

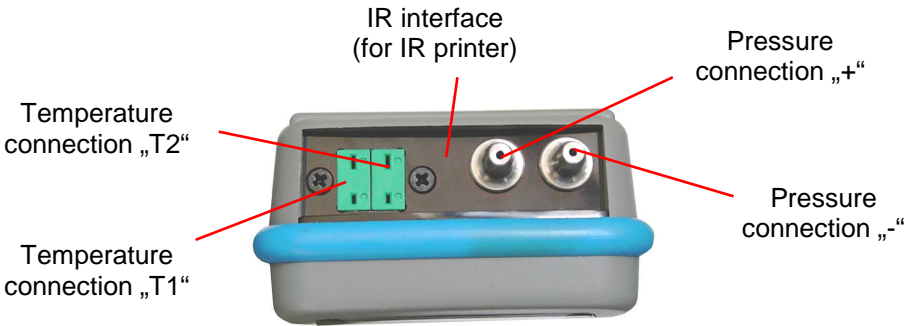


Operating Instructions

ecom[®] DPH

Index	Page
1. Design ecom-DPH	3
2. Installation	
2.1. Power supply	4
2.2. Accumulator charging	4
2.3. Clock set	4
3. Numerical indication	
3.1. Zeroing pressure sensor	6
3.2. Display damping	6
4. Check programs	
4.1. Heating check	
4.1.1. Gas losses	7
4.1.2. Surface losses	8
4.1.3. Ventilation losses	9
4.2. 4-Pa Test (Option)	10
4.3. Differential pressure	11
4.4. Pitot tube	11
4.5. Temperature	11
5. Adjustments	
5.1. DPH Adjustments	12
5.2. Parameters for measurements	13
5.3. Adjustments 4-Pa Test	13
6. Technical data ecom-DPH	14
7. Maintenance Tips	15

1. Design ecom-DPH



2. Initialisation

2.1. Power supply

The ecom-DPH is powered by 3 batteries or 3 accumulators. The following types can be used to operate the instrument:

- Battery 1,5 V AA (Mignon)
- Accumulator 1,2 V AA NiCd (nickel cadmium)
- Accumulator 1,2 V AA NiMH (metal hydride)

If you are using a loading unit, please adjust the function „**Batt.charg**“ to YES.

Open the battery compartment and insert the batteries. Be careful to ensure proper polarity. If using the rechargeable battery type, it will be necessary to fully charge the batteries prior to initial use (approx. 4 hours). The voltage of the batteries is monitored by the DPH and will indicate a low battery condition by approx. 3.3 V by beeping and flashing a signal on the LCD display. If the voltage sinks (approx. 3 V) so the ecom-DPH will automatically switch off.

2.2. Accumulator charging

The accumulator charging procedure is monitored by the ecom-DPH. Once connected to AC power, the instrument switches on. During the charging procedure, a BATTERY indicator will be shown on the LCD display. Once the battery is fully charged, the BATTERY indicator on the display will blink. It is possible to operate the ecom-DPH on AC power during the charging procedure by pressing the <ON> button.

2.3. Setting clock

The internal clock and the internal RAM memory of the ecom-DPH are buffered via a capacitor. If the instrument is without current supply during more than approx. 10 minutes, the recorded information gets lost. Before using the ecom-DPH for the first time, adjust the internal clock.

Date and time can be set as follows:

1. Select with the cursor keys **<RIGHT/LEFT>** the position to be changed (corresponding field blinks).
2. Adjust the correct numbers with the cursor keys **<UP/DOWN>**.

Set clock	
12:00:08	
01.01.09	
DPH adjustments	Menu

3. Numerical indication



The internal pressure sensor should be flown with pressure after the switch-on of the instrument, as it is zeroed during switch-on procedure!

After switch-on, the measurement values T1 and Pressure will be displayed. Use the cursor key <up> to select the measured parameter for the upper value (cursor key <down> for the lower value). As measured parameters the temperatures T1 and T2 and the differential pressure in hPa or Pa are available. Are for T1 or T2 no temperature sensor connected, dashes will appear in the measured value display.

20.8	T1 °C
0.00	Press Pa
ΔP->0 Int=0	
Menu	



1. Before making measurements, the instrument must have adapted the ambient temperature!
2. Make sure, that the ambient temperature remains constant during measurement!

3.1. Zeroing pressure sensor

As the difference pressure sensor can drift because of its sensitivity in the zero point, it is possible to reset the zero point. Press <F1> to zero the value of the pressure sensor.

20.8	T1 °C
0.00	Press Pa
ΔP->0 Int=0	
Menu	

3.2. Display damping

The display damping can be adjusted with <F2> from 0 to 9 (0 = no damping; 9 = high damping; default = 1). In the menu “Adjustments/Param.f.measurement“ you can adjust, if the damping should be progressively (for large pressure changes the display reacts faster than by small pressure changes; default = No).

20.8	T1 °C
0.00	Press Pa
ΔP->0 Int=0	
Menu	

4. Check programs

After pressing <F4> (Menu / measured value display) the main menu with pre-programmed measurement programs is displayed.

4.1. Heating check

The heating check is a simple, expressive process to evaluate a complete heating plant (heat production, distribution and transfer) from the energetic point of view.

Hereby the single plant components get inspected by the heating engineer in a combination of measurements and visual assessment and valued in regards of their energetic quality acc. to a negative point system of maximum 100 points.

The higher the score, the farer the current plant is away from the desirable energetic stand and the higher the energy saving potential would be if modernization measures are conducted. In combination with the special probes required hereto, the ecom-DPH is able to perform the measurement of the heating check parameters: gas losses, ventilation losses and surface losses.

Out of the main menu select the sub-menu "**Heating check**" and confirm with <OK>.

Heating-Check
4-Pa Test
Diff.pressure
Pitot tube
Temperature
Main menu

4.1.1. Gas losses

The menu point "**Gas losses**" is used to convert from already determined flue gas loss values (in %) in negative points. The value can be set as follows:

1. Use the cursor keys <right/left> (corresponding field blinks) to select the position you want to change.
2. Set the correct numerical value with the cursor keys <up/down>.

After entering, the result is calculated and stored for analysis ("**Show Analysis**") by pressing <OK>.

Gas losses
Surface losses
Ventilation losses
Show Analysis
New Heating-Check
Heating-Check

4.1.2. Surface losses

The **surface losses measurement** is performed by a temperature sensor specific for surfaces. The temperature difference between boiler surface and room temperature (air temperature sensor) is determined and the percentage loss is calculated. Once the menu point is called up, the room temperature must be determined. Connect the air temperature sensor to T1. After sufficient measurement time (approx. 10 s) press **<F1>** or **<F2>**. The value is stored and used to calculate the temperature difference. Then the boiler performance needs to be entered. To ease the measurement width, depth and height of the boiler can also be entered (dimensions will be memorized for surface calculation). Please proceed as follows:

- activate respective input window with **<OK>**
- select the position with the cursor keys **<right/left>** (corresponding field blinks)
- set the correct value with the cursor keys **<up/down>**
- confirm input with **<OK>**

If the boiler dimensions are not entered, the measurement recording must be started with **<F3>** (Next) . Here the dimensions must be entered for all surfaces. You can start with measurement after pressing the **<F1>** or **<F2>**. Proceed as follows:

- Connect surface probe at T2
- select surface with cursor keys **<right/left>**
- position surface probe
- take temperature difference with **<F1>** - per surface 9 measurements can be taken (they get averaged automatically)
- if necessary clear measurements with **<F2>**
- repeat process for each surface

Gas losses
Surface losses
Ventilation losses
Show Analysis
New Heating-Check
Heating-Check



Air temperature sensor



Temperature sensor for surfaces

Are all surface temperatures determined, you can leave the menu with **<F3>** (Analys) or **<F4>** (Menu). The surface losses are calculated automatically. The result and the conversion of the surface losses in penalty points is available with **<F3>** (Analys) or at the menu point **"Show Analysis"**.

4.1.2. Ventilation losses

The **ventilation losses** measurement is performed by a flow probe 30 sec. after burner switch-off. This measurement can be performed at the earliest 5 min. after instrument's switch-on as the pressure sensor requires this period of time for stabilization. Once the menu point is called up, the room temperature must be determined. Connect the air temperature sensor to T1. After sufficient measurement time (approx. 10 s) press **<F1>** or **<F2>**. The value is stored and used to calculate the temperature difference. Then the values for air pressure, external temperature, boiler performance and flue gas pipe diameter must be inputted. Hereto proceed as follows:

Gas losses
Surface losses
Ventilation losses
Show Analysis
New Heating-Check
Heating-Check



Air temperature sensor

- activate respective input window with **<OK>**
- select the position with the cursor keys **<right/left>** (corresponding field blinks)
- set the correct value with the cursor keys **<up/down>**
- confirm input with **<OK>**

You can start the measurement with **<F3>** (Next). Proceed as follows:

- connect temperature sensor of flow probe with T2
- disconnect hoses of flow probe from instrument
- zero the pressure sensor with **<F1>**
- connect hoses of flow probe to instrument
- put flow probe into the flue gas pipe (take care to marking for flow direction)
- switch off burner and press simultaneously **<F2>**
- or:
- press **<F3>** to activate timer (3 sec.) and switch off burner by second beep
- after approx. 30 sec. the measurement value and the converted result (negative points) are available



Flow probe

An overview of the measurements is available under "**Show Analysis**". Press **<F1>** (Print) to print them out (only with option IR printer). Please care for a frictionless (direct sight) connection between the sending diode on the front of the instrument and the receiving diode on the printer. The maximal distance between both units should not exceed ca. 40 cm otherwise a trouble free transfer is no more ascertained in any case.

With "**New Heating-Check**" it is possible to clear all partial results are for a new measurement (**<F1>** (yes)). You can leave the submenu "**Heating-Check**" with the cursor key **<left>**.

Gas losses
Surface losses
Ventilation losses
Show Analysis
New Heating-Check
Heating-Check

4.2. 4-Pa Test (Option)

The simultaneous operation of room-dependent firing place and air evacuation system can lead to dangerous low pressure conditions. With the ecom-DPH it is possible to check the low pressure limit value of 4 Pa and to document in a diagram the time course of the low pressure value. Once the menu point is called up, the measurement is to be performed as follows:

Heating-Check
4-Pa Test
Diff.pressure
Pitot tube
Temperature
Main menu

- connect capillary hose for room where burner is installed to „+“
- connect capillary hose for reference place (staircase or outside air) to „-“
- operate firing and evacuation systems with maximal performance
- open window resp. connection door to burner room and check the correct evacuation of the exhaust gases
- zero pressure sensor with **<F1>**
- position capillary hose for reference location
- start record pressure value course with **<F2>** (Start)
(an acoustical signal is issued every 30 sec.)
- record pressure by opened window resp. connection door
- close window resp. connection door after approx. 30 sec. and check low pressure
- after approx. 30 sec. open window resp. connection door and check zero point
- close window resp. connection door after approx. 30 sec. and check low pressure
- after approx. 30 sec. open window resp. connection door and check zero point
- close window resp. connection door after approx. 30 sec. and check low pressure

Once the measurement time is completed, the diagram can be viewed on the display. Use cursor keys **<up/down>** to emphasize illustration 1x, 2x, 4x, 8x times. With the cursor keys **<right/left>** the time axis can be adjusted. Press **<F1>** (Print) to start a print out (only with option IR printer).

4.3. Differential pressure

After calling up the menu point **“Differential pressure”** it is possible to make pressure measurements. The measured values can be displayed in hPa or Pa (switch with **<F3>**).

+ press -	
Diff.press.measur.	
0.00	Press Pa
ΔP->0 Int=0 hPa/Pa Menu	

4.4. Pitot tube

After calling up the menu point **“Pitot tube”** it is possible to make flow measurements with the flow probe. Connect the temperature plug of the flow probe to T2. Please take care to marking for flow direction.

+ press -	
T2 Pitot measur.	
Temperatur	Flow
23.4 °C	0.95 m/s
ΔP->0 Int=0 Menu	

4.5. Temperature

After calling up the menu point **“Temperature”** it is possible to make differential temperature measurements. Connect temperature sensor for surfaces and air temperature sensor to T1 and T2. The temperature difference between the two sensors is calculated. With **<F1>** (Mode) the temperature difference of the two sensors to the internal temperature sensor can be calculated.

T1: 22.4 °C	
T2: 20.4 °C	
ΔT: 2.0 °C	
Mode	Menu

5. Adjustments

5.1. DPH Adjustments

Additionally to those ecom-DPH functions described previously, various adjustments can be made in the instrument. From the main menu, select the sub-menu "**Adjustments**" and confirm with **<OK>**. Under "**DPH settings**" you will get a selection of modifiable parameters that can be adjusted depending on the application. Place the cursor on the desired line and call up the setting with **<OK>**. The modifiable parameters are:

DPH Adjustments
Param. f.measurement 4Pa-Test
Adjustments

Set clock (press **<OK>** to access setting menu):

-correction of internal clock with cursor keys

LCD lighting (press **<OK>** to access setting menu):

-setting the display backlight with cursor keys **<up/down>**:

-ON = Lighting is always on

-OFF = Lighting is always off

-1, 5, 10 minutes = Lighting on for 1, 5, 10 minutes,
if no key is pressed

LCD contrast (press **<OK>** to access setting menu):

-setting the display contrast with cursor keys **<up/down>** in 4 steps:

-Low, Middle, High, Very High

Key beep (press **<OK>** to access setting menu):

-setting an acoustic signal by key pressing with cursor keys **<up/down>**

Batt.charg (press **<OK>** to access setting menu):

-setting if a loading unit is used or not with cursor keys **<up/down>**

5.2. Parameters for measurements

Under "**Param.f.measurement**" you will get a selection of modifiable parameters that can be adjusted depending on the measurement. Place the cursor on the desired line and call up the setting with **<OK>**. The modifiable parameters are:

DPH Adjustments
Param. f.measurement
4Pa-Test
Adjustments

Atm.press (press **<OK>** to access setting menu):
-input of barometric air pressure for velocity calculation
(default = 1013 hPa)

Factor f. Pitot t. (press **<OK>** to access setting menu):
-input of pitot factor for velocity calculation
(default = 0.93 for flow probe)

Progressive damping (press **<OK>** to access setting menu):
-setting if the damping should be progressively (for large pressure changes the display reacts faster than by small pressure changes; default = No).

5.3. Adjustments 4-Pa Test

Under "**4Pa-Test**" you can adjust the measuring time for the 4-Pa-Test (settings 3, 4, 5, 6 minutes are possible; default = 4 minutes). You can leave the submenu "**Adjustments**" with the cursor key **<left>**.

DPH Adjustments
Param. f.measurement
4Pa-Test
Adjustments

6. Technical data ecom-DPH

- Power supply:**
- Battery: 3 x 1,5 V AA (Mignon)
 - or 3 x 1,2 V AA NiCd (nickel cadmium)
 - or 3 x 1,2 V AA NiMh (metal hydride)
- Power consumption:**
- With backlit approx. 90 mA
 - Without backlit approx. 45 mA
- Display:**
- Graphic display
 - Resolution 128 x 64 pixel
 - Window approx. 43 x 28 mm
- Operation:
(menu-monitored)**
- 4 cursor keys
 - 1 confirmation key
 - 4 function keys
 - 1 ON/OFF key
- Differential pressure
measurement:**
- Pressure range +/- 10 hPa (mbar)
- Resolution:**
- 0,01 hPa (mbar) or 0,01 Pa
- Accuracy:**
- < 3% of measured value
 - < 0,3 Pa from 0 to 10 Pa
- Internal clock:**
- Adjustment via menu and keyboard
 - Buffer for battery change only (approx. 1 minute)
- Dimensions (LxWxH):**
- Approx. 170 x 75 x 35 mm
- Weight:**
- Complete approx. 300 g
- Ambient temperature:**
- 0 bis 50 °C

7. Maintenance Tips

To secure the accuracy of your measuring instrument we recommend the annual check by an authorized ecom partner. In the case of strong demand (e.g. permanent several hours of measurement per day, rough conditions etc.) shorter intervals between checks should be selected - please contact your ecom partner. All ecom partners are listed under www.rbr.de.

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