

Trouble Shooting FAQ PACEMAKER HF™

1 Abstract

The purpose of this error evaluation manual is to solve possible problems that can occur in working with Pacemaker HF. The available manual is for the 2nd level support only, i.e. proposals for solutions, which are mentioned in this manual, may be carried out only by a specialized person.

If errors or problems should arise, the system usually recognizes the error cause and indicates a message on the display. These error messages are here explained and advices for their solving are given in the following.

You can solve most of the problems yourself. If you find variations or obscurities in this manual, please contact us, so that we can find the solution together.



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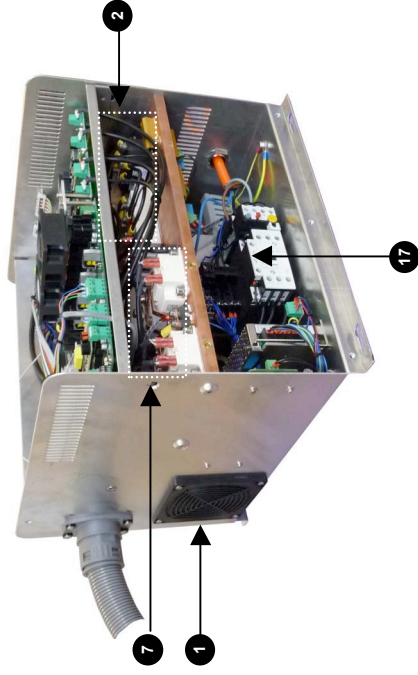
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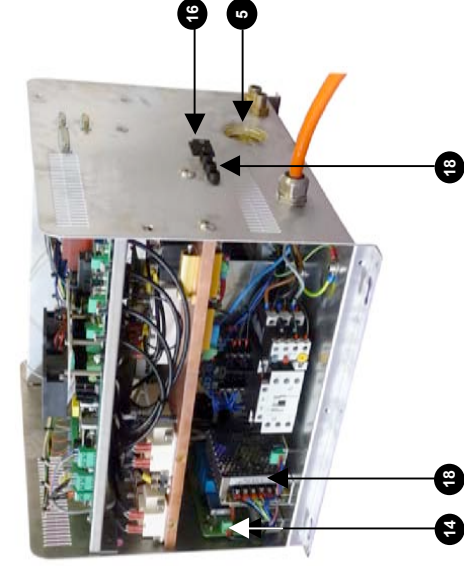
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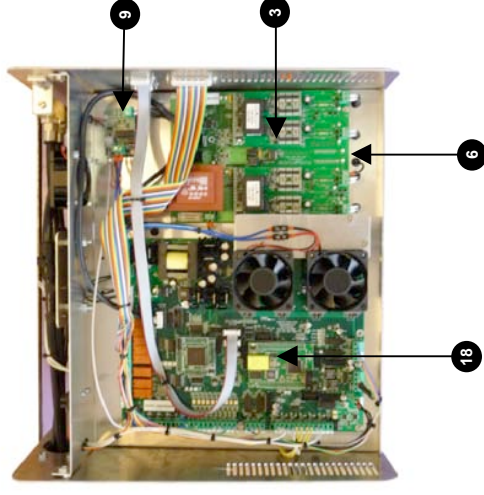
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- 1 Ventilation cover**
Air inlet of the ventilator.
- 2 Chopper**
Area where the IGBTs and diodes are.
- 3 Chopper driver**
Connecting terminal of the chopper driver.
- 4 Water input**
Area for measuring the differential pressure.
- 5 Rotary flow**
To measure the flow.



- 6 Battery voltage**
Measuring points to measure the battery voltage.
- 7 H-bridge**
Area where the IGBTs and diodes are.
- 9 Frequency measurement board**
Frequency measurement board with 24V power supply.
- 14 C-bar**
C-bar with terminal to measure the signal across the H-bridge.
- 16 Main switch**
switch



- 17 Main conductor**
Area to measure the phase voltage
- 18 Control transformer / power supply**
Location of the fuses for supply and control voltage
- 19 Mainboard**
Main control board

2 Error message

Error messages		
Error message	Potential cause	Potential remedy
„HF“ button is blinking	The controller can not synchronize with the resonance frequency	<p>Is the used inductor original or was it ordered separately? If original -> Next instruction; Separate -> Contact Can Man.</p> <p>Is the wiring between C-bank and frequency measurement board correct? 9</p> <p>Check if the green LED on the frequency measurement board is running. 9</p> <p>Check the fuse of the 24V power supply. 18</p> <p>Check if the relay K4 is properly installed. 17</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Output overcurrent	Overcurrent in the power circuit	<p>Check if there aren't any conductive parts between the windings of the coil. Check if the coil outputs are isolated (Teflon). Check if all capacitors are screwed on and if they look optically correct.</p> <p>Is the wiring between current sensor and HF controller correct?</p> <p>Is the used inductor original or was it ordered separately? If original -> Next instruction; Separate → Contact Can Man.</p> <p>Check the “over current” in the basic-setup. Password for overcurrent = “UP-DOWN-UP-MENU-ENTER-MENU” (HF5/10=40A; HF15/20=80A)</p> <p>Check the “current limit” in the basic-setup. Password for current limit = “ENTER-UP-MENU-UP-DOWN-UP” (HF5/10=16A; HF15/20=35A)</p> <p>Check the input voltage. (400Vac) 17</p> <p>Is the wiring between C-bank and frequency measurement board correct? 9</p> <p>Check if the green LED on the frequency measurement board is running. 9</p> <p>Check the fuse at the 24V power supply. 18</p> <p>Check if the relay K4 is properly installed. 17</p> <p>Measure the chopper current with a clamp-on ammeter. Does the current signal sink briefly to zero? Yes -> Choke perhaps defective; No -> Next instruction.</p> <p>Test diode and IGBTs at chopper and H-bridge. (See page 7) 2 7</p> <p>Try to start the generator.</p> <p>Remove connections to C-Bar.</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Output overvoltage	Overvoltage in the oscillator circuit	<p>Check the „over voltage limit“ in the basic-setup. Password for overvoltage (max. 900V) = “MENU-DOWN-ENTER-UP-DOWN-UP”</p> <p>Check the “voltage limit” in the basic setup. Password for “voltage limit” (max. 565V) = “UP-DOWN-ENTER-UP-MENU-DOWN”</p>

		<p>Check the input voltage. (400Vac) 17</p> <p>Is the wiring between C-bar (voltage measuring) and HF controller correct? 14</p> <p>Check the voltage signal over the C-bar. The voltage peaks should not be higher than the "over voltage limit". 14</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
HB temp.high	Temperature H-bridge too high	<p>Check if there is enough water flowing through.</p> <p>Check the input pressure difference. Approx. 4-5bar. 4</p> <p>Check the temperature limit for the H-bridge in the basic setup. Password for „Max. HB temp.“ (max. 60°C) = "DOWN-UP-MENU-DOWN_UP_MENU"</p> <p>Is the wiring between temperature sensor on the heat sink and HF controller correct?</p> <p>Check the temperature sensor with a multimeter. Remove the connections at the HF board pin 47 and 48 and measure the resistance of the sensor. 60°C = 2.24k</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Coil temp.high	Temperature inductor/coil too high	<p>Check if there is enough water flowing through.</p> <p>Check if the coil is maybe blocked (lime, deposits, freeze protection</p> <p>Check the input pressure difference. Approx. 4-5bar. 4</p> <p>Check the temperature limit for the coil in the basic setup. Password für „Max. coil temp.“ (max. 60°C) = "DOWN-UP-MENU-DOWN_UP_MENU"</p> <p>Is the wiring between coil temperature sensor and HF controller correct?</p> <p>Check the temperature sensor with a multimeter. Remove the connections at the HF board pin 53 and 54 and measure the resistance of the sensor. 60°C = 2.24k</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Choke temp.high	Temperature choke too high	<p>Check the temperature limit of the choke in the basic menu. Password für „Max. Choke temp.“ (max. 130°C) = "DOWN-UP-MENU-DOWN_UP_MENU"</p> <p>Check if the fan is still running. 1</p> <p>Is the wiring between choke temperature sensor and HF controller correct? 19</p> <p>Check the temperature sensor with a multimeter. Remove the connections at the HF board pin 49 and 50 and measure the resistance of the sensor. 130°C = 0.23k</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Driver#1 fault / HB-driver fault	Driver supply of H-bridge too low	<p>If the error arises, check the frequency on the display. The frequency should not change in relation to the factory report and/or to functioning conditions. Maximum possible frequency is 200kHz.</p> <p>Test diode and IGBTs at the chopper and H-bridge. (See page 7) 7</p> <p>Check the wiring between driver output and IGBTs.</p> <p>Check the voltage at the driver output terminal. Min. 14 V at the HF controller?</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
No water flow	Not enough water	<p>Check if there is enough water flowing through. 5</p> <p>Check if the green LED on the frequency measurement board is running. 9</p>

		<p>Check the fuse at the 24V power supply. 18</p> <p>Check if the relay K4 is right installed.</p> <p>Check if the coil is maybe blocked (lime, deposits, freeze protection ...)</p> <p>Check the input pressure difference. Approx. 4-5bar. 4</p> <p>Check the measured water quantity in the standby condition of the generator. (Press the button "arrow-down" in the standby-condition. Now you can see parameters on the display. Press the "arrow-down" button again until you can see the entry "water flow".)</p> <p>Now compare the adjusted limit with the before measured value in the basic setup. If the measured value is deeper than the limit, the water system is blocked and must be cleaned. If not -> Next instruction.</p> <p>Check the rotary flow for dirt (sand...).</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
CH-Driver fault	Overcurrent in the power circuit	<p>Check the wiring between the chopper board and the HF controller. 3</p> <p>Check the fuse on the chopper board. (T500mA@250V) 3</p> <p>Check the choke temperature. (see error message „choke temp. high“) 19</p> <p>Measure the chopper current with a clamp-on ammeter. Does the current signal sink briefly to zero? Yes -> Choke perhaps defective; No -> Next instruction. 12</p> <p>Check the voltage at the driver output terminals. Min. 14 V at the chopper board? 3</p> <p>Deactivate the chopper error in the menu „OPTIONS“. Password for „Error CHOP:“ = „DOWN-MENU-UP-DOWN-ENTER-UP“</p> <p>Try to start the generator. Ok. -> Chopper board is defective.</p> <p>Test diodes and IGBTs at chopper and H-bridge. (See page 7) 7</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Battery voltage low	DC voltage across the chopper too low	<p>Measure the voltage over the battery / capacitors in the standby condition. (min. 400 Vdc) 6</p> <p>Check if the green LED on the frequency measurement board is running.</p> <p>Check the fuse at the 24V power supply. 18</p> <p>Check if the relay K4 is properly installed.</p> <p>If the message arises sporadically after a certain time, the receiver on the HF controller is probably defective. → Contact Can Man.</p>
E-Stop remote	Error in the security network	<p>Check if the electrical security network is closed.</p> <p>Depending to the signal level the input must be redefined. Change in the menu "OPTIONS" the message "Ext.Err." from 0 to 1 and/or 1 to 0. Password for „Ext. Err.“ = „DOWN-MENU-UP-DOWN-ENTER-UP“</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
Frequency too high	Oscillator frequency too high	<p>If the error arises, check the frequency on the display. The frequency should not change in relation to the factory report and/or functioning conditions. Maximum possible frequency is 200kHz.</p> <p>Check if the green LED on the frequency measurement board is running. 9</p>

		<p>Check the fuse at the 24V power supply. 18</p> <p>Check if the relay K4 is properly installed. 17</p> <p>Test diodes and IGBTs at chopper and H-bridge. (See page 7) 7</p> <p>Check the wiring between driver (HF controller) and IGBTs.</p> <p>Check the voltage at the driver output terminal. Min. 14 Vdc ?</p> <p>Is green LED on the frequency measuring board running? 9</p> <p>Check the 24V supply. Min. 22Vdc 18</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
One phase missing	Missing phase L3	<p>Check the input voltage. (400Vac) 17</p> <p>Check the thermal fuse at the main switch. 16</p> <p>Check the fuses at the control transformer. 18</p> <p>If the message arises sporadically after a certain time, the receiver on the HF controller is probably defective. → Contact Can Man.</p> <p>Try to start the generator. Not successful → Contact Can Man.</p>
+15V supply failure	Error at internal supply	Error at internal supply. Contact Can Man immediately.
-15V supply failure	Error at internal supply	Error at internal supply. Contact Can Man immediately.
+5VA supply failure	Error at internal supply	Error at internal supply. Contact Can Man immediately.
-5VA supply failure	Error at internal supply	Error at internal supply. Contact Can Man immediately.

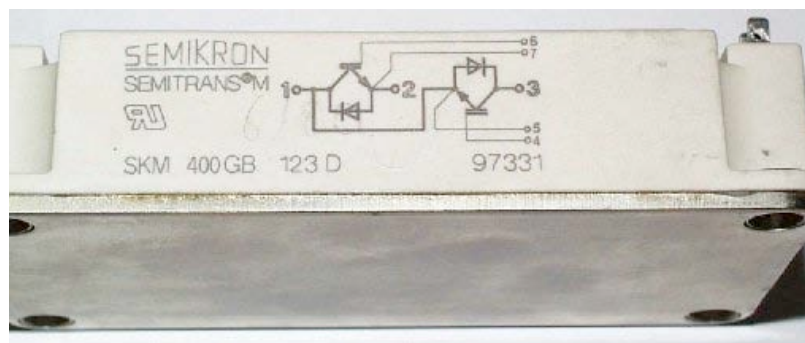
3 Test of IGBTs and diodes.

Attention! IGBTs are electrostatic sensitive! To avoid electrostatic charge on the gate which would destroy the IGBT, the module is delivered with a conductive plastic foam (or clamp) cover connecting gates and emitter. Handle modules with care!

To basically test the IGBT condition, you can use a universal instrument (multimeter). This is a static-test and gives not a 100% guarantee, but normally you will find out the error in case of damages. Before measuring, disconnect conductors and cables from IGBT-Module. Here is the list of necessary measurements:

The measurements with the Ohm-meter (resistance) on IGBTs control-connections as in following table must give you a high Ohm-value ($>2 \text{ MOhm}$, typically infinite = 0.L):

4 +	-----	5 -
4 -	-----	5 +
3 +	-----	4 -
3 -	-----	4 +
6 +	-----	7 -
6 -	-----	7 +
1 +	-----	6 -
1 -	-----	6 +



Normally you have also a diode-checking function on your multimeter. With this you can check both diodes in IGBT (see picture). For this measurement, connect short the points 6 – 7 and 5 – 4.

1 +	——	2 -	Not conductive (0.L)
1 -	——	2 +	Conductive (~0.3V)
1 +	——	3 -	Conductive (~0.3V)
1 -	——	3 +	Not conductive (0.L)





Further, you can also measure the input capacitance between gate and emitter.

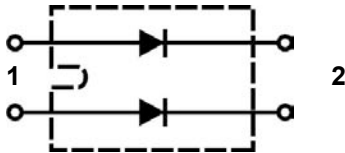
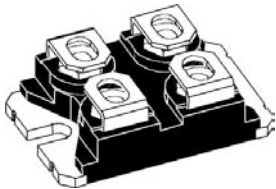
You must measure a value between input 6 and 7 or 4 and 5, which is higher than 15 nF. Otherwise the IGBT would be broken.



You can also check the switch of the IGBT. For this test you must start the system and bring it to the state "Stand by". Measure the resistor of the switch with a diode test controller as following:

- 1 - ——— 2 + (About 300 Ohm)
- 1 + ——— 2 - (About 300 Ohm)
- 1 + ——— 3 - (About 300 Ohm)
- 1 - ——— 3 + (About 300 Ohm)

The diodes can be tested with the diode test control unit (multimeter) at the chopper and H-Bridge.



- 1 + 2 - Conductive (~0.3V)
- 1 - 2 + Not conductive (O.L)

If new IGBTs or diodes are inserted, it is important, that the lower surface was coated with a small layer of thermal compound!