



BEVCHECK

Operating Manual for
Integrity Test Device

SW VERSION 3.06E



domnick hunter

PROCESS FILTRATION

Contents	Page
1. Introduction	2
1.1. What is BEVCHECK?	
1.2. BEVCHECK Capabilities	
1.3. BEVCHECK Limitations of Use	
2. Operational Principles	4
3. Description of BEVCHECK	5
3.1. Keyboard and display	
3.2. External Features	
3.3. Instrument Case	
4. BEVCHECK Function Map / Top Level Menu	8
5. Main Functions	9
6. Service Functions	10
7. How to Carry out an Integrity Test (Filter Test) /Connections to Housing	12
8. Filter Test (from Switch ON)	13
9. Test Program Data input at Keypad (from Switch on)	17
10. Displaying Historical Test Results	21
11. Test Conditions for the BEVCHECK & Filter System	23
11.1. Parameter Limits	
11.2. Calculation of the Diffusion Rate	
11.3. Calculation of the Upstream Volume	
12. Upload and Download of Data from PC / Printing the Data	25
12.1. Upload of Data from a PC (Test Program Data)	
12.2. Download of Data to a PC	
13. Change Clock to Summer or Winter Time	26
14. How to Carry Out an Auto-Test	27
15. Technical Features	28
15.1. Automatic Measurement	
15.2. Automatic Cut-Off	
16. Malfunction Diagnostics	29
17. Batteries	30
17.1. How to re-charge the Batteries	
17.2. How to charge the Batteries WARNING	
18. Storage of BEVCHECK	31
19. Technical Data	
20. Upstream Volumes (domnick hunter Housings)	32

1. Introduction

1.1. What is "BEVCHECK"?

BEVCHECK is a small, lightweight portable device for testing the integrity of membrane filters. It is microcomputer-controlled to make operation easier for the operator. Due to its lightweight and small size it is easy to handle. The instrument is primarily intended for use in the brewing and beverage industries.

1.2. BEVCHECK Capabilities

BEVCHECK makes integrity testing by diffusional flow easy to perform. Owing to its precise pressure measurement it is able to give an exact determination of the drop in pressure (ΔP) of a filter system. At the end of an integrity test BEVCHECK indicates whether the test was a PASS or FAIL.

With BEVCHECK you can test any filter cartridges in any housing configuration. For maximum flexibility, BEVCHECK allows the user to store test data for up to 19 different systems.

This data may be entered via the instrument keypad, or uploaded from a PC.

Each test carried out is automatically logged into the BEVCHECK's memory. The operator can either recall the results of the test to the screen (one hundred test results can be stored) or produce a hard copy by connecting the unit for download to a PC and printer.

BEVCHECK may be operated in imperial or metric mode, and contains the following languages:
English, German, Italian, French, Spanish & Portuguese.

1.3. BEVCHECK Limitations of use

BEVCHECK is a semi-automatic device. It does not automatically adjust line pressure to pressure used when integrity testing. Consequently, it is not capable of performing integrity tests without input from an operator. BEVCHECK signals the need for operator intervention, via text and indicator lights.

2. Operational Principles

During the integrity test, BEVCHECK takes a very precise pressure measurement. It determines the pressure drop during the test time and automatically calculates the diffusion rate from the pressure drop and the upstream volume of the system.

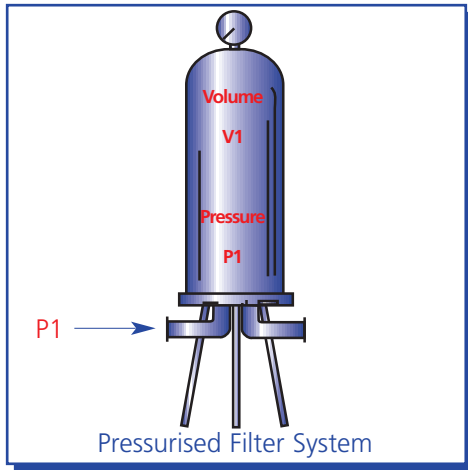


Figure 1

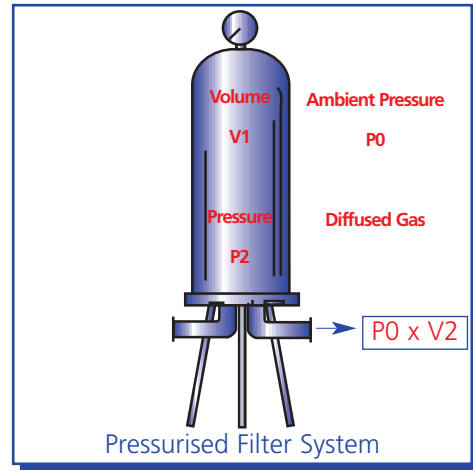


Figure 2

The calculation is based on the following principles:

During the stabilisation period the housing is connected to compressed air $P1$. The housing has a known upstream volume $V1$ (figure 1) this must be input by the operator either at the BEVCHECK, or via PC upload. (Refer to Section 20 for upstream volumes of **dh** housings)

At the beginning of the test, the compressed air supply $P1$ is isolated manually. The diffusion of gas from the pressurised upstream ($P1$) side through the wetted membrane to atmospheric pressure downstream side ($P0$) of the filter creates a pressure drop in the filter housing. At the end of the test the filter housing is pressurised by the reduced pressure, $P2$. The diffused gas $V2$ is at atmospheric pressure $P0$.

The volume of gas lost due to diffusion $V2$ can be calculated as follows:

Total volume of gas initially in the filter system: $C = P1 \times V1$

Corresponds to the volume of gas after the test plus the diffused volume of gas:

$$C = (P2 \times V1) + (P0 \times V2)$$

From that follows: $P1 \times V1 = (P2 \times V1) + (P0 \times V2)$

$P1$ and $P2$ are measured, $V1$ and $P0$ are known.

From that follows: $V2 = (P1 - P2) \times V1 / P0$

The diffusion rate corresponds with the diffused volume of gas in millilitres per minute.

$$\text{Diff} = V2 / \text{test duration}$$

The ambient temperature influences the pressure measurement and the diffusion rate. Therefore, it is important that the ambient temperature does not fluctuate during the test.

Testing should not be carried out immediately after steam sterilisation of the filter system but only after the filter housing has cooled to ambient temperature. It is further recommended that testing be avoided in extremes of temperature.

To calculate the diffusion rate from the pressure drop, BEVCHECK assumes that the temperature is at a constant 20°C and that the atmospheric pressure does not vary from 1000 mbar absolute.

3. Description of BEVCHECK

3.1 Keyboard and display



Figure 3

The display consists of two lines:

The first line usually represents the current menu position.

The second line usually indicates which keys can be pressed. The triangular black arrow represents the "START" key. The presence of the "?" also indicates that the "START" button is an expected input in most cases.

Example:

Test Filter? Proceed >↑↓	-- To start a filter test? – press "START" OR -- Continue to another menu option with ↑ Key: (forwards) OR ↓ Key: (backwards).
-----------------------------	--

The keypad comprises 16 keys, the functions of which are listed below:



forwards, next menu option or step



backwards, previous menu option or step



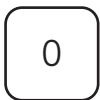
start a function



stop a function, also an emergency exit



"*" and "#" are special functions
 these are indicated on the display when required.
 "*" may also be used for alphanumeric input of data.



'0...9': number input & Alpha numeric input.

3.2 External Features

On/Off Switch

The on/off switch is located on the left side of the device. It is protected against humidity by a transparent silicone cap. BEVCHECK can also switch off by itself, for instance when batteries are discharged. BEVCHECK will warn the operator if the batteries are low.

Compressed Air Connection

The compressed air connection is located at the bottom of the BEVCHECK and ensures that no water accumulates in the device during measurement (see also technical specifications).

Charger Connector

The jack for the external charger unit is located on the right side of the housing. A charge control indicator beside the connection indicates whether the charger is operating (see technical data).

Warning: It is important that only the original charger and the correct type of batteries are used!

PC Link

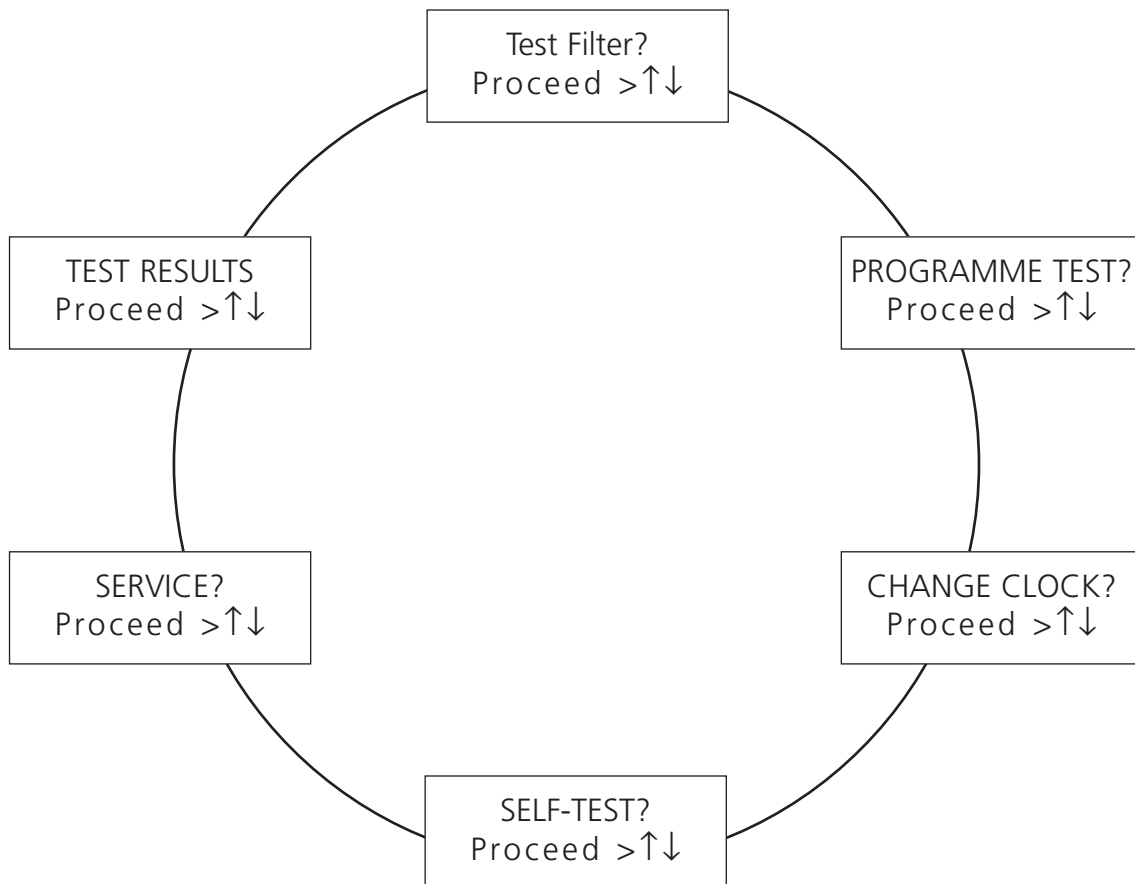
At the top of the device is located a round PC link that is protected against humidity by a plastic cap. The PC link is used for the upload of test programs and the download of test results to a PC and for other operations in combination with the WIN-FILTER programme (see also technical data).

3.3 Instrument Case

The case will protect the instrument against humidity and damage through rough handling. Nevertheless it is recommended that the usual precautions for the handling of high-quality electronic devices be taken. Moreover, the instrument should be protected from prolonged exposure to humidity and mechanical stress (see also technical data).

4. BEVCHECK Function Map / Top Level Menu

The connection between the individual functions of BEVCHECK is presented in the form of a diagram below. The display windows describe the main functions, the way to each function is indicated by the presence of arrow key symbols. To reach the top-level menu, switch on the BEVCHECK, then press the "STOP" Key immediately.



Note: The symbol ">" means press "START" to access this option

5. Main Functions

These detail all functions that are necessary for integrity testing and the management of the test results:

TEST FILTER?
Proceed >↑↓

The FILTER TEST function can test up to 19 different filter systems. Each test result is stored into the memory. Up to 100 results can be stored.

To start a test, press "START", to move to another menu option use the arrow ↑↓ Keys.

TEST RESULTS?
Proceed >↑↓

The TEST RESULTS function allows any of the previous 100 filter test results to be displayed. Press "START" to enter the function.

PROGRAMME TEST?
Proceed >↑↓

In order to enter in the data of a new filter system use the function PROGRAM TEST. Up to 19 different filter systems can be stored.

Press "START" to begin programming. The last test used or programmed will be displayed. Select an alternative test program by using the number keys.

CHANGE CLOCK?
Proceed >↑↓

With the function CHANGE CLOCK change the clock from summer to wintertime. Press the "START" Key to change the clock.

SELF-TEST?
Proceed >↑↓

AUTO-TEST checks the most important components of BEVCHECK. Press "START" Key to begin.

SERVICE?
Proceed >↑↓

With the SERVICE function exit the main functions and get to special service functions. However, for the everyday use of BEVCHECK this is not necessary.

6. Service Functions

The block of service functions contains all functions that are necessary for special – not everyday – adjustments of BEVCHECK. Only qualified **domnick hunter** personnel should use the service functions: See next page for full description of this function.

SERVICE?
Proceed >↑↓

Access SERVICE from top level menu by using the arrow keys until this menu option is displayed.
Press the “#” Key to enter the SERVICE menus.

SECURITY CODE?
Proceed >↑↓

Default value is 7. This security number may be changed.

* SERVICE *
Proceed >↑↓

This screen indicates successful entry of the user code. Now use the ↑↓ Keys to select options as below.

SET CLOCK?
Proceed >↑↓

Press “START” to reset the clock. Select from date, summer /winter or time using ↑↓ to make changes press “*” Key followed by numeric data if required.

CALIBRATION?
Proceed >↑↓

Enter by pressing “START” Key. It is recommended that the user does not select this option. Consult **domnick hunter**, for information.

LANGUAGE?
Proceed >↑↓

Select the desired language. Press “START” then ↑↓ to make a new selection.

INFORMATION?
Proceed >↑↓

Operating data may be viewed in this option.
Press "START" to select. STOP or ↑ to exit.

SECURITY CODE?
Proceed >↑↓

CLEAR?
Proceed >↑↓

WARNING: Do not enter this menu. There is a risk of loss of calibration and test result data. Contact domnick hunter for further information.

BAUD RATE?
Proceed >↑↓

Baud rate for data transfer may be changed. Press "START" Key then use ↑↓ Keys to select a new baud rate.
Press "STOP" to save & exit. This feature may not be available on later models where baud rate selection is automatic.

CONFIGURATION?
Proceed >↑↓

Select Imperial or metric measurement in this mode. Press "START" key then use "*" to select options. Press "STOP" to save & exit. In this mode the user code feature may be switched on and off (see TEST FILTER) and the ID code system may be set to auto, (BEVCHECK increments ID code at each test) set to on (user determines ID code) or off (no ID code allocated). The final option here is to select the battery type fitted to the unit. See Technical data section for details.

7. How to Carry out an Integrity Test (Filter Test) / Connections to Housing

The BEVCHECK can be connected directly to the housing with rectus 21 pneumatic fittings. A female rectus 21 fitting is supplied with the instrument as standard. A complete hardware kit is available from **domnick hunter**, to facilitate connection. Order Stock N°. 63 950 2520

It is important that BEVCHECK is in a vertical position so that any water that may be present does not enter the device. Please note: the quality of the compressed air supply used to conduct the testing, should be compatible with the requirements of the process.

See below for the two recommended connection configurations.

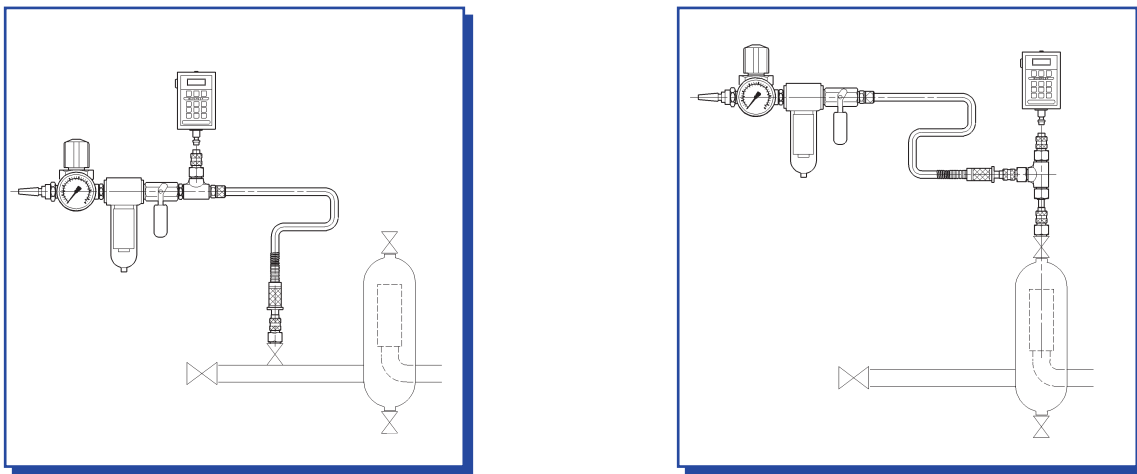


Figure 5

If the filter is flushed to wet out the membrane ensure that the BEVCHECK remains totally isolated as bulk liquid entering the device will cause damage.

After flushing is complete, ensure that the pressure used to evacuate the filter housing of liquid does not exceed the test pressure.

It is essential to observe the following points when connecting the BEVCHECK:

- do not exceed maximum pressure (see technical data)
- ensure pressure is regulated
- only use clean, dry, oil-free compressed air or Nitrogen
- all liquid should be drained off from the filter housing before connecting BEVCHECK
- BEVCHECK should be connected in an upright, vertical position
- avoid temperature changes around the instrument or test housing

8. Filter Test (from Switch on)

The filter test or integrity test, will determine whether or not the filter system has any leaks and that the filter cartridges are integral.

Before testing, the filter system must be fully wetted out. It is important that the cartridge manufacturer's guidelines for wetting out are observed.

It is also important to protect the BEVCHECK from being exposed to bulk liquids. See above section 7.

After flushing is complete, attach the BEVCHECK to the upstream side of the filter system and switch it ON.

When pressing the keypad buttons it is recommended that the BEVCHECK be supported with the free hand in order to prevent excess strain on the air connection.

Please find below the LCD text displays, from switch on, that will be displayed during a typical integrity test and during the programming of a test.

There is also a description of the required operator input / keypad input at each step.

Note: All of the parameters that are entered during PROGRAM TEST operations may be uploaded to BEVCHECK from a PC.

The operator should check the parameters via the PROGRAM TEST menu option before performing a test.

BEVCHECK
test program 1

The BEVCHECK always displays this screen when first switched on. The test program number will be the program last used to perform a test, or edited (in PROGRAM TEST). To perform a test with program displayed press "START". To change the program press the number key for the required test program.

OR

TEST FILTER?
Proceed >↑↓

If the main menu has to be accessed (eg to change test parameter) press "STOP" to display this menu option or use the ↑↓ Keys to move through the top level menu to find this screen. Then press "START".

BEVCHECK
test program 1

Once the test program required is displayed press "START" as above. Alternatively use the number buttons to select a new test program.

BEVCHECK
filter unknown >↑↓

If this appears when a number key is pressed, the test program is empty or incomplete. See PROGRAM TEST for information.

BEVCHECK
test program 3

Once the required program number is displayed press "START" to begin the test.

USER CODE
enter >↑↓

The user code is used to track which operator is performing the test. A four-digit number must be entered. This will be logged with the results of the test in the BEVCHECK memory. Press the ↑ Key to step to the next stage after typing in the user code.

The first parameter is: Pore size. If the down arrow or "STOP" key are pressed at this point the error message parameters not complete appears. This will reset itself.

COMPRESSED AIR
switch on>↑

The BEVCHECK is now waiting for the required test pressure to be detected at the pressure sensor. Turn the compressed air valve to the on/open position. The red LED will flash until the test pressure is detected or the ↑ pressed.

(Note: if the test pressure etc. as above)

(Note: using a pressure regulator carefully allow pressure to build to the starting test pressure)

STABILISATION
802mbar 120 sec

The BEVCHECK will automatically start the test once the pre-set test pressure is detected. The yellow "IN PROGRESS" LED will flash. The first stage is stabilisation. The stabilisation time will count down to zero.

COMPRESSED AIR
switch off>↑

After the full stabilisation time has elapsed, the BEVCHECK prompts the operator to switch off the compressed air supply. Turn the compressed air valve to the off/closed position. The red LED will flash until the operator signals that this action has been performed by pressing the ↑ Key. **It is essential that the compressed air supply is isolated from the test system at this point.**

Δ 0 mbar
120 sec

Now the BEVCHECK monitors the pressure drop during the pre-set test time. The test time counts down to zero. The BEVCHECK can display the pressure loss (since test start) or various other information while the test progresses. Press the "*" Key during test time to select the preferred display.

Δ 0.0 mbar/min
* PASS * >↑↓

The test results PASS / FAIL will be indicated by the BEVCHECK at the end of the test time. The green LED will be illuminated for a PASS.

The pressure decay value is also displayed. To toggle between pressure decay and diffusional flow result press the "*" Key.

In the case of a FAIL this will be reported as a FAIL and the red LED will flash.

The instrument may also display an ABORT message if the test was interrupted before completion.

TEST DATA
DISPLAY >↑↓

Start

"START" to proceed or "STOP" to stop.

PRESSURE DROP
Δ 1.1 mbar/min >↑↓

DIFFUSION RATE
0.9 ml/min >↑↓

First display shows the pressure drop per minute.

Toggle to diffusional flow result with "*" Key.

testpress 580mb
ok >↑↓

"*" Key to toggle. Use arrow keys to step through the test parameters in the memory

testpress 130mb
OUT OF RANGE !

The actual test pressure is displayed.

stabilisation
120 sec >↑↓

If there was a fault, this is highlighted. Use arrow key to step next display.

test duration
120 sec >↑↓

Confirms stabilisation time. Use arrow key to step to next display.

Result
PASS >↑↓

Confirms test time. Use arrow key to step to next display.

NOTES:

The results of a test are determined by the following parameters in addition to the diffusional flow limit / pressure decay limit being exceeded:

The test is deemed to be a FAIL if:

1. At the beginning of the test the pressure differs by more than ± 30 mbar from the defined test pressure.
2. The pressure drop during the test is more than 200 % higher than the pressure drop allowed. In this case the test will be stopped immediately. This interrupt will only occur after minimum test time of one minute. Re-wet the filter with suitable wetting fluid; if problems persist, contact **domnick hunter** for guidance.

9. Test Program Data Input at Keypad (from SWITCH ON)

test program 1

The BEVCHECK always displays this screen when first switched on. The test program number will be the program last used to perform a test, or edited (in PROGRAM TEST).

TEST FILTER?
proceed >↑↓

Press "STOP" and this top-level function will be displayed.

PROGRAM TEST?
proceed >↑↓

Use arrow keys to step through the top-level menus until program test option is displayed. Once program test option is displayed, press "START".

test program 1
enter the no >↑↓

Now use the number keys to select the program number required, e.g. 12.

test program 12
enter the no >↑↓

Press ↑ Key to begin to check/edit the contents of program 12.

Pore size ?
>0.00 μm >↑↓

Enter the correct pore size using the number keys, e.g. 1.00μm. Press the ↑ Key to step to the next parameter for edit.

Pore size ?
>1.00 µm >↑↓

diffusion rate
max 18.0 ml/m >↑↓

Press the ↑ Key to continue to check/edit the contents of program 12. Next parameter is diffusion rate.

Continue to enter data with the number keys and step to the next parameter with the ↑ Key.

test pressure
> 800mbar >↑↓

Enter the test pressure.

nb. cartridges
> 1 >↑↓

Enter the number of cartridges in the housing.

upstream volume
> 2500ml >↑↓

Enter the upstream volume in ml. For a complete list of housing volumes for **domnick hunter** filter vessels, see section 20.

stabilisation
max> 30sec >↑↓

Enter stabilisation time required.

max testing time
max> 30sec >↑↓

Enter the testing time required.

filter type
description >↑↓

The filter type will usually be a brand name. e.g. TETPOR 0.45. For this reason it is particularly convenient to upload this data from a PC.

If the operator wishes to enter text (alphanumeric) with BEVCHECK this is also possible. Press the ↑ Key to view current filter type.

no data
*:new #:delet >↑↓

“*” Key will enter alphanumeric mode to enable text entry. “#” Key will delete current entry. After successful detection and/or typing of new text, press the ↑ Key to step to the next parameter.

serial No
enter the No >↑↓

If desired, a filter serial number may be entered. As above this is intended as an uploaded parameter, but may be entered at the BEVCHECK.

Press the ↑ Key to view current serial number.

no data
*:new #:delet >↑↓

In this example, no serial number has been uploaded or entered for this test. “*” Key will enter alphanumeric mode to enable text entry. “#” Key will delete current entry. After successful deletion and/or entering of new text press the ↑ Key to step to the next parameter.

Note: Any number key if pressed and held down will enter character entry mode. Removing finger from the button for 3 seconds will select the character/number presently displayed at the cursor point.

housing
enter the nb >↑↓

Enter a housing number and/or press the ↑ Key to step to the next parameter (if the number displayed is correct).

no data
*:new #:delet >↑↓

Press the ↑ Key to display the options.

fluid type
description >↑↓

Press "*" Key to scroll through the choices, water, IPA/Water, product, fluid 1 or fluid 2. These are default choices and may be changed and uploaded from a PC.

water
*:choice#:del >↑↓

Once the desired option is displayed, press the ↑ Key to step the the next parameter.

parameter
calculated >↑↓

This is a message to advise the operator that the next displays contain parameters calculated by BEVCHECK using the data input byt he operator, or by the PC upload.
Press the ↑ Key to step to the next display.

diffusion rate
tot 18.0ml/m >↑↓

Total maximum allowable diffusional flow for the system. This unit is ml per minute.

pressure drop
maxΔ7.2mb/mi>↑↓

Total maximum allowable pressure drop for the system. This unit is mbar per minute.

The BEVCHECK will now allow a test to be performed using this program. If the unit is powered down, this will become the default program.

10. Displaying Historical Test Results

TEST RESULTS?
proceed >↑↓

Find "TEST RESULTS" option in the top-level menu.
Press "START" to begin.

search in memo
with >↑↓

Press ↑ Key to display most recent result. At any time, the most recent result can be displayed using the "#" Key.

xx.xx.xx xx:xxh
ID Code yyy

Use the arrow keys to step through the recorded test results. The date and time of the test or the ID code may be used to locate the required data. (The more recent test may be displayed immediately by pressing the "#" Key).

#

Start

Once the desired test is found, press "START" to begin to examine the logged data.

test data
>↑↓

The first display is shown here. Press the ↑ Key to step through the displays.

ID Code 7
>↑↓

This confirms the ID code of the test result being viewed. In this case it was the 7th result logged in the memory since the last data downloaded.

Press the ↑ Key.

user code 1111
>↑↓

This confirms the operator number/user code of the person who performed the test.

Press the ↑ Key.

date 13.06.00
time 09:27h >↑↓

This confirms the date and time of the test being viewed.

Press the ↑ Key.

test program 1
>↑↓

This confirms the test program that was used to perform the test being view.

Press the ↑ Key.

All of the programmed parameters may be viewed in sequence in this manner: (filter type, serial number, housing number, fluid type) as entered by upload or in the program test menu. See section 9.

result
PASS >↑↓

Eventually the test data is reached.

Press the ↑ Key.

pressure drop
0.0 mbar/min >↑↓

All of the result data may be viewed in the same order as previously described in section 8 "TEST DATA DISPLAY". The data is presented on screen at a time determined by use of the ↑↓ Keys.

Note: This is the ACTUAL recorded data obtained during the test.

filter parameters
>↑↓

Attached to the end of the test results data is additional information concerning the filter parameters.

pore size
0.20µm >↑↓

These are accessed one display at a time by use of the ↑↓ Keys. This first display being "PORE SIZE". Again, this information is presented in the same order as the data was entered in the "PORGRAM TEST MODE". See section 8 for details.

This is a duplication of the data entered during program test, supplied for information purposes.

TEST RESULTS?
proceed >↑↓

To exit this option press "STOP" Key.

11. Test Conditions and Limits for BEVCHECK

11.1 Parameter Limits

BEVCHECK can store up to 19 different test programmes allowing its use with 19 different combinations of cartridges and housings. To create a programme, you have to enter the relevant data of your filtration line. This can be performed at a PC for greater ease, or with the BEVCHECK keypad. The following limitations apply:

		permitted data range
1	programme number (No. of the filter line)	19
2	pore size	0.01 - 2.00µm
3	maximum diffusion rate per cartridge	1 - 999.9ml/min
4	test pressure	1 - 4000mbar
5	number of cartridges	1 - 99
6	upstream volume of the filter	10 - 999999ml
7	stabilisation time	1 - 1800 secs
8	test time	1 - 1800 secs

11.2 Calculation of the Diffusion Rate

When entering the test program, it is assumed that cartridges of the same type are in the filter housing. The maximum permitted diffusion rate for a single cartridge must be determined and entered in the programme. Please note that most cartridge manufacturers (including **domnick hunter**), indicate the diffusion rate for a 10" filter element. Consequently, for longer filter cartridges, multiply this diffusion rate: Please check with care when compiling a test program.

Diffusion rate = permitted diffusion per 10" unit x number of the 10" modules

Calculation for a 20" cartridge is: diffusion rate = permitted diffusion x 2

Calculation for a 30" cartridge is: diffusion rate = permitted diffusion x 3

(Example: 3 round 30 inch housing. Each cartridge diffusion = permitted diffusion x 3, in a three round system this value must be multiplied by three. The number of cartridges is therefore 9 and the diffusion per cartridge is that quoted for a 10 inch element).

If the filter housing contains different cartridges, it is necessary to calculate the entire diffusion rate. Divide this value by the number of cartridges to obtain the average diffusion rate per cartridge: Enter this value as the diffusion rate per cartridge into BEVCHECK.

Diffusion rate per cartridge = entire diffusion rate of all cartridges / number of cartridges.

If the cartridge manufacturer supplies data for 10, 20, 30 etc the calculation is more simple. The number of cartridges still needs to be input. (Example: 3 round 30 inch would be 3 cartridges in this case and the diffusion per cartridge is that quoted for a 30 inch element).

11.4 Calculation of the Upstream Volume

The upstream filter volume is defined as the complete volume of the upstream part of the tested system, from the upstream water inlet valve, including the associated pipe work and the housing minus the volume of the fitted filter cartridges.

Filter upstream volume = housing volume + vol. connecting pipe – vol. of all filter cartridges

Note: the volume of the filter cartridges can be assumed to be 1 litre per 10" unit, if this information is not readily available. See appendix 1 for details of the upstream housing volumes (with cartridges fitted), for all **domnick hunter** liquid and gas housings.

12 Upload & Download of Data to a PC

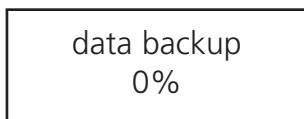
12.1 Download of Data to a PC

Reports stored by the BEVCHECK can be transmitted via the serial interface to a PC using the data backup programme WINFILTER for archive or printing. The data backup programme can be used with Windows 3.0 or Windows 95. It contains a detailed online help icon.

For the data transfer, BEVCHECK must be connected to the PC via a data cable provided to a serial comms port and be switched on. All subsequent operations are carried out on the PC.

Start the data backup programme WINFILTER on your PC.

Connect BEVCHECK via data transfer cable and switch on.



Start the data backup by clicking on the corresponding symbol for the programme.

The data is now downloaded to the PC and displayed in a table.



With the "STOP" key, interrupt the data transfer at any time.

12.2 Upload of test Data

A key feature of BEVCHECK is the ability to upload test data from PC. This makes entry of alphanumeric data quick and simple, and enables centralised control of all 19 test programs.

With the PC & BEVCHECK connected as described above, and winfilter running, click on the device parameter option to activate the upload control screen.

A complete list of the options available with the PROGRAM TEST menu provided by the BEVCHECK software is presented.

The PC keyboard may then be used to complete the test parameters. Click the upload button to send the data to BEVCHECK.

13. Change Clock to Summer or Winter Time

First start as described in section 4. Use the arrow keys to find the top-level menu option below:

CHANGE CLOCK ?
proceed >↑↓

Start function "CHANGE CLOCK"

Start

time 11:45:39
summer time *>↑

BEVCHECK displays the actual time and current selection.

*

With "*" key switch from summer to winter time and vice versa.

time 10:45:39
winter time *>↑

14. How to Carry Out Self Test

First start as described in chapter 4.

SELF TEST?
proceed >↑↓

Press "START" to initiate the AUTO TEST function.

Test ...
battery wait ...

The most important components of BEVCHECK are tested sequentially.

Test ...
battery ok

The result of the tests is displayed each time.

Auto-test
ok

Finally, the entire test result is displayed.

Auto-test
Error: xx >*

If a malfunction is detected, an error code that describes the malfunction precisely is displayed.

With "*" Key the test can be repeated.

15. Technical Features

In order to save battery power, BEVCHECK is equipped with an automatic energy saving function that switches off components not being used.

15.1 Automatic Measurement

The pressure sensor is only activated when BEVCHECK needs pressure values (during filter test or calibration). After being switched on, the pressure sensor needs a few seconds to give a stable measurement.

15.2 Automatic Cut-Off

If BEVCHECK is switched on without any keyboard input, it will switch off automatically after about 5 minutes to preserve the battery.

This function is invalidated when a filter test is in operation and during calibration.

16. Malfunction Diagnostics

BEVCHECK carries out a continuous verification of the most important operating data. If an error occurs at any time, it is immediately displayed, together with one of the following error messages:

Error message!
temp. too low

The temperature in the device is below 3°C.
Measurement precision of the device can no longer be guaranteed.

Error message!
temp. too high

The temperature in the device is above 37° C.
Measurement precision of the device can no longer be guaranteed.

Error message!
OVERLOAD

The applied pressure is above 6800 mbar!
A further increase might damage the pressure transducer.

Error message!
pressure sensor

The pressure measured is outside the permitted range.
Pressure measurement is faulty or should be readjusted.
Contact **domnick hunter**.

Error message!
memory

A data error has been discovered in the memory of BEVCHECK. Data has been destroyed.
Please note the error message and send this information to **domnick hunter**. The device may need to be returned for repair.

Error message!
AD Overflow: x

The value measured cannot be evaluated because it is too high or too low. Please note the error message and send this information to **domnick hunter**. The device may need to be returned for repair.

Error message!
charge battery

If this message appears, the battery is running out. Let the device continue operating until it switches off.
Connect BEVCHECK to the charger in order to continue the operation without interruption.

Error message!
FRAM

The internal FRAM of BEVCHECK is defective.
Please note the error message and send this information to **domnick hunter**.
The device may need to be returned for repair.

17. Batteries

When the message "Charge battery" appears on the display, recharge BEVCHECK using the charger supplied.

Warning: Do not use the device with regular batteries.

Ni Cad Type batteries

To optimise the life of the batteries, it is important that they are allowed to fully discharge before recharging. In this case, do not recharge the BEVCHECK immediately after the message "Charge battery" but let it continue to operate without external power supply unit until it automatically switches off.

The above is not required when NiMH type batteries are fitted. Simply recharge as soon as is convenient.

For charging only use the original adaptor. To do this, switch off BEVCHECK and connect the power jack of the adaptor to the charger socket at the side. The red charging control light indicates whether the charger is operating.

The batteries are completely recharged after approximately 8 hours. BEVCHECK is equipped with a protection against overcharging. The older the batteries, the longer they have to be recharged and the operating time is reduced.

Do not leave BEVCHECK plugged into the adaptor permanently if not in use!

17.1 How to Refresh ?Your Batteries (NiCad Type).

If the operating time is reduced, despite correct recharging, it might be necessary to refresh the batteries.

The batteries have to be recharged while the BEVCHECK is switched on. In order to avoid the automatic cut off, carry out the first step of a filter test.

TEST RESULTS?
proceed >↑↓

start test

The device should be recharged in this mode 12 hours maximum.

18. Storage of BEVCHECK

It is important that BEVCHECK is always stored in a dry place. The foam-lined storage and transportation case is ideally suited.

If water has penetrated into the compressed air connector, it must be removed before extended storage of the device, (always store the device in a vertical position to assist drying).

In the case of an extended storage, ensure that the batteries do not completely discharge, as this will lead to complete memory loss. In order to avoid this, recharge the device from time to time.

19. Technical Data

Ambient conditions

Permitted temperature range	3 – 33 °C
Maximum humidity	95 % relative humidity
Protection class	IP 53, protection against water splashes

Electrical data

Batteries	4xNiMH (or NiCd) 4.8V, 1500mAh NiMH
Time taken to recharge battery	12 h
Operating time (yellow LED flashing)	7 h
Normal operation	7 – 12 h
Data storage (with full batteries)	6 months
In case of battery failure automatic switching off and data storage	

Charger

Charger	100-240V AC/ 47-63Hz / 7.5 V 1.33A
Charger for different countries available	
Charger jack	3.5 mm
PC link	4 pol jack with cover cap

Programmes

Maximum number of different test programmes	19
Maximum number of test reports memorised	100

Pressure measurement

Range of measurement	0 – 4000 mbar
Precision of measurement	± 8 mbar absolute error (ref. 4000 mbar)
Temperature error	± 20 mbar for ± 15 Kelvin
Compressed air connector	Compressed air nipple 5 mm

Housing

Material of housing	ABS
Compatibility of housing	diesel, sea-water, light alkalis, light acids, alcohol
Incompatibility of housing	benzene, acetone
Measures	210x105x45 mm
Weight	520 g

Miscellaneous

Display	2x16 characters liquid crystal display (LCD)
Signal indicators	red, green, yellow, 3 mm
Recharge control indicator	red, 3 mm
Keypad	16 keys

20. Net Upstream Volumes (domnick hunter housings)

Note: All volumes quoted assume that all of the designated cartridges are in place, and include the volume from the upstream tri-clover, weld in point or flange, to the cartridge(s).

Vessel	Vol (ml)	Vessel	Vol (ml)
VBL01K	560	VIL011	1620
VBL011	1920	VIL012	2860
VBL012	3060	VIL013	4180
VBL013	4180	VIL014	5432
VBL014	5332	VIL031	8360
VBL031	5060	VIL032	12080
VBL032	8280	VIL033	16040
VBL033	11740	VIL051	10600
VBL034	14996	VIL052	14800
VBL052	14500	VIL053	19400
VBL053	20500	VIL054	23660
VBL054	26160	VIL082	42880
VBL082	22480	VIL083	55440
VBL083	31640	VIL084	67456
VBL084	40256	VIL122	55320
VBL121	19440	VIL123	73160
VBL122	30420	VIL124	89184
VBL123	42360		
VBL124	53484		
VBL193	68520		
VBL194	84508		

Allow additional volume for the connection apparatus as follows. 6mm internal diameter plastic tube= 28.3ml / metre length.
Supplied as part of the **domnick hunter** kit code XAK00BC1

Vessel	Vol (ml)
VSL011	1760
VSL012	2900
VSL013	4120
VSL014	5272
VSL031	8600
VSL032	15720
VSL033	22380
VSL034	28736
VSL051	6840
VSL052	12440
VSL053	17740
VSL054	22600
VSL122	34490
VSL123	48130
VSL124	62454

Allow additional volume for the connection apparatus as follows. 6mm internal diameter plastic tube= 28.3ml / metre length.
Supplied as part of the **domnick hunter** kit code XAK00BC1



Europe



domnick hunter limited
Process Filtration
 Durham Road,
 Birtley, England DH3 2SF
 Tel: +44 (0)191 410 5121
 Telefax: +44 (0)191 410 5312
 E.mail: process@domnickhunter.com

PTI Technologies Ltd
 Orgreave Lane, Handsworth
 Sheffield, S13 9NZ
 Tel: +44 (0) 114 269 3999
 Telefax: +44 (0) 114 269 1409
 E.mail: filters@ptitechnologies.co.uk

domnick hunter limited
Industrial Operations
 Dukesway, Team Valley Trading Estate,
 Gateshead, England NE11 0PZ
 Tel: +44 (0)191 402 9000
 Telefax: +44 (0)191 482 6296
 E.mail: industrial@domnickhunter.com

domnick hunter limited
Gas Generation
 Dukesway, Team Valley Trading Estate,
 Gateshead, England NE11 0PZ
 Tel: +44 (0)191 402 9000
 Telefax: +44 (0)191 497 1216

domnick hunter
fabrication limited
 Boldon Business Park,
 Boldon, England
 Tel: +44 (0)191 519 0066
 Telefax: +44 (0)191 519 1400



dh Group Benelux B.V.
 Roosendaal, The Netherlands
 Tel: +31 165 527 127
 Telefax: +31 165 394 461



domnick hunter Skandinavien A/S
 Slangerup, Denmark
 Tel: +45 473 80644
 Telefax: +45 473 80643
 E.mail: skand@domnickhunter.com



domnick hunter France s.a.s.
 Villefranche sur Saône, France
 Tel: +33 4 74 62 34 51
 Telefax: +33 4 74 62 35 44
 E.mail: info.france@domnickhunter.com



domnick hunter gmbh
 Willich, Germany
 Tel: +49 (0)2154 48100
 Telefax: +49 (0)2154 481010



dh Group Benelux B.V.
 Roosendaal, The Netherlands
 Tel: +31 165 527 127
 Telefax: +31 165 394 461



domnick hunter Iberica
 Barcelona, Spain
 Tel: +34 93 572 0050
 Telefax: +34 93 572 1585



domnick hunter AB
 Sweden
 Tel: +46 (0)31 748 0610
 Telefax: +46 (0)31 748 0621

USA / Canada / South America



domnick hunter inc
 Charlotte, USA
 Tel: +1 704 921 9303
 Telefax: +1 704 921 1960
 Toll Free: 1-800-345-8462

PTI Advanced Filtration
 2340 Eastman Avenue, Oxnard
 California, USA 93030
 Tel: +1 805 604 3400
 Telefax: +1 805 604 3401
 Toll Free: (877) PTI-2234



hb-domnick hunter
equipamentos ltda
 Sao Paulo, Brazil
 Tel: +55 (0)11 3766 3977
 Telefax: +55 (0)11 3768 1421
 E.mail: engenharia@hbdh.com.br



domnick hunter Canada inc
 Mississauga, Canada
 Tel: +1 905 820 7146
 Telefax: +1 905 820 5463
 Toll Free: 1-888-342-2623

Xebec Inc
 Quebec, Canada
 Tel: +1 450 979 8700
 Telefax: +1 450 979 7869

Africa



domnick hunter (SA) Pty. Ltd
 Springs, South Africa
 Tel: +27 (0)11 817 3600
 Telefax: +27 (0)11 817 3603

Asia / Pacific



domnick hunter pty ltd
 Victoria, Australia
 Tel: +61 (0)3 8720 9600
 Telefax: +61 (0)3 8720 9690



domnick hunter China
 Beijing, China
 Tel: +86 10 646 33523
 Telefax: +86 10 646 33521

domnick hunter China
 Shanghai, China
 Tel: +86 21 5240 0220
 Telefax: +86 21 6283 8311



domnick hunter India Pvt Ltd
 New Dehli, India
 Tel: +91 11 6166304 / 6188940
 Telefax: +91 11 6185279



domnick hunter Nihon
 Yokohama, Japan
 Tel: +81 (0)45 250 1522
 Telefax: +81 (0)45 250 1523

domnick hunter Nihon
 Kobe, Japan
 Tel: +81 (0)78 304 5351
 Telefax: +81 (0)78 304 5352



domnick hunter Malaysia
Compressed Air Treatment
Sdn Bhd
 Petaling Jaya, Malaysia
 Tel: +60 3 8024 3163
 Telefax: +60 3 8024 3162



domnick hunter
Group Pte Ltd
 Singapore
 Tel: +65 6 744 4088
 Telefax: +65 6 744 9959



domnick hunter - RL
(Thailand) Co Ltd
 Bangkok, Thailand
 Tel: +66 2 255 5305
 Telefax: +66 2 255 5340

www.domnickhunter.com

domnick hunter limited has a continuous policy of product development and although the Company reserves the right to change specification, it attempts to keep customers informed of any alterations. This publication is for general information only and customers are requested to contact our Process Filtration Sales Department for detailed information and advice on a products suitability for specific applications. All products are sold subject to the company's Standard conditions of sale.



Durham Road, Birtley, Co. Durham, England DH3 2SF

Tel: +44 (0)191 410 5121

Telefax: +44 (0)191 410 5312

E-mail address: process@domnickhunter.com

Website: <http://www.domnickhunter.com>

Copyright domnick hunter limited 2004

Publication Reference: PD13/09/04

Stock N°. : 17 950 1413 Revv 006