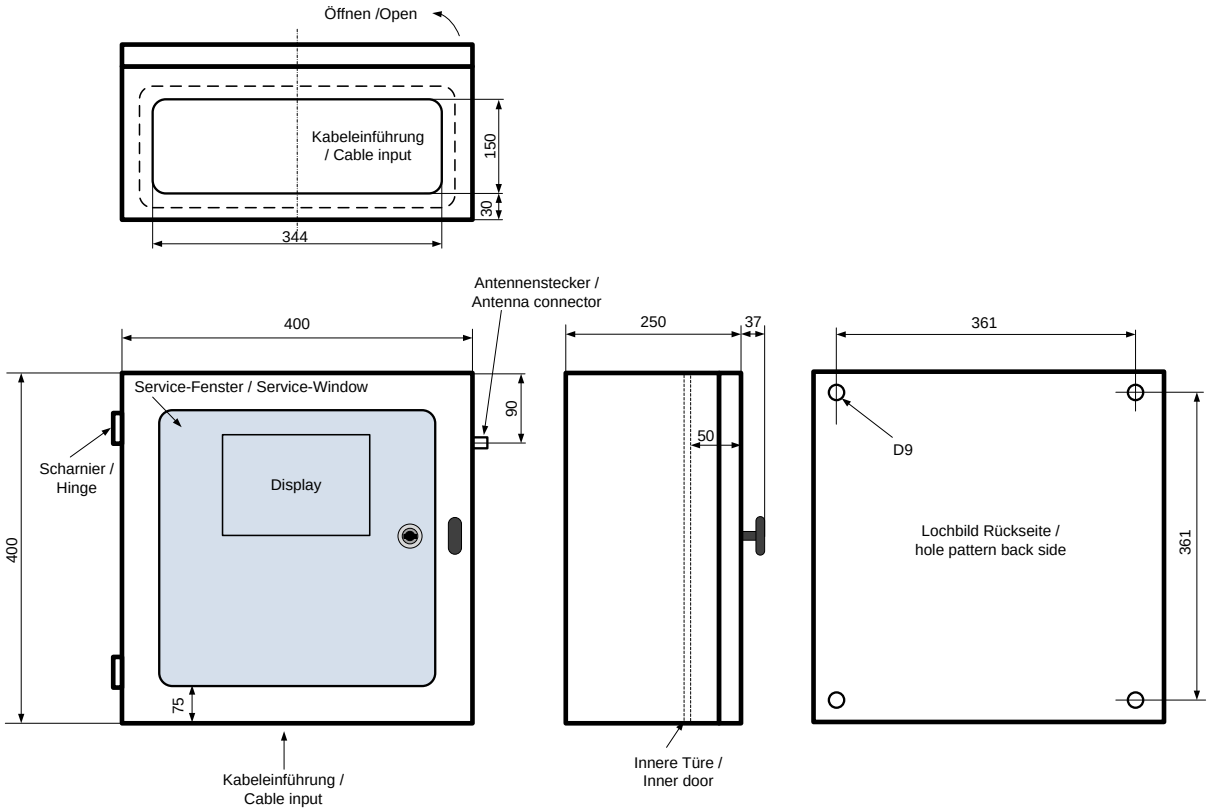
No	Error description	Possible cause
0	Everything OK	There is no error message. Everything OK
1	-	Unused
2	Pump was switched off due to radio interruption	If the receiver no longer receives radiograms from the transmitter than defined in the system settings (see Table 6, page 13, point 4), the pump switches off and this error message appears.
3	Negative pressure active for too long	Negative pressure present for too long was detected. This could indicate a leak (hose break) or filling the pipe with liquid manure takes longer than was defined in the system settings (see Table 6, page 13, points 1 and 2).
4	Overpressure active for too long	Overpressure was detected and the pump was switched off. A check must be carried out as to why pressure has become too high and then corresponding adjustments have to be made to the speed or the other causes.
5	No flow during pumping	No flow was detected even though the pump was switched on (dry run protection). Check whether suction is working correctly.
19	Engine temperature too high	The engine temperature is too high. Wait until it cools down again.
20	Engine could not be started	Charge control (D+) does not give any feedback that the engine has been started. Check input 71 and the starter.
21	Oil pressure too low (digital input)	Too low oil pressure was detected. Check the oil level and pressure, as well as digital input 72.
22	Cooling water level too low	The cooling water level is too low. Fill up the cooling water.
23	Cooling water temperature too high.	The temperature of the cooling water is too high. Wait until it cools down again.
24	Oil pressure too low (analogue input)	Too low oil pressure was detected. Check the oil level and pressure, as well as the system settings of the oil pressure (see Table 6, page 13)
50	Internal error 1	Internal error. Plug could no longer be inserted correctly or hardware error. Please contact Meier Elektronik AG.
51	No connection to the control	This message only appears on the receiver display if the Ethernet cable between the Rx-Pilot and the ZP-ProfiPilot-Tx printer is not plugged in.
52	Radio interruption - Communication with the pump is currently not possible	The transmitter is out of range of the pump or the receiver is not switched on.
53	Flow difference too large - pump will be switched off	If the system has two flow counters (one on the pump and the other on the drag hose) and an excessively large difference is detected, this error message will be issued. Setting of the necessary parameters can be found in the flow settings (see Table 2, page 8, point B-F)
54	Error when reading the local	Internal error. Plug could no longer be inserted correctly

	flow sensor	or hardware error. Please contact Meier Elektronik AG.
55	Manual mode active	Manual mode is activated on the receiver. Operation via the radio transmitter is therefore not possible.
56	Radio operation active	This message only appears on the receiver display when the operation selector switch (3) is in the remote position.
57	Error when reading the local hardware (transmitter)	Internal error. Plug could no longer be inserted correctly or hardware error. Please contact Meier Elektronik AG.
58	Parameters saved but not yet sent!	This message is only possible in test mode at Meier Elektronik AG.
59	Operation selector switch in the OFF position - functions inactive	The operating switch (2) is in the "Off" position and therefore no functions are possible.

9 Assembly instructions

9.1 Receiver-housing dimensions

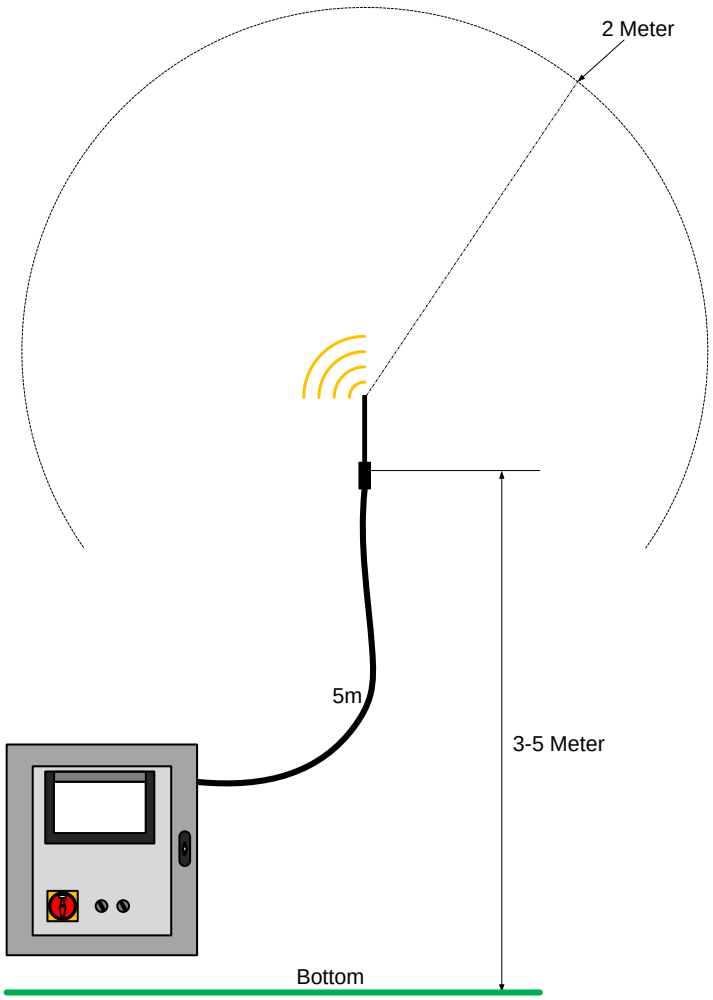
Figure 18: Receiver-housing dimensions



9.2 Antenna

The best reception properties can be achieved with visual contact. However, since this is usually not possible, the receiver antenna must be placed in such a way that it can radiate or receive as independently as possible.

Figure 19: Antenna assembly of standard antenna



It is ideal if the antenna can emit at least 2 metres freely. As far as possible, there should be no obstacles in this area. In addition, the reception quality can be increased if the antenna is mounted 3-5 metres from the floor.

10 Software update

10.1 General information

To simplify support and service, we have implemented special software update functions in the device. There are two ways to download new, modified software to the device:

1. Installation directly from our FTP server (see section 10.4 or 10.6)
2. Installation using an SD card

In both cases, our support tool "ProfiPilotSupport.exe" is required, which you can obtain from our FTP server (ftp://tools.meier-elektronik.ch).
Login as follows:

User: tools.meier-elektronik.ch
Password: **Tools2020!**

If your service laptop is connected to the Internet via WiFi and the Ethernet port is not used, continue with **section 10.3**, page 29 (fully automatic software update).

If your service laptop is connected to the Internet via the Ethernet port and it is not possible to establish a connection to the ProfiPilot at the same time, since you no longer have a free Ethernet port, continue with **section 10.6**, page 33 (semi-automatic software update).

10.2 System requirements

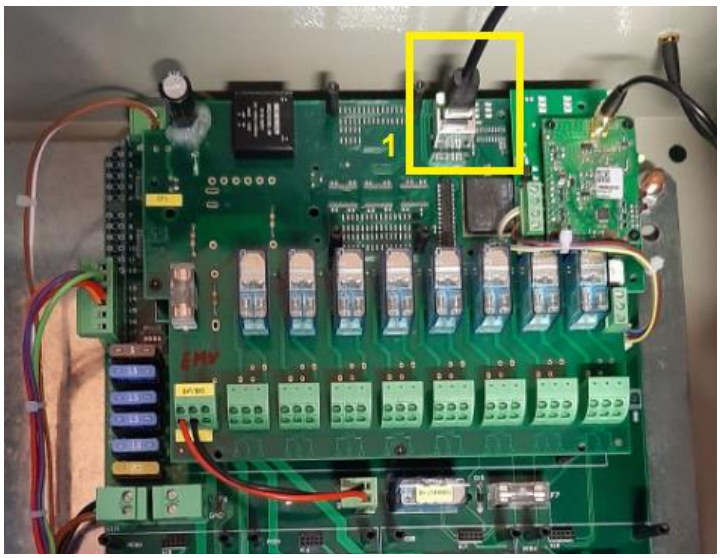
1. Windows 7 or later
2. Internet connection
3. Ethernet connection with admin rights for changing the IP configuration

10.3 Establishing a connection between the receiver and a laptop/PC

10.3.1 Configuring a LAN connection

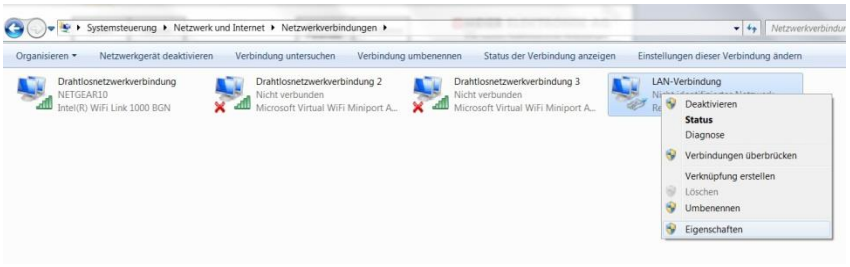
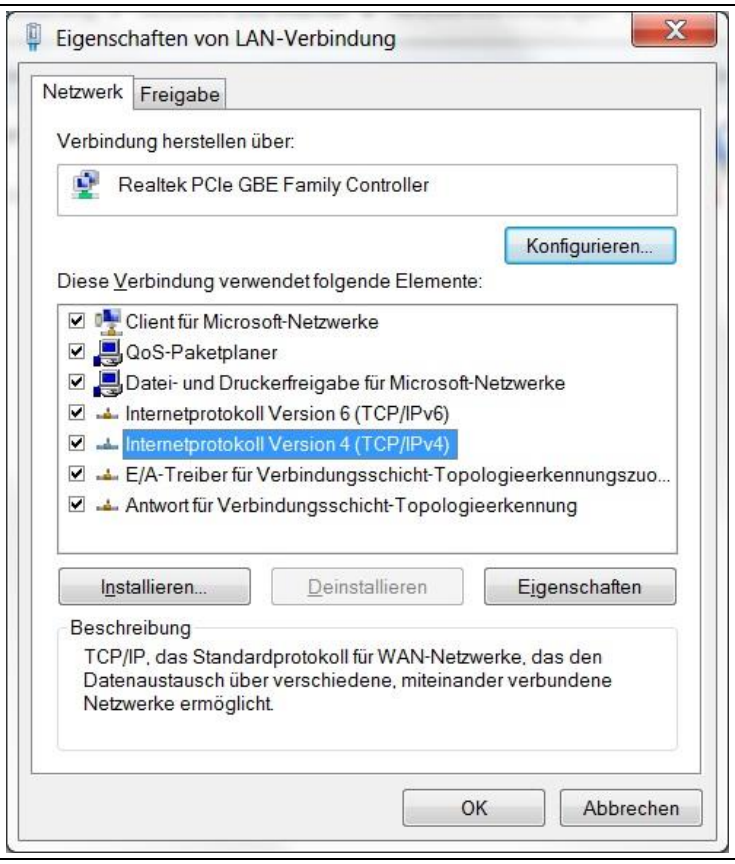
Remove the existing Ethernet cable from the port according to Figure 20 - (1) and connect your laptop to this Ethernet port (1) using an Ethernet cable.

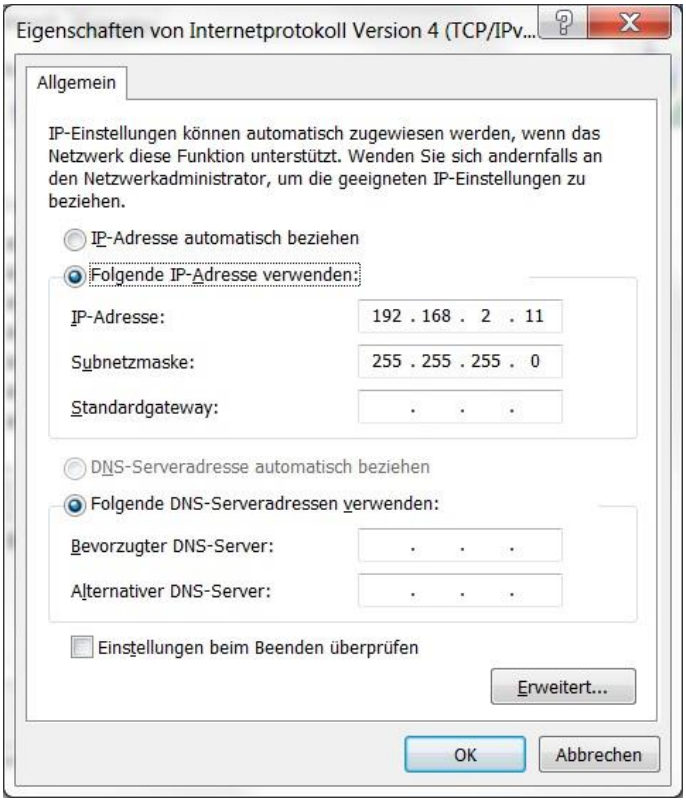
Figure 20: ProfiPilot receiver Ethernet port



Then do the following on your laptop/PC:

Table 9: Configuring a LAN connection

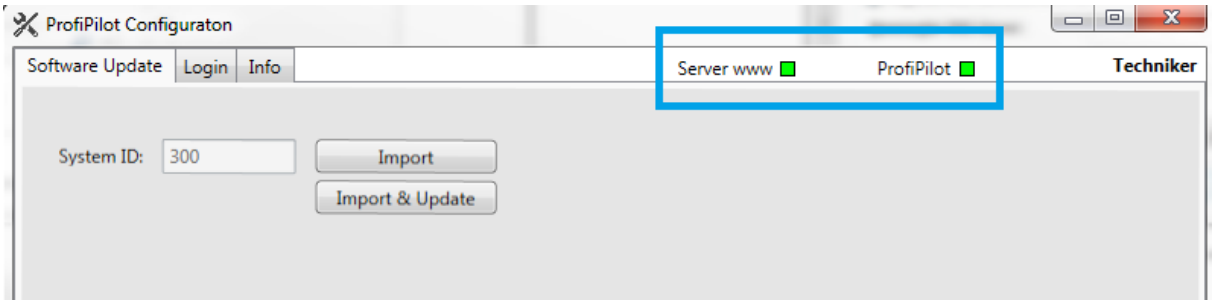
Step 1: Open the network connections in the control panel of the laptop/PC. **Right-click** on the LAN connection you want to use for the connection to the radio system and select **Properties**.	
Step 2: A window appears and there you mark Internet Protocol Version 4 (TCP/IPv4). Then select the **Properties** button.	

Step 3: A window appears again and there you enter under **192.168.2.11** under IP address. Enter **255.255.255.0** in the Subnet mask field. Confirm all open windows with **OK**.	
Step 4: Now your Ethernet port is in the 168.192.2.1 network	Ethernet port configuration is now complete

10.4 "Fully automatic" receiver software update

Open the ProfiPilotSupport.exe tool and check whether both connections are present (framed in blue). If one of the two lights up red, recheck the connections and configuration.

Figure 21: Software update connection status "fully automatic"



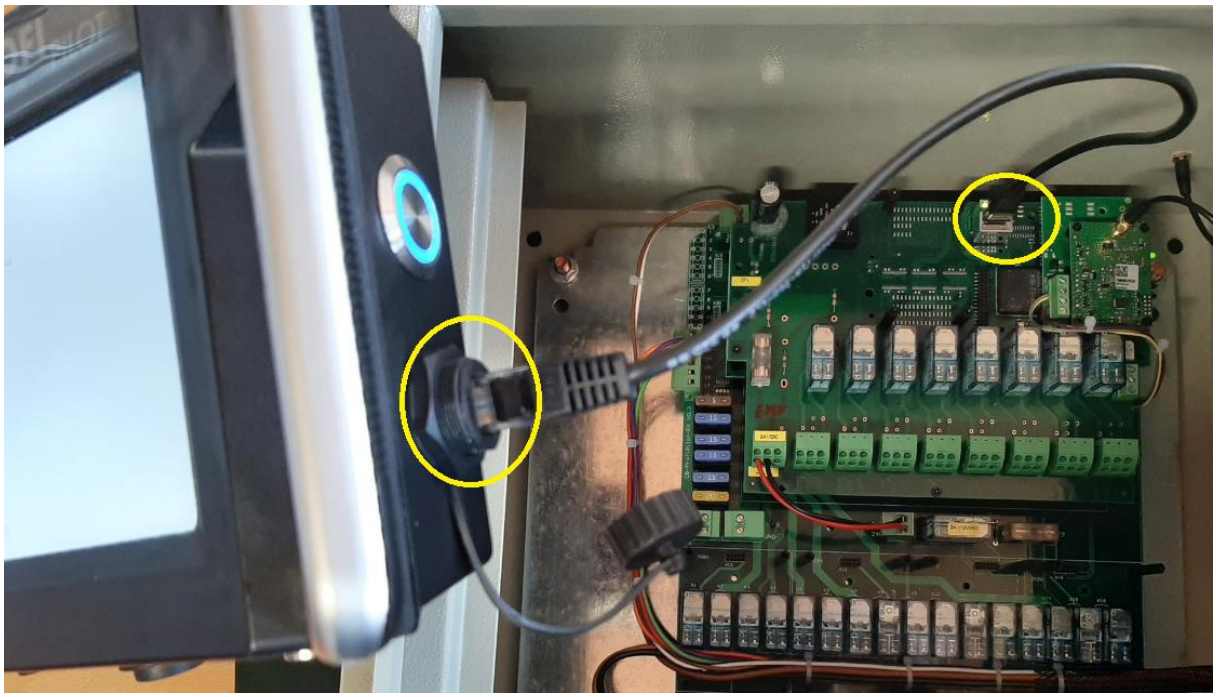
If both connections are "green", you can press the "Import & update" button. After that, it takes about 2-5 minutes for the software to download and to be installed (depending on the internet connection speed).
Restart the ProfiPilot receiver. The new software is then active and installed.

10.5 Transmitter software update

If the receiver software is changed, a software update of the transmitter must always be carried out!

After you have updated the receiver and restarted it, remove the Ethernet cable from the PC/laptop and connect it to the transmitter according to Figure 22 (open the protective cap next to the On/off button). Then restart the transmitter.

Figure 22: Transmitter software update

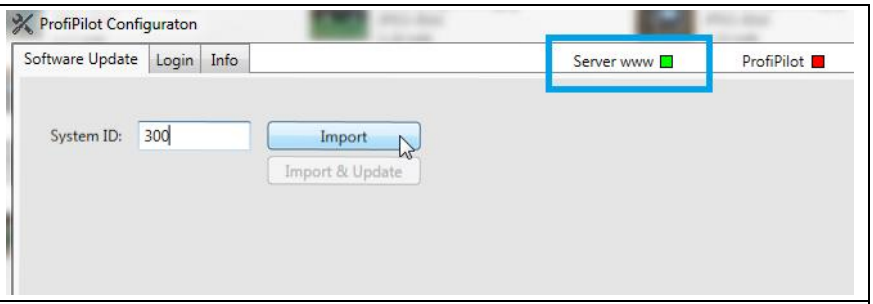
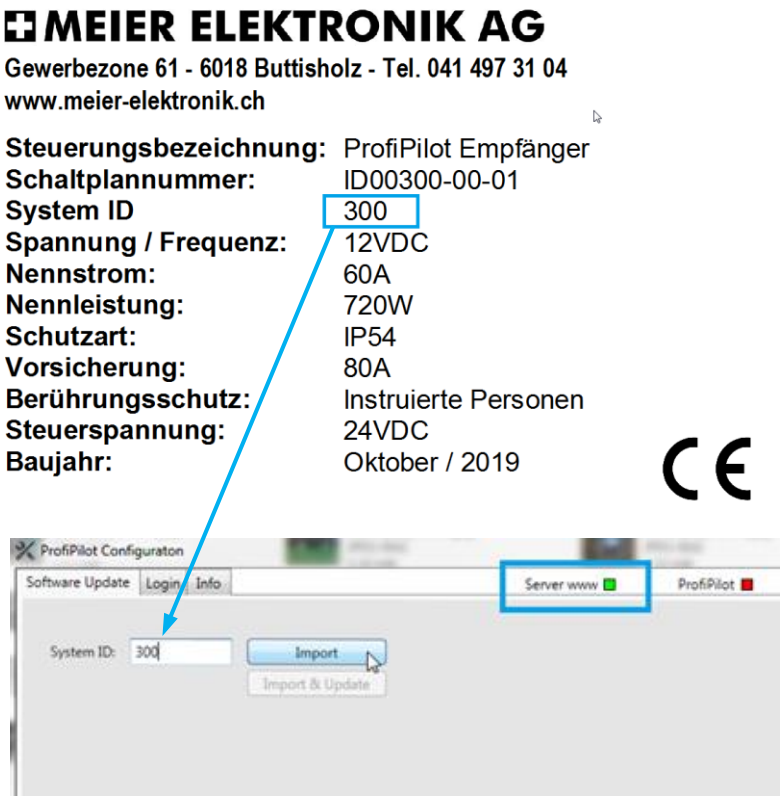


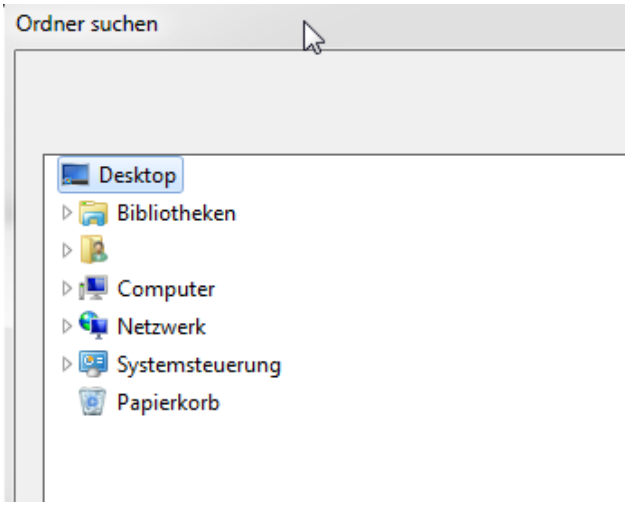
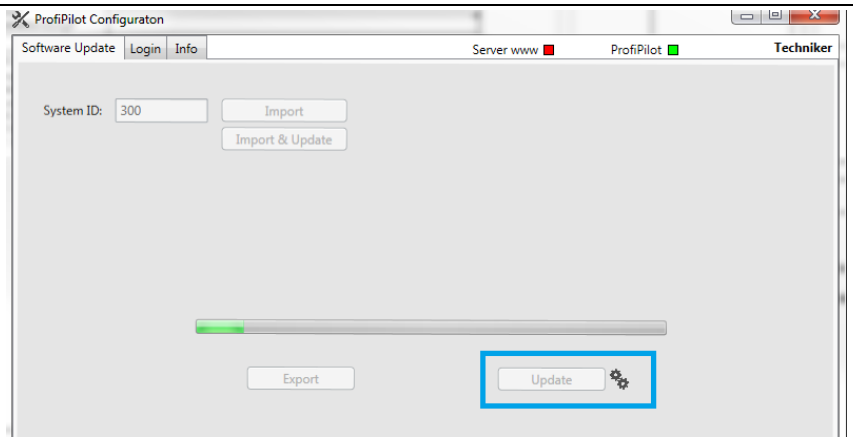
When starting up, the transmitter now recognises the new software that is on the receiver and updates itself.

As soon as the application has started, the software on the transmitter is updated.

10.6 "Semi-automatic" receiver software update

If your Internet is on the only Ethernet port, you must first download the software from the FTP server and then reconfigure the Ethernet adapter (port).

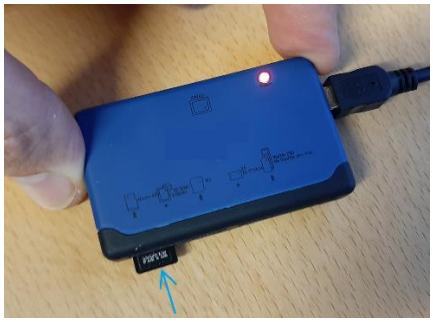
Step 1: Open the ProfiPilotSupport.exe tool and check whether the connection to the FTP server (server www) is green. If the symbol is red, please check your internet connection	
Step 2: Read the system ID on the nameplate and enter it in the "System ID" field and then press the "Import" button.	

Step 3: After approx. 10-20s, a window opens where you have to specify a target drive for the software.	
Step 4: Now configure the Ethernet adapter (port) according to section 10.3, page 29 and then continue with point 5.	
Step 5: Now press the "Update" button and select the saved software, which is available as a ZIP file.	
Step 5: The software update is completed after approx. 1-2 minutes.	Restart the ProfiPilot receiver. The new software is then active and installed.
Step 6: Now also update the transmitter software.	See section 10.5, page 31

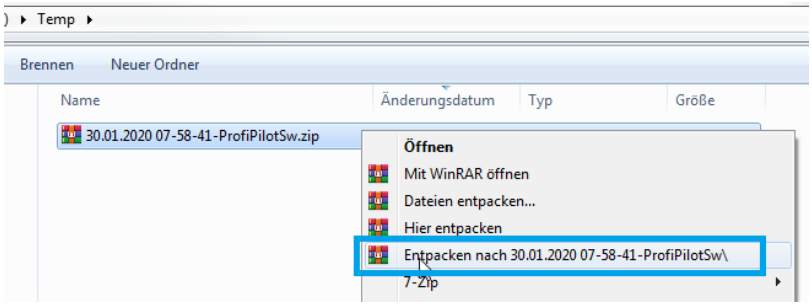
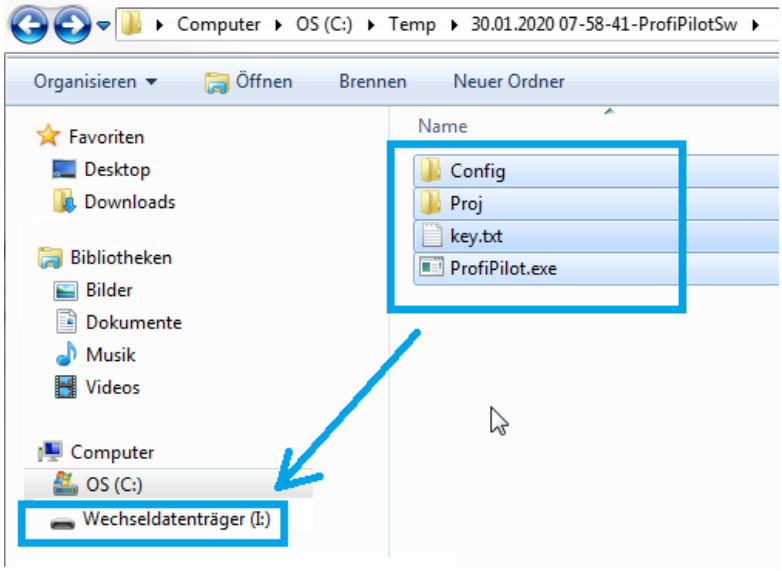
10.7 Software update receiver using an SD card

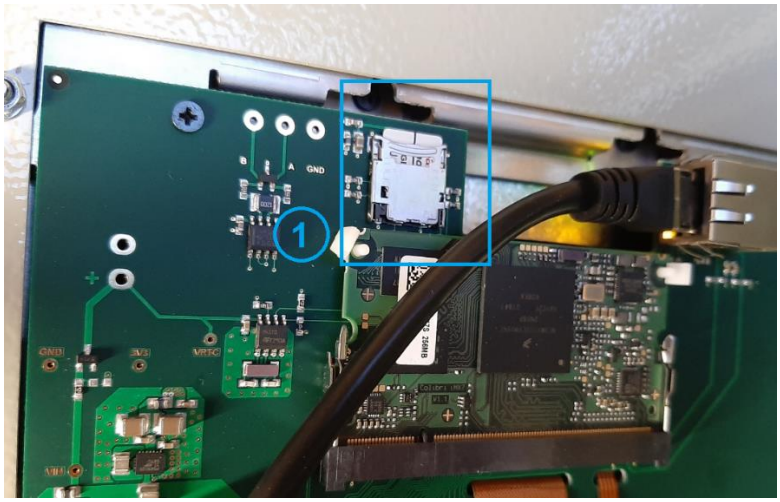
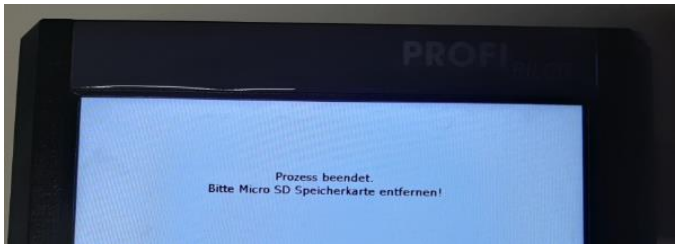
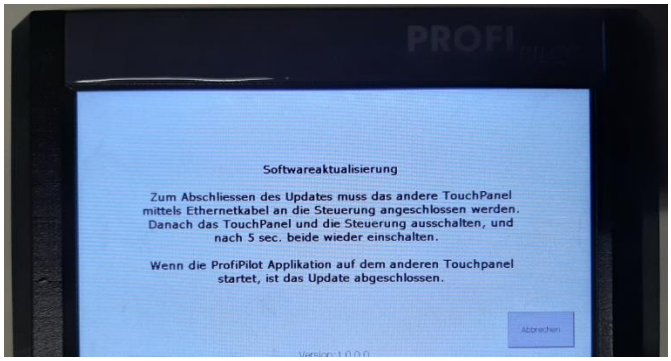
To receive the latest software, you can download it (see section 10.4) or order it from Meier Elektronik AG by email. You also need a Micro SD card reader and a Micro SD memory card (formatted with FAT32).

Figure 23: Micro SD card reader with inserted Micro SD card



In both cases, proceed as follows.

Step 1: Unzip the software you received	
Step 2: Copy the files to the SD card according to the illustration on the right.	

Step 3: Insert the SD card into the ProfiPilot receiver. Make sure that the SD card is inserted correctly.	
Step 4: Restart the ProfiPilot receiver and wait until the following message appears on the receiver display:	Process exited. Please remove the micro SD memory card! 
Step 5: If the following message then appears, the receiver software has been updated.	**Software update** To complete the update, the other touch panel (transmitter) must be connected to the controller using an Ethernet cable. Then switch off the touch panel and the control and switch them on again after 5 seconds. If the ProfiPilot application is on the other touch panel (transmitter), the update is complete. 
Step 6: Restart the transmitter and receiver. The software update is then completed	

11 Technical data

Table 10: ProfiPilot technical data

Frequency	869.525 MHz
Transmitting power	+27 dBm/500mW
Duty cycle [%]	< 10% (according to RIR1008)
Antenna	Folded rod antenna
Modulation	LoRa
Addressing	16 bit unique code, factory-programmed
Keyboard	1 x 28 touch display button Optional 2 x 28 touch display button
Standby	Display can be switched on/off using the buttons
Transmitter supply	Lithium nickel cobalt aluminium battery, 3.6V, 4400mAh including PCM
Max. transmitter power consumption	13W (incl. battery charging and radio transmission)
Max. receiver power consumption	20W (including radio transmission)
Transmitter battery life	Approx. 5 hours (without transmission, with display on) Approx. 2 hours (incl. transmission and display on)
Battery life	3-4 years with normal use
Maximum battery storage without use	2 years at ambient temperature used in transmitters
Transmitter housing	Plastic, IP65 black with ventilation membrane
Transmitter dimensions	270 x 55 x 85 mm (without antenna and inserted charging cable)
Receiver housing	Metal housing with service door, IP65, lockable
Digital inputs	52 (thereof 4 frequency inputs 500Hz)
Digital outputs	52
Analog inputs	2x 0-10V 5x 4-20mA 4x Resistor inputs 1x W-Signal Alternator (1000Hz)
Analog outputs	1x 0-24V 2x 4-20mA 1x Potentiometer (0-10kOhm)
Receiver dimensions	400 x 400 x 250 (without antenna and door handle)
Temperature range	- 15..+50 °C
Storage temperature	0..30° C/< 90% RH
Moisture	< 90% RH
Warranty	2 years after delivery
Conformity	CE, Class II type B, IEC/EN 60950

12 CE declaration of conformity

According to the EC Machinery Directive 2006/42/EC, Annex II B for machines to be installed

Device: Radio remote control

Trademark: ProfiPilot

Type: ProfiPilot Receiver 8..28VDC (Art. no. 702516)
ProfiPilot Transmitter 8..28VDC (Art. no. 700935)

Further information: See operating instructions

The undersigned, acting as Authorised Representatives, declare that the equipment mentioned above complies with the following Radio Equipment, EMC and Electrical Safety Requirements

DIRECTIVE 2006/42/EC: Machinery Directive
RICHTLINIE 2006/42/EG: Maschinenrichtlinie

DIRECTIVE 2014/53/EU Radio Equipment Directive (RED)
RICHTLINIE 2014/53/EU Funkanlagen

DIRECTIVE 2014/30/EU Electromagnetic Compatibility (EMC)
RICHTLINIE 2014/30/EU Elektromagnetische Verträglichkeit

DIRECTIVE 2014/35/EU Low Voltage Directive (LVD)
RICHTLINIE 2014/35/EU Niederspannungsrichtlinie

DIRECTIVE 2011/65/EU Restriction of Hazardous Substances (RoHS)
RICHTLINIE 2011/65/EU Beschränkte Verwendung bestimmter gefährlicher Stoffe

The following standards were applied:
EN 300 220-1 V3.1.1 2017-02
ETSI EN 300 220-2 V3.1.1 (2017-02)
EN 301 489-1 V2.1.1 2017-02
EN 301 489-3 V2.2.1 2017-03
EN 60950-1: 2006 + A2: 2013
EN 60669-2-1:2004/A12:2010
EN 60204-1

Documentation manager (according to MRL 2006/42(EC)): Markus Kurmann
The instruction manual for the control cabinet is available in the language of the user country.

Test laboratory: EMC-TESTCENTER AG, Moosäckerstrasse 77, CH-8105 Regensdorf

Manufacturer: Meier Elektronik AG, Gewerbezone 61, CH-6018 Buttisholz

Authorised representative:	Buttisholz	21/01/2020	
	Town/city	Date	Managing Director