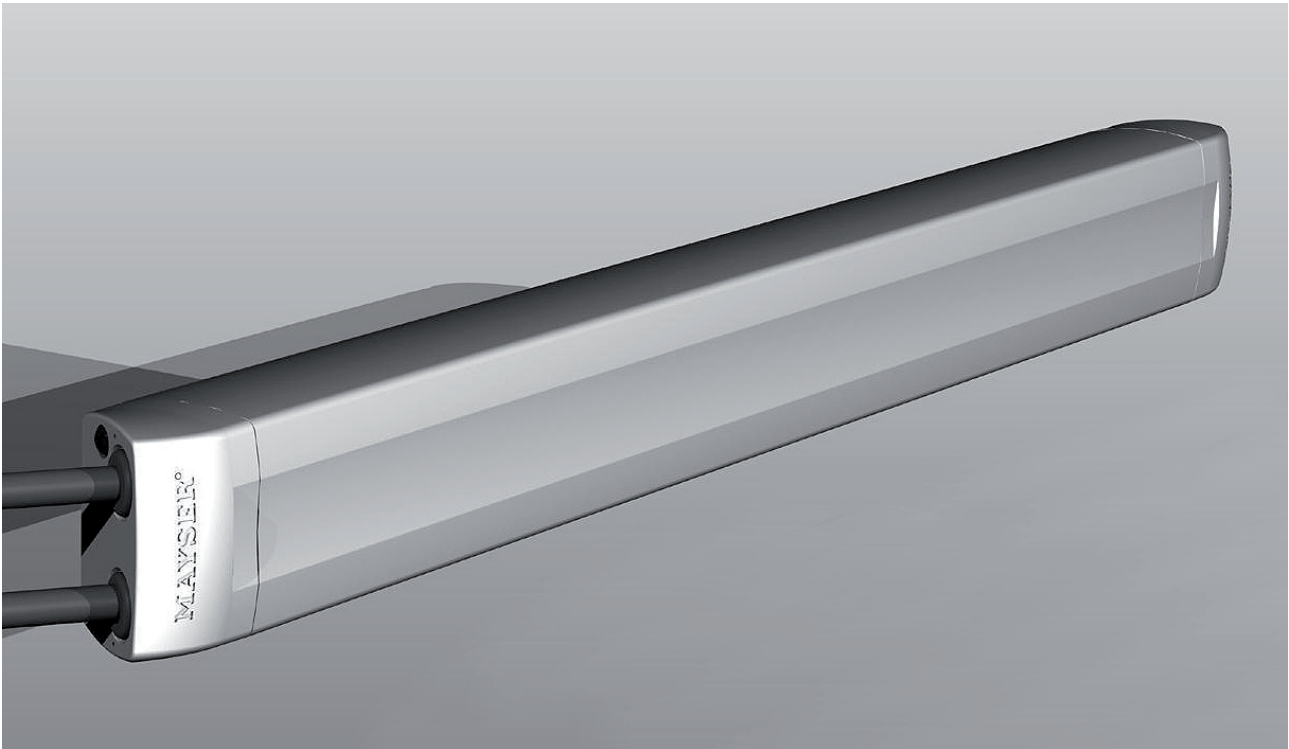


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## Installation Instructions

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## Transponder system TRS-S

Application on sliding gates

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# 1 About these installation instructions

These installation instructions are part of the product.

Mayser Polymer Electric accepts no responsibility or warranty claims for damage and consequential damage due to failure to observe the installation instructions.

- ➔ Read installation instructions carefully before use.
- ➔ Keep installation instructions for the complete service life of the product.
- ➔ Pass installation instructions on to every subsequent owner or user of the product.
- ➔ Add any supplement received from the manufacturer to the installation instructions.

**Validity**

These installation instructions are only valid for the products specified on the title page.

**Target group**

The target group of these installation instructions are operators and trained specialist personnel familiar with installation and commissioning.

**Other applicable documents**

- ➔ The following documents are to be observed in addition to the installation instructions:
  - drawings of the components (optional)
  - wiring diagram (optional)
  - operating instructions of the Control Unit SG-TRS 208
  - assembly instructions Safety Edges

**Symbols used**

Symbol	Meaning
➔ ...	Action with one step or with more than one step where the order is not relevant.
1. ... 2. ... 3. ...	Action with more than one step where the order is relevant.
• ...	Bullets first level
- ...	Bullets second level
(see chapter 1)	Cross-reference

Table 1-1: Other symbols

**Danger symbols and information**




Symbol	Meaning
<p><b>DANGER</b></p> 	Immediate danger leading to death or serious injury.
<p><b>CAUTION</b></p> 	Possible danger which may lead to slight injury or damage to property.
	Information on easier or safer working practices.

Table 1-2: Danger symbols and information

## 2 Safety

### 2.1 Intended use

The transponder system transmits switching states of tactile sensors (Safety Edges). The tactile sensors can either contain a transponder chip themselves or provide a potential-free contact, which must be wired accordingly.

Safety Edges can protect secondary closing edges in addition to the main closing edge of the sliding gate. The Safety Edges for protecting secondary closing edges on the fixed part of the sliding gate (see for example Pos. 6 in Fig. 6-1) are connected directly to the Control Unit.

### 2.2 Residual dangers

**High voltages**

High voltages ( $U_{ss}$  max. 300 V) may occur on the antenna connection of the Control Unit SG-TRS 208 and on the antenna cable.

➔ Observe protective regulations against accidental contact.

**Replacement parts**

When using non-OEM replacement parts, the safety of the transponder system may be impaired.

➔ Only use OEM replacement parts from Mayser.

## 2.3 Applicable standards

The construction type of the product complies with the EC machinery directive 2006/42/EC and EMC directive 89/336/EEC.

Applicable standards:

- EN 954 “Safety of machinery – Safety-related parts of controls”
- EN 12978 “Doors and gates; safety devices for power-operated doors and gates; requirements and test procedures”
- EN 13241-1 “Gates; product standard; part 1: Products without fire resistance or smoke control characteristics”
- EN 60204-1 “Safety of machinery – Electrical equipment of machines; part 1: General requirements”
- EN 61000 “Electro-magnetic compatibility (EMC)”
- IEC 61508 “Functional safety of safety-related electrical/electronic/programmable electronic systems”

These installation instructions were prepared in compliance with DIN EN 62079 “Preparation of instructions – structuring, content and presentation”.

## 3 Technical data

Protection class of the Control Unit	IP20
Protection class of the antennae and the tuning box	IP66
Behaviour in the event of a fault	EN 954 Category 3
Safety integrity level SIL2	SIL2 in accordance with IEC 61508
Operating temperature of the Control Unit	–20 °C to +50 °C
Operating temperature of the antennae and the tuning box	–40 °C to +70 °C
Storage temperature	–20 °C to +50 °C
Available lengths	3 m to 18 m

*Table 3-1: Technical data*

### Type plate

To identify the Control Unit and the tuning box, type plates are attached to their enclosures and inside cover as well as to the packaging. In the event of enquiries, have the specified information to hand.

## 4 Transport and storage

### 4.1 Packaging and transport

Depending on quantities, the plastic channels (spool carrier) are either packed in heavy duty cardboard tubes or in heavy duty cardboard boxes.

➔ Do not kink or bend plastic channels during transport.

The Control Unit and the tuning box are packaged separately.

#### CAUTION



#### **Danger of injury due to components falling!**

- ➔ Only use tested, suitable load bearing equipment.
- ➔ Use appropriate load securing devices (e.g. transport belts, anti-slipping devices).
- ➔ Do not stand under suspended loads.

### 4.2 Storage

➔ Store system in original packaging in a dry place.

➔ Note and observe storage temperature in accordance with the technical data.

## 5 Before installation

### 5.1 Preparing the installation site

#### DANGER



#### **Danger of injury from the gate system, parts thereof and traffic!**

- ➔ Switch gate system off and secure against being switched on again.
- ➔ Disconnect all equipment and voltage-carrying parts from the power supply and secure against being switched on again (see relevant operating instructions).
- ➔ Check that the equipment or parts are disconnected from the power supply.
- ➔ Block working area for traffic.
- ➔ Wear mandatory personal protective equipment.

➔ Preparing the gate system:

- Select installation location of the components.
- Lay out circuit diagrams of the gate system.
- Install Safety Edge in accordance with installation instructions.

➔ Have necessary tools ready.

➔ Have installation accessories ready.

## 5.2 Unpacking

CAUTION



### Damage to property due to incorrect handling!

- ➔ Do not kink or bend plastic channels (spool carrier).
- ➔ Protect Control Unit against rain and moisture.
- ➔ Do not use the connection cable of the antennae as a carrying handle.

1. Check that the contents of the packaging are undamaged.
2. Lay out system at installation location and check for completeness (see parts list in section 11).

## 6 Installation

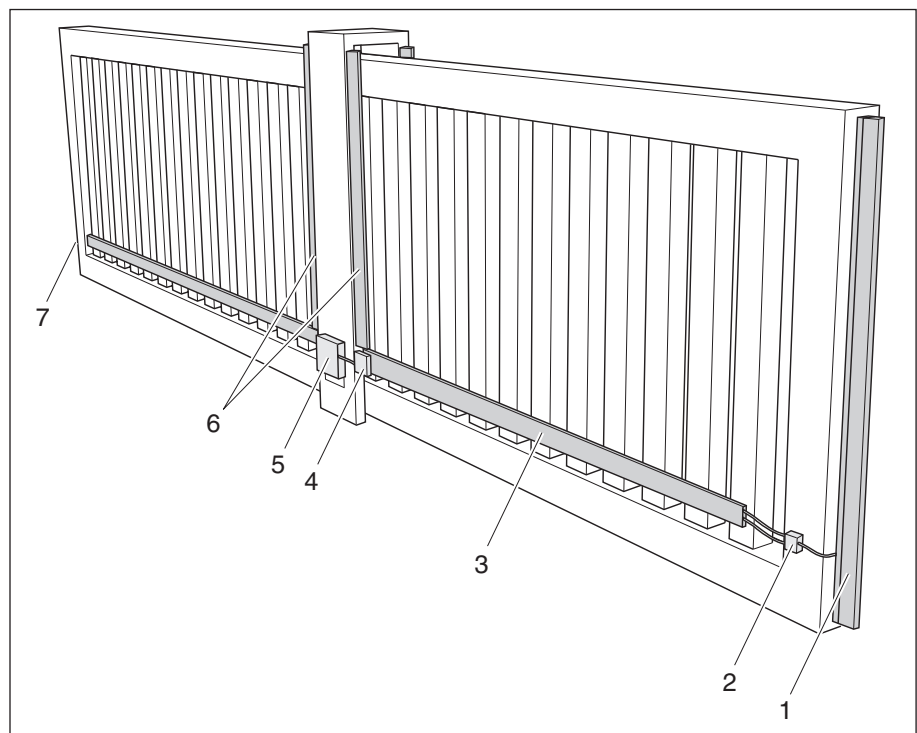


Fig. 6-1: System overview

- 1 Safety Edge, main closing edge
- 2 Tuning box
- 3 Transponder antenna
- 4 Transmitting antenna
- 5 Control Unit
- 6 Safety Edges, secondary closing edges on fixed part of the sliding gate
- 7 Secondary closing edge on moving part of sliding gate

## 6.1 Defining installation positions of the system components

For safe transmission of the switching signal from the Safety Edge to the Control Unit, the transmitting antenna and transponder antenna must be opposite each other in every position of the gate. The length of the transponder antenna can be adjusted for this.

### 6.1.1 Defining length of the transponder antenna

➔ Define runway between the two gate end stops “Open” and “Closed” (see Fig. 6-2).

The length of the transponder antenna corresponds to the opening width L.

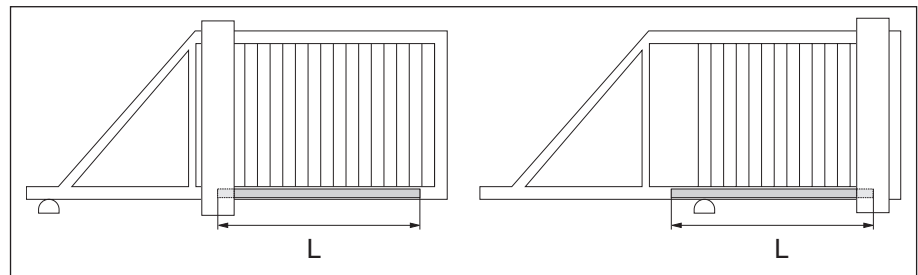


Fig. 6-2: Define opening width L  
Left: gate closed  
Right: gate open

### 6.1.2 Defining positions

#### Installation positions

Transponder antenna: On the moving part of the gate.

Transmitting antenna: On the fixed part of the gate, opposite the transponder antenna (connection line of the transmitting antenna may be shortened to max. 1 m residual length).

Tuning box: On the moving part of the gate, near the transponder antenna (distance to the transponder antenna should be max. 20 cm).

Control Unit: On the fixed part of the gate, near the transmitting antenna.

➔ Define installation positions in such a way that the following conditions are met along the runway:

#### Installation conditions

- Distance D between the antennae (see Fig. 6-3 and Fig. 6-4): Min. 10 mm
- Height offset H of the antennae (see Fig. 6-3): Max. 10 mm
- Angle of inclination of the transmitting antenna to the transponder antenna (all axes): Max. ±20°
- Distance between the tuning box and the transponder antenna: Max. 20 cm

- Apart from the installation base, there must be no metal in the immediate vicinity of the antennae. Distance from metal: Min. 40 mm
- Transmitting antennae for plastic must not be screwed onto metal. Distance from metal: Min. 40 mm

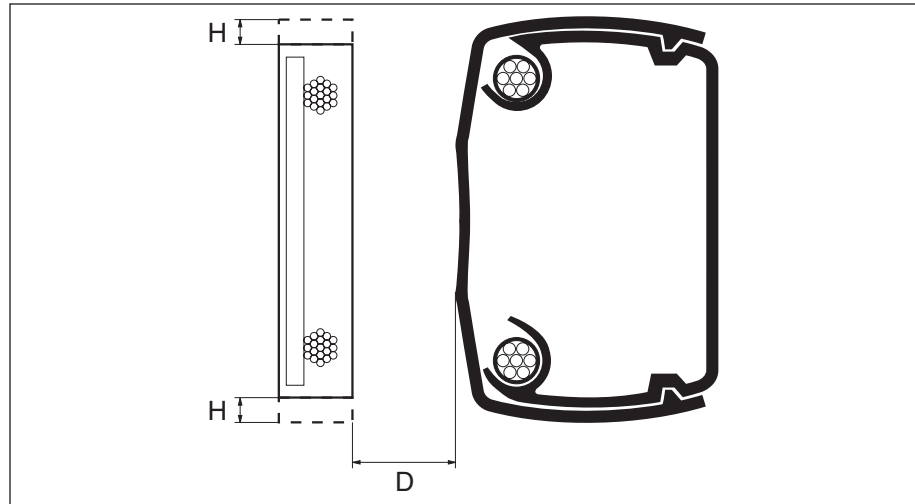


Fig. 6-3: Tolerances when positioning the antennae

H Height offset: max. 10 mm

D Distance: min. 10 mm, depending on the opening width L  
(see Fig. 6-4)

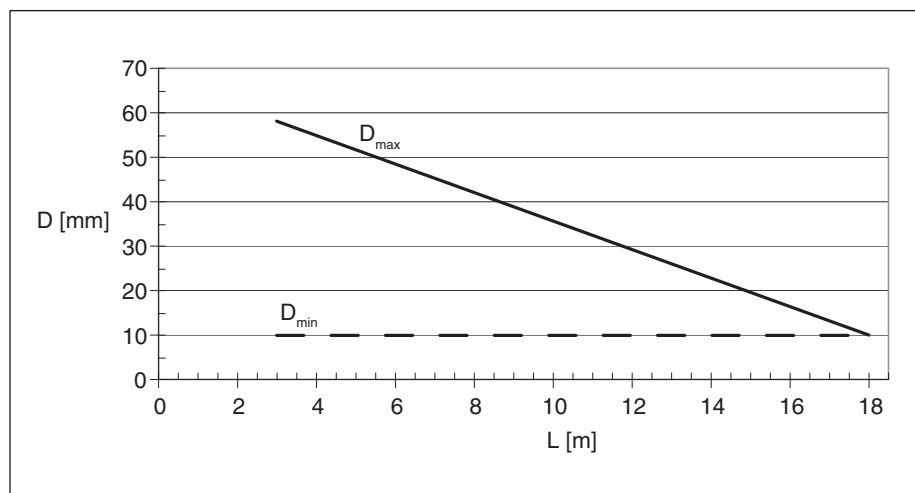


Fig. 6-4: Relation of antenna distance  $D$  (see Fig. 6-3) to the opening width  $L$ ,  $D_{max}$  only valid with ideal conditions: a Safety Edge and 2.6 m transmitting antenna connection line

- ➔ If necessary prepare relevant fixing parts (fixing bracket, spacer material).

## 6.2 Installing transponder antenna

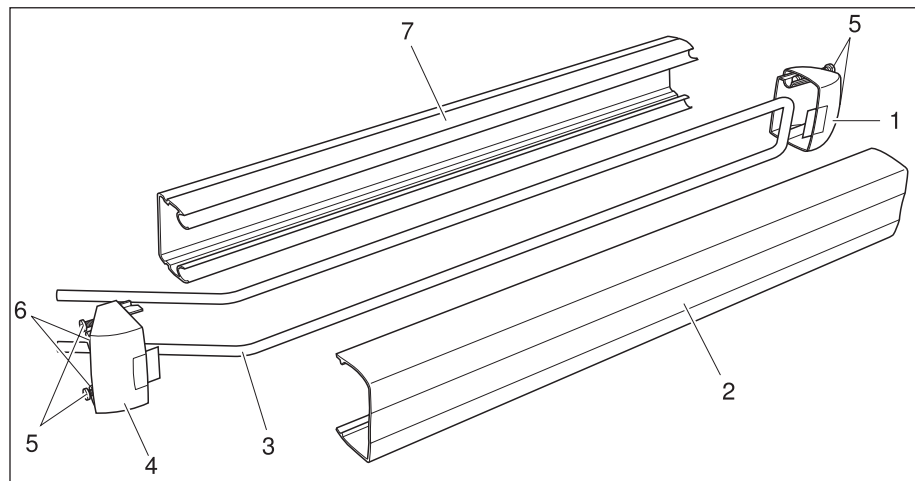


Fig. 6-5: Parts overview transponder antenna (see also section 11)

- 1 End cap for TRS 55 (part of the end cap set TRS-S 55)
- 2 Spool carrier upper section TRS 55  
(part of the spool carrier set TRS 55)
- 3 Antenna cable for TRS 55
- 4 End cap for TRS-S 55 (part of the end cap set TRS-S 55)
- 5 Fixing screws for TRS 55  
(part of the end cap set TRS-S 55)
- 6 Cable grommets for TRS-S 55  
(part of the end cap set TRS-S 55)
- 7 Spool carrier lower section TRS 55  
(part of the spool carrier set TRS 55)



If the transponder antenna consists of more than one spool carrier, the upper and lower sections must be installed offset to one another, so that their protective edges do not come into contact with each other.

1. Observe conditions for the installation position of the transponder antenna (see section 6.1.2).
2. Screw spool carrier lower section to the moving part of the gate. Observe the following:
  - Underlay spool carrier lower section if necessary.
  - Align spool carrier lower section (pos. 7 in Fig. 6-5) such that the openings of the cable conduits face upwards (see Fig. 6-6).
  - Affix screws at max. interval of 80 cm.
  - Drill screw holes in spool carrier lower section with a 2 mm larger diameter.
  - Use screws with washers which completely cover the holes on the inside of the spool carrier lower section.

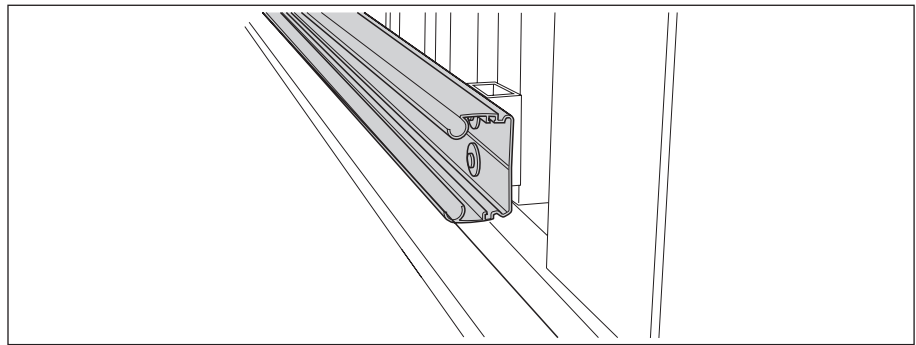


Fig. 6-6: Install spool carrier lower section (example)

3. Insert the antenna cable (pos. 3 in Fig. 6-5) in a loop in the cable conduits.
4. If necessary, prevent antenna cable from falling out by fixing it to the spool carrier upper section or with adhesive tape.
5. Push (closed) end cap, (pos. 1) into the spool carrier lower section and screw on with the two fixing screws (pos. 5).
6. Push spool carrier upper section (pos. 2) onto the spool carrier lower section until it locks in place.
7. Insert cable grommets (pos. 6) into the holes of the end cap for TRS-S (pos. 4).
8. Feed the end of the antenna cable through the cable conduits and insert the end cap in the spool carrier lower section.
9. Screw on the end cap with the two fixing screws.

### 6.3 Installing tuning box

1. Observe conditions for the installation position of the tuning box (see section 6.1.2).
2. Drill holes for the screwed cable glands (PG9 screw connection) on the side wall of the tuning box in accordance with the installation position.

**CAUTION**



**Damage to the PCB!**

- ➔ Take the PCB out of the tuning box before drilling.
- ➔ Before re-inserting, remove drilldust.



Drill the holes for the PG9 screw connection with a diameter of 16 mm or a special PG9 tap.

3. If 2 cables are used, replace the single conduit in the PG9 screw connection with a double conduit.
4. Install screwed cable glands.
5. Screw tuning box onto gate.

6. Feed ends of the antenna cable and of the Safety Edge cable through the screwed cable glands (see Fig. 6-7).

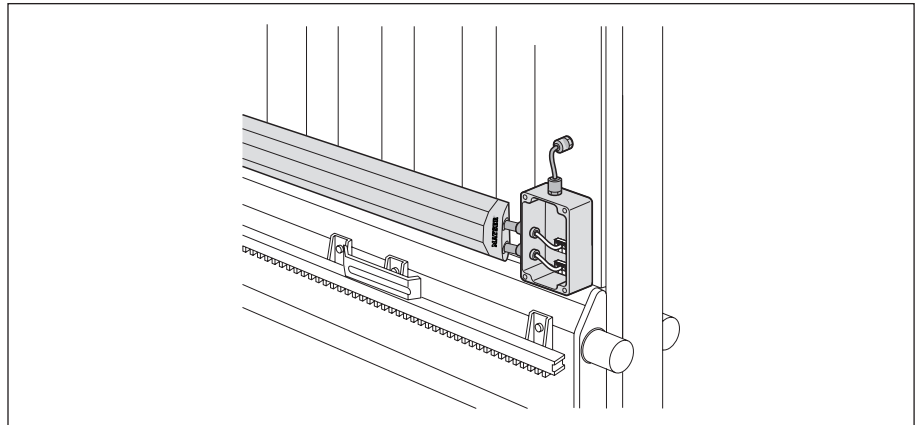


Fig. 6-7: Installing tuning box (example)

7. Tighten screwed cable glands.

## 6.4 Cabling tuning box

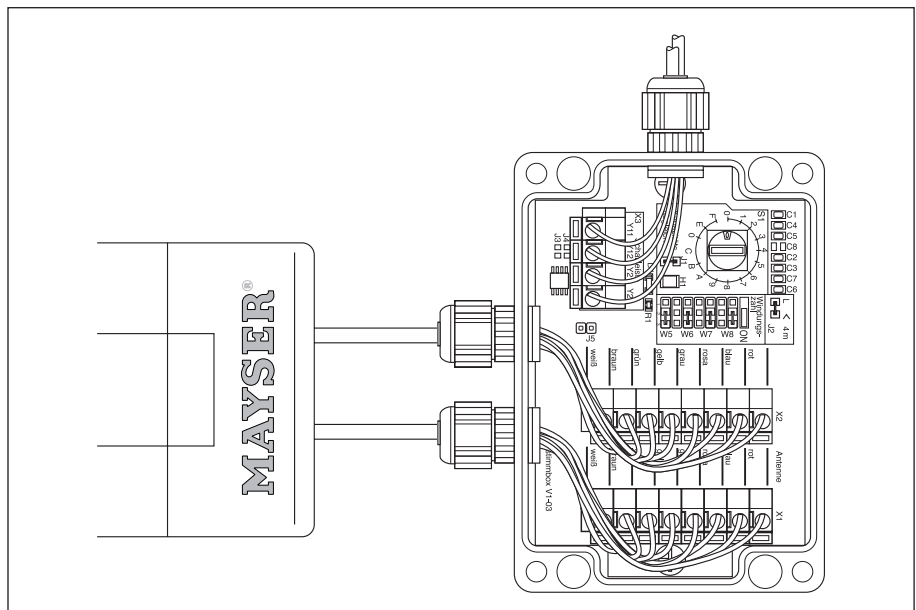


Fig. 6-8: Cabling tuning box



- ➔ Always observe order of colours on PCB.
  - ➔ Avoid unnecessary cable reserves. Lead cable directly to terminals.
- Terminals X1 and X2 can also be interchanged.

1. Connect Safety Edge(s) to terminals of the tuning box according to design (polarity-free).

The following diagrams show the 3 connection examples for various Safety Edge designs on the main closing edge and on the secondary closing edge on the moving part of the sliding gate.

**Connection example 1**

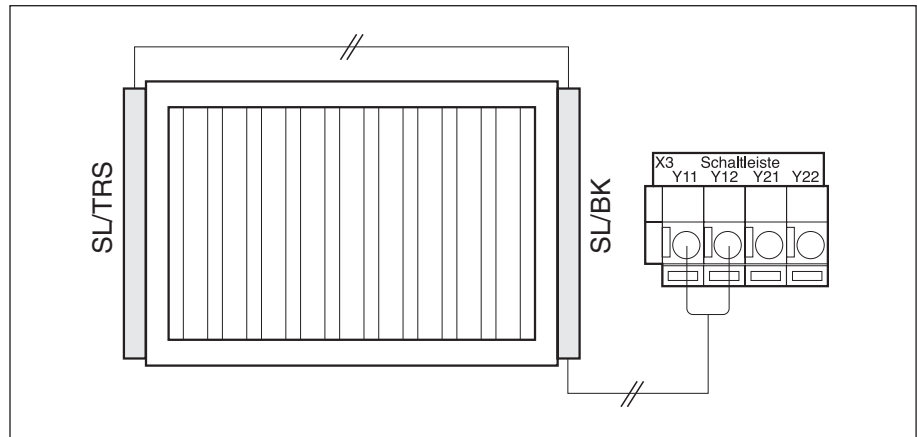


Fig. 6-9: Safety Edge SL/TRS on main closing edge and Safety Edge SL/BK on secondary closing edge

**Connection example 2**

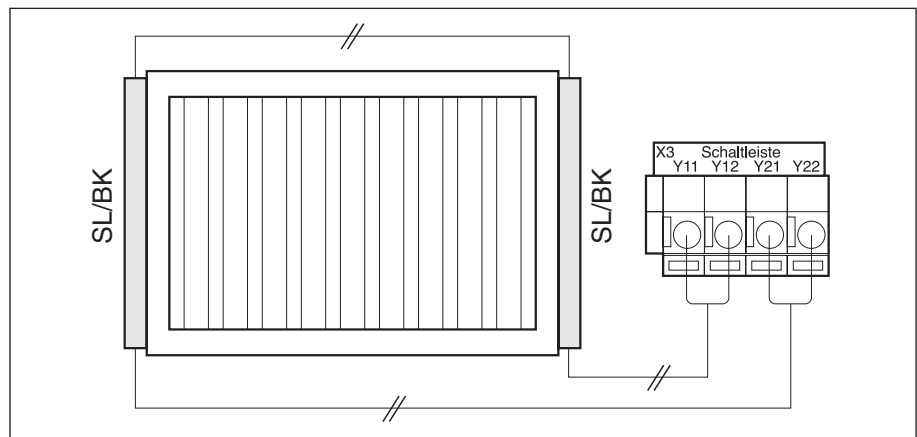


Fig. 6-10: Safety Edges SL/BK on main and secondary closing edge

**Connection example 3**

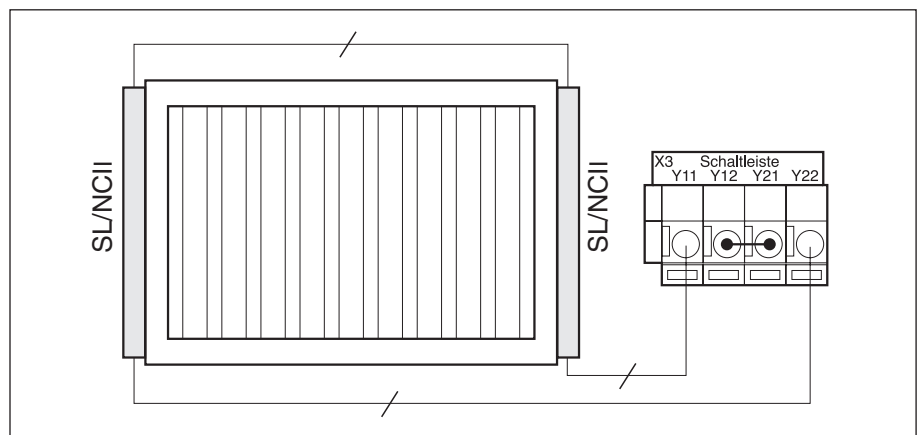


Fig. 6-11: Safety Edges SL/NCII on main and secondary closing edge

2. Connect upper end of the antenna cable to terminal X2 observing the colour order on the PCB.

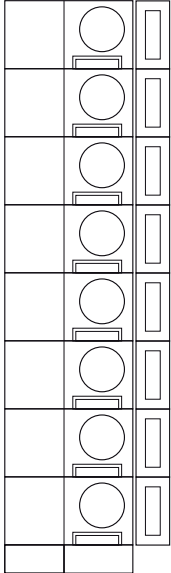
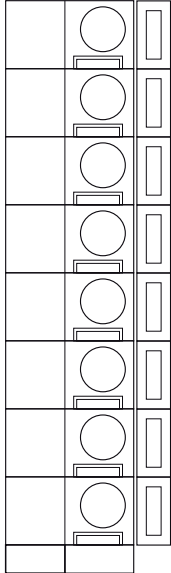
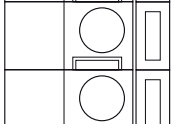
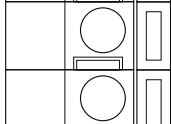
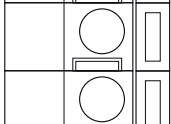
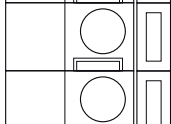
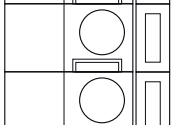
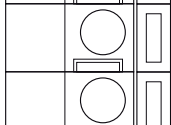
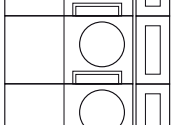
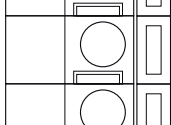
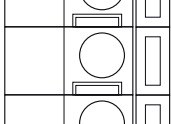
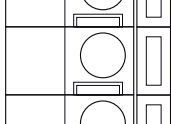
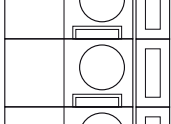
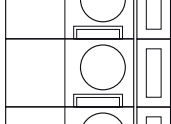
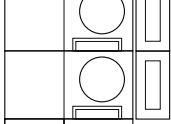
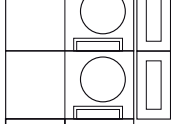
Terminal X2		Terminal X1		Colour
	X2		X1	
rot		rot		red
blau		blau		blue
rosa		rosa		pink
grau		grau		grey
gelb		gelb		yellow
grün		grün		green
braun		braun		brown
weiß		weiß		white

Table 6-12: Colour order of the terminals X2 and X1

3. Connect lower end of the antenna cable to terminal X1 observing the colour order on the PCB.
4. Do not close cover yet.

## 6.5 Installing transmitting antenna

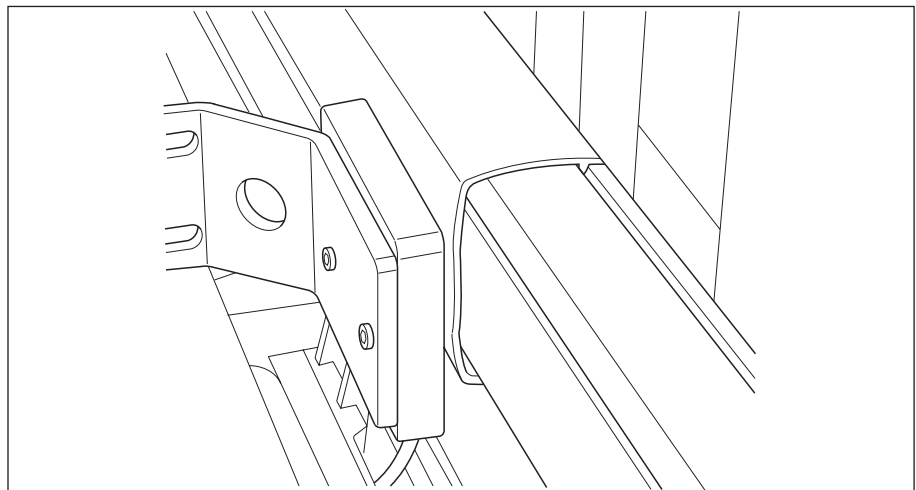


Fig. 6-13: Installing transmitting antenna

1. Observe conditions for the installation position of the transmitting antenna (see section 6.1.2).
2. Screw transmitting antenna with the top (cast side) in the direction of the transponder antenna to the fixed part of the gate.

## 6.6 Cabling transmitting antenna

CAUTION



---

**Danger due to high voltage (AC 300 V with max. 4mA) on the antenna cable and the connection terminals of the Control Unit!**

- ➔ Observe protective regulations against accidental contact.
- 



---

The transmitting antenna is suitable for use with the Control Units of series SG-TRS 208.

- ➔ Connection line of the transmitting antenna may be shortened to max. 1 m residual length.
  - ➔ Observe operating instructions of Control Unit SG-TRS 208.
  - ➔ Always lay connection line of transmitting antenna separately. Signal or power lines in the vicinity of the connection line may affect the signals between the transmitting antenna and the Control Unit.
  - ➔ Do not form loops with the connection line of the transmitting antenna. Loops may impair operation.
- 

1. Lay connection line of the transmitting antenna protected in accordance with the relevant regulations valid for the country of use.
2. Connect both wires of the connection line to the terminals 1 and 2 of the Control Unit SG-TRS 208.

## 7 Commissioning

### 7.1 Before commissioning

CAUTION



---

**Danger of injury due to incorrect handling of the gate system or of the Control Unit!**

- ➔ Observe information and safety instructions for commissioning of the gate system.
  - ➔ Observe information and safety instructions for Control Unit SG-TRS 208.
- 

### 7.2 Commissioning transponder system

#### 7.2.1 Commissioning Control Unit



---

Carry out functional test of the transponder system in accordance with the description in section 7.3 and only after tuning the transponder antenna.

---

1. Connect Control Unit SG-TRS 208 to power supply.

The LED “Betrieb” (Power) on the Control Unit is lit.

The LED “Betätigt Kanal 1” (Activated channel 1) is lit when the Safety Edge is activated or with missing connection to Safety Edge.

2. If secondary closing edges are used on the fixed part of the sliding gate: Observe wiring in accordance with the operating instructions of the Control Unit SG-TRS 208.

## 7.2.2 Tuning transponder antenna

To put the system into operation, the transponder antenna must be tuned. For this the number of windings in the tuning box and the capacity value are set. Both values depend on the opening width L (see Fig. 6-2).

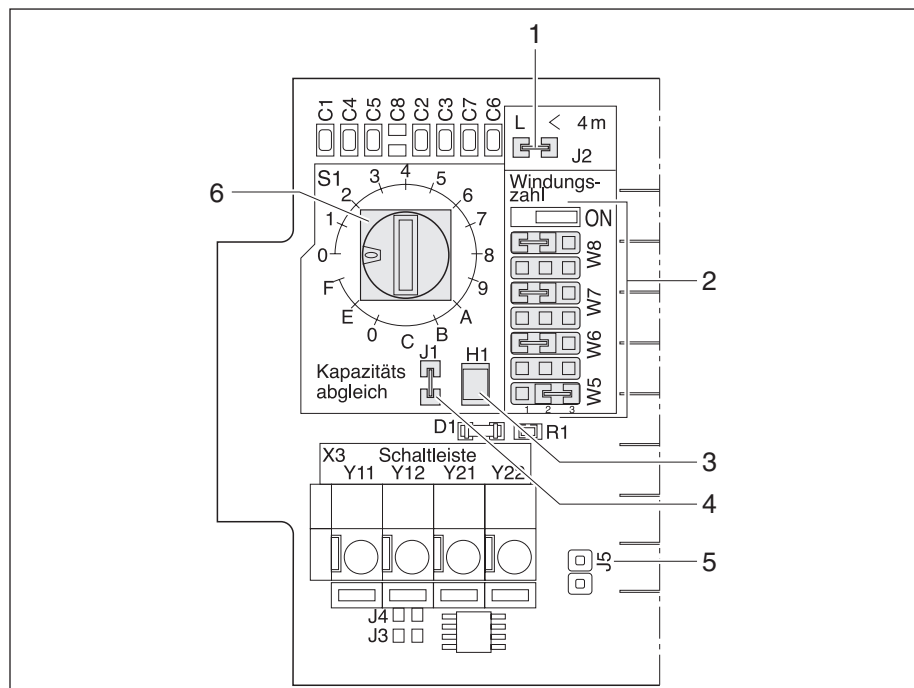


Fig. 7-1: Tuning transponder antenna

- 1 Jumper “J2”: Setting for small opening widths
- 2 Jumper “W5” to “W8”: Setting of the winding number
- 3 LED “H1”: Tuning control
- 4 Jumper “J1”: Activation of tuning control
- 5 Measuring point “J5”: Connection of a TRUE-RMS meter
- 6 Rotary knob “S1”: Setting of the capacity value

### Setting winding number

1. Define opening width L (see section 6.1.1).
2. Set winding number in the tuning box in accordance with the following table.

Opening width L	Winding number	Jumper setting
18 m to 17 m	5	
17 m to 10 m	6	
10 m to 7 m	7	
7 m or less	8	
< 4 m	8	

Table 7-1: Ratio opening width/windings



The winding values in the table are minimum values in each case.

- ➔ Set the jumpers in accordance with the table to “ON” (bridge between pin 2 and 3).
- ➔ With opening width  $L < 4$  m, set jumper “J2”.

#### Setting capacity value



- ➔ Determine correct capacity value with maximum brightness of LED “H1”.
- ➔ Set jumper “J1” only for capacity balancing.

1. Set jumper “J1”.
2. With rotary knob “S1” find the maximum brightness of the LED “H1”.  
Observe the following tips:

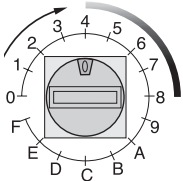
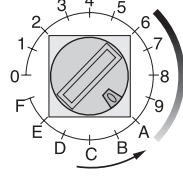
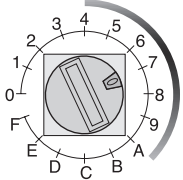
Situation/observation	Procedure	Example
LED "H1" is equally bright over a wide range of the rotary knob	<p>a. Turn rotary knob "S1" clockwise until the relay responds (aural or visual inspection on SG-TRS 208).</p> <p>b. Turn rotary knob "S1" counter-clockwise until the relay responds again (aural or visual inspection on SG-TRS 208).</p> <p>The optimum to be set is exactly in the middle of the two positions.</p>	<p>Position 4:</p>  <p>Position A:</p>  <p>Position 7:</p> 
There are hardly any differences in brightness on the LED "H1" between the rotary knob positions "0" to "F" (one turn clockwise)	<p>The wrong winding number was selected.</p> <p>a. Depending on the opening width L, pre-select the next winding number.</p> <p>b. Find the maximum brightness of the LED "H1" again.</p> <p>In exceptional cases, the opposite next winding number may help.</p>	<p>The opening width L is 7.65 m. According to table 7-1 the winding number should be selected as 7.</p> <p>Pre-select winding number 8 because this range is closer to the opening width L than the winding number 6, which is intended for lengths between 10 m and 17 m.</p>
A TRUE-RMS meter is available	<p>a. Connect TRUE-RMS meter to the two contacts "J5" (see Fig. 7-1).</p> <p>b. Turn rotary knob "S1" until voltage &gt; 10 V.</p>	

Table 7-2: Tips for setting the capacity value

3. Disconnect jumper "J1" after setting the capacity value.
4. Put Control Unit SG-TRS 208 into operation in accordance with the relevant operating instructions (if not already done).

### 7.3 Testing

**Conditions**

- Control Unit SG-TRS 208 is in operation (see relevant operating instructions).
- If there are no Safety Edges on the secondary closing edge of the fixed part of the sliding gate, the inputs for secondary closing edges on Control Unit SG-TRS 208 must be connected in accordance with the operating instructions.

- Safety edge(s) is/are not activated.
- ➔ During the following actions, observe LEDs on Control Unit SG-TRS 208.
1. Start system.  
Fault-free start:
    - LED "Betrieb" (Power) lit.
    - LED "Störung all." (Fault gen.) and LED "Störung Kanal 2" (Fault channel 2) not lit.
  2. Put system into operation.  
Fault-free operation:
    - LED "Betätigt Kanal 1" (Activated channel 1) and LED "Betätigt Kanal 2" (Activated channel 2) not lit.
    - LED "K1/K2 aktiv" (C1/C2 active) lit.
    - Output relays C1 and C2 respond.
  3. Activate Safety Edge main closing edge.  
Fault-free reaction:
    - LED "Betätigt Kanal 1" (Activated channel 1) lit.
    - LED "Betätigt Kanal 2" (Activated channel 2) and "LED K1/K2 aktiv" (C1/C2 active) not lit.
    - Output relays C1 and C2 deenergized.
  4. Activate Safety Edge secondary closing edge on moving part of sliding gate.  
Fault-free reaction:
    - LED "Betätigt Kanal 1" (Activated channel 1) lit.
    - LED "Betätigt Kanal 2" (Activated channel 2) and LED "K1/K2 aktiv" (C1/C2 active) not lit.
    - Output relays C1 and C2 deenergized.
  5. Activate secondary closing edge on fixed part of sliding gate.  
Fault-free reaction:
    - LED "Betätigt Kanal 2" (Activated channel 2) lit.
    - LED "Betätigt Kanal 1" (Activated channel 1) and LED "K1/K2 aktiv" (C1/C2 active) not lit.
    - Output relays C1 and C2 deenergized.
  6. Hold metal plate which is bigger than transmitting antenna between transmitting antenna and transponder antenna.  
Transmit signal is interrupted.  
Fault-free reaction:
    - LED "Betätigt Kanal 1" (Activated channel 1) lit.

- LED "Betätigt Kanal 2" (Activated channel 2) and LED "K1/K2 aktiv" (C1/C2 active) not lit.
  - Output relays C1 and C2 deenergized.
7. After successful functional test close all enclosures.

**Functional test  
failed?**

See troubleshooting

## 8 Troubleshooting

1. Carry out troubleshooting in accordance with the operating instructions of the Control Unit SG-TRS 208.
2. If faults still exist, carry out the following inspections:

Fault display	Possible cause	Remedy
LED "Kanal 1 Betätigt" (Channel 1 activated) lit permanently.	Tuning faulty	Check tuning and if necessary re-tune transponder antenna (see: LED "H1" not lit)
	Safety Edge activated or faulty	Check Safety Edge for short-circuit
	Antennae not always opposite each other	Check observation of tolerances over the whole runway (see section 6.1.2)
	Jumper "J1" not disconnected	Disconnect jumper
	Earth contact to gate system	Re-measure wiring and eliminate earth contact
LED „H1“ not lit	Tuning faulty	Connect jumper "J1" and check tuning
	Antenna cable not correctly connected	Check wiring, especially colour coding
	Safety Edge activated or shorted	If necessary disconnect Safety Edge and test tuning
	Transmitting antenna not opposite transponder antenna or not correctly connected	Check antenna connection Check observation of tolerances over the whole runway (see section 6.1.2)
	Metal parts too close to the antennae	Ensure that metal parts have a minimum distance of 40 mm from the antennae
	Transmitting antenna for plastic installed on metal	Install transmitting antenna correctly
	Transmitting antenna installed with top (cast side) facing downwards	
	Too low voltage on transmitting antenna	Test antenna voltage with a TRUE-RMS meter (125 kHz, max. 300 V $U_{SS}$ ). With voltages < 200 V change antenna. If the voltage is still too low after changing the antenna: Replace Control Unit.
	Earth contact to gate system	Re-measure wiring and eliminate earth contact

Table 8-1: Troubleshooting

## 9 Maintenance and cleaning

The transponder system is virtually maintenance-free.

### Cleaning

- ➔ Free surfaces of the antenna of coarse dirt at regular intervals.
- ➔ After cleaning, remove any remaining fluid.

### Regular inspections

- ➔ Check correct operation of safety equipment/sensors in accordance with the specifications of the gate system.
- ➔ Check Safety Edges for damage at regular intervals.
- ➔ Immediately replace damaged Safety Edges with new ones.

## 10 Disposal

The products included in the scope of supply contain the following materials:

### Antennae

- Plastics
- Copper (interior of antennae, cables)
- Ferrite

### Tuning box, Control Unit

- Copper (cables)
- Plastics (enclosure, PG screw connections)
- Steel (screws)
- Compound material (PCBs)

### Installation accessories

- Steel (screws)
- Aluminium (retention brackets for transmitting antenna or tuning box if used)




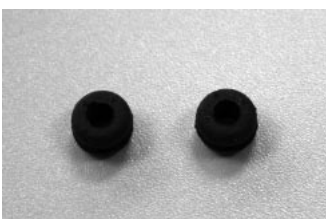

### Packaging

- Cardboard, plastics

The following is to be observed when disposing of these materials:

- ➔ Observe all relevant national disposal regulations and statutory conditions.
- ➔ Provide the above-mentioned material lists if you use a disposal company.
- ➔ Recycle or dispose of materials in an environmentally friendly way.

## 11 Parts list

	Designation	Part number
 	<p>Spool carrier set TRS 55, 3 m length, 2 m length, consisting of:</p> <p>Spool carrier upper section TRS 55</p> <p>Spool carrier lower section TRS 55</p>	<p>7502023 7502024</p>
   	<p>End cap set TRS-S 55, consisting of:</p> <p>1 End cap for TRS 55, closed</p> <p>1 End cap for TRS-S 55, with holes</p> <p>2 Cable grommets TRS-S 55</p> <p>4 Fixing screws for TRS 55</p>	<p>7502025</p>


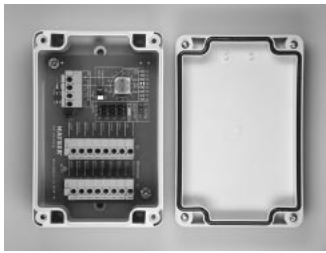
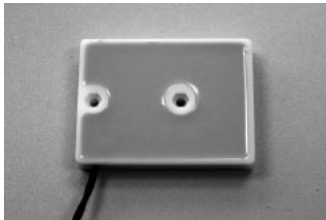

	Designation	Part number
	Antenna cable for TRS-S 55, 100 m length	1004242
	Tuning box TRS-S 55	1004300
	Transmitting antenna TRS-01-M for fixing to metall  Transmitting antenna TRS-01-K for fixing to plastic	7501107   7501200
	Control Unit SG-TRS 208/8k2 Control Unit SG-TRS 208/NC	1004179 1004180

Table 11-1: Parts list for the transponder system