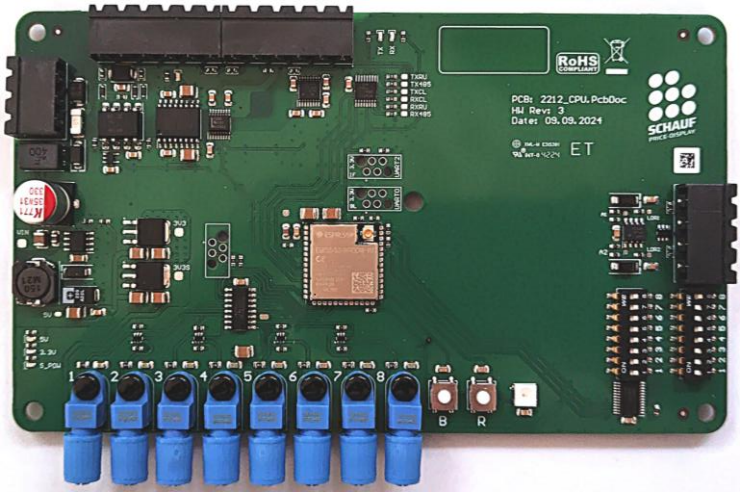
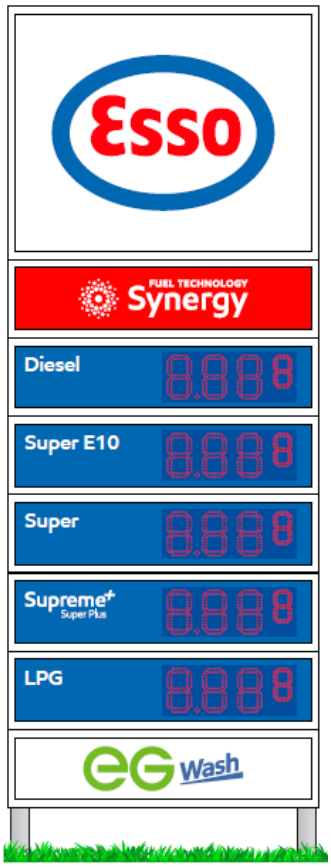
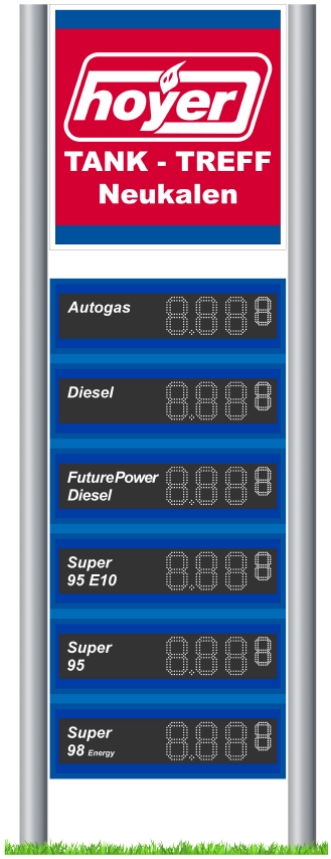
Central control electronics

Type: 2212_CPU

Revision: V20







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1 Technical specifications

Assembly 2212_CPU (Control electronic, 8 Products)

Voltage supply	12 bis 24 VDC
Power consumption	2 bis 3 W
Serial Interface (1)	Current Loop, RS232 (V24), RS485 (V11)
Special features:	Integrated protection against transient overvoltage, short circuits and reverse polarity, as well as against condensation water
Operating temperature (ambient)	-20°C bis 60°C

(1) Only for internal communication with the operating device.

2 Accessories

Part number	Description	Quantity
150297	Control electronic 8 Products (Type 2212_CPU)	1
100794	Brightness sensors Schauf system (double-sided) / with 3m connection cable	1
140594	Brightness sensors Schauf-System (auf Platine)	2
146114	Fiber optic cable (FO) for Schauf price displays	Per meter
137777	Data cable, Unitronic LiYD11Y 4 x 0.25 mm²	Per meter
136786	PCB connector 12-pin	1
136787	PCB connector 4-pin	1
136788	PCB connector 3-pin	1

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3 Preamble

This document contains technical information for the Schauf price pole electronics as well as examples of typical wiring, installation, configuration and testing.

This documentation is primarily intended as an informational guide for project planning, system planning, implementation or troubleshooting of a price pole with Schauf electronics.

This documentation does not replace technically qualified personnel and is not a guide or instruction for the installation team.

The relevant documentation for the actual wiring, circuitry, the components installed and the system integration into the existing station installation must be obtained from the relevant companies that assembled and installed the system. As well as the companies responsible for the maintenance and repair of the respective station.

This documentation will not be able to cover every possible aspect that has arisen or may arise over the years due to changes in technology, technical progress, repairs, replacement of components, loss of documentation, changes in management and project management, as well as changes in responsibilities.

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4 Safety information

4.1 General guidelines

This manual contains information required for the application and use of the product in the manner intended. It is intended for technically qualified personnel who have relevant knowledge in the field of electrical engineering / automation technology / data transmission technology.

Qualified personnel are persons,

- who, as project planners, are familiar with safety concepts in electrical engineering / automation technology or data transmission technology
- or who have been trained as operating personnel in handling the devices or the system and are familiar with the necessary contents of this manual
- or who have been trained as commissioning engineers / service technicians for corresponding systems in accordance with the safety technology standard.

Detailed knowledge and technically correct implementation of the installation guidelines / safety instructions / functions described in this manual are a prerequisite for safe operation.

As the components and devices described can be used in a wide variety of applications and systems, it is essential to incorporate their functions and the corresponding safety instructions into the safety concept of the overall system.

The MSI-Sign Group support team is available to assist with any questions in specific individual cases.

4.2 Intended use

The components / device may only be used in the manner for which it was designed (according to the product information or technical description). Relevant safety standards and guidelines were observed during the development, manufacturing, testing, and documentation of the item. If handling instructions and safety precautions are followed, the product generally poses no risk of damage to property or personal injury.

CAUTION

- After opening the housing, parts of the devices that may be live are accessible.
- The safety of the product requires proper transport, storage, installation and operation.
- Work on the products may only be carried out by qualified personnel familiar with the manual.

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5 Installation

5.1 Mounting

The module frames are installed by the respective installation company. As a standard, a price pole is fully assembled in the factory and set up and connected at the installation site.
Examples of the display modules would be

- Schauf-typical THT and SMD module frames including masking plate with free/open wiring at ESSO and Avia and many independent petrol stations.
- HEM-typical individual modules in a closed aluminium housing with masking plate and connections to the outside at HEM petrol stations.

5.2 Power Supply

Power is supplied via a single separate power supply unit, whereby the individual double lines of the module frames are routed to the busbar. (star wiring)
It is also possible to use several power supply units for power, temperature or redundancy reasons.
The power supply for the individual LED digits is daisy-chained per module frame.
The control electronics (CPU) are usually supplied by the same power supply unit via the busbar.
➔ See block diagram

5.3 Data connections of the modules

The data line from the control electronics (CPU) to the individual module frames is wired using a POF fibre optic cable.
e.g. type: OKE 1000-B

Any single-wire POF cable with a fibre core diameter of 1 mm and an outer diameter of 2.2 mm can be used as the fibre optic cable.
The fibre optic cable is connected directly to the transmitter and receiver module. These modules each hold the fibre optic cable with a fixing screw.

The POF cables do not require any special tools. A sharp knife and a firm surface are sufficient for shortening.
Wire cutters or similar tools are unsuitable. A clean, straight cross-section is required for optimum light coupling.

The 7-segment LED boards are pre-wired inside the module frames with 10-pole ribbon cables. Only the ribbon cable from the fibre optic receiver board to the first 7-segment board of the rear module frame needs to be added.

Keep the ribbon cable as short as possible.

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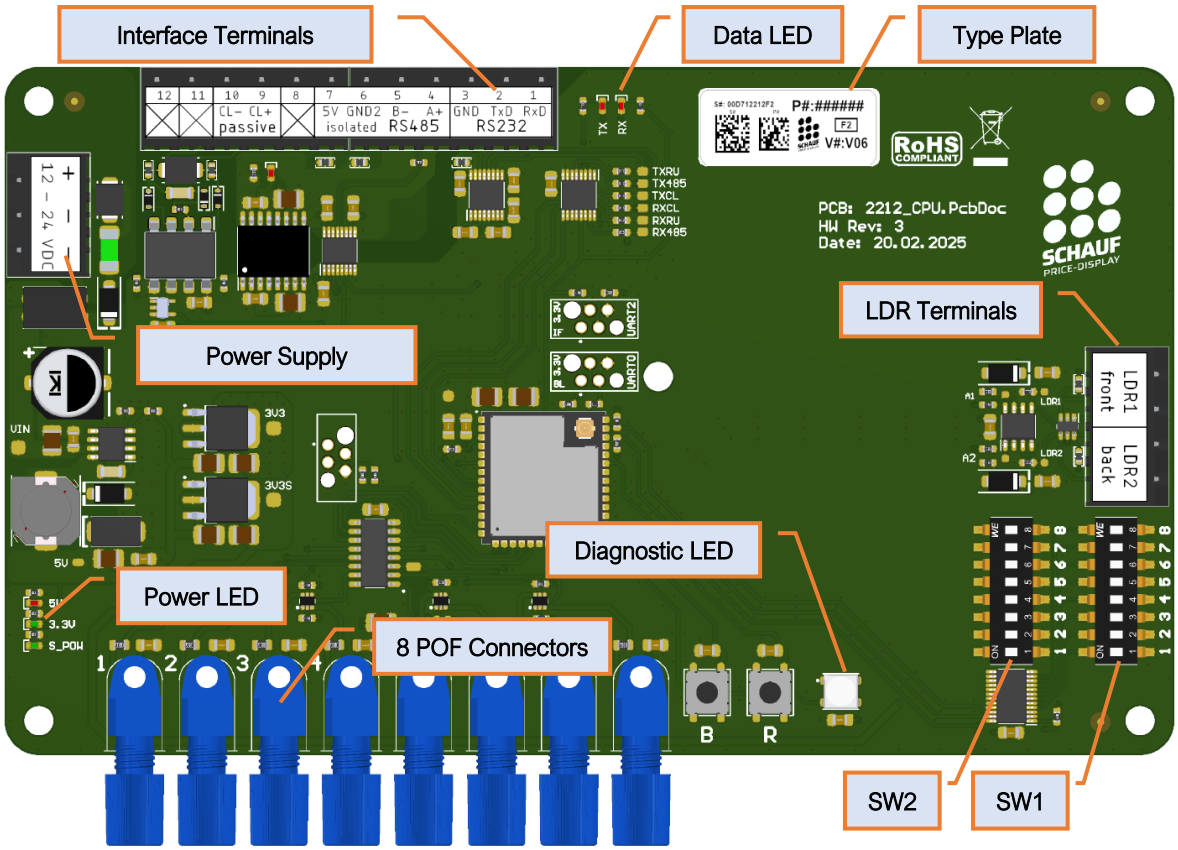
6 Initial setup

6.1 General

Once the power supply and data cables have been wired, the system can be put into operation. Firstly, the configuration must be set using the dipswitch on the control electronics (CPU) according to the following description.

6.2 Control electronics module

6.2.1 Overview



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6.3 Description of components

6.3.1 Signal LED

Power LED – In normal operation, all LEDs light up

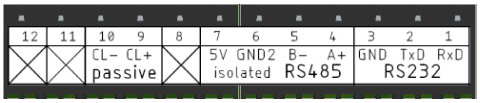
Data LED – flashes, when there is activity at the interface. Dark in idle state.
Exception: Current Loop activated but not connected -> RX lights up permanently.


Diagnose LED – Multifunction LED for quick diagnostics.

- Blue flash every second: watchdog function, regular operation.
- Yellow flash: Successful data processing. e.g.: Received price data OK.
- Green at start: protocol selection valid.
- Red light up: General error. e.g. Received data corrupt, protocol selection not valid.

6.3.2 Terminal connectors

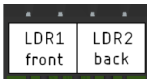
Interface Terminals



1 bis 3 – RS232
4 bis 7 – RS485
9 bis 10 – Current Loop

Notice: The protocol selection activates the corresponding interface. Only one interface can be used at a time.

LDR Terminals



LDR 1 – Front light sensor (primary side)
LDR 2 – Back light sensor (secondary side)

6.3.3 POF Connectors

All 8 fibre optic connections are active on the module.

The order of the display lines must be configured on the control electronics by assigning the fibre optic connections. A direct assignment is recommended.

The product assignment can be adjusted via software in the control device PST1.

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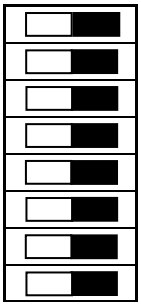
6.4 Configurable switches

6.4.1 SW1 – DIP switch array 1 – Protocols and options for the displays



Function name	Description
LED segment & brightness test	Forces the self-check of all digit lines.
Display leading zeros	Leading zeros are displayed when switched on
Display decimal point	Decimal point is displayed when switched on
----	----
Data protocol selector	Protocol selection via 4 switches. See table for details

Data protocol selector (DIP 1- 4) Table

DIP Switch SW1						
1	2	3	4	Protocol name	Interface	Connector
Standard protocols for operating device PST1 (version 1.15 or better)						
1	1	1	0	Schauf-Std.	Current Loop, passive,1200 Bd.	Pin 9: CL+ Pin 10: CL-
0	0	0	1	Schauf-Spezial	RS232, 1200 Bd.	Pin 1: RxD Pin 2: TxD Pin 3: GND
1	0	0	1	Schauf-Spezial	RS485, 1200 Bd.	Pin 4: A+ Pin 5: B- Pin 6: GND2 iso Pin 7: 5V iso
0	1	0	1	Schauf-Spezial	RS232, 9600 Bd.	Pin 1: RxD Pin 2: TxD Pin 3: GND
1	1	0	1	Schauf-Spezial	RS485, 9600 Bd.	Pin 4: A+ Pin 5: B- Pin 6: GND2 iso Pin 7: 5V iso
0	0	1	1	Schauf-Std.	RS232, 1200 Bd.	Pin 1: RxD Pin 2: TxD Pin 3: GND
Special protocols for outdated operating devices (AST1000, MST500 etc.)						
0	0	0	0	Kienzle (AST1000)	Current Loop, passive	Pin 9: CL+ Pin 10: CL-
0	1	0	0	Westerstrand (MST500)	Current Loop, passive	Pin 9: CL+ Pin 10: CL-

The interface (current loop passive, RS485 or RS232) is activated or deactivated via software.
The terminal assignment must be changed as required to suit the set protocol.

Please note:
This data protocol selection is only applied after a restart or when switching on.
A configuration during operation does not result in any changes.

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6.4.2 SW2 – DIP switch array 2 – Additional options

ON OFF		Function name	Description
	8	Diagnostic mode	Displays the measured brightness from 0 to 100% or the software version.
	7		
	6	Time interval for brightness control	Delays the changes in brightness for display
	5		
	4	---	---
	3	---	---
	2	Factory settings	Resets all software settings.
	1	Memory diagnostics	Outputs memory contents

Explanation of functions

• DIP 1 – Memory diagnostics - only for factory analyses (not for normal operation)

• DIP 2 – Factory setting (not for normal operation)
After switching on the switch, the settings are reset to the factory setting after 5 seconds. This affects prices, brightness limits and standby mode.
Note: Set the switch back to OFF after the reset, otherwise normal operation is not possible.

• DIP 5-6 – Brightness control
These switches are used to set the update time for brightness control. During this time, an average value is calculated to prevent short-term fluctuations in brightness (caused by trees or passing vehicles).

00 - update time: ~1 second
01 - update time: ~5 seconds
10 - update time: ~10 seconds
11 - update time: ~15 seconds

• DIP 7-8 – Diagnostic display (not for normal operation)
When in use, the price display is switched to diagnostic mode.
This means that measured values are displayed instead of prices.

• DIP 7-8 to 01 = Brightness value of side 1 (front) is displayed. (between 0 and 100)
• DIP 7-8 to 10 = Brightness value of side 2 (back) is displayed. (between 0 and 100)
• DIP 7-8 to 11 = Firmware version is displayed (e.g. ‘ 20’)
• DIP 7-8 to 00 = normal operation.

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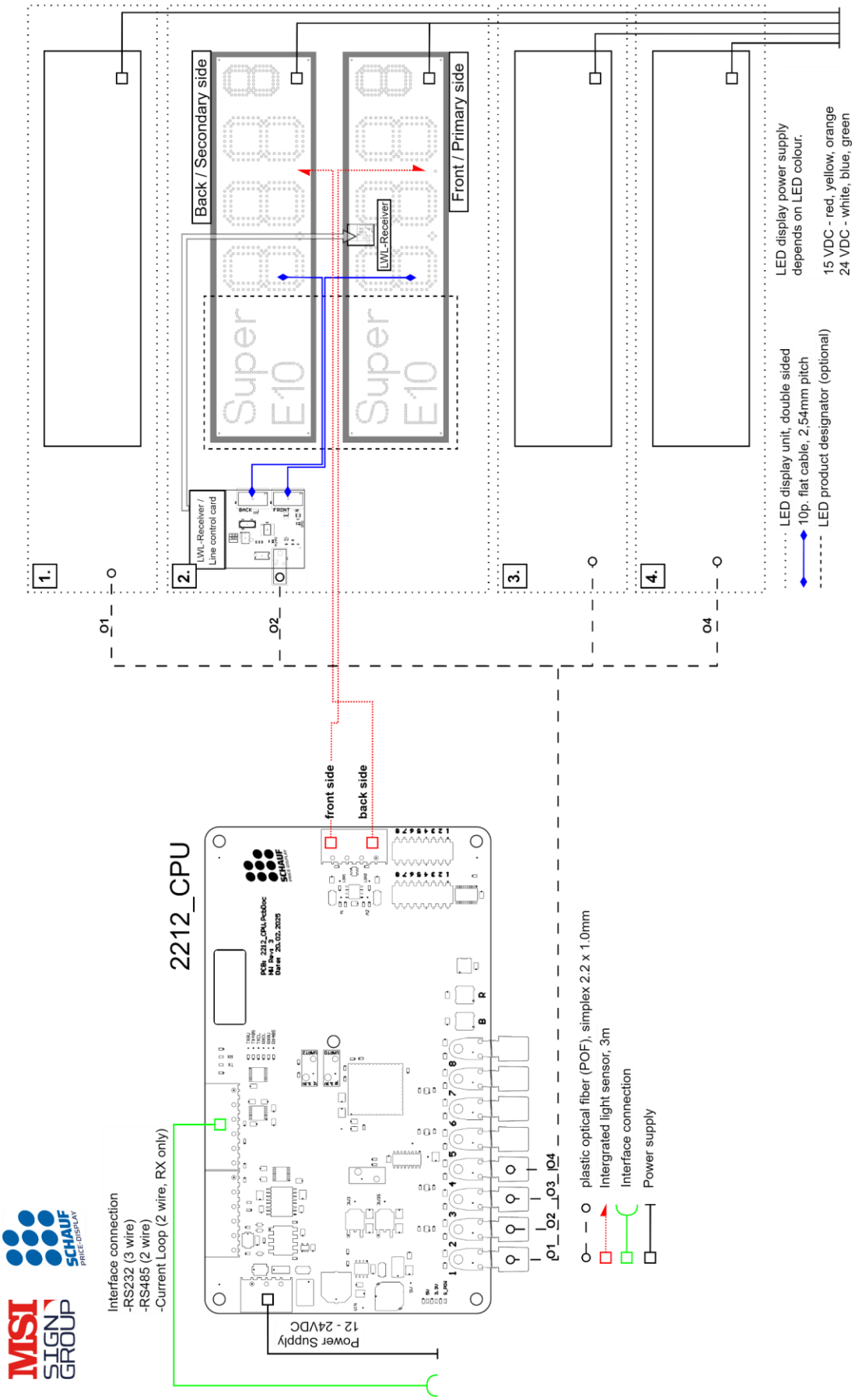
7 Block Diagram



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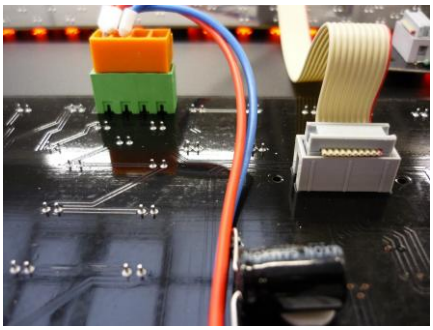
8 Checklist

A visual inspection must be carried out after completion of the installation and wiring work, as well as after modifications and maintenance work on the system.
The following instructions must be observed:

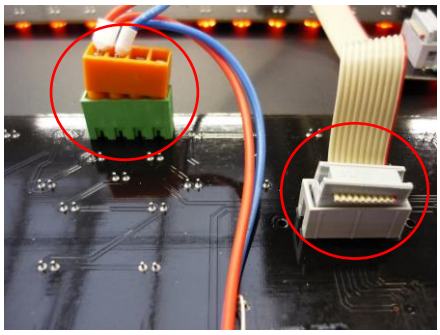
1. Check all cables/wires to ensure that they are routed correctly in the housing. They should not be in contact with sharp-edged housing parts and should not be squeezed.
2. There shall be no metal shavings in the housing or on the electronic components.
3. Ensure that the two light sensors (front and rear) are mounted correctly. They should not be covered or slipped into the housing. It must be ensured that the sensors can measure the ambient brightness.
4. The housing must be sealed so that no water can ingress.
5. The housing should be as well ventilated as possible to reduce heat build-up and condensation.
   The ventilation openings provided must therefore be free of dust and dirt.
   Ventilation openings close to the ground should not be buried in the ground or blocked by overgrown vegetation.
6. However, when in doubt, protection against the ingress of water should be favoured over ideal ventilation!
7. Especially with old systems: even careful repair work can cause damage or faults.
   Ribbon cables and spring contacts inside a plug can fatigue over time. Contact pins can be covered with an oxide layer. The combination of these results in contact faults.
   For example, a repair (replacement of a defective digit) can result in the display continuing to be faulty, as the ribbon cables were not replaced at the same time.
   This often leads to a misinterpretation of the fault pattern and makes troubleshooting more difficult.

8.1 Check the plug connections

The delivery of the display lines often consists of individual, pre-wired modules that are installed in an existing housing. Despite careful testing and packaging, the connectors may have come loose in whole or in part on delivery. This must be considered during inspection. In addition, some plugs and cables must be installed when the lines are mounted.
After installation, all connectors of the ribbon cables, power supply cables and fibre optic cables must be checked to ensure that they are correctly fitted.



Connector OK



Connector not OK
(Connectors are not fully plugged in)

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8.2 Segment test of the display

After start-up, the display modules perform the LED segment and brightness test once and then enter normal operating mode.

If there is not enough time for the visual inspection, the test mode can be forced.
See chapter: **Protocols and options for the displays**.

The segments on all digits are now displayed **one after the other**.
No more than one segment should be displayed on a digit. Furthermore, segments must not light up permanently.

Next follows a brightness test in which all segments briefly display the brightness levels from 5% to 100%. None of the digits may permanently display 100% or not change brightness.
Once the test has been completed, the segment test must be switched off again.

8.3 Checking the order

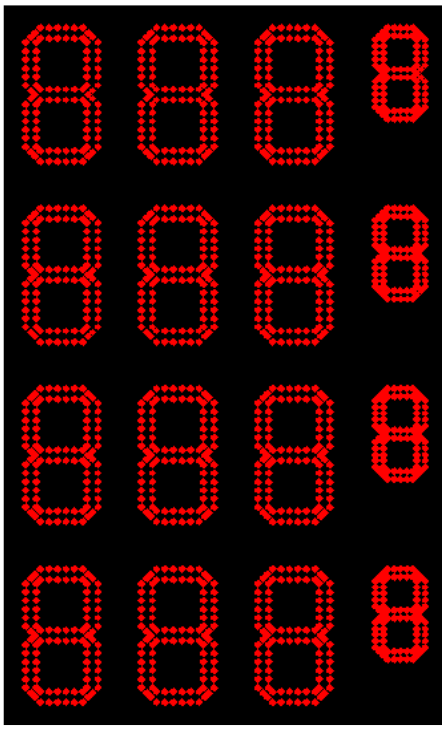
Enter product types 1 to 8 and send to price display
Type 1 '1111' Type 2 '2222' Type 3 '3333' Type 4 '4444', etc.

Check whether the sequence of the numbers sent is displayed correctly (from top to bottom)
If not, reconnect the fibre optic cables to the control electronics until the correct sequence is displayed.
See chapter: 'Block diagram'.

A direct assignment is recommended.
The product allocation should be adapted to the circumstances and documented on the software side by means of the setting in the PST1 operating device or in the POS system.

8.4 Checking the brightness control

Send '8888' to all lines.



Illuminate the light sensor with a light source (flashlight etc.).

The brightness of the displays must now increase evenly in all lines on the corresponding side.

Alternatively, the sensor can also be concealed.

If one of the lines on the wrong side changes in brightness, then the ribbon cables from the fibre optic receiver to the front/rear display lines are probably reversed.

Carry out this check for both sides.

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8.5 Typical errors and their rectification

Failure	Possible causes	Actions
Entire price pole does not light up.	Voltage 230VAC missing	Check the breaker in the switch cabinet If necessary, check whether a timer switch is installed.
	15VDC not present at the output of the switching power supply	Switching power supply defective or short circuit or sense connection open.
	All lines set to 'blank', brightness set to 0 or control electronics in standby mode.	Resend prices and brightness settings
	Control electronics defective and no Signal-LED active	Check power supply, replace control electronics
No data transmission from the control panel to the pole.	Cable connection: control panel-->price pole defective	Check cable connections and pin assignment.
	Radio transmission disrupted or one of the transceiver modules defective or disrupted	Systematically observe the transmission and reception behaviour over the entire distance using the activity LED and isolate the fault. PST1 -> Transmitter->Receiver->Control electronics. All devices have corresponding indicators.
	Connection of the data line reversed	Check the pin assignment
	Incorrect physical interface or PT protocol selected	Set the control panel to the appropriate PT protocol
	Incorrect interface set on the control electronics	Set the correct interface on dipswitch SW1.
No data transmission from the POS system to the control panel	Cable connection POS-> control panel defective or data cable connections swapped	Check cable connections and pin assignment.
	Incorrect POS module used. Incompatible protocol.	Check PST1 POS module version and protocol. Enquire about compatibility if necessary.
	POS system not configured correctly.	Contact the technical support of the POS system.
One product shows nothing on both sides (stays dark)	Fibre optic receiver in the line or the first primary digit is defective. (First primary digit supplies the fibre optic receiver with power)	Use swap comparison to narrow down errors, swap fibre optic receiver, first digit and ribbon connections
	No power supply to the line or poor contact at the screw connections	Check the power supply cable from the busbar to the line. If necessary, loosen each screw connection and reinsert and tighten it again.
A product on both sides in a permanent self-test	Fibre optic transmitter on control electronics defective or transmission power too low due to normal wear and tear	Replace control electronics
	Fibre optic receiver in the display line defective	Replace fibre optic receiver
	Fibre optic cable unclean, light coupling insufficient	Re-cut fibre optic cable. Ensure clean cross-section. If necessary, remove dirt from the transmitter and receiver housing with compressed air
One or more digits of a line do not light up or show artefacts	One or more digits defective, e.g. due to corrosion	Replacing the entire display line is faster, more efficient and cheaper than troubleshooting and replacing the digits and cable connections.
One product lights up with a different brightness than on the back (a complete wall should always have the same brightness	Ribbon cables swapped in the line on the fibre optic receiver. (front and rear)	If this does not help, the fault pattern 'One or more digits defective, e.g. due to corrosion' is applicable. See above.
Brightness sensor on the front controls the rear side	Connection of the brightness sensors to the control electronics reversed.	Swap LDR1 and LDR2 connections
Price pole shows incorrect prices in the morning hours or sporadically or does not respond	Timer switch prevents or disrupts the function of the price pole	Remove the timer switch and use the 'Opening times' function in the control unit instead.
	Control electronics in the price pole covered with dew / condensation. Software function affected.	Replace old control electronics with worn or missing protective coating with a new and better protected version.

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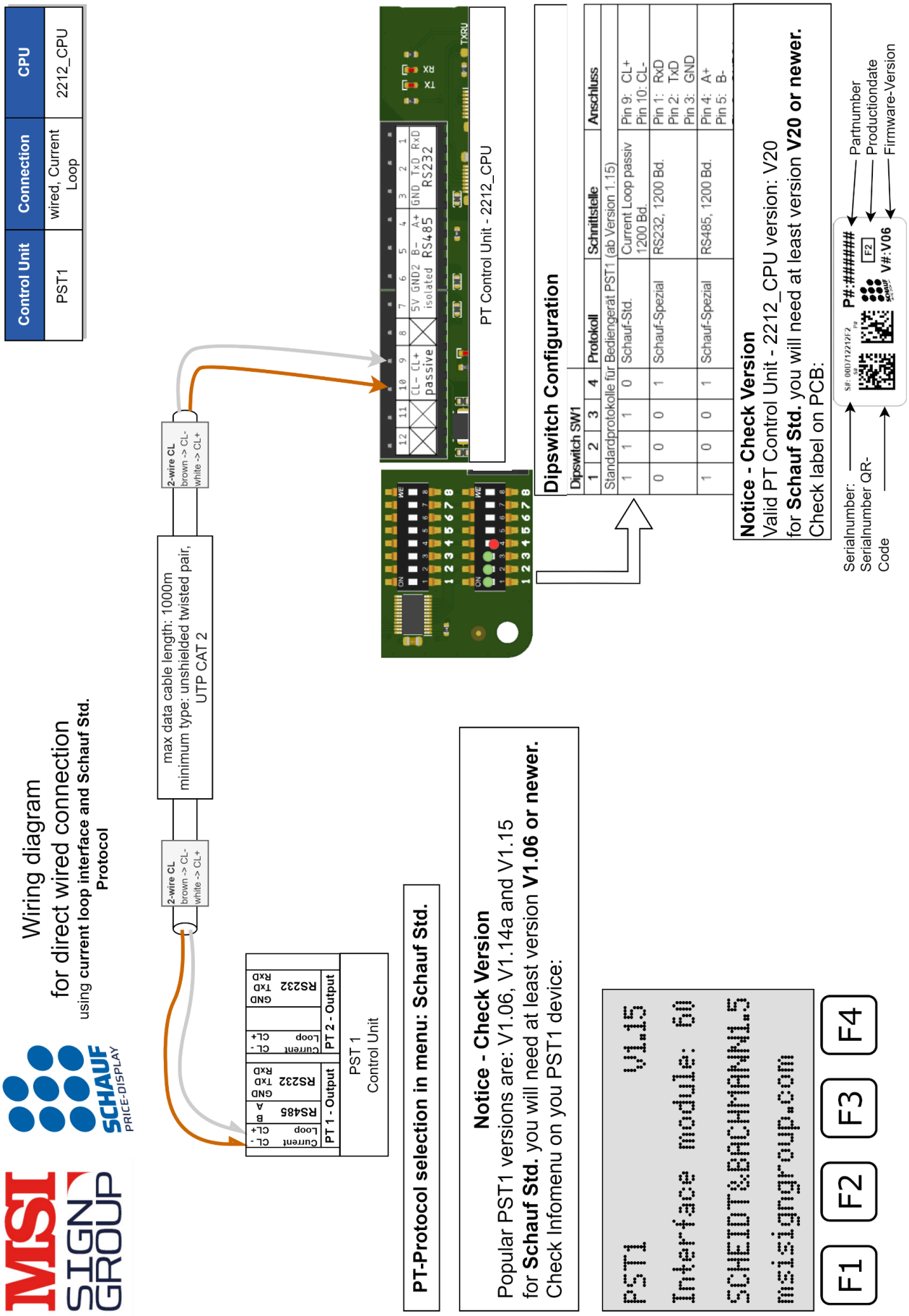
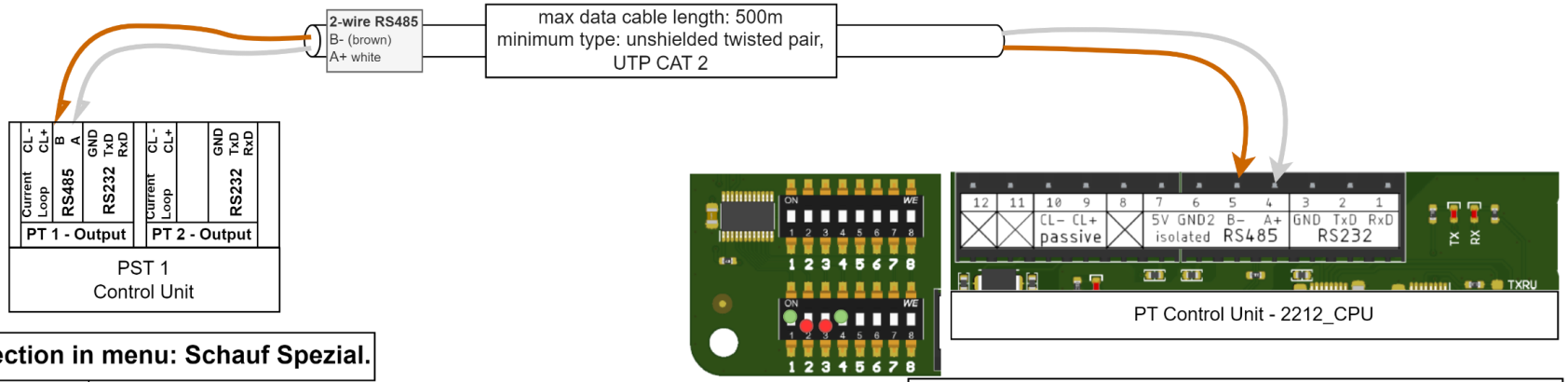
9 Typical connection variants (PST1 and price pole CPU)



Wiring diagram
for direct wired connection

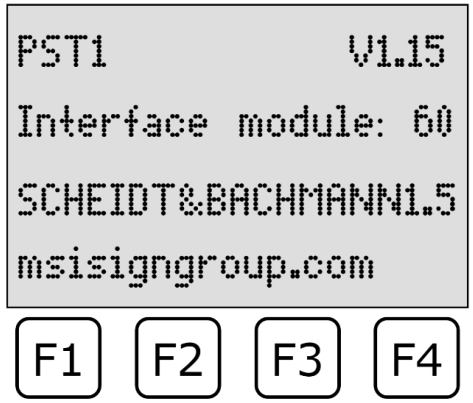
using 2-wire RS485 interface and Schauf Spezial protocol.
(without common ground)

Control Unit	Connection	CPU
PST1	wired, RS485	2212_CPU



PT-Protocol selection in menu: Schauf Spezial.

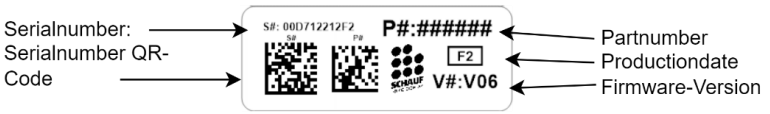
Notice - Check Version
Popular PST1 versions are: V1.06, V1.14a and V1.15
for **Schauf Spezial** you will need at least version **V1.15 or newer.**
Check Infomenu on your PST1 device:



Dipswitch Configuration

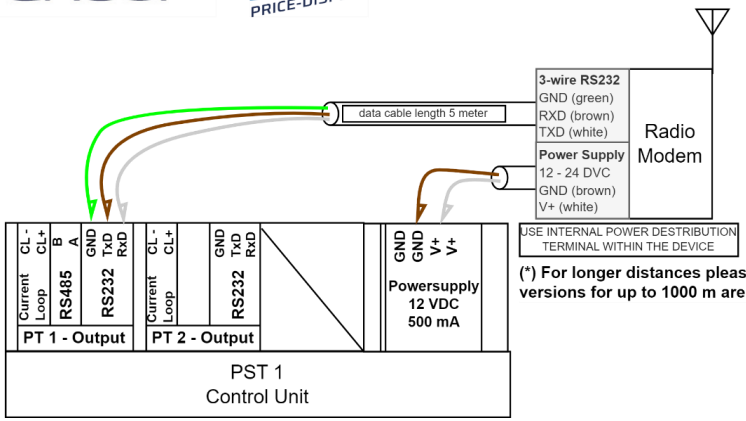
Dipswitch SW1						
1	2	3	4	Protokoll	Schnittstelle	Anschluss
Standardprotokolle für Bediengerät PST1 (ab Version 1.15)						
1	1	1	0	Schauf-Std.	Current Loop passiv 1200 Bd.	Pin 9: CL+ Pin 10: CL-
0	0	0	1	Schauf-Spezial	RS232, 1200 Bd.	Pin 1: RxD Pin 2: TxD Pin 3: GND
1	0	0	1	Schauf-Spezial	RS485, 1200 Bd.	Pin 4: A+ Pin 5: B- Pin 6: GND2 iso Pin 7: 5V iso

Notice - Check Version
Valid PT Control Unit - 2212_CPU version: V20
for **Schauf Spezial.** you will need at least version **V20 or newer.**
Check label on PCB:

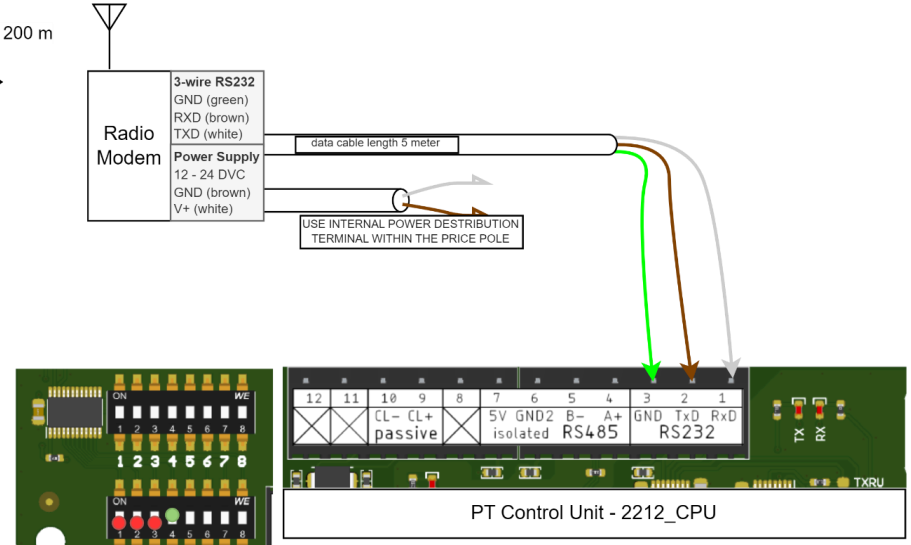


Wiring diagram
for radio connection via Adeunis 868 MHz
point-to-point

Control Unit	Connection	CPU
PST1	wireless, Adeunis Radio	2212_CPU



(*) For longer distances please contact us. versions for up to 1000 m are possible.



PT-Protocol selection in menu: Schauf Spezial.

Notice - Check Version

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for **Schauf Spezial** you will need at least version **V1.15 or newer.**
Check Infomenu on your PST1 device:

Dipswitch Configuration

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Standardprotokolle für Bediengerät PST1 (ab Version 1.15)						
1	1	1	0	Schauf-Std.	Current Loop passiv 1200 Bd.	Pin 9: CL+ Pin 10: CL-
0	0	0	1	Schauf-Spezial	RS232, 1200 Bd.	Pin 1: RxD Pin 2: TxD Pin 3: GND
1	0	0	1	Schauf-Spezial	RS485, 1200 Bd.	Pin 4: A+ Pin 5: B-

Notice - Check Version

Valid PT Control Unit - 2212_CPU version: V20
for **Schauf Spezial** you will need at least version **V20 or newer.**
Check label on PCB:

Installation instructions and user manual
Central control electronics and general price pole function