

# LocControl100 RS

## Instructions for Installing LocControl100 on the vehicle

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Version I

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## 1 Document notes

### 1.1 Purpose of this document

This document describes the mounting of the LocControl100 RS radio remote control on the vehicle.

### 1.2 Version control

V.	Status	Who	When	Changes to the previous version
A	Replaced	GJO	04.07.2008	
B	Replaced	RBU	16.10.2008	Earthing 19" Receiver with locomotive chassis
C	Replaced	RBU	04.11.2008	Note on placing DIN 41612 coding pins
D	Replaced	RBU	02.02.2010	Current designations are tracked, new products considered
E	Replaced	RBU	16.03.2010	Sec. 5, 6: IP54 in place of IP45
F	Replaced	RBU	12.01.2011	Sec. 6.1: Installation position for Compact Receiver Sec. 16: Mounting the battery charger Reference to related documents
G	Replaced	MRA	21.02.2014	Sec. 10.1 added
H	Replaced	MRA	15.03.2016	Sec. 8.1 Pictures adjusted (new IP65 housing) / Comment for vertical installation added Sec. 8.2 type countersink screw updated Sec. 9.3 Comment for earthing added
I	Active	MRA	29.07.2019	Sec. 13 upgraded with instruction for mech. installation

Status: Draft Document in draft.  
 Replaced This document is no longer valid and has been replaced by one or several others.  
 Obsolete Document is no longer valid and has not been replaced by any other.  
 Review Document is frozen to conduct the review.  
 Active Document is released.

### 1.3 Related document

***Always use the latest version of the document listed.***

Dokument	Doku- Nummer (ohne Version)
<b>Specifications and technical documentation</b>	
[1] General operating instructions	10.0296.6600.01
[2] Overview of mechanical dimensions	10.0296.6042.01
[3] Operating instructions for LocControl100 battery charger	10.0296.6500.01
[4] LocControl100 Receiver interface Specification	10.0296.6212.01
[5] LocControl100 Commissioning and maintenance concept	10.0296.6039.01
[6] Mounting a Telegärtner connector onto an antenna cable	10.0296.6066.01
[7]	
[8]	

## 2 Introduction

This document describes the mounting of the LocControl100 RS radio remote control on the vehicle.

## 3 Pictogram

The following icons are used in these instructions for better comprehension of the user.



*This note provides useful tips and advice for better handling and improving the performance and reliability of the radio remote control.*



*This note draws attention to potentially hazardous situations and points out that severe damage to the radio - radio remote control, to the locomotive or the general railway infrastructure may be caused if handled incorrectly.*

*These safety instructions, as well as applicable safety regulations in the workplace must be observed during all operations!*



*This note draws attention to dangers in the area of electrical systems and electronics.*

*Work on the electrical and electronic assemblies and components are to be carried out by a qualified professional with a completed training in electrical systems and a training certificate from Schweizer Electronic Group.*

**These notes must be observed before operating the radio remote control.**

## 4 Using Schweizer Electronic materials



*Only those materials are to be used for installation, which have been supplied by Schweizer Electronic. This includes, among other things, signal cables, connectors for signal cables, coaxial cables, RF connectors, antennas and other material needed for installation.*

*This does not include consumables such as screws. This is to ensure that the right quality is used, for example, Inox.*



*If it is established that an interruption was caused by using foreign material, this would result in an immediate and fully comprehensive cancellation of all warranty and liability claims on the part of Schweizer Electronic [1]*

*For troubleshooting, Schweizer Electronic shall invoice for both the hours worked and travel time as well as the appropriate material.*

## 5 Opening LocControl100 RS Transmitter and Receiver

The Transmitter and the Receiver (19-inch rack, IP65 housing or Compact) may not be opened during installation.

For commissioning and maintenance work, the requirements apply in accordance with "Commissioning and maintenance concept LocControl100" [5].



**LocControl100 RS Transmitter and the Receiver may be opened only by authorized and trained Schweizer Electronic personnel.**

*If the seal mounted on the Transmitter or the Receiver is broken or destroyed, the corresponding system component must be taken out of service immediately. This warning is printed on the label*



**Never open the device itself! In such case the safe operation is no longer guaranteed.  
Consequence: Risk to people and property.  
In case of defect always return to the assigned authorized service centre! 0000002**



*After each opening LocControl100 must be subjected to a complete functional and final test. The functional test and the final test must be carried out only by personnel authorized and trained by Schweizer Electronic Personal at a test facility or on a test system designated for this purpose.*



*Neither the LocControl100 Transmitter nor Receiver may be put back into operation after opening without performing the functional test and the final test.*

## 6 Connecting and installing the 19" rack model Receiver



### 6.1 Mechanical installation

The requirements of the „Overview of mechanical dimensions“ [2] are applicable for mechanical installation.

The following points should be noted when mounting the 19 " rack Receiver:



*The 19 " rack Receiver is to be installed in a lockable, electric cabinet provided for this purpose. The electrical cabinet must meet IP54.*



*The Receiver 19 "- rack must not be installed on a device which gives off heat. If heat is given off, it should be ensured through appropriate measures (active ventilation) that the temperature inside the switch cabinet remains within the temperature limits of the 19 "rack receiver under all operating and storage conditions.*



*The electric cabinet is to be mounted with effective shock absorbers. If this is not the case, the compact Receiver must be equipped with corresponding shock absorbers.*



*The installation depth of the 19 " rack Receiver must be chosen so that from the rear wall of the Receiver to the rear wall of the electric cabinet a distance of 20mm is maintained.*

### 6.2 Electrical connection

The requirements of LocControl100 interface specifications [4] are applicable for electrical installation.

## 7 Installing compact model Receiver

The requirements of the „Overview of mechanical dimensions“[2] are applicable for mechanical installation.

The following points should be noted when installing the compact Receiver:

### 7.1 Mechanical installation



The compact Receiver must be installed in a lockable electric cabinet.  
The electrical cabinet must meet IP54.



The compact Receiver must not be installed on a device which gives off heat.  
If heat is given off, it should be ensured through appropriate measures (active ventilation) that the temperature inside the switch cabinet remains within the temperature limits of the compact receiver under all operating and storage conditions.



There must be a clearance of at least 50mm above the compact Receiver so that the heat is sufficiently dissipated.



Sideways, on the opposite side of the mounting side of the compact Receiver model, must be a minimum clearance of 50 mm so that the heat can be sufficiently dissipated.






The mounting depth of the compact Receiver must be chosen such that from the rear wall of the Receiver to the rear wall of the electric cabinet a distance of 20mm is maintained.



The electric cabinet is to be mounted with effective shock absorbers.  
If this is not the case, the compact Receiver must be equipped with corresponding shock absorbers.

### 7.2 Installation position for compact Receiver model

To ensure **adequate heat dissipation** (passive ventilation) the compact LocControl100 Receiver must be installed in non-air-conditioned environment in an **upright, correct position**.

correct installation	incorrect installation	incorrect installation
		
Housing mounted <b>upright</b> Cooling slots "long" on upper side <b>Optimal heat dissipation</b>	Housing mounted upright , cooling slots "small" on upper side <b>Insufficient heat dissipation</b>	Housing mounted horizontally, cooling slots sideways, <b>Insufficient heat dissipation</b>

### 7.3 Electrical connection

The requirements of LocControl100 interface specifications [4] are applicable for electrical installation.

## 8 Installing Receiver model with IP65 housing

The requirements of the „Overview of mechanical dimensions“[2] are applicable for mechanical installation.

The following points should be noted when installing Receiver with IP65 housing:

### 8.1 Mechanical installation





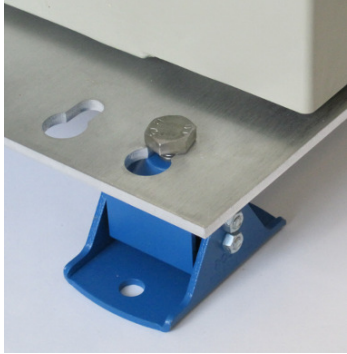
*The Receiver with IP65 housing must be set and installed on the vehicle such that the housing is protected against damages.*



*The Receiver Housing IP65 must not be installed on a device which gives off/emits heat.*



*The Receiver with IP65 housing must be installed with the supplied adapter plate and shock absorbers.*

Vertical mounting	Horizontal mounting	Mounting on vibration dampers
		
Receiver installed vertically on the mounting plate	Receiver IP65 installed horizontally on the mounting plate	Mounting plate bolted on vibration dampers "Rosta"



*It must be ensured that on vertical mounting no water is gathering on upper side between housing and cover.*

### 8.2 Required installation material

The following material must be used for the proper installation of an IP65 Receiver:

Article No.	Label	Number (pcs)
EEM0353	Aluminium mounting plate	1
EEE0145	Vibration damper Rosta	4
A01398	Countersunk head screw M8 x 18	4
EES0688	Hexagonal screw M8 x 12	4

### 8.3 Electrical connection

For the electrical connection of the Receiver, the requirements of the LocControl100 interface specifications [4] are applicable.





## 9 Earthing of the Receiver


### 9.1 Earthing of Receiver models 19" Rack/Relay and 19" Rack/CANopen

To ensure a correct and reliable earthing the Receiver (19" rack and Compact) must be electrically connected to the locomotive chassis.

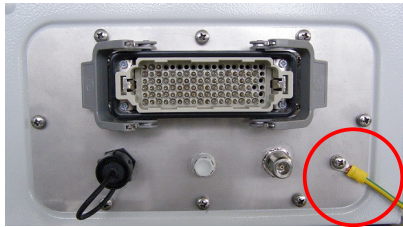
For this purpose, a 1.5 mm<sup>2</sup> stranded wire (yellow-green) with a suitable length is to be used. This is to be installed between the earthing connection of the LocControl100 RS Receiver and the vehicle chassis.

Receiver model 19" rack with split front panel	Receiver model 19" rack with full front panel
	
Earthing without earthing jack	Earthing with earthing jack on the front panel

### 9.2 Earthing of the compact model Receiver

Compact receiver mounting

Earthing with earthing jack

### 9.3 Earthing of IP65 model Receiver

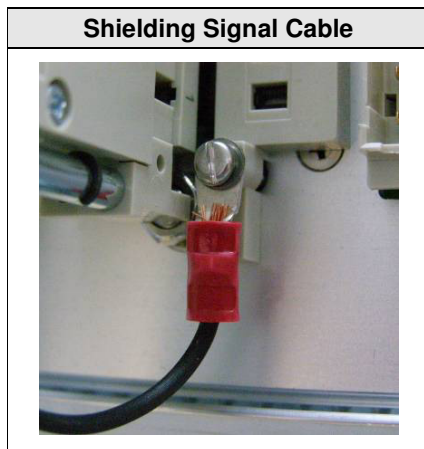
Empfänger Ausführung IP65

Erdung mit Erdungsbuchse

## 10 Wiring the receiver with supply cable and signal cable

### 10.1 Using shielded signal cable

If signal cables with integrated shield are used, the shield must be grounded only on the Receiver side. The installation point is the mounting of the coding bar of the connector. The shielding must be ***absolutely*** fixed in place.

Installation order: coding bar - ring terminal of the shield - washer - spring washer - bolt



### 10.2 19" rack model Receiver with relay interface

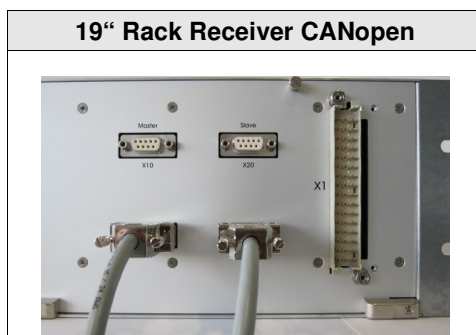
The signals and the supply for the 19" rack model Receiver are wired with 48-pin DIN 41612 connectors. Depending on the configuration and system type of the 19" rack model Receiver, 2, 3 or 4 identically constructed cables are to be used. The DIN 41612 connectors are coded and distinctively assigned to the respective connector place.

The cables should run in cable conduit or protected in an armored tube.

### 10.3 19" rack model Receiver with CANopen interface

In case of 19" rack Receiver with CANopen the supply and signals of the six safety relays are to be wired using a 48-pin DIN41612 connector.

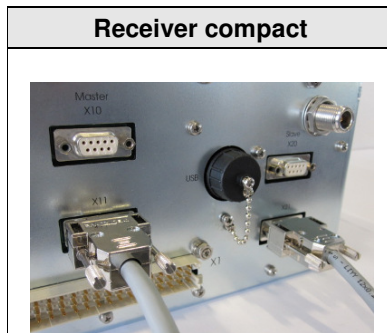
The cables should run in cable conduit or protected in an armored tube.



#### **10.4 Compact model Receiver with CANopen interface**

In case of compact Receiver the supply and signals of the six safety relays are to be wired using a 48-pin DIN41612 connector.

The maximum length of the cable is 3m. Schweizer Electronic must be contacted when using longer cables.  
The cables should run in cable conduit or protected in an armored tube.



#### **10.5 Receiver with IP65 housing**

The power supply of the Receiver is performed by a separate 2- wire cable.




In case of Receiver with IP65 housing, the signals are to be wired to a HAN108 connector using a 100-pole cable. The maximum length of the cable is 3m. Schweizer Electronic must be contacted when using longer cables.

The cables should run in cable conduit or protected in an armored tube.

## 11 Vehicle antennas

### 11.1 Available vehicle antennas

The vehicle antennas of Schweizer Electronic should be used for the antenna installation:

vehicle antenna 410 - 470MHz, 0dB	vehicle antenna 410 - 430MHz, +2dB	vehicle antenna 450 - 470MHz, +2dB
		
<p>Art No. VWE1766 antenna height 142mm</p>	<p>Art No. VWE1620 antenna height 355mm</p>	<p>Art No. VWE1768 antenna height 355mm</p>

### 11.2 Mounting the antenna

The vehicle antenna is to be installed at the highest possible point on the locomotive (vehicle), i.e. on the roof of driver's cabine with a completely unrestricted visual contact on a sufficiently large surface.

#### 11.2.1 Metallic surface

The antenna must be mounted on a metallic earthing surface of minimum 500 mm x 500 mm. In most cases the roof of vehicles (trains and locomotives) is made of metal. For security reasons, these surfaces must be sufficiently earthed in order to conduct high voltages and currents to earth.

#### 11.2.2 Non-metallic surfaces

Today vehicles are constructed more and more with non-metallic materials. These non-conductive surfaces cannot be used for the antenna installation.

An additional metallic surface of 500 mm x 500 mm must be attached.

This surface must be sufficiently earthed for safety reasons in order to conduct high voltages and currents to earth.

The antenna must have a good electrical contact with these metallic earthing surfaces.

#### 11.2.3 Earthing the vehicle antenna

In case of an accident or a fault in the high voltage line (catenary), a high voltage might be supplied to the antenna and, consequently, a high current flow. Low voltages on the connector are ensured by well-earthed

antenna flanges. To achieve the best conductivity, the installation surfaces on the antenna socket and the associated surface on the vehicle must be properly cleaned. All paint residues and other contaminants must be removed before installation.

#### **11.2.4 Sealing the vehicle antenna**

To avoid corrosion and leakages of the vehicle, the antenna connector must be sealed against the mounting. Every antenna is supplied with an O-ring to seal the hole in the vehicle body against the antenna connector. The opposing surface must be even. Corrosion on superimposed surfaces between the antenna and the mounting surface is a critical point for the correct functioning of the antenna.

#### **11.2.5 Painting the vehicle antenna**

We recommend that you do not paint the antenna. Due to the small size of the antennas, we consider it reasonable to accept minimal optical limitations.

#### **11.2.6 Aligning the antenna**

The vehicle antennas are geometrically aligned to the direction of travel of the vehicle.



#### **11.2.7 Obstacles in the vicinity of the vehicle antenna**

In order that the electromagnetic waves can optimally propagate from the antenna, a flat roof without obstacles is preferable. Obstacles in the vicinity of the antenna can affect the radiation pattern and the radiated electromagnetic waves.

There must not be any obstacles within a radius of at least 1 m meters to the antenna.

#### **11.2.8 Distance to other antennas in the same frequency band**

The distance from other antennas is dependent on the required antenna decoupling. This value must be discussed with the manufacturers of other radio systems installed on the vehicle. The rule is that the distance should not be a multiple of the wavelength  $\lambda / 2$ .

The following can be applied as a rule of thumb for determining the wavelength or distance  $\lambda$  (lambda):

$$\lambda = 300/\text{Frequency in MHz}$$

#### **11.2.9 Installing antenna cable**

The antenna cable between the Receivers (19 " rack, IP65 housing, Compact) to the vehicle antenna is installed using a flame retardant coaxial cable.

The maximum length of the cable is 5m. Schweizer Electronic must be contacted when using longer cables.

The use of HF - angle connectors is prohibited.

Tight radius of the coaxial cable must be installed with flexible RF jumper cable.

If after installation the coaxial cable is subsequently packaged with an antenna connector, the requirements for "Mounting a Telegärtner connector onto an antenna cable" [6] must be complied with.

The cables should run in cable conduit or protected in an armored tube.

## 12 Mounting the Transmitter holder

The requirements of the „Overview of mechanical dimensions“ [2] are applicable for mechanical installation.

### 12.1 Mounting for Operating the Transmitter in the Transmitter holder

The Transmitter can be operated in a Transmitter holder. When mounting the Transmitter holder, the following points should be noted:



*The front of the Transmitter must not be covered. There must be at least 1 meter distance to the nearest metal surface.*



*The Transmitter holder must not be installed above a device which gives off heat.*



*The Transmitter holder is to be mounted with the supplied shock absorbers.*



*If the operation of a Transmitter in the Transmitter holder is provided for, **the operator monitoring function must be integrated in the Transmitter.***



*If the operation of a Transmitter in the Transmitter holder is provided for, **this operational method must be specified and briefed in the operational provisions of the operator.***

### 12.2 Mounting for storing the Transmitter in the Transmitter holder

The Transmitter can be stored in the Transmitter holder. When mounting the Transmitter holder, the following points should be noted:



*The Transmitter holder must not be installed above a device which gives off heat.*



*The Transmitter holder is to be mounted with the supplied shock absorbers.*



*The Transmitter holder for storage of the Transmitter is to be mounted on a lockable, dry location which is not directly exposed to sunlight.*

### 13 Connecting and installing locControl100 battery charger on the vehicle

The LocControl100 charger is used to charge one or two 7.2 VDC lithium ion batteries and can be installed on a vehicle.

The requirements of the „Overview of mechanical dimensions“ [2] are applicable for mechanical installation.

You must observe the operating instructions of the LocControl100 battery charger [3] and comply with its requirements when installing LocControl100 battery charger.



*The battery charger must always be visible and accessible.*



*No moisture should penetrate into the loading bays, the battery charger must not be exposed to moisture.*



*The charger must not be opened by unauthorized persons.*

### 13.1 Mechanical installation

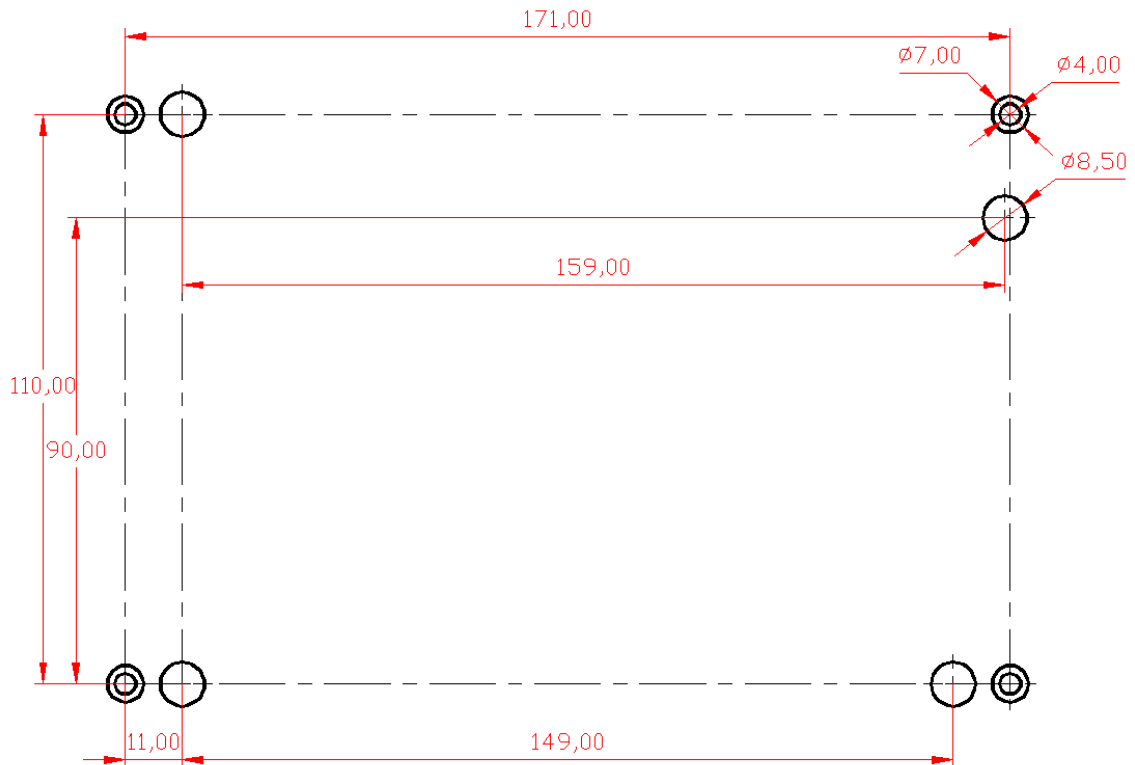
Bill of materials:

- 1x Charger "LocControl100 RS" (Art.nr. VGG1769)
- 4x "PT-Countersink screw 'H' KA30x12» (Art.nr. EES0571)

Instruction:

- 1) Measure and mark points for anchor supports (4x) of charger on horizontal base, according to the following dimensions (L=171mm, W=110mm) and for stabilization cut-outs (4x).

**Attention:** Material thickness of base must not exceed 3mm. In case of thicker material, please use screws with appropriate length.





- 2) Drill holes (Ø 4mm) for shown anchor points (red marked circles) and cut-outs (Ø 8.5mm) for stabilization (yellow marked circles) on the basement.



- 3) Use provided screws (4x)



4) Mount charger with screws from the bottom up (see red marked arrows)



## 14 Holder for RFID key

An empty RFID cabinet can be mounted on the driver cabin for the safekeeping of the RFID key (optional).



*The detailed assembly drawings are included in the delivery*

## 15 Switch manual operation ← → radio operation

To toggle between manual operation ← → radio remote control operation a switch can be mounted on the driver cabin (optional). Schweizer Electronic offers a standard solution with the key switch for the Loc-Control100 Transmitter.



*The detailed mounting drawings are included in the delivery.*