

# **Operator Manual**

## **Hand-Held TS**



**[www.hetronic.com](http://www.hetronic.com)**

**YOUR #1 PARTNER IN RADIO REMOTE CONTROLS**

**Hetronic**

4300 Highline Blvd., Bldg. A  
Oklahoma City, OK 73108  
405-946-3574 Fax 405-946-3564

OPMN\_HHD\_0001.0  
6/02

Congratulations on purchasing this high quality safety radio remote control system from HETRONIC. You have selected a quality product from a leading manufacturer of safety radio remote control systems and can therefore be fully confident that this product reflects state-of-the-art technology.

All rights are reserved, including those relating to photomechanical reproduction and to recording on electronic media.

The explanations, illustrations and diagrams are the property of HETRONIC, and may only be used with the express permission of HETRONIC.

Subject to change without notice

Version: 1.1  
Date: 08/2001

HETRONIC  
4300 Highline Blvd., Bldg. A  
Oklahoma City, OK 73108 USA  
Tel. : +1-405-946-3574  
Fax. : +1-405-946-3564  
Website: [http\\www.hetronic.com](http://www.hetronic.com)  
E-Mail: [info@hetronic.com](mailto:info@hetronic.com)

# Contents

<b>1. Safety</b>	<b>4</b>
1.1 Safety of this radio remote control system	4
1.2 Safety instructions and tips	4
1.3 Sources of risk	4
1.4 Qualified operators	5
1.5 Safety precautions in the working area	5
1.6 Protection devices	5
1.7 What to do in an emergency	5
<b>2. Operation</b>	<b>6</b>
2.1 Handling the batteries / rechargeable batteries	6
2.1.1 Replacement of batteries / rechargeable batteries	6
2.1.2 Rechargeable battery: Battery charger and charging the battery	7
2.2 Control elements	8
2.2.1 Hand- Held/S-2	8
2.3 Operation mode	9
2.3.1 Visual checks	9
2.3.2 Safety checks and starting the radio remote control system	9
2.3.3 Proportional function	10
2.4 Troubleshooting Table	11
2.5 Frequency table CS434 (433.875MHz – 434.650MHz)	12
2.6 Frequency table CS458 (458.800MHz – 459.175MHz)	13
<b>3. Installation Instructions</b>	<b>14</b>
3.1 Connection instructions and commissioning	14
3.2 Drill diagrams for the receiver	15
3.3 Receiver with optional external antenna	15
3.3.1 Receiver housing HS1	17
3.3.2 Receiver housing HS2	17
<b>4. Maintenance</b>	<b>18</b>
<b>5. Battery Disposal</b>	<b>18</b>
<b>6. Technical data</b>	<b>19</b>
6.1 General system data	19
6.2 Transmitter	19
6.3 Receiver	19
6.4 VersaPak battery charger	20
6.5 Rechargeable batteries and other batteries	20
6.6 Transmitter and receiver diagrams	21
6.6.1 Transmitter hand-held / TS	21
6.6.2 Transmitter hand-held / TS proportional	22
6.6.3 RX receiver HS1 housing	23
6.6.4 RX receiver HS2 housing	24
6.6.5 RX receiver HS2 housing proportional	25
<b>7. Appendix A</b>	<b>26</b>

# 1. SAFETY

## 1.1. SAFETY OF THIS RADIO REMOTE CONTROL SYSTEM

This radio remote control system is equipped with both electronic and mechanical safety devices.

When allocated, coding applies to one transmitter only, meaning that control commands cannot be received from other transmitters.

### THIS CONCERNS YOUR SAFETY

**In the event of incorrect operation or misuse, there is a risk of harm to:**

- the health of the operator or other persons, and
- the machinery and other property.

**All persons working with this radio remote control system**

- must be both suitably qualified and have been instructed, as required by regulations, and
- must comply strictly with the contents of these Operating Instructions.

## 1.2. SAFETY INSTRUCTIONS AND TIPS

**The following symbols are used for warnings and advisory notes in these operating instructions, with the following meanings:**



**DANGER:** This symbol is used to warn you of the risk of fatal accidents or serious injuries. Such risks can arise whenever operating or working instructions are not strictly followed.



**WARNING:** This symbol is used to warn you of the risk of damage to the machinery or to other property if the operating or working instructions are either not followed or are not followed properly. Disregarding these warnings may void your warranty.



**NOTE:** This symbol is intended to draw your attention to particular features or important information designed to make your work easier.

## 1.3. SOURCES OF RISK

The system is designed for permitting machinery to be controlled by radio remote control. However, since the control commands are also transmitted beyond your range of vision, and through or around obstacles in the vicinity, you should always:

- disconnect the power supply before you start any installation, maintenance or repair work.
- never remove or modify safety devices!
- place the transmitter on a clean and dry surface and remove the accumulator or the battery box, if you put the transmitter down.

## 1.4. QUALIFIED OPERATORS

**IMPORTANT:** See operating instructions for the machinery you intend to operate with this control system!

The operator is responsible for ensuring that when the transmitter is put down, it cannot be used by unauthorized persons.

**The user:**

- must provide the operator with the operator instructions **and**
- ensure that the operator has read and understood them.

## 1.5. SAFETY PRECAUTIONS IN THE WORKING AREA

**IMPORTANT:** Ensure that there is no risk of slipping in the work area. Before each use of the radio remote control system, check that no persons or obstacles are within the working area or swivelling range of your load.



**CAUTION:** To prevent unauthorized or accidental operation, remove the battery or the battery tube from the battery compartment if you put down the transmitter.

## 1.6. PROTECTION DEVICES

**The machinery will stop:**

- If you actuate the red emergency stop button on the control panel of the transmitter
- 450ms (approx. 0.5s) after switching off the transmitter.
- If the range is exceeded.
- If there is receiver interference.

**These protection devices:**

- Are included for the safety of both persons and property, and
- Must not be modified, removed or bypassed under any circumstances or in any way whatsoever!

## 1.7. WHAT TO DO IN AN EMERGENCY

**In an emergency you should press the emergency stop button immediately. Then proceed as instructed in the operating instructions for your machinery.**



Figure 1

## 2. OPERATION

Read and understand the Operating Instructions, in particular Section 1 on safety and protections devices. Untrained personnel must not attempt to operate the radio remote control system!

### 2.1. HANDLING THE BATTERIES / RECHARGEABLE BATTERIES



**NOTE:** Your HETRONIC radio remote control system is delivered with charged rechargeable batteries (optional) or with alkaline mignon batteries. The radio remote control system is ready for immediate use.

#### 2.1.1. Replacement of batteries / rechargeable batteries

Proceed as follows:

1. Place the transmitter on a clean and dry surface.

##### Alkaline mignon batteries:

1. Press the lever at the black end of the battery tube downwards to release the battery compartment from the battery tube.
2. Remove the two dead alkaline batteries.
3. Insert two charged 1.5V alkaline batteries into the battery compartment with the negative pole first, as shown on the battery compartment.

**IMPORTANT:** Ensure that you only use alkaline batteries. The transmitter's power input (approx. 80mA) with zinc-carbon batteries will be insufficient, because of higher internal resistance.

4. Insert the battery compartment into the transmitter's battery tube, with the end with the metal ring first (it will help if you hold the battery compartment vertically so that the alkaline batteries cannot fall out).
5. Press the battery compartment in the direction of the battery tube until it fully locks into place (see Figures 2.1 to 2.4).

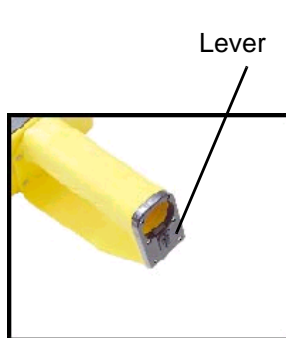


Figure 2.1

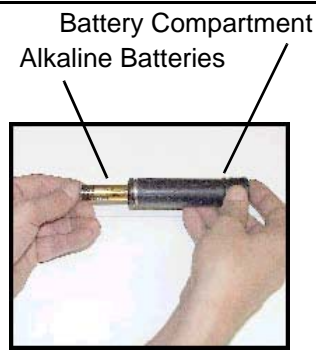


Figure 2.2

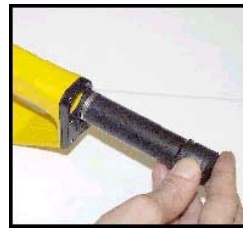


Figure 2.3

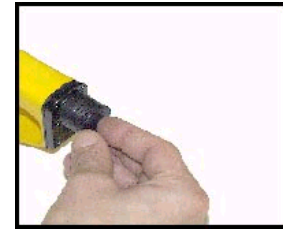
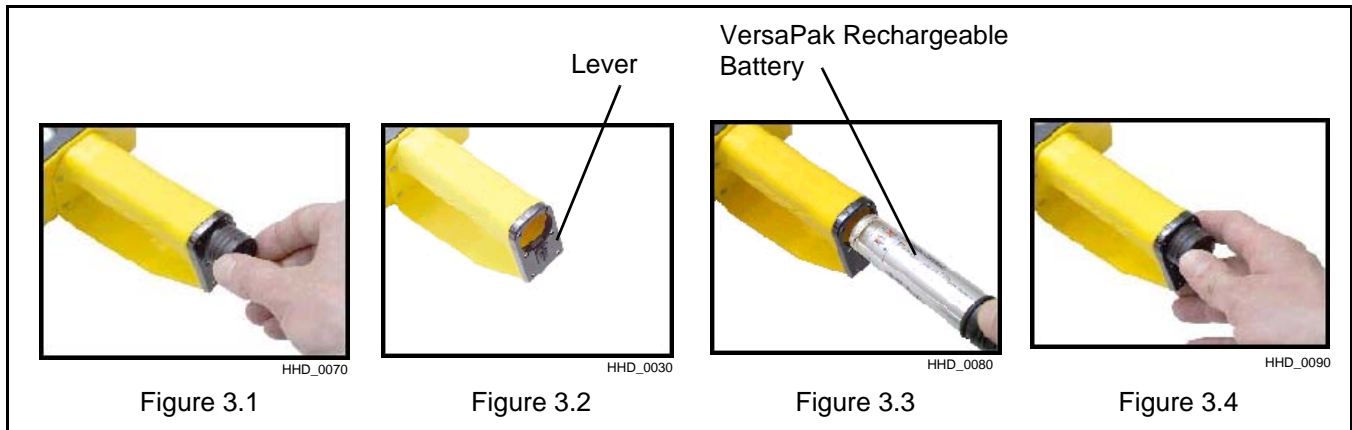


Figure 2.4

### **VersaPak rechargeable battery:**

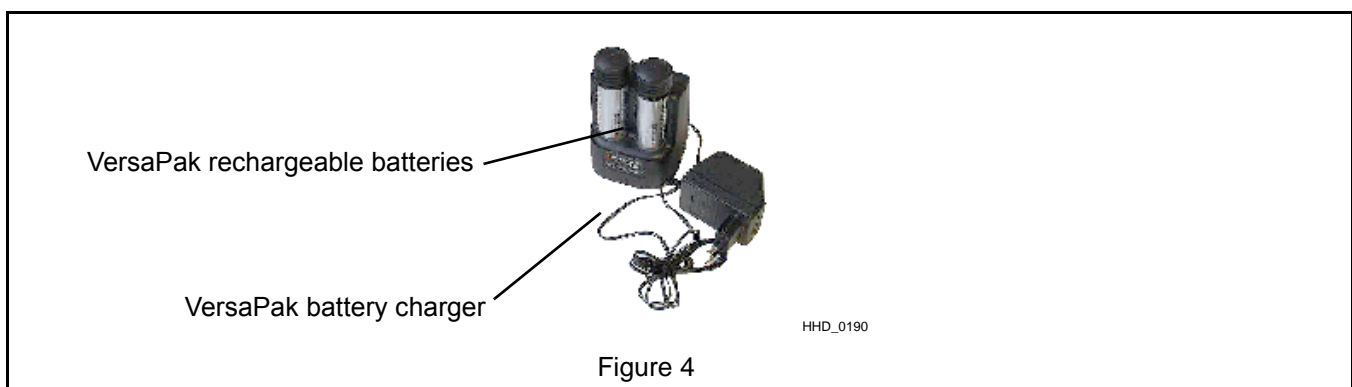
1. Press the lever at the black end of the battery tube downwards to release the VersaPak rechargeable battery from the battery tube.
2. Remove the discharged battery.
3. Recharge the rechargeable battery immediately, if possible, so that you have a recharged battery available for immediate re-use.
4. Pick up the recharged battery by the black plastic grip.
5. Insert the rechargeable battery into the corresponding battery tube at the bottom end of the handle.
6. Press the rechargeable battery in the direction of the battery tube until it fully locks into place (see Figures 3.1 to 3.4).



### **2.1.2. Rechargeable battery**

#### **Charging the rechargeable batteries**

1. Remove the rechargeable battery as described in Section 2.1.2.
2. Insert the rechargeable battery in the corresponding charging jack of the battery charger with the contact end first.
3. Check that the main plug of the battery charger is plugged in. Charging should take about 3 hours.





**DANGER: AVOID INJURY** - Please make sure that you read the operating instructions provided by the manufacturer with the battery charger before use. Follow all safety instructions. HETRONIC will not accept liability for improper or negligent use.

To avoid risk of explosion, use only genuine HETRONIC parts or parts approved by HETRONIC. Emitted chemicals and flying parts can cause injury.

To prevent possible damage to rechargeable batteries and the battery charger:

Please ensure that rechargeable batteries do not remain in the battery charger for more than 24 hours.

(This only applies to VersaPak staggered-slot rechargeable batteries and the battery charger).

Rechargeable battery packs and batteries are to be treated as hazardous waste!

Use a suitably qualified firm for their recycling and disposal!

Defective rechargeable battery packs can also be disposed of directly through HETRONIC.

## 2.2. CONTROL ELEMENTS

### 2.2.1. Hand – Held TS

1. Emergency stop button
2. Toggle switch S1 to S4 with function (T-0-T). Up to 7 toggle switches possible according to version (see Section 7 - Transmitter and receiver drawings).
3. Battery compartment
4. Proportional switch
5. Lever
6. Battery tube or VersaPak rechargeable battery

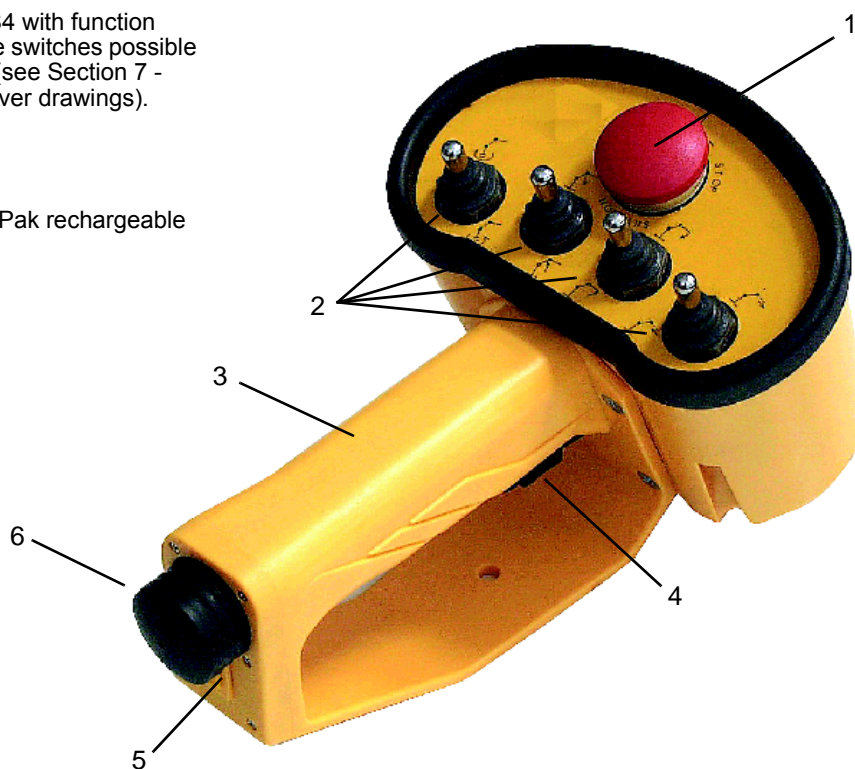


Figure 5

HHD\_0100



## 2.3. OPERATION MODE

Before you use the system you must carry out the safety checks described in Sections 2.3.1 and 2.3.2 below.

These safety checks must be carried out at least once each day before you start using the system or before each shift change.



**CAUTION:** An illustration of your version of the transmitter is in Section 7.6. If your transmitter is not shown there, a drawing is attached to these Operating Instructions. The illustration forms part of the Operating Instructions. The arrangement of the controls and the transmitter labelling will vary depending on customer requirements, but will generally be the same as the labelling of the manual controls you are familiar with.

**IMPORTANT:** Refer to the manufacturer's operating instructions for your machinery and the diagram of your transmitter to familiarize yourself with the arrangement of the controls and their functions!

The section below deals with the radio remote control system's controls and special features.



**DANGER:** Risk to life and property!

Check the emergency stop button each time before starting use, as described in the manufacturer's operating instructions.

### 2.3.1. Visual checks

**Always check the transmitter for damage each time before use!**

- Are all safety devices there and do they work?
- Are there any broken parts?
- Are the rubber sleeves crack-free?

**Never work with a transmitter that is damaged in any way!**

**Ensure that any damage is repaired immediately!**

### 2.3.2 Safety checks and starting the radio remote control system

**You must check the following:**

- Check that either the two charged 1.5V alkaline mignon batteries are in the battery compartment or that the charged VersaPak rechargeable battery is in the battery tube of the transmitter.
- Pull out the emergency stop button, if it is pressed.
- Operate one of the transmitter's toggle switches. This should result in the activation of the function corresponding to the toggle switch.
- Please check that the transmitter sends a signal only as long as you keep the function toggle switch pressed.
- The radio signal, and with it the emergency stop relay, only remains activated continuously until the transmitter is switched off if you are in continuous transmission mode, available as an option. Please contact your dealer if you require this mode.
- Now actuate one of the functions of the machinery to be operated (one of the four or seven toggle switches on the transmitter, as described below in Section 2.2 Control Elements).
- Check the EMERGENCY STOP FUNCTION as described in the manufacturer's operating manual for the machinery. Use the EMERGENCY STOP BUTTON on the transmitter instead of the EMERGENCY STOP BUTTON on the machinery.
- Press the EMERGENCY STOP BUTTON on the transmitter.

**IMPORTANT:** Once you have actuated the EMERGENCY STOP BUTTON on the transmitter, it should no longer be possible to exercise control over any of the machinery's functions!

- If the EMERGENCY STOP SYSTEM does not function properly, DO NOT use the radio remote control system. Contact your dealer or Hetronic for repairs.



**DANGER:** Stop the machinery immediately if a fault is found while checking the system! Inform your dealer immediately so that the cause can be located and repaired!

Never work with machinery for which the EMERGENCY STOP SYSTEM does not function properly!



**WARNING:** Failure to comply with these instructions could lead to personal injury or damage to property!

All actions that contribute to a failure to comply with these instructions may void your warranty and result in the withdrawal of your operating permit!

### 2.3.3. Proportional function

Radio remote control systems with a proportional function in the series TS, are also fitted with a black proportional switch or rotary selector. The receiver is equipped with a pulse width module PWM. The adjustments of the pulse width module are preset at HETRONIC. These adjustments should not be changed. If you require a modification of the preset values, contact your dealer or HETRONIC customer service.

The proportional function allows you to control the speed of motion for that function. To execute the proportional function you must operate a toggle switch first. You can then control the function with the proportional switch.

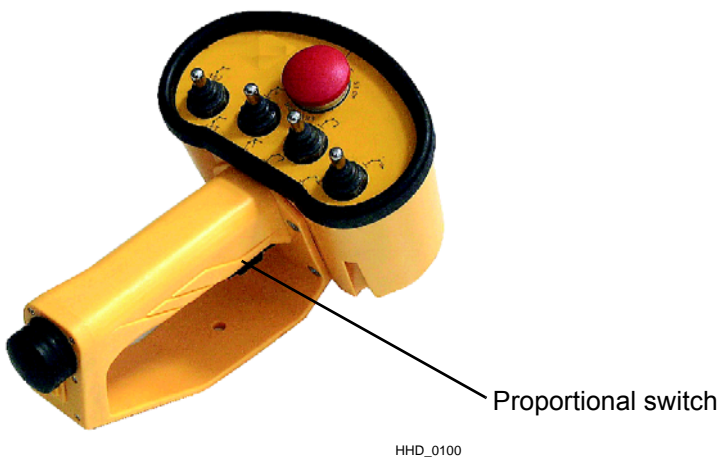


Figure 6

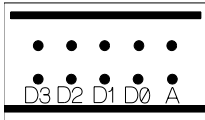
## 2.4. TROUBLESHOOTING TABLE

Your radio remote control system is designed and manufactured with state-of-the-art technology. Every device is subjected to stringent quality controls at our factory before being released for delivery.

**In the event of trouble symptoms, please check the following points:**

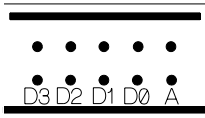
Trouble symptom	Possible causes	Solution
On/Off function cannot be actuated or controlled.	Self-test routine	The transmitter begins to transmit the signal after a 3 second self-test routine.
	Emergency stop switch pressed.	Check the position of the emergency stop button.
	Battery discharged.	Insert charged rechargeable battery or check batteries.
No reaction to keying the transmitter.	Interruption to receiver power supply.	Switch on the master switch of the machinery. Check connectors. Measure the supply voltage of the receiver. Check the system ground.
	Addresses of transmitter and receiver do not correspond with each other.	Set addresses as instructed (The addresses in the transmitter and receiver must be identical).
	Rechargeable battery or battery compartment is defective (contact corrosion). Batteries have leaked.	Check if the second rechargeable battery / new batteries produce the same results. Check the battery compartment and rechargeable battery compartment. Clean if required. Please contact your dealer.
Operating time too short.	Incorrect or discharged batteries were inserted.	Check if the power supply for the charger is switched on, or if the connection is faulty or loose. Only use rechargeable batteries approved by HETRONIC. Only use alkaline batteries.
There is interference with the transmission of the control commands to the machinery.	A radio remote control system with the same frequency is being used within the vicinity.	Try out an alternative frequency setting for the transmitter and receiver.
	No radio link.	Check that a yellow and a green LED flash on the receiver. If not, please contact your dealer.
	Check to see if there is a large metal surface located between the transmitter and receiver.	Remove the metal obstruction or relocate your position of operation.
	The range has been exceeded.	Please contact your dealer.
	The receiver is located in a steel cabinet or a vehicle or is installed inside the machinery to be controlled. The antenna is therefore inadequate.	An external antenna must be installed outside the steel cabinet, vehicle or the machinery to be controlled. Please contact your dealer.
Individual functions cannot be actuated or controlled.	Broken control lead between the machinery to be controlled and the receiver.	Check that the connector plug is connected properly. Check the cable of the machinery. Check the wiring and cable-based controls of individual functions if necessary.
	Output module in the receiver is defective.	Check that an LED lights up on the output modules in the receiver in response to actuating the function. If not, please contact your dealer.

## 2.5 FREQUENCY TABLE FOR CS434 (433.875 MHz – 434.650 MHz)

<b>Gruppe A</b> <b>Lötbrücke: ZU</b>  <b>Group A</b> <b>Soldering Jumper "Off"</b>	<b>X1/X7</b> 	<b>Gruppe B</b> <b>Lötbrücke: OFFEN</b>  <b>Group B</b> <b>Soldering Jumper "ON"</b>
--	---	--

Channel	Frequency (MHz)	D0	D1	D2	D3	Frequency (MHz)	Channel
A1	433.875	ON	ON	ON	ON	433.900	B1
A2	433.925	OFF	ON	ON	ON	433.950	B2
A3	433.975	ON	OFF	ON	ON	434.000	B3
A4	434.025	OFF	OFF	ON	ON	434.050	B4
A5	434.075	ON	ON	OFF	ON	434.100	B5
A6	434.125	OFF	ON	OFF	ON	434.150	B6
A7	434.175	ON	OFF	OFF	ON	434.200	B7
A8	434.225	OFF	OFF	OFF	ON	434.250	B8
A9	434.275	ON	ON	ON	OFF	434.300	B9
A10	434.325	OFF	ON	ON	OFF	434.350	B10
A11	434.375	ON	OFF	ON	OFF	434.400	B11
A12	434.425	OFF	OFF	ON	OFF	434.450	B12
A13	434.475	ON	ON	OFF	OFF	434.500	B13
A14	434.525	OFF	ON	OFF	OFF	434.550	B14
A15	434.575	ON	OFF	OFF	OFF	434.600	B15
A16	434.625	OFF	OFF	OFF	OFF	434.650	B16

## 2.6. FREQUENCY TABLE FOR CS458 (458.800 MHz – 459.175 MHz)

<b>Gruppe A</b> <b>Lötbrücke: ZU</b>  <b>Group A</b> <b>Soldering Jumper</b> <b>"OFF"</b>	<b>X1/X7</b> 	<b>Gruppe B</b> <b>Lötbrücke: OFFEN</b>  <b>Group B</b> <b>Soldering Jumper</b> <b>"ON"</b>
--	---	--

Channel	Frequency (MHz)	D0	D1	D2	D3	Frequency (MHz)	Channel
A1	458.525	ON	ON	ON	ON	458.800	B1
A2	458.550	OFF	ON	ON	ON	458.825	B2
A3	458.575	ON	OFF	ON	ON	458.850	B3
A4	458.600	OFF	OFF	ON	ON	458.875	B4
A5	458.625	ON	ON	OFF	ON	458.900	B5
A6	458.650	OFF	ON	OFF	ON	458.925	B6
A7	458.675	ON	OFF	OFF	ON	458.950	B7
A8	458.700	OFF	OFF	OFF	ON	458.975	B8
A9	458.725	ON	ON	ON	OFF	459.000	B9
A10	458.750	OFF	ON	ON	OFF	459.025	B10
A11	458.775	ON	OFF	ON	OFF	459.050	B11
A12	458.825	OFF	OFF	ON	OFF	459.075	B12
A13	458.8375	ON	ON	OFF	OFF	459.100	B13
A14	458.900	OFF	ON	OFF	OFF	459.125	B14
A15	458.825	ON	OFF	OFF	OFF	459.150	B15
A16	458.900	OFF	OFF	OFF	OFF	459.175	B16



**WARNING:** Use of the RF module CS434 and CS458 is not subject to registration or payment of a fee.

The transmitter must never be used without an antenna, as this could destroy the RF high-level stage!

**The adjustments of the frequency and the address are factory- preset by HETRONIC.**

It is not permitted to change the frequency or the address, because there exists the risk of danger to personel and equipment.

All measures which act contrary to this guideline can lead the loss of your warranty and your operating permission.

If you experience difficulties with the radio link in your system, please contact your dealer or HETRONIC Customer Service.

### 3. INSTALLATION INSTRUCTIONS

#### 3.1. CONNECTION INSTRUCTIONS AND COMMISSIONING

The machinery may only be connected up by a qualified expert familiar with the machinery to be operated (see Section 4 Maintenance).

**The following also applies:**

- Before starting any work on the control cabinet or the receiver, switch off the power supply to the machinery to be controlled.
- VDE standards (German Association of Electrical Engineers), the regulations of local electricity supply companies, and German UVV safety standards must all be complied with.



**NOTE:** HETRONIC will not accept liability or provide a guarantee in the event of personal injury, damage to property and consequential damage resulting from improper or negligent handling or from handling that does not comply with the regulations and standards on which these Operating Instructions are based.

You must ensure that the receiver is located in an easily accessible place and is not installed within the vehicle, the machinery to be controlled, a control cabinet or any other similar equipment.

If installation in such a location is unavoidable, an external antenna must be installed also. Projecting antennas can be purchased from your dealer. Please refer to Section 3 of these Operating Instructions for installation instructions.

Switch off the power supply to the machinery before connecting the power supply of the receiver.



**NOTE:** For the dimensions of the receiver and the drilling pattern please refer to Section 3.2.



**DANGER:** The radio remote control system may only be connected by a qualified expert familiar with the electrical circuitry of the machinery to be controlled. The maximum permissible current loading of the relay is 8 ampere at 230 VAC or 30 VDC.

#### **Receiver RX:**

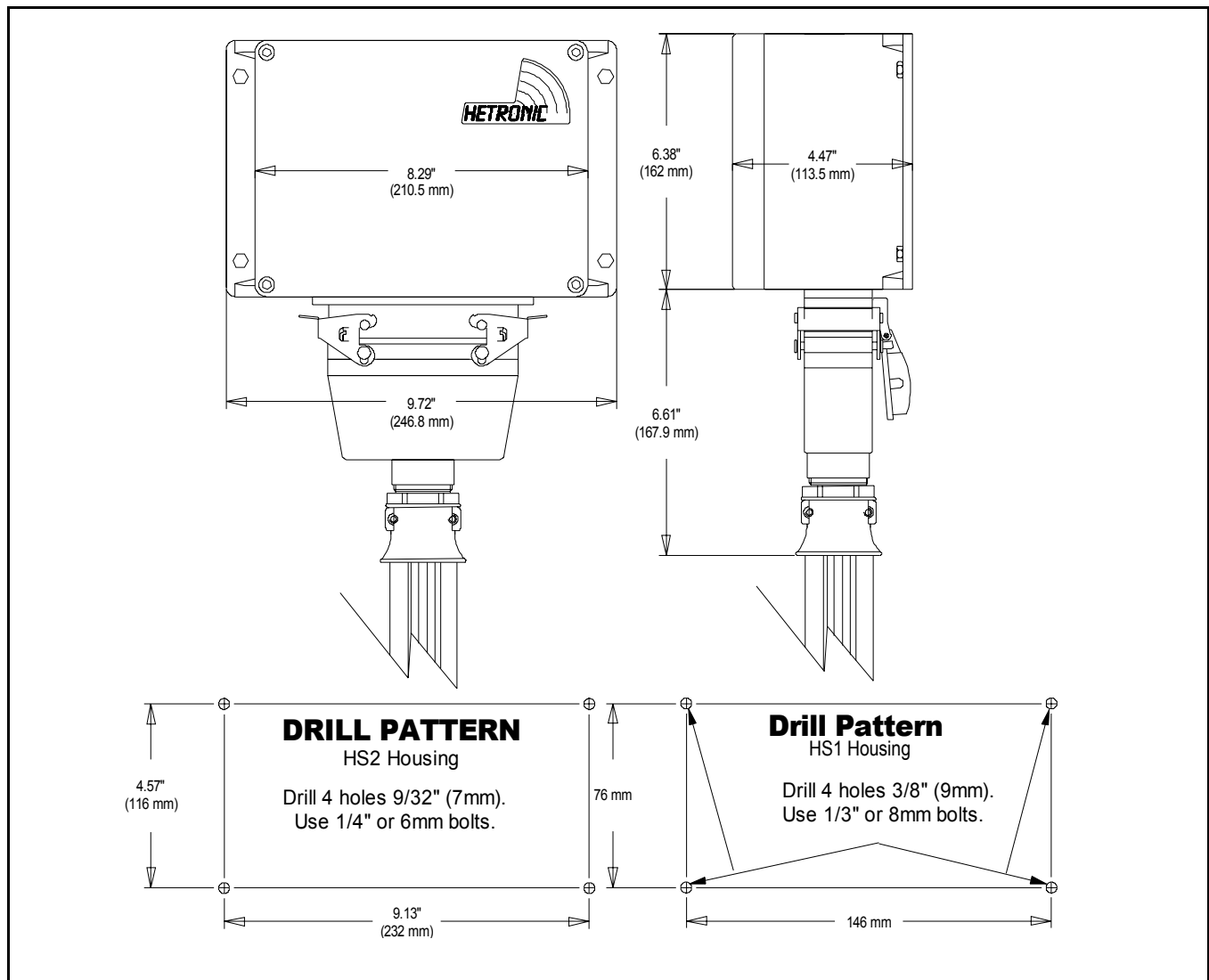
The receiver should be mounted on the vehicle or machinery to be controlled with the threaded glands underneath!

If your receiver is to be installed on a vehicle or on mobile machinery, you should provide the receiver with four rubber buffers. These are available from your dealer or directly from HETRONIC. The rubber buffers will prevent heavy vibrations being transferred from the machinery to the receiver.

For the receiver diagrams, please refer to Section 6.6 Transmitter and receiver diagrams.

**IMPORTANT:** When mounting the receiver, be sure the antenna is not shielded by large metal surfaces. This also applies to receivers with projecting antennas.

### 3.2. DRILLING DIAGRAMS FOR THE RECEIVER



### 3.3 RECEIVER WITH OPTIONAL PROJECTING ANTENNA

The quality of data transmission by radio can be reduced if:

- the approximate range of 100 meters is exceeded (between transmitter and receiver),
- or if the receiver is installed in a completely enclosed housing or space.

Since there are circumstances in which the above conditions and resultant impairments will arise, an external antenna may be necessary. This optional device can be purchased from your dealer or directly from HETRONIC.

#### Receiver RX:

This means that you can replace the internal standard antenna with an antenna projecting from the receiver case, using a heavy-gauge threaded gland.

The projecting antenna will enable you to extend the available range, either through appropriate positioning of the antenna or through using an antenna with more gain (Gainflex).

If you have to use your receiver in a completely enclosed housing or space, you can place your antenna outside the space. To connect it to the receiver inside the housing or space, use an antenna cable.

Antenna cables in lengths of 1.5m / 3.0m and 5m are available from your dealer or directly from HETRONIC.

#### Installation of the projecting antenna:

1. Unscrew the receiver cap.

2. Carefully remove the internal SMB antenna. Place a flat screwdriver between the SMB jack of the RF module and the brass contact of the SMB antenna. Press the screwdriver down by turning it lightly. Carefully detach the SMB antenna from its fixing point.
3. Unscrew the PG7 blanking cover on the front of the receiver (only receiver types RX-2 and RX-4 in HS1 housing).
4. Unscrew the PG16 or PG13,5 blanking cover on the front of the receiver (receiver types RX-6, RX-10, RX-10a, RX-14a and RX-14b in HS2 housing).
5. Screw the existing PG16 to PG7 or PG13,5 to PG7 reducer onto the receiver case as far as the stop.

**NOTE:** The receiver types RX-2 and RX-4 do not need a PG reduction, since they have a PG7 blind cover.

6. Turn the PG7 threaded gland into the opening or reducer. Please ensure that the receiver's moisture protection device is kept in place. Use a square-head wrench to screw the heavy-gauge threaded gland fully to the reducer.
7. Pass the antenna cable terminal through the heavy-gauge threaded gland.
8. Carefully connect the antenna cable terminal to the antenna jack of the receiver.
9. Feed the antenna cable to the antenna jack in a direct line.
10. Then tighten the PG7 threaded gland until the rubber seal grips and the antenna cable can no longer be fed through.
11. Screw the receiver cap back onto the receiver.
12. Always install the receiver with the heavy-gauge threaded glands below.
13. Find a suitable place to install your projecting antenna.
14. Fasten the antenna in accordance with the installation instructions supplied with the projecting antenna.
15. Lay the antenna cable correctly from the receiver to the location you have chosen for your projecting antenna.

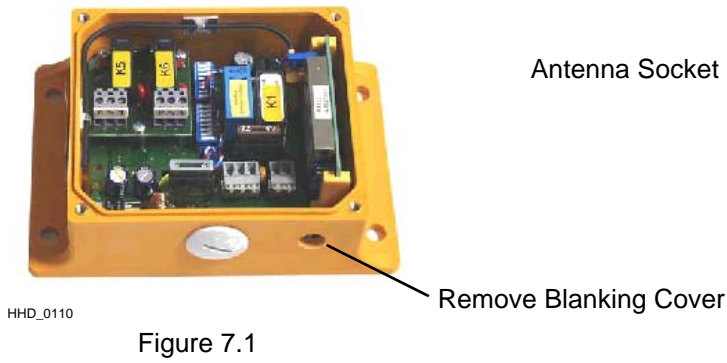


**CAUTION:** Never let the antenna cable get squeezed anywhere and never let it get kinked.

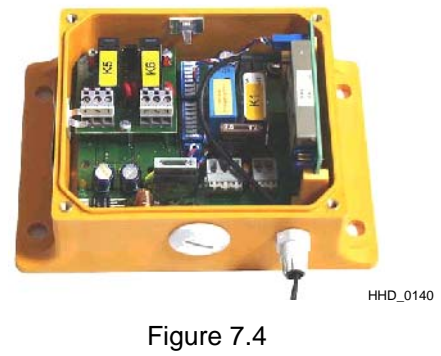
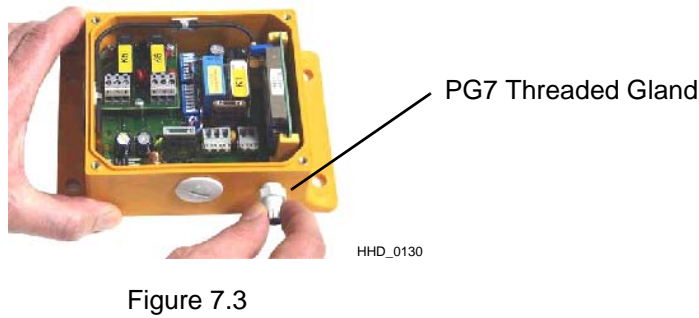
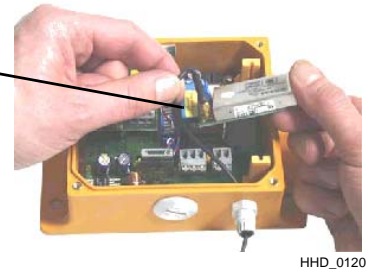
16. Drill a suitable hole in the case through which the antenna cable can be fed out.
17. Do not simply lay the antenna cable on the floor. Lay it correctly using cable clamps. To avoid accidental damage, mark the cable run to make it visible.
18. Ensure that you use a longer length of cable and lay it correctly. Improper installation could cause injury or damage to equipment.



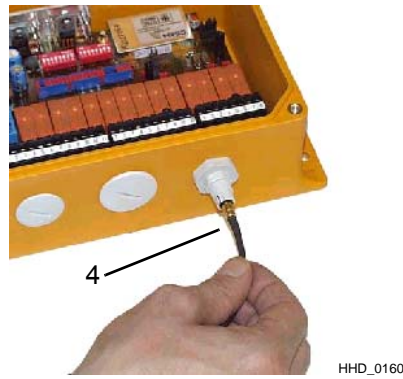
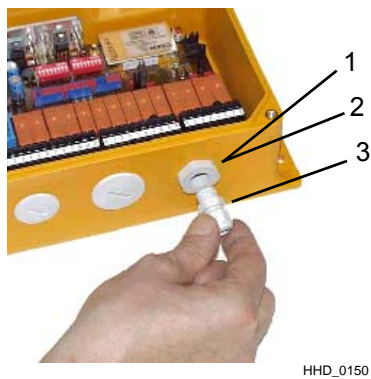
### 3.3.1 Receiver housing HS1



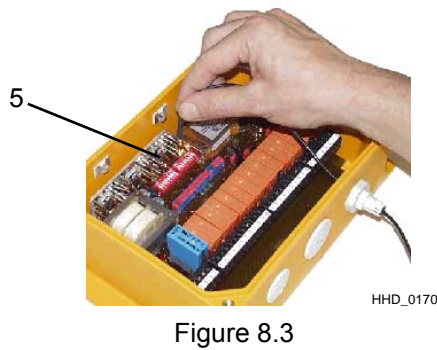
Antenna Socket SMB



### 3.3.2. Receiver housing HS2



1. Remove the blanking cover
2. Insert the PG reduction
3. Insert the PG7 connection into the PG reduction
4. Pull the antenna cable through the PG cable gland.
5. Attach the antenna cable onto the SMB socket.



## 4. MAINTENANCE

The company has responsibility for ensuring that devices for the wireless transmission of control commands must be subjected to a formal inspection by a qualified expert on a regular basis, and at the latest once per year.



**CAUTION:** A qualified expert is someone who has adequate skills and knowledge in the field of wireless transmission of commands, based on relevant technical training and experience, and is familiar with applicable national industrial safety regulations, safety standards, guidelines and generally approved technical practice (including DIN standards, VDE standards, and technical standards of other member states of the European Union or other states party to the convention on the European Economic Area), to the extent that they can assess the operating safety of devices for the wireless transmission of control commands.

## 5. BATTERY DISPOSAL



**CAUTION:** Do not pollute the environment!  
Electronic devices and their components are problematic waste. This applies particularly to rechargeable battery packs! Use a specialist disposal company for recycling and disposal! Defective rechargeable battery packs can also be disposed of directly through HETRONIC!

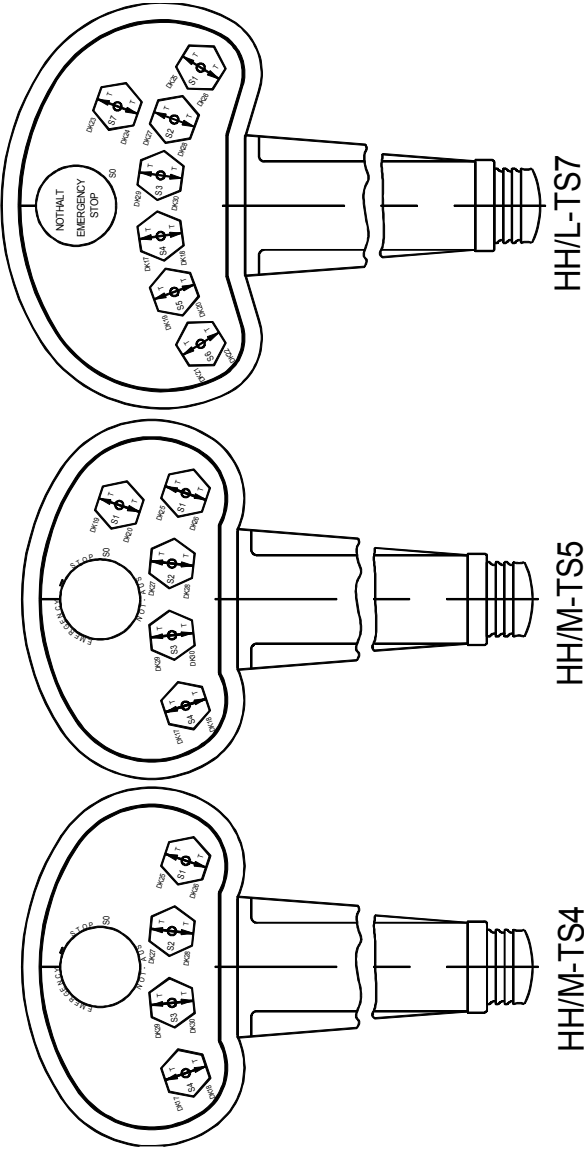
## 6. TECHNICAL DATA

Model	Hand – Held Series, Type TS
System	
<b>6.1 General Data</b>	
Frequency	433.875MHz to 434.650MHz or 458.525MHz to 459.175MHz / 70 cm band
Range	Approx. 50 meters (115ft), 100 meters (330ft) with projecting antenna
Addressing	20 Bit over 1 Million possibilities
Operating temperature	-20°C to +70°C (-4F to 158F)
Hamming distance	4
Baud rate	4800 baud
<b>6.2 Transmitter</b>	
Degree of protection	IP 65
Transmitting power	<10mW
Current input self-test	40mA
Current input transmitting	45mA
Dimensions: (LxWxH) HH/M housing HH/L housing	Approx. 210mm x 130mm x 115mm Approx. 220mm x 147mm x 120mm
Weight HH/M housing: (with batteries) (with VersaPak battery) HH/L housing: (with batteries) (with VersaPak battery)	Approx. 500g Approx. 600g Approx. 600g Approx. 700g
<b>6.3 Receiver</b>	
Degree of protection	IP65
System	Synthesizer technology
Decoding	Multiple bit scanning, self-monitoring
Fuses	7,5Ampere / 80V car fuse
Antenna connection	SMB – internal antenna
Static current	Approx. 50mA
Contact rating	8A/250VAC or 8A/30VDC 50Hz
Operating voltage	12/24VDC or 48/115/230VAC (-20% - +20%)
Closed-circuit current consumption	Approx. 50mA

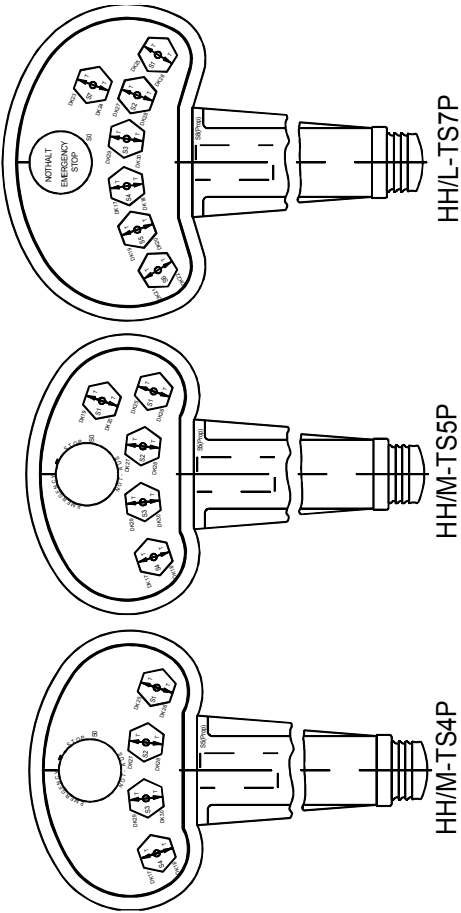
Output	Self- monitoring emergency stop function, 2 to 14 normally open contact relays potential free or 10 to 14 transistor outputs with common positive potential 12-24VDC/5A
Dimensions HS1 housing HS2 housing	Approx. 165mm x 115mm x 64mm Approx. 246mm x 180mm x 89mm
Weight HS1 housing: HS2 housing	Approx. 650g Approx. 2200g
<b>6.4 VersaPak Battery Charger</b>	
Operating voltage	230VAC, 115VAC or 12VDC
Charging voltage	2 x 4.35VDC
Charging current	210mA / 1.8VA
Charging time	Approx. 3 hours
<b>6.5. Rechargeable batteries and other batteries</b>	
Rechargeable batteries	2 x 3.6VDC / 1.2Ah (NiCd)
Operating time	Approx. 8h at 100% duration of current
Batteries	
Hand – Held / TS	2 x 1.5VDC / alkaline
Operating time	Approx. 6h at 100% duration of current

6.6. TRANSMITTER AND RECEIVER DIAGRAMS

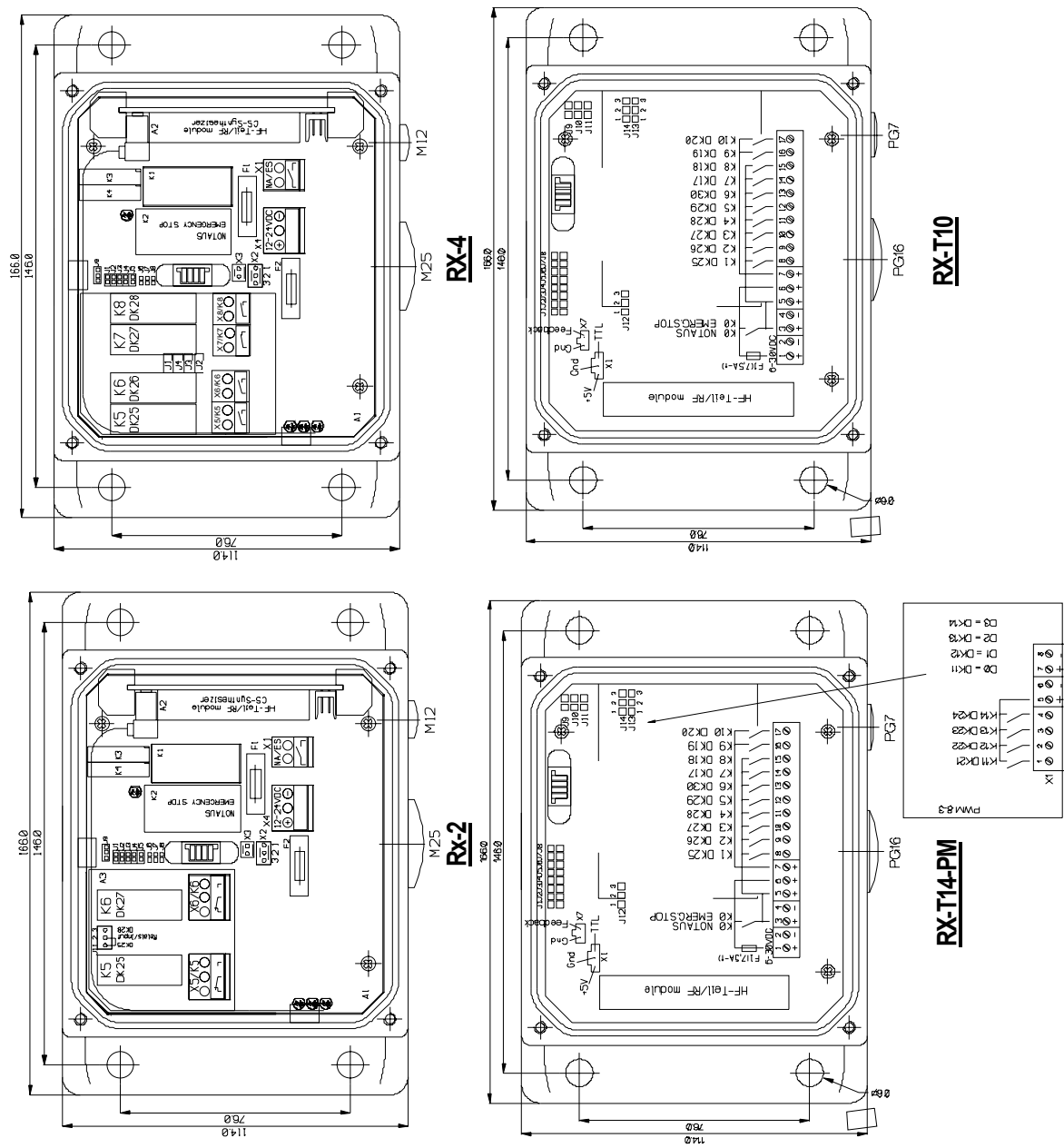
6.6.1. Transmitter Hand – Held / TS



6.6.2. Transmitter Hand – Held / TS proportional



6.6.3. RX receiver HS1 housing



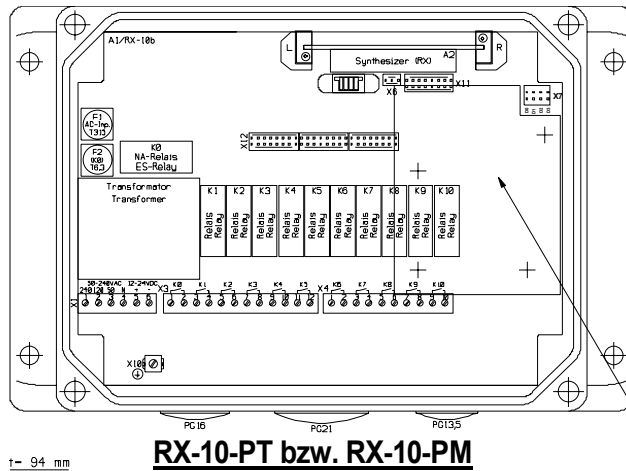
#### 6.6.4. RX receiver HS2 housing



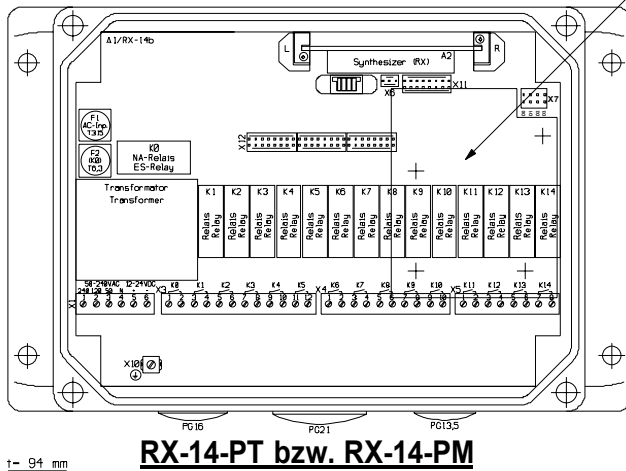
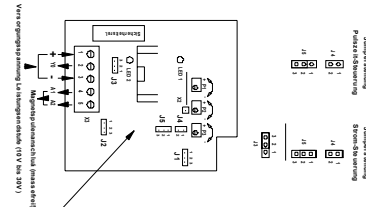
Ma stab/Scale: 1:15



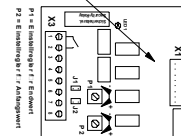
### 6.6.5. RX receiver HS2 housing proportional



**PM (PWM 8.1)**  
**Puls-Zeit-Steuerung**  
**bzw. Stromsteuerung**



**PT (G-DA-W-5)**  
**Potiersatz**  
**Spannungssteuerung**



## 7. APPENDIX A

### INSTALLATION AND SAFETY TEST DECLARATION

This form must be completed and signed by the person responsible for installation of this radio remote control system.

Hetronic assumes no responsibility for the correct installation of the radio remote control system. The equipment operator must ensure that the radio remote control system and the crane/machine operate correctly together. The operator must also ensure that all safety devices and features are in place and operating correctly. The operator is responsible for understanding and following all safety precautions in this and other applicable operator manuals.

<b>Crane Data</b>	
Manufacturer	
Model Number	
Serial Number	
Year of Production	
<b>Radio Remote Control Data</b>	
Manufacturer	Hetronic
Model	BMS
System Type	GA 610
Serial Number	
I/We installed the radio remote control system, performed the safety test and inspected the crane/machine. The appropriate instructions and rules of this machine type were followed.	
Place	
Date	
Company	
Name of Installation Technician	
Signature	