



## Notes to the FCC authority to operate the equipment

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) **this** device must accept any interference received, including interference that may cause undesired operation.

### Caution:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

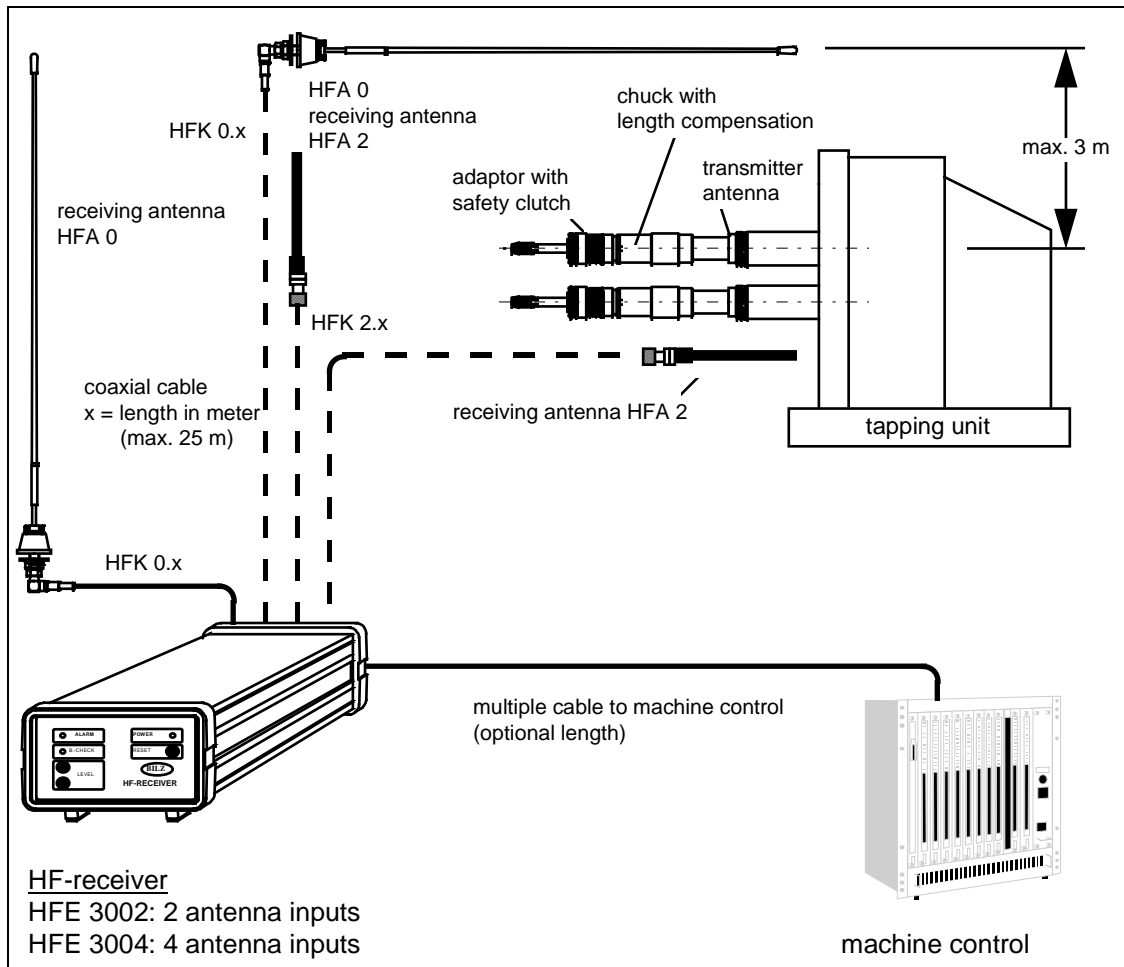
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different **from** that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



## HF Wireless Tapping Control Unit HF 3000 OPERATING INSTRUCTION

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# 1 Layout Diagram: HF Wireless Tapping Control Unit HF 3000



## 2 Introduction

HF Tapping Control Unit (HF = High Frequency)

When tapping on transfer lines, special purpose machines and machining centers, damage of the tap cannot always be prevented. Occasionally, the threads are not tapped to full depth or are missing at all. Such faults remain often undetected until assembling of the parts. This causes high remachining costs and means sometimes even the rejection of the component. In combination with the BILZ WFL, WFLK or WFLP Quick Change Tapping Chucks and Adaptors with safety clutch, the HF unit controls the thread depth, identifies possible tap breakage during tapping operation and prevents such malfunctions.

## 3 The HF transmitters

### 3.1 Transmitter "HFS 3100"

#### 3.1.1 Operational Modes of HF Transmitter

Collision alarm	Battery monitoring alarm
<u>Alarm triggering:</u> Chuck is compressed in the clockwise direction or extended in the anticlockwise direction	<u>Alarm triggering:</u> Battery voltage drops below 3.0 V.
<u>Reaction:</u> HF signal in 1 sec. rhythm	<u>Reaction:</u> HF signal in .5 sec. rhythm.
<u>End of alarm:</u> Collision alarm is cancelled 5 sec. after chuck release. Transmitters of extended transmittal time are available on request	<u>End of alarm:</u> Battery monitoring alarm can be cancelled <b>only</b> by removing the empty battery.

As long as no alarm is being triggered the HF transmitter is in inoperative position and requires max. 20  $\mu$ A of energy.

#### 3.1.2 Battery replacement

As soon as a battery monitoring alarm is being triggered, the battery is to be **replaced immediately**.

- Remove from spindle the chuck having triggered battery monitoring alarm (for identification see 4.2.1), dry it up and unscrew plug screw from shank.
- Remove empty battery and replace it by a new one.

**Attention:** Insert battery with negative pole (-) towards open end of shank.

For replacement purposes use **only** lithium-thionyl-chloride batteries, size ½AA (preferably Sonnenschein SL-750/S).

- Screw in again shank plug screw.

### 3.2 Transmitter "HFS 3000"

#### 3.2.1 Operational Modes of HF Transmitter

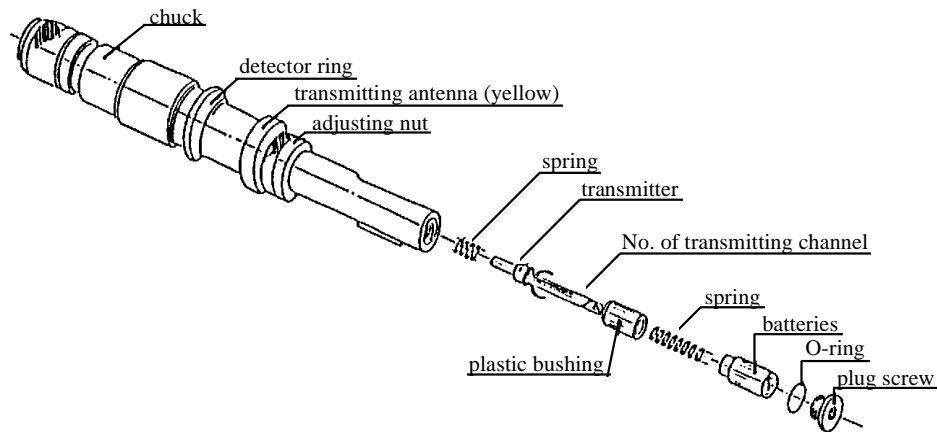
Collision alarm	Battery monitoring alarm
<u>Alarm triggering:</u> Chuck is being compressed	<u>Alarm triggering:</u> Battery voltage drops below 3,1 V.
<u>Reaction:</u> Permanent HF signal	<u>Reaction:</u> Permanent HF signal
<u>End of alarm:</u> Alarm is being cancelled only after releasing the chuck	<u>End of alarm:</u> Battery monitoring alarm can be cancelled <b>only</b> by removing the empty battery.

As long as no alarm is being triggered the HF transmitter is in inoperative position and requires max. 20  $\mu$ A of energy.

#### 3.2.2 Battery replacement

As soon as a battery monitoring alarm is being triggered the battery is to be **replaced immediately**.

- Remove from spindle the chuck having triggered battery monitoring alarm (for identification see 4.2.1), dry it up and unscrew plug screw from shank.
- Remove batteries and test voltage using battery tester: minimum 3.0 V.
- Replace empty batteries by new ones.
- Remove transmitter from shank by pulling it downward; do not lose spring of switch pin .
- Visual inspection of transmitter:
  1. for humidity and corrosion
  2. for integrity of contact bow.



- Putting back the transmitter into the chuck:
  1. Place the spring on the switching pin and push the transmitter back into the shank hole from the bottom towards the top.
  2. Insert batteries with the positive pole to the open end of the shank. 3 mercuryoxide batteries are needed for replacement purposes (according to IEC NR07, NR44 or ANSI N15 resp. USASI M15) e.g.: Varta V675HP, Mallory M P 675 H, Daimon/Berec MP675H, Ucar EP 675E, FDH 675E.  
**Zinc-air batteries must not be used.**  
**All of the 3 batteries are to be replaced at the same time.**
  3. Replace O-ring on the screwplug each time the plug had been unscrewed. Screw plug is to be tightened with 5 to 6 Nm.

### 3.3 Technical data

#### General

Country	FRG	U.K.	USA	USA	Sweden	
frequency range	70.00-72.00	49.82-49.98	49.83-49.89	72.00-72.99	30.27-30.34	MHz
channel spacing	80	16	15	30	30/40	kHz

transmitting range (distance chuck - antenna) abt.

3 m

HF-output

< 1 nW

permissible ambient temperature

0 - 80 °C

#### HFS 3100

Power source: lithium thionyl chloride battery

3.6 V

Battery capacity

850 mAh

#### HFS 3000

Power source: 3 mercury batteries 1.4 V each

4.2 V

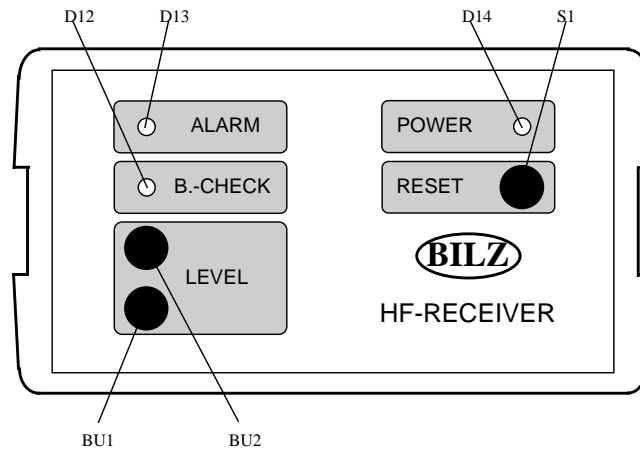
Battery capacity

240 mAh

## 4 The HF Receivers "HFE 3002" and "HFE 3004"

### 4.1 Operating Elements of HF Receiver and their Functions

#### a) Front panel of the unit



#### Element:

S1

"RESET" button

#### Function:

A signal emitted by a chuck will be memorized by the receiver. Pushing "RESET" button will clear the receiver.

D12

Yellow "B.-CHECK" indicator

Lights up **only as long as** a signal emitted by one of the chucks on this receiver's channel is being **received**.

D13

Red "ALARM" indicator

Informs that a signal emitted by one or several chucks on this receiver's channel has been and/or is being received.

D14

Green mains indicator

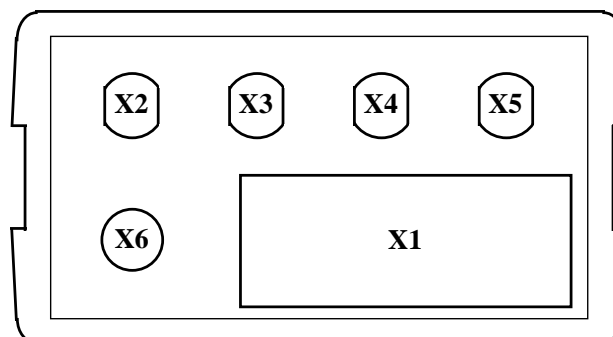
Lights up when power is switched on.

BU1 (-), BU2 (+)

Level output

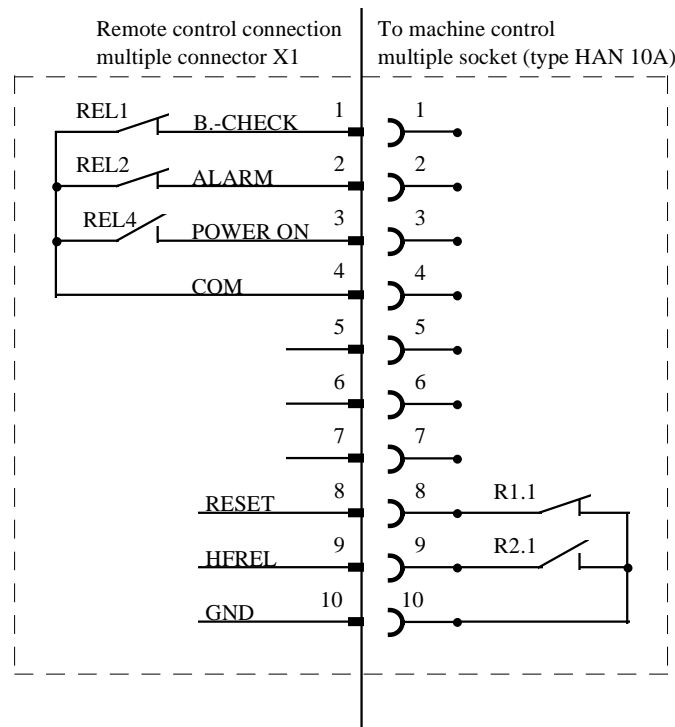
The strength of the HF signal received (level) can be measured by voltmeter. The level depends on antenna's positioning (see 6.2).

#### b) Rear panel of the unit



<u>Element:</u>		<u>Function</u>
X1	Multiple connector	Ten pin plug for Harting socket HAN 10 A for remote control of the receiver, see below and 4.5. The socket is to be <b>inserted all the time</b> . If remote control isn't needed, please install bridge (part of our supply).
X2, X3, X4, X5	Antenna inputs	Coaxial socket type N with an impedance of 50 Ohm. <b>The receiver "HFE 3002" is being equipped with the two antenna inputs X2 and X3 only.</b>
X6	Mains connection	Mains connection of abt. 1.8 m incl. line plug. To change mains voltage shift bridges on printed board inside the receiver.

**Assignment of multiple connector X1:**



<u>Element:</u>		<u>Function</u>
X1 comprises:		
REL1	Normally closed contact	"B.-CHECK" contact, open when signal from tool is being received.
REL2	Normally closed contact	"ALARM" contact, open when signal from one or several chucks on this receiver's channel has been and/or is being received.
REL4	Operating contact	Power contact, closed when power supply is switched on.

## 4.2 Operational and Alarm Modes of HF Receiver

### 4.2.1 Mains operated

Collision alarm		Battery monitoring alarm	
<b>Yellow "B.-CHECK" indicator and "REL1" contact:</b>			
Transmitter HFS 3000	Transmitter HFS 3100	Transmitter HFS 3000	Transmitter HFS 3100
As long as an alarm signal is being received, "B.-CHECK" indicator lights up. "REL1" contact: open.	As long as an alarm signal is being received, "B.-CHECK" indicator is flashing in <b>1 sec. rhythm</b> . "REL1" contact opens and closes in the same rhythm.	As long as an alarm signal is being received, "B.-CHECK" indicator lights up. "REL1" contact: open..	As long as an alarm signal is being received, "B.-CHECK" indicator is flashing in <b>.5 sec. rhythm</b> . "REL1" contact opens and closes in the same rhythm.
<b>Red "ALARM" indicator and "REL2" contact:</b>			
As soon as the HF receiver has identified an alarm signal, the "ALARM" indicator lights up and the "REL2" contact opens. This situation will remain unchanged even after alarm signal ends, until the receiver will be reset by pushing RESET button of its front panel or by opening the bridge between pins 8 and 10 of the multiple plug X1.			

#### **Recognition of faulty thread spindle in case of collision alarm:**

All HF transmitters in the chucks of one multi-spindle tapping station can operate on the same frequency, i.e. on the same channel. To recognize the spindle of the faulty thread, the chuck shanks are equipped with detector rings. When the length compensation of a chuck gets compressed, the detector ring will be moved upwards and thus identifies the spindle of the faulty thread. After correction, the detector ring is to be pushed back by hand into zero position. Minimum compression length to get a signal response from the chucks is 1 mm (.04").

#### **Recognition of the spindle with battery monitoring alarm:**

In case of alarm, all chucks are to be released first. If luminous diode "B.-CHECK" continues lighting or flashing (HFS 3100): A battery monitoring alarm has occurred. The individual chucks of the different spindles are to be compressed now in succession. When compressing the chuck giving battery monitoring alarm, luminous diode "B.-CHECK" will discontinue to give light. When compressing any other chuck, the luminous diode "B:\_CHECK" will continue to light up resp. to flash.

**The chuck giving battery monitoring alarm can be identified much easier by using the HF receiver "HFC 70".**

After recognition of the chuck having caused battery monitoring alarm and after battery replacement, the detector rings are to be pushed back into zero position.

### 4.2.2 Standby operational mode

During intermissions (mains cut off) the receiver switches on periodically for short moments, to check if one of the chucks is emitting battery monitoring alarm and, if any, memorizes it. During stand-by neither the indicator diodes of the front panel nor the remote control relays are being activated. A fully loaded buffer battery allows to maintain stand-by for abt. 3 weeks. After switching on again electricity supply system, the alarm indicating diodes of the receiver's front panel are being switched on, too, and the remote control relays are being activated as well.

#### **Recognition of the chuck having caused battery monitoring alarm, after switching on mains supply:**

Weak battery	Empty battery
<ul style="list-style-type: none"> <li>Red "ALARM" indicator lights up.</li> <li>Yellow "B.-CHECK" indicator lights up or flashes in .5 sec. rhythm (HFS 3100).</li> </ul>	<ul style="list-style-type: none"> <li>Red "ALARM" indicator lights up.</li> <li>Yellow "B.-CHECK" indicator does not light up.</li> </ul>
see chapter 4.2.1	Check all chucks by compressing one after another. <ul style="list-style-type: none"> <li>Active battery: "B.-CHECK" lights up or flashes in 1 sec. rhythm (HFS 3100).</li> <li>Empty battery: "B.-CHECK" <b>doesn't</b> light up.</li> </ul>



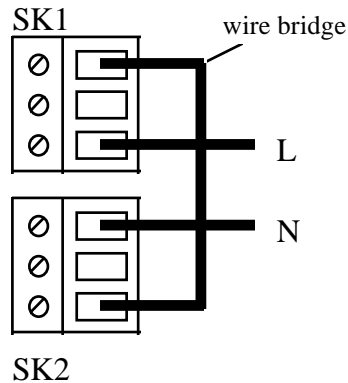
### 4.3 Mains Voltage Setting

**ATTENTION!!!**  
**Disconnect mains supply before opening equipment!!!**

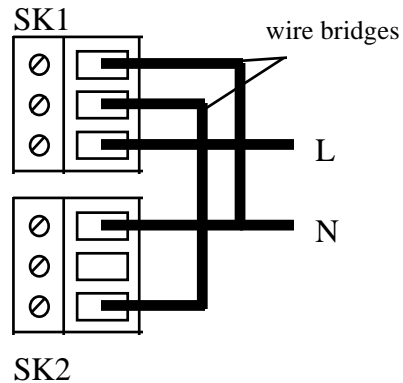
SI Fuse socket To change mains fuse, remove cover, replace fuse (63 mA, slow), put back cover.

SK1, SK2 Screw clips To connect mains supply.

#### 230 V:



#### 115 V:



### 4.4 Technical Data

Mains voltage		115 V +/- 10 % or 230 V +/- 10 %
Mains frequency		50 - 60 Hz
Fuse	(slow)	63 mA
Power consumption		6.9 VA
Battery voltage		12 V
Battery capacity		280 mAh
Permissible ambient temperature		0 - 65 °C
Recommended antennae		HFA 0 and HFA 2
Relay contact rating		230 V / 2 A
Sensitivity		- 90 dBm
Adjacent channel suppression (40 kHz separation)		> 40 dB
Number of channels per receiver		1
Number of antenna connections per receiver		2
	HFE 3002	2
	HFE 3004	4
Antenna impedance		50 Ohm
Degree of case protection		IP54
Dimensions	Width	* Height * Length
	160	* 98 * 340 mm
	6.3	* 3.9 * 13.4 inch
Weight		2.4 kg
		5.3 pound

## 4.5 Remote Control of Receiver by Programmable Logic Control

### 4.5.1 Wiring explanations

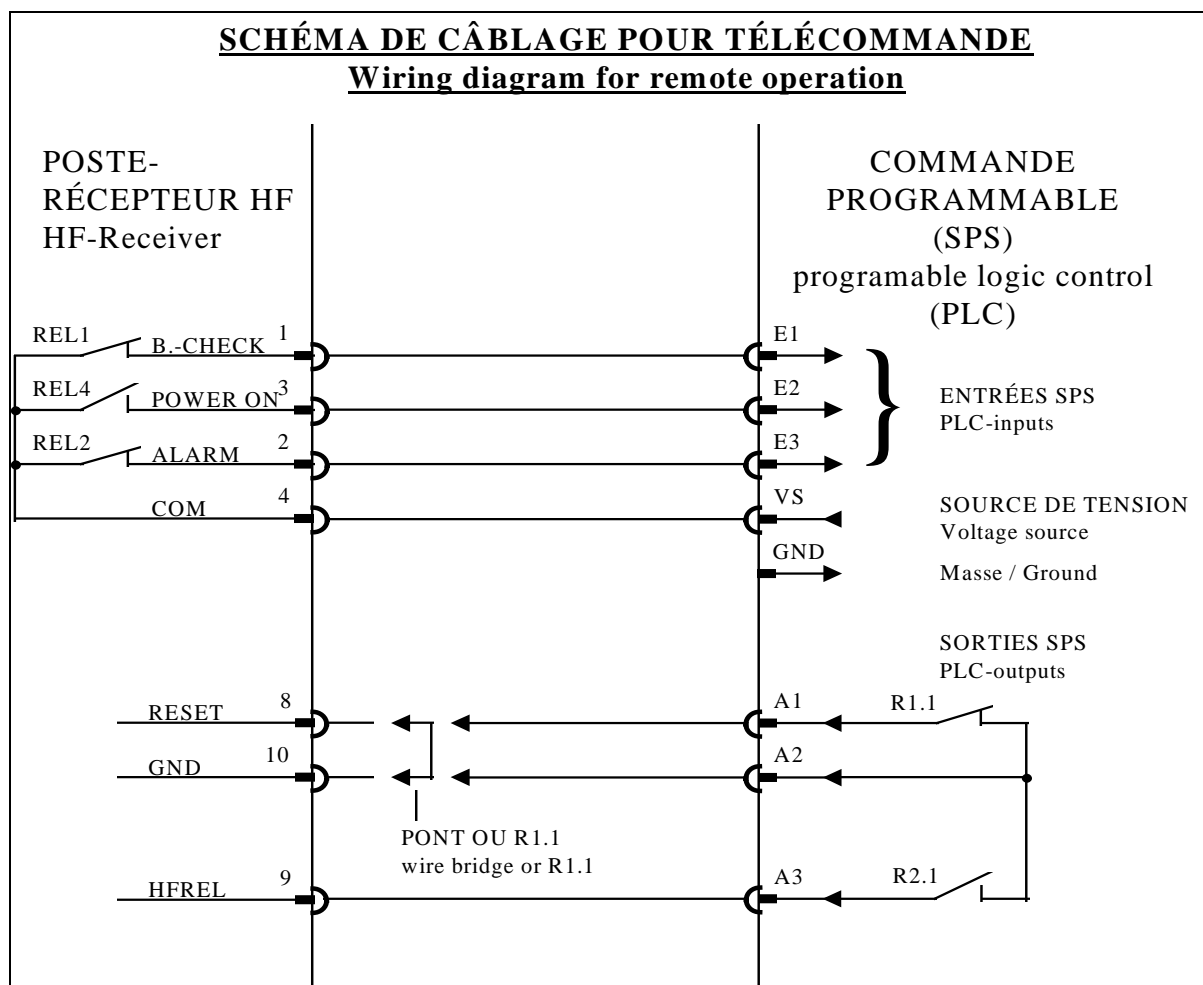
R1, R2	Relay
R1.1	Normally closed contact of relay R1, controlled by one of the PLC outputs
R2.1	Main contact of relay R2, controlled by one of the PLC outputs
E1, E2, E3	Inputs of PLC
A1, A2, A3	Outputs of PLC
VS	Voltage supply, up to 230 V
GND	Ground wire of voltage supply
REL1, REL2	Normally closed contacts of the relays inside the receiver
REL4	Main contact of REL4 relay inside the receiver

### 4.5.2 Status schedule of relaycontacts

Contact	REL1 B.-CHECK	REL2 ALARM	REL4 POWER ON
No power supply	closed	closed	open
<b>Power supply switched on and:</b>			
no signal received so far	closed	closed	closed
signal is just being received	open	open	closed
signal was received	closed	open	closed
reset when just no signal is being received	closed	closed	closed

The receiver is memorizing the reception of a signal until reset by front panel button or by reset input on remote control connection, respectively.

### 4.5.3 Wiring Diagram of HF Receiver



### 4.5.4 Realisation of Remote Control Operation

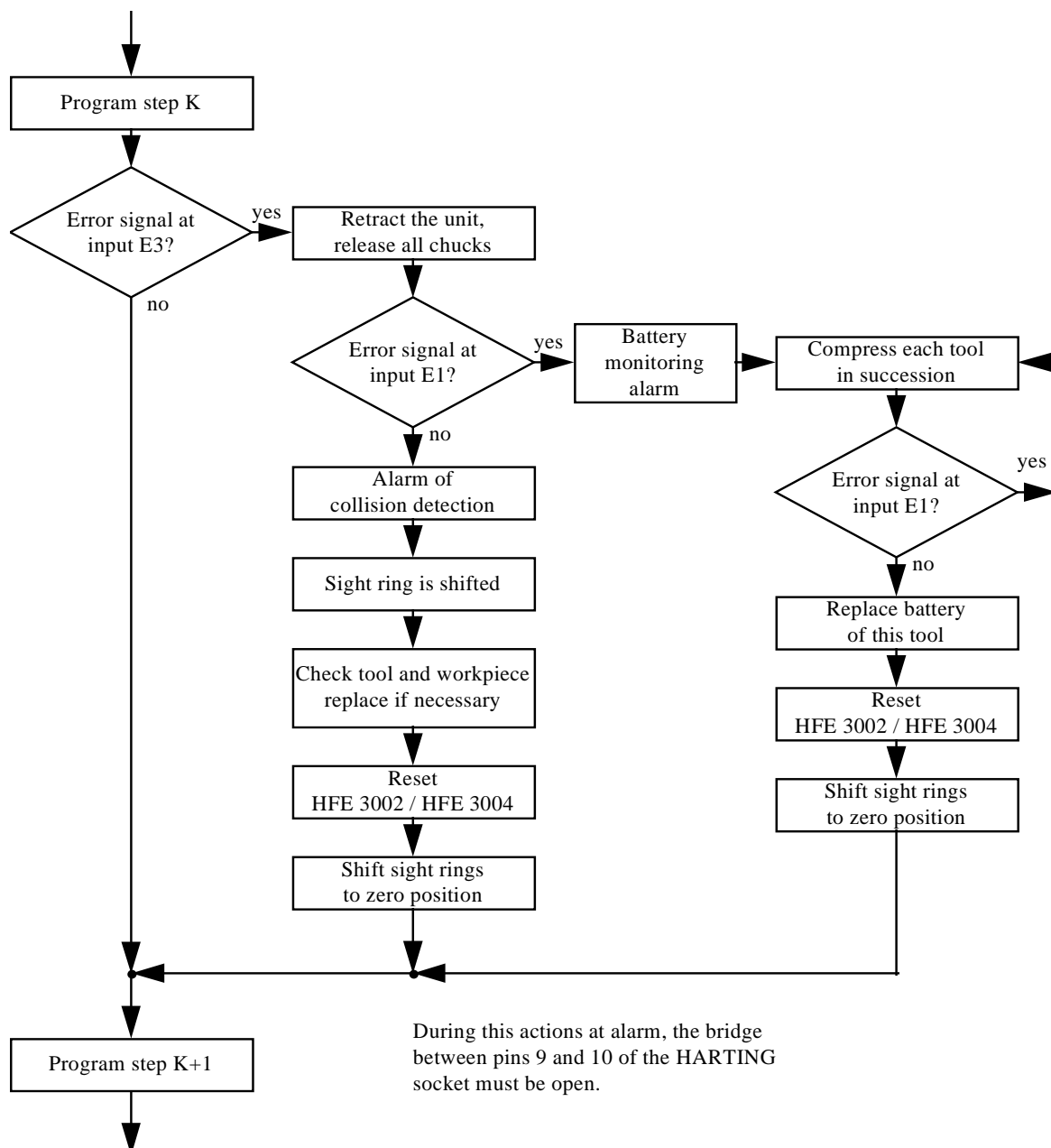
- Wire receiver according to wiring diagram of chapter 4.5.3.
- PLC supervises inputs E1, E2, E3.
- When not operated (mains supply connected), inputs E1, E2, E3 are connected to VS.

Input	Function	Source of signal at receiver
E1	B.-CHECK	Output 1
E2	Mains	Output 3
E3	ALARM	Output 2

Output	Function	Action
A1, A2	Reset of receiver	Bridge between receiver's inputs 8 and 10 is being opened
A2, A3	HF reception suppressed	Bridge between receiver's inputs 9 and 10 is being closed

After a malfunction signal and the necessary steps, the machine control cancels the signal. For that purpose PLC will activate the contact R1.1 for a short moment (> .1 sec).

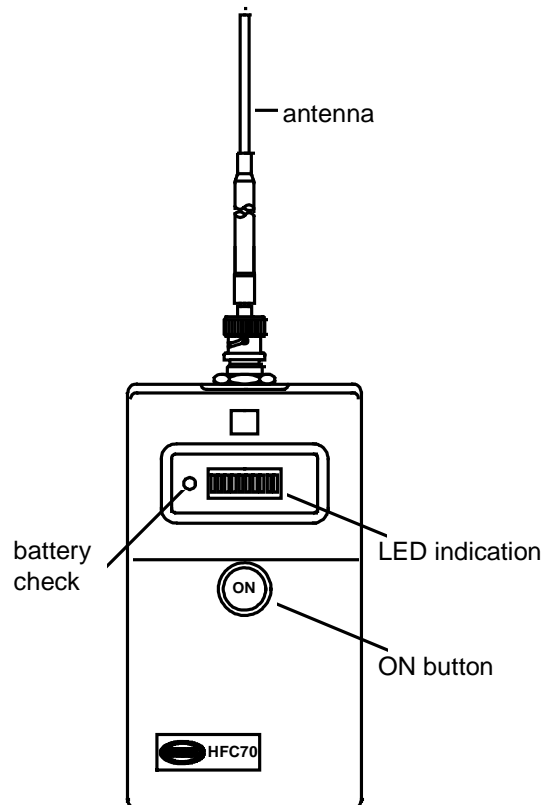
### 4.5.5 Actions at alarm



## 5 The HF Receiver "HFC 70"

The use of the HF receiver "HFC 70" is of help to easily identify a chuck having caused battery monitoring alarm.

Such chuck can be identified by making contact to the transmitting antenna (yellow ring) of the chuck by the "HFC 70" antenna.



### Operating elements of the hand-held receiver

- **ON button:**  
Hand held receiver is switched on as long as ON button is being pushed.
- **Indication of signal level (by LED):**  
The level of the signal received by the stub antenna is being shown by LED row. A distinct deflection will be seen only after the antenna bar has nearly touched the antenna ring on the chuck.
- **Battery check:**  
A red LED in the left corner of the LED row is determined to show operating readiness:
  - fully charged battery:  
when pushing ON button: LED lights up for a short moment
  - weak battery:  
when pushing ON button: LED **doesn't** light up

The battery is of standard 9 V bloc type.

## 6 Installation

### 6.1 General Information

The HF receiver is protected against interference pulses. Normally adjacent electrical motors, transformers, controls, radios etc. will not cause alarm signals. On the operating frequency, interference signals must not exceed the maximum level of -93 dBm.

The field strength of the HF signal transmitted by the chucks stays below the permitted upper limit, and thus interference with other radio services and other electronic equipment are prevented.

We recommend that BILZ HF Equipment on adjacent machines is operated on different channels to avoid mutual interference.

### 6.2 Assembly

#### HF Quick Change Tapping Chucks

The insertion of HF Quick Change Tapping Chucks into the spindle is simple and follows the same principle as standard chucks. However, avoid damaging the yellow isolation of the antenna ring which neither must be completely screened by metallic items.

#### Receiver antennae

2 (HFE 3002) or 4 (HFE 3004), respectively, antennae can be connected to the HF receivers. The positioning of the antennae should be as close as possible to the chucks, however far enough away from metallic parts (minimum distance 30 cm), to avoid weakening of the HF reception field.

The ideal length of the antenna bar is one quarter of the wavelength, as a rule the antenna is abt. 1.1 m long (HFA 0). However, if lack of space prevents the use of such antenna, a shorter one (HFA 2) can be used.

The antenna cable (RG58U) should be as short as possible; the maximum length between each antenna and the receiver is 25 m. Please handle the antenna cable with care, do not pull nor bend it!

#### Level output on the front panel of HF receiver

To make installation easier and to evaluate the strength of a signal received, the receivers are equipped with a level output which can be connected to standard voltmeters.

**Digital voltmeters must not be used, as they cannot react quickly enough to the transmitter's pulsed signals.**

**To evaluate the level of a signal received by a certain antenna, only this one is to be connected to the receiver. All other antennae are to be disconnected from the receiver so far.**

The voltage at the level output is increasing depending on the level of the signal received.

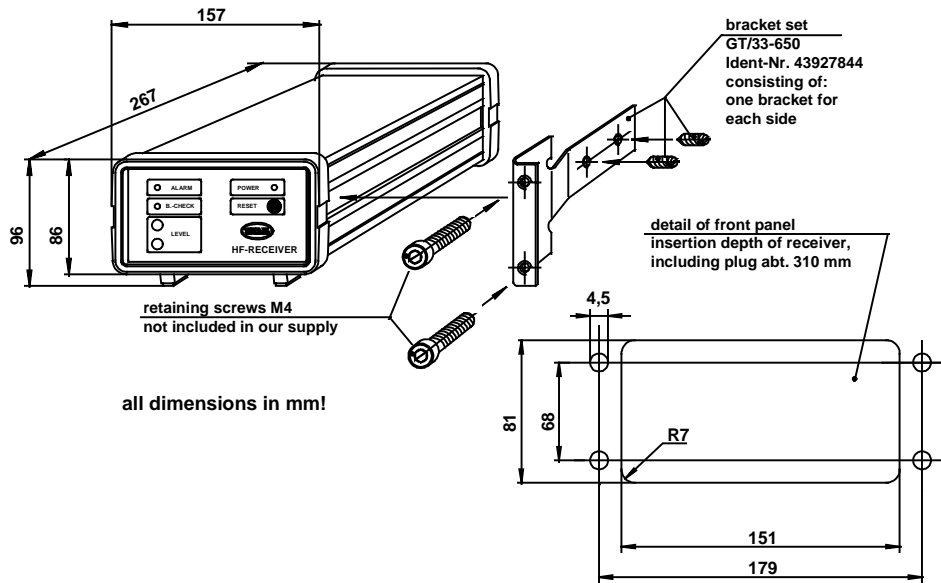
The following standard values should be considered for new transmitter batteries:

- Voltage < 1 V: weak signal received, improve antenna positioning.
- Voltage > 2 V: good signal received.

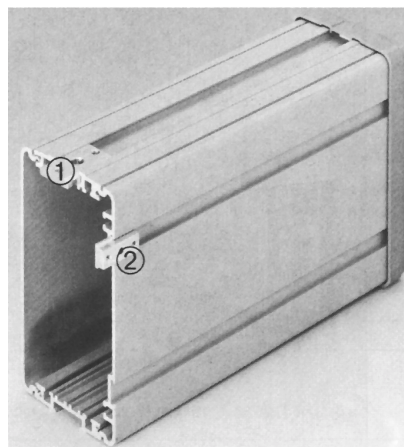
#### Additional Antennae

If, despite optimal antenna positioning, the signal level remains too low (metal parts and/or coolant may affect transmission fields), additional antenna rings combined with rods can improve the radiation of signals from the chuck group. These are special items to be designed for each individual case. For any further advice we will be gladly at your disposal.

### 6.2.1 Front mounting of receiver in the switchboard



### 6.2.2 Mounting of receiver with sliding blocks for handle and feet slots



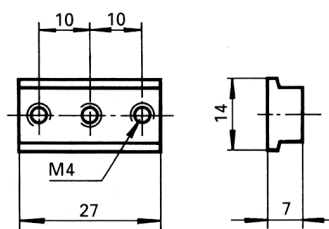
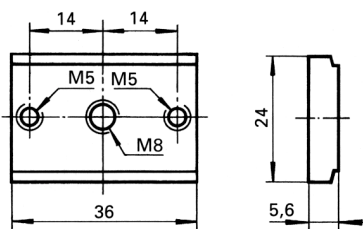
- ① sliding block for handle slot      ② sliding block for feet slots

The sliding blocks (extruded aluminium, alodine) provide an optional means of attachment for the receiver case. The blocks are inserted in the lateral slots of the case or in place of the feet.

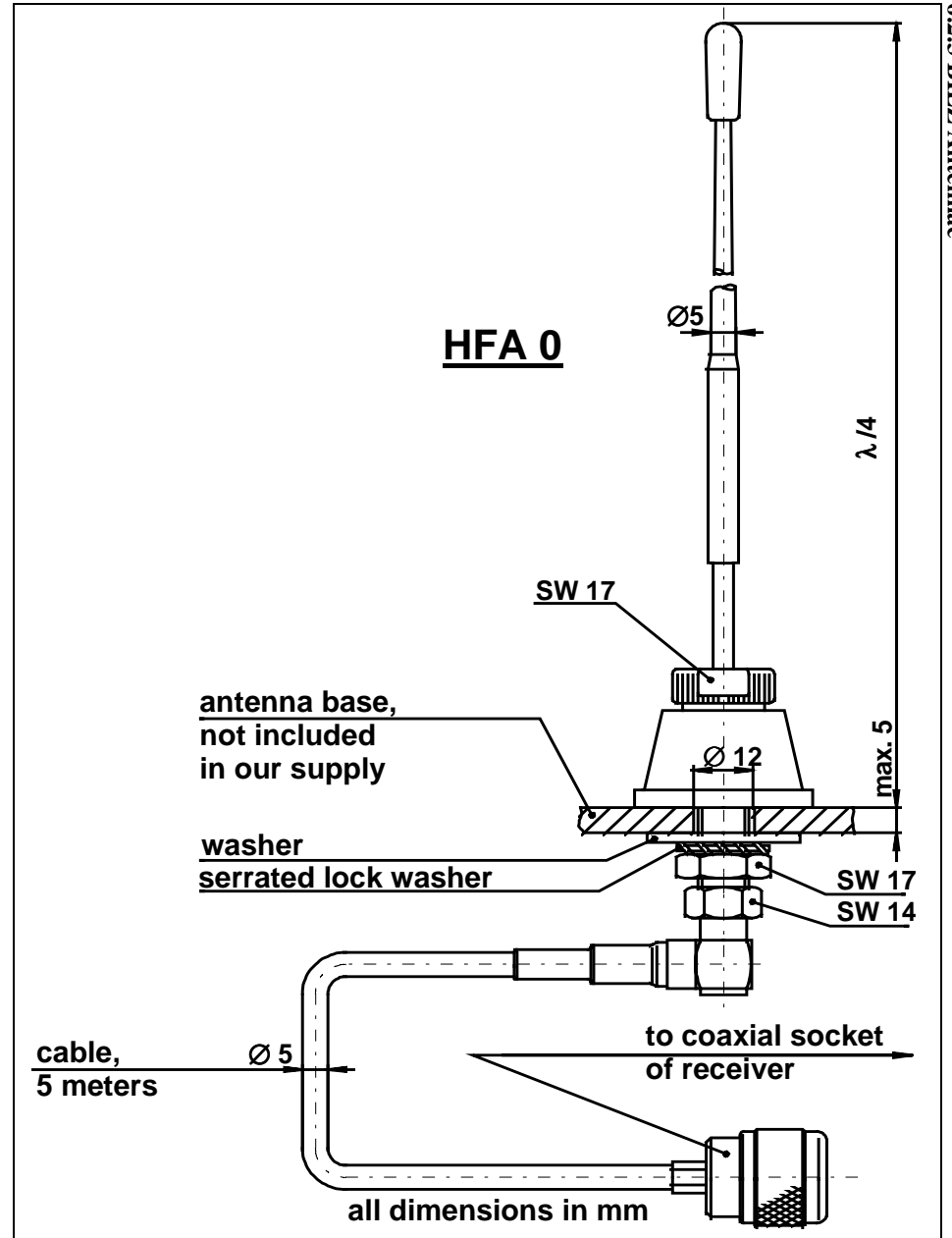
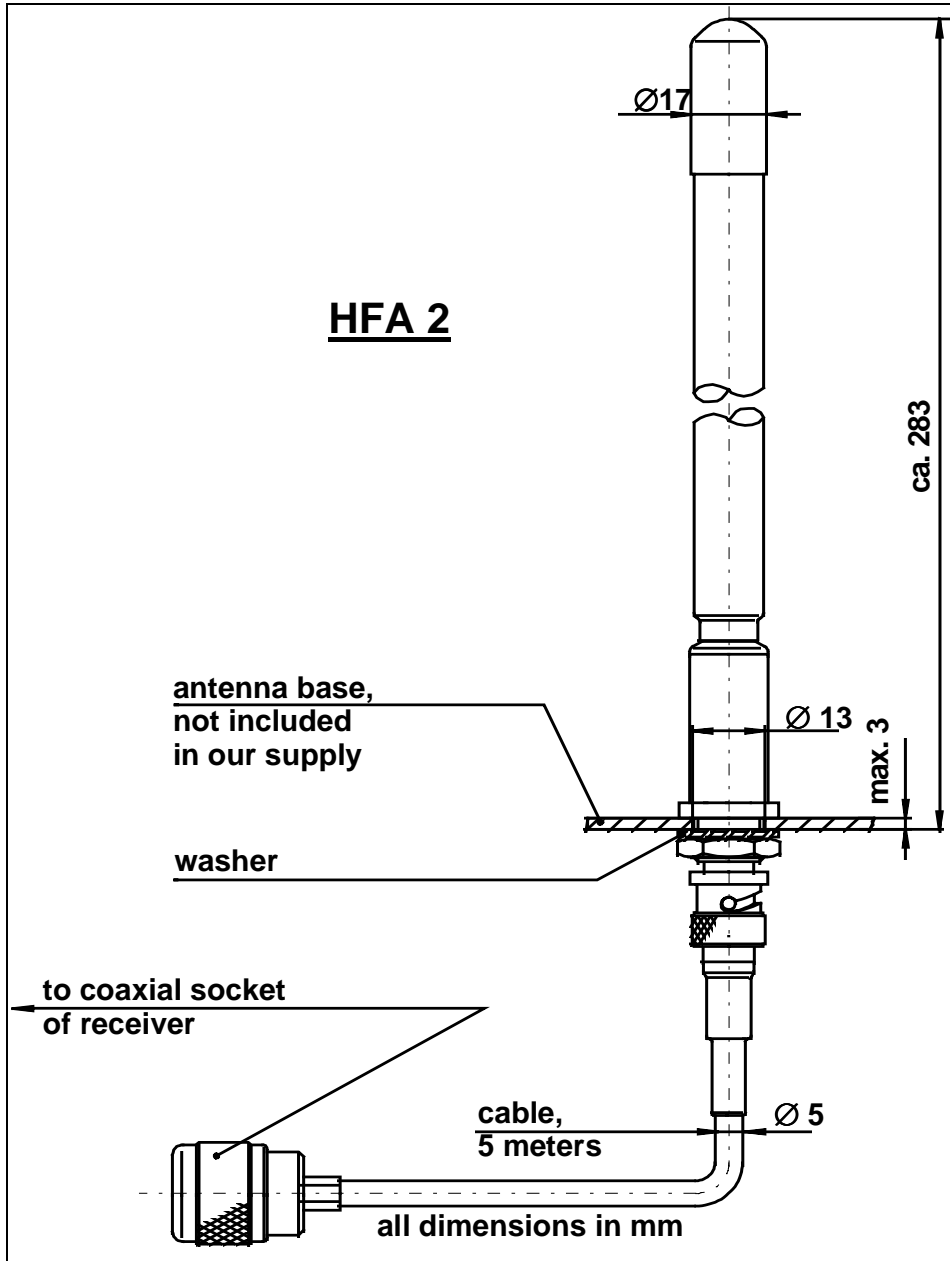
Line drawing of the attachment points

sliding block for handle slot

sliding block for feet slots



- Notes:
- all distances in mm
  - centre distance between the two feet slots: 83.4 mm.



## 7 Maintenance

### 7.1 Quarterly Maintenance

1. Sight inspection of antenna and its accessories:
  - a. damages, dirt, moisture
  - b. screwed connections of the antenna cable and loose plug connections of the remote control indicator.

Protocol:

Date:

Name:

1st yearly quarter

---

2nd yearly quarter.

---

3rd yearly quarter

---

4th yearly quarter

---

2. Quick change adaptors type WESN  
 Dismantle adaptors' safety clutches, clean everything and refill with grease Molykote Pate G, readjust torque according to operating instructions and table BA 102. For cold-forming of threads increase torque values by 50 % to the values shown in tapping torque tables.

Protocol:

Date:

Name:

1st yearly quarter

---

2nd yearly quarter

---

3rd yearly quarter

---

4th yearly quarter

---



**7.2 Semi-annual Maintenance**

**HFS 3100:**

Check of transmitter batteries: All chucks are to be compressed in turn

<b>Fully charged battery</b>	<b>Weak battery</b>	<b>Empty battery</b>
<u>Chuck compressed:</u> Yellow "B.-CHECK" LED flashes in 1 sec. rhythm.	<u>Chuck compressed:</u> Yellow "B.-CHECK" LED flashes in 1 sec. rhythm.	<u>Chuck compressed:</u> Yellow "B.-CHECK" LED <b>doesn't light up.</b>
<u>Chuck released:</u> Yellow "B.-CHECK" LED flashes in 1 sec. rhythm till follow-up time of transmitter has run out, after which indication ends.	<u>Chuck released:</u> Yellow "B.-CHECK" LED flashes in 1 sec. rhythm till follow-up time of transmitter has run out, after which it flashes in .5 sec. rhythm (battery monitoring alarm).	<u>Chuck released:</u> Yellow "B.-CHECK" LED <b>doesn't light up.</b>
<u>Remedial actions:</u> <b>No action required!</b>	<u>Remedial actions:</u> <b>Replace battery!</b>	<u>Remedial actions:</u> <b>Replace battery!</b>

**HFS 3000:** Remove battery block as per 3.2.2 and test voltage by battery tester: minimum 3.0 V.

Protocol:

Date:

Name:

1st half of the year

---

2nd half of the year

---

## 8 Annex

### 8.1 Frequency Table

<b>D</b>		<b>F</b>		<b>UK</b>		<b>USA</b>		<b>USA</b>	
Channel No.	Frequ. MHz	Channel No.	Frequ. MHz	Channel No.	Frequ. MHz	Channel No.	Frequ. MHz	Channel No.	Frequ. MHz
0	w/o quartz	26	72,000	7 UK	49,820	1 U	49,830	21 U	72,810
1	70,000	27	70,040	8 UK	49,852	2 U	49,860	22 U	72,870
2	70,080	28	70,120	9 UK	49,884	3 U	49,890	23 U	72,930
3	70,160	29	70,200	10 UK	49,916	4 U	49,815	24 U	72,990
4	70,240	30	70,280	11 UK	49,948	5 U	49,845	25 U	72,060
5	70,320	31	70,360	12 UK	49,980	6 U	49,875	26 U	72,120
6	70,400	32	70,440					27 U	72,180
7	70,480	33	70,520			8 U	72,030	28 U	72,240
8	70,560	34	70,600			9 U	72,090	29 U	72,300
9	70,640	35	70,680			10 U	72,150	30 U	72,360
10	70,720	36	70,760			11 U	72,210	31 U	72,420
11	70,800	37	70,840			12 U	72,270	32 U	72,480
12	70,880	38	70,920			13 U	72,330	33 U	72,540
13	70,960	39	71,000			14 U	72,390	34 U	72,600
14	71,040	40	71,080			15 U	72,450	35 U	72,660
15	71,120	41	71,160			16 U	72,510	36 U	72,720
16	71,200	42	71,240			17 U	72,570	37 U	72,780
17	71,280	43	71,320			18 U	72,630	38 U	72,840
18	71,360	44	71,400			19 U	72,690	39 U	72,900
19	71,440	45	71,480			20 U	72,750	40 U	72,960
20	71,520	46	71,560						
21	71,600	47	71,640						
22	71,680	48	71,720						
23	71,760	49	71,800						
24	71,840	50	71,880						
25	71,920	51	71,960						

<b>S</b>		<b>DK</b>		<b>A</b>	
Channel No.	Frequ. MHz	Channel No.	Frequ. MHz	Channel No.	Frequ. MHz
0	w/o quartz	0	w/o quartz	0	w/o quartz
1 S	* 62,000	1 DK	32,275	1 A	40,665
2 S	* 62,080	2 DK	32,300	2 A	40,695
3 S	* 62,160	3 DK	32,325		
4 S	* 62,240				
5 S	* 62,320				
6 S	* 62,400				
7 S	30,270				
8 S	30,300				
9 S	30,340				

\* Only for replacement!

## 8.2 Homologations

For EC-Type Examination see separate file

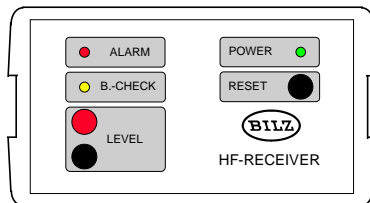


## HF Tapping Control Unit System HF 3000

Check-list of HF Tapping Control Unit, system HF 3000  
for HF alarm.

The HF Tapping Control Unit supervises tapping during machining process and indicates arisen faults by alarm signal.

The HF receiver differentiates between:



1. Procedure alarm due to faults arisen during tapping operation
2. Battery monitoring alarm due to battery voltage fallen below limit value

### Machine stop due to procedure alarm

Red LED ALARM at the receiver lights up, detector ring of the chuck displaced

#### **Cause of malfunction:**

Length compensation of chuck compressed due to:

- a. released safety clutch by:
  - worn out tap
  - wrong torque setting in adaptor
  - cored hole too narrow
  - cored hole not deep enough
  - lack of coolant
- b. missing cored hole
- c. cored hole not chamfered
- d. insufficient initial cutting pressure by the chuck

### Machine stop due to battery monitoring alarm

Red ALARM and yellow LED BATTERY ALARM at the receiver light up, detector ring of the chuck not displaced.

#### **Cause of malfunction:**

Battery voltage below limit value.

Such alarm may arise during machining process as well as during non working time of the machine.

### Recognition of the spindle having caused battery monitoring alarm

The hand-held receiver HFC 70 helps to identify the chuck having signaled the malfunction.

The chuck emitting alarm signal will be identified by making contact to the chuck's transmitting antenna (yellow ring) by the „HFC 70“ antenna.



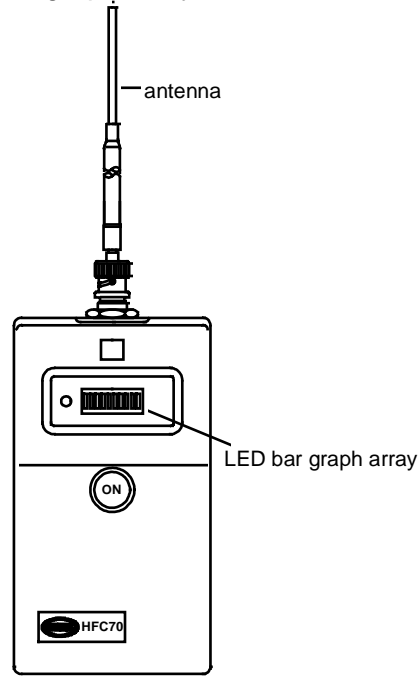
HF-Tapping Control Unit  
System HF 3000

Recognition of the spindle having caused procedure alarm:

Since at procedure alarm the length compensation of the chuck is always being compressed, the detector ring of the chuck is inevitably being displaced, thus allowing to identify the chuck having signaled malfunction, even at multispindle operation.

After eliminating malfunction push back detector ring into zero position and cancel alarm signal by pushing reset button. Now the machine is ready for operation again.

Malfunction signal is being indicated by LED bar graph array.



Battery monitoring alarm may also be recognized without the use of HFC 70: The chucks are to be compressed in succession. The chuck having signaled battery monitoring alarm will be recognized by the fact, that the yellow LED of the receiver discontinues to give light as long as the chuck is being compressed.

**HF Tool Supervising System  
Layout Diagram**

