

SERVICE-MANUAL

INDUCTION COOKER

BASE-LINE/FAJITA HEATER

SH/BA 3500 FH

CONTENT

1	Safety	2
1.1	Description of danger signs	2
1.2	Qualification and training of personnel.....	2
1.3	Safety prescriptions for installation and service	3
1.4	Unauthorized reconstruction and use of spare parts.....	3
1.5	Improper operating methods	3
2	Technical information	4
3	Functioning	4
3.1	Adjusting the Temperature / Time	4
3.2	Check of the temperature.....	5
3.3	Overload current protection	5
4	Tests	6
4.1	Pan material for induction cookers.....	6
4.2	Fan.....	6
4.3	Test of the components.....	7
4.3.1	Rectifier.....	7
4.3.2	Transistor (IGBT)	7
5	Maintenance/Service	9
6	Fault finding	10
6.1	Generally.....	10
6.2	Error messages	10
6.3	Flow chart to fault finding	12
7	Exchange of spare parts	13
7.1	To open the induction unit.....	13
7.2	Repair of spare parts.....	14
7.3	Initialisation of the induction unit by PC/Laptop.....	15
7.4	Change of the parameters	15
7.5	Parameters for mains current and pan detector.....	18
8	IR Interface	19
8.1	Build-up of IR communication	19

1 Safety

1.1 Description of danger signs



This symbol identifies the safety information which may cause danger (personal injury) for people at non-observance of proper operation.



This dangerous voltage warning symbol indicates a risk of electric shock and hazards from dangerous voltage.

CAUTION

Indicates a hazard or unsafe practice which could result in minor personal injury or property damage.



Electromagnetic field

Information signs mounted directly on the cooker must be observed at all times and kept in a fully legible condition.

1.2 Qualification and training of personnel

The staff for assembly, installation, commissioning, operation and maintenance must have the appropriate qualification. The field of responsibility, competence and supervision of the staff must be defined and controlled.

1.3 Safety prescriptions for installation and service

The operating personnel must make sure that installation and service as well as all inspection, is done by authorized and qualified personnel. This personnel must have read very carefully the “Instructions for Use” in order to meet the requirements. For installation, service, maintenance, repair and overhaul of the induction cookers, the personnel must be specially qualified and must have attended a special training, authorized by the manufacturer.

In principle, such work at induction appliances must only be carried out when it is under no electrical tension. The cookers must be switched off and disconnected from the electric connection. The installation of safety and protection must be re-installed after finishing the work.

1.4 Unauthorized reconstruction and use of spare parts

Reconstruction of the cooker or changes to the cooker is not allowed. Contact the manufacturer if you intend to do any changes to the cooker. To guarantee safety, use genuine spare parts and accessories authorized by the manufacturer. The use of other components will cancel any liability for the resulting consequences.

1.5 Improper operating methods

The operating reliability of the cookers can only be guaranteed with appropriate use of the cooker. The limit values may be exceeded on no account.

2 Technical information

Modell SH/BA3500 FH	208 V/1 Ph
Wattage kW	3.5
Current A	max. 16
Power factor Cos φ	>0.95
Leakage current (mA)	4
Ø Coil mm	160

Max. tolerance of power supply	Nominal voltage +6/-10 %
Frequency	50/60 Hz
Protection class	IP X0
Min. diameter of pans	Approx. 12 cm/approx. 4.7"
Ambient temperature range: stockage	-20 to 70°C / 0 to +160°F
Ambient temperature range: function	+5 to 80°C / 40 to 110 °F
Relative humidity of air: stockage	10 to 90 %
Relative humidity of air: function	30 to 90 %

3 Functioning

3.1 Adjusting the Temperature / Time

The required temperature and or time are adjusted with control knob.

- position 1 > 600°F Adjustment
- position 2 > Pan reheating
- position 3 > 350°F Adjustment
- position 4 > 250°F Adjustment
- position 5 > 35sec Timer Adjustment
- position 6 > 30sec Timer Adjustment
- position 7 > 25sec Timer Adjustment
- position 8 > 15sec Timer Adjustment
- position 8 > 10sec Timer Adjustment

There is a possibility of end temperature control or time adjustment control. Measure the elapsed time on the timer adjustment or temperature on temperature setting. Both of the tests

are reliable for quality control. Used (cold) pan must be in temperature range 10°C (50°F) – 40°C (104°F).

3.2 Check of the temperature

Induction coil

The temperature of the induction coil is checked by a temperature sensor. If the coil is heated over the maximum temperature, the heating process is stopped. As soon as the coil has cooled down, the Induction unit can be re-started. Turn the position of the control knob on “0” and then on the required power level (see chapter 7.2 Error Messages).

Power board

The temperature of the heat sink is checked by a temperature sensor. As soon as the heat sink is heated over 70°C/158°F, a cooling fan is started. If the temperature exceeds 90°C/194°F the unit will stop working and show error code E03 (see chapter 7.2). The internal temperature of the unit is supervised as well. As soon as the temperature exceeds 75°C/167°F the unit will stop working and show the error code E06 (see chapter 7.2).

3.3 Overload current protection

When inappropriate pan material or magnetic objects are detected on the heating area, the current in the induction coil may rise substantially. In order to protect the power board, the coil current is checked. As soon as the current in the coil exceeds the tolerance, the generator will cut out and there is no further active energy exchange. The unit can be re-started as soon as normal working conditions are reached.

4 Tests

4.1 Pan material for induction cookers

When cooking with induction it is most important to use appropriate pan material. The bottom of the pan is the element that closes the magnetic field generated by the induction coil. We recommend customers only use appropriate pan material.

In order to find out whether the pan material is appropriate for induction, use a magnet. This has to stick to the bottom of the pan. This test says nothing about the efficiency or the material structure of the pan (it can be a bad induction pan).

4.2 Fans

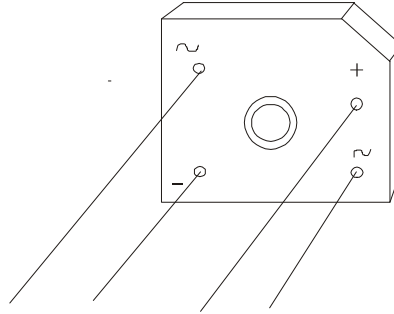
With this test, fans, fans controller and wiring are controlled.

- Adjust setting 1 without pan (Fajita 600°F). The coil fan starts automatically.
- Place pan on the center of the heating area. As soon as the pan is detected the second fan (heatsink fan) starts automatically.
- Remove pan from the heating area. Heatsink fan stops.

4.3 Test of the components

CAUTION The mains cable must be switched off.

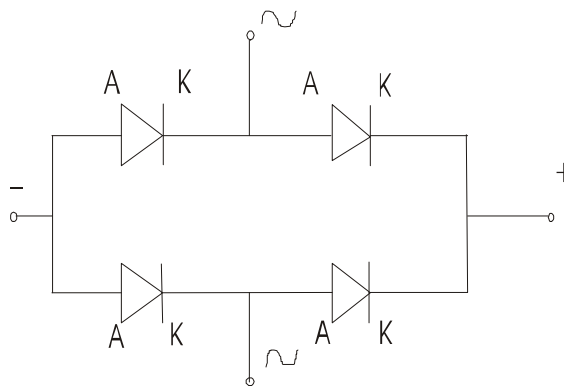
4.3.1 Rectifier



The rectifier is fixed at the power board with four wires. These rectifier connections have to be unsoldered for correct test results. At first, you have to measure the forward voltage between anode – cathode by means of the multimeter (please use only multimeters with diode check as an additional function).

The forward voltage for this diode is about **0,5V** in the direction **A – C**, in the opposite direction there is no current flow.

In case one of the four diodes shows a short circuit or an interruption, the rectifier is defective and has to be exchanged.

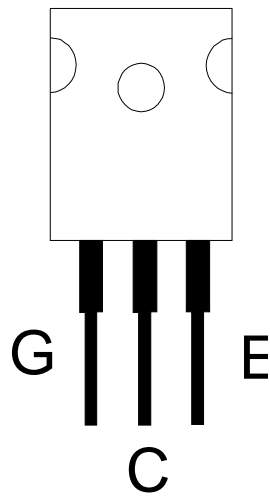
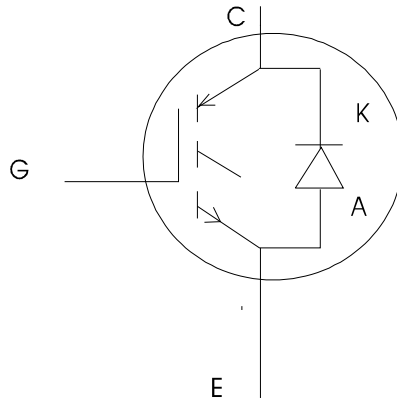


4.3.2 Transistor (IGBT)

The IGBT (Insulated Gate Bipolar Transistor) is fixed on the circuit board with three solder connections.

The IGBT Transistor has as a supplementary protection an integrated recovery diode. At first, we have to measure the on-state voltage of this diode. The forward voltage of this diode should be about **0,5V**.

In case the recovery diode shows a short circuit or an interruption, the IGBT transistor is defective and has to be exchanged.



5 Maintenance/Service

Maintenance work may only be done by authorized personnel. Before starting the maintenance work, the power supply must be turned off and the appliance must have cooled down. The following maintenance works need to be carried out periodically. The longer and more frequently the cooker is used, the more often the maintenance works have to be done. Every cooker should be checked at least once a year.

Fan

The proper function of the cooker can only be guaranteed if the electronic unit is kept at normal working temperature.

- The air inlet and outlet slots must not be blocked or covered.
- The air filter must not be blocked by dirt or grease.
- The airducts must be free of dirt.
- The air must circulate freely through the heat sink .
- The fan is properly mounted.
- The heat sinks are properly mounted.

Check Induction coil

- Mechanical fixing (screws tightened)?
- Coil adhesive (mounting o.k.)?
- Ferrite (mounting o.k.)?
- Copper coil (mounting o.k.)?

General check

- Earth protection
- Screwed connections
- Cable insulation
- Any kind of dirt or liquids that have entered the cooker must be cleaned out
- Remove insects (if present)

6 Fault finding

6.1 Generally

Caution	Do not open the cooker while the power is connected. Dangerous voltage!
----------------	---

The induction cooker may only be serviced by authorized personnel.

Stop any work if the heating area (Ceran Glass) is broken. The induction cooker must be switched off and the mains cable disconnected. Do not touch any parts inside the cooker.

Before replacing a part, check the wiring. Give special attention to the following faults:

- Broken cables
- Squeezed cables
- Defective insulations of cables
- Bad soldering joints

You must not do any repair on the circuit boards. The appropriate maintenance work should be carried out after each repair (see „Maintenance“, and „Service“).

6.2 Error messages

Number of flashing signals Error code	Significance	Measures to take
2 -.-.-.-	Unapropriate pan – no possibility to reach wanted temperature with pan. Pan misaligned from the center	a. Use recomended pan b. Align pan to the heating area center c. Control if the pan is deformed
3 -...-...-	Temperature heat sink ³⁾	d. Heat sink temperature too high– wait until the temperature has cooled down under 80°C/176°F e. Check supply of cooling air – perhaps blocked – check function of fan f. Check temperature of heat sink – replace power circuit

Number of flashing signals Error code	Significance	Measures to take
4 -.....-.....-	Coil Temperature too high ³⁾	a. Wait until the cooking surface cools down b. Check coil sensor – index value at 25°C/75°F – approx. 75 Ohm
6 -.....-.....-	Temperature inside the unit too high ³⁾	a. Check whether the unit is next to a source of heat as e. g. friteuse b. Check whether hot air is taken in – generator has no air exhaust system
8 -.....-.....-	Sensor error ³⁾	a. Check coil sensor b. Check heat sink sensor c. Check board sensor
17	Coil sensor overtemperature ³⁾	a. Temperature of the cooking field too high b. Check coil sensor , index value 75Ohm at 25°C/75°F
20	Power reduction generator inside temperature ²⁾	a. Check for heat sources around the generator and remove them b. Check air circulation
21	Heat sink sensor error ³⁾	a. Contact Inducs AG b. Exchange Power unit
24	Board temperatur sensor error ³⁾	a. Exchange CPU unit
25	Coil sensor error ³⁾	a. Check Coil sensor for short circuit or discontinuation, index value 75Ohm at 25°C/75°F

¹⁾ The induction unit can only be restarted when the fault has been rectified (turn power rotary knob „off“)

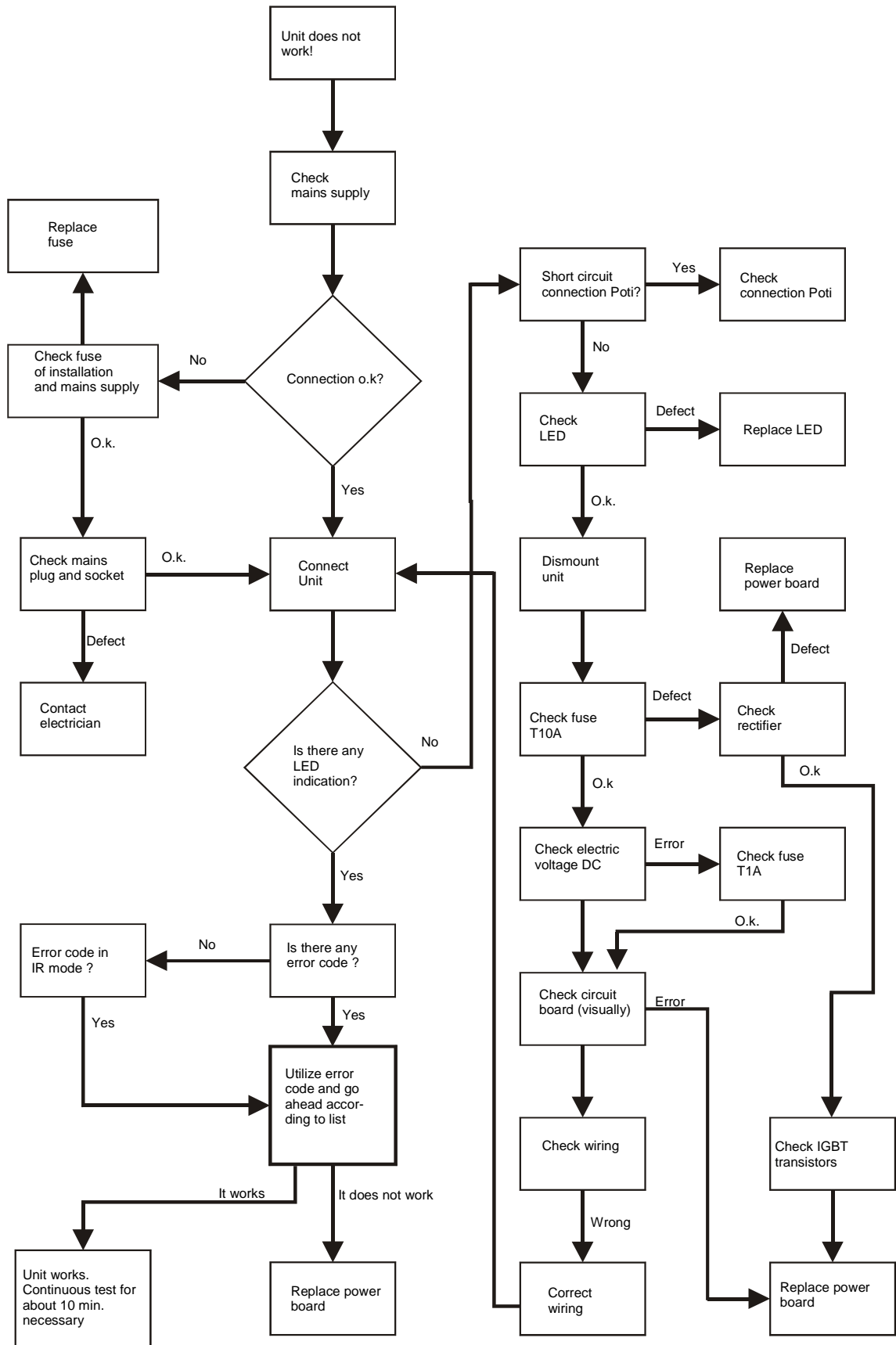
²⁾ The induction unit continues working.

³⁾ The induction unit does not heat..

Order of error message for error code 1-8:

The indicator lamp flashes for an interval of 0,6 sec. The following short flashes need to be counted. This gives information about the error corresponding to the above mentioned code system.

6.3 Flow chart to fault finding



7 Exchange of spare parts

Caution	All spare parts and accessories may only be changed by authorized personnel.
----------------	--

Caution	In order to guarantee safety use only genuine spare parts and accessories from INDUCS Ltd. If other components are used no liability is accepted.
----------------	---

Caution	The mains cable must be disconnected.
----------------	---------------------------------------

7.1 To open the induction unit

- Turn the induction unit over (upside down)
- Remove M4x8 screws
- Turn induction unit back to normal position
- Lift cover, tip to the right side, stand it on its side
- Remove coil carrier: remove the 2 stop nuts on the left
- Remove M4 screws
- Remove screws A1 and A2
- Turn away coil carrier at the left

7.2 Repair of defected parts

Repair of defected parts (Power board, control board etc.) and of whole units may only be affected by INDUCS Ltd. Therefore check and replace only parts described in this service manual.

In case you should repair parts, please describe exactly the faults and give information about the history of the unit, for example new installation, changements done next to the induction cooker or to other units supplied by the same network.

In order to save transport charges, do not return defective parts such as temperature sensors, rectifier, transistor modules, and interrupter's. Such parts can be disposed correctly on place.

7.3 Initialisation of the induction unit by PC/Laptop

The adjustments of pan detection and performance can be done by means of the hyperterminal program. You will find exact information for the handling of the hyperterminal program in chapter 9 „IR interface“.

IMPORTANT! Pay special attention whether you receive feedback signal from the PC/Laptop after every chngement. This will be the sign that the chngement has been accepted.

12345	Entry to the mode of adjustment (password)
N	Increase the mains current limit (+)
n	Decrease the mains current limit(-)
"	Save the limit of the mains current
T	Increment pan detection (+)
t	Decrement pan detection (-)
=	Save pan detection
-?	Leave the mode of adjustment
.	State software version

7.4 Change of the parameters

1. Connect the RS232 connection cable to the PC/Laptop and straighten the IR-box to the left lower corner of the ceran glass.
2. Start HT2400 (see chapter 9), cooker must be set in the “OFF” position!
3. By input of “12345” the mode of adjustment is started. The following message appears on the hyperterminal program:

IR= On
WELCOME REPAIRMEN

4. Set the limit of the mains current (see mains current parameters in chapter 8.2):

N increase the limit of the mains current (+)
n decrease the limit of the mains current (-)

The following message appears on the hyperterminal program:

linecurrent limit=

5. Save the limit of the mains current with the key „“ “. On the console appears the message „please confirm“. Press the key „“ " again. The following message appears on the monitor:

save linecurrent limit:

6. Set the pan detector (see pan detector parameters in chapter 8.2):

T increase pan detector (+)
t decrease pan detector (-)

The following message appears on the monitor:

pan detection limit=

7. Save the pan detector with the key „=“. On the console appears the message „please confirm“. Press the key „=“ again. The following message appears on the monitor:

save pan detection limit:

8. By input „-?“ “ the mode of adjustment will be left. The following message appears on the monitor:

see you again!

9. The mode of adjustment has a time-out function. After 10 minutes the mode of adjustment will be left automatically.

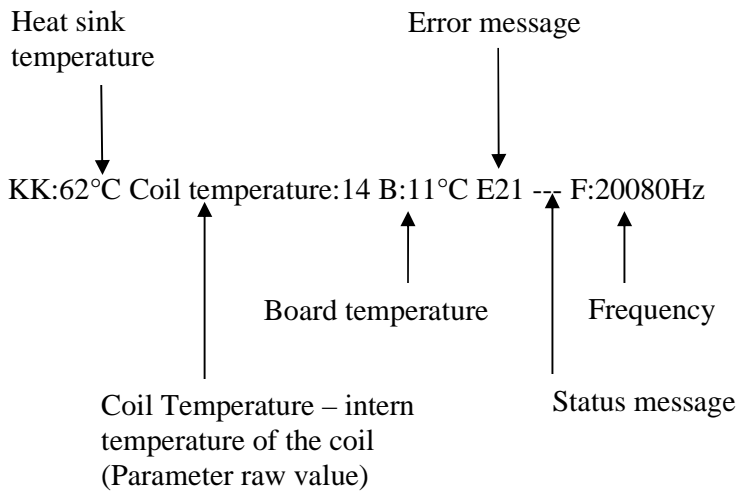
The adjustments are now finished and it is not possible to make any other adjustments. Otherwise you have to start at the beginning!

Different information about the unit is shown in the adjusting mode. The following parameters can be read:

Output on the hyperterminal program:

```
KK:62°C Coil temperature:14 B:11°C --- --- F:20080Hz
KK:62°C Coil temperature:14 B:11°C --- --- F:20080Hz
KK:62°C Coil temperature:14 B:11°C E21 --- F:20080Hz
KK:62°C Coil temperature:14 B:11°C E21 --- F:20080Hz
```

Meaning:



7.5 Parameters for mains current and pan detector

Article Nr.	Unit	Mains current	Pan detector
99600017	SH/BA 3500 FH, 208VAC, 1N, 3,5kW	197	35

8 IR Interface

8.1 Build-up of IR communication

To build-up the IR communication, you need the software Hyper Terminal which is usually already available in Windows under **Start =>Program=>Accessories => Hyperterminal**. Prior to the first use, Hyperterminal should be configured properly. INDUCS service needs the following settings:

Connect the IR box and bring it into line to the IR sensor on the generator.

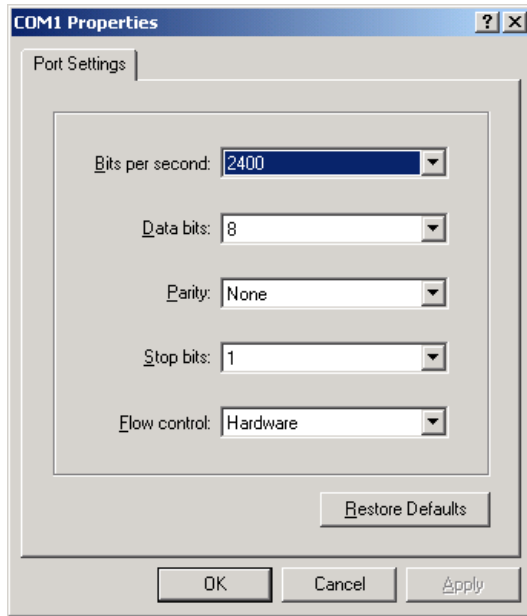
Start Hyperterminal and give an access name, e. g. IR2400.ht



Select the communication via COM1 (or where your IR box has been connected).



Select the following settings: 2400 Bits/sec., 8 Databits, no parity, 1 Stop bit, Hardware protocol



These adjustments will be saved under the access name IR2400.ht and this shortcut could be used every time using Inducs service interface.