HPLC - PELTIER
COLUMN-THERMOSTATS

Jetstream Series

Technical Handbook Rev. 2.1d

1. GENERALITIES

This manual has been updated to the actual Jetstream Series standard.
It now covers all the features of the actual Jetstream series models.

The authors and editors do not assume any guarantee for the correctness of this manual. Nor they will assume any responsibility or liability for defective specifications und resulting consequences.

The designations used in this manual could be trademarks even though not mentioned as such.

The contents of this manual could be subject to changes any time and without notice.

Despite of the carefulness with which the texts and graphics have been composed, mistakes could still have occurred.

The authors would be grateful for any improvement proposition or indication of mistakes.

Impression: June 2008

2. CONTENT

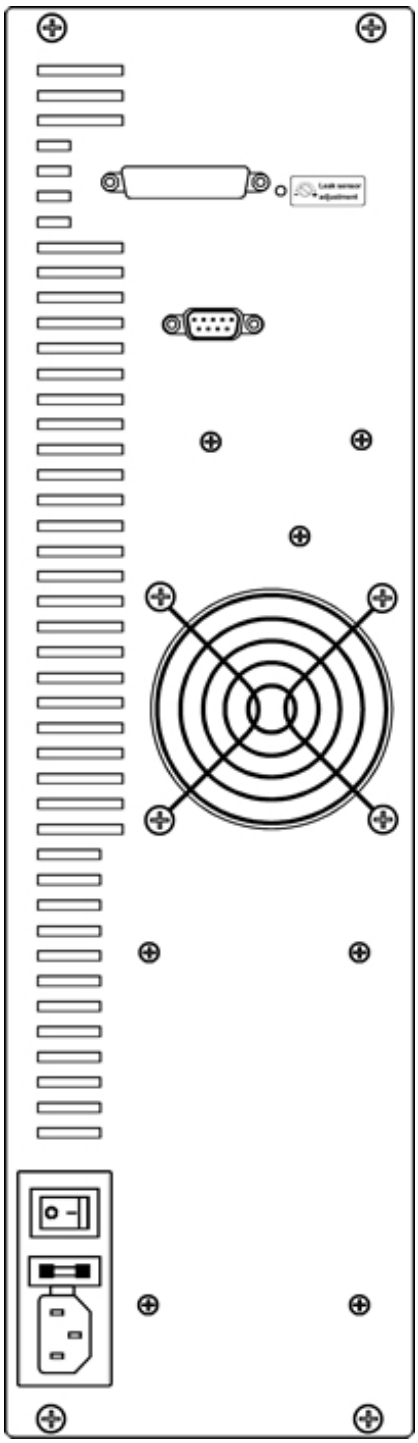
3. GENERAL DESCRIPTION

The Jetstream-Series-HPLC Column Thermostats are specifically designed for the analytical needs in chemical and biological research as well as routine laboratories.
The use of thermo-electrical elements (Peltier) offers the possibility of heating and cooling. Therefore not only very rapid changes of temperature can be attained, but also analyses independent of ambient temperature.
The temperature regulation is microprocessor-controlled, via the control module or an external computer.
Software, which has been developed especially for HPLC needs, allows an optimization of the analyses.

Safety:
To prevent any damages there is an inbuilt “watch-dog” which,
three times per second, checks the proper function of the temperature control.

4. INSTALLATION

Backside View JETSTREAM Series



4.1. Location

Select a place, which is stable, level and not submitted to shocks.
The room temperature should be 17 to 28°C, the relative air humidity between 35% and 85% (not condensing).
Please take care that the Jetstream does not stand near a source of heat or in the sun. Make sure the location offers a sufficient aeration of the instrument.
Do not expose the Jetstream to alkaline or aggressive vapours.
During periods of great temperature differences between in- and outside, let the unit equilibrate for a few hours before installation (especially in winter time).

4.2. Connections

You need the following connections at the location you want to install the unit:
A security socket with 90-230V, 50-60 Hz and 10A fuse.

WARNING: Electric shock in contact with inside of instrument!
✶ Beware of electric shock. Potentially dangerous voltages are present within the instrument.

WARNING: Electric shock due to improper grounding!
✶ This instrument is classified as „1“ in IEC1010-1 Annex H and „plug-connected type“ in IEC1010-1, so connect the power cable to a grounded 3-wire outlet.

Please do not use a multiple-socket with other instruments also connected to it.
Use the by-packed power cord, or a similar one.
Connect the control unit with the keyboard-connection on the rear side of the instrument and fix it with the screws.
Turn the switch on the right rear side ON. The instrument goes into a self-test and displays

after satisfactory conclusion of the diagnostic procedure.

Open the thermostat door and place the column(s) into the clips inside the oven.

Model Jetstream II Plus:
In order to install the inlet- and outlet tubings to valves, injectors, detector, etc, remove the caps on the sidewall of the oven. The tubing can now easily be fed through the openings. When working in low temperature ranges it is recommended to cut a small hole or slit in the caps and feed the tubing through.

Model Jetstream Plus:
Close the door. The tubings can be fed between the sealing of the door and the main unit.

You can now proceed to set the desired temperature (-profiles) with the control unit, your thermostat is now ready to use.

4.3. Control unit

The control unit consists of a 4 x 4 matrix keyboard and a display with 2 lines. On the bottom side of the keyboard, there is a little opening, through which you can adjust the contrast of the display with a small screw-driver.

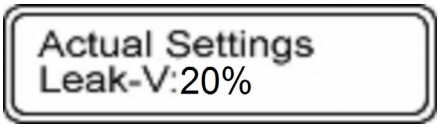
5. OPERATION

5.1. General Settings

After you switched on the thermostat on the back-panel, you can read following message on the display:

Whereas the 6-digits number indicates the serial number of your instrument.

Next the default settings for the leak-detector are displayed:



The built-in solvent-leak-detector is automatically in function after the instrument has been switched on and attains its full functionality after approx. 3 minutes.

You can adjust the sensitivity with the LEAK-key of the control unit.
For more details, see.5.2.2. Adjustments
Please do take into consideration that the sensitivity alters with temperature. You might have to readjust it after having gathered experience. As soon as the acoustic alarm is audible, the power to the heating/cooling element is shut off.
Whenever you solved your " leak " -problem and you are ready to start again, simply press the ENTER-key on the control unit, the instrument will work as usual.
For more details, see.5.4.Error statements

The actual setting for the T-Lock-temperature will be displayed next:

This feature is considered to prevent destruction of temperature sensitive columns caused by handling errors.
You may want to adjust a maximum temperature the thermostat should not override. Whenever this temperature has been reached, the power to the heating/cooling unit will be switched off and a warning will appear on the display.
For more details, see 5.2 and 5.4

The instrument then continues the self-test.

During this self-test, please do not hit any key!!

If the instrument passed successfully the test, the display will show:

if not, please shut off, wait 5 seconds and repeat the power-on-procedure.
If the procedure fails a second time, see error messages, page 19.

1.) if you pressed a key during the test, switch off and on again

3.) Send your instrument to be repaired.

5.2. Configuration

5.2.1. Leak sensor

Setting the sensitivity of the solvent leak detector:

1. LEAK

2. Enter the desired sensitivity
   Range: 00-99%
   00% solvent leak detector switched off
   99% maximum sensitivity

5 0

3. ENTER

For more details please see Maintenance page 21.

WARNING: Ignition of flammable chemicals!

✶ Beware of ignition hazard when using flammable chemicals such as organic solvents.

✶ Always check the following conditions. If an abnormality is found, stop operation immediately.

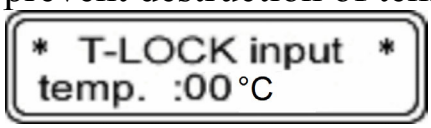
- Leakage of solvent or waste solution.
- Leakage of solvent inside the instrument.
- Inadequate ventilation of the laboratory room.

✶ This instrument is not explosion-proof. Although aqueous solvents or organic solvents having an ignition point of 70°C or higher are useable, do not use organic solvents having an ignition point below 70°C.

5.2.2. T-Lock

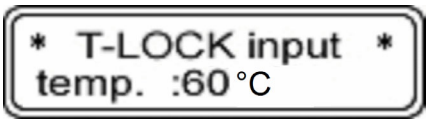
Setting T-Lock temperature (to prevent destruction of temp. sensitive columns):

1. TLOCK



2. Enter the desired T-LOCK temperature 05-85°C
   00°C → T-LOCK function inactive.

2. 6 0



3. ENTER

5.3. Programming the Thermostat

CAUTION: Touching hot part could result in burns!

✶ The column oven becomes hot and can severely burn you if touched.

✶ Before column replacement, open the column oven door and wait until the inside temperature in the column oven decreases down to room temperature.

5.3.1. Enter a fix temperature (isothermal)

Press	*Display*
1. ENTER	choose function
2. MAN.	* Manualmode * set :00°C

3. Enter the desired temperature i.e. 39°C

3 9	* Manualmode * set :39°C
4. ENTER	MANUAL set:39°C HEAT act:32.2°

act: XX ° (XX = actual temperature)

In addition the display shows the actual status:

HEAT	temperature lower than set: heating modus
COOL	temperature higher than set: cooling modus
IDLE	set temperature attained

TLOCK Pressing this key you reduce the set temperature by one degree. If you keep pressing it, it will have a repetition effect (once a second).

LEAK Pressing this key you increase the set temperature by one degree. If you keep pressing it, it will have a repetition effect (once a second).

ENTER Pressing this key, you quit the manual setting mode.

5.3.2. Temperature programming with internal timer

The following example shows how to program temperature steps. In this example, we assign Program #0 to start from, let us say, 30°C, stay for 10 minutes and then increase to 40°C, maintain it for 10 minutes and come back to initial temperature of 30°C.

Press *Display*

1. PROG

Enter program number

2. 0

3. ENTER

Enter desired temperature (in °C) (05-85°C)

4. 3 0

5. ENTER

Enter duration in min.(01-98min)

5. 1 0

6. ENTER

no input necessary, see pages 17/18.

8. ENTER

Input of program #0 is now completed. In order to enter the next program step, you only need to increase program # by one, set temperature to 30°C, clock to 10 minutes. Following this procedure up to 99 temperature profiles can be stored.
To come back to start temperature, increase again next program # by one, negotiate all entries and for time:

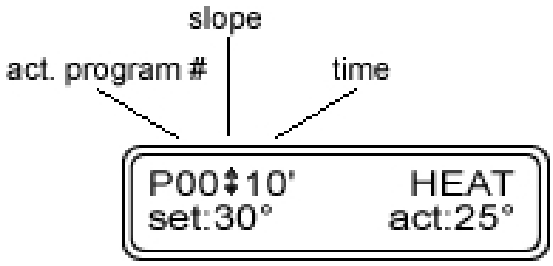
Time = 00	go back to program 0 :-Sequence will be automatically repeated
Time = 99	stay at final temperature set with CL 99
Temp = 00	stops the temperature program

Starting the program:
In order to start the program, press the START key, enter the program number (0) and press ENTER

1. START

2. 0

3. ENTER



Slope:

↑ positive slope

↓ negative slope

↕ No slope. Timer function active.

Time: Time left in the actual function

↑↓ Slope function:

ENTER With this key you may quit the slope function and activate the timer function

↕ Timer function:

ENTER With this key you may quit the programming function

TLOCK With this key you may decrease the program # by one

LEAK With this key you may increase the program # by one

Please make sure that sufficient time is programmed to allow the thermostat to reach the desired temperature in this time. Typically a 2-3°C/min rise should be planned. If the programmed time is too short to reach the upper temperature, the programmed time will prevail and the oven might not reach the desired temperature.

5.3.3. Temperature curves

The Jestream models are able to calculate linear temperature in-/decreases.

Press *Display*

1. PROG

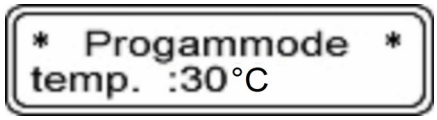
Enter the program number

2. 0

3. ENTER

Enter desired temperature (in °C)

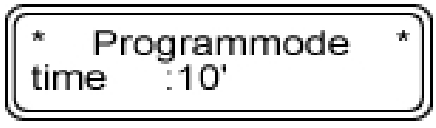
4. 3 0



5. ENTER

Enter dwell time after ramp (01-98min)

6. 1 0

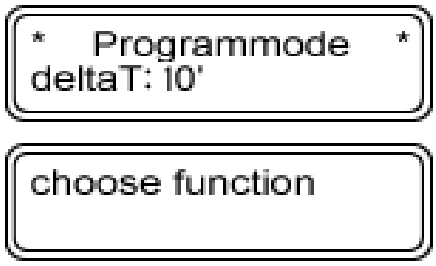


7. ENTER

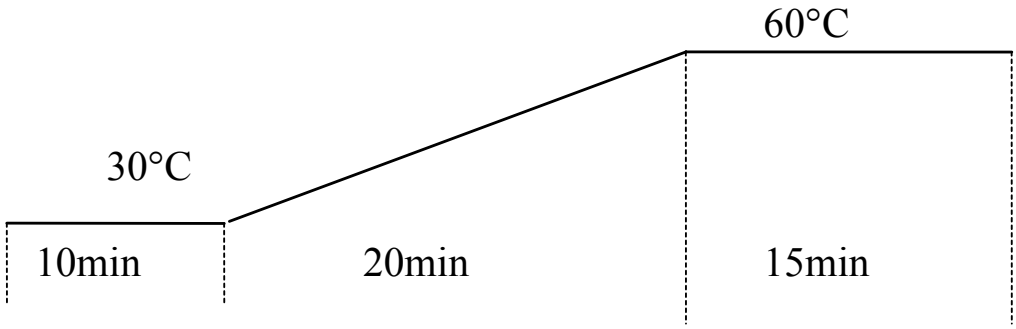
Enter time to reach temperature (Slope) (01-98min)

8. 1 0

9. ENTER



Example



The oven will keep a temperature of 30°C for 10 minutes, than linearly increase it in 20 min to 60°C and keep it for 15 minutes.

Pr. 00 (Temperature for 10 Min at 30°C)

1. ENTER
2. PROG
3. 0 (Pr. No.)
4. ENTER
5. 3 0 (Temp.)
6. ENTER
7. 1 0 (time)
8. ENTER
9. 0 0 (delta°)
10. ENTER

Pr. 01 (increase to 60° und keep it 15 Min.)

1. PROG
2. 0 1 (Pr. No.)
3. ENTER
4. 6 0 (Temp.)
5. ENTER
6. 1 5 (clock)

(by input 99 temperature will be endlessly maintained .)
minimum is 1 minute

7. ENTER
8. 2 0 (delta t)

(time to raise temp. from 30 to 60°C). Control unit calculates a slope of 1.5°C/min

9. ENTER

- Now enter next program step or enter following closed loop program

closed loop program

If you want the temperature profile to repeat itself automatically, you can program a closed loop. In the example above, select prog.# 2 with clock 00. Please make sure to program sufficient time to allow the thermostat to return to its initial temperature before you make your next analysis.
To start this program, select prog #0, press

START

and

ENTER

5.4. Error messages

If the system detects some kind of error, it sends a repeated alarm signal.

1. Temperature limit has been reached:

Check programming or selected maximum temperature.
If wide apart, contact your service agent.

ENTER After having located and eliminated the source of the error, you may continue with this key.

2.) Solvent is leaking: Check column and its connections

ENTER After having located and eliminated the source of the error, you may continue with this key.

3.) Instrument failure

Contact your service agent.

6. ADDENDUM

Thermostat fan:
If the oven is not in use, both internal fans will automatically turn off after 2 or 3 minutes

Idle status:
If *choose function* displayed, the instrument is in idle status: cooling and heating elements are switched off, as well as the fans (after 2 or minutes); power consumption is reduced to a minimum.

Power off:
Programs will not get lost if power is switched off.

Temperature profile:
The temperature change in the column is approximately 2-3°C/min. Please take this into consideration by programming and leave sufficient time for the temperature to stabilize.

Displayed Temperature:
There is a highly precise temperature sensor (PT1000) inside the chamber designed similar to a column. Please consider this when comparing with a standard temperature probe (i.e. air circulation)

Erase inputs:
You only have to overwrite old inputs by new entries.

7. MAINTENANCE

7.1. Leak-Detection – Test-Protocol

! The inside temperature of the oven should be 20-30 ° Celsius !
Equipment to be used:

Syringe: 50 ul, 300 ul – MEOH

Instrument Condition:
After power-on please wait ~3-5 minutes before you can go on with the test procedure!

Instrument at 20 – 30 ° C in working condition
- not "Standby"-mode (internal fan on).
Instrument position vertical, front door and all 8 holes
(with stoppers as shipped, model Jetstream II Plus) closed.

Injection of MEOH:
Insert syringe horizontally through stopper on right side close to the bottom (Jetstream II Plus) or between sealings (Jetstream Plus), so that the tip of the syringe is approx. in center of the inner chamber (please do not try to inject directly into leak detection sensor by extreme placement of syringe), inject and afterwards close hole with stopper.

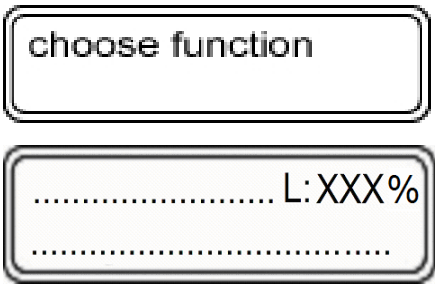
Open the door for 2 minutes between the two test to let remaining Methanol from the first test routine evapour completely!

Test results:

50 ul MEOH – no alarm should be triggered
300 ul MEOH - alarm should be triggered

If leak detection fails:

1. 9 5 7



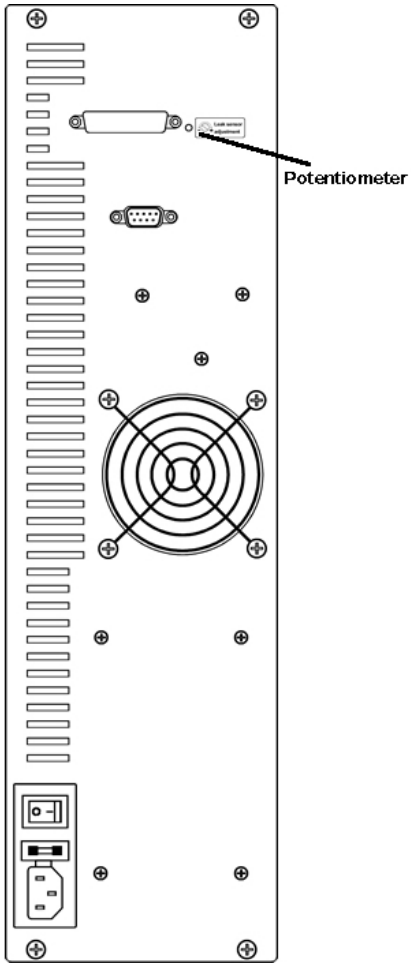
If the value “L” is greater than 100% , an alarm will be triggered.

You can adjust the value “L”(eak) with the potentiometer on the rear panel.

But also the setting in section 5.2.1 affects the sensitivity.

Turn the adjusting knob clockwise with a screwdriver to increase the sensitivity, the value in the “L”(eak) field will increase.

Turn the adjusting knob counter- clockwise with a screwdriver to decrease the sensitivity, the value in the “L”(eak) field will decrease.



The audio alarm signal is disabled during this operation !

The leak detection test procedure is recommended to be done at least once a year!

Enter ENTER to exit the menu.

7.2.Temperature correction

7.2.1.Temperature – Auto-Calibration-Feature

The new Auto-Calibration-Feature provides you with the possibility of having your thermostat calibrate itself directly in the laboratory.
After following the instructions below, you thermostat will start a self-calibration- and control-routine for 8 hours. (see fig. 7.2.1.a)

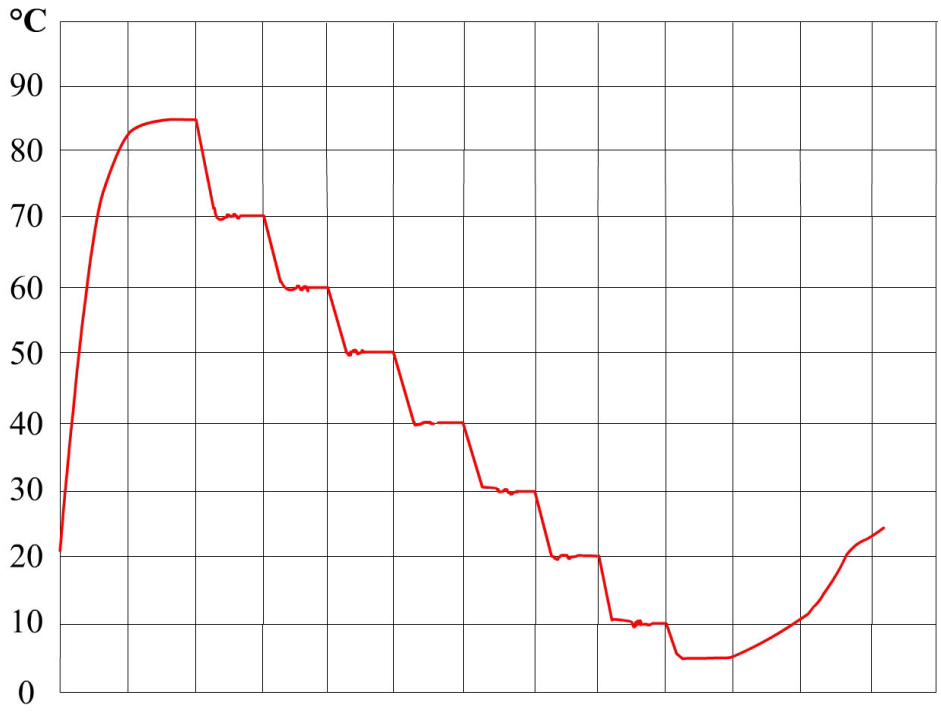
!Room temperature should be stable (22° - 23° C)!

1. Press TLOCK and enter 0°C. When 0°C is displayed, exit with ENTER.

2. Enter 9 5 6 and close with 0.

3. The instrument goes through following temperature values:
   85°, 70°, 60°, 50°, 40°, 30°, 20°, 10°, 05° C

4. As soon as the measurements are done, the display shows “choose function” again. Switch off for 15 sec. and on to activate the changes. *fig. 7.2.1.a*



7.2.2. Manual Temperature Correction

Because of the precision of the instrument, it should only be calibrated by your service agent. However you may do it yourself, if you need values correlating with your temperature measurement.

The temperature values can be corrected at the following points :

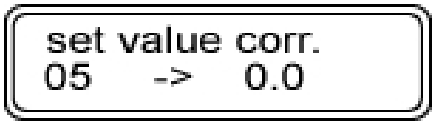
05, 10, 20, 30, 40, 50, 60, 70, 85°C

Measure the actual temperature for all those settings, and write down the differences to the set temperatures. You now have your own correction table, which you can enter with the following procedure:

Display:

Enter the following keys: 9 4 9

Display:



The correction value for 5°C is shown on the display.

If you do not want to change it, go to the next value with TLOCK

If you want to change it, press ENTER .

Enter your correction value with numerical keys.

!maximum +/- 2.5 °C ! at 85°C you can only correct -> +1°C or –2.5°C !

Change the sign to minus with TLOCK, to plus with LEAK .

Example:	set temperature	measured temperature	correction value
	05	5,1	-0,1
	10	10,0	0,0
	20	19,8	+0,2
	30	29,6	+0,4

Display:

Display: e.g.

-0.1 by 5°C means, the reference value will be decreased by 0.1°C.

Close the entry with ENTER.

With TLOCK scroll downwards, with LEAK scroll upwards.

Enter 1 to exit the menu.

Switch the instrument off for a minute and on again,
in order to activate the changes!

8. INSTALLATION PROTOCOL

Ser.No.: _____

Responsible for Installation:

_____

Please stick to the follow-up procedure, as explained below, to guarantee the proper setup for your column thermostat:

1. Select a flat and stable place, not submitted to shocks to setup your column thermostat.

2. The room temperature should be 17° to 28°C, the relative air humidity between 35 and 85 % (not condensing).

3. Please check for sufficient aeriation of the instrument. The column thermostat should not stand near a source of heat or in the sun.

4. Connect the by-packed power cord with the thermostat and a security socket (90-230 V, 50-60 Hz and 10A Fuse). Please don't use multiple sockets with other instruments also connected to it.

5. Connect the control unit with the keyboard-connection on the rear side of the instrument and turn the power switch ON.

6. The instrument is now performing a self-test.

7. If afterwards, the display shows "choose" function the column thermostat has been properly set up.

Date: _____ Signature: _____

9.CE - DECLARATION OF CONFORMITY

EQUIPMENT	Column Thermometer
TYPE	JETSTREAM 2
Declaration No.	255 698

CE

This declaration of conformity is according to article 7(3) and article 10(2) of the Council of European Communities of 3 May 1989.
The protection requirements according the Council Directive article 4 and Annex III are kept.

This declaration is given from the manufacturer

WO INDUSTRIAL ELECTRONICS
Hauptplatz 4
2103 Langenzersdorf
Austria

submitted by

EMV - Testhaus GmbH
Gustav-Hertz-Straße 35
94315 Straubing

To the judgement of the products with regard to electromagnetic compatibility according following regulations:

EN 50081-1 (EN 55022:1987 Class B)
EN 50082-2 (IEC 801-2, -3, -4, -5)

28. Dezember 1995

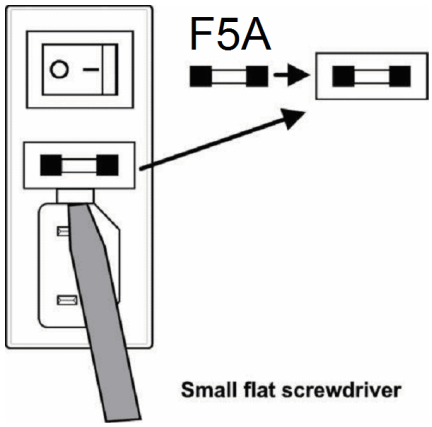
Signature Manufacturer

Signature Testlab

10.TECHNICAL DATA

Temperature range.....5 - 85°C
Temperature accuracy: .....+/- 0.1°C
Temperature stability: .....+/- 0.02°C*
*measured in a 25cm test column
Temperature change: .....2-3°C/min
Nominal voltage: 100-230VAC
Nominal frequency: 47-63Hz
Power consumption: 72W

Main fuse in drawer close to power connector.



Caution: *To protect against fire hazard, replace fuses with those of the same type and rating*