SÜTRON

ELECTRONIC GMBH

Technical Manual

TesiMod Touch Panel

TP35C

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Table of Contents

1 Explanation of Symbols 5

2 The Touch Panel TP35 5

2.1 Front View 6

2.2 Keyboard 7

2.2.1 Function Keys 7

2.2.1.1 Function Key Arrangement 7

2.2.1.2 Slide-in Identification Strips for the Function Keys 7

2.3 Rear View 10

2.3.1 Standard 10

2.3.2 RS422 / RS485 11

2.3.3 InterBus 12

2.3.4 SUCOnet K 13

2.3.5 Profibus-DP 14

2.3.6 CAN-Bus 15

2.3.7 LON Bus 16

2.3.8 InterBus - Optical Fibre 17

2.4 Mounting the Terminal 18

2.4.1 Front Panel Dimensions 19

2.4.2 Side View, Mounting Depth 20

2.4.3 Panel Cutout 21

2.5 Pin Assignments 22

2.5 Pin Assignments 22

2.5.1 Pin Assignment X1 Supply Voltage 23

2.5.2 Pin Assignment X2 TTY / 20 mA Current Loop 24

2.5.3 Pin Assignment X2 RS422 / RS485 25

2.5.4 Pin Assignment X3 RS232c / V.24 26

2.5.5 Pin Assignment X2.1/ X2.2 InterBus 27

2.5.6 Pin Assignment X2.1/ X2.2 SUCOnet K 28

2.5.7 Pin Assignment X2.1 Profibus DP 29

2.5.8 Pin Assignment X2.1/ X2.2 CAN Bus 30

2.5.9 Pin Assignment X2 LON Bus 31

2.5.10 Pin Assignment InterBus Optical Fibre 32

2.6 Shield 32

2.7 Display 33

/000-8348/
TP35C_grau_eng_V10.30000QK0

2.7.1 Display Brightness Setting 33
2.7.2 Default Brightness Setting 34
2.7.3.1 Font Normal 35
2.7.3.2 Font Zoom 36
2.7.3.3 ASCII Character Set Table 37

2.8 User-Mode Switch 38

2.9 Battery 39

2.10 Fuse 40

3 Technical Data 41

1 Explanation of Symbols

This manual uses the following symbols to indicate notes and hazardous situations.



Notes for the User



General Danger



Specific Danger

2 The Touch Panel TP35

The Touch Panel **TP35C** is an operating terminal that can be operated by a touch screen instead of the normal keyboard.

Nevertheless the **TP35C** is equipped with funktion keys with integrated status LEDs below the display. The funktions keys can be used for controller access, as direct access keys or as softkeys. Obvious you can individually label the funktion keys with slide-in strips.

The touch panel **TP35C** is equipped with a color display with a size of 10.4“. It is able to display full graphics and supports positioning of images, text elements and process values dot by dot.

The TesiMod operating conept allows a comfortable use of the touch panel.

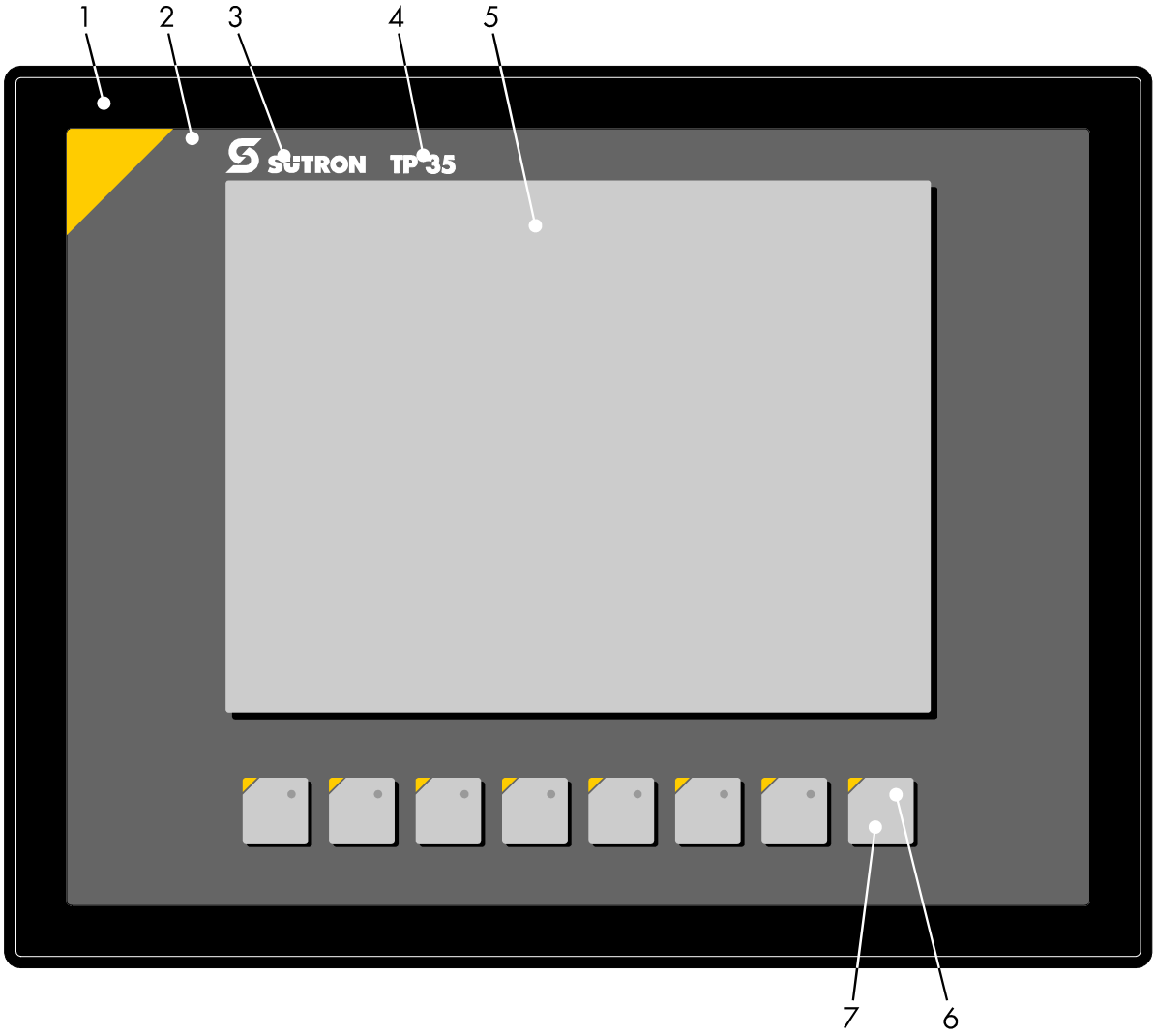
A built-in lithium battery buffers the data in the RAM and also supplies the reeal-time clock with power. The discharge state of the battery is monitored constantly by the system.

The communication with the **TP35C** is supported by standardized interfaces. The modularity of the software allows a quick adjustment to different protocols.

The operator guidance for the **TP35C** is done by means of the PC program TSwin.

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2.1 Front View



1 Front Panel
2 Front Cover
3 Company Logo
4 Appliance Type Logo
5 Touch - Display
6 Status-LED of the Function keys
7 Function keys F1 to F8

2.2 Keyboard

The **Touch Panel** has ether a touch display and eight function keys with integrated status LEDs. The keyboard consists of short-stroke switches. The stroke distance is 0.5 mm and the key area is 16 x 16 mm. The key elements are covered by an embossed polyester foil against environmental infuences. This combination allows a sensitive use of the keys. The status LEDs illuminate green.
The function of the keys depend on the application.
The keys can be used for the following operations:

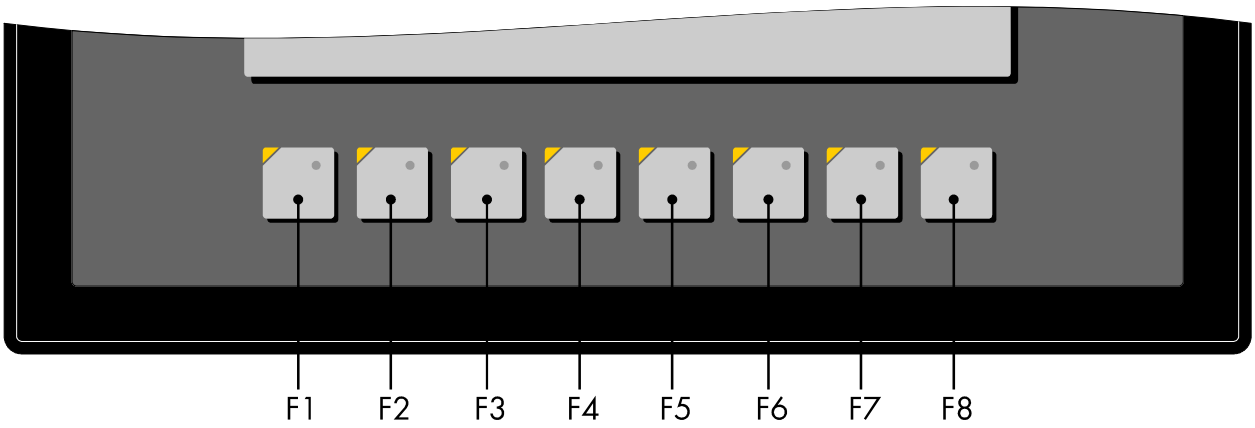
- Function keys (functions are independent of the current mask)
- Softkeys (functions depent on the current mask)
- Mask change (direct access keys)
- Activate functions in the controller
- Inernal controller operations (set/reset system variables)

2.2.1 Function Keys



Funktion key F1 to F8 with integrated LEDs for functional feedback. The key functions can be freely assigned to a softkey functionality, either as direct access keys for menu control or to activate a function in the controller.

2.2.1.1 Function Key Arrangement



2.2.1.2 Slide-in Identification Strips for the Function Keys

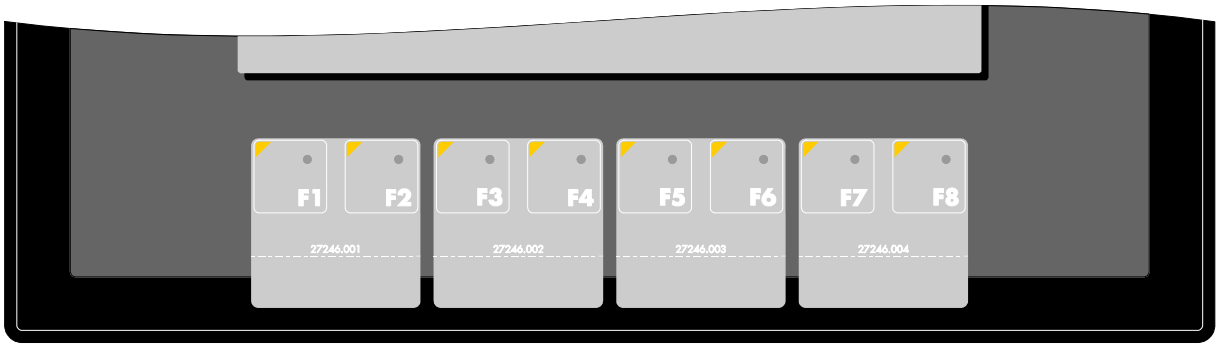
The identification strips can be replaced after the terminal is dismounted. Inserting the strpis from the rear of the front panel does not affect the tightness specified for the appliance.
The appliance is delivered with a set of identification strips.
The set consists of:

- four identification strips, labeled with F1 to F8
- four blank identification strips.

Various labeling methods are recommended, depending on the number of appliances involved.

Suitable labeling methods for:

Single appliances, prototypes:	lableling with an indelible pen
Small batch production:	transparency with laser printing
Large batch production:	custom specific printed identification strips



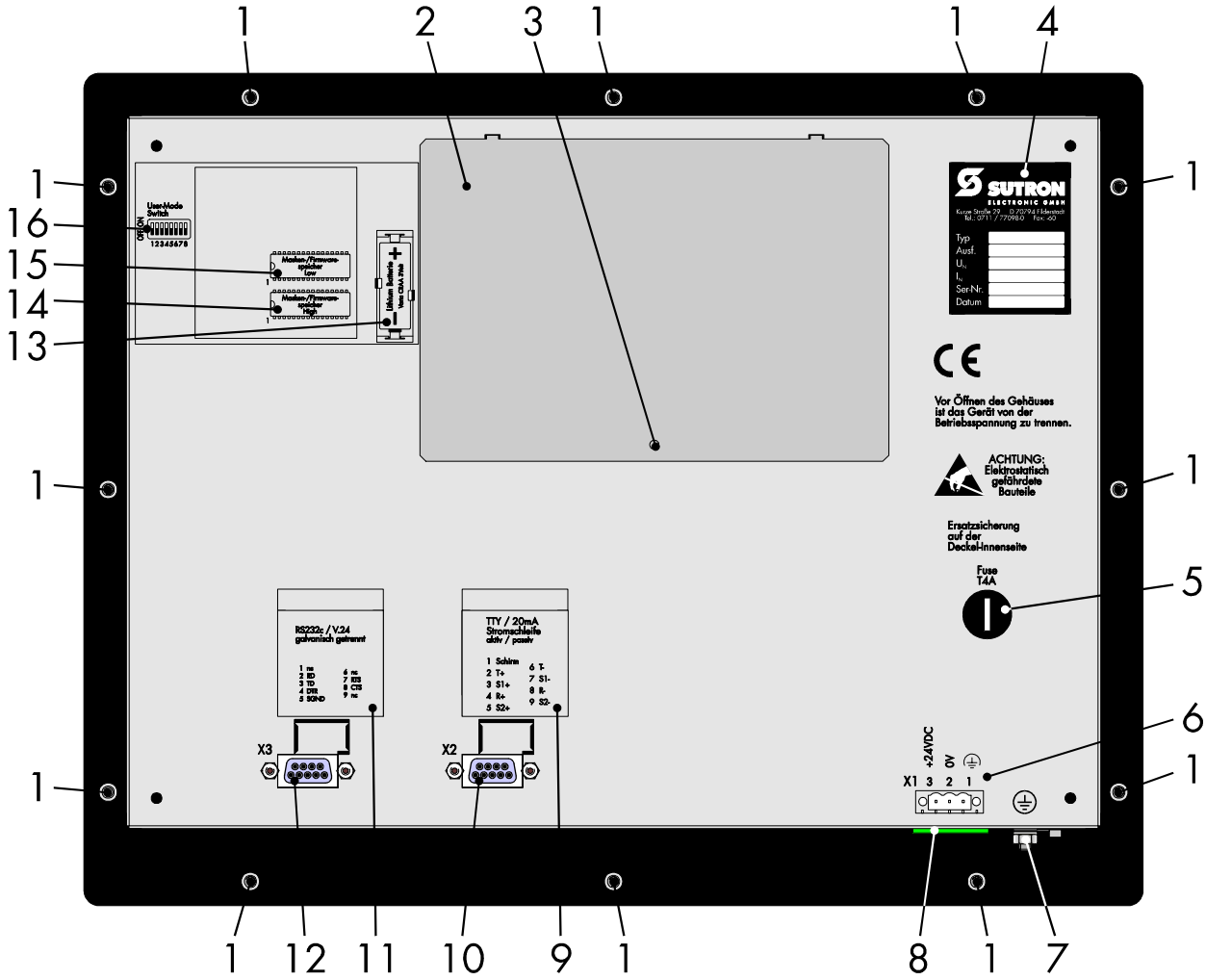
Position of identification strips

Labeled identification strips, standard

Blank identification str

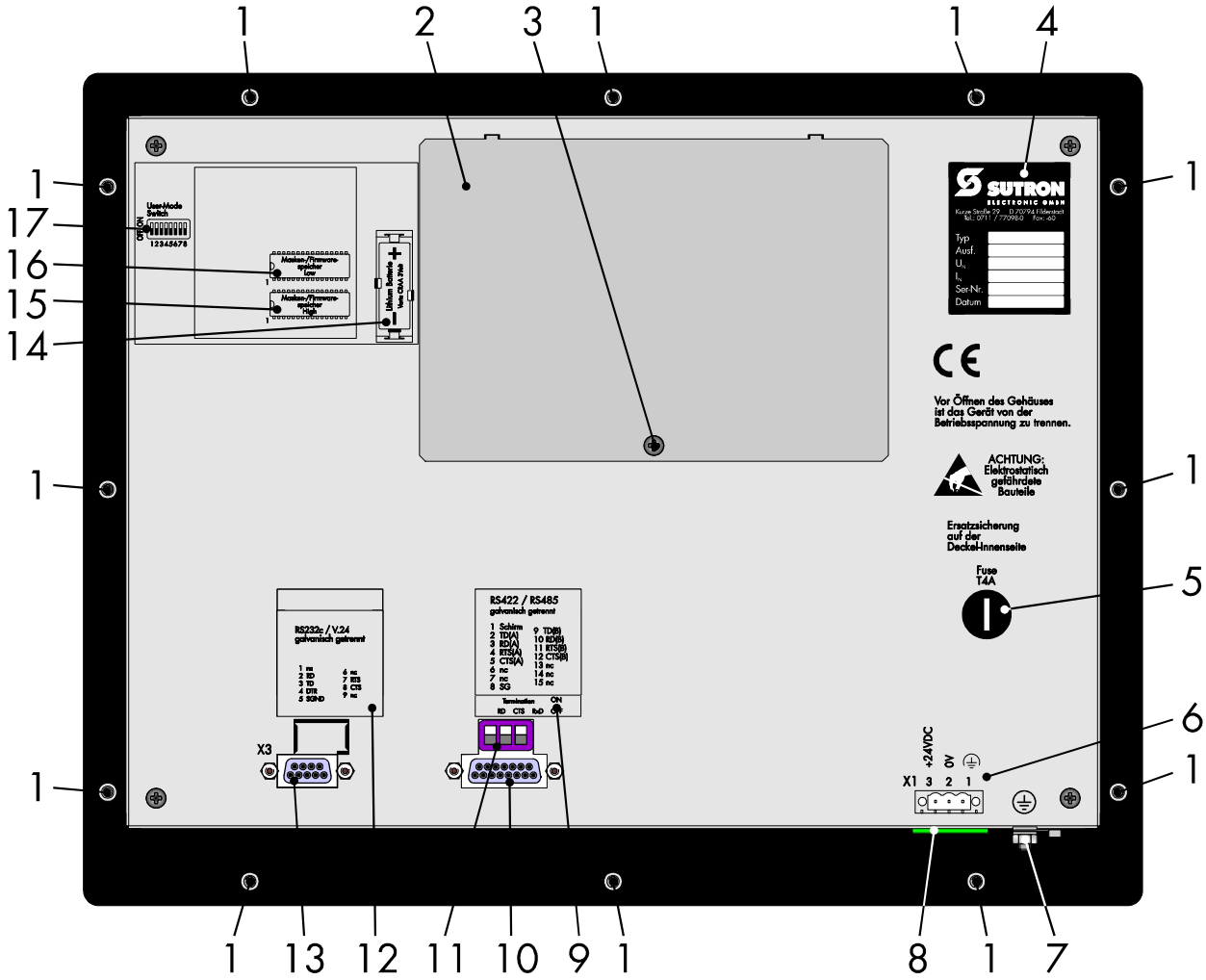
2.3 Rear View

2.3.1 Standard



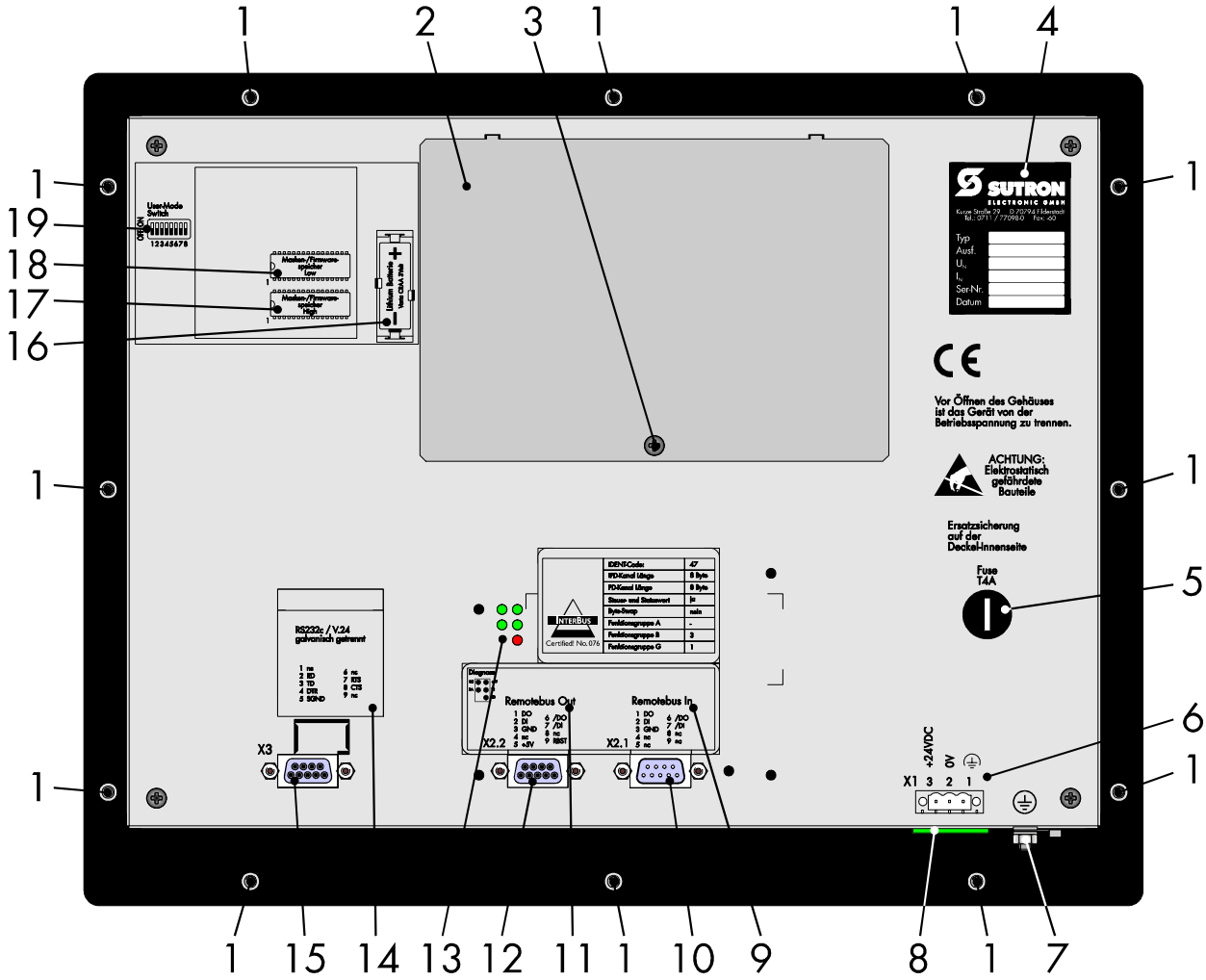
1	Mounting bolts
2	Hinged Cover
3	Screw for Hinged Cover
4	Position of Name Plate
5	Fuse
6	Pin Assignment Connector X1 (Power Supply)
7	Ground Screw
8	Connector X1 (Power Supply)
9	Pin Assingnment Interface X2 (TTY/20 mA)
10	Female Connector Interface X2 (TTY/20 mA)
11	Pin Assingnment Interface X3 (RS232c)
12	Female Connector Interface X3 (RS232c)
13	Position Battery (inside appliance)
14	Position Application memory (inside appliance)
15	Position Application memory (inside appliance)
16	Position User-Mode Switch (inside appliance)

2.3.2 RS422 / RS485



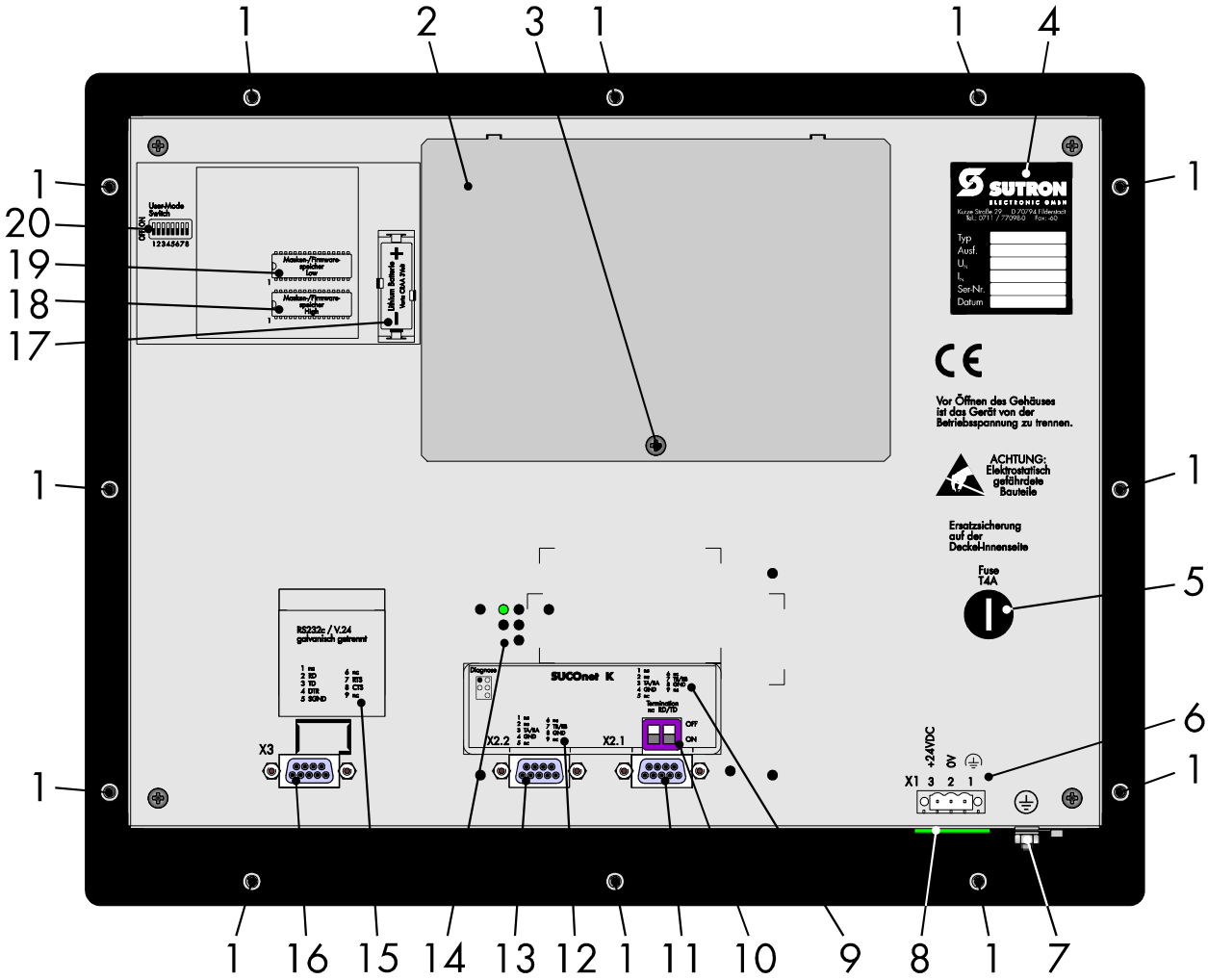
1	Mounting bolts	11	Terminator Switch Interface X2 (RS422/ RS485)
2	Hinged Cover	12	Pin Assingnment Interface X3 (RS232c)
3	Screw for Hinged Cover	13	Female Connector Interface X3 (RS232c)
4	Position of Name Plate	14	Position Battery (inside appliance)
5	Fuse	15	Position Application memory (inside appliance)
6	Pin Assignment Connector X1 (Power Supply)	16	Position Application memory (inside appliance)
7	Ground Screw	17	Position User-Mode Switch (inside appliance)
8	Connector X1 (Power Supply)		
9	Pin Assingnment Interface X2 (RS422/RS485)		
10	Female Connector Interface X2 (RS422/ RS485)		

2.3.3 InterBus



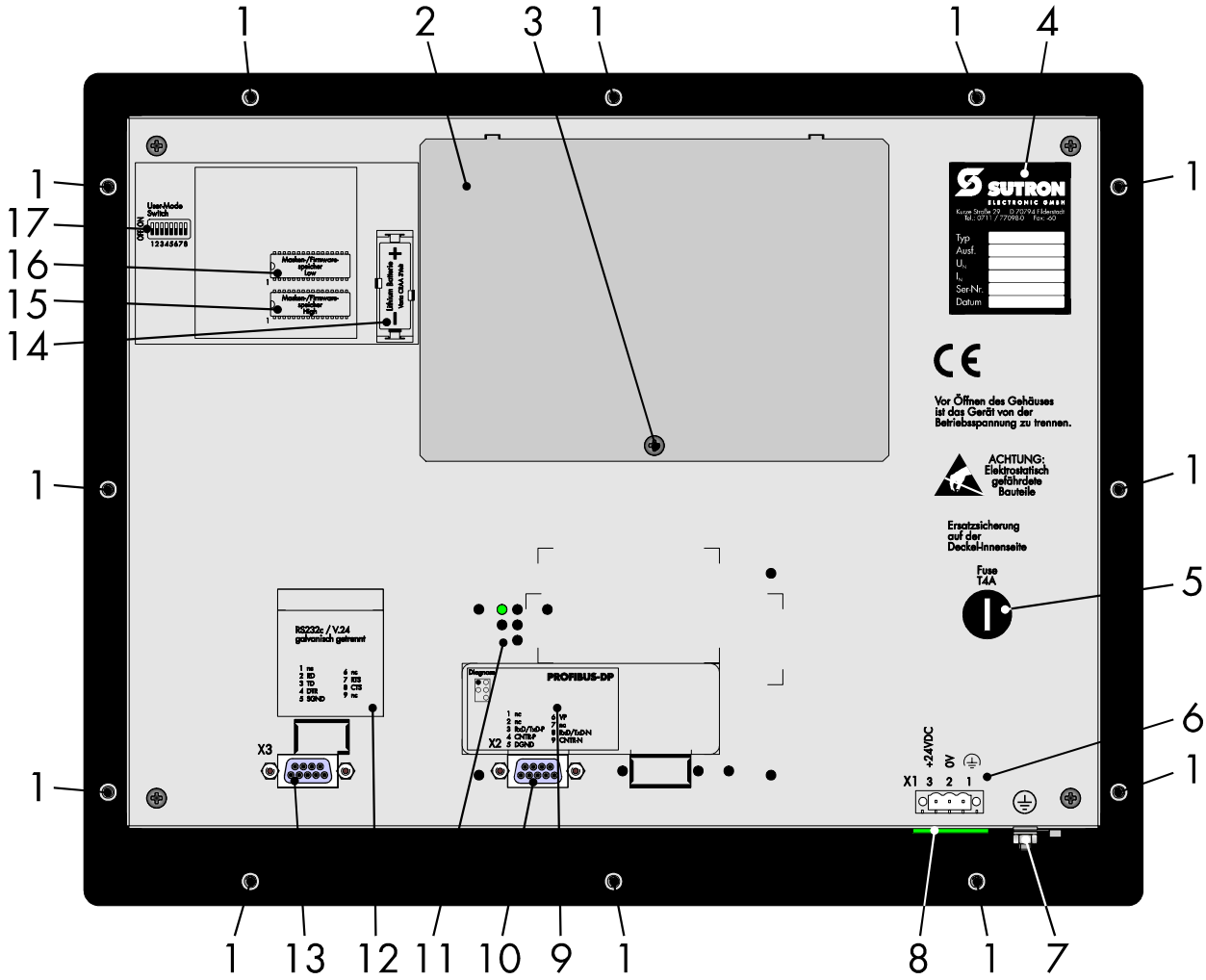
1	Mounting bolts		Out)
2	Hinged Cover	12	Female Connector Interface X2.2 (Remotebus Out)
3	Screw for Hinged Cover	13	Diagnostic LEDs Interbus
4	Position of Name Plate	14	Pin Assingnment Interface X3 (RS232c)
5	Fuse	15	Female Connector Interface X3 (RS232c)
6	Pin Assignment Connector X1 (Power Supply)	16	Position Battery (inside appliance)
7	Ground Screw	17	Position Application memory (inside appliance)
8	Connector X1 (Power Supply)	18	Position Application memory (inside appliance)
9	Pin Assingnment Interface X2.1 (Remotebus In)	19	Position User-Mode Switch (inside appliance)
10	Male Connector Interface X2.1 (Remotebus In)		
11	Pin Assingnment Interface X2.2 (Remotebus		

2.3.4 SUCOnet K



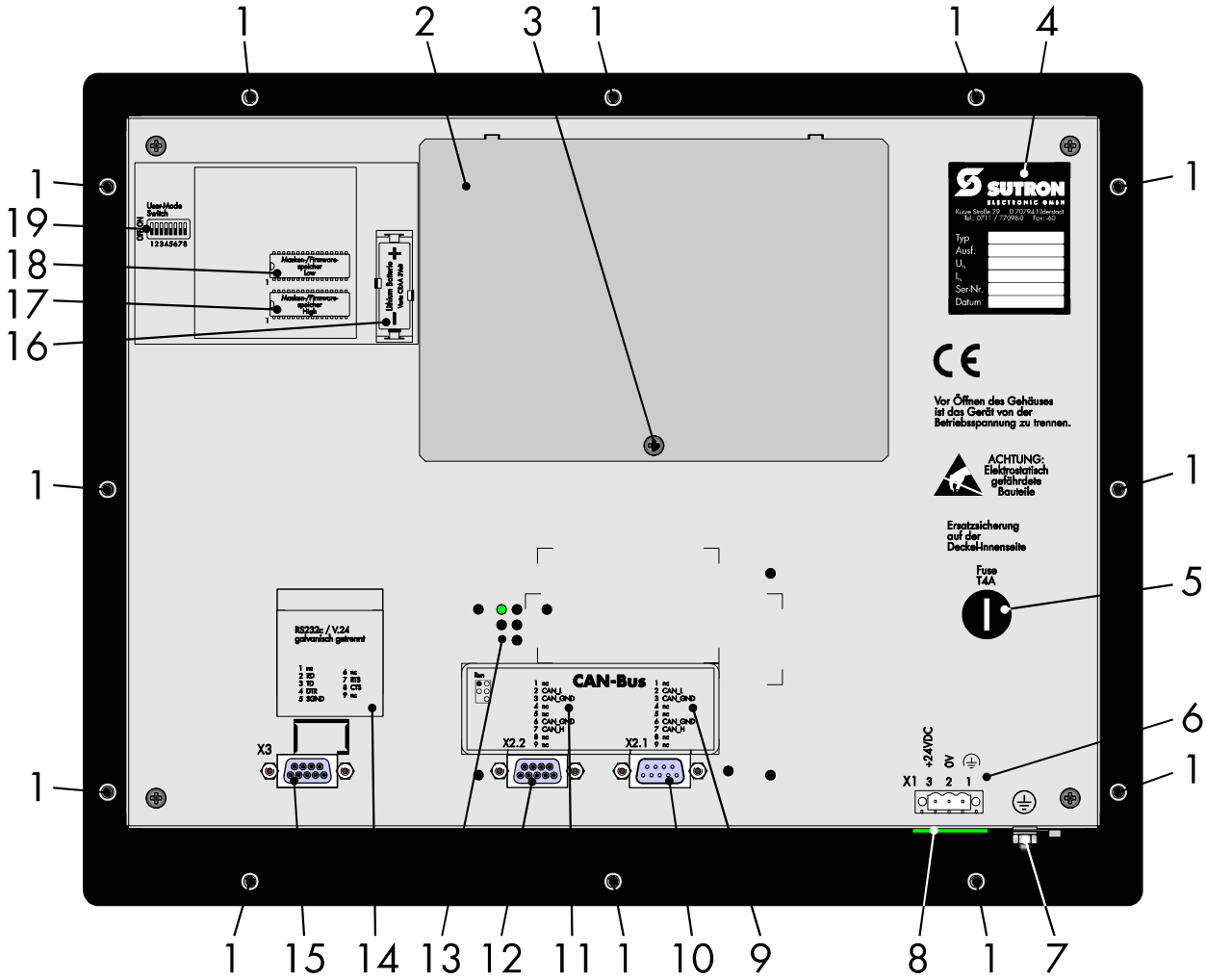
1	Mounting bolts	13	Female Connector Interface X2.2 (SUCOnet K)
2	Hinged Cover	14	Diagnostic LED SUCOnet K
3	Screw for Hinged Cover	15	Pin Assingnment Interface X3 (RS232c)
4	Position of Name Plate	16	Female Connector Interface X3 (RS232c)
5	Fuse	17	Position Battery (inside appliance)
6	Pin Assignment Connector X1 (Power Supply)	18	Position Application memory (inside appliance)
7	Ground Screw	19	Position Application memory (inside appliance)
8	Connector X1 (Power Supply)	20	Position User-Mode Switch (inside appliance)
9	Pin Assingnment Interface X2.1 (SUCOnet K)		
10	Terminator Switch (X2.1-SUCOnet K)		
11	Female Connector Interface X2.1 (SUCOnet K)		
12	Pin Assingnment Interface X2.2 (SUCOnet K)		

2.3.5 Profibus-DP



1	Mounting bolts
2	Hinged Cover
3	Screw for Hinged Cover
4	Position of Name Plate
5	Fuse
6	Pin Assignment Connector X1 (Power Supply)
7	Ground Screw
8	Connector X1 (Power Supply)
9	Pin Assingnment Interface X2 (Profibus-DP)
10	Female Connector Interface X2 (Profibus-DP)
11	Diagnostic LED Profibus-DP
12	Pin Assingnment Interface X3 (RS232c)
13	Female Connector Interface X3 (RS232c)
14	Position Battery (inside appliance)
15	Position Application memory (inside appliance)
16	Position Application memory (inside appliance)
17	Position User-Mode Switch (inside appliance)

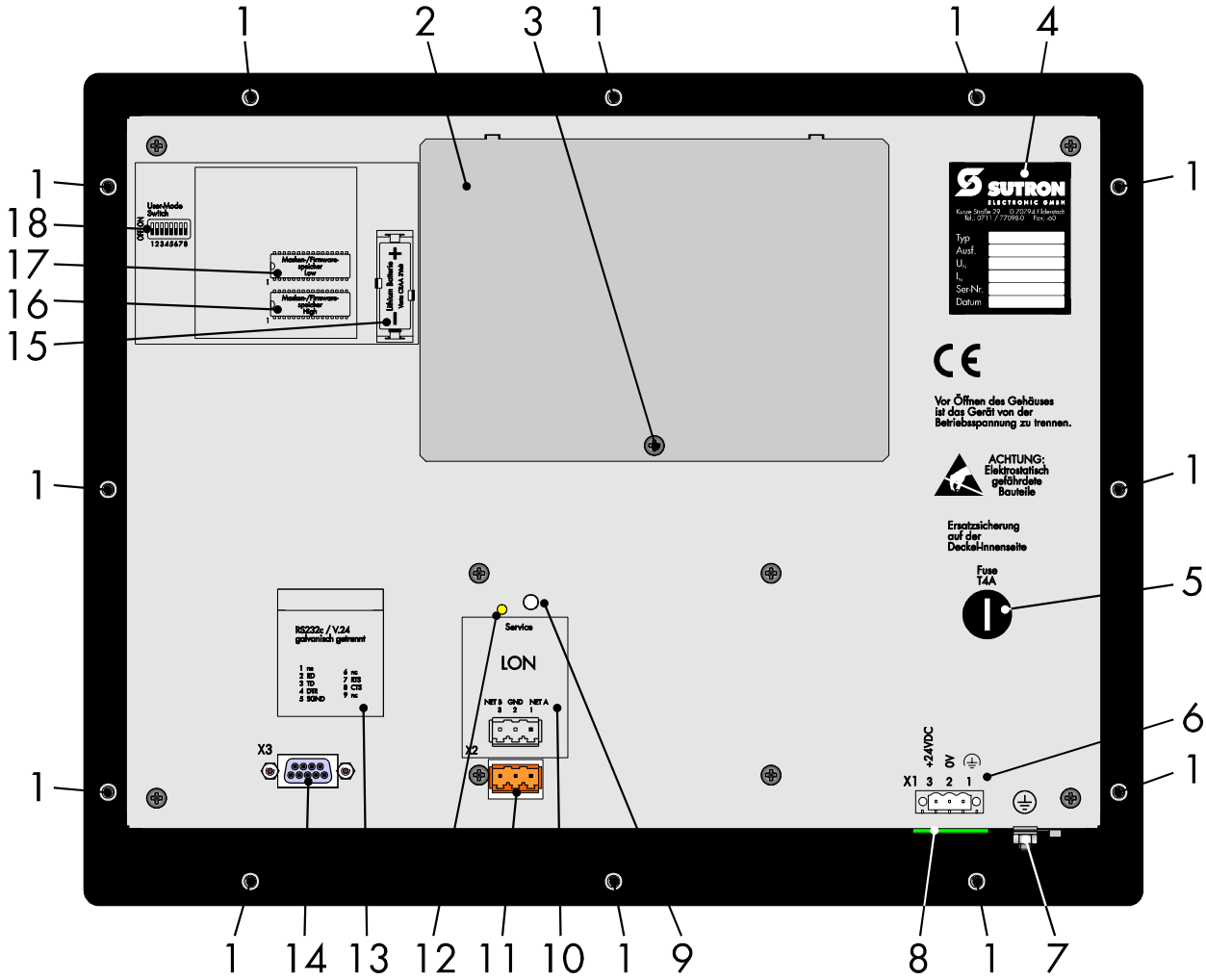
2.3.6 CAN-Bus



1	Mounting bolts	12	Female Connector Interface X2.2 (CAN)
2	Hinged Cover	13	Diagnostic LED CAN
3	Screw for Hinged Cover	14	Pin Assingnment Interface X3 (RS232c)
4	Position of Name Plate	15	Female Connector Interface X3 (RS232c)
5	Fuse	16	Position Battery (inside appliance)
6	Pin Assignment Connector X1 (Power Supply)	17	Position Application memory (inside appliance)
7	Ground Screw	18	Position Application memory (inside appliance)
8	Connector X1 (Power Supply)	19	Position User-Mode Switch (inside appliance)
9	Pin Assingnment Interface X2.1 (CAN)		
10	Male Connector Interface X2.1 (CAN)		
11	Pin Assingnment Interface X2.2 (CAN)		

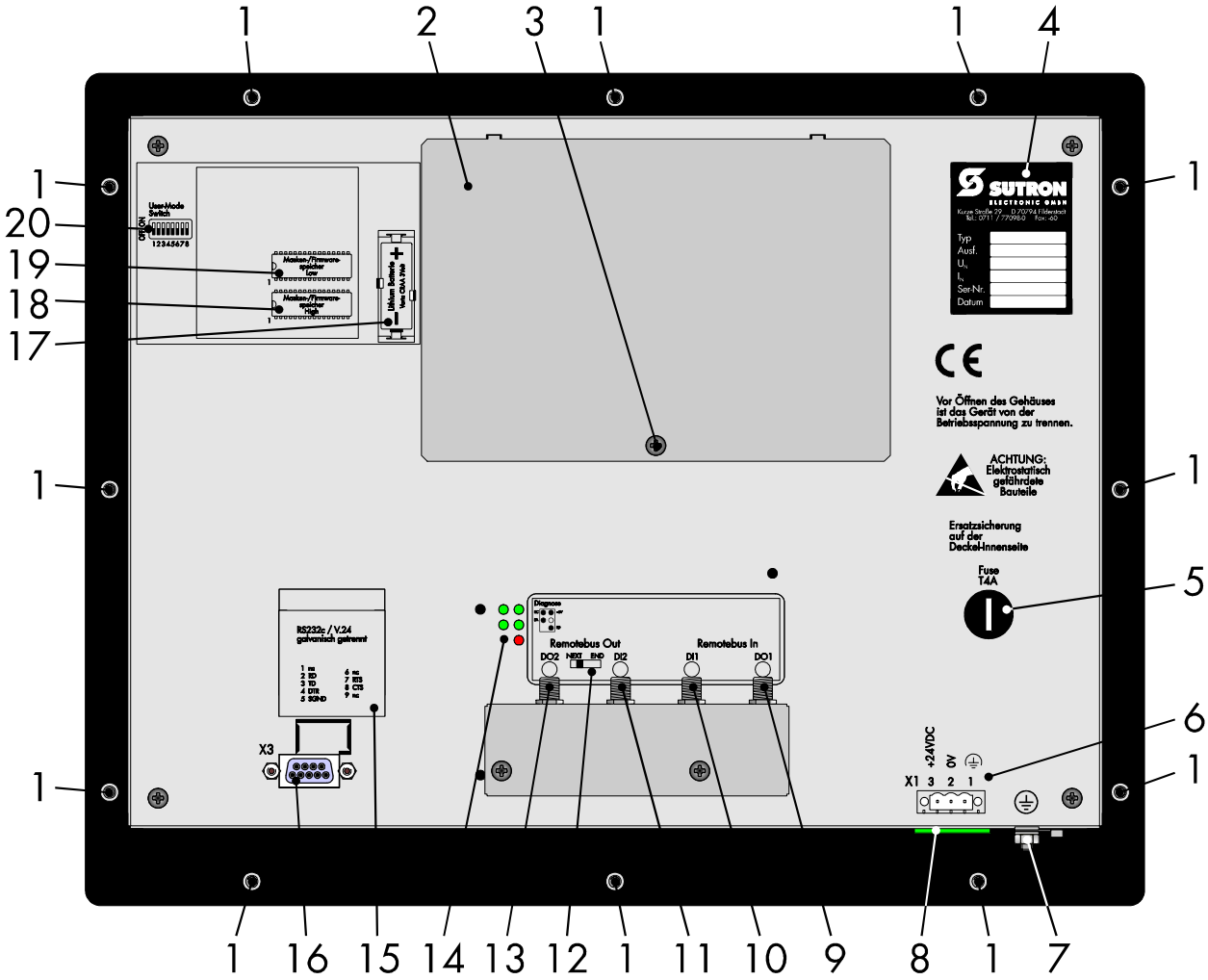
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2.3.7 LON Bus



1	Mounting bolts
2	Hinged Cover
3	Screw for Hinged Cover
4	Position of Name Plate
5	Fuse
6	Pin Assignment Connector X1 (Power Supply)
7	Ground Screw
8	Connector X1 (Power Supply)
9	Service Switch LON
10	Pin Assingnment Interface X2 (LON)
11	Male Connector Interface X2 (LON)
12	Service LED LON
13	Pin Assingnment Interface X3 (RS232c)
14	Female Connector Interface X3 (RS232c)
15	Position Battery (inside appliance)
16	Position Application memory (inside appliance)
17	Position Application memory (inside appliance)
18	Position User-Mode Switch (inside appliance)

2.3.8 InterBus - Optical Fibre



1	Mounting bolts	12	Terminator Switch (InterBus)
2	Hinged Cover	13	Fibre Optical Interface DO2 (Remotebus Out)
3	Screw for Hinged Cover	13	Diagnostic LEDs InterBus
4	Position of Name Plate	14	Pin Assingnment Interface X3 (RS232c)
5	Fuse	15	Female Connector Interface X3 (RS232c)
6	Pin Assignment Connector X1 (Power Supply)	16	Position Battery (inside appliance)
7	Ground Screw	17	Position Application memory (inside appliance)
8	Connector X1 (Power Supply)	18	Position Application memory (inside appliance)
9	Fibre Optical Interface DO1 (Remotebus In)	19	Position User-Mode Switch (inside appliance)
10	Fibre Optical Interface DI1 (Remotebus In)		
11	Fibre Optical Interface DI2 (Remotebus Out)		

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2.4 Mounting the Terminal

The rear panel mounting is suitable for easy and sealed installation in places where the rear side of the appliance is accessible. The appliance is particularly suitable for mounting in control cabinets with a mounting wall plate thickness of approximately 1 to 6 mm.
The front panel permits sealed installation of the operating terminal in accordance with the IP65 degree of protection (at the front). At the rear side of the front panel a circumferencial sealing is attached.
All parts for mounting the appliance are given with the spare parts set.

Special care needs to be taken during installation to maintain this high degree of protection. The operating terminal is inserted from the front through the panel cutout and screwed to the mounting wall from the rear. The seal must be positioned evenly and the fastening elements tightened uniformly.

When installing the terminal, keep a minimum space of 30 mm around the terminal for adequate air circulation.

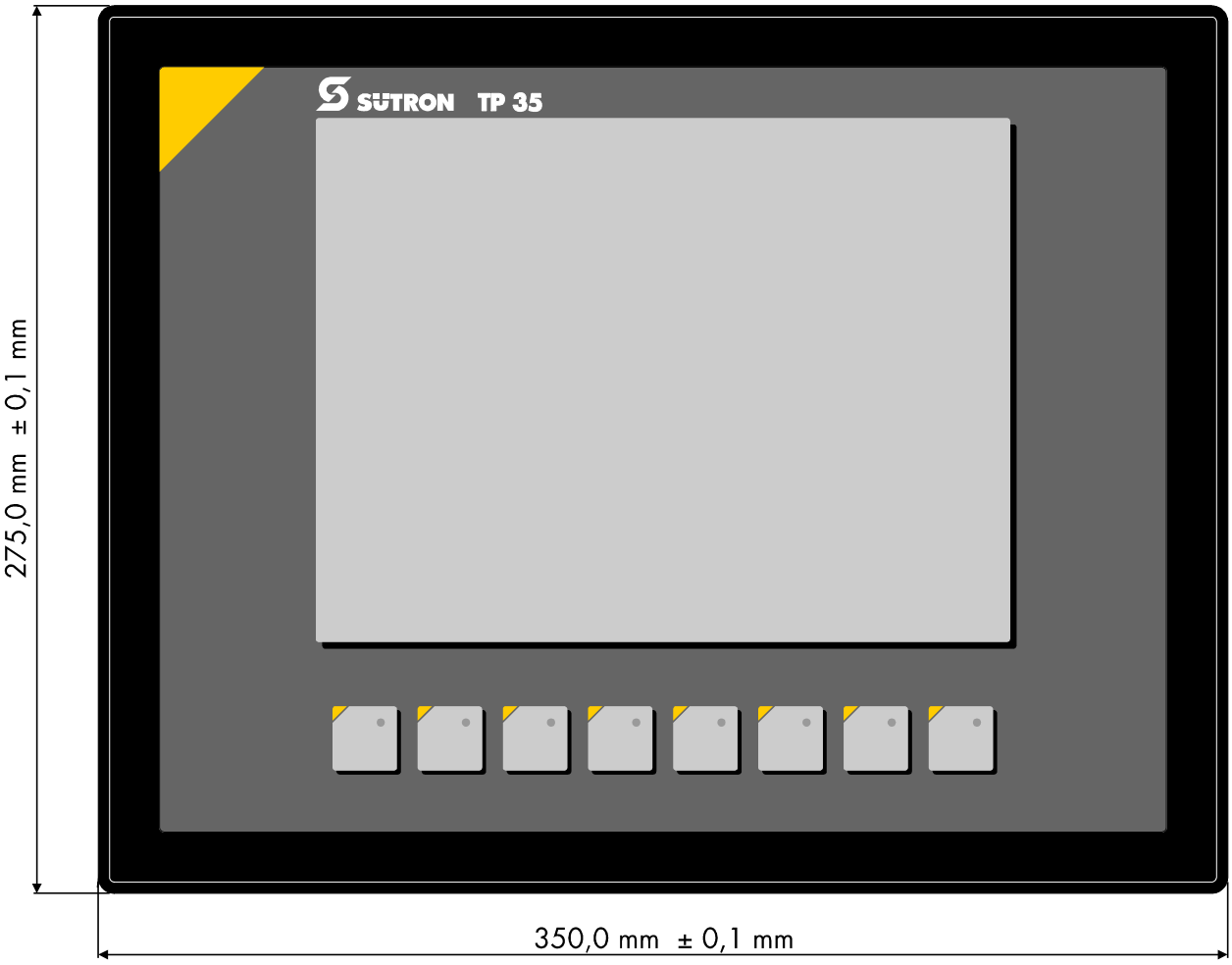
The tightness between the front panel and the mounting surface depends on the care during installation.



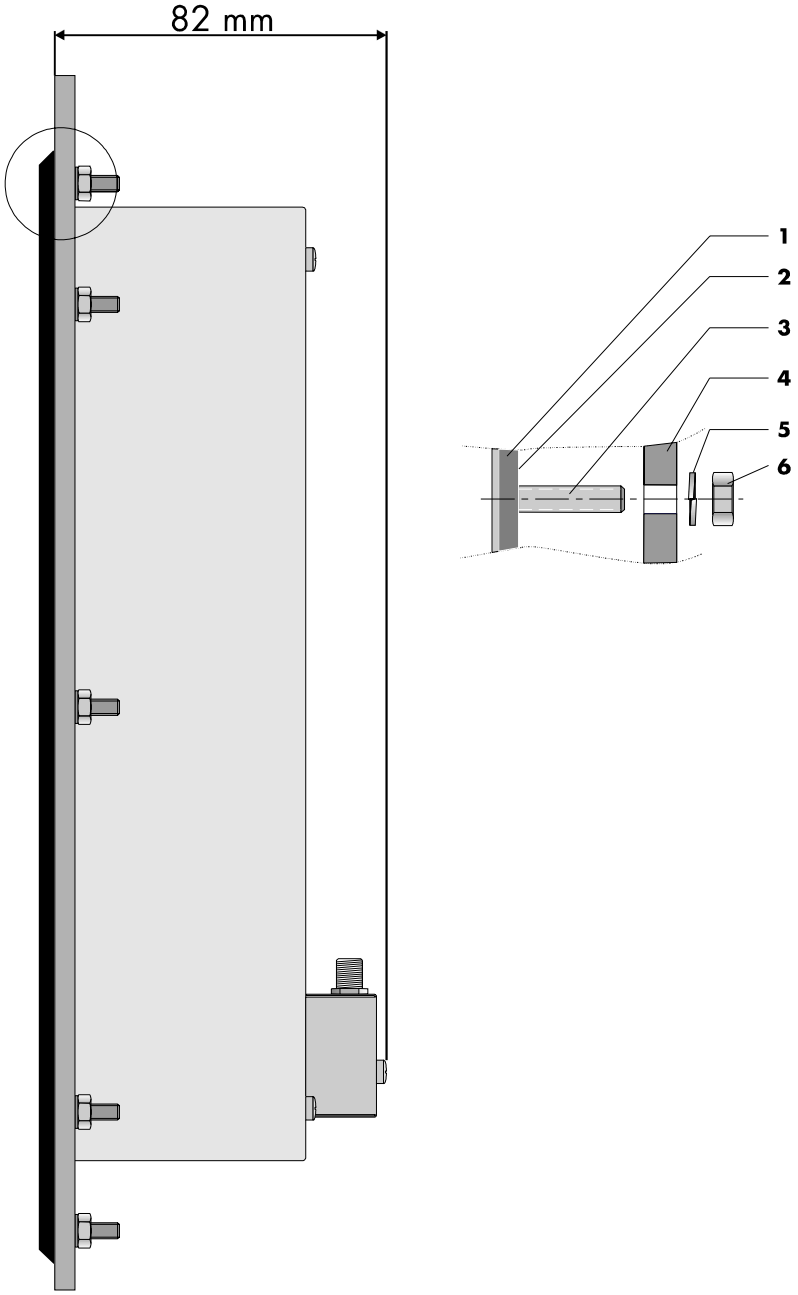
When mounting the device, observe the safety information in the mounting instructions!

Front Panel Dimensions:	275.0 x 350.0 x 4.0 mm	(H x W x D)
Panel Cutout:	238 x 324 mm	(H x W)

2.4.1 Front Panel Dimensions

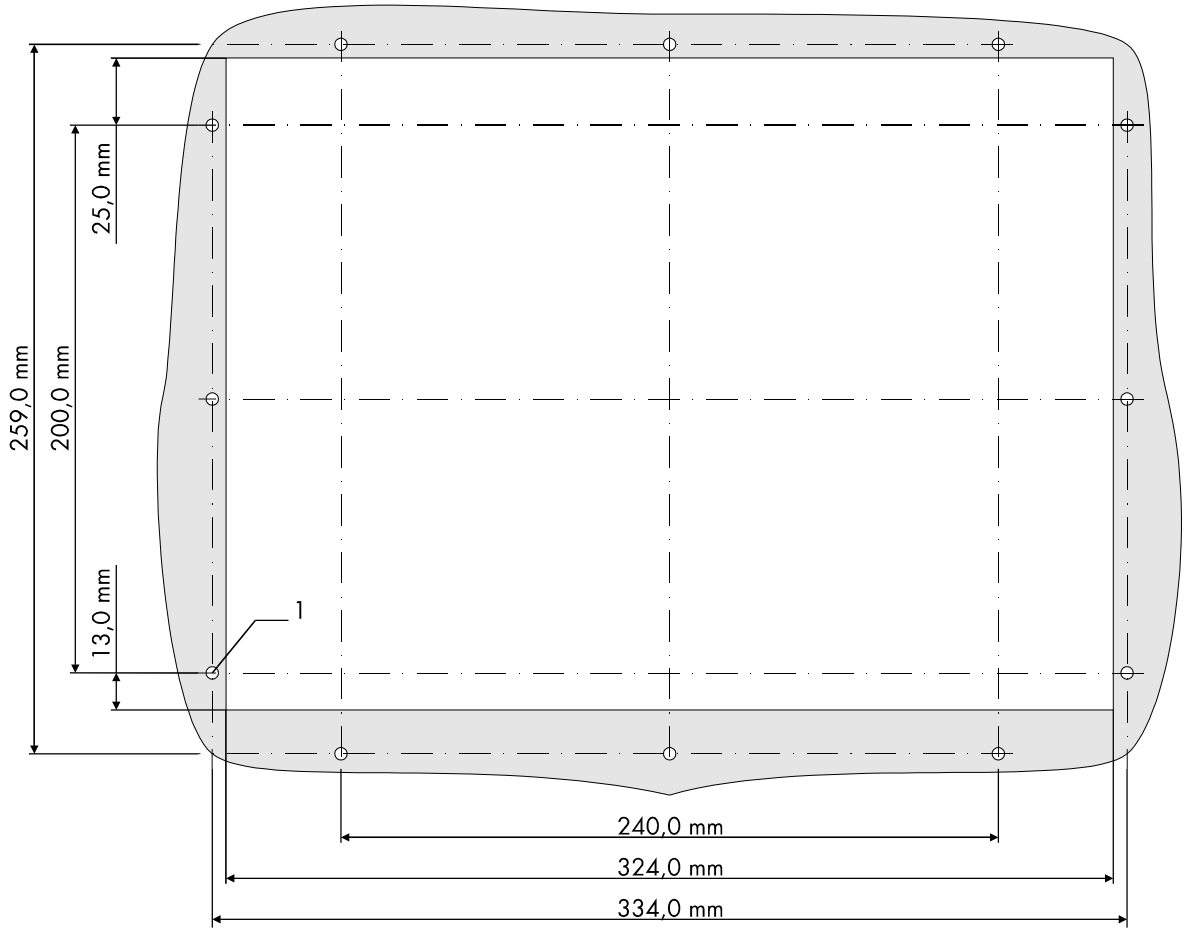


2.4.2 Side View, Mounting Depth



1	Front Panel TP35	4	Mounting Surface Thickness 1 to 10 mm
2	Circumferencial Sealing	5	Spring Lock Washer B4 DIN127 Form B
3	Press-In Threaded Bolt M4 x 16 mm	6	Nut M4 DIN934

2.4.3 Panel Cutout



1 12 holes with a diameter of 4.5 mm

2.5 Pin Assignments

The Touch Panel is fitted with the following interfaces:

Connector X1 ..... Supply voltage
Female connector X2 ..... TTY / 20 mA
Female connector X3 ..... RS232c / V.24

Optional the Touch Panel can be equipped with the interfaces shown below:

Female connector X2 ..... RS422 / RS485
Female/male connector X2.1 and X2.2 ..... InterBus
Female connector X2 ..... Profibus DP
Female connectors X2.1 and X2.2 ..... SUCOnet K
Female/male connector X2.1 and X2.2 ..... CAN
Male connector X2 ..... LON
Connector DO1, DI1, DO2 and DI2 ..... InterBus - Optic fibre

The interfaces are galvanical insulated against the electronic circuitry inside.

The interfaces at the connectors X2, X2.1/X2.2 und DO1/DI1/DO2/DI2 are used to connect a PLC or Host computer.
The interface at connector X3 is used to connect a printer and is also responsible for logging functions and connecting a PC for downloading purposes.

2.5.1 Pin Assignment X1 Supply Voltage

The supply voltage is connected via the connector X1.

Connector in the terminal: 3-pin male connector strip Phoenix COMBICON MSTBV 2,5/3-GF

Pin	Designation	Function
1	⏚	Signal Ground
2	0 V	Supply Voltage 0 V
3	24 VDC	Supply Voltage 24 VDC

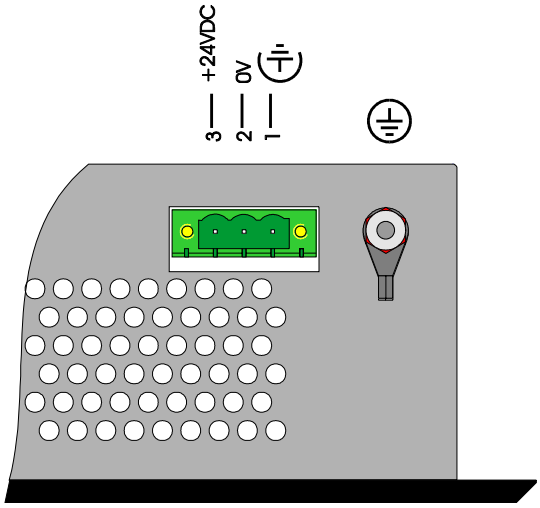
The supply voltage is connected via a plug-in 3-pin female connector strip. The cable is secured in the female connector strip by means of screw terminals. Cables with fine wires with a cross-section of up to 2.5mm^2 can be used. The female connector strip is secured in position by means of a screw-type locking.
The female connector strip of the type **Phoenix COMBICON MSTB 2.5/3-STF** is supplied.

When connecting the device, observe the safety information in the mounting instructions!

Please note with respect to pin assignment:
If shielded connecting cables are used for the supply voltage, the shield should be connected to the ground screw.
Any protective conductors in the cable must be connected with pin 1.

Separate ground screw for protective grounding

A separate ground conductor must be provided for the ground screw in each case. The minimum cross-section of the ground conductor must be 1.5 mm^2. Compliance with this information increases the operational safety.



2.5.2 Pin Assignment X2 TTY / 20 mA Current Loop

Connector in the terminal: 9-pin subminD female connector

TTY / 20 mA current loop, passive

Pin	Designation	Function
1	Shield	Shield
2	T+	Transmit Data, Positive Polarity
4	R+	Receive Data, Positive Polarity
6	T-	Transmit Data, Negative Polarity
8	R-	Receive Data, Negative Polarity

TTY / 20 mA current loop, active

Pin	Designation	Function
1	Shield	Shield
2	T+	Transmit Data, Positive Polarity
3	S1+	Power Source 2, Positive Polarity
4	R+	Receive Data, Positive Polarity
5	R-	Receive Data, Negative Polarity
6	S2+	Power Source 1, Positive Polarity
7	T-	Transmit Data, Negative Polarity
8	S1-	Power Sink 1, Negative Polarity
9	S2-	Power Sink 2, Negative Polarity

The interface can be connected as either an active or passive current loop depending on the wiring. The transmit line and the receive line are provided with separate 20mA power sources. The compliance voltage is approximately 24 VDC.
The maximum baud rate is 19200Bd. The maximum cable length depends on the baud rate and rate of transmission errors.
For longer cable lengths, the 20mA power supply should be fed by the transmitting unit. This can decrease crosstalk on the signal lines considerably.
In idle state (signal logical 1) a current loop of 20mA can be measured on the cable.

Termination :
For proper operation of the TTY/20 mA current loop the **termination** of the RS422/RS485 interface must always be **OFF**.

A shielded cable with twisted pair wires (cable type LiYCY-TP) and a minimum cross section of 0.08 mm^2 must be used. The maximum cable length is 100 m.



Connect the cable shield to the metal hoods of the connectors over as large a surface as possible!

2.5.3 Pin Assignment X2 RS422 / RS485

The interfaces RS422 and RS485 are suitable for point-to-point connections and multipoint connections.

Termination for point-to-point connection:
For operation with point-to-point connection the **termination** must always be activated.

Termination for multipoint connection:
For operation with multipoint connections only the **termination** at the cable end must be activated.

The signals of the interface are electrically isolated.
The configuration of the hardware can be adapted to different systems. The associated wires are marked with „A“ and „B“. Some descriptions refer to the pins with „+“ and „-“, where the following applies: A = + and B = -. The voltage levels comply with the standards and are defined as follows:

Signal logical 1 - $U_A - U_B <= -0.3$ V i.e. ($U_A < U_B$)
Signal logical 0 - $U_A - U_B >= +0.3$ V i.e. ($U_A > U_B$)

Connector in the terminal: 15-pin SubminD female connector

Pin	Ass.	Designation	Function
1	x	Shield	Shield
2	x	T(A)	Transmit Data Channel A
3	x	R(A)	Receive Data Channel A
4	x	RTS(A)	Request to Send Channel A
5	x	CTS(A)	Clear to Send Channel A
6	x	*TXCK(B)*	*Transmitter Clock Channel B*
7	x	*RXCK(B)*	*Receiver Clock Channel B*
8	x	SG	Signal Ground
9	x	T(B)	Transmit Data Channel B
10	x	R(B)	Receive Data Channel B
11	x	RTS(B)	Request to Send Channel B
12	x	CTS(B)	Clear to Send Channel B
13	x	*TXCK(A)*	*Transmitter Clock Channel A*
14	x	*RXCK(A)*	*Receiver Clock Channel* A
15	-	nc	not connected

Pins signed with - are not connected.
Italic printed pins are only available in special models.

A shielded cable with twisted pair wires (cable type LiYCY-TP) and a minimum cross section of 0.34 mm^2 (for 400 m) must be used. The maximum cable length is 400 m.



Connect the cable shield to the metal hoods of the connectors over as large a surface as possible!

2.5.4 Pin Assignment X3 RS232c / V.24

Connector in the terminal: 9-pin SubminD female connector

The assignment is PC-AT compatible!

Pin	Bel.	Bezeichnung	Funktion
1	-	*DCD*	*Data Carrier Detect*
2	x	RD	Receive Data
3	x	TD	Transmit Data
4	x	DTR	Data Terminal Ready
5	x	GND	Signal Ground
6	-	*DSR*	*Data Set Ready*
7	x	RTS	Request to Send
8	x	CTS	Clear to Send
9	-	*RI*	*Ring Indicatot*

Italic printed pins are not available.

A shielded cable with stranding in layers (cable type LiYCY) and with a minimum cross-section of 0.25 mm^2 must be used. The maximum cable length is 15 m.



Connect the cable shield to the metal hoods of the connectors over as large a surface as possible!

2.5.5 Pin Assignment X2.1/ X2.2 InterBus

The unit can be fitted with the bus interfaces X2.1 and X2.2 for connection to the InterBus instead of the standard interfaces TTY / 20 mA and RS422 / RS485. The InterBus connection is certified under the number 076. The connectors are of the 9-pin Submin D female and male connector strip type.

Connector in the terminal: 9-pin SubminD male connector strip for **Remotebus In**

Assignment:

Pin	Ass.	Designation	Function
1	x	DO	Data Out
2	x	DI	Data In
3	x	GND	Signal Ground
4	-	nc	not connected
5	-	nc	not connected
6	x	/DO	Data Out Reverse
7	x	/DI	Data In Reverse
8	-	nc	not connected
9	-	nc	not connected

Pins signed with - are not connected.

Connector in the terminal: 9-pin SubminD female connector strip for **Remotebus Out**

Assignment:

Pin	Ass.	Designation	Function
1	x	DO	Data Out
2	x	DI	Data In
3	x	GND	Signal Ground
4	-	nc	not connected
5	x	+5 V	Power Supply +5 VDC
6	x	/DO	Data Out Reverse
7	x	/DI	Data In Reverse
8	-	nc	not connected
9	x	RBST	Remote Bus Status

Pins signed with - are not connected.

A shielded cable with twisted pairs (Cable type LiYCY-TP) is used. The maximum cable length depends on the usage within the InterBus topology.

2.5.6 Pin Assignment X2.1/ X2.2 SUCOnet K

To integrate the appliance into a network topology of the SUCOnet K it can be equipped with the special interfaces X2.1 and X2.2 for SUCOnet K. The connectors are 9-pin SubminD female and male connectors. The pinning of either connectors is the identical.

Termination:
Activate the **termination** of the physically first (master) and last station in the network at all times. The termination of the stations located in between remains inactivated. To activate the termination, the termination switch RD/TD must be set to ON.

Connector in the operating terminal: 9-pin SubminD female/male connector strip

Pin	Ass.	Designation	Function
1	-	nc	not connected
2	-	nc	not connected
3	x	TA/RA	Transmit- / Receive channel A
4	x	GND	Signal Ground
5	-	nc	not connected
6	-	nc	not connected
7	x	TB/RB	Transmit- / Receive channel B
8	x	GND	Signal Ground
9	-	nc	not connected

Pins signed with - are not connected.

A shielded cable with twisted pair wires (cable type LiYCY-TP) must be used.
The maximum cable length depends on the data transmission rate that is used.
For a transmission rate of 187.5 kbps the maximum cable length is 600 m, for a transmission rate of 375 kbps a cable length of 300 m should not be exceeded. If longer cable length are required, repeaters must be used for signal conditioning. Self-controlled repeaters may be used for this process.

2.5.7 Pin Assignment X2.1 Profibus DP

To integrate the appliance into a network of the Profibus-DP it can be equipped with the special interface for Profibus-DP connection. A 9-pin SubminD female connector strip is used as a connector.

Connector on the operating terminal: 9-pin SubminD female connector strip

Assignment:

Pin	Ass.	Designation	Function
1	-	nc	not connected
2	-	nc	not connected
3	x	TB/RB	Transmit / Receive Data Plus
4	x	RTS	Request to Send
5	x	GND	Signal Ground
6	x	+5 V	Power Supply +5 VDC
7	x	nc	not connected
8	x	TA/RA	Transmit / Receive Data Minus
9	-	nc	not connected

Pins signed with - are not connected.

Principally, all cable types specified in EN 50170 as cable type A can be used.
This allows the following cable lengths (depending on the baud rate):

Baud Rate (bps)	Cable Length (m)
9 600	1200
19 200	1200
93 750	1200
187 500	1000
500 000	400
1 500 000	200
12 000 000	100

2.5.8 Pin Assignment X2.1/ X2.2 CAN Bus

To integrate the appliance into a network topology of the CAN bus it can be equipped with the special interfaces X2.1 and X2.2 for CAN Bus. The CAN bus is stated as a high-speed-bus according to ISO-DIS 11898.

Connector: 9-pin SubminD male connector strip X2.1

Pin	Designation	Function
1	nc	not connected
2	CANL	CAN_L bus line (dominant LOW)
3	CAN_GND	CAN Ground
4	nc	not connected
5	nc	not connected
6	CAN_GND	CAN Ground
7	CANH	CAN_H bus line (dominant HIGH)
8	nc	not connected
9	nc	not connected.

Connector: 9-pin SubminD female connector strip X2.2

Pin	Bezeichnung	Funktion
1	nc	not connected
2	CANL	CAN_L bus line (dominant LOW)
3	CAN_GND	CAN Ground
4	nc	not connected
5	nc	not connected
6	CAN_GND	CAN Ground
7	CANH	CAN_H bus line (dominant HIGH)
8	nc	not connected
9	nc	not connected

All signals of X2.1 to X2.2 are interconnected. The connecting cable has to be connected to all pins including the reserved ones. The intention is, that there shall be no interruption of any of the wires in the bus cable, assuming a possible future specification of the use of the reserved pins.

A shielded cable with twisted pair wires (cabe type LiYCY-TP) must be used. The CAN bus must be terminated with resistors on both ends of the cable structure.



Connect the cable shield to the metal hoods of the connectors over as large a surface as possible!

2.5.9 Pin Assignment X2 LON Bus

To integrate the appliance as a node into a network topology of the LON bus it can be equipped with the special interface X2 for LON.

Connector: 3-pin male connector strip SLA 3/180B 32 SN OR as X2

Pin	Designation	Function
1	Net A	Net A
2	GND	Signal Ground
3	Net B	Net B

On the rear side of the appliance you are given a service LED a service switch.

The service LED indicates the status of the LON node by different flashing patterns:

- 1 s ON, then 2 s OFF, at last permanent ON — LON node without application software
- FLASHING in times of 1 s — LON node without communication relation
- FLASHING ONCE, at last permanent OFF — LON node is working correct

The service switch is used to send out a special network management telegram to distribute the neuron ID-code. The neuron ID-code can be used to address the LON node while installation.

A shielded cable with twisted pair wires (cable type LiYCY-TP) must be used.



Connect the cable shield to the metal hoods of the connectors over as large a surface as possible!

2.5.10 Pin Assignment InterBus Optical Fibre

To integrate the appliance into a network topology of the InterBus optical fibre device net it can be equipped with the special interfaces for InterBus Optical Fibre.
The optical fibre interface is stated as F-SMA type 905.

The connectors for the optical fibres are
DO1 and DI1 for Remotebus In and
DO2 and DI2 for Remotebus Out.

The connection must conform to „Technical Guideline For Optical Transmission“.

For the optical transmission a dielectrical fibre with refractive index profile, likely a polymer fibre with a diameter of 980 µm of the core and 1000 µm of the coating. The connector of the type F-SMA is according to the specifications of IEC 874-2 respectively DIN 47258.
The permitted distance between two subscribers of the optical fibre device bus is 1 through 5 m.



Infrared light can **damage the retina of the eye**! Never look into the open end of the optical fibre! Secure the open ends of the optical fibres and the plugs with caps! Always wear safety glasses!



The transmitter and receiver units may get unusable by dirt. For transportation, storage and when a unit is not in use, place caps on the plug terminals.

2.6 Shield

The shield must be connected to the metal hoods of the connector housings at both ends and over as large a surface as possible. It should be noted that a potential equalization line with a minimum cross-section equal to 10 times that of the shield may be necessary as a result of the grounding on both sides.

2.7 Display

The display in the Touch Panel **TP35C** consists of a high-resolution, color, backlit TFT module. The display features a resolution of 640 x 480 pixels (VGA) and is capable of simultaneously displaying up to 3200 characters of the normal font. The characters of the normal font are displayed by a matrix of 8 x 12 dots. The format allows 40 lines with 80 characters each to be displayed.
In addition any font that comes with Windows can be displayed.

The operating terminal has an optimum viewing angle of approximately 90°.
The default brightness can be adjusted at operating time by means of a system variable.

Overview of the Display of the **TP35C**:

Type:	TFT module
Resolution:	640 x 480 dots
Color Capability:	256 colors
Backlight:	CFL-tube
Graphics Capability:	full graphics capability
Lines (Font Normal):	40
Characters/Line (Font Normal):	80
Visible Front Cutout (H x W):	162 mm x 215 mm



If the display is damaged, do not swallow or breathe in the liquids or gases being emitted and avoid direct contact with skin.
Danger of Poisoning! Could Result in Burns!

2.7.1 Display Brightness Setting

The brightness for the display can be adjusted by means of the software. This requires the system variable **LCDContrast** to be set up in an I/O mask of the application. The value can then be modified using any editor that can handle integer numbers.
The limit values for the brightness must be set to

Lower level:	0
Upper level:	+70

If this variable is not defined in the menus or the value is out of the range of values, the default setting (value 0) will be loaded when the system is initialized.
The system variable can be stated in any I/O-mask of the application!

2.7.2 Default Brightness Setting

If the brightness of the display should be such that the masks are no longer legible, the default contrast setting can be restored using the user mode switch.

Position of the switch to restore the brightness:

S1 ON
S2 OFF
S3 OFF
S4 ON

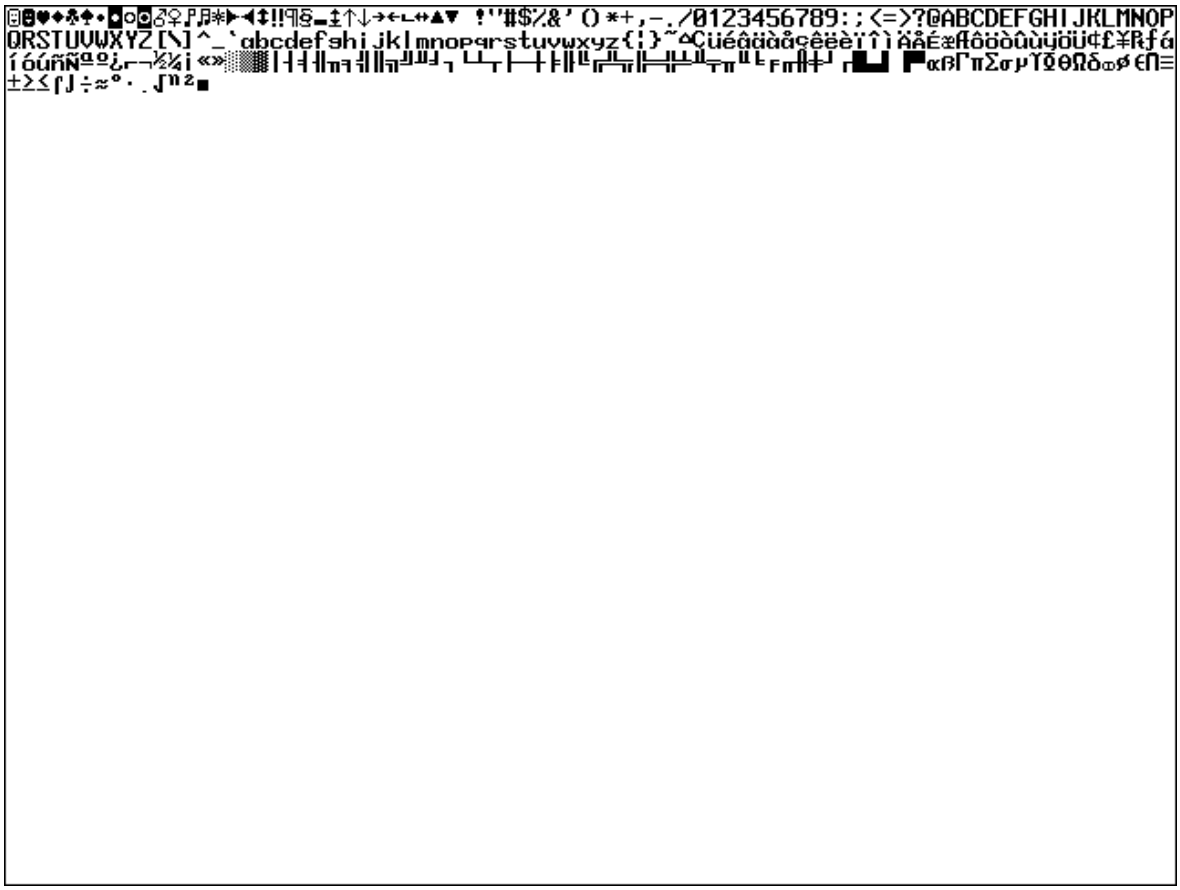
This switch position coincides with “activating download by hardware”. The brightness will be reset before the warning is displayed. The warning will be displayed in a legible manner. Upon display of this warning, switch off the terminal, set the switch 4 to the OFF-position and switch the terminal on again. The application description is not lost.

2.7.3 Character Attributes

By preselecting an attribute, any characters can be displayed as follows:
- normal, using one of the 256 colors
- flashing
- underlined
- foreground/background grey scale

and in any combination

2.7.3.1 Font Normal



2.7.3.2 Font Zoom

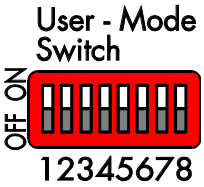


2.7.3.3 ASCII Character Set Table

000		032		064	@	096	`	128	Ç	160	á	192	└	224	α
001	☺	033	!	065	A	097	a	129	ü	161	í	193	┴	225	β
002	☻	034	"	066	B	098	b	130	é	162	ó	194	┬	226	Γ
003	♥	035	#	067	C	099	c	131	â	163	ú	195	├	227	π
004	♦	036	$	068	D	100	d	132	ä	164	ñ	196	─	228	Σ
005	♣	037	%	069	E	101	e	133	à	165	Ñ	197	┼	229	σ
006	♠	038	&	070	F	102	f	134	å	166	ª	198	╞	230	µ
007	•	039	'	071	G	103	g	135	ç	167	º	199	╟	231	τ
008	◘	040	(	072	H	104	h	136	ê	168	¿	200	╚	232	Φ
009	○	041	)	073	I	105	i	137	ë	169	⌐	201	╔	233	Θ
010	◙	042	*	074	J	106	j	138	è	170	¬	202	╩	234	Ω
011	♂	043	+	075	K	107	k	139	ï	171	½	203	╦	235	δ
012	♀	044	,	076	L	108	l	140	î	172	¼	204	╠	236	∞
013	♪	045	-	077	M	109	m	141	ì	173	¡	205	═	237	ø
014	♫	046	.	078	N	110	n	142	Ä	174	«	206	╬	238	∈
015	☼	047	/	079	O	111	o	143	Å	175	»	207	╧	239	∩
016	►	048	0	080	P	112	p	144	É	176	░	208	╨	240	≡
017	◄	049	1	081	Q	113	q	145	æ	177	▒	209	╤	241	±
018	↕	050	2	082	R	114	r	146	Æ	178	▓	210	╥	242	≥
019	‼	051	3	083	S	115	s	147	ô	179	│	211	╙	243	≤
020	¶	052	4	084	T	116	t	148	ö	180	┤	212	╘	244	⌠
021	§	053	5	085	U	117	u	149	ò	181	╡	213	╒	245	⌡
022	▬	054	6	086	V	118	v	150	û	182	╢	214	╓	246	÷
023	↨	055	7	087	W	119	w	151	ù	183	╖	215	╫	247	≈
024	↑	056	8	088	X	120	x	152	ÿ	184	╕	216	╪	248	°
025	↓	057	9	089	Y	121	y	153	Ö	185	╣	217	┘	249	∙
026	→	058	:	090	Z	122	z	154	Ü	186	║	218	┌	250	·
027	←	059	;	091	[	123	{	155	¢	187	╗	219	█	251	√
028	∟	060	<	092	\	124	¦	156	£	188	╝	220	▄	252	ⁿ
029	↔	061	=	093	]	125	}	157	¥	189	╜	221	▌	253	²
030	▲	062	>	094	^	126	~	158	₧	190	╛	222	▐	254	
031	▼	063	?	095	_	127	⌂	159	ƒ	191	┐	223	▀	255	

2.8 User-Mode Switch

The user-mode switch is placed under the hinged cover at the rear side of the **Touch Panel**. The switch levers can be accessed by using a pen or a small screwdriver.



The switches S5 to S8 can be used by the user as needed. The switch positions are stored at initialization time and afterwards they can be overtaken to the controller.

S1	S2	S3	S4	S5	S6	S7	S8	Funktion
I	X	-	-	X	X	X	X	Standard-Mode with PLC (delivery state)
I	X	I	-	X	X	X	X	Standard-Mode without PLC
I	-	-	I	X	X	X	X	Activate Download (deletes application memory) and also main contrast setting

Legend of above table:
I = Switch position ON
\- = Switch position OFF
X = Switch position irrelevant

2.9 Battery

A built-in lithium battery buffers the data in the RAM memory and also supplies the real-time clock with power. The discharge degree of the battery is monitored constantly to prevent any loss of data.
The battery provides a minimum life of 5 years, even under unfavorable operating conditions.
If the battery is drained the system message „change battery“ is generated.
A new battery is supported by Sütron electronic or the sales representative of your country.

Replacing the battery:
The battery can be replaced while the operating voltage is connected to ensure that the message data and time setting are not lost. Mind the safety instructions!

- Open the cover lid on the rear side of the appliance by removing the screw
- Replace the cable fastener, wich is used ony for transportation
- Replace the battery out of the battery holder
- Place a new battery into the battery holder **OBSERVE THE CORRECT POLARITY OF (-) AND (+)**
- A new cable fastener is not necessary
- Close the cover lid by fastening the screw carefully

Changing the battery may only be performed by qualified and authorized personnel!

Sewage and refuse displosal:
Dispose only drained batteries into the colletion box of the community or of the local dealer. The battery is stated as drained when the message „change battery“ appears on the display of the appliance.

To prevent short circiutry in the collection boxes insulate the poles of each battery with insulation tape or put each single battery into a plastic bag.



Do not put lithium batteries in fire or heat them above 100° C and do not recharge them. **Danger of Explosion!**



Do not open lithium batteries. **Danger of Poisoning!**



Hazardous voltages can exist inside electrical installations that can pose a danger to humans. Coming in contact with live parts may result in **electric shock!**



Electrostatic discharges can damage electronic components! ESD protective measures must be observed!

2.10 Fuse

A miniature fuse 4 AmT is used to prevent damage to the operating terminal. A spare fuse is placed on the inside of the cover lid.

Changing the battery may only performed by qualified and authorized personnel!



Hazardous voltages can exist inside electrical installations that can pose a danger to humans. Coming in contact with live parts may result in **electric shock!**



Electrostatic discharges can damage electronic components! ESD protective measures must be observed!

2.11 Application Memory

A 4.64 MByte flash memory is used as an application memory. This memory area is available to store the user application, the loadable protocol driver, the fonts and the recipe data. The advantage of the flash memory is thata programming and deleting processes can be carried out directly in the appliance.

Changing the application memory may only be performed by qualified and authorized personnel!



Hazardous voltages can exist inside electrical installations that can pose a danger to humans. Coming in contact with live parts may result in **electric shock!**



Electrostatic discharges can damage electronic components! ESD protective measures must be observed!

3 Technical Data

Keybord	a Total of 8 Keys, Mechanical with Tactile Feedback 8 Function Keys with LEDs and Slide-in Identification Strips
Display	TFT-Module, CFL-Backlight, 256 Colors, 640 x 480 Dots (VGA), 40 Lines with 80 Characters Each, Display Area 162 x 215 mm (H x W)
Touch Front	Resistive Touch-Panel for 10,4“ Displays
Interfaces	Variable Baud Rates and Data Formats 600 to 19200 Bd X2 TTY / 20 mA Passive, Electrically Isolated or TTY / 20 mA Active, Non Isolated X2 Alternative RS422 / RS485 X3 RS232c
Protocoll Possibilities	ABB CS31 ABB T200 AEG KS-Functions AEG Modbus Allen Bradley Bosch BUEP19 Bosch BUEP19E CAN DIN-Meßbus Slave, DIN-Meßbus Gateway GE Fanuc SNP IDEC Micro3 InterBus Jetter PASE/PCOM5 Klöckner Moeller SUCOM 1 (PS306/316) Klöckner Moeller SUCOM 1 (PS4-201) Klöckner Moeller SUCOM 1 (PS416) LON Mitsubishi A-Series Mitsubishi FX-Series OMRON Host-Link Profibus DP Siemens Sinec L1 Master Link Siemens 3964R/RK512 Siemens S5 PG (AS511) Siemens S7 PPI Siemens S7 MPI (HMI-Adaptor) SUCOnet K
Central Unit	386EX, 25MHz, Watchdog-Timer, real Time Clock, Programmable Interface Parameters, Temperature Compensation of the Display, Adjustment of Contrast, Battery Monitoring, User-Mode Switch

/000-8348/
TP35C_grau_eng_V10.30000QK0

Memory	4.64 MByte Flash Memory Application Memory 256 kByte stat. CMOS-RAM, Battery-Backed
Connection System	Plug-in Type, via SubminD Female and Male Connector Strips
Supply Voltage	24 V Direct Voltage, Residual Ripple Max. 10% Minimum Voltage 19.2 V Maximum Voltage 30.2 V Typ. Power Consumption 0.8 A Peak Current (10 ms) 4.0 A
Connected Load	~25 W
Noise Immunity	EC Electromagnetic Compatibility Directive 89/336/EWG EN 55011 Limit Class A* EN 50081-1 Table A1 EN 50082-2 EN61000-4-2 EN61000-4-4 EN61000-4-5 EN61000-4-6 DIN VDE 0843-3 DIN VDE 0843-6

*Caution: This is a class A product. In residential areas there may be radio disturbance. Appropriate protective measures must be taken by the operator.

Invironmental Test	DIN40040	Operation	Storage
	Code Letter - Temperature	KW	HU
	Code Letter -Humidity	F	F
Degree of Protection	DIN 40050 Mechanical Degree of Protection Front: IP65 Rear: IP20		
Front Panel	Aluminium Anodized with Affixed Polyester Cover, Circumferential Sealing on Rear Side of Front Panel 275.0 x 350.0 x 4.0 mm (H x W x D)		
Mounting Cutout	238 x 324 mm (H x W)		

Mounting Depth	Dependent on Type of Interface 65 mm without Connector (approx. 100 mm with Connector) Standard and Bus Types, except for InterBus Optical Fibre 82 mm for InterBus Optical Fibre
Enclosure	Zink Coated Steel Plate
Total Weight	Approx. 3430 g

4 Declaration of Conformity

EG - Konformitätserklärung

Dokument - Nr./
Monat. Jahr : CE-TP35C.000_1.1/05.1997

Hersteller : SÜTRON ELECTRONIC GMBH

Anschrift : SÜTRON ELECTRONIC GMBH
Kurze Straße 29
D-70794 Filderstadt (Bonlanden)

Telefon 0711/77098-0
Telefax 0711/77098-60

Teilenummer : 81075.000
Produktbezeichnung : Touch - Panel TP35 Color F03 S

Hiermit wird bestätigt , daß das bezeichnete Produkt den wesentlichen Schutzanforderungen folgender Europäischen Richtlinie entspricht :

Nummer 89 / 336 / EWG

Text Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit , geändert durch RL 91 / 31 / EWG , geändert durch RL 93 / 68 / EWG , geändert durch Neufassung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten vom 30.08.1995.
Weitere Angaben über die Einhaltung dieser Richtlinien enthält der Anhang .

Anbringung der CE - Kennzeichnung[1]) :-

Aussteller : SÜTRON ELECTRONIC GMBH

Ort , Datum : Filderstadt , 20.05.1997

Rechtsverbindliche Unterschrift : Siegfried Buck

Angaben zum Unterzeichner : Siegfried Buck , Geschäftsführer

Die Anhänge sind Bestandteil dieser Erklärung .
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien , beinhaltet jedoch keine Zusicherung von Eigenschaften .
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten .

1) Nur nach der Niederspannungsrichtlinie

Seite 1

Anhang
zur EG - Konformitätserklärung
oder EG - Herstellererklärung

Dokument - Nr./
Monat. Jahr : CE-TP35C.000_1.1/05.1997

Teilenummer : 81075.000
Produktbezeichnung : Touch - Panel TP35 Color F03 S

Zur Beurteilung des Erzeugnisses wurden folgende Normen herangezogen .

Harmonisierte Europäische Normen :

Referenznummer	Ausgabedatum	Referenznummer	Ausgabedatum
EN 55011	03.1991	EN 50081-1 Tabelle A 1	01.1992
EN 50082-2	03.1995	EN 61000-4-2	1995
EN 61000-4-4	1995	EN 61000-4-5	1995
EN 61000-4-6	08.1996	EN 61000-4-3	02.1995
.....	.....	.....	.....
.....	.....	.....	.....

Nationale Normen (nach NSR oder nach MSR Art. 5 Abs. 1 Satz 2) :

Referenznummer	Ausgabedatum	Referenznummer	Ausgabedatum
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

EC - Standards (nur NSR) :

Referenznummer	Ausgabedatum	Referenznummer	Ausgabedatum
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

Prüfbericht : 74800P001

SÜTRON ELECTRONIC GMBH
Kurze Straße 29
D-70794 Filderstadt (Bonlanden)

Telefon 0711/77098-0
Telefax 0711/77098-60

Geschäftsführer:
Siegfried Buck Karl Mohn
Manfred Süssmilch

Amtsgericht Nürtingen
HRB - Nr. 981

5 Index

A

Application Memory 40
ASCII Character Set Table 37

B

Battery 39

C

Character Attributes 34

D

Declaration of Conformity 44
Default Brightness Setting 34
Degree of protection 18
Display 33
Display Brightness Setting 33

E

Explanation of Symbols 5

F

Font
  Normal 35
  Zoom 36
Front Panel Dimensions 19
Front View 6
Function Key Arrangement 7
Function Keys 7
Fuse 40

I

Index 47

K

Keyboard 7

M

Mounting Depth 20
Mounting theTerminal 18

P

Panel Cutout 21
Pin Assignment
  InterBus Optical Fibre 32
  X1 Supply Voltage 23
  X2 LON Bus 31
  X2 RS422 / RS485 25
  X2 TTY / 20 mA Current Loop 24
  X2.1 Profibus DP 29
  X2.1/ X2.2 CAN Bus 30
  X2.1/ X2.2 InterBus 27
  X2.1/ X2.2 SUCOnet K 28
  X3 RS232c / V.24 26
Pin Assignments 22

R

Rear View 10
  CAN-Bus 15
  InterBus 12
  InterBus - Optical Fibre 17
  LON-Bus 16
  Profibus-DP 14
  RS422 / RS485 11
  Standard 10

S

Shield 32
Side View 20
Slide-in Identification Strips for the Function Ke 7

T

Technical Data 41

U

User-Mode Switch 38