INTELLIGENT MESSEN!
INTELLIGENT ANALYSIS!

ecom®

English

OPERATION MANUAL

ecom® DP3

Index

1. Application and components

The **ecom-DP3** easies tightness tests. Besides gas pressure measurements, tightness checks as well as leakage volume determination according to DVGW-TRGI 2018 can be performed. The following components belong to the **ecom-DP3** set:

Standard

ecom-DP3
Pressure measurement instrument with automatic check programmes

Connection hose
2,8 m long, with quick-fittings

Y-Piece
with quick-fittings

Conic test stopples
1/2" - 3/4" and
3/4" – 1 1/4",
with quick-fittings

High-pressure test stopples
3/8" auf 1/2" und
3/8" auf 3/4"
with quick-fittings

One-pipe counter cap
for gas meters G4/G6
with quick-fitting

Hose connector
with quick-fitting

Ball valve
with quick-fitting

Connecting piece with safety valve
with quick-fitting

Plug
with quick-fitting

Software „DP3Report"
to create inspection reports

Optionen / Zubehör

Gasspürgerät ecom-LSG
for identification of leakages at gas pipes
(Item no.: 102145)

External pressure sensor (0 – 20 bar)
with connection cable
(Item no.: 102158)

2 x Capillary hose
for 4-Pa-Test

External pressure sensor (0 – 40 bar)
with connection cable
(Item no.: 103932)

External room temperature sensor
with connection cable
(Item no.: 102156)

2 x Silicone hose
for small pressure measurement

One-pipe counter cap
for gas meters G10/G16
with quick-fitting
(Item no.: 102705)

External pipe temperature sensor
with connection cable
(Item no.: 12019)

Test stopple conic
12 – 22 mm
with quick-fitting
(Item no.: 102706)

Test stopple conic
35 – 65 mm
with quick-fitting
(Item no.: 102707)

Test stopple cylindrical
diameter 14,5 mm
with quick-fitting
(Item no.: 102708)

Test stopple cylindrical
diameter 19 mm
with quick-fitting
(Item no.: 102709)

Test stopple cylindrical
diameter 24 mm
with quick-fitting
(Item no.: 102710)

Test stopple cylindrical
diameter 35 mm
with quick-fitting
(Item no.: 102711)

Test stopple cylindrical
diameter 41 mm
with quick-fitting
(Item no.: 102712)

Test stopple cylindrical
diameter 52mm
with quick-fitting
(Item no.: 102713)

2. Design ecom-DP3

Connection
loading unit

Accu
compartment

Connection
temperature
sensor 2

Connection
AUX

USB connection

Connection
temperature
sensor 1

Connection
external
pressure sensor

Slot for multi-
media card

Connection
tightness checks
Pmax = 1500 hPa

Connection small
pressure measurement
(option)

Grafic display

Integral printer
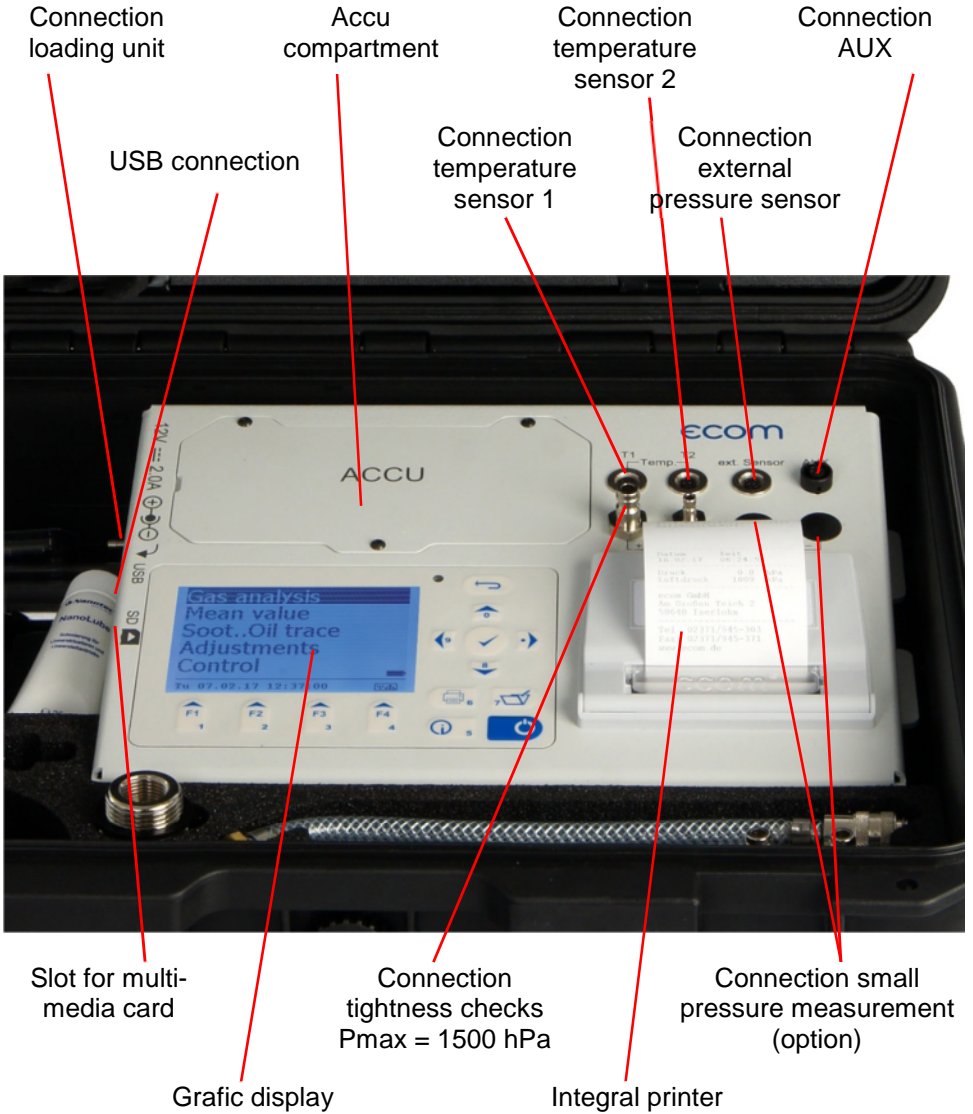
Keyboard

In the input mode, the keys are used for numerical inputs

ESC key
(quit/
exit menu)

Enter key
(confirm
selection)

Cursor keys
(Up/Down/Right/
Left/Scroll)

Values
recording

Function keys
(function shown on
display)

Info key
(access to
control menu)

ON / OFF
key

Print key
(access to
printing menu)

3. Connection of components

Please connect the components as shown on below plan.
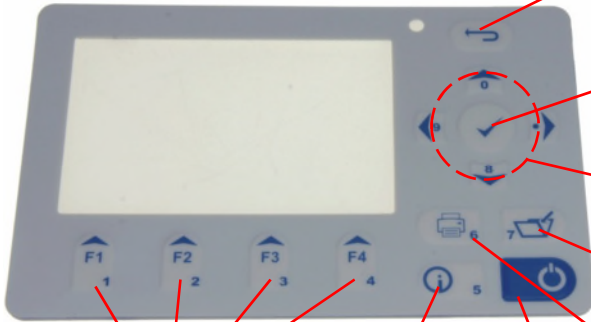
ecom-DP3

Connection hose
for connection on „ P high 1 +
" at the ecom-DP3

Y-piece
for the con-
nection of 2
line sections
(f.e. with one-
pipe counter
cap)

High-pressure test stopples
for connection at screw con-
nections

Conic test stopples
for connection at line ends

Hose connector
for connection at measuring nipple of the plant

One-pipe coun-ter cap
for the connection in place of the gas meter

Plug
to check the tightness of the ecom-DP3

Ball valve
for connection of exter-nal devices for pressure build-up

Connecting piece with safety valve
for connection of exter-nal devices for pressure build-up

> **Never connect external devices for the pressure build-up without connecting piece with safety valve!**

Option

External room temperatur sensor
to measure the room temperature during the test (connection „T1")

External pipe temperature sensor
to measure the pipe temperature during the test (connection „T1")

External pipe temperature sensor
to measure the pipe temperature during the test (connection „T2")

ecom-DP3

External pressure sensor
(0 – 20 bar or 0 – 40 bar) for checking heating and drinking water plants (connection „ext. Sensor")

2 x Capillary hose
to measure the difference pressure with the 4-Pa-Test (connection „P low 2")

2 x Silicone hose
for small pressure and flow measurements with f.e. pitot probe (connection „P low 2")

4. Data processing

4.1. Data storage

The measurements made with the equipment can be assigned to a customer. For each customer a file with file name is created on the memory card (e.g.: DP3_0001.DAT). Into this file all measurements belonging to the customer are written.

The files can be transferred to the PC using a card reader. With the software **"DP3Report"** a protocol for each check can be made. The following conditions must be fulfilled for using a multi media card:

- min. card volume 32 MB - max.32 GB (UHC)
- card formatted on 16 bit FAT or FAT32
- SD cards from SanDisk recommended
- PC with card reader

> **Never pull out cards during data record - data loss and damaging of the data carrier possible!**

4.2. Edit customer

If the instrument gets switched on and a SD or MM Card with no customer data is inserted the inquiry follows whether you would like to edit a customer. If the measurement is to be assigned to a customer, press the key **<F1>** (**<F4>** = no: Measurement is made without allocation). Proceed as follows:

-select line to be filled out with the cursor keys
 <up/down> and confirm with **<Enter>**
-select keyboard **<F3>**
 (4 keyboard are available)
-select a character with the cursor keys
 <up/down/right/left>
 (selected character is black deposited)
-take over the character with **<Enter>** (the last
 character can be deleted with **<F2>**)
-repeat the procedure, until the desired designation
 is complete
-if a character is to be corrected, proceeded as
 follows:

  -interrupt the character selection with **<F4>**

```
No customer
existing!

  ┌──────────────┐
  │  Create new  │
  └──────────────┘


    ┌──YES    NO──┐
    ↓             ↓
```

```
Customer number
───────────────
Name
───────────────
Street
───────────────
ZIP/City
───────────────
DP3_0001.DAT
  ☑
───────────────
Tel.
───────────────
Others
```

-select the character to be corrected with the
 cursor keys **<right/left>**
-activate the character selection with **<F4>** and
 correct the character
-return to line selection with **<F1>** and choose
 the next line

If all necessary lines are filled out, a file is created
with **<F1>**. With **<ESC>** you can leave to select a
control program.

```
Customer number
123456789
Name
Customer 1
Street
Street 1
ZIP/City
11111 City 1
DP3_0001.DAT
  ✓
Tel.
123456789
Others
Customer 1 Others
```

4.3. Select customer

With the help of the software **"DP3Report"** customer
data can be stored for the use at the DP3 on SD or
MM Card. If the instrument gets switched on and a
SD or MM Card with customer data is inserted a
customer for allocation can be selected with **"Search
for/Scroll"** / **<Enter>**:

```
    Customer data
Search for/Scroll
Create new
View/Modify
Format
DP3_0001.DAT
Fr 20.01.12  09:50:33  MMC
```

Customer is selected

Scroll:
Select **"Scroll"**, if you want to find the customer with the help of the cursor keys
<up/down>. Further functions are:

<F1> = to the first customer
<F2> = 10 customers forward
<F3> = 10 customers backward

Search for:
Select **"Search for"**, if you want to find the customer by the input of at least 3
connected characters. Edit 3 characters as described in the chapter before and
start the search with **<Enter>**. All agreements with the character sequence are
picked out. The selection can be paged through with **<F3>** (with **<F1>** to the be-
ginning of the selection).

If the desired customer is found, select with **<Enter>**. With **"View/Modify"** the
customer data can be viewed and modified.

Format:
This function is usually needed by initial adjustment of the instrument at our facto-
ry (preparation of SD or MM Card for data recording).
**Caution: All stored values will be cancelled! Please switch instrument after
formatting off and on again!**

5. Control programs

After switching on of the instrument the following pre-programmed control programs are available:

Natural gas:
-Stress test acc. to TRGI 2018
-Tightness check acc. to TRGI 2018
-Usability check acc. to TRGI 2018

Liquid gas:
-Tightness check
-Pressure test

Drinking water:
-Drinking water plant (wet) acc. to DIN EN 806-4:
    -Function test
    -Pressure test
    -Extended test
-Drinking water plant (dry) acc. to DIN EN 806-4:
    -Tightness test
    -Stress test

Heating:
-Heating installation acc. to DIN 18380

Sewage:
-Sewage installation acc. to DIN 1610

More measurements:
-Pressure check (arbitrary pressure)

```
Natural gas
Liquid gas
Drinking water
Heating
Sewage
Fr 20.01.12  09:50:33
More measurement
Adjustments
Data storage
```

In menu **„Adjustments" / „Setup checks"** the parameters for the control programs can be adjusted:

5.1. Setup control programs

Scroll with the cursor keys **<up/down>** to the menu **„Adjustments"**. Activate the menu with **<Enter>**. Scroll with the cursor keys **<up/down>** to the menu point **„Setup checks"** and activate with **<Enter>**. The following parameters can be adjusted:

Pressure check (arbitrary pressure):
-Stabilisation time (0 - 10 min, default: 0 min)
-Measurement time (0 - 6000 min, default: 0 min)

```
        Adjustments
Setup checks
Set clock
Paper feeding
Print contrast
Select: ∧∨√
Displ. contrast
Key beep
Language: English
Pitot factor
Scan data logger
Printout
```

Stress test acc. to TRGI 2018:
-Stabilisation time (1 - 10 min, default: 1 min)
-Measurement time (10 - 120 min, default: 10 min)
-Test pressure (900 - 1500 hPa, default: 1000 hPa)
Tightness check acc. to TRGI 2018:
-Stabilisation time installation lower 100 Liter (1 - 20 min, default: 10 min)
-Measurement time installation lower 100 Liter (9 - 120 min, default: 10 min)
-Stabilisation time installation 100 bis 200 Liter (20 - 40 min, default: 30 min)
-Measurement time installation 100 bis 200 Liter (19 - 120 min, default: 20 min)
-Stabilisation time installation higher 200 Liter (50 - 70 min, default: 60 min)
-Measurement time installation higher 200 Liter (29 - 120 min, default: 30 min)
-Test pressure (15 - 500 hPa, default: 150 hPa)
Usability check acc. to TRGI 2018:
-Stabilisation time (5 - 240 min, default: 10 min)
-Measurement time (2 - 30 min, default: 5 min)
-Reference pressure (10 - 100 hPa, default: 23 hPa)
Function test drinking water plant (wet) acc. to DIN EN 806-4:
-Stabilisation time (0 - 120 min, default: 30 min)
-Measurement time (1 - 120 min, default: 15 min)
-Test pressure (0.01 – 20.00 bar, default: 6.00 bar)
Pressure test drinking water plant (wet) acc. to DIN EN 806-4:
-Stabilisation time (0 - 120 min, default: 0 min)
-Measurement time (1 - 120 min, default: 30 min)
-Test pressure (0.01 – 20.00 bar, default: 11.00 bar)
Extended test drinking water plant (wet) acc. to DIN EN 806-4:
-Stabilisation time (0 - 120 min, default: 0 min)
-Measurement time (1 - 240 min, default: 120 min)
-Test pressure (0.01 – 20.00 bar, default: 5.50 bar)
Tightness test drinking water plant (dry) acc. to DIN EN 806-4:
-Stabilisation time (0 - 120 min, default: 0 min)
-Measurement time (1 - 240 min, default: 120 min)
-Test pressure (1 - 2000 hPa, default: 150 hPa)
Stress test drinking water plant (dry) acc. to DIN EN 806-4:
-Stabilisation time (0 - 120 min, default: 0 min)
-Measurement time (1 - 120 min, default: 10 min)
-Test pressure (0.01 – 5.00 bar, default: 1.00 bar)
Heating plant acc. to DIN 18380:
-Stabilisation time (0 - 120 min, default: 0 min)
-Measurement time (1 - 240 min, default: 120 min)
-Test pressure (0.01 – 20.00 bar, default: 10.00 bar)
Sewage plant acc. to DIN 1610:
-Stabilisation time (0 - 100 min, default: 0 min)
-Measurement time (1 - 120 min, default: 30 min)
-Test pressure (1 - 2000 hPa, default: 200 hPa)

Tightness check liquid gas:
-Stabilisation time (0 - 60 min, default: 10 min)
-Measurement time (0 - 60 min, default: 10 min)
Test pressure (0 - 1000 hPa, default: 100 hPa)
Pressure test liquid gas:
-Stabilisation time (0 - 60 min, default: 10 min)
-Measurement time (0 - 60 min, default: 20 min)
-Test pressure (0 - 1500 hPa, default: 1000 hPa)
Pressure test 0 – 40 bar liquid gas:
-Stabilisation time (0 - 120 min, default: 10 min)
-Measurement time (1 - 240 min, default: 10 min)
-Test pressure (0 - 40 bar, default: 10 bar)

Each parameter can be adjusted the same way:
1. Select the parameter with cursor keys **<up/down>**
2. Press **<Enter>** to activate
3. Use numerical keys to input the value
To adjust the standard value press <F2>

```
┌───────────────────────┐   ┌───────────────────────┐
│ Pressure check        │   │ Pressure check        │
│                       │   │                       │
│ Standard value : F2   │   │        20█    min     │
│                       │   │                       │
│       10 min          │   │       10 min          │
│ Stabilisation time    │   │ Stabilisation time    │
│                       │   ├───────────────────────┤
│ Select: ＡＶ✓          │   │ Please use the        │
└───────────────────────┘   │ Numeral keys!         │
                            └───────────────────────┘
```

5.2. Natural gas

5.2.1. Stress test

The stress test acc. to DVGW – TRGI Process Instructions G 600 at gas pipes (operation pressure up to 100 hPa) is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Natural gas"** to the menu point **"Stress test"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Lock the gas pipe with a suitable adapter (test stopple, high pressure stopple or one-pipe counter cap).

4. Connect the components as described in chapter 3.

5. Start the control program with **<Enter>** (the pump of the instrument is building up the adjusted pressure).

6. Wait for stabilisation time (if the pressure remains in the range "test pressure - 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Stress test"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is switched on) or a new measurement can be started with **<F1>**.

```
Stress test
1Bar/1000hPa TRGI 2018
Connect!
Forward w.: ✓

«««▐▌         0.0hPa

Set value      1000hPa

⊡                 MMC ▬▬
```

```
Stress test
1Bar/1000hPa TRGI 2018
Set value    1000hPa
is built up!

⏱ 1min
▶| 10min   902.3hPa
                  ▾▾
▭▭▭▭▭▭▭▭▭▭
                  MMC ▬▬
```

```
Stress test
1Bar/1000hPa TRGI 2018
Stabilisation time
Res. time:      58sec
         1002.3hPa
       Start    Difference
Pressu 1003.1hPa   -0.8hPa
Temp.    22.6°C     0.3°C
▣▶|               MMC ▬▬
```

```
Stress test
1Bar/1000hPa TRGI 2018
Measur. in process
Res. time:      9:25min
         1002.3hPa
       Start    Difference
Pressu 1002.3hPa    0.0hPa
Temp.    22.6°C     0.0°C
                  MMC ▬▬
```

```
Stress test              ▣
1Bar/1000hPa TRGI 2018
Measurement     10:00min
Ini. Press     1002.3hPa
Fin. Press     1002.3hPa
Difference        0.0hPa
Ini. temp.        22.6°C
End temp.         22.6°C
Difference         0.0°C
Forward w.: ✓     MMC ▬▬
```

```
Stress test
1Bar/1000hPa TRGI 2018

    Start new
    measurement?

Select: ◁✓▷

    ┌─YES─┐    NO ┐
    ↓              ↓
```

5.2.2. Tightness check

The tightness check acc. to DVGW – TRGI Process Instructions G 600 at gas pipes (operation pressure up to 100 hPa) is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Natural gas"** to the menu point **"Tightness check"**. Activate the menu point with **<Enter>**.

2. Adjust the gas pipe volume with **<F2>** (lower 100L, 100L..200L or higher 200L).

3. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

4. Lock the gas pipe with a suitable adapter (test stopple, high pressure stopple or one-pipe counter cap).

5. Connect the components as described in chapter 3.

6. Start the control program with **<Enter>** (the pump of the instrument is building up the adjusted pressure).

7. Wait for stabilisation time (if the pressure remains in the range "test pressure - 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

8. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

9. If the menu **"Tightness check"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

5.2.3. Usability check

The usability check acc. to DVGW – TRGI Process Instructions G 600 at gas pipes (operation pressure up to 100 hPa) is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Natural gas"** to the menu point **"Usability check"**. Activate the menu point with **<Enter>**.

2. The measurement becomes prepared. The piston is brought into its initial position.

3. Connect the components as described in chapter 3.

4. Open gas shut-off valve of the installation. As soon as the operating pressure of the plant is recognized, the system is aired out and the instrument starts automatically the stabilisation time. If necessary the stabilisation time can be terminated with **<F1>**.

5. Close gas shut-off valve after stabilisation time. The measurement of the leak rate begins with **<Enter>**.

```
Usability check
acc. to TRGI 2018
 ┌──────────────────────────┐
 │ Measuring in preparation │
 │                          │
 │ Do not connect           │
 │ any tubing!              │
 └──────────────────────────┘

Quit with: ⟵        MMC  ▬
```

```
Usability check
acc. to TRGI 2018
 ┌──────────────────────────┐
 │ Connect tubes!           │
 │ Open gas shut-off valve! │
 │                          │
 │ Measuring starts once ope.│
 │ pressure is identified   │
 └──────────────────────────┘
                    0.0hPa
 ⊠▶▶               MMC  ▬
```
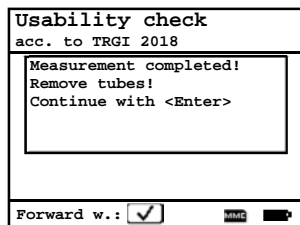
```
Usability check
acc. to TRGI 2018
 ┌──────────────────────────┐
 │ Air is getting removed   │
 │ from system!             │
 │                          │
 │ Measuring then starts    │
 │ automatically!           │
 └──────────────────────────┘

Quit with: ⟵        MMC  ▬
```

```
Usability check
acc. to TRGI 2018
┌───────────────────────────┐
│ Stabilisation time        │
│ Res. time:     9:58min    │
└───────────────────────────┘
               24.15hPa
 ┌─────────────────────────┐
 │                         │
 └─────────────────────────┘
 ⊠▶▶               MMC  ▬
```

```
Usability check
acc. to TRGI 2018
 ┌──────────────────────────┐
 │ Lose gas shut-off        │
 │ valve now!               │
 │ Continue with <Enter>    │
 └──────────────────────────┘
               24.11hPa
Forward w.: ☑
 ⊠▶▶               MMC  ▬
```

```
Usability check
acc. to TRGI 2018
┌───────────────────────────┐
│ Measur. in process        │
│ Time:          1:25min    │
└───────────────────────────┘
 Leak rate  1.52l/h
┌───────────────────────────┐
│ Pressu 24.11hPa           │
│ Temp.   24.3°C            │
└───────────────────────────┘
 ⊠▶▶               MMC  ▬
```

6. After measuring time the installation must be brought back into its original condition (remove hoses and open gas shut-off valve).

```
Usability check
acc. to TRGI 2018
┌─────────────────────────┐
│ Measurement completed!   │
│ Remove tubes!            │
│ Continue with <Enter>    │
│                          │
│                          │
└─────────────────────────┘
Forward w.: ✓        MMC ▬▶
```

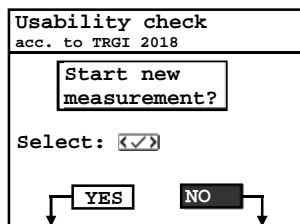7. After the pressure in the instrument reduced itself (or after pressing **<Enter>**), the result is displayed and can be printed with **<Print>**.

```
Usability check        ⬚
acc. to TRGI 2018
Measurement        5:00min

Leak rate          1.51l/h
Ini. temp.          22.6°C
End temp.           22.6°C
Difference           0.0°C
Forward w.: ✓        MMC ▬▶
```
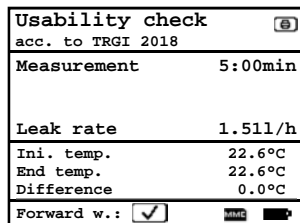
8. If the menu **„Usability check"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Usability check
acc. to TRGI 2018
   ┌───────────────┐
   │ Start new     │
   │ measurement?  │
   └───────────────┘
Select: ‹✓›

      ┌─YES─┐    NO
      ↓          ↓
```

5.3. Liquid gas

5.3.1. Tightness check

The tightness check acc. to TRF at liquid gas pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Liquid gas"** to the menu point **"Tightness check"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Lock the gas pipe with a suitable adapter (test stopple, high pressure stopple or one-pipe counter cap).

4. Connect the components as described in chapter 3.

5. Start the control program with **<Enter>** (the pump of the instrument is building up the adjusted pressure).

6. Wait for stabilisation time (if the pressure remains in the range "test pressure - 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Tightness check"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

Liquid gas
Tightness check
Connect!
Forward w.: ☑
◀◀◀ ▛   0.0hPa
Set value   100hPa
⊐   MMC ▬

Liquid gas
Tightness check
Set value   100hPa
is built up!
⊙ 10min   92.3hPa
▶ 10min
▬▬▬▬▬▬
MMC ▬

Liquid gas
Tightness check
Stabilisation time
Res. time: 9:58min
102.3hPa
Start   Difference
Pressu 103.1hPa   -0.8hPa
Temp.   22.6°C   0.3°C
▣▶▶   MMC ▬

Liquid gas
Tightness check
Measur. in process
Res. time: 9:25min
102.3hPa
Start   Difference
Pressu 102.3hPa   0.0hPa
Temp.   22.6°C   0.0°C
MMC ▬

Liquid gas	🖨
Tightness check	
Measurement	10:00min
Ini. Press	102.3hPa
Fin. Press	102.3hPa
Difference	0.0hPa
Ini. temp.	22.6°C
End temp.	22.6°C
Difference	0.0°C
Forward w.: ☑	MMC ▬

Liquid gas
Tightness check
Start new
measurement?
Select: ◁☑▷
YES   NO

5.3.2. Pressure test

The pressure test acc. to TRF at liquid gas pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Liquid gas"** to the menu point **"Pressure test"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Lock the gas pipe with a suitable adapter (test stopple, high pressure stopple or one-pipe counter cap).

4. Connect the components as described in chapter 3.

5. Start the control program with **<Enter>** (the pump of the instrument is building up the adjusted pressure).

6. Wait for stabilisation time (if the pressure remains in the range "test pressure - 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Pressure test"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Liquid gas
Pressure test
Connect!
Forward w.: ✓
⟪⟪▄       0.0hPa
Set value    1000hPa

⊏⊐              MMC ▬▬
```

```
Liquid gas
Pressure test
Set value   1000hPa
is built up!
⊘ 1min
▶ 10min   902.3hPa
                 ▼▼
                MMC ▬▬
```

```
Liquid gas
Pressure test
Stabilisation time
Res. time:    9:58min
         1002.3hPa
        Start    Difference
Pressu 1003.1hPa    -0.8hPa
Temp.    22.6°C      0.3°C
⊠▶▶⊓            MMC ▬▬
```

```
Liquid gas
Pressure test
Measur. in process
Res. time:    9:25min
         1002.3hPa
        Start    Difference
Pressu 1002.3hPa     0.0hPa
Temp.    22.6°C      0.0°C
                MMC ▬▬
```
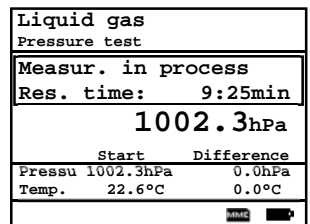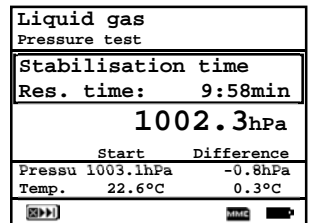
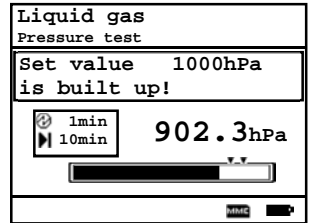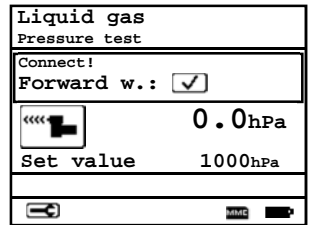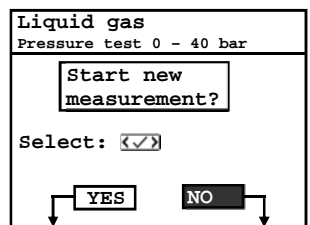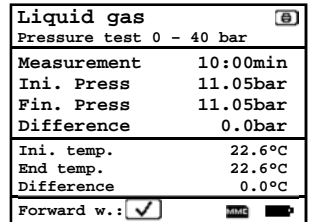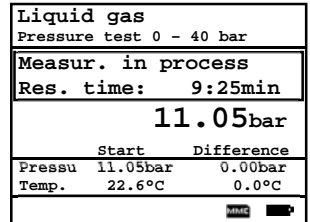```
Liquid gas   ⊟
Pressure test
Measurement   10:00min
Ini. Press   1002.3hPa
Fin. Press   1002.3hPa
Difference   0.0hPa
Ini. temp.   22.6°C
End temp.   22.6°C
Difference   0.0°C
Forward w.: ✓   MMC ▬▬
```

```
Liquid gas
Pressure test

   Start new
   measurement?

Select: ⟨✓⟩

   ┌─YES    NO─┐
```

5.3.3. Pressure test 0 – 40 bar

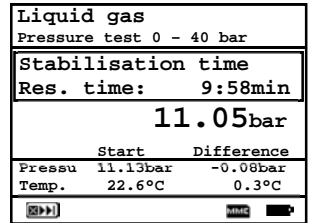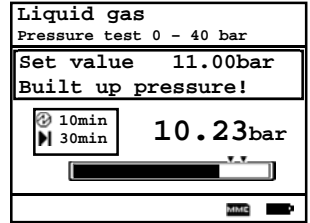The pressure test 0 - 40 bar at liquid gas pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

```
Liquid gas
Pressure test 0 - 40 bar
┌────────────────────────┐
│Set value     11.00bar  │
│Built up pressure!      │
└────────────────────────┘
 ⊘ 10min     10.23bar
 ▶ 30min
 ┌──────────────────┐
 ████████████▁▁▁▁▁▁
                      MMC ▬
```

1. Scroll with the cursor keys **<up/down>** in the menu **"Liquid gas"** to the menu point **„Pressure test 0 – 40 bar"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

```
Liquid gas
Pressure test 0 - 40 bar
┌────────────────────────┐
│Stabilisation time      │
│Res. time:      9:58min │
└────────────────────────┘
          11.05bar
          Start     Difference
Pressu   11.13bar    -0.08bar
Temp.     22.6°C       0.3°C
 ⏩                       MMC ▬
```

3. Connect the external pressure sensor to the liquid gas pipe.

4. Connect the external pressure sensor as described in chapter 3.

```
Liquid gas
Pressure test 0 - 40 bar
┌────────────────────────┐
│Measur. in process      │
│Res. time:      9:25min │
└────────────────────────┘
          11.05bar
          Start     Difference
Pressu   11.05bar     0.00bar
Temp.     22.6°C       0.0°C
                        MMC ▬
```

5. Start the control program with **<Enter>** (the pump of the instrument is building up the adjusted pressure).

6. Wait for stabilisation time (if the pressure remains in the range „test pressure - 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

```
Liquid gas                    ▣
Pressure test 0 - 40 bar
Measurement       10:00min
Ini. Press        11.05bar
Fin. Press        11.05bar
Difference          0.0bar
Ini. temp.          22.6°C
End temp.           22.6°C
Difference           0.0°C
Forward w.: ✓          MMC ▬
```

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **„Pressure test 0 – 40 bar"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Liquid gas
Pressure test 0 - 40 bar
    ┌──────────────┐
    │ Start new    │
    │ measurement? │
    └──────────────┘
Select: ◁✓▷

    ┌─────┐   ┌─────┐
    │ YES │   │ NO  │
    └─────┘   └─────┘
      ▼          ▼
```

5.4. Drinking water (option)

5.4.1. Drinking water plant (wet)

5.4.1.1. Function test

The function test acc. to DIN EN 806-4 at drinking water pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Drinking water / Drinking water plant wet"** to the menu point **"Function test wet"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Connect the external pressure sensor to the drinking water pipe.

4. Connect the external pressure sensor as described in chapter 3.

5. Start the control program with **<Enter>** and built up the adjusted pressure.

6. Wait for stabilisation time (if the pressure remains in the range "test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Function test wet"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Drinking water plant
Function test wet
Set value    6.00bar
Built up pressure!

 30min
 15min      5.23bar
                 ▾▾
 ▬▬▬▬▬▬▬▬▬▬▬▬
                 MMC  ▰
```

```
Drinking water plant
Function test wet
Stabilisation time
Res. time:   29:58min
             6.05bar
        Start    Difference
Pressu  6.13bar    -0.08bar
Temp.   22.6°C       0.3°C
 ▣▸▸▮              MMC  ▰
```

```
Drinking water plant
Function test wet
Measur. in process
Res. time:   14:25min
             6.05bar
        Start    Difference
Pressu  6.05bar     0.00bar
Temp.   22.6°C       0.0°C
                 MMC  ▰
```

```
Drinking water plant ▣
Function test wet
Measurement    15:00min
Ini. Press      6.05bar
Fin. Press      6.05bar
Difference      0.0bar
Ini. temp.       22.6°C
End temp.        22.6°C
Difference        0.0°C
Forward w.: ✓    MMC  ▰
```

```
Drinking water plant
Function test wet
   Start new
   measurement?

Select: ◁✓▷

    ┌─────┐    ┌────┐
    │ YES │    │ NO │
    └─────┘    └────┘
```

5.4.1.2. Pressure test

The pressure test acc. to DIN EN 806-4 at drinking water pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Drinking water / Drinking water plant wet"** to the menu point **"Pressure test wet"**. Activate the menu point with **<Enter>**.

```
Drinking water plant
Pressure test wet
Set value     11.00bar
Built up pressure!
 ⏲ 10min
 ▶ 30min      10.23bar
                    MMC ▭
```

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Connect the external pressure sensor to the drinking water pipe.

4. Connect the external pressure sensor as described in chapter 3.

```
Drinking water plant
Pressure test wet
Stabilisation time
Res. time:      9:58min
              11.05bar
         Start    Difference
Pressu 11.13bar   -0.08bar
Temp.   22.6°C      0.3°C
 ▣▶▶▮                MMC ▭
```

5. Start the control program with **<Enter>** and and built up the adjusted pressure.

6. Wait for stabilisation time (if the pressure remains in the range "test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

```
Drinking water plant
Pressure test wet
Measur. in process
Res. time:     29:25min
              11.05bar
         Start    Difference
Pressu 11.05bar   0.00bar
Temp.   22.6°C     0.0°C
                    MMC ▭
```
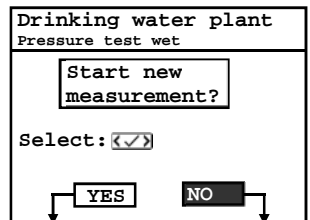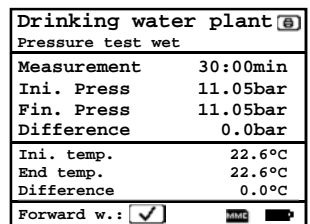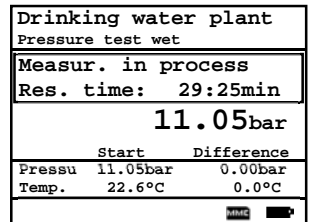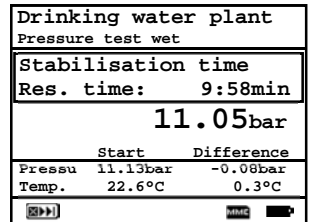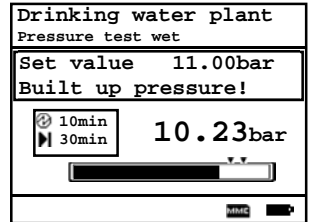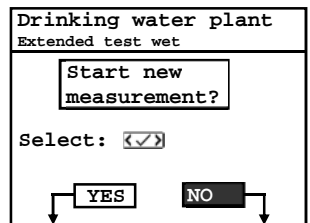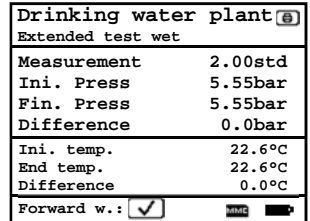
7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Pressure test wet"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Drinking water plant ▣
Pressure test wet
Measurement      30:00min
Ini. Press       11.05bar
Fin. Press       11.05bar
Difference        0.0bar
Ini. temp.        22.6°C
End temp.         22.6°C
Difference         0.0°C
Forward w.: ✓       MMC ▭
```

```
Drinking water plant
Pressure test wet
      Start new
      measurement?

Select: ⟨✓⟩

      ┌─┐
      │YES│      NO
      └─┘        
```

5.4.1.3. Extended test

The extebded test acc. to DIN EN 806-4 at drinking water pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:
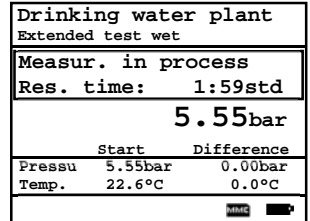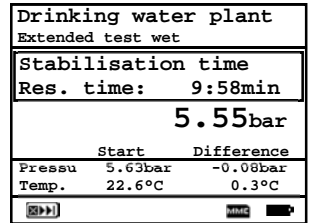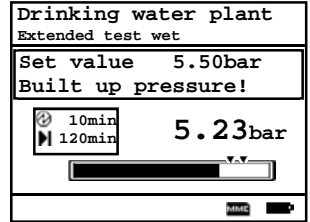
1. Scroll with the cursor keys **<up/down>** in the menu **"Drinking water / Drinking water plant wet"** to the menu point **"Extended test wet"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Connect the external pressure sensor to the drinking water pipe.

4. Connect the external pressure sensor as described in chapter 3.

5. Start the control program with **<Enter>** and built up the adjusted pressure.

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Extended test wet"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Drinking water plant
Extended test wet
Set value    5.50bar
Built up pressure!
  10min
  120min    5.23bar
```

```
Drinking water plant
Extended test wet
Stabilisation time
Res. time:    9:58min
            5.55bar
        Start    Difference
Pressu  5.63bar  -0.08bar
Temp.   22.6°C    0.3°C
```

```
Drinking water plant
Extended test wet
Measur. in process
Res. time:    1:59std
            5.55bar
        Start    Difference
Pressu  5.55bar   0.00bar
Temp.   22.6°C    0.0°C
```

```
Drinking water plant
Extended test wet
Measurement      2.00std
Ini. Press       5.55bar
Fin. Press       5.55bar
Difference        0.0bar
Ini. temp.        22.6°C
End temp.         22.6°C
Difference         0.0°C
Forward w.: ✓
```

```
Drinking water plant
Extended test wet
    Start new
    measurement?
Select:
    YES      NO
```

5.4.2. Drinking water plant (dry)

5.4.2.1. Tightness check

The tightness check acc. to DIN EN 806-4 at drinking water pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Drinking water / Drinking water plant dry"** to the menu point **"Tightness check dry"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Lock the gas pipe with a suitable adapter (test stopple, high pressure stopple or one-pipe counter cap).

4. Connect the components as described in chapter 3.

5. Start the control program with **<Enter>** (the pump of the instrument is building up the adjusted pressure).

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **"Tightness check dry"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.


```
Drinking water plant
Tightness check dry
Connect!
Forward w.: ✓
«« ▀▄         0.0hPa
Set value       150hPa
⊏⊐              MMC ▰
```

```
Drinking water plant
Tightness check dry
Set value    150hPa
is built up!
🕙 10min
▶ 120min     140.3hPa

                MMC ▰
```

```
Drinking water plant
Tightness check dry
Stabilisation time
Res. time:    9:58min
             152.3hPa
         Start    Difference
Pressu  153.1hPa    -0.8hPa
Temp.    22.6°C      0.3°C
                MMC ▰
```

```
Drinking water plant
Tightness check dry
Measur. in process
Res. time:    1:59std
             152.3hPa
         Start    Difference
Pressu  152.3hPa     0.0hPa
Temp.    22.6°C      0.0°C
                MMC ▰
```

```
Drinking water plant
Tightness check dry
Measurement      2.00std
Ini. Press      152.3hPa
Fin. Press      152.3hPa
Difference        0.0hPa
Ini. temp.        22.6°C
End temp.         22.6°C
Difference         0.0°C
Forward w.: ✓   MMC ▰
```
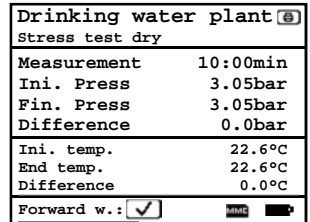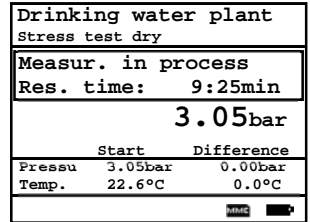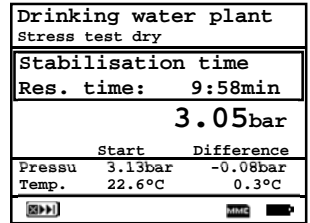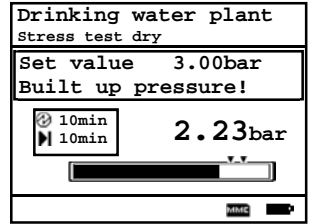
```
Drinking water plant
Tightness check dry
     Start new
     measurement?

Select: ‹✓›

    ┌─YES   NO ─┐
```

5.4.2.2. Stress test

The stress test acc. to DIN EN 806-4 at drinking water pipes is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"Drinking water / Drinking water plant dry"** to the menu point **„Stress test dry"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Connect the external pressure sensor to the drinking water pipe.

4. Connect the external pressure sensor as described in chapter 3.

5. Start the control program with **<Enter>** and built up the adjusted pressure.

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **„Stress test dry"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Drinking water plant
Stress test dry
------------------------
Set value    3.00bar
Built up pressure!

 10min
 10min       2.23bar

                  MMC
```

```
Drinking water plant
Stress test dry
------------------------
Stabilisation time
Res. time:     9:58min
              3.05bar
         Start    Difference
Pressu   3.13bar   -0.08bar
Temp.    22.6°C     0.3°C
                     MMC
```

```
Drinking water plant
Stress test dry
------------------------
Measur. in process
Res. time:     9:25min
              3.05bar
         Start    Difference
Pressu   3.05bar    0.00bar
Temp.    22.6°C     0.0°C
                     MMC
```

```
Drinking water plant
Stress test dry
------------------------
Measurement      10:00min
Ini. Press        3.05bar
Fin. Press        3.05bar
Difference         0.0bar
Ini. temp.         22.6°C
End temp.          22.6°C
Difference          0.0°C
Forward w.: ✓       MMC
```

```
Drinking water plant
Stress test dry
------------------------
   Start new
   measurement?

Select: ‹✓›

    YES      NO
```

5.5. Heating (option)

The test of heating installations acc. to DIN 18380 is registered as a control pragram in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** to the menu point **„Heating"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

3. Connect the external pressure sensor to the drinking water pipe.

4. Connect the external pressure sensor as described in chapter 3.

5. Start the control program with **<Enter>** and built up the adjusted pressure.

6. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

7. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

8. If the menu **„Heating"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
Heating
─────────────────────────
Set value     3.00bar
Built up pressure!
─────────────────────────
 ⊘ 10min
 ▶| 120min      2.23bar
              ▼▼
 [████████        ]
─────────────────────────
                  MMC ▬
```

```
Heating
─────────────────────────
Stabilisation time
Res. time:    9:58min
─────────────────────────
              3.05bar
        Start     Difference
Pressu  3.13bar    -0.08bar
Temp.   22.6°C      0.3°C
 ◼▶▶|              MMC ▬
```

```
Heating
─────────────────────────
Measur. in process
Res. time:    1:59std
─────────────────────────
              3.05bar
        Start     Difference
Pressu  3.05bar    0.00bar
Temp.   22.6°C     0.0°C
                  MMC ▬
```

```
Heating                 ▣
─────────────────────────
Measurement      2.00std
Ini. Press       3.05bar
Fin. Press       3.05bar
Difference       0.0bar
─────────────────────────
Ini. temp.        22.6°C
End temp.         22.6°C
Difference         0.0°C
─────────────────────────
Forward w.: ✓      MMC ▬
```

```
Heating
─────────────────────────
    Start new
    measurement?

Select: ◀✓▶

    ┌──────┐      ┌────┐
    │ YES  │      │ NO │
    └──┬───┘      └─┬──┘
       ▼            ▼
```

5.6. Sewage (option)

The test of sewage installations acc. to DIN 1610 is registered as a control program in the **ecom-DP3**. Proceed as follows:

```
┌──────────────────────────┐
│ Sewage plant             │
├──────────────────────────┤
│ Set value    150hPa      │
│ Built up pressure!       │
├──────────────────────────┤
│ ⊘ 10min                  │
│ ▶ 10min    140.3hPa      │
│         ▁▁▁▁▁▁▁▁▁▁▼▼▁    │
│         ▇▇▇▇▇▇▇▇▇         │
│                    MMC ▬▬ │
└──────────────────────────┘
```

1. Scroll with the cursor keys **<up/down>** to the menu point **„Sewage"**. Activate the menu point with **<Enter>**.

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**).

```
┌──────────────────────────┐
│ Sewage plant             │
├──────────────────────────┤
│ Stabilisation time       │
│ Res. time:    9:58min    │
│            152.3hPa      │
│        Start    Difference│
│ Pressu 153.1hPa   -0.8hPa │
│ Temp.   22.6°C     0.3°C  │
│ ◀▶▶│             MMC ▬▬  │
└──────────────────────────┘
```

3. Connect the testing balloons as described.

4. Start the control program with **<Enter>** and built up the adjusted pressure.

5. Wait for stabilisation time (if the pressure remains in the range „test pressure +/- 10%" during stabilisation time, so the measurement time will start). If necessary the stabilisation time can be terminated with **<F1>**.

```
┌──────────────────────────┐
│ Sewage plant             │
├──────────────────────────┤
│ Measur. in process       │
│ Res. time:    9:25min    │
│            152.3hPa      │
│        Start    Difference│
│ Pressu 152.3hPa    0.0hPa │
│ Temp.   22.6°C     0.0°C  │
│                   MMC ▬▬  │
└──────────────────────────┘
```

6. Once the measurement time is over, the result is displayed and can be printed with **<Print>**.

7. If the menu **„Sewage"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

```
┌──────────────────────────┐
│ Sewage plant         ⊡   │
├──────────────────────────┤
│ Measurement   10:00min   │
│ Ini. Press   152.3hPa    │
│ Fin. Press   152.3hPa    │
│ Difference     0.0hPa    │
│ Ini. temp.      22.6°C   │
│ End temp.       22.6°C   │
│ Difference       0.0°C   │
│ Forward w.: ✓    MMC ▬▬  │
└──────────────────────────┘
```

```
┌──────────────────────────┐
│ Sewage plant             │
├──────────────────────────┤
│      ┌────────────┐      │
│      │ Start new  │      │
│      │measurement?│      │
│      └────────────┘      │
│ Select: ◁✓▷              │
│      ┌──────┐  ┌────┐    │
│    ──┤ YES  │  │ NO │──  │
│    ↓ └──────┘  └────┘ ↓  │
└──────────────────────────┘
```
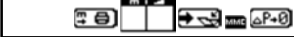
6. More measurements

6.1. Single measurement

Beside the control programs the ecom-DP3 can be used also to measure pressures, temperatures and flow rates. Under **„More measurements / Single measurment"** all measured values are displayed on a view. The measurement of the flow rate is made with a pitot tube (connection P low 2).

If the measured values should be printed, press the key **<record>** (disk symbol) to transfer the values in the intermediate memory. The values can be printed with the help of the **<print>** key (printer symbol). If a printout of the values should be made simultaneously to the intermediate recording, so press **<F2>** (the intermediate memory will be printed).

After selection of a customer, a data logging of all measured values can be started (and also stopped) with **<F3>**. The interval time for the data logging can be adjusted under **„Adjustments / Scan data logger"**. With the help of the software **„DP3Report"** the data can be converted into a format readable for Microsoft Excel.

```
We 01.02.12  09:17:55
T1            23.2 °C
T2            23.1 °C
dT             0.1 °C
Pressure      20.4 hPa
Ext.          4.00 bar
dP            12.8 Pa
V.Gas          2.5 m/sec
```

```
We 01.02.12  09:17:55
T1            23.2 °C
T2            23.1 °C
dT             0.1 °C
Pressure      20.4 hPa
Ext.          4.00 bar
dP            12.8 Pa
V.Gas          2.5 m/sec
```

Measurement stored in intermediate memory

```
We 01.02.12  09:17:55
T1            23.2 °C
T2            23.1 °C
DT             0.1 °C
Druck         20.4 hPa
Extern        4.00 bar
dP            12.8 Pa
V.Gas          2.5 m/sek
```

Data logger is started

6.2. 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.

In combination with the special probes required hereto, the **ecom-DP3** is able to perform the measurement of the heating check parameters: ventilation losses and surface losses. Out of the main menu point **"More measurements"**, select the sub-menu **"Heating Check"** and confirm with **<Enter>**.

With the menu point "**Gas losses**" gas loss values can be converted to negative point system. The gas loss value can be edit with the numerical keyboard. After input the result is calculated with **<Enter>** and stored in **„Results"**.

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

- activate respective input window
  with **<Enter>**
- inputs values using the keys numerical
  function
- confirm input with **<Enter>**
  or:
- adjust values using the cursor
  keys **<Right/Left>**


```
        Heating Check
Gas losses
Surface losses
Ventilation losses
Results
Cancel

Select:  ⟑∨✓
```


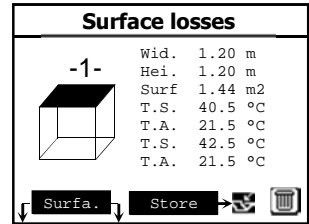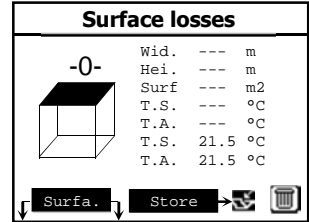**Temperature sensor
for surfaces**

```
          Surface loss

           P.Boiler 24.5 kW
           Width    1.20 m
           Depth    1.20 m
           Hight    1.20 m

Modify: ⟑∨◈✓

Start          Start +✛
```

If no boiler dimensions are inputed, press **<F1>** (Start) to activate the measure-ment recording. Here the dimensions for all surfaces must be inputed.

Press **<F3>** (Start + ->) to start the real measure-ment. Proceed as follows:

- select surface (boiler side) to be
  measured with **<F1>** or **<F2>**
- position surface sensor
- record temperature difference with
  <Memory> - up to 10 values can be
  recorded per surface out of which a
  mean value will be calculated
  automatically
- if need be, cancel measurements
  with **<F4>**
- repeat this procedure for each surface

Surface losses	
	Wid. --- m
-0-	Hei. --- m
	Surf --- m2
	T.S. --- °C
	T.A. --- °C
	T.S. 21.5 °C
	T.A. 21.5 °C
Surfa.	Store 🗑

Surface losses	
	Wid. 1.20 m
-1-	Hei. 1.20 m
	Surf 1.44 m2
	T.S. 40.5 °C
	T.A. 21.5 °C
	T.S. 42.5 °C
	T.A. 21.5 °C
Surfa.	Store 🗑

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**".

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, exter-nal temperature, boiler performance and exhaust gas pipe diameter must be inputed . Hereto proceed as follows:

- open respective window with **<Enter>**
- input figures using numerical function of keys
- confirm input with **<Enter>**
  or:
- adjust values using the cursor keys **<Right/Left>**

Flow probe

Press **<F1>** (Start) prior to going thru the following steps to start the measurement:

- release tubing of the flow probe
- wait for zeroing of pressure sensor
- re-connect tubing of the flow probe
- position flow probe into exhaust gas pipe (observe mark for flow direction)
- switch off burner and simultaneously press **<F1>**
  or:
- press **<F2>** to activate timer (5 sec.) and switch off burner by beep
- after approx. 30 sec. the measurement value converted in negative points
  is available

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

Heating Check
Gas losses √
Surface losses √
Ventilation losses √
Results
Cancel
Select: △▽✓

Heating Check	
Gas loss	**2.9 %**
Points	**2.6**
Surf. Lo.	**2.29 %**
Points	**3.4**
Vent. lo.	**3.11 %**
Points	**3.0**
Quit with: ⤺	

6.3. 4Pa measurement (option)

The simultaneous operation of room-dependent firing place and air evacuation system can lead to dangerous low pressure conditions. With the **ecom-DP3** it is possible to check the low pressure limit value of 4 Pa and to document in a diagramme the time course of the low pressure value. Once the menu point is called up, the measurement is to be performed as follows:

- connect capillary hose for room where burner is installed to „**-**"
- connect capillary hose for reference place (staircase or outside air to „**+**"
- operate firing and evacuation systems with maximal performance
- open window resp. connection door to burner room and check the correct
  evacuation of the exhaust gases
- zero pressure sensor with **<F4>**
- position capillary hose for reference location
- start record pressure value course with **<F1>** (Start) (an acoustical signal is
  issued every 30 sec. which can be deactivated / re-activated by pressing **<F2>**)
- record pressure by opened window resp. connection door
- close window resp. connection door after approx. 30 sec. and check low
  pressure
- after approx. 30 sec. open window resp. connection door and check zero point
- close window resp. connection door after approx. 30 sec. and check low
  pressure
- after approx. 30 sec. re-open window or connection door and check zero point
- after approx. 30 sec. close window resp. connection door and check low
  pressure

Once the measurement time is completed, the diagramme can be viewed on the display (use **<F3>** to emphasize illustration 1x, 2x, 4x, 8x times or A for automatic). Start a printout if needed with **<Print>**.

6.4. Pressure check

```
Pressure check
───────────────────────
Build up pressure
Forward w.: ✓
───────────────────────
«««■▄        0.0hPa
───────────────────────
⊏▬⊐          MMC ▬▬
```

The pressure check (long term measurement up to 1500 hPa or 20 bar with external pressure sensor) is registered as a control program in the **ecom-DP3**. Proceed as follows:

1. Scroll with the cursor keys **<up/down>** in the menu **"More measurements"** to the menu point **„Pressure check"**. Activate the menu point with **<Enter>**.

```
Pressure check
───────────────────────
Stabilisation time
Res. time:      58sek
            1002.3hPa
       Start     Difference
Pressu 1003.1hPa    -0.8hPa
Temp.    22.6°C      0.3°C
▣▶▶              MMC ▬▬
```

2. Check if necessary the values of stabilisation time, measurement time and test pressure with **<F1>** (back with **<ESC>**). If the measurement time is set to 0, thecontrol program runs until it is interrupted.

```
Pressure check
───────────────────────
Measur. in process
Res. time:      9:25min
            1002.3hPa
       Start     Difference
Pressu 1002.3hPa     0.0hPa
Temp.    22.6°C      0.0°C
                 MMC ▬▬
```

3. Lock the gas pipe with a suitable adapter (test stopple, high pressure stopple or one-pipe counter cap) or connect the external pressure sensor.

4. Connect the components as described in chapter 3.

```
Pressure check           ▣
───────────────────────
Measurement      10:00min
Ini. Press     1002.3hPa
Fin. Press     1002.3hPa
Difference        0.0hPa
───────────────────────
Ini. temp.         22.6°C
End temp.          22.6°C
Difference          0.0°C
───────────────────────
Forward w.: ✓    MMC ▬▬
```

5. Start the control program with **<Enter>** and built up the adjusted pressure.

6. If the internal sensor (up to 1500 hPa) is used, the needed pressure can be built up with the internal pump (switch on and off with **<F3>**).

```
Pressure check
───────────────────────
    Start new
    measurement?

Select: ◁✓▷

    ┌──────┐
    │ YES  │   NO
    └──────┘
    ↓          ↓
```

7. Wait for stabilisation time. If necessary the stabilisation time can be terminated with **<F1>**.

8. Once the measurement time is over (or with **<Enter>** if measurement time = 0), the result is displayed and can be printed with **<Print>**.

9. If the menu **„Pressure check"** is selected again, so the result can be called up with **<F4>** (as long as the **ecom-DP3** is on) or a new measurement can be started with **<F1>**.

7. Adjustments

Adjustments
Setup checks
Set clock
Paper feeding
Print contrast

select: ⌃⌄✓

Displ. contrast
Key beep
Beep at end
Language: English
Pitot factor
Scan data logger
Printout

Additionally to those **ecom-DP3** functions described previously, various adjustments can be made in the instrument. From the main menu, select the sub-menu **"Adjustments"** and confirm with **<Enter>**.
A selection of modifiable parameters, adjustable according to the application, is displayed. Place the cursor on the desired line and press **<Enter>** to call up or modify the adjustment. The modifiable parameters are:

Setup checks
(press **<Enter>** to access input menu):
-Input of parameters for the check programs

Clock set (press **<Enter>** to access setting menu):
-Correction of internal clock with cursor keys

Paper feed (press **<Enter>** to activate paper feeding):
-Paper feed line by line

Print contrast (press **<Enter>** to access setting menu):
-Print contrast adjustment with cursor keys

Display contrast (press **<Enter>** to access setting menu):
-Display contrast adjustment with cursor keys

Key beep (**<F1>** for YES / **<F4>** for NO):
-Acoustical signal by key pressing

Beep at end (0, 1, 2, 3, 4 or 5 seconds)
(selection after pressing **<Enter>**):
-Acoustical signal at the end of a measurement lasting at least 2 minutes

Language: English (change with **<Enter>**):
-Info about selected language (3 languages selectable)
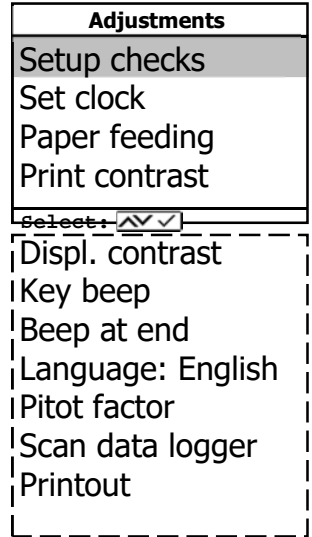
Pitot factor (selection after pressing **<Enter>**):
-Input of Pitot factor for flow rate calculation (standard = 0.93)

Scan data logger (min 1 second / max. 59:59 minutes):
(press **<Enter>** to access menu):
-Input the interval time for data logging (1 sec = 0.01 min).

Printout (selection after pressing **<Enter>**):

-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 **<F4>**.
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 **<Enter>**.
5. Repeat procedure until desired text is complete.
6. Once input for line 1 is completed, deactivate the characters selection mode
   with **<F4>** 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>**.

8. Control (system test)

In menu „Control" (access with **<Info>** key) informations are displayed on 2 pages (use cursor keys to scroll):

-software version
-serial number
-error amount
-operation hours since last service
-total operation hours
-operation hours pump
-distance of the piston
-date of the next recommended service
-phone number of the next service center

-accu voltage (charging status);
 is displayed as a symbol in all menus:
Full charge   Half charge   Empty

```
Program version: V1.0 25.01.2012
Serial number  : 4711
Error counter  :    12
---------------------------------
Operation hrs  :        8.45 std
At a total     :       18.75 std
Pump           :        0.17 std
Cylinder (way) :          13 m
---------------------------------
Next sevice    : 25.01.2013
Service tel.   : 02371/945-5
---------------------------------
Further pages: ⋀⋁
```

```
Programmversion: V1.0 25.01.2012
Geräte Nr.     : 4711

Battery   6.73 Volt         ▮
---------------------------------
Systemtest: ✓
---------------------------------
Next sevice    : 25.01.2013
Service tel.   : 02371/945-5
---------------------------------
Further pages: ⋀⋁
```

System test (check of instrument tightness):

1. introduce system test with **<Enter>**
2. lock connection „P high 1 +" with plug
3. start test with **<Enter>** (pressure is built up)
4. wait for result (approx. 2 min)
5. remove plug and leave with **<Enter>**

If the system is leaky,please contact your ecom partner.

9. Technical Data ecom-DP3

Power supply: -battery: Lithium-Ions 6 V 4,6 Ah
-charger 230 V / 50 Hz~

Indication: -grafic display; backlit
-resolution 240 x 160 Punkte
-window approx. 79 x 53 mm

Pressure range: -0 - 1500 hPa
-0 - 20 bar (option / external sensor)
-0 - 10 hPa (option / Pa sensor)
Resolution: -0,1 hPa
-0,01 bar (option / external sensor)
-0,1 Pa (option / Pa sensor)

Leak rate: -0 - 8 l/h
Resolution: -0,1 l/h

Temperature: -2 x 0 -100 °C (option / external temperature sensor)
Resolution: -0,1 °C (option / external temperature sensor)

Dimensions (LxWxH): -approx. 380 x 430 x 170 mm

Weight: -complete with accessories approx. 9 kg

Ambient temperature: -0 to 50 °C

10. Maintenance tips

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

Change printer paper roll
-Release the printer cover (press lock downwards).
-If necessary, extract the paper rest out of the printer. Hereto select
  "Adjustments"/"Paper feed"/<Enter>.
-Remove the plastics tube of the previous roll.
-Insert the paper end in the slot under the transport roll (paper roll inner side
 facing you while inserting the paper).
-Convey approx. 3 cm paper thru the printer (**"Adjustments"/"Paper
 feeding"/<Enter>**).
-Lay the paper roll in the corresponding hollow.
-Insert the paper thru the slot of the printer compartment cover and close the
 latest.

**Unlocking
printer cover**

Subject to technical changes
V1.4 05.2021

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