

MultiBox 3060 • 3061 • 3065



Operating Instructions

Revision 1.10/ 11-10-24
TKZ L3160-00-00.85EN



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1 Safety

1.1 General Safety and Warning Hints

- Never cut, damage or modify the connection cables of the power pack and do not place things on it.
- Never touch the power pack with wet or moist hands.
- Connect the power pack to suited power supplies, only (see technical data).
- Unplug the mains cord during a thunderstorm.
- Unplug the mains cord if you detect smoke or smell, or if it is damaged.
- Assure sufficient grounding of your installations. Inadequate grounding may lead to measuring peaks.

1.2 Hints for the Operation of the Instrument

- Never expose the instrument to excessive heat or moisture; obtain the requirements as stated in the technical data.
- Do not store the instrument at humid or dusty locations or at temperatures below freezing point.
- Never dip the instrument into water or other liquids. Never let liquids come into the instrument.
- Never open the instrument.
- Never use the instrument, if the casing is damaged.
- Avoid strong magnetic fields. Keep distance of electric motors or other instruments that generate electro-magnetic fields. Strong magnetic fields may cause malfunctions and influence measured values.
- Avoid the condensation of water. If there is condensed water, the instrument must acclimate before you switch it on. Otherwise it could be damaged.

1.3 Hints for the Treatment of Sensors and Wires

- Protect the sensors from exceeding the allowed power range, mechanical overload and wrong pin assignment.
- Assure to enter the sensor parameters correctly when using sensors without ISDS (Intelligent Sensor Detection System).
- The measuring cables MK 01 and MKS may not be lengthened. Otherwise the shielding will be interrupted.
- The data of an ISDS sensor are transferred to the measuring instrument when it is switched on. If you connect new sensors, you will have to switch the instrument off and on.



2 Introduction

The information contained in this section is important. If you neglect them, you might lose possible warranty claims.

2.1 Range of Validity

The operating instruction manual on hand is valid for measuring instruments named „MultiBox 3060“, or „MultiBox 3061“, or „MultiBox 3065“. It addresses to the operator of this instrument, that means the person, who works with the instrument. The manual is not a technical manual. Please contact our service staff for questions, that exceed the contents of this manual.

2.2 Copyright

The measuring instrument and this manual are protected on copyright. Manufacture without license will be prosecuted by law. All rights reserved on this manual, even the reproduction and/or duplication in any thinkable form, e.g. by photocopying, printing, on any data recording media or translated. Reproduction of this manual is only permitted with a written approval of Hydrotechnik GmbH.

The technical state by the time of delivery of instrument and manual is decisive, if no other information is given. Technical changes without special announcements are reserved. Earlier manuals are no longer valid.

The general conditions of sale and delivery of Hydrotechnik GmbH are valid.

2.3 Limitation of Liability

We guarantee the faultless functioning of our product in accordance with our advertising, the product information edited by Hydrotechnik GmbH and this manual. Further product features are not guaranteed. We take no liability for the economy and faultless function if the product is used for a different purpose than that, described in the chapter „Use as Agreed“.

Compensation claims are generally impossible, except if intention or culpable negligence by Hydrotechnik GmbH is proved, or if assured product features are not provided. If the product is used in environments, for which it is not suited or which do not represent the technical standard, we are not responsible for the consequences.

We are not responsible for damages at installations and systems in the surroundings of the product, which are caused by a fault of the product or an error in this manual.

We are not responsible for the violation of patents and/or other rights of third persons outside the Federal Republic of Germany.

We are not liable for damages, which result from improper operation according to this manual. We are not liable for missed profit and for consecuting damages due to non regardance of safety advice and warning hints. We don't accept liability for damages which result from the use of accessoires which are not delivered and/or approved by Hydrotechnik GmbH.

The products of Hydrotechnik GmbH are designed for a long life. They represent the standard of technique and science and were checked on all functions individually before delivery. The electrical and mechanical construction corresponds to the current norms and regulations. Hydrotechnik GmbH is doing product and market research for the further development and permanent improvement of their products.

In case of faults and/or technical trouble please contact the Hydrotechnik GmbH service staff. We assure that suitable measures will be taken immediately. Hydrotechnik GmbH guarantee regulations are valid, which we will send to you on demand.

2.4 Use as Agreed

The measuring instruments of the family „MultiBox 306x“ are mobile hand-held devices for the collection and recording of measured values. These are detected by sensors connected to the instrument. A large variety of different sensors can be connected to the instrument, but they must correspond with the requirements given in the section „Technical Data“.

Any other use of the measuring instrument is considered as not agreed.

If you have any question or want to use the measuring instrument for a different purpose, please do not hesitate to contact our service staff. We will be pleased to help you.

2.5 Warranty Regulations

In accordance to our warranty regulations we guarantee the condition without defects for this measuring instrument for a duration of six months. Wearing parts and storage batteries are excepted from this warranty. The warranty is spoiled if repair work or interventions are executed by unauthorized persons.

Within the warranty period we repair damage or defects which are caused by a manufacturing fault. We only accept warranty claims if they are reported to us immediately after their discovery, but latest six months after delivery. The warranty benefit is by our choice through repair of defective parts or replacement by intact parts.

Send your instrument with an invoice copy or delivery note copy to Hydrotechnik:

Hydrotechnik GmbH

Holzheimer Str. 94-96 • D-65558 Limburg • Tel. +49 6431 4004-0

2.6 Obligations to the Customer

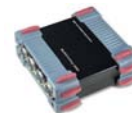
The operating authority of this product has to assure, that only authorised persons may use and operate this product. Persons are regarded as authorised, who have a qualified education, technical experience, and knowledge of the current norms and regulations, what enables them to estimate their duties and detect possible danger at an early time.

Operator of the Instrument

Persons are regarded as authorised that have been trained in the operation of the instrument and have read and understood this manual completely.

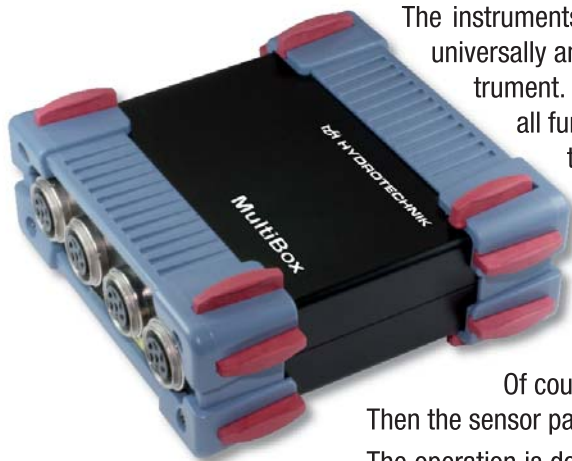
Persons for Installation and Maintenance

Persons are regarded as authorised that have been trained in all aspects of the instrument and have read and understood this manual completely.



3 Description of the Instrument

3.1 Qualities of the MultiBox 306x



The instruments of the MultiBox 306x family are measuring boxes that can be used universally and expand a standard Computer to a valuable 4-channel measuring instrument. Remote-controlled with the software **HYDROwork**, the operator can use all functions demanded and required for the execution of challenging tasks in the field of professional measuring technology.

When using HySense® sensors with ISDS signal, the instrument automatically detects the connected sensors when switched on and takes over all parameters: measuring range, physical measurand, units, output signal and characteristic curve (linearisation). A mix-up of sensors is avoided, the manual entering of many data becomes superfluous.

Of course you can also connect sensors without ISDS signal to the instrument. Then the sensor parameters are entered in a single dialog window.

The operation is done completely with the connected PC, where the software **HYDROwork** must be installed. Here you can do all required configurations and select the desired display type.

You can connect up to four sensors to the MultiBox 306x, additionally you can use two pseudo channels for online calculations. The versions MultiBox 3061 and 3065 come with an internal memory, after the required configurations the instruments can work as autonomous data loggers without being connected to a PC.

3.2 Instrument Versions

MultiBox 3060

- three analog input channels
- one switchable input channel analog / digital (frequency)
- USB interface for remote control

MultiBox 3061

- like 3060, additionally:
- internal memory for the autonomous recording of measured values

MultiBox 3065

- like 3061, additionally:
- Ethernet interface for measuring data communication

All instrument versions are operated nearly identically and will not be distinguished in the following manual. When ever differences in the operation of the variants occur, it will be pointed out clearly.

3.3 Connectors



Pic. 1 Connectors of the MultiBox

1. Measuring channel 1 (analog)
2. Measuring channel 2 (analog)
3. Measuring channel 3 (analog)
4. Measuring channel 4 (switchable analog/digital)
5. Ethernet interface (MultiBox 3065 only)
6. Indicator „Status“ (see section 8.4 on page 30)
7. USB interface
8. Jack for power supply (MultiBox 3061 and 3065 only)

4 Operation Software *HYDROwork*

A new software has been developed especially for the operation of the MultiBox measuring instruments. **HYDROwork** combines easy operation with professional functionality. You can control all functions of the instrument in a fast and easy way.

4.1 System Requirements

Your computer should have the following minimum qualities for installation and operation of **HYDROwork**:

- CPU with 1.8 GHz clock frequency
- HDD with 50 MB available capacity
- 512 MB RAM
- Operating System Windows 2000 SP4, XP SP2, Vista
- Microsoft .NET Framework 2.0 SP1
- CD-ROM drive



4.2 Installation

Installation of **HYDR**work

1. Insert the CD delivered with the instrument into the drive of your computer.
2. Obtain the instructions given on the screen.

Installation of the MultiBox



Information

The installation of the MultiBox must be done when the first measuring instrument is connected with the computer. Then all further instruments will be detected automatically.

1. Use the delivered USB cable and connect the MultiBox with your computer.
2. The operating system of your computer detects the instrument and asks, whether you want to browse the internet for software. Say „No“ to this.
3. Enable the option „Browse a directory for the software“ and navigate to the directory (or the CD), where the driver file (e.g. „HT_USBIO.inf“ oder „HT_USBIO_x64.inf“) is contained.
4. Click on „Continue“ and follow the rest of the instructions.
5. When the installation is completed, the message „The instrument can now be used“ will be displayed.

4.3 Launch the Software

Double-click the file „HYDRwork.exe“, this window will be displayed:

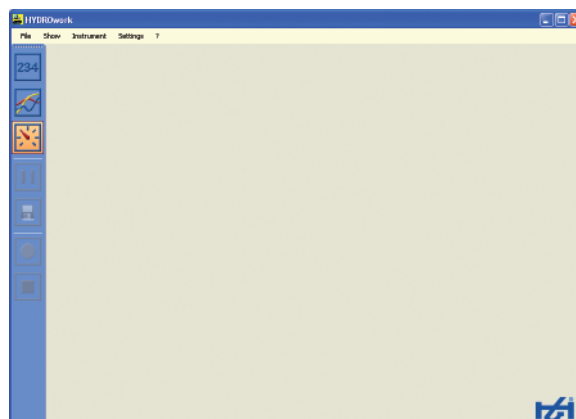


Fig. 2 **HYDR**work window – not connected

You see the **HYDR**work application window with all major elements:

- on top the title bar
- beneath the menu bar
- left a bar with buttons
- beside that the working area

The functions of the software will be explained when they are used the first time during the operation process of the MultiBox.

5 Configure the MultiBox



Information

Channel configurations can only be saved, if there is no connection to a MultiBox.

Before you enable the connection to the MultiBox, you should check the four items of the following list:

- select operation language
- select MultiBox version
- do the required MultiBox settings
- configure the channels

5.1 Select Operation Language

Select the function „Settings – Language“:



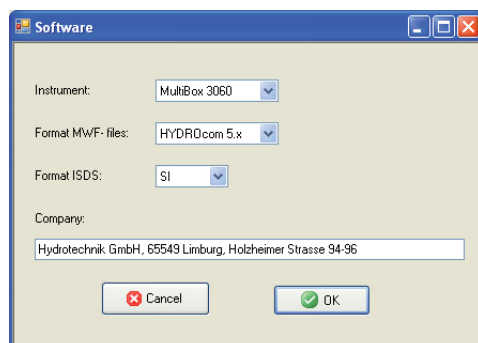
Pic. 3 Language selection dialog

Click on the flag symbol of the desired operation language and then on „OK“.

5.2 Select MultiBox Version

All versions of the MultiBox can be operated with **HYDRO**work. Since the functionality and the required device parameters differ, the present instrument version must be selected.

Select the function „Settings – Customize software“:



Pic. 4 Customize **HYDROwork**

Here you can select or enter four options:

Instrument	select the instrument that you want to operate
Format MWF-files	select the file format you want to use for the files with measured values, written by the MultiBox (see information box)
Format ISDS	select whether metric (SI) or us-american units (US) shall be used for ISDS sensors
Company	enter the company name that shall be written into the files with measuring data

Set the desired options and then click on „OK“.



Information

The software „**HYDROcom 6.x**“ will be available within 2009. For the use with the current **HYDROcom** version, the format „HYDROcom 5.x“ must be selected. The created files with measuring data cannot be processed with older **HYDROcom** versions.

5.3 Settings of the MultiBox

The specific qualities of the MultiBox are configured with the first three items in the menu „Settings“. Dependant on the selected MultiBox (menu „Settings – Customize software“), only one or two of the items are available:

Status	MultiBox 3060 – information on the MultiBox
Data logger	MultiBox 3061 and 3065 – information and settings regarding the functionality as autonomous data logger
Ethernet	MultiBox 3065 – information and settings regarding the Ethernet communication of the instrument

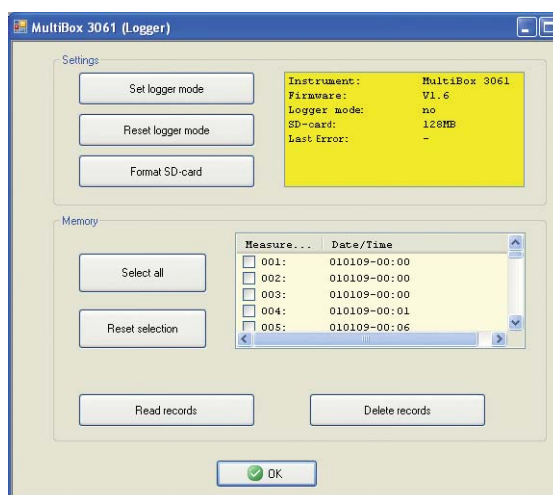
5.3.1 Status



Pic. 5 Settings – Status

Here you can see the installed version of the instrument firmware and information on the last error (if there was one). The error codes are explained on page 30.

5.3.2 Data logger

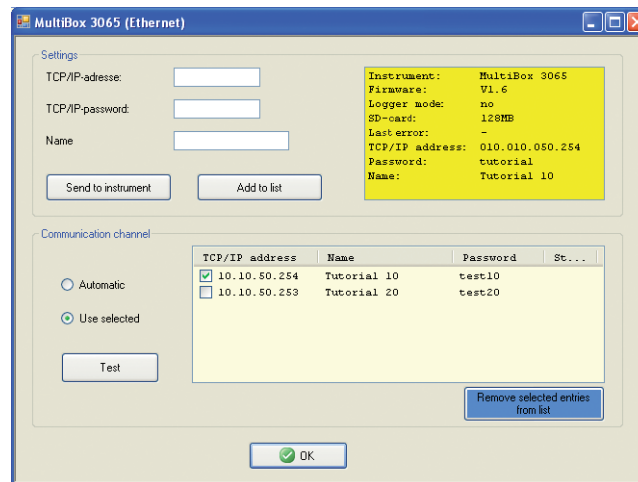


Pic. 6 Settings – Data logger

The current MultiBox settings are shown in the yellow status box. You may configure the data logger mode and transfer measuring data to the PC. How the MultiBox is configured as a data logger is described in section 7.3.



5.3.3 Ethernet



Pic. 7 Settings – Ethernet

The current MultiBox settings are displayed in the yellow status box. In the dialog you can define all network settings of the instrument:

Sector ‚Settings‘

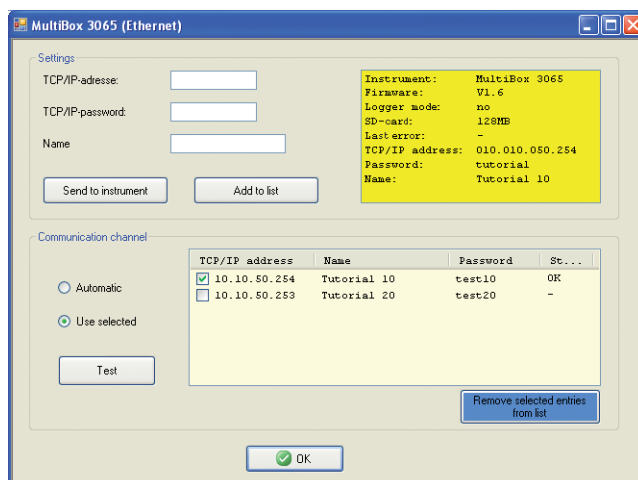
Enter address, password and name of a new network connection here. Then click on „Add to list“. After some seconds the new connection is displayed in the sector ‚Communication channel‘.

If you want to use the new network connection directly, you should click on „Send to instrument“ after entering the data. The connection will appear in the list, too, but will be setup as current connection simultaneously.

Sector ‚Communication channel‘

A list of all network connections saved in the instrument is displayed here. You can use several functions:

- Automatic enable this option to start the network connection automatically; if there are several connections in the list, the device tries to connect with the first address; if that fails, the second and then all the other addresses in the list will be used
- Use selected enable this option to use only those network connections enabled in the list; to enable a connection, you have to check the square beside the connection in the list (see Pic. 7); if several connections are enabled, they will be used subsequently to built up the connection; the first possible connection will be used
- Test click on this button to test the connections in the list; after a few seconds the connections will be displayed that can be used:



Pic. 8 Tested network connections

Here the first connection was tested with positive result and can be used to build up the connection. The second connection is not operational.

The connection data of the used connection are displayed in the yellow status box.



Information

This test will only check, whether a network participant with the entered address is available. It does not check, whether it is a MultiBox.

Delete network connections

Click on a connection in the list to highlight it. Then click on „Remove selected entries from list“ to delete them.

5.3.4 Execution of a network configuration

The following procedure contains two cases:

- Connect a MultiBox 3065 to an existing company network: you will need an Ethernet CAT5 patch cable
- Connect a MultiBox 3065 per Ethernet to a computer: you will need an Ethernet CAT5 cross or crossover cable

Determination of the network address

If you want to connect a MultiBox 3065 to an existing company network, you should ask the network administrator for an available IP address. Note this address.

If you want to connect the MultiBox to a PC, you have to find out its network address. This is contained in the dialog „Internet protocol TCP/IP properties“ that can be opened via the system settings and the properties of the network connections. Please see the documentation of your PC or your operating system if you have problems to find the information.

Note the IP address of the PC and increase the last number block by 1. Example: IP address of the PC is 10.10.50.200, IP address of the MultiBox will be 10.10.50.201.



Configure MultiBox

- Connect the MultiBox via USB to your PC. Wait until the device has been detected and the message „... can now be used“ is displayed.
- Start the software HYDROwork.
- Select the command „Settings – Customize“, select MultiBox 3065 as device type (see section 5.2) and confirm with OK.
- Select the command „Settings – Ethernet“ (see section 5.3.3) and enter the IP address of the MultiBox.
- Enter an arbitrary password (6 to 10 characters) and a name (max. 20 characters) for the MultiBox.
- Click on „Send to instrument“. The message „Function has been accepted“ will be displayed after max. 1 minute that you may confirm with OK.
- Enable the option „Automatic“ at „Communication channel“ and close the dialog by clicking OK.

Connect MultiBox

- Unplug the USB cable from the MultiBox.
- Connect a power supply to the MultiBox and wait a minute, until the device has booted completely.
- Connect the network cable to MultiBox and computer/network socket.
- Select the command „Instrument – Connect“ in HYDROwork. The IP address of the connected MultiBox will be displayed in the title bar of HYDROwork.

5.3.5 Functions with USB/Ethernet connection

Please consider the following differences concerning the range of functions when connecting a MultiBox with a PC:

Function	Connection with	USB	Ethernet
View MultiBox configuration		yes	no
Online measuring rate		1 ms	10 ms
Online recording scan rate		≥ 1 ms	≥ 10 ms
Configure measuring channels		yes	yes
Configure recording		yes	yes
Configure data logger		yes	no
Read data logger memory		yes	no
Configure Ethernet		yes	no

5.4 Configure Channels

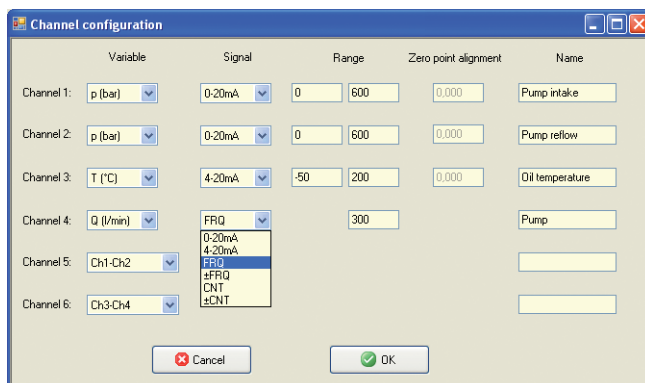
The input channels must be configured, before the connection to the instrument is built up, since the channel parameters are transferred during the connecting procedure between PC and instrument.



Information

If ISDS sensors are connected to the MultiBox, the manual channel configurations will be overwritten when the power supply of the MultiBox is enabled.

Select the command „Instrument – Configure channels“:



Pic. 9 Channel configuration



Information

The configurations in [square brackets] do not need to be executed when using sensors with Hydrotechnik ISDS. Then the parameters will be transferred from the sensor to the instrument automatically.

Channels 1 ... 4

[Variable]	select measurand and units of the sensor connected to the corresponding channel
[Signal]	select the output signal of the sensor; for channel 4 you can also select a frequency signal (FRQ: frequency without direction; ±FRQ: frequency with direction; CNT: volumeter without direction; ± CNT: volumeter with direction)
[Range]	enter the lower (left) and upper (right) limit of the sensor measuring range; for frequency sensors you only have to enter the calibration value
[Zero point alignment]	the values of the last zero point alignment are displayed here; please see section 6.3.7
Name	enter a channel name; it will be displayed together with the measured values and written into the measuring data files



Channels 5 and 6

Variable	select one of the offered formulas to execute online measurements on the channel
Name	enter a channel name; it will be displayed together with the measured values and written into the measuring data files



Information

Calculated channels can be displayed and recorded just like measured channels. This may ease later evaluations.

Confirm the entries with „OK“.

6 Operation of the MultiBox

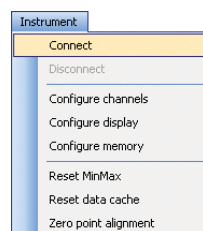
6.1 Connect with the MultiBox



Information

The MultiBox must be installed once at each computer, before **HYDRO**work can be connected with it. Please see section 4.2 for more information.

Use the delivered USB cord to connect MultiBox and Computer. Select the command „Instrument – Connect“:



Pic. 10 Connect with instrument

The name of the connected instrument will be displayed in the title bar.






Information

The internal clock of the MultiBox is synchronised with the PC clock automatically during the connection is started.

6.2 Display measured values

The current measured values will be displayed immediately after putting up the connection. One of three display modes is used, you can switch between them by clicking on the respective button:

-  numerical display
-  line diagram
-  gauge style

6.2.1 Numerical Display



Pic. 11 Numerical Display

The values from the channels are displayed numerically, here. Beneath the values you can read number, name, measurand and units of the channel.



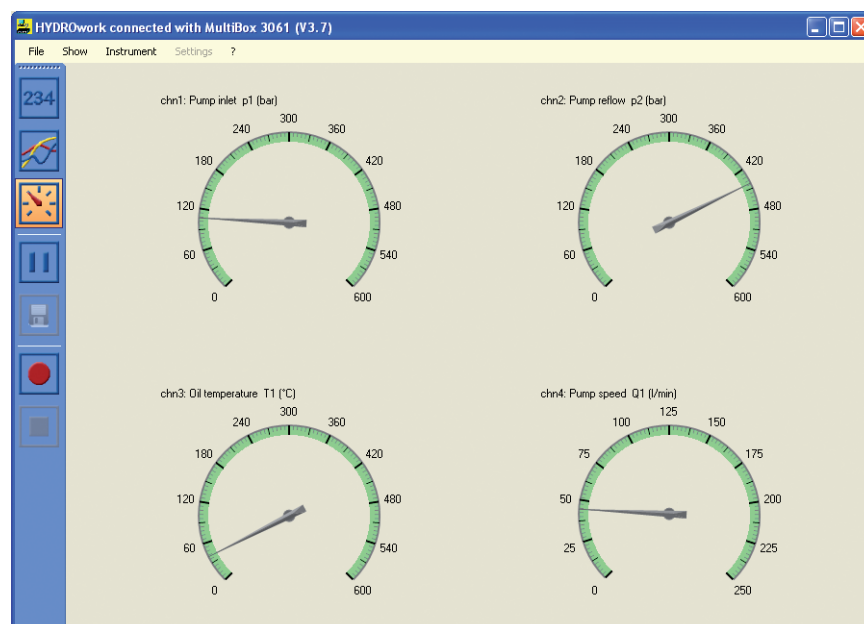
6.2.2 Line diagram



Pic. 12 Line diagram

The values from the channels are displayed graphically as a line diagram, here. Number, name, measurand and units of the channels are displayed to the left of the curves. Later in this manual you will learn how to split the diagram display, and change scaling and line colors.

6.2.3 Gauge Style



Pic. 13 Gauge Style Display

The values from the channels are displayed in gauge style, here. Number, name, measurand and units of the channels are displayed left above the gauges. If a manual scaling is fallen below or exceeded, the gauge will be displayed in red color.

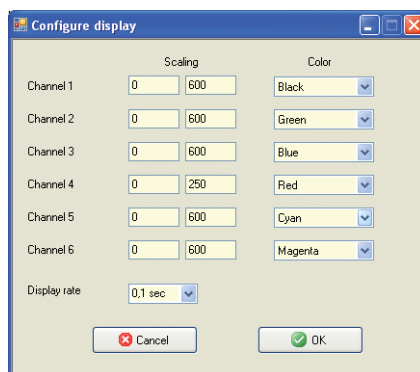
6.3 Display Options

You can use several functions to configure the value displays for your individual requirements:

- configure display
- select channels
- split (line diagram, only)
- zoom (line diagram, only)
- pause
- display MinMax-values (numerical display, only)
- zero point alignment

6.3.1 Configure Display

Select the command „Instrument – Configure display“:



Pic. 14 Configure Display



Information

Modifications of the scaling effect line diagrams and gauge style displays, only. Color definitions effect line diagrams, only.

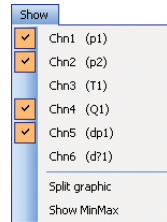
Scaling	if you do not want to display the complete measuring range of a channel, you can define lower and upper limits; data outside of these limits will not be displayed; the settings do not effect the recording of the measured values coming from the channel
Color	define the line color for each channel
Display rate	select the time interval that shall be used for the updating of the display; the settings do not effect the recording of the measured values coming from the channel

Click on „OK“ to save the display configuration.



6.3.2 *Select Channels*

The channels to be displayed can be selected in the menu „Show“:

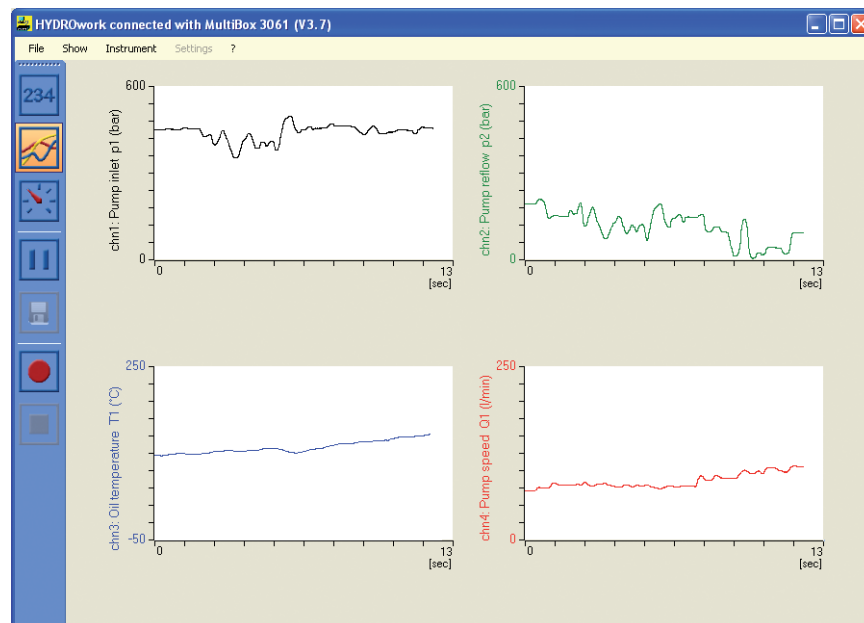


Pic. 15 Select channels

All checked channels will be displayed (here channels 1, 2, 4 and 5). Click on a channel to select / deselect it.

6.3.3 *Split*

The selected channels are overlaid in the line diagram (all curves in one diagram). You can choose to display each channel in its own diagram. Select the command „Show – Split graphic“:




Pic. 16 Split graphic

If you deselect channels during this display, the remaining diagrams will be enlarged automatically.

6.3.4 **Pause**

You can use the pause function to „freeze“ the display, there will be no more updates and you have time for a detailed analysis. The measured values are buffered during the pause in the background, that means the values from the last 60 seconds will be available at any time.

 Click on the „Pause“ button to freeze the display. Click the button again to display the current measured values.

6.3.5 **Zoom**

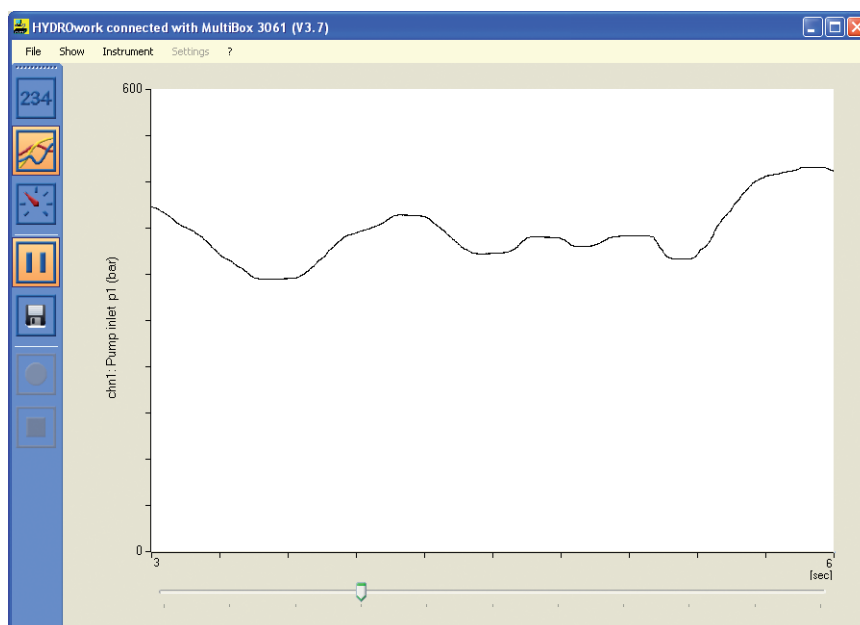


Information

If you do not use a mouse with scroll wheel, you can press „+“ and „-“ on your keyboard to zoom in and out. The function is available with the line diagram, only.

The zoom function allows to enlarge the display of curve sections of a diagram. This is possible with overlaid and splitted diagrams.

Click on the pause button to freeze the display. Possibly it makes sense to disable the display of not required channels to get a better overview. Turn the scroll wheel of the mouse to enlarge the line diagram:



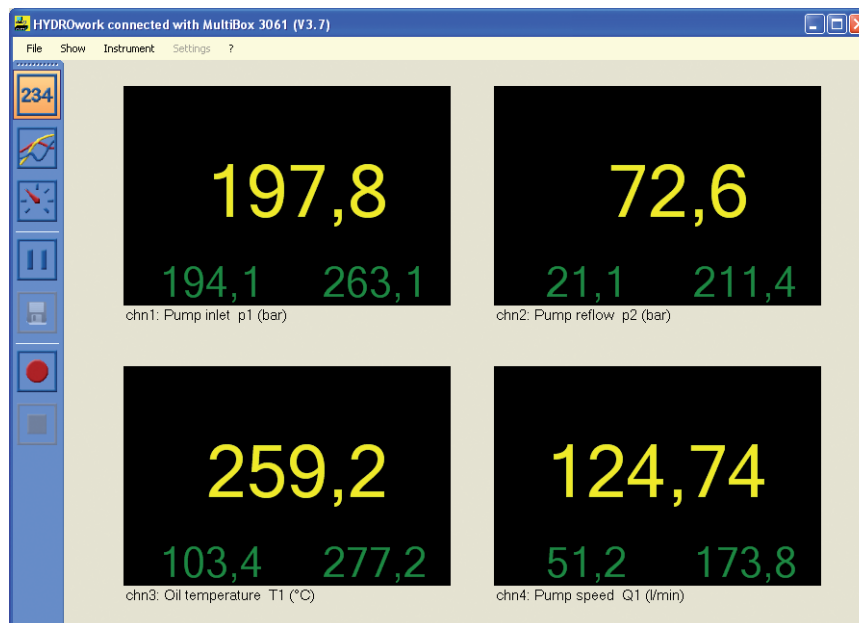
Pic. 17 Enlarged line diagram

A sliding controller is displayed beneath the line diagram. You can use it to move the displayed section of the line diagram. Turn the scroll wheel of the mouse, to zoom further into, or out of the diagram.



6.3.6 *MinMax-Values*

It is possible during the numerical measured value display to show the minimal and maximal values for each channel. Select the command „Show – Show MinMax“:



Pic. 18 MinMax display

You can now see the smallest and biggest value that has been measured since start of the measurement, or since the last MinMax buffer reset. To reset the MinMax buffer, select the command „Instrument – Reset MinMax“.

6.3.7 *Zero Point Alignment*

Due to a number of circumstances it may happen that a measured value is displayed, although the sensor delivers the value zero. Then you can execute a zero point equalisation. This will be executed for the analog sensors of all channels that are currently selected for display and which measuring range starts with „0“.

Select the command „Instrument – Zero point alignment“. The values of the displayed channels will be set to zero. The values of the channels that are not displayed will not be influenced.

To undo the zero point alignment, disconnect the instrument and execute the zero point alignment again.



7 Record Values

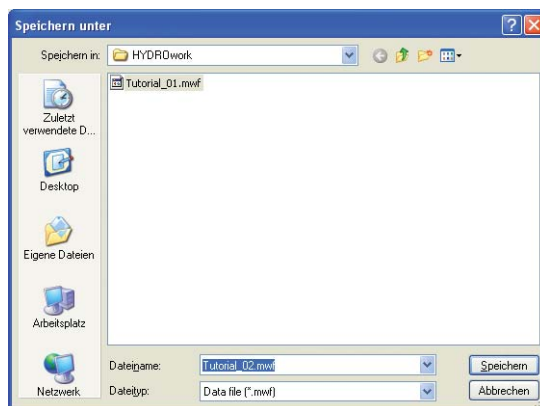
With all MultiBox versions it is possible, to record measured (channels 1 to 4) and calculated channels (channels 5 and 6). You can use two different record functions:

- buffer recording: the contents of the data cache is written into a file
- programmed recording: the recording defined in the record configuration is started and written into a file

7.1 Buffer Recording

The MultiBox is equipped with an internal data cache, where the last 60 seconds of all channels are buffered at any time. These data can be written into a measured value file whenever required:

1. Click on  to „freeze“ the display.
2. Click on  to save the data contained in the cache:



Pic. 19 Enter file name

Enter a name for the file and select the directory.


Possibilities of the buffer recording

The buffer recording offers possibilities to save exactly those data in the measured value file that are of special interest for you:

- basically only those data will be written into the measured value file that are displayed currently
- values of channels that are disabled for display will not be written into the file
- if you have enlarged a section with the zoom function, only this section will be written into the file
- as long as the display is frozen, you can enable and disable channels and use the zoom function freely, before you execute the recording



Information

After clicking on  again, the display jumps to the current time position. Then only the last 60 seconds are available in the data cache, older data will be deleted.

Empty data cache manually

If you want to execute a buffer recording, you can empty the data cache first to avoid recording undesirable data. Select the command „Instrument – Reset data cache“.

7.2 Programmed Recording

It is basically during the programmed recording that always a defined program will be executed. This is defined in two menus:

- recording rate, duration and further parameters are defined in the memory configuration in the menu „Instrument“
- the channels to be recorded are selected in the menu „Show“

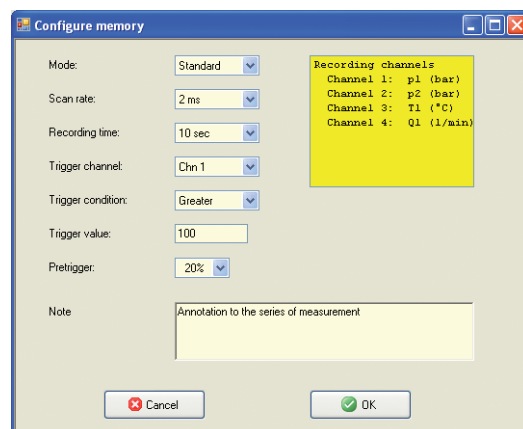


Information

During this type of recording, only the values of those channels will be recorded that were enabled for display when the recording has been activated.

7.2.1 Record configuration

Select the command „Instrument – Configure memory“:



Pic. 20 Memory configuration

General recording parameters

Here you can define the general recording parameters and enter an annotation to the recording:

Mode	select between „Standard“ (= recording will be executed once) and „Cyclic“ (= recording will be repeated until it is stopped manually)
Scan rate	select the time lag between two sensor data to be written into the measured value file
Recording time	select how long measured values shall be recorded
Note	enter an arbitrary text; this will be saved together with the measured values and is available during a later evaluation of the measuring data



Wise combination of recording parameters

The larger measured value files are, the more difficult becomes their evaluation. This is why you should select scan rate and recording time in a way that no superfluous data are recorded. At a scan rate of 1 ms and a recording time of 1 minute, the total of $1000 \times 60 \times 4 = 240,000$ measured values are recorded for four channels. The setting of the scan rate to 2 ms halves the number of measured values.

Selected channels

The channels selected for recording are displayed in the yellow info box. Open the menu „Show“ to select or deselect channels for recording.

Trigger Recordings

By using a trigger you can limit the recording to the time period that is interesting for you. A trigger is an incident that starts a recording when it occurs.

The definition of a trigger requires four parameters:

Trigger channel	select the measuring channel that shall be supervised for the trigger condition
Trigger condition	select the trigger condition that shall start the recording
Trigger value	enter the value whose overstepping or undercut (due to trigger condition) shall start the recording
Pretrigger	enter the percentage of the recording time that shall be used for the values coming BEFORE the trigger incident

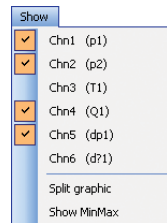
Example

The trigger configuration in Pic. 20 means that the recording starts, if the measured value on channel 1 (trigger channel) exceeds (trigger condition) the value 100 (trigger value). Then a recording of 10 seconds with a 2 ms scan rate will be executed, where 2 seconds (Pretrigger 20%) will be spent on the time before the trigger incident.



7.2.2 **Select Channels**

During the programmed recording only those channels will be recorded that are activated in the menu „Show“:



Pic. 21 Channel selection for programmed recording

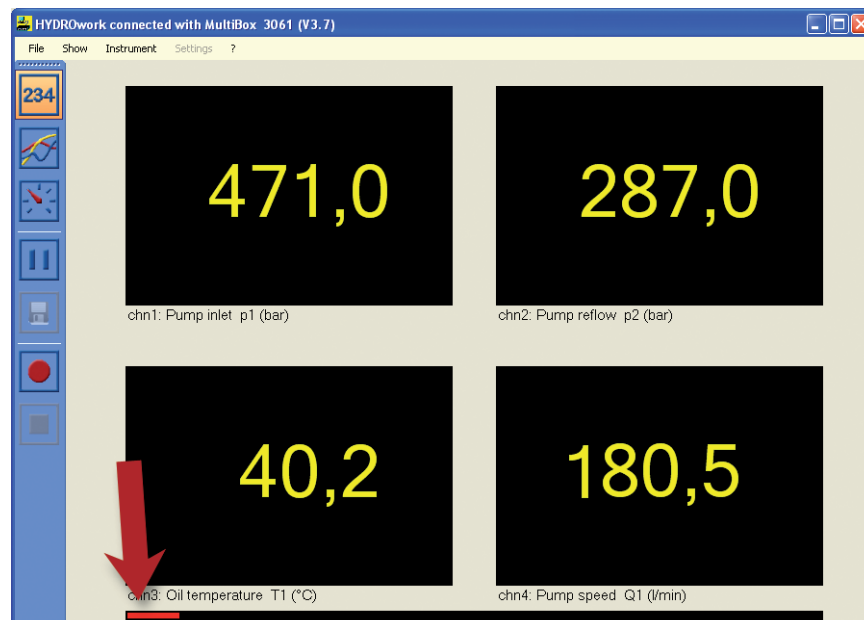
All checked channels will be recorded (here channels 1, 2, 4 and 5). Click on a channel to check/uncheck it.

7.2.3 **Start Programmed Recording**

Start the programmed recording by clicking on . If no trigger is defined, the recording starts instantly. If a trigger is defined, the recording starts automatically after the trigger condition has been fulfilled.

Start Recording with Trigger

If you have defined a trigger in the memory configuration and click on , a progress bar will be displayed beneath the measured value displays:



Pic. 22 Recording display – filling the pretrigger buffer

The progress of the recording is indicated with the bar. The color red shows that the pretrigger buffer is currently filled. As soon as it is full, the color changes to green:




Pic. 23 Recording display – pretrigger buffer is full

Now the pretrigger buffer is full, as soon as the trigger incident happens, the recording can start as defined. If the trigger incident happens, before the pretrigger buffer is full, the pre-trigger and the recording time will be shortened correspondingly.

As soon as the trigger incident happens, the recording starts and the bar is colored yellow:




Pic. 24 Recording display – recording in progress

After the recording is finished, or after you have aborted the recording by clicking on , a dialog will be displayed, where you can enter a name for the measured value file and select the directory.

Recording without Trigger

The recording starts instantly after clicking on . The yellow progress bar will be displayed beneath the measured value displays. This indicates the progress of the recording.

After the recording is finished, or after you have aborted the recording by clicking on , a dialog will be displayed, where you can enter a name for the measured value file and select the directory.

7.3 Logger Function



Important

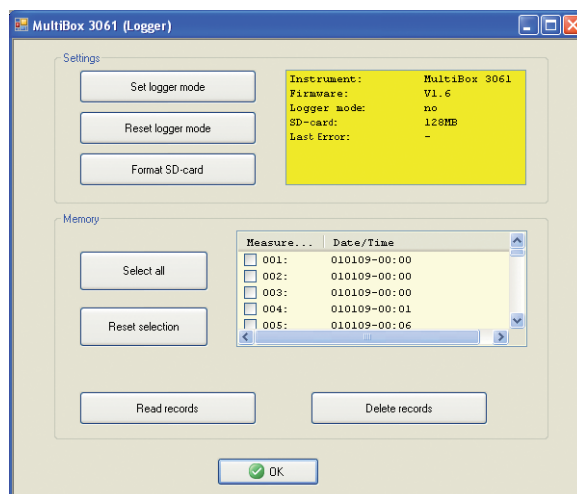
The logger function is supported by the instrument versions MultiBox 3061 and 3065, only. The use of this function requires an external power supply by the power packs delivered by Hydrotechnik. The logger function works not via Ethernet, but with the USB connection, only.

7.3.1 Start Logger Mode

As a logger the MultiBox is able to work autonomous and record measuring data. This is done as soon as the power supply is connected, and if the defined trigger incident has happened (if a trigger incident is programmed).

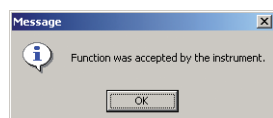
Some steps are required for the configuration as a logger:

- execute the memory configuration (see section 7.2.1) as required
- activate all channels that you want to record (see section 7.2.2)
- select the command „Instrument – Disconnect“ to interrupt the connection to the instrument
- select the command „Settings – Data logger“:



Pic. 25 Data logger settings

- Click on the button „Set logger mode“.
- Wait until the logger mode is confirmed:



Pic. 26 Logger mode confirmation

- Click on „OK“ to close the dialog with logger settings.
- Disconnect the USB connection to the PC.
- Disconnect the connection to the power supply.
- Connect the sensors to the MultiBox 3061 or 3065.
- Connect the power pack to the MultiBox 3061 or 3065.

The logger mode is activated during the boot sequence of the instrument. As soon as the programmed trigger incident happens, the recording starts. If cyclic recording has been selected, a new series of measurement will be written at each occurrence of the trigger incident. When the internal memory is full with 200 series of measurement, no further recordings will be executed.

7.3.2 Capacity of the Internal Memory

The MultiBox 3061 and 3065 are equipped with a 128 MB internal memory. Dependant on the scan rate, the following theoretical recording times can be realized. The number of recorded channels doesn't matter.

Scan Rate	Recording Time	Scan Rate	Recording Time
1 ms	3:20 h	100 ms	333:20 h
2 ms	6:40 h	200 ms	666:40 h
10 ms	33:20 h	500 ms	(1666:40 h)*
20 ms	66:40 h	1 Sek.	(3333:20 h)*
50 ms	166:40 h	*: theoretical values, max. 1,600 h possible	

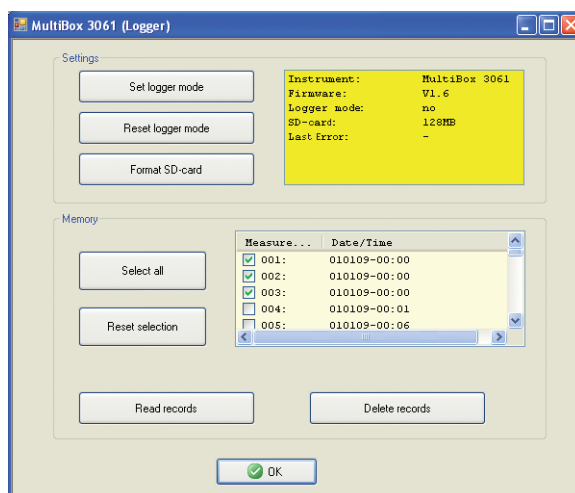
Practically the MultiBox allows to record 200 series of measurement, each with a duration of 1 hour. This totals up in a capacity of 200 hours.

It is possible on request to implement recording times of 4 or 8 hours with a scan rate of at least 10 ms, what increases the recording capacity to 1,600 hours.

7.3.3 Download and Evaluate Measuring Data

After using the MultiBox 3061 and 3065 as a logger, it is very easy to download the recorded series of measurements:

- Use the USB cord to connect MultiBox and computer.
- Start **HYDRO**work.
- Do not connect with the instrument!
- Select the command „Settings – Data logger“:



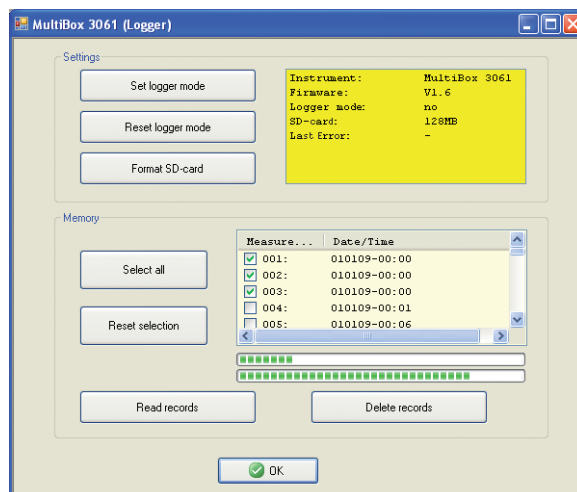
Pic. 27 Select series of measurements

In the section „Memory“ you can see a list of all series of measurements, stored in the MultiBox. You can check a series by clicking into the box left beside its number (here series 001, 002 and 003).



Now you can start to download them:

- Check the series of measurements that you want to transfer to the PC; click on „Select all“ to check all series.
- If you have checked too many series, click on „Reset selection“ to clear the check boxes.
- Click on „Read records“; a dialog will be displayed, where you can enter a file name and select a directory. Click on „OK“ in this dialog to start the download:



Pic. 28 Series of measurements are downloaded

If you have checked several series of measurements, they will all be stored with the entered file name, but expanded by a consecutive number.

After the download you may click on „Delete records“ to empty the internal memory of the MultiBox.

8 Maintenance

8.1 Care and Cleaning of the MultiBox



Important

Assure during care and cleaning of the MultiBox that no water comes into the device. This is especially valid for the Ethernet jack of the MultiBox 3065. Incoming water will destroy the device. If water came into the casing, do not connect the power supply and send the instrument to our service department.

1. Disconnect the power supply of the MultiBox, before you start the cleaning. Otherwise a short-circuit may happen that would destroy the instrument.
2. Wipe the casing with a clean, soft and slightly dampened cloth to remove dirt.
3. Use a mild household detergent to remove stubborn dirt.
4. **Never use aggressive detergents, solvents, cleaning benzine or similar chemicals to clean the instrument. That would damage the casing.**

8.2 Format the SD Card



Important

All data contained on the SD card will be deleted by the formatting. The function is only available at the versions MultiBox 3061 and 3065.

You should format the SD card from time-to-time, since the deletion of measuring data may lead to data gaps, what may reduce the storage capacity. Select the command „Settings – Data logger“ and click on „Format SD card“. The card will be formatted after some seconds.

8.3 Calibration • Maintenance • Repair

This measuring instrument works maintenance-free. But it is required to calibrate it regularly. If the device is in normal use, we recommend a re-calibration every two years. Hydrotechnik runs an efficient calibration laboratory. Please contact us:










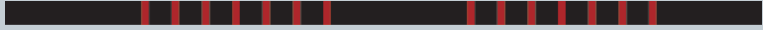


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8.4 Codes of the „Status“ Indicator

To the left of the USB interface you can find a red LED that indicates operational conditions of the MultiBox by emitting light codes:

LED Code	Status	Explanation
 LED lights permanently	Switching on	LED is on until the MultiBox is ready for operation
 LED is off and blinks each 3.5 seconds	Operation	–
 LED is on and turns off each 1.0 seconds	Online	Instrument is connected to a computer either via USB or Ethernet
 LED is on and turns off 2x each 1.8 seconds	Recording	Recording in progress; with trigger: trigger has started recording
 LED is on and turns off 3x each 1.8 seconds	Recording	Recording in progress; pretrigger is full, waiting for trigger incident
 LED is on and turns off 4x each 1.8 seconds	Recording	Recording in progress; pretrigger is filled, waiting for trigger incident
 LED is off and blinks 2x each 1.8 seconds	Error code 2	ISDS error; sensor not detected correctly; check connection and switch on
 LED is off and blinks 3x each 1.8 seconds	Error code 3	SD card full; download and delete measuring data, or format SD card
 LED is off and blinks 4x each 1.8 seconds	Error code 4	Ethernet error; check cable; check network installation
 LED is off and blinks 7x each 1.8 seconds	Error code 7	Flash memory error; contact customer service
 LED is off and blinks 8x each 1.8 seconds	Error code 8	no SD card inserted; contact customer service
 LED is off and blinks 9x each 1.8 seconds	Error code 9	SD card error; contact customer service

The error display will be active until the instrument is switched off.

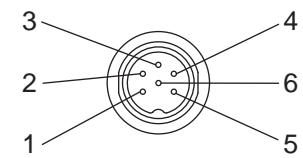
8.5 Error codes

The line „Last error“ is displayed in the configuration dialogs for data logger or Ethernet (see e.g. Pic. 28). If an error is present, the error code will be displayed there:

- 8131 Error SD card formatting; writing on the SD card is not possible, it must be re-formatted
- 8132 Error SD card too small; not enough memory available on the SD card; transfer measuring data to a PC
- 8160 Error buffer battery (missing or empty); the buffer battery in the device is empty, defective or missing; important data might get lost; please contact our customer support

9 Technical Data

	MultiBox 3060	MultiBox 3061	MultiBox 3065
Inputs	3x analog + 1x analog/frequency		
Analog input signal	analog: 0/4 ... 20 mA / digital (frequency): 1 ... 50 kHz (without direction)		
Resolution A/D-converter	12 Bit		
Input frequency	1 Hz ... 10 kHz		
Measuring rate	1 ms		
ISDS channels	4x		
Internal memory	–	128 MB	
Recording capacity	–	max. 1,600 h	
Interfaces	USB 2.0 (full speed)		USB, Ethernet
Power supply sensors	12 VDC		
Power supply MultiBox	5 VDC, via USB		
... alternatively	–	9 ... 30 VDC, from external power pack	
Current consumption	< 500 mA	< 600 mA	
Protection type	IP 54	IP 54	IP 40
Temperature range (not condensing)	-35 ... +50 °C		0 ... +50 °C
Dimensions (L x W x H)	120 x 124 x 52 mm		

Pin assignment measuring inputs	analog 0/4 ... 20 mA	analog 0 ... 10 V	digital (frequency)
	1 – Signal, Ri 49.9 Ω, Ci 100 nF	1 – free	1 – Signal, Ri 4.7 kΩ, Ci 1 nF, limitation 33 VDC, protection type transile diode
	2 – mass	2 – mass	2 – mass
	3 – Ub ¹ , limitation 12 VDC	3 – Ub ¹ , limitation 15 VDC	3 – Ub ¹ , limitation 12 VDC
	4 – free	4 – Signal, Ri 11 kΩ, Ci 22 nF	4 – direction ² , Ri 4.7 kΩ, Ci 1 nF, limitation 33 VDC, protection type transile diode
	5 – shield	5 – shield	5 – shield
	6 – ISDS	6 – ISDS	6 – ISDS

1: Ub total load of all channels max. 100 mA

2: direction signal only with special instrument versions

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