

**INTELLIGENT MESSEN!**  
MEASURE WITH INTELLIGENCE!

**ecom<sup>®</sup>**

English

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# OPERATION MANUAL

## ecom<sup>®</sup> J2KN<sup>pro</sup>

### Versions

ecom-J2KNpro Easy (Item no: 107660 and 9107660)  
ecom-J2KNpro Expert (Item no: 108050 and 9108050)  
ecom-J2KNpro Engine (Item no: 7108007 and 9108007)  
ecom-J2KNpro Industry (Item no: 7108008 and 9108008)

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Congratulations!

With your purchase you have decided on a high-quality product of ecom GmbH.

Get to know the product before you start using it while reading carefully the following instructions of use and the safety indications. Use the product only as described and only for the given areas of application in order to ascertain its longevity.

## Safety Instructions



### WARNING

#### **Risk of poisoning**

Noxious gases are sucked in by the measuring device and released into the ambient air. Only use the measuring device in well ventilated spaces!



### WARNING

#### **Risk of injury**

Improper work on combustion engines or combustion controllers can lead to injuries.

Work on such systems may only be carried out by specialists.



### WARNING

#### **Risk of electric shock**

Live components are exposed when the housing is open. Before opening the device, disconnect it from the power supply voltage.



### WARNING

#### **Explosion Hazard**

The ecom-J2KNpro is not approved for use in hazardous areas / ATEX zones!

The ecom-J2KNpro must not be used in such areas!



## WARNING

### **Explosion Hazard**

The ecom-J2KNpro is not approved for measuring explosive gas mixtures!

The ecom-J2KNpro must not be used for such purposes!



## CAUTION

### **Damage to electronic components**

Moisture or frost can damage the electronics.

Do not store the unit in moist rooms or at sub-zero temperatures.



## CAUTION

### **Damage to electronic components**

Electrostatic discharge can damage electronic components.

Before touching the inside of the housing, touch a grounded component!



## CAUTION

### **Damage to the sensors**

Substances containing solvents damage the device's sensors.

Avoid contact with substances containing solvents!

## NOTICE

The ecom-J2KN<sup>pro</sup> may not be used for continuous emission control!

## NOTICE

The ecom-J2KN<sup>pro</sup> meets the requirements of DIN EN 50379 part of 2.

## NOTICE

Following minimum times must be kept, in order to receive correct measured values:

- 1 min. to calibrate the sensors at fresh air
- 2 min. for stable measured values

## NOTICE

1. Charge the accumulator regularly (Charge not used instrument min. once a month)!
2. Never store the instrument with unloaded battery!

## NOTICE

Strong electromagnetic fields can affect the function of the device.  
Do not expose the device to strong electromagnetic radiation.

## NOTICE

Check fine dust filter regularly. Replace the fine dust filter if the soot scale has a grey value  $> 3$ .

## Important hints for using IR bench

### NOTICE

Please switch on the instrument 15 min. before starting the fresh air calibration, in order to bring the infrared bench on operating temperature!

### NOTICE

Please start every 15 min. a fresh air calibration by using the infrared bench (especially with methane) to get accurate measurements (Adjustments / Re-Calibration)!

### NOTICE

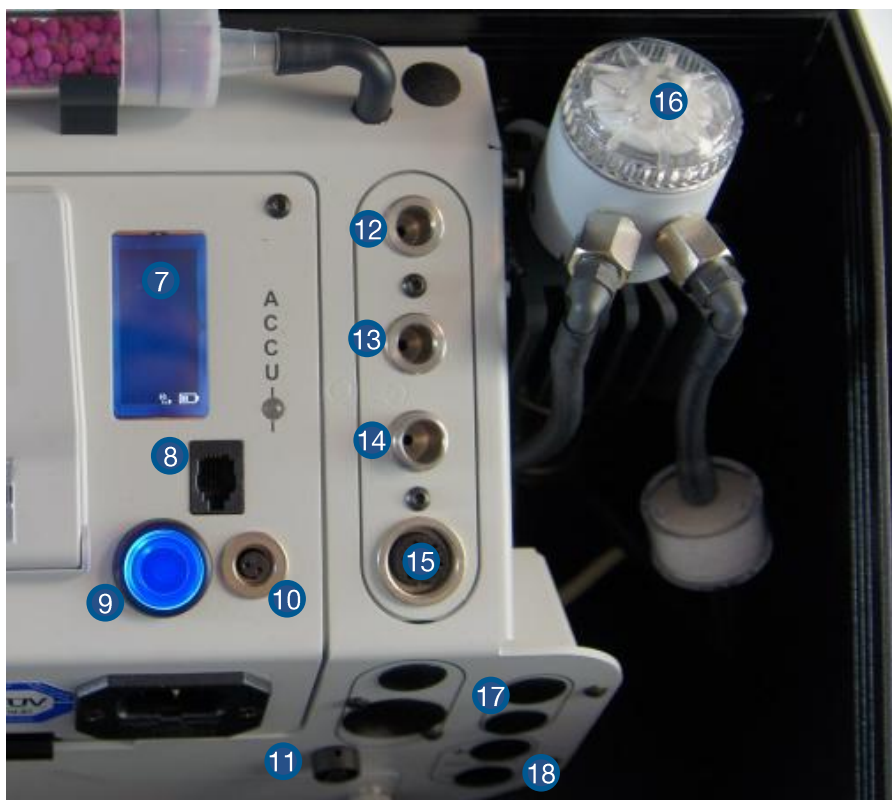
If the infrared bench is calibrated with methane, the measured value is displayed as CH<sub>4</sub>. This value is converted into mg/m<sup>3</sup> of carbon and is available as ~TOC (the proportion of CH<sub>4</sub> within the total organic carbon).

# 1. Instrument design

## 1.1. Basic module



|   |                                          |   |                             |   |                                  |
|---|------------------------------------------|---|-----------------------------|---|----------------------------------|
| 1 | Control module                           | 3 | Printer                     | 5 | Connection heated probe (option) |
| 2 | SO <sub>2</sub> /NO <sub>x</sub> -filter | 4 | Connection mains power plug | 6 | Connection condensate evacuation |



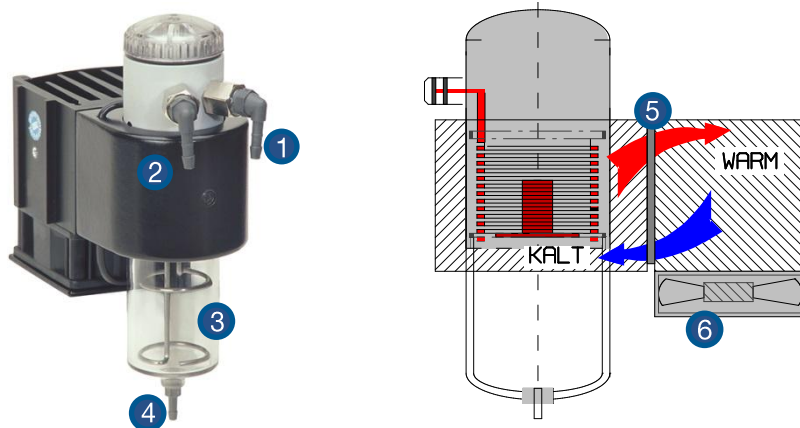
|    |                                   |    |                     |    |                                       |
|----|-----------------------------------|----|---------------------|----|---------------------------------------|
| 7  | Info display                      | 11 | Connection AUX      | 15 | Connection gas temperature            |
| 8  | Connection basic / control module | 12 | Connection pressure | 16 | Condensate trap with fine dust filter |
| 9  | Basic ON / OFF                    | 13 | Connection draught  | 17 | Connection analogue inputs            |
| 10 | Connection 1 air temperature      | 14 | Connection gas      | 18 | Connection pitot tube (option)        |

## 1.2. Control module



|   |                              |    |                                   |    |                     |
|---|------------------------------|----|-----------------------------------|----|---------------------|
| 1 | Connection 2 air temperature | 6  | Store key                         | 11 | Connection keyboard |
| 2 | BLE antenna (Option WiFi)    | 7  | Cursor keys                       | 12 | Display backlit     |
| 3 | Slot for Multi-Media-Card    | 8  | ESC-keys                          | 13 | OK key              |
| 4 | Display                      | 9  | ON/OFF control module             | 14 | Print key           |
| 5 | Function keys                | 10 | Connection basic / control module | 15 | USB-Anschluss       |

## 2. Gas cooler (Option)



|   |            |   |                       |   |                 |
|---|------------|---|-----------------------|---|-----------------|
| 1 | Gas inlet  | 3 | Level control         | 5 | Peltier element |
| 2 | Gas outlet | 4 | Condensate evacuation | 6 | Fan             |

### NOTICE

When the gas cooler is active, the power requirement increases. In case of battery operation, the cooling performance is reduced.

Exhaust gas with a temperature over the steam dew point (35 to 65 °C) is flown spiral via a long gas path thru a surface coated metal body with good thermal conductivity. The gas radiates its heat to this metal body. A PELTIER element (semiconductor cooling element) flown by a continuous current is thermally connected with this body and with a second metal body with cooling ribs and ventilation slots. The flow thru the PELTIER element creates a heat transfer from WARM to COLD, drains the heat of the metal body flown by gas and conveys it to the outer cooling body. This heat is conveyed thru a vertical forced ventilation to the surrounding air. The condensation issued by the heat loss of the gas drops in a receptacle and is pumped out on request by a periodically working hose pump.

### 3. Power supply

#### NOTICE

Used accumulators can be returned to us or brought to recycling stations of public waste disposal companies respectively accumulators selling stores!

The basic module of the ecom-J2KN<sup>pro</sup> is delivered with internal loading unit. The instrument can be operated upon a longer time period with the internal accumulator (7,2 V; 11,6 Ah). Connecting the internal charging unit to mains power is only compulsory to recharge the accumulators and to operate the heated probe system.

The accumulators should be recharged when the instrument shows a corresponding message (acoustical warning and display information). The accumulators loading stand can be checked, looking at the voltage information on the display (menu "Control"). The battery warning is activated when the value „ACC.B“ is smaller than 6,5 V. By 6,0 V the power operation via battery is no more possible. The instrument must be further powered via internal charging unit.

#### NOTICE

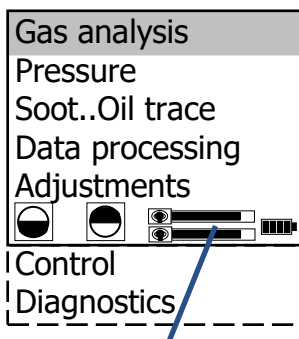
Never use batteries, to operate the control module of the J2KN<sup>pro</sup>!

The control module of the ecom-J2KN<sup>pro</sup> is powered by 3 nickel-metal-hydride accumulators (type AA). In case of need, the accumulators can be recharged by docking the control module to the basic module.

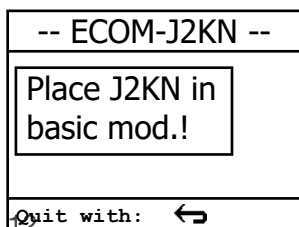
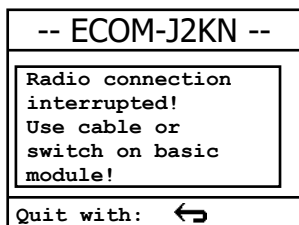
## 4. Radio communication basic / control module



Unlocking



Bar indication  
Radio quality



Thanks to the detachable control module the basic module can be monitored wireless. The basic module can be unlocked as follows:

1. Press to unlock,
2. Tip control module forwards.
3. Release control module from basic module.

The information exchange between control and basic module is performed via radio transmission (868 MHz) with a coverage of approx. 70 m (by free sight). The quality of the radio transmission is documented by a bar indication in the main menu of the instrument (long bar = good radio communication).

By interruption of the radio communication, an error message is displayed. By persisting disturbances of the radio communication, a cable (option) can take over the transfer (connection between socket DATA on control unit and socket DATA on basic module).

If the basic module is switched off and the control module not, so the display will show an error message inviting to fix the control module in its docking station (helps also not to forget the control module). Observe this order, quit with **<ESC>** and finally switch off the control module.

## 5. Data record

The multi-media card enables the storage of both punctual measurements and data logger records. The values of punctual measurements are written in a text file (J2KDV.txt). Those of data logger records in a csv file (J2KDL-xx.csv / xx = records numbered consecutively).

Both file types have the same structure and can be imported respectively opened in Excel. See chapter „Technical Data“ for data format information. The files can be transferred on the PC using a card reader.

### NOTICE

The SD card must have the following properties:

- min. card volume 32 MB - max.32 GB (UHC)
- card formatted on 16 bit FAT or FAT32



Insert the multi-media card as shown. Take care that the card does not stand out and hooks on.



### CAUTION

#### **Data loss**

Never pull-out cards during data record - data loss and damage of the data carrier possible!

## 6. Instrument switch on

### NOTICE

At temperatures below 10 °C the gas channel plate will be heated with mains power connection – connect instrument to mains power!

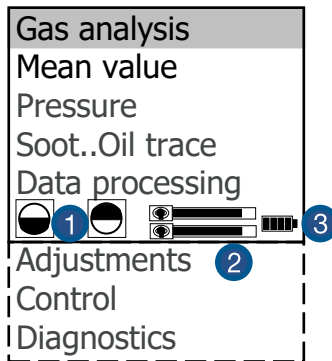
### NOTICE

Always position the probe in the exhaust pipe once the calibration phase is over! (Exception: devices with fresh air valve)

### NOTICE

Always use a filtering system as per our recommendation for combustion plants firing solid combustibles!

Once the control module has been switched on (key <I/O>), the main menu is displayed. 8 sub-menus with the following functions are displayed (non-visible sub-menus can be called up scrolling the arrow keys):



1

Display contrast  
(set with F1 and F2)

2

Display radio and  
transmission quality

3

Display charging  
status

1. Gas analysis: Perform gas analysis.
2. Mean value: Measurement with mean value calculation.
3. Draught measure.: Perform draught or pressure measurement.
4. Soot...Oil trace: Input of soot measurements results.
5. Data processing: Assign measurements / Load or send data.
6. Adjustments: Modify instrument adjustments.
7. Control: Check operation state of instrument.
8. Diagnosis: Read-out of firing automats (only in connection with ecom-xRE) / dT-measurement.



## CAUTION

### Wrong measurement results

Make sure that the instrument is turned on in clean air, because the zero point of the sensors will be updated with fresh air!

If measurements are carried out first the basic module has to be turned on (switch below the info display). Select with the **cursor keys** the sub-menu "**Gas analysis**" and confirm with **<OK>**. The instrument starts a 1- minute calibration phase and it enquires if you wish to use the data bank. If you want to assign the sampled data to a specific plant, so press **<F1>** (**<F4>** = no: measurement will be performed without assignment).

| Fuel type                                                                                   |      |       |
|---------------------------------------------------------------------------------------------|------|-------|
| Fuel oil (B)                                                                                |      |       |
| CO2max                                                                                      | A1   | B     |
| 15.4                                                                                        | 0.50 | 0.007 |
| Select:  |      |       |

Fuel types acc. to 1st BImSchV\*:

Fuel oil (B)  
 Natural gas (B)  
 City gas (B)  
 Coke oven gas (B)  
 Liquid gas (B)

*\* Country specific fuel types programmable on demand.*

Use the **cursor keys** to select the de-sired fuel type and confirm with **<OK>**.

## 7. Input or select plant specific data

To call up plant data recorded in the ecom-J2KN<sup>pro</sup> or to create a new file, the following possibilities are available:

|                                                                                              |  |
|----------------------------------------------------------------------------------------------|--|
| Selection upon:                                                                              |  |
| Search word                                                                                  |  |
| Memory number                                                                                |  |
| Create new                                                                                   |  |
| Quit with:  |  |

**Create new** (is automatically selected by first use of a MM card): To create a new file, a numerical number can be assigned:

1. Select **"Create new"**.
2. Confirm with **<OK>**.
3. Input a number (max. 16 numbers).

**Example: "25.11.2017"**

|                              |
|------------------------------|
| Input number                 |
| 25.11.2017                   |
| Please use the numeral keys! |

**Tip:** We suggest a date-related input to easily find the data record later on via the search function (search per date).

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|
| Insert Text                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
| 25.11                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
| <table border="0"> <tr> <td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td>J</td><td>K</td><td>L</td><td>M</td> </tr> <tr> <td>N</td><td>O</td><td>P</td><td>Q</td><td>R</td><td>S</td><td>T</td><td>U</td><td>V</td><td>W</td><td>X</td><td>Y</td><td>Z</td> </tr> <tr> <td>Ä</td><td>Ö</td><td>Ü</td><td>.</td><td>-</td><td>(</td><td>)</td><td>[</td><td>]</td><td>{</td><td>}</td><td></td><td></td> </tr> </table> | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | Ä | Ö | Ü | . | - | ( | ) | [ | ] | { | } |  |  |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | B | C | D | E | F | G | H | I | J | K | L | M |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
| N                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | O | P | Q | R | S | T | U | V | W | X | Y | Z |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
| Ä                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Ö | Ü | . | - | ( | ) | [ | ] | { | } |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
|                                                                                                                                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |

After confirming with **<OK>** it is possible to enter a text (max. 6 lines with 20 indications) with a software keyboard (for print out or data processing).

Proceed as follows:

1. Choose Text line 1 with the **cursor keys <up/down>** and confirm with **<OK>**.
2. Select keyboard (4 keyboards are available) with **<F3>**.
3. Select with the **cursor keys <up/down/right/left>** a character (selected character is black deposited).
4. Choose the character with **<OK>** (the last character can be deleted by pressing **<F2>**).
5. Repeat procedure, until line is complete.

If you want to correct a character, proceed as follows:

1. Interrupt choosing characters with **<F4>**.
2. Select character with the **cursor keys <right/left>**.
3. Activate choosing characters with **<F4>** and set a new character.
4. Select the next line after pressing **<F1>**.

You can close the text input with **<ESC>**. Activate the next free record number with **<OK>** and start flue gas measurement with **<F1>**.

|                                                                                              |
|----------------------------------------------------------------------------------------------|
| Selection upon:                                                                              |
| Search word                                                                                  |
| Memory number                                                                                |
| Create new                                                                                   |
| Quit with:  |

|                                                                                    |
|------------------------------------------------------------------------------------|
| Memory number                                                                      |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">1</div> |
| Please use the Numeral keys!                                                       |

**Example:** "1" for memory number 1

**Memory number:** For check of the plant already stored in the instrument, the selection upon record number is most appropriate:

1. Select **"Memory number"**.
2. Confirm with **<OK>**.
3. Input a random memory number.
4. Press **<OK>** once the input is completed to call up said data memory number. The **cursor keys <Up/Down>** enable the check of the record numbers.
5. Press **<F1>** to select the first record number and **<F2>** for the last.
6. Press **<F4>** to delete the content of the selected record number.
7. Press **<OK>** to activate the record number.
8. Finally press **<F1>** to start the gas analysis.

**Search word:** If the plant code is known, it is possible to find the plant data stored with help of a search machine.

|             |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |     |  |  |  |  |  |  |  |  |  |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|-----|--|--|--|--|--|--|--|--|--|
| Search word |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |     |  |  |  |  |  |  |  |  |  |
| 25.11       |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |     |  |  |  |  |  |  |  |  |  |
| A           | B | C | D | E | F | G | H | I | J | K | L | M | N  | O | P | Q | R | S | T | U | V | W | X | Y | Z |     |  |  |  |  |  |  |  |  |  |
| Ä           | Ö | Ü | . | - | ( | ) | [ | ] | { | } |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |     |  |  |  |  |  |  |  |  |  |
| ✓           |   |   |   |   |   |   |   |   |   |   |   |   | ←→ |   |   |   |   |   |   |   |   |   |   |   |   | f a |  |  |  |  |  |  |  |  |  |

**Example:** "25.11" for plant code 25.11.2017

|                                                  |  |
|--------------------------------------------------|--|
| Memory number 1                                  |  |
|                                                  |  |
| 25.11.2017                                       |  |
| F1:First record<br>F2:Last record F4:Delete      |  |
| End with : <input checked="" type="checkbox"/> ! |  |

1. Select **"Search word"** and press **<OK>**.
2. Input with software keyboard 4 related figures of the plant code:
3. Press **<F1>** after input to start the searching process. All possible correspondences with this figures sequence will be filtered. The selection can be stepped thru with the arrow keys (**<F1>** for selection beginning, **<F2>** for selection end)
4. Press **<OK>** to activate once the desired data block is found
5. Press / „View“ / **<OK>** to view the previous analysis at this plant
6. All measured and calculated values can be called up on 4 display pages using the arrow keys to step thru.

Measurement available

|                                                                     |  |
|---------------------------------------------------------------------|--|
| Memory number 1                                                     |  |
|                                                                     |  |
| 25.11.2017                                                          |  |
|                                                                     |  |
| Data record 12:15:53 25.11.17<br>Further pages:<↑↓> Memory number 1 |  |

|                                    |           |
|------------------------------------|-----------|
| O2                                 | 3.2 %     |
| CO2                                | 13.1 %    |
| CO                                 | 0 ppm     |
| Eff.                               | 92.5 %    |
| Losses                             | 7.5 %     |
| Exc. air                           | 1.18      |
| T.Gas                              | 184.4 °C  |
| T.Air                              | 20.3 °C   |
| Draught                            | -0.03 hPa |
| Gas analysis 12:15:53 25.11.17     |           |
| Further pages:<↑↓> Memory number 1 |           |

|                                    |         |
|------------------------------------|---------|
| O2                                 | 17.5 %  |
| CO 0%                              | 738 ppm |
| CO                                 | 123 ppm |
| Exc. air                           | 7.00    |
| CO measurement 12:15:53 25.11.17   |         |
| Further pages:<↑↓> Memory number 1 |         |

|                                                                          |          |
|--------------------------------------------------------------------------|----------|
| O2 value in air                                                          |          |
|                                                                          |          |
| O2                                                                       | 19.5 %   |
| CO                                                                       | 3 ppm    |
| Draught                                                                  | 0.01 hPa |
| Ringspaltmessung 12:15:53 25.11.17<br>Further pages:<↑↓> Memory number 1 |          |

|                     |       |
|---------------------|-------|
| Soot..Oil trace     |       |
| Boiler temp. : 65°C |       |
| 1st Soot meas.:     | 0.5   |
| 2nd Soot meas.:     | 0.3   |
| 3rd Soot meas.:     | 0.7   |
| Oil trace           | NO    |
| Mean value          | : 0.5 |

|                                    |         |
|------------------------------------|---------|
| dT measurement                     |         |
| T1                                 | 70.4 °C |
| T2                                 | 56.3 °C |
| dT                                 | 14.1 °C |
| dT measurement 12:15 25.11.17      |         |
| Further pages:<↑↓> Memory number 1 |         |

Press **<F1>** to quit the previous measurement and start recording of the current measurement values.

## 8. Gas measurement

### 8.1. Gas analysis

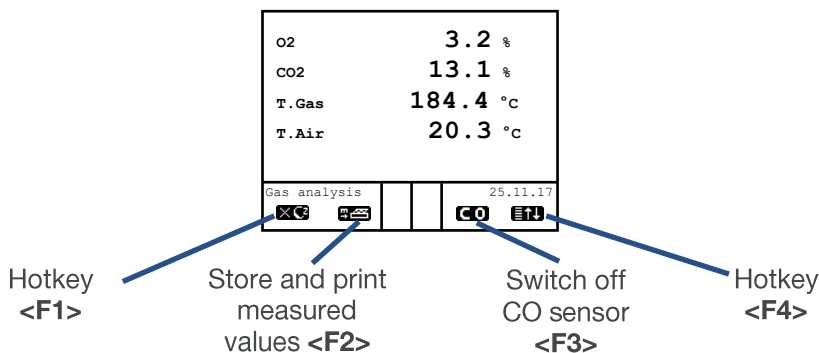


#### CAUTION

##### Wrong measurement results

Re-calibrate the instrument after each measurement (after one hour at the latest) to get correct results!

After the 1-minute calibration phase, the instrument switches over to the measurement mode. The gas measurement values can be viewed on different display pages. Use the **cursor keys** to scroll the pages.



With <F1> you can switch from the measured value display to a menu or to „Standby“ selected before (see chapter „Adjustments“). Possible menu options are: Soot... Oil trace, Data processing, Adjustments, Control, Fuel type, Eff. (C), Memory -> M, Pressure. Further you can switch with <F1> from any menu back to the measured value display.

With <F2> you can print and store the measured values into the intermediate memory at the same time.

With <F3> you can switch off the CO sensor, in order to protect the sensor against too high concentrations. The automatic disconnection will switch off the CO sensor at 2500 ppm or 4000 ppm (depending on the model).

With <F4> you can switch from the measured value display to a menu or to „Standby“ selected before (see chapter „Adjustments“). Possible menu options are: Soot... Oil trace, Data processing, Adjustments, Control, Fuel type, Eff. (C), Memory -> M, Display values, Pressure.

Further you can switch with **<F1>** from any menu back to the measured value display.

The position of the measured and calculated values (gas analysis) on the display pages is free selectable (choose **"Display values"** for **<F4>** Hot-key). For alteration of the existing succession respectively personal listing, proceed as follows:

1. Press **<F4>** to activate the function.
2. Select the line with the **cursor keys <up/down>**.
3. Select the measured or calculated value with the **cursor keys <right/left>**.
4. Repeat this procedure until all modifications are completed.
5. Press **<F4>** to deactivate the function.

### **Instruments with magnetic valve and fresh air connection**

Instruments that are equipped with magnetic valve technology and fresh air connection are able to be purged or calibrated with fresh air without taken out the probe out of the flue gas duct:

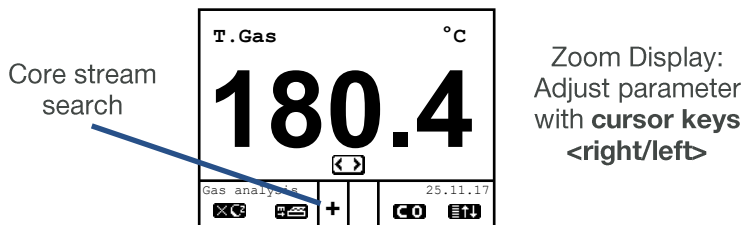
For fresh air purging, press the **<OK>** key from the measured value display, select the menu item **"Fresh air purge"** and press the **<OK>** key again. The fresh air purging can be ended with **<F3>** in the measured value display.

For fresh air calibration, press the **<OK>** key from the measured value display, select the menu item **"Re-Calibration"** and press the **<OK>** key again. After the following query has been answered with **"YES" (<F1>)**, the 1-minute calibration phase starts.

### **Core stream search**

Position the sampling probe in the exhaust channel so that the thermocouple is fully surrounded with the gas.

Perform the measurement in the core stream of the exhaust gas channel (probe placed in the highest gas temperature area).



A trend indication for T.Gas eases the core stream search. As long as the display shows a + symbol, the measured temperature increases, it means the probe tip moves towards the core stream. If a - symbol is displayed, pull the probe out of the core stream and the temperature sinks. If no temperature change is shown for at least 3 seconds, so the trend indication will be deleted.

CO<sub>2</sub>, efficiency, losses, excess air and dew point are calculated values. They can only be calculated if realistic values for the basic parameters O<sub>2</sub> and temperatures are available. It must be ascertained that:

$$\text{O}_2 < 20,5 \% \text{ and } \text{T.Gas} - \text{T.Air} > + 5 \text{ } ^\circ\text{C}$$

are given. The dew point can only be calculated accurately if, in the menu "**Adjustments**", the current barometric air pressure value has been entered. This value cannot be determined by the **ecom-J2KN<sup>pro</sup>**. If the gas temperature falls below the dew point (between 25 and 65 °C), ETA will be calculated with condensation. In the display (C) appears behind ETA.

Correct measurement values are displayed first after a short delay, necessary for the gas transport and the build-up of a stable electro-chemical reaction at the sensors. This time period lasts approx. between 1 and 1.5 minute. For recording, printout and evaluation wait until the values do not change anymore. If deviations higher than 2 ppm still occur by the gas values, they can be due to unstable pressure conditions in the exhaust channel.

|                        |          |
|------------------------|----------|
| O <sub>2</sub>         | 3.2 %    |
| CO <sub>2</sub>        | 13.1 %   |
| T.Gas                  | 184.4 °C |
| T.Air                  | 20.3 °C  |
| Gas analysis recorded! |          |
| 25.11.17               |          |
| CO                     |          |

Measurement stored in intermediate memory

If the measurement values are stable and the results can be printed out, press the key **<Store>** (disk symbol) to transfer the values in the intermediate memory (caution: store gas analysis and CO measurement values separately). The values are stored for a later printout and, if need be, for a final data record storage.

If a printout of the values should be made simultaneously to the intermediate recording, so press **<F2>** (the complete content of the intermediate memory will be printed).

## 8.2. CO measurement (gas channel check)

For the technical check of gas-fired plants in regards of safety aspects the gas channel check called also CO measurement is used. Hereby the CO concentration in the gas channel is measured after the flow safety device and calculated on an undiluted value (oxygen rest content in flue gas = 0 %). As the gas conditions after the flow safety device are no more homogeneous because of the flow in of secondarily air and consequently the core stream measurement can be erratic, the analysis of the exhaust gas is performed along the totality of the exhaust pipe diameter. A multi-hole probe (optional accessory) is hereby used as sampling probe.

|                          |         |
|--------------------------|---------|
| O <sub>2</sub>           | 17.5 %  |
| CO 0%                    | 738 ppm |
| CO                       | 123 ppm |
| Exxc. air                | 7.00    |
| CO measurement recorded! |         |
| 25.11.17                 |         |
| CO                       |         |

Measurement stored in intermediate memory

The calculated value shown on the line CO 0 % corresponds to the measured CO concentration supposed the oxygen content would amount 0% by the same exhaust gas volume. It is consequently the undiluted CO content in exhaust gas. If the value indication is stable, press the key **<Store>** (disk symbol) to store the result in the intermediate memory. If a printout of the values should occur simultaneously to the recording in the intermediate memory, press **<F2>** (the complete content of the intermediate memory will be printed out).

### 8.3. O<sub>2</sub> check

| O2 value in air           |      |          |      |
|---------------------------|------|----------|------|
| O <sub>2</sub>            | 19.5 | %        |      |
| CO                        | 3    | ppm      |      |
| Draught                   | 0.01 | hPa      |      |
| O2 value in air recorded! |      | 25.11.17 |      |
|                           |      | CO       | AP-0 |

Measurement stored in intermediate memory

This measurement is performed by room-independent plants like gross calorific value plants. It is determined if exhaust gas flows into the combustion air (O<sub>2</sub> content drops down / CO content may be rise) and herewith influence on the combustion quality.

For this analysis a special multi-hole probe (optional accessory) should be used. If the value indicated is stable, press the key **<Store>** (disk symbol) to store the value in the intermediate memory. If a printout of the values should occur simultaneously to the recording in the intermediate memory, press **<F2>** (the complete content of the intermediate memory will be printed out).

### 8.4. Flow measurement (Option)

| Flow measurement       |     |                    |      |
|------------------------|-----|--------------------|------|
| V. Gas                 | 0.4 | m/sec              |      |
| M. Flow                | 44  | Nm <sup>3</sup> /h |      |
| dP                     | 0.1 | Pa                 |      |
| Flow measur. recorded! |     | 25.11.17           |      |
|                        |     | CO                 | AP-0 |

Measurement stored in intermediate memory



Connections for pitot tube

This measurement can be done with a pitot tube. At first the pitot factor of the pitot tube must be entered (**„Adjustments“ / „Internal“ / „Pitot factor“**). After connecting the pitot tube to the instrument, the zero point of the sensor can be set with **<F4>**. With **<F1>** the cross section of the flow channel can be entered (needed for calculation of the flow rate). After the pitot tube is positioned in the flow channel, the display shows the speed (m/s), the flow rate (Nm<sup>3</sup>/h) and the differential pressure (Pa). If the value indicated is stable, press **<Store>** to store the value in the intermediate memory. If a printout of the values should occur simultaneously to the recording in the intermediate memory, press **<F2>** (the complete content of the intermediate memory will be printed out).

## 8.5. Draught measurement

A trend indication for the draught conditions in the exhaust channel can already be determined during the gas analysis. Nevertheless the value for the chimney draught will not be stored together with the gas values while pressing the key **<Store>**. Indeed the difference pressure sensor tends to drifts because of its sensibility and, for an exact measurement it is consequently advised to re-calibrate the sensor immediately before sampling and documenting the value. Access the menu while selecting the sub-menu **"Pressure"**.

|                                                                                               |
|-----------------------------------------------------------------------------------------------|
| Pressure                                                                                      |
| -0.12 hPa                                                                                     |
| Recorded value:<br>--.-- hPa                                                                  |
| New 0 point  |

The current value is displayed as well as the instruction to adjust the zero point of the sensor. Release hereto the draught hose from the instrument for a short moment and press **<F4>**. The sensor is herewith re-calibrated.

|                                                                                               |
|-----------------------------------------------------------------------------------------------|
| Pressure                                                                                      |
| -0.12 hPa                                                                                     |
| Recorded value:<br>-0.12 hPa                                                                  |
| New 0 point  |

Fix the draught hose again. The display shows the exact measurement value which can be stored while pressing **<Store>** and added to the previous results in the intermediate memory. The stored value is shown on the display. Press **<ESC>** to quit the differential pressure measurement menu.

Measurement stored in  
intermediate memory

## 8.6. Soot..Oiltrace

| Soot..Oil trace |      |
|-----------------|------|
| Boiler temp.:   | 66°C |
| 1st Soot meas.: | -. - |
| 2nd Soot meas.: | -. - |
| 3rd Soot meas.: | -. - |
| Oil trace :     | ---- |
| Mean value:     | -. - |

The sub-menu "**Soot...Oil trace**" enables the input of measured results for boiler temperature, soot dots and oil trace. Select the line „**Boiler temp.**“ and press **<OK>** to activate the input. The input can be made using the numerical keys. Press **<OK>** to store the value in the data record of the measurement.

The soot dot measurement is to be performed with the optional heated pistol grip probe which heating function prevents the filter paper to become wet because of the humidity issued by the combustion condensate. The filter paper slot is hereby heated up to approx. 70 °C. Switch hereto the probe heating of the pistol grip probe while selecting „**Adjustments / Internal / Probe heating / <F1>**“.

Proceed as follows:

1. Insert a filter paper in the paper slot.
2. Select the line „**1st. Soot meas.**“.
3. Press **<OK>** to start the measurement. The display shows the volume to be sucked and the pump starts sampling.

If the soot dot analysis is made with a manual pump the sucking procedure can be interrupted while pressing **<F4>** (result value can immediately be entered).

Once 1,63 litre has been sucked in, the instrument will instruct to input the opacity degree. Proceed as follows:

1. Release the filter paper from the probe slot.
2. Compare the greyness with the opacity scale.
3. Input the result using the numerical keys and press **<OK>**.
4. Repeat this procedure until all 3 soot dot analysis are completed.
5. The mean value will be calculated and automatically stored.

The result of the oil trace check is to be documented as follows:

| Soot..Oil trace |      |
|-----------------|------|
| Boiler temp.:   | 66°C |
| 1st Soot meas.: | 1.0  |
| 2nd Soot meas.: | 0.5  |
| 3rd Soot meas.: | 1.5  |
| Oil trace :     | NO   |
| Mean value:     | 1.0  |

1. Set the cursor on the line "**Oil trace**".
2. Input the result with **&ltOK>** ("**NO**", "**YES**" or "- - -").

Press **&ltESC>** to quit the menu once all necessitated inputs have been entered. The measurement is now completed.



## WARNING

### Hazard of burning

Get the probe cooled down before putting it back in its fixation!

## 8.7. Measurement record and printout



### CAUTION

#### Data loss

Once the gas analysis is completed, transfer the values recorded in the intermediate memory to the Multi-Media-Card otherwise they could get lost by switch-off of the instrument!

|                |
|----------------|
| --ECOM-J2KN--  |
| Start printout |
| View memory    |
| Memory -> M    |
| Insert Text    |
| Quit with:     |

Press **<Print>** (printer symbol) to enter the printing menu. The sampled data can be checked one more time („**View memory**“, **<OK>**) and scroll with the **cursor keys**).

The software keyboard enables the input or correction of the 6 x 20-character text. Select hereto „**Input text**“, press **<OK>** and input text (see chapter 7).

|                |
|----------------|
| --ECOM-J2KN--  |
| Start printout |
| View memory    |
| Memory -> M    |
| Insert Text    |
| Quit with:     |

Press „**Memory -> M**“ and **<OK>** to store the all data -if correct- in the internal memory or on the multi-media card. Once the transfer is completed, a "**Memory symbol**" appears on the bottom right of the display. The entered text will only be recorded in the data record by use of the multi-media card.

|                |
|----------------|
| --ECOM-J2KN--  |
| Start printout |
| View memory    |
| Memory -> M    |
| Insert Text    |
| Quit with:     |

Select „**Start printout**“ and press **<OK>**) to start a printout.

Press **<ESC>** to turn back to the gas analysis menu.

Memory symbol

|                |
|----------------|
| --ECOM-J2KN--  |
| Start printout |
| View memory    |
| Memory -> M    |
| Insert Text    |
| Quit with:     |

## 8.8. Printed protocol ecom-J2KN<sup>pro</sup>

```
*****
* E C O M - J 2 K N *
*****
```

```
TextTextTextTextText
TextTextTextTextText
TextTextTextTextText
TextTextTextTextText
```

Free text input (6 x 20 characters for comments, remarks, information, etc.)

```
-----
Mister Musterman
-----
```

For example, name

```
Date      Time
21.09.04   13:42:02
-----
```

Date and time of recording

```
CO measurement
-----
```

Results of CO check

```
02          19.5  %
CO  0%02     6370  PPM
CO           455  PPM
Exc. air     14.00
-----
```

```
02 value in air
-----
```

Results of O<sub>2</sub> check

```
02          19.9  %
-----
```

```
Gas analysis
-----
```

Gas analysis results

```
Fuel type
Fuel oil
-----
```

```
T.Air        22  °C
T.Gas        122  °C
T.Boiler      66  °C
02           19.6  %
CO           170  PPM
CO2           1.0  %
Eff.          50.6  %
Losses        49.4  %
Exc. air      15.00
Dew poi.       105  °C
Draught       -0.02 hPa
Soot          1.5 1.0 0.5
Oil trace     NO
-----
```

Results of differential pressure measurement  
Results of soot measurement

```
-----
-rbr- Messtechnik
Am grossen Teich 2
58640 Iserlohn
-----
```

Free text programming of 8 lines 20 characters each for customers company address

```
Tel. 02371-945-5
Fax. 02371-40305
EMail : info@rbr.de
http://www.rbr.de
```

## 9. Mean value measurement

By mean value measurement function measurements can be taken in an adjustable time frame and mean values can be calculated. Should the several measurement values or the mean value result be stored a storage place has to be selected as described in chapter 7. If the function “**Store**” is activated, based on this storage place all measurements will be written consecutively on the next storage places. If the function “**Store**” is not activated, the mean value result can be stored on MMC with **<Print>** / “**Memory -> M**”.

|                 |
|-----------------|
| Gas analysis    |
| Mean value      |
| Pressure        |
| Soot..Oil trace |
| Data processing |
| Adjustments     |
| Control         |
| Diagnostics     |

|                                                                                                |
|------------------------------------------------------------------------------------------------|
| Mean value                                                                                     |
| Start measurement                                                                              |
| Meas. time                                                                                     |
| Scanning                                                                                       |
| Printer                                                                                        |
| Store                                                                                          |
| Quit with:  |

After run through fresh air calibration the menu point “**Mean value**” can be chosen. Before the mean value measurement can be started the settings for “**Meas.time**”, “**Scanning**”, “**Printer**” and “**Store**” should be checked and if necessary be changed. The meanings are:

**Meas. time** = Time frame in which the mean values will be calculated

**Scanning** = time between the measurements taken for mean value calculation

**Printer** = logging of measurements taken for mean value calculation

**Store** = all measurements for mean value calculations will be stored

“**Measurement time**” and “**Scanning**” can be adjusted as follows:

1. Select menu point and confirm with **<OK>**.
2. With the numeric keys set the desired time (0.01 = 1sec. = minimum value / 59.59 = 59 min. : 59 sec. = maximum value).
3. Confirm with **<OK>**.

The setting for **“Printer”** can be changed as follows:

1. Select menu point and confirm with **<OK>**.
2. Select desired setting with the cursor keys.
3. Confirm with **<OK>**.

The setting for **“Store”** can be changed as follows:

1. Select menu point and confirm with **<OK>**.
2. Activate storage function with **<F1>**.
3. Deactivate storage function with **<F4>**.

|                                                                                   |                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| O2                                                                                | 3.2 %                                                                             |
| CO2                                                                               | 13.1 %                                                                            |
| CO                                                                                | 0 ppm                                                                             |
| Eff.                                                                              | 92.5 %                                                                            |
| Losses                                                                            | 7.5 %                                                                             |
| Exc. air                                                                          | 1.18                                                                              |
| T.Gas                                                                             | 184.4 °C                                                                          |
| T.Air                                                                             | 20.3 °C                                                                           |
| Mean value                                                                        |                                                                                   |
| 15:59 min                                                                         | 25.11.17                                                                          |
|  |  |

By **“Start measurement”** / **<OK>** the evaluation of the measurement values will be started. On the display the actual mean values will be shown (will be up-dated with new measurement values / switch to the actual values with **cursor keys <up/down>**). It is possible to scroll through the values with the **cursor keys <right/left>**. With **<F2>** you can interrupt and with **<F4>** stop the measurement.

After finishing the measurement time a protocol of the results with all mean values can be printed (key **<Print>**).

## 10. Adjustments

Additionally to the **ecom-J2KN<sup>pro</sup>** functions described previously, various adjustments can be made in the instrument. From the main menu select the sub-menu **"Adjustments"** and confirm with **<OK>**.

|                       |   |
|-----------------------|---|
| <b>Re-Calibration</b> |   |
| Unit                  |   |
| Second unit           |   |
| Ref. O2               |   |
| Fuel type             |   |
| Quit with:            | ← |
| Set clock             |   |
| Paper feed            |   |
| Internal              |   |
| Tightness test        |   |

A selection of modifiable parameters, adjustable according to the application, is displayed. Place the cursor on the desired line and press **<OK>** to call up or modify the adjustment. The modifiable parameters are:

### Re-Calibration (Start with **<OK>**):

- Start of a calibration phase to set new zero-point for the sensors.

### Unit (adjustment with **cursor keys**):

- Calculation of gas concentrations in:

1. ppm = volume concentration (parts per million)
2. mg/m<sup>3</sup> = mass concentration per volume unit
3. mg/kWh (undiluted) = mass concentration per power unit
4. mg/MJ (undiluted) = mass concentration per power unit
5. ppm (undiluted) = volume concentration (parts per million)
6. mg/m<sup>3</sup> (undiluted) = mass concentration per volume unit

### Undiluted:

- Conversion of the gas concentration on selected reference oxygen
- mg/kWh and mg/MJ are always calculated on 0% O<sub>2</sub> basis
- Conversion formula:

$$E_{\text{ref}} = E_{\text{meas}} * \frac{21 - O_{2\text{ref}}}{21 - O_{2\text{meas}}}$$

### Second unit (adjustment with **cursor keys**):

- two different unit for one gas concentration possible

**Ref. O<sub>2</sub>** (for ppm and mg/m<sup>3</sup> units - Input after **<OK>** pressing):

- Input of O<sub>2</sub> reference value O<sub>2ref</sub>

**Fuel type** (press **<OK>** to access selection list):

- Modification of adjusted fuel type (e.g. by measurements at combination plants)

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

- Correction of internal clock with **cursor keys**

**Paper feed** (press **<OK>** to activate paper feeding):

- Paper feed line by line

**Tightness test** (Start with **<OK>**):

- Leakage test of gas system of the **ecom-J2KN<sup>pro</sup>**
- Lock probe with a plug and start test with **<OK>**

|                          |
|--------------------------|
| <b>Print contrast</b>    |
| <b>Reload function</b>   |
| <b>Key beep</b>          |
| <b>Graphic menu</b>      |
| <b>Probe heating</b>     |
| <b>Quit with: ↩</b>      |
| <b>Low power mode</b>    |
| <b>Language: English</b> |
| <b>F1 Hotkey</b>         |
| <b>F4 Hotkey</b>         |
| <b>Value options</b>     |
| <b>RF-connect. only</b>  |
| <b>USB</b>               |
| <b>Bluetooth</b>         |
| <b>WLAN</b>              |
| <b>Pitot factor</b>      |
| <b>Printout</b>          |

**Internal** (press **<OK>** to open menu):

- Further instrument settings:

**Printout contrast** (0..9)

(press **<OK>** to access input menu):

- Printer contrast adjustment

**Recharging function**

(**<F1>** for ON / **<F4>** for OFF):

- Recommended setting = OFF

**Key beep**

(**<F1>** for ON / **<F4>** for OFF):

- Acoustical signal by key pressing

**Graphic menu**

(**<F1>** for ON / **<F4>** for OFF):

- Activation of graphic mode

**Low power mode**

(**<F1>** for ON / **<F4>** for OFF):

- Switching on / off the probe heating and the gas cooler at battery operation

**Probe heating** (<F1> for ON / <F4> for OFF):

- ON/OFF switch for probe heating for soot measurement

**Language: English** (Switch with <OK>):

- Info about language (3 languages selectable)

**F1 Hotkey** (Choose after pressing <OK>):

- Change the menu you get to after pressing <F1> in value display

**F4 Hotkey** (Choose after pressing <OK>):

- Change the menu you get to after pressing <F4> in value display

**Value options** (Switch with <OK>):

- Temperature in °C or °F (not possible at all instruments)
- Excess Air as proportionate number or in %
- Calculation of efficiency with and without condensation
- Pressure in hPa, mmH<sub>2</sub>O, "H<sub>2</sub>O, PSI, mbar (not possible at all instruments)

**RF-connect. only** (Choose after pressing <OK>):

- **Standard:** no radio connection if control module is located in basic module
- **RF-connect. only:** radio connection also if control module is located in basic module
- **Remote:** without function

**USB** (Choose after pressing <OK>):

- Adjustment of transfer speed (Cursor keys <Up/Down>)
- Adjustment of Protocol (Cursor keys <Right/Left>):
  - Protocol DAS = Protocol for the program DASNT
  - Protocol Enhanced = Protocol for the program DAS5

**Bluetooth LE** (<BLE> no adjustment needed):

- Online data = Remote

## **WLAN** (Choose after pressing <OK>)

Instrument as Access Point (for connection with mobile terminals):

- **(Start/Stop WLAN:** Manual switching of WLAN connection – available only with deactivated Auto Connect)
- **Access Point:** (<F1> for ON / <F4> for OFF)
- **(W.O.) Auto Connect:** Automatically connection (<F1> for ON / <F4> for OFF)
- **Security:** Use password for connection (<F1> for ON / <F4> for OFF)  
the password is „1234567890“
- **Channel:** Input channel (1 – 13) (Entry after pressing <OK>)

Connection with existing network:

- **(Start/Stop WLAN:** Manual switching of WLAN connection – available only with deactivated Auto Connect)
- **Existing Network:** Available only with deactivated Access Point
- **(W.O.) Auto Connect:** Automatically connection (<F1> for ON / <F4> for OFF)
- **Network scan:** Search for available networks (selection with <OK>)
- **WPA password:** Input of password for selected network

**Pitot-factor** (Input after pressing <OK>):

- Input of pitot factor for flow rate calculation (ecom flow probe = 0.93)
- If the flow rate calculation is not needed, set pitot factor to 0

**Printout** (Input after pressing <OK>):

- Text input for printout on measurement protocol (8 x 24 characters)
- Input the text of line 1 as follows:

1. Activate character selection list with <OK>.
2. Select keyboard type with <F3> (4 different keyboards available).
3. Use the cursor keys to select the desired character (selected character is outlined by black background).
4. Confirm selection while pressing < OK >.
5. Repeat procedure until desired text is complete.
6. Once input for line 1 is completed, deactivate the characters selection mode with <F1> and move to the second line with the cursor key <Down>.
7. Once all lines have been processed as desired, exit the menu with <ESC>.

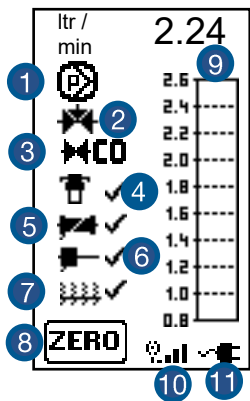
# 11. Control

The electrochemical sensors alter their output values along the operation period. The programme controls the sensors and corrects drifts. If the drifts and the correlated measurement errors increase, an error message is displayed. In this case the corresponding sensor must be changed by an authorised service centre. The control menu informs about the current status values for the sensors as well as about (page 2 and 3 with cursor keys <up/down>):

|                                                                                                                                                         |                                                                                                                    |                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------|
| Control                                                                                                                                                 |                                                                                                                    |                    |
| 1                                                                                                                                                       | ecom GmbH<br>Am Großen Teich 2<br>58640 Iserlohn<br>Tel.: 02371-945-5<br>Fax : 02371-40305<br>eMail : info@ecom.de | 8<br>9<br>10<br>11 |
| 2                                                                                                                                                       | 3                                                                                                                  |                    |
| Operation hours : 8.45 hrs<br>Serial no. : JZKN 12345<br>Service tel. : 02371-945-5<br>Programm version : V3.0 / 12.07.16<br>Next unit check : 20.04.17 |                                                                                                                    |                    |
| Control                                                                                                                                                 |                                                                                                                    |                    |
| 4                                                                                                                                                       | 12                                                                                                                 |                    |
| 5                                                                                                                                                       | 13                                                                                                                 |                    |
| 6                                                                                                                                                       | 14                                                                                                                 |                    |
| 7                                                                                                                                                       | 15                                                                                                                 |                    |
| 4.2 /s 22 ppm<br>4.2 /s 4 X<br>0.0 /s 11 X                                                                                                              |                                                                                                                    |                    |
| Operation hours : 8.45 hrs<br>Serial no. : JZKN 12345<br>Service tel. : 02371-945-5<br>Programm version : V3.0 / 12.07.16<br>Next unit check : 20.04.17 |                                                                                                                    |                    |
| Control                                                                                                                                                 |                                                                                                                    |                    |
| 7                                                                                                                                                       | Last service (history)<br>19.12.15 133 hrs                                                                         |                    |
| O2 10744 mV<br>CO 7 mV<br>Batt. 4.50 V<br>Bat.B 6.09 V                                                                                                  |                                                                                                                    |                    |

|   |                               |    |                                |    |                                 |
|---|-------------------------------|----|--------------------------------|----|---------------------------------|
| 1 | Next service centre           | 6  | Number of frames (USB)         | 11 | Recommended maintenance date    |
| 2 | Serial number                 | 7  | Date of last service           | 12 | Number of CO-switch-offs        |
| 3 | Software version              | 8  | Sensor voltages                | 13 | ppm hours of CO sensor          |
| 4 | Radio quality                 | 9  | Voltage control / basic module | 14 | Number of errors                |
| 5 | Sent frames / Received frames | 10 | Operation hour                 | 15 | Number of instrument switch-ons |

Info display:



|   |                          |   |                              |    |                              |
|---|--------------------------|---|------------------------------|----|------------------------------|
| 1 | Gas pump is running      | 5 | Heated hose ready for use    | 9  | Gas flow (liters per minute) |
| 2 | Air valve is open        | 6 | Heated head ready for use    | 10 | Radio mode                   |
| 3 | CO purging is running    | 7 | Sensors ready for use        | 11 | Mains operation              |
| 4 | Gas cooler ready for use | 8 | Calibration phase is running |    |                              |

# 12. Data Processing

## 12.1. Communication

If a MM card is inserted in the slot, so it will be used as record medium.  
The menu “**Data processing**“ offers the following functions:

|                  |
|------------------|
| Select           |
| View             |
| Memory (M)       |
| DRT <-> PC !     |
| Format           |
| Quit with: ⬅     |
| Automatic measu. |

| Date        | Time     | Fuel type |
|-------------|----------|-----------|
| 1 01.09.17  | 11:01:24 | Fuel oil  |
| 2 01.09.17  | 11:02:34 | Fuel oil  |
| 3 01.09.17  | 11:04:20 | Fuel oil  |
| 4 01.09.17  | 11:07:44 | Fuel oil  |
| 5 01.09.17  | 11:11:25 | Fuel oil  |
| 6 01.09.17  | 11:23:02 | Fuel oil  |
| 7 01.09.17  | 11:44:09 | Fuel oil  |
| 8 01.09.17  | 11:53:13 | Fuel oil  |
| 9 01.09.17  | 11:59:59 | Fuel oil  |
| 10 01.09.17 | 11:59:59 | Fuel oil  |

|               |
|---------------|
| Select: ⬆ ⬇ ⬅ |
|---------------|

### Select:

For search or creation of plants files for measurement values assignment (compare chapter “**Input or select plant specific data**”).

### View:

Recorded values to a selected plant can be viewed (compare chapter “**Input or select plant specific data**”).

### Memory (M):

Here all stored measurements (sorted by record number) can be seen. Individual measurement values can be called as follows:

1. Choose record number with the **cursor keys** and confirm with **<OK>**
2. Scroll with the **cursor keys**
3. Leave record number with **<ESC>**

|              |
|--------------|
| DFÜ <-> PC ! |
| Send data    |
| Load data    |
| Quit with: ⬅ |

### DFÜ <-> PC!:

#### Load data:

Enables the data import from e.g. ecom software (available on website „www.ecom.de“). See chapter „**Technical Data**“ for data format information (please observe the transfer options of your software!).

Proceed as follows:

1. Connect ecom-J2KNpro and PC via USB cable.
2. Select “**Load data**” and confirm with **<OK>**.
3. Answer the displayed question with **YES (<F1>)**.
4. Decide if the data recorded can be cancelled (**<F1>** for **YES** / **<F4>** for **NO**).
5. Start the data transfer on your PC.

**Send data:**

With this function the data records completed with measurement values can be transferred to the PC programme (procedure similar to chapter „**Load data**“).

**Format:**

This function is usually needed by the initial adjustment of the instrument at our factory (preparation of internal memory for data record).

**Caution: All stored values will be cancelled!**

## 12.2. Automatic measurement (Option)

The configuration of the ecom-J2KNpro with operation securing, self-regulating additional components like the condense trap, the gas cooler and the magnetic valve technique permits even a long-term operation of the instrument. By setting time intervals for the measurement the instrument switches autonomously to fresh air purge after the measurement phase (gas will be sucked via the connection fresh air) and operates a calibration phase for the sensors.

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| <b>Automatic measu.</b> |                                                                                     |
| <b>Automatic</b>        |                                                                                     |
| <b>Data logger</b>      |                                                                                     |
| <b>Automatic time</b>   | <b>120 min</b>                                                                      |
| <b>Measurem. time</b>   | <b>115 min</b>                                                                      |
| <b>Save to MMC</b>      | <b>1 sec</b>                                                                        |
| <b>CSV+Header</b>       |                                                                                     |
| <b>Quit with:</b>       |  |

This cycle repeats itself until the auto-matic measurement will be finished. For setting the time intervals select from the menu “**Data processing**” the menu item “**Automatic measu.**”. The time intervals have following meanings:

**Automatic time** (min. 10 minutes / max. 120 minutes)

- Time interval from one calibration phase to the next one.

**Measurement time** (max. Automatic time minus 5 minutes)

- Time interval within the automatic time in which the instrument gathers measurement values, i.e., in which the measurement gas will be sucked. The difference between the measurement time and the automatic time is used for purging the sensors with fresh air.

**Save to MMC** (min. 1 second / max. 255 seconds)

- Adjustment of the interval time for data logger recordings.

**CSV+Header** (<F1> for ON / <F4> for OFF)

- Adjustment of data logging with or without column headings.

Start the automatic measurement by setting the cursor to line “**Automatic**” and pressing the key <OK> (on top right on the display appears “**A**” for automatic).

## 12.3. Data logger

Here a Data logger record (“**Data logger**” and key <OK> / on top right on the display appears the disk symbol) can be started or finished (just available when using the multi-media card). With <Store> you can interrupt and continue the record (only in gas analysis). For each recording one file will be written on the card. The files will be numbered consecutively (J2KDL-00.csv, J2KDL-01.csv and so on) and can be transferred to PC with a card reader. The length of a dataset is 500 byte which means that on a 32 MB card 64000 measurements could be recorded.

## 12.4. Data logging with DASNT2

In addition to data logger recordings the data could also be transferred online via USB, Bluetooth (option) or via data interface to the software "**DASNT2**". For the USB connection, a driver is required. Software and USB driver are available free of charge from the ecom website. The following transfer parameters must be set at ecom-J2KNpro ("**Adjustments**" / "**Internal**" / "**USB**");

- **1200 Baud**
- **Protocol DAS**

Please notice the hints in the software manual.

## 12.5. Data processing with DAS5

To display and storage of measured values and measured value gradients the software "**DAS5**" is available. With the help of a multi-media card customer and measurement data can be exchanged between software and instrument. An online connection to store measured values and measured value gradients is possible with USB or WLAN. For the USB connection, a driver is required. Software and USB driver are available free of charge from the ecom website. The following transfer parameters must be set at ecom-J2KNpro ("**Adjustments**" / "**Internal**" / "**WLAN**");

- **1200 - 38400 Baud** (setting as in the software "**DAS5**")
- **Protocol Enhanced**

For the wireless connection (WLAN), the following transfer parameters have to be set at ecom-J2KNpro ("**Adjustments**" / "**Internal**" / "**WLAN**");

- **Access Point = ON**
- **Auto Connect = ON**

Please notice the hints in the software manual.

## 12.6. Data processing with App

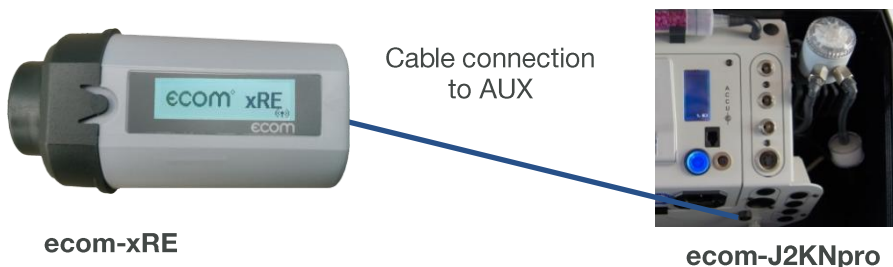
To display and storage of measured values, the App “**ecomMANDER**” for smartphones (iOS or Android) is available (the instrument must be equipped with Bluetooth LE or WLAN). Test results are stored along with customer information in a pdf-file and can be sent e.g., as email attachment. Links to free download of the App can be found on the ecom web-site. For the wireless connection (WLAN), the following transfer parameters must be set at ecom-J2KNpro ("**Adjustments**" / "**Internal**" / "**WLAN**");

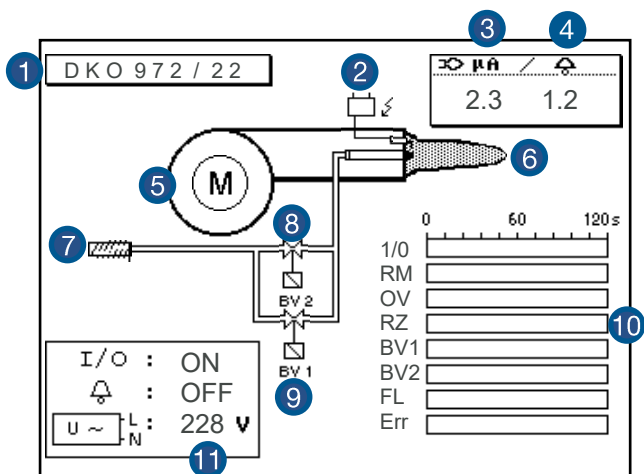
- **Access Point = ON**
- **Auto Connect = ON**

## 13. Diagnostics

### 13.1. Fault diagnostic

The ecom-J2KNpro can receive and process information sent via cable by the ecom-xRE (read-out head for digital firing automats). In the main menu select the sub-menu "**Fault diagnosis**" and confirm with **<OK>**. The ecom-J2KNpro tries to get into contact with the ecom-xRE (message: „**Searching**“) Once the connection is realized, the current operation stand of the burner is shown graphically on the display. The operation stand can be recorded (max. 100 sec). Press **<OK>** to start a new recording phase (reset).





Recording of operation status (max. 100 sec):

1/0 = Continuous phase  
 RM = Fan motor  
 OV = Oil preheater  
 RZ = Ignition  
 BV1 = Valve 1st stage  
 BV2 = Valve 2nd stage  
 FL = Flame identified  
 Err = Disturbance

Reset = Start a new recording (press **<OK>**)

|   |                      |   |                                     |    |                               |
|---|----------------------|---|-------------------------------------|----|-------------------------------|
| 1 | Model name           | 5 | Engine on                           | 9  | Valve 2 on                    |
| 2 | Ignition active      | 6 | Flame identified                    | 10 | Recording of operation status |
| 3 | Current flame signal | 7 | Pre-warmer / Pressure switch active | 11 | Operation voltage             |
| 4 | Min. flame signal    | 8 | Valve 1 on                          |    |                               |

Use the **<Up/Down>** keys to call up further data of the firing auto-mat.  
The 2<sup>nd</sup> display page lists information about the disturbance history (type and volume of information depending on firing automat).

|   |                                         |                    |                   |
|---|-----------------------------------------|--------------------|-------------------|
|   | <b>Error history</b>                    |                    |                   |
| 1 | Number of start-ups total               | 677                |                   |
|   | Service counter actual                  | 142                |                   |
| 2 | No error                                |                    |                   |
| 3 | No flame at the end<br>Of safety time   | 004<br>0.0 $\mu$ A | 9:23 min<br>227 V |
|   | Flame signal during<br>Straylight check | 001<br>2.2 $\mu$ A | 12 sec<br>225 V   |
| 4 | Total                                   | : 46               |                   |
|   | Straylight                              | : 22               |                   |
|   | Safety time                             | : 9                |                   |
|   | Loss of flame                           | : 17               |                   |
|   | FT/LW                                   | : 0                |                   |

The 3<sup>rd</sup> display page lists information about the monitoring times (type and volume of information depending on firing automat

|   |                                                                                                         |          |
|---|---------------------------------------------------------------------------------------------------------|----------|
| 5 | <b>Timing values</b>                                                                                    |          |
|   | Safety time                                                                                             | 4.9      |
|   | sec                                                                                                     |          |
|   | Delay time valve 2                                                                                      | 40.0 sec |
|   | Pre-ignition time                                                                                       | 17.0 sec |
|   | Post-ignition time                                                                                      | 20.0 sec |
|   | Delay straylight sup.                                                                                   | 11.5 sec |
|   | Straylight supervision                                                                                  | 5.0 sec  |
|   | Post time TSA                                                                                           | 4.1 sec  |
|   | <b>Further pages:</b>  |          |

|   |                         |   |                     |   |             |
|---|-------------------------|---|---------------------|---|-------------|
| 1 | Number of burner starts | 3 | List of last errors | 5 | Time values |
| 2 | Current error           | 4 | Error statistics    |   |             |

## 13.2. dT measurement

With the ecom-J2KNpro a difference temperature measurement is possible. For measurements at pipes (e.g., in and out of heating systems) special temperature sensors are needed, that can be ordered from your responsible ecom distributor.

| delta-T Messung          |      |    |          |
|--------------------------|------|----|----------|
| T1                       | 70.4 | °C |          |
| T2                       | 56.3 | °C |          |
| DT                       | 14.1 | °C |          |
| dT-measurement recorded! |      |    | 25.11.17 |

Measurement stored in intermediate memory

Select from the main menu point "Diagnostics" the submenu "**dT measurement**" and confirm with **<OK>**.

The instrument indicates the temperature T1 (sensor at connection „gas temperature“), the temperature T2 (sensor at connection „air temperature“) and the difference of both temperatures (T1 - T2). With the key **<Store>** the result of the measurement is stored in intermediate memory. A printout can be started with **<Print>**.

## 13.3. Heating Check (Option)

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 modernisation measures are conducted.

| Heating Check      |   |
|--------------------|---|
| Gas losses         |   |
| Surface losses     |   |
| Ventilation losses |   |
| Results            |   |
| Cancel             |   |
| Quit with:         | ← |

In combination with the special probes required hereto, the ecom-J2KNpro can perform the measurement of the heating check parameters: gas losses, ventilation losses and surface losses. Out of the main menu point "**Diagnostics**", select the sub-menu "**Heating Check**" and confirm with **<OK>**.

|                        |          |
|------------------------|----------|
| O2                     | 3.2 %    |
| CO2                    | 13.1 %   |
| T.Gas                  | 184.4 °C |
| T.Air                  | 20.3 °C  |
| Gas analysis recorded! |          |
| 25.11.17               |          |
| C.O                    |          |

Measurement stored in intermediate memory



Temperature sensor for surfaces

| Surface losses    |         |
|-------------------|---------|
| P.Boiler          | 24.5 KW |
| Width             | - - - m |
| Depth             | - - - m |
| Height            | - - - m |
| Start measurement |         |
| Quit with: ⬅      |         |

The **gas losses measurement** is to be performed with the instrument's sampling probe in the gas core stream after menu call up (see chapter "**Gas analysis**"). Once the measurement is recorded with **<Store>** (disk symbol) the conversion of the measurement results in neg-ative points is available under the menu point „**Results**“.

The **surface losses measurement** is performed by a temperature sensor specific for surfaces. The temperature difference between boiler surface (temperature sensor at connection „gas temperature“) and room temperature (air temperature sensor) is determined and the percentage loss is calculated. Once the menu point is called up, the boiler performance must be inputted. To easy the measurement width, depth and height of the boiler can also be entered (dimensions will be memorized for sur-face calculation). Please proceed as follows:

1. Activate respective input window with **<OK>**.
2. Put in values by using numerical function of the keys.
3. Confirm input with **<OK>**.

The dimensions can be entered also later for each surface.

| Surface losses |      |
|----------------|------|
| Width          | ---  |
| Height         | ---  |
| Surf           | ---  |
| T.S.           | ---  |
| T.A.           | ---  |
| T.S.           | 21.5 |
| T.A.           | 21.5 |

-0-

| Surface losses |      |
|----------------|------|
| Width          | 1.20 |
| Height         | 1.20 |
| Surf           | 1.44 |
| T.S.           | 40.5 |
| T.A.           | 21.5 |
| T.S.           | 42.5 |
| T.A.           | 21.5 |

-1-

Press „**Start measurement**“ / **<OK>** to start the real measurement. Proceed as follows:

1. Select surface (boiler side) to be measured with **<F1>** or **<F2>**.
2. Position surface sensor.
3. Record temperature difference with **<Store>** - up to 10 values can be recorded per surface out of which a mean value will be calculated automatically.
4. If need be, cancel measurements with **<F4>**.
5. Repeat this procedure for each surface.

Once all surface temperatures have been determined, quit the menu with **<ESC>**. The surface losses get automatically calculated. The value conversion in negative points is available in the menu point „**Results**“.



Flow probe

The ventilation loss 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 stabilisation. Once the menu is called up, the values for air pressure, external temperature, boiler performance and exhaust gas pipe diameter must be entered. Hereto proceed as follows:

1. Open respective window with **<OK>**.
2. Put in values by using numerical function of the keys.
3. Confirm input with **<OK>**.

Press „**Start measurement**“ / **<OK>** prior to going thru the following steps to start the measurement:

1. Release tubing of the flow probe.
2. Wait for zeroing of pressure sensor.
3. Re-connect tubing of the flow probe.
4. Position flow probe into exhaust gas pipe (observe mark for flow direction).
5. Switch off burner and simultaneously press **<F1>**.

|                                                                                              |  |
|----------------------------------------------------------------------------------------------|--|
| <b>Heating Check</b>                                                                         |  |
| <b>Gas losses</b>                                                                            |  |
| <b>Surface losses</b>                                                                        |  |
| <b>Ventilation losses</b>                                                                    |  |
| <b>Results</b>                                                                               |  |
| <b>Cancel</b>                                                                                |  |
| Quit with:  |  |

or:

5. Press **<F2>** to activate timer (5 sec.) and switch off burner by beep.
6. After approx. 30 sec. the measurement value converted in negative points is available.

|                                                                                              |               |
|----------------------------------------------------------------------------------------------|---------------|
| <b>Heating Check</b>                                                                         |               |
| <b>Gas loss</b>                                                                              | <b>2.9 %</b>  |
| <b>Points</b>                                                                                | <b>2.6</b>    |
| <b>Surf. lo</b>                                                                              | <b>2.29 %</b> |
| <b>Points</b>                                                                                | <b>2.6</b>    |
| <b>Vent. lo</b>                                                                              | <b>3.11 %</b> |
| <b>Points</b>                                                                                | <b>2.6</b>    |
| Quit with:  |               |

An overview of the measurements is available under „**Results**“. Press **<Print>** to print them out.

## 14. Maintenance tips



### CAUTION

#### Loss of approval

o not use other sensors or feelers from other manufacturers otherwise the TÜV approval will not be valid anymore!

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.ecom.de](http://www.ecom.de). The following advices will be of help for the daily check and maintenance of single parts or assemblies:



### CAUTION

#### Loss of warranty

Service made by service centres not authorised by ecom GmbH will result in a complete and immediate loss of any warranty!

### Fine dust filter



Fine dust filter

Screw off the cover of the condensate trap/gas cooler and check the state of the particle filter. Change it once the filter has a grey colour (number 2-3 of the soot comparison scale).

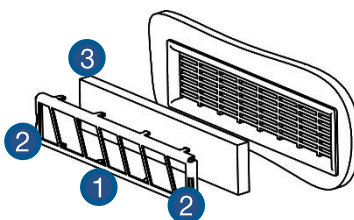
## Safety filter



Check the state of the safety filter. Change it once the filter has a grey colour (number 2-3 of the soot comparison scale).

## Ventilation filter

The ventilation filter should be changed, if the filter is grey coloured (number 2-3 of the soot comparison scale). Remove for this the filter holder with the help of a screw driver (recesses on the right of and left side). Change the filter cartridge and fasten the filter holder.



1 Filter holder

2 Recesses

3 Filter cartridge

## Sensors

The sensors get calibrated with the reference gas fresh air by each switch-on procedure. The state of the sensors is permanently controlled by the instrument. New sensors age along the operation period because of the wearing of the reagents (oxygen sensor) and due to soiling respectively exceeding concentrations beyond the nominal measurement range (toxic sensors). The output values of the sensors are (enter menu "**Control**"):

|                |                  |
|----------------|------------------|
| O <sub>2</sub> | approx. 12000 mV |
| Others         | 0 mV (+/- 150)   |

If an error message is displayed during calibration and cannot be eliminated despite several calibration phases, so the instrument must be checked by a qualified and authorised service centre. The oxygen sensor must show a value >7000 mV, otherwise it must be changed by an authorised service centre.

The CO sensor is protected against overload by the internal programme. If the limit value of 4000 ppm is exceeded, a second pump switches on and flows the sensor with fresh air.

## SO<sub>2</sub>/NO<sub>x</sub> filter



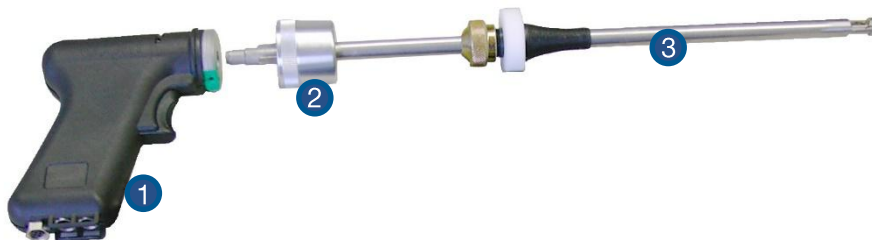
SO<sub>2</sub>/NO<sub>x</sub> filter

In the tubing leading to the CO sensor on the top of the instrument there is a chemical filter for filtering SO<sub>2</sub> and NO<sub>x</sub> out of the flue gas. The filter material is manganese-4-oxide granules and should be changed once it has turned grey (colour change: pink> brown> black> grey> white).

## Probe and hose

Depending on the frequency of use, probe and hose should be regularly cleaned in order to release particle deposits and to prevent early wearing due to corrosion. Release the connections at the instrument and at the probe grip to free the hose. Clean the hose (flow warm water in then dry respectively blow water drops out). The hose connector O-rings should occasionally be lightly lubricated with non-acidic lubricant.

## Disconnect probe pipe



1 Probe grip

2 Collar

3 Probe pipe

1. Turn the collar counter-clockwise.
2. Still holding the collar, pull the grip straight away.



## CAUTION

### Risk of leakage

Turning and pulling the probe pipe can cause leakages at the probe system!

## Change printer paper roll

1. Release the printer cover.
2. If necessary, extract the paper rest out of the printer ("**Adjustments**" / "**Paper feed**" / <OK>).
3. Remove the printer shaft and place the new paper roll on the printer shaft.
4. Insert the paper end in the slot (future printed side must be ahead).
5. Press ("**Adjustments**" / "**Paper feed**" / <OK>) to transport  $\pm 10$  cm paper thru the printer.
6. Place the printer shaft back in the fixation.
7. Insert the paper thru the cover of the printer compartment.
8. Close the printer compartment while fixing the cover.

## 15. FAQ

| FAQ                                                        |                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Where do I find important instrument information?          | In the menu „Control“ all important instrument information are shown (e.g. battery voltage, sensor values, unit number, next service date, operation hours etc.). With the arrow keys stands you can switch to the second page.                                                                                                                                            |
| The instrument shows the error message „O2 sensor 0 mV“!   | The sensor must be renewed.                                                                                                                                                                                                                                                                                                                                                |
| The instrument shows the message „Check required“!         | This message appears automatically every 12 months or after 250 operating hours. Note: This is a recommendation to let check the instrument. The instrument is however still ready for use.                                                                                                                                                                                |
| The instrument shows the error message „T-Gas“ or „T-Air“! | <p>Possible reasons could be:</p> <ul style="list-style-type: none"> <li>• Cable is broken (at the plug)</li> <li>• T-Air sensor is broken</li> <li>• Thermocouple is broken</li> <li>• Cable is defective</li> </ul> <p>Note: The error messages can be ignored at the J2KNpro by pressing „OK“. Calculations that depends on these temperatures are not implemented.</p> |
| The instrument shows wrong or inaccurately CO2 values!     | <p>Possible reasons could be:</p> <ul style="list-style-type: none"> <li>• O2 is defective (CO2 values are calculated from the O2 values)</li> <li>• Pump is not working correctly</li> <li>• Leakage in the gas way</li> <li>• Condensate trap / gas cooler is clogged</li> </ul>                                                                                         |
| My instrument cannot be switched on!                       | <ul style="list-style-type: none"> <li>• Please check the mains cable</li> <li>• Please check the fuse</li> <li>• Please check mains connection (Plug socket switched on?)</li> <li>• Please load the accumulator min. 8 hours (Accumulator could be over-discharged)</li> </ul>                                                                                           |

|                               |                                                                                                                                                                                                                                                                                                  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| My instrument does not print! | Please check whether the printer paper is correctly inserted. The thermal printer writes only on the thermally sensitive side. Please use always the correct paper for the printer, you will prevent defects at the printer. Please make sure that the printer is clean (no chads in the drive). |
| Can I change the printout?    | You can change the printout (Menu: Adjustments).                                                                                                                                                                                                                                                 |

## 16. Technical Data

| Parameter                              | Range                                                | Principle        |
|----------------------------------------|------------------------------------------------------|------------------|
| O <sub>2</sub>                         | 0 - 21 vol. %                                        | Electrochemistry |
| CO                                     | 0 - 10000 ppm                                        | Electrochemistry |
| CO (Option)                            | 0 - 20000 ppm                                        | Electrochemistry |
| CO% (Option)                           | 0 - 6,3 vol. %                                       | Electrochemistry |
| CO% (Option)                           | 0 - 6,3 vol. %                                       | Infrared         |
| NO (Option)                            | 0 - 5000 ppm                                         | Electrochemistry |
| NO Low (Option)                        | 0 - 300 ppm                                          | Electrochemistry |
| NO <sub>2</sub> (Option)               | 0 - 1000 ppm                                         | Electrochemistry |
| NO <sub>2</sub> Low (Option)           | 0 - 100 ppm                                          | Electrochemistry |
| SO <sub>2</sub> (Option)               | 0 - 5000 ppm                                         | Electrochemistry |
| SO <sub>2</sub> Low CO (Option)        | 0 - 5000 ppm                                         | Electrochemistry |
| SO <sub>2</sub> Low (Option)           | 0 - 100 ppm                                          | Electrochemistry |
| H <sub>2</sub> S (Option)              | 0 - 1000 ppm                                         | Electrochemistry |
| H <sub>2</sub> S (Option)              | 0 - 5000 ppm                                         | Electrochemistry |
| H <sub>2</sub> (Option)                | 0 - 2000 ppm                                         | Electrochemistry |
| H <sub>2</sub> (Option)                | 0 - 20000 ppm                                        | Electrochemistry |
| C <sub>x</sub> H <sub>y</sub> (Option) | 0 - 4 vol. %                                         | Catalytic        |
| C <sub>x</sub> H <sub>y</sub> (Option) | 0 - 2000 ppm (C <sub>3</sub> H <sub>8</sub> )        | Infrared         |
| C <sub>x</sub> H <sub>y</sub> (Option) | 0 - 30000 ppm (CH <sub>4</sub> )                     | Infrared         |
| CO <sub>2</sub> (Option)               | 0 - 20 vol. %                                        | Infrared         |
| CO <sub>2</sub>                        | 0 - CO2max                                           | Calculation      |
| T.Gas                                  | 0 - 500 °C                                           | NiCr-Ni          |
| T.Air                                  | 0 - 99 °C                                            | Semi-conductor   |
| Differential pressure                  | 0 - +/- 100 hPa                                      | DMS-Brücke       |
| Air pressure                           | 300 - 1100 hPa                                       | DMS-Brücke       |
| Efficiency                             | 0 - 120 %                                            | Calculation      |
| Losses                                 | 0 - 99,9 %                                           | Calculation      |
| Excess air                             | 1 - ∞                                                | Calculation      |
| Adjustable reference O <sub>2</sub>    | 0 - 21 vol. %                                        | Calculation      |
| Flue gas dew point                     | x °C                                                 | Calculation      |
| ~TOC                                   | x mg/m <sup>3</sup> (proportion of CH <sub>4</sub> ) | Calculation      |

| Further Data              |                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------|
| Power supply              | Mains power: 230 V / 50 Hz~;<br>Battery: 7,20 V / 11,6 Ah                             |
| Radio signal              | Transmission power: < 5 mW<br>Frequency range: 868 – 870 MHz<br>(AX5243)              |
| Bluetooth LE              | Transmission power: < 5,5 mW<br>Frequency range: 2402 – 2480 MHz<br>(CYBLE 202007-01) |
| WLAN                      | Transmission power: < 32 mW<br>Frequency range: 2400 – 2495 MHz<br>(GS2200MIZ)        |
| Protocol printer          | 58mm paper width                                                                      |
| Dimensions<br>(L x H x D) | 510 x 330 x 250 mm                                                                    |
| Weight                    | ca. 14 kg with standard sampling probe                                                |
| Application limits        | +5 - +40 °C<br>max. 90 % RH, non-condensing                                           |

## NOTICE

Subject to technical changes! (Status 08.2026)

Description of data record ecom-J2KNpro with Multi Media Card  
Format data logger records: J2KDL-xx.csv  
Format punctual measurements: J2KDV.txt  
(Separation mark between values = comma)

| Column | Description                  | Remark                              |
|--------|------------------------------|-------------------------------------|
| A      | Datum                        | DD.MM.YYYY (also US-Version)        |
| B      | Zeit                         | HH:MM:SS (also US-Version)          |
| C      | O2 in vol.%                  | 0,0 - 21,0                          |
| D      | CO in ppm                    | 0 - 10000                           |
| E      | NO in ppm                    | 0 - 5000                            |
| F      | NO2 in ppm                   | 0 - 1000                            |
| G      | SO2 in ppm                   | 0 - 5000                            |
| H      | CO (Unit 1)                  |                                     |
| I      | NO (Unit 1)                  |                                     |
| J      | NO2 (Unit 1)                 |                                     |
| K      | NOx (Unit 1)                 |                                     |
| L      | SO2 (Unit 1)                 |                                     |
| M      | T.Gas in °C or °F            | US-Version °F                       |
| N      | T.Air in °C or °F            | US-Version °F                       |
| O      | Zug in hPa                   | 0,00 - +/- 100,0                    |
| P      | CO2 in vol.%                 | 0,0 - 25,0                          |
| Q      | ETA in %                     | 0,0 - 120,0                         |
| R      | Losses in %                  | 0,0 - 100,0                         |
| S      | Lambda                       | > 1,00                              |
| T      | Dew point in °C or °F        | US-Version °F                       |
| U      | Poison index                 | > 0,0                               |
| V      | O2 (CO measurement) in vol.% | 0,0 - 21,0                          |
| W      | CO (CO measurement) in ppm   | Related to 0,0 vol.% O2             |
| X      | CO (CO measurement) in ppm   | Measured value                      |
| Y      | O2 (O2 check) in vol.%       | 0,0 - 21,0                          |
| Z      | T.Boiler in °C or °F         | US-Version °F                       |
| AA     | T.Sensor in °C or °F         | US-Version °F                       |
| AB     | O2 Reference                 | 0,0 - 21,0                          |
| AC     | Unit 1                       | 0=ppm; 1=mg/m3; 2=mg/kWh; 3=mg/MJ   |
| AD     | Normalization                | N = converted to O2 Reference       |
| AE     | Fuel type number             | Index according to instrument table |
| AF     | Fuel type text               | Text according to instrument table  |
| AG     | Soot number 1                | 0,0 - 9,9                           |
| AH     | Soot number 2                | 0,0 - 9,9                           |
| AI     | Soot number 3                | 0,0 - 9,9                           |
| AJ     | Oil trace                    | 0=no; 1=yes                         |
| AK     | 20 characters text           |                                     |
| AL     | 20 characters text           |                                     |

|    |                               |                                                            |
|----|-------------------------------|------------------------------------------------------------|
| AM | 16 characters text            |                                                            |
| AN | Serial number                 |                                                            |
| AO | CO (O2 check) in ppm          |                                                            |
| AP | Zug (O2 check) in hPa         |                                                            |
| AQ | CxHy in ppm or vol. %         |                                                            |
| AR | Number copy Data              |                                                            |
| AS | T1 (deltaT-meas.) in °C or °F | US-Version °F                                              |
| AT | T2 (deltaT-meas.) in °C or °F | US-Version °F                                              |
| AU | Velocity in m/s               |                                                            |
| AV | CO Environment in ppm         |                                                            |
| AW | free                          |                                                            |
| AX | Comment text 1                |                                                            |
| AY | Comment text 2                |                                                            |
| AZ | Comment text 3                |                                                            |
| BA | Comment text 4                |                                                            |
| BB | H2 in ppm                     |                                                            |
| BC | H2 (Unit 1)                   |                                                            |
| BD | Sensor 6 in ppm               |                                                            |
| BE | Sensor 6 (Unit 1)             |                                                            |
| BF | DP (velocity) in Pa           | 0 – 1000,00                                                |
| BG | Air pressure in hPa           | 300 – 1100                                                 |
| BH | Unit 2                        | 0=ppm; 1=mg/m3; 2=mg/kWh; 3=mg/MJ; 4=ppmN; 5=mg/m3N; 6=--- |
| BI | CO (Unit 2)                   |                                                            |
| BJ | NO (Unit 2)                   |                                                            |
| BK | NO2 (Unit 2)                  |                                                            |
| BL | NOx (Unit 2)                  |                                                            |
| BM | SO2 (Unit 2)                  |                                                            |
| BN | Analogue input 1              |                                                            |
| BO | Analogue input 2              |                                                            |
| BP | Sensor 7 in ppm               |                                                            |
| BQ | Meas. gas volume in l/min     |                                                            |
| BR | CO% in ppm                    | 0 - 63000                                                  |
| BS | ~TOC in mg/m3                 |                                                            |
| BT | Last column                   | 0                                                          |

## Data transfer ecom-J2KNpro to PC (USB)

The transfer occurs with 1200 - 38400 BAUD; 1 stop bit; no parity (ANSI character set); CR / LF is send after each data record

| Column  | Description                                                   | Length |
|---------|---------------------------------------------------------------|--------|
| 1-5     | Storage number                                                | 5      |
| 6-7     | Hour                                                          | 2      |
| 8-9     | Minute                                                        | 2      |
| 10-11   | Day                                                           | 2      |
| 12-13   | Monat                                                         | 2      |
| 14      | Fuel type number (0 – 9)                                      | 1      |
| 15-19   | T.Air in °C or °F                                             | 5      |
| 20-24   | T.Gas in °C or °F                                             | 5      |
| 25-29   | O2 in vol.% (without comma)                                   | 5      |
| 30-34   | CO in ppm                                                     | 5      |
| 35      | Draught (sign / - = minus; blank character = plus)            | 1      |
| 36-39   | Draught in Pa                                                 | 4      |
| 40      | Oil trace (0 = no; 1 = yes)                                   | 1      |
| 41      | Soot number 3                                                 | 1      |
| 42      | Soot number 2                                                 | 1      |
| 43      | Soot number                                                   | 1      |
| 44-48   | free                                                          | 5      |
| 49-53   | NO in ppm                                                     | 5      |
| 54-58   | T.Boiler                                                      | 5      |
| 59-78   | 20 character text                                             | 20     |
| 79-98   | 20 character text                                             | 20     |
| 99-114  | 16 character text                                             | 16     |
| 115-116 | 2 signs (HEX \$80, \$00)                                      | 2      |
| 117-121 | O2 (CO measurement) in vol.% (without Comma)                  | 5      |
| 122-126 | CO (CO measurement) in ppm related to 0 vol.% O2              | 5      |
| 127-131 | free                                                          | 5      |
| 132-136 | free                                                          | 5      |
| 137-141 | free                                                          | 5      |
| 142-146 | free                                                          | 5      |
| 147-151 | free                                                          | 5      |
| 152-156 | O2 (O2 check) in vol.% (without comma)                        | 5      |
| 157-161 | CO (O2 check) in ppm                                          | 5      |
| 162     | Draught (O2 check / sign / - = minus; blank character = plus) | 1      |
| 163-166 | Draught (O2 check) in Pa                                      | 4      |
| 167-168 | CR-LF (#13#10)                                                | 2      |

Data transfer PC to ecom-J2KNpro (USB / ANSI character set):

First send: \$00 \$01

Then send: 56 characters text

Then send: \$80 \$00

Once the ecom-J2KNpro has processed the data, it sends \$FF back. If the data volume is too large, it sends another byte back. If the data transfer should be terminated, so just 60 byte \$00 need to be sent to the instrument.

## EG-Konformitätserklärung | EC Declaration of Conformity

Hiermit erklärt der Hersteller  
The manufacturer

**ecom GmbH**  
Am Großen Teich 2  
D-58640 Iserlohn, Germany



in alleiniger Verantwortung für die Ausstellung dieser Erklärung, dass die nachfolgend aufgeführten Produkte:  
hereby declares under its sole responsibility, that the products

**Abgasanalysegeräte / flue gas analysis devices**

Type: ecom-B

ecom-CL2/ B+

ecom-D

ecom-EN3

ecom-J2KNpro

ecom-J2KNpro IN / ~J2KNpro INS

ecom-J2KNpro TECH

ecom-ST

allen einschlägigen Bestimmungen der folgenden EU-Richtlinien entsprechen:  
comply with the following European Directives:

|                |                                                              |
|----------------|--------------------------------------------------------------|
| 2014/53/EU     | Funkanlagenrichtlinie / <b>Radio Equipment Directive</b>     |
| 2011/65/EU     | RoHS                                                         |
| 2014/35/EU (*) | Niederspannungsrichtlinie / <b>Low Voltage Directive (*)</b> |

(\*): Gilt nur für Geräte mit 230 V Eingangsspannung / applies only to devices with 230 V input voltage

Folgende Normen wurden angewendet:  
The following standard/s were used:

|                           |                                                                                                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EN 61010-1:2010/A1:2019   | Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte<br>Safety requirements for electrical equipment for measurement, control, and laboratory use                                                                                                                                  |
| EN 300 328 V2.2.2         | Breitband-Übertragungssysteme - Datenübertragungsgeräte zum Betrieb im 2,4 GHz-Band<br>Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz band                                                                                                                             |
| ETSI EN 301 489-1 V2.2.3  | Elektromagnetische Verträglichkeit (EMV) - Standard für Funkanlagen und -dienste –<br>ElectroMagnetic Compatibility (EMC) standard for radio equipment and services                                                                                                                                          |
| ETSI EN 301 489-17 V3.2.4 | Elektromagnetische Verträglichkeit (EMV) für Funkanlagen und -dienste - Teil 17:<br>Spezifische Bedingungen für Breitbanddatenübertragungssysteme<br>ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 17:<br>Specific conditions for Broadband Data Transmission Systems |
| EN 61326-1:2013           | Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen<br>Electrical equipment for measurement, control and laboratory use – EMC requirements                                                                                                                                                |
| EN 50270:2015/AC:2016-08  | Elektromagnetische Verträglichkeit - Elektrische Geräte für die Detektion und Messung von<br>brennbaren Gasen, toxischen Gasen oder Sauerstoff<br>Electromagnetic compatibility - Electrical apparatus for the detection and measurement of<br>combustible gases, toxic gases or oxygen                      |
| EN IEC 63000:2018         | Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der<br>Beschränkung gefährlicher Stoffe<br>Technical documentation for the assessment of electrical and electronic products with respect<br>to the restriction of hazardous substances                              |

Iserlohn, 25.07.2022

Matthias Platte (Geschäftsführer / Managing Director)



## Declaration of Conformity

The manufacturer

ecom GmbH  
Am Großen Teich 2  
D-58640 Iserlohn, Germany



hereby declares under its sole responsibility, that the products

**Flue gas analysis devices**

Type: ecom-B

ecom-CL2/B+

ecom-D

ecom-EN3

ecom-J2KNpro

ecom-J2KNpro IN / INS

ecom-J2KNpro TECH

ecom-ST

comply with the following European Directives:

**Radio Equipment Regulations 2017**

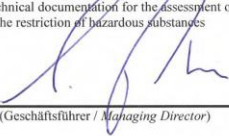
**The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (RoHS)  
Electrical Equipment (Safety) Regulations 2016 (\*)**

(\*): applies only to devices with 230 V input voltage

The following designated standards / other technical standards and specifications were used:

|                           |                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| EN 61010-1:2010/A1:2019   | Safety requirements for electrical equipment for measurement, control, and laboratory use                                                            |
| EN 300 328 V2.2.2         | Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz band                                                            |
| ETSI EN 301 489-1 V2.2.3  | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services                                                                        |
| ETSI EN 301 489-17 V3.2.4 | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 17: Specific conditions for Broadband Data Transmission Systems |
| EN 61326-1:2013           | Electrical equipment for measurement, control and laboratory use – EMC requirements                                                                  |
| EN 50270:2015/AC:2016-08  | Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen                   |
| EN IEC 63000:2018         | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances             |

Iserlohn, 12.10.2022

  
Matthias Platte (Geschäftsführer / Managing Director)

INTELLIGENT MESSEN!  
MEASURE WITH INTELLIGENCE!



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