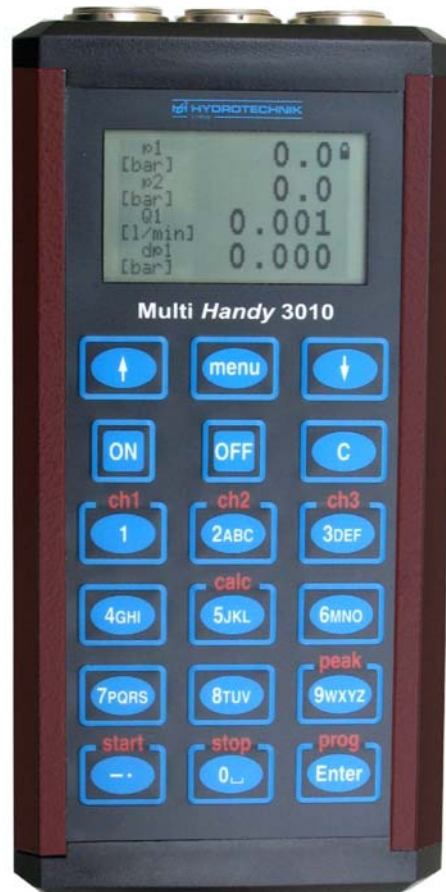


1.

*User manual*  
*for*  
*Multi Handy 3010*



**ISDS** *Intelligent Sensor  
Detection System*

Please read the user instructions carefully, before putting the measuring instrument into operation.

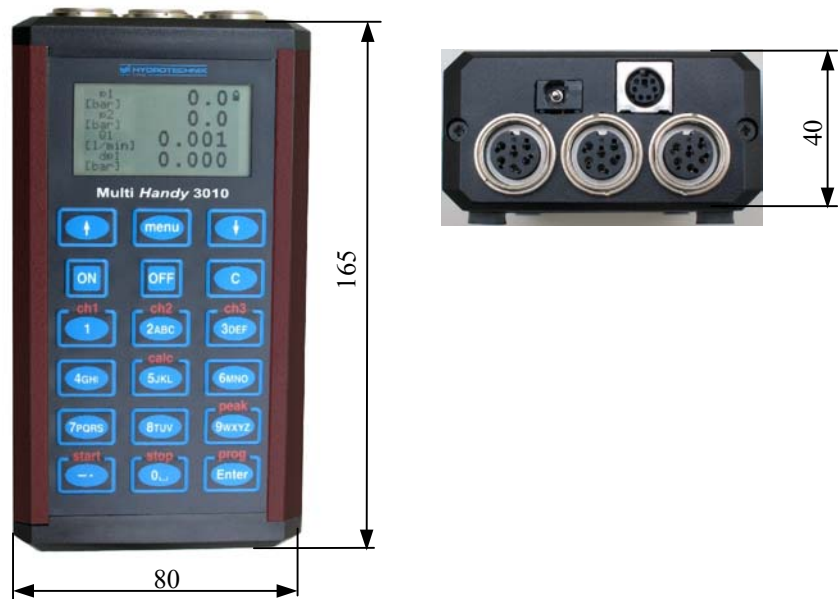
**Part-number: 3160-00-67.00**

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**HYDROTECHNIK GmbH version 04/04**

## 1.1 Dimensions



## 1.2 Preface

This user manual is a description of the hand held measuring instrument Multi-Handy 3010.

All information in this documentation have been compiled with great care, but must not be construed as a warranty for product characteristics. Hydrotechnik's liability is limited exclusively to the extent specified in their sales and delivery terms.

The copying and passing on to others of the documentation and software in connection with this product and the use of their contents require the written permission of Hydrotechnik.

Modification to reflect technical progress are reserved.

Thank you very much for your confidence.

You have purchased a powerful, state-of-the-art measuring instrument, which will support you well in your daily measuring activities.

You will be enthusiastic, no additional amplifier boxes or things of that kind have to be connected. Connect the cable between sensor and measuring instrument, at ISDS sensor only switch on the Multi-Handy and you can start the first measurement.

Please read the user manual firstly.

After receipt of the instrument, please check the outer condition of the measuring instrument, as well as possible delivered transport cases or bags, on external damages.

If further equipment is delivered, this should also be checked and their completeness should be determined, according to the list of parts.

The user manual includes all information, which are necessary for the operation of the measuring instrument. The permanent readiness for use and an optimal use is only ensured, if you pay attention to the user manual.

The use of the Multi-Handy 3010 should not provide any problems for you, but you can make only full use of its features if you acquaint yourself with the instrument.

We will be happy to assist you in the unlikely case of difficulties.

We wish you success in the use of our hand held measuring instrument Multi-Handy 3010.

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### 1.3 Notes about the Multi-Handy 3010

State-of-the-art hand held measuring instruments must support the user at his daily measurement tasks. ISDS sensors are automatically detected by the measuring instrument during the power-up phase and the following parameters are recognised: measuring range, physical size, unit of measure, signal output and characteristic curve (linearisation).

Confusing sensors and the need to enter sensor - specific data are, therefore, a thing of the past. The Multi-Handy 3010 with storage capacity, real time clock and PC-interface meets today's challenges. The unit has a simple to use menu operation, similar to that in mobile phones.

The transferring of the measurements (storages) to the PC via RS 232 (optional USB via USB serial adapter) is possible. Software support with HydroComsys/WIN 32<sup>“</sup> for data representation and analysis. Printing of measuring values on the PC.

The software belongs to the delivery of the Multi-Handy 3010.

Up to three sensors may be connected and their measuring results will be stored simultaneously. Calculations of values, like difference, sum and performance as well as derivations, e.g. speed, are at your disposal as 4<sup>th</sup> channel, for display and memory (pseudo channel)..

Minimum and maximum values are stored continuously and may be displayed at any time.

Stored data can be transferred to the PC in a fast way via the RS 232 - interface or with a USB - adapter.

The data analysis software “HYDROcomsys/WIN32” from Hydrotechnik manages large data volumes either in graphical or tabular form and or data analysis and their presentation directly on the PC.

- 2,2“ 8 line display
- Operation via foil keyboard
- Numeric display of actual measuring values
- Storage of measuring values with different trigger adjustments.  
For the definition of a trigger condition, a measuring channel can be used.
- Remote control via RS232 (USB adapter)
- Overwriting flash - memory (operation programme) via RS 232 (USB adaptor)
- 2 analog inputs for sensors with a current signal of 0-20/4-20 mA  
Internal, all channels are working with a 10 bit A/D - converter
- One input for frequency measurement without detection of direction.
- A pseudo channel. This pseudo channel arises from the calculation or the combining of real measuring channels
- Maximal 4 standard measures can be stored. Measuring channels and combined channels (e.g. dp) can be used as storage channel.
- Data transmissions up to 57,6 kbps are possible with the RS 232 interface.

## 1.4 System reset



With help of a system reset, you can put back your measuring instrument to the previous standard condition. All variables will be deleted or put back to the start values. The measuring value memory will be also deleted.

To carry out a reset, you have to press the keys 1, 2, 3 immediately one after the other, after the instrument has been switched on. If you carry out a reset at the Multi-Handy 3010, the following message will be displayed:  
„init - complete“

yes → menu

no → C

To start the reset event, press the key “menu”. If you press the key “C”, this event will be aborted.

## 1.5 Notes about the internal instrument batteries

Each time you use the measuring instrument, you should make sure that the NiCd batteries are fully charged before you start (a symbol is shown in the display).

In case of doubt, you can go on working with the help of a HYDROTECHNIK - plug-in power supply unit. By operation with a HYDROTECHNIK - plug-in power supply unit (primary 230 VAC, secondary 24 VDC), a continuously charging of the battery is guaranteed.



If you use the Multi-Handy for the first time, please take these notes, for the internal battery charging, into consideration.

Please remember that the batteries are only slightly charged when leaving the manufacturer.

We recommend connecting the plug-in power supply unit to the measuring instrument for approximately 14 to 16 hours prior to initial use. The batteries should always be re-charged using the plug-in power supply unit.

If the battery is discharged it should be re-charged for 16 hours, while the instrument is switched off. The service life of NiCd batteries can be very long, depending on their use. For optimum use of your batteries, they should be totally discharged, permanently re-charged or immediately re-charged after each use.

Re-charging NiCd batteries after very short time of use is not recommended. If the battery is repeatedly discharged slightly and immediately re-charged, the battery cells capacity reduce rapidly. If that occurs over a long period of time, the battery can suffer permanent damage. You can, however, repair the damage by repeatedly discharging and re-charging the batteries, i.e. by using the instrument for a long period of time and then re-charging the battery.

Should the batteries not be charged sufficiently, a “Charge batteries” warning will be displayed. When this occurs, a minimum of 16 hours recharging time is urgently required.

We recommend that you charge the batteries regularly, i.e. once a month and after a long period of non-use.

The self-discharging of NiCd batteries is physically known and only a regular care of the batteries, by the user, is of help.

Due to this, you save a lot of time and trouble, as your measuring instrument will be ready for use because of the regularly care of the batteries.

## 1.6 Equipment

The following mentioned equipment makes the Multi-Handy 3010 usable. No equipment set has been arranged, as the user should always select the components according to his tasks. .

Our customer service will be glad to serve you with this.

Instrument selection		Part-number
- <b>Multi Handy 3010</b>	(with software HydroComsys/WIN)	3160-00-67.00
- <b>Table power supply unit</b>	230 VAC / 24 VDC / 340 mA	8812-00-00.28
- <b>Car connection cable</b>		8824-64-05.00
optional		
- <b>Measuring cable MKS (ISDS)</b>	for connection to <b>ISDS</b> - pressure-, temperature and volume flow rate sensors. Length: 2,5 m 6 pole.	8824-S1-02.50Z
- <b>Data communication cable</b>	for online measurements via PC (HydroComsys WIN)	8824-K0-02.00
optional		
- <b>RS232-USB Adapter</b>	for connection on the PC USB-connection	8824-50-00.21
- <b>Bootloader cable optional</b>	for Flash-Update from PC/Notebook. Length: 2,0 m	8824-K1-02.00
- <b>Software Bootloader optional from May 2004</b>		8874-00-06.01



Please make sure that the measuring cable MK01 and MKS cannot be used as a prolongation repeatedly behind each other, as the protection is interrupted at this cable types.

This cable should be used for the connection to the sensor only in its complete length.

Other cable lengths can be delivered on enquiry.

## 1.7 General notes on safety



### Warning notes

#### Concerning your safety and the operational safety of the measuring instrument:

- Do never expose the instrument to excessive warmth or humidity, take the technical data of the measuring instrument into consideration.
- Do not store the instrument in wet or dusty places.
- Never dip the instrument into water or other liquids.  
Let liquid never reach the equipment inside.
- Do not open the instrument by yourself.
- Do not use the instrument if it has been fallen or the housing is damaged.
- Do not cut, damage or modify the cable of the power supply unit.
- Do not touch the power supply with wet or damped hands.
- Please use only current sources, which are recommended for this instrument.

#### Please pull the network adapter out of the electrical outlet:

- During a thunderstorm.
- If you detect smell or smoke.
- At a damage of the mains cable.

**Please protect your sensor against:**

- Exceeding the permitted voltage supply range.
- The mechanical overload over the permitted measuring range.
- Wrong connection assignments, especially at sensors of other manufacturers.

**Responsibility range.:**

- By using our measuring instrument and the connected sensors, you as a user should allow, that only trained, well instructed and authorised person are using your equipment, instrument and test benches. Due to this you have the possibility to reduce the security risk to a minimum, depending on the application, e.g. wrong operation, wrong connection, complete failure of the equipment, pollution of the environment. Through this clear delimitation of the responsibility areas can be described between the manufacturer Hydrotechnik and the user (operator).
- Please keep the instrument away from children.

**As agreed use:**

- Please take the high security risks, which can arise by an improper operation, into consideration. Wrong sensor data input at sensors without ISDS.

Use of batteries:

- Keep battery away of heat sources and open fire. Do not dip them into water.
- Do never try to dismantle or modify batteries.
- Never short-circuit the contacts of batteries. (e.g. with metal items).
- Use only batteries, which are authorised by Hydrotechnik.



**Avoidance of error functions**

- Avoid magnet fields  
Keep the measuring instrument away from the immediate surroundings of electric motors or other equipment, which produce strong electromagnetic fields.  
Strong magnetic fields can cause error functions or influence measuring values.
- Pay attention to a proper earthing of your equipment.  
At a faulty earthing interpretation, measuring peaks in your measuring signals can arise
- Avoid formation of condensed water.  
Use the instrument only after a temperature adjustment, if condensed water could have been formed. Otherwise the device can be damaged.  
Storage over a longer time at minus temperatures.  
Wait until the humidity is completely evaporated.
- Please make sure that the measuring cable cannot be used as a prolongation repeatedly behind each other, as the protection is interrupted at this cable types.  
This cable should be used for the connection to the sensor only in its complete length.
- Inputs of signal type, measuring range and calibration value are very important. They influence directly the displayed measuring values. Enter the correct data mentioned on the sensor.
- Data of ISDS - Sensors will be only read by switching on the instrument if the corresponding sensor is connected on the measuring instrument.



## **Allgemeine Hinweise**

### **Cleaning**

- If the housing is dirty, clean it with a soft cloth which is slightly dampened with a mild household cleaner (please read the instructions from the cleansing agent manufacturer first). Do not use chemical solvents because they will attack the housing.
- Before cleaning the instrument, you must disconnect it from the power supply.

### **Battery disposal**

- According to the battery regulation you are legally obliged to give back all used batteries.
- Dispose used batteries carefully (hazardous waste).  
All recycling courts are obliged to take back used batteries.  
You can of course sent back the old measuring instrument - batteries to HYDROTECHNIK
- Before dispose, you should stick the contacts with isolating material, if possible.

### **Protect the environment**



## **1.8 Explanations**



This symbols means “ATTENTION: Important note”

## 2. Instrument executions

### 2.1 Technical data, Hardware

Housing material:	Aluminium / ABS-plastic	
Weight:	720 g incl. battery	
Protection type:	Instrument front:	IP 40
	Housing:	IP 40
	Measuring inputs:	IP 40
CE-identification:	Comply with EN 50 081-1 and EN 50 082-1	
Instrument power supply:	With direct current 24 VDC, with a protection against wrong electrical connection and over voltage, the instrument is protected with self reversed safety resistance (PTC)	
Dimensions:	Multi-Handy 3010: approx. 165 x 80 x 40 mm (HxWxT)	
Display	LCD-Display 128x64 points without background illumination 2,2"	
Serial interface:	RS232 for data transmission and flash update	
Ambient temperature:	0 °C to 50 °C	
Relative humidity:	0% to <80% (not dewed)	
Storage temperature:	- 20 °C to 70 °C	
Measuring value display:	5-digits, 2 or 4 lines	
Operation	8 lines	
Trigger:	adjustable	Channel 1, Channel 2, Channel 3, none or key
Basis scanning rage:	adjustable	from 1 ms to 10 min
Measuring rate:	Analog inputs:	1 ms
	Frequency inputs:	from 0,5 Hz to 56 Hz a period measurement effects from 56 Hz on, the measuring time is = 17,7 ms
Measuring value memory:	256 kB	approx. 115.000 analog measuring values approx. 57.500 frequency measuring values for max. 5 series of measurement
Extreme value memory:	Min./Max.-values of all analog channels in the background 1 ms.	
Programme memory	128kB Flash- memory for programme code (external programmable without opening the instrument ))	
Error limit:	analog:	± 0,2 % of end value
	digital:	± 0,2 % of measuring value
Measured variable:	Different measured variables can be registered e.g. pressure, temperature, speed, voltage, current, force, revolutions, etc.	

### 2.2 Description, Hardware

#### 2.2.1 Power supply

External supply:	230 VAC / 24 VDC / 340 mA - power unit
Connector:	Power unit jack 6,3 mm

#### 2.2.2 Measuring value memory

The memory size is 256 KB. The number of possible memories is limited to 5 series of measurement.

#### 2.2.3 Extreme value memory

An internal extreme value memory includes the min- and max values of all measuring inputs..

Measuring rate	analog channel 1 ms. frequency channels (>=17ms)
----------------	---

### 2.2.4 Programme memory

An internal FLASH- memory is used for the software. With this, the instrument is updateable for new programme version without assembling expenditure. The programming of the FLASH- memory effects via the serial interface, with the HT software “Bootloader“. Software is not included in the delivery of the measuring instrument.

### 2.2.5 Real time clock

Internal real time clock; battery buffered

### 2.2.6 Display

The measuring instrument has a 2,2“ display. This display offers a good contrast. The resolution of the display is 128\*64.

### 2.2.7 Sensor detection

An automatic sensor detection is integrated in the measuring instrument. The sensor detection effects on a digital basis. For this, a EPROM is integrated in the sensors, which contains apart from the sensor type, the calibration value of the sensor and the linearisation data. These data are taken over from the measuring instrument via the 6<sup>th</sup> PIN of the connection jack. The measuring instrument can work in 2 operation ways:

- with automatic sensor detection (Instruction SI – US units, via the instrument menu).
- without sensor detection.

At “ automatic sensor detection ”, all measuring channels of the instrument will be checked if the user switch on the measuring instrument. If a sensor with sensor detection has been detected on the channel, all sensor data will be taken over and the old channel parameter (calibration value, linearisation) will be written over.

### 2.2.8 Battery

Internal power supply via batteries 14,4 VDC, 700 mAh

Durance of operation with batteries:  $\geq$  8 hours at max. power input

Battery condition is mentioned in the display.

### 2.2.9 Connections



2 x Analog

1 x Frequency

1 x RS 232

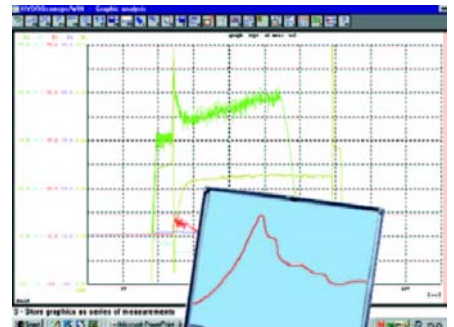
1 x Power supply

## 2.2.10 Connection possibilities for Multi-Handy 3010

Connection of different sensors with or without ISDS  
 Hydrotechnik sensors and other sensors.  
 Data presentation via PC.



→  
**RS232**  
 ←



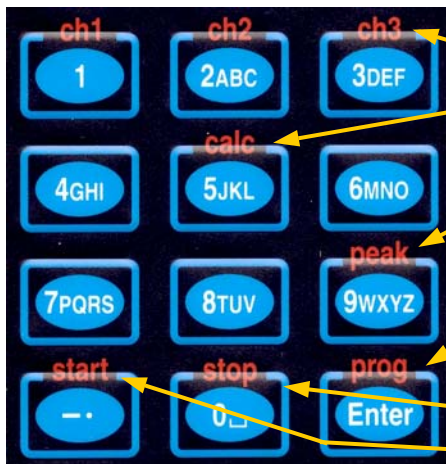
### 3. Operation menu

#### Operation via menu keys



- Taste **menu** Select the main (start window for all adjustments).
- ↑ ↓** Selection; confirm with Enter
- ON** Switch on the instrument.
- OFF** Switch off the instrument, press for approx.  $\geq 2$  s
- C** Back or abort without confirmation "ESC"
- Enter** Next menu and back with confirm "OK"

#### Operation via function keys

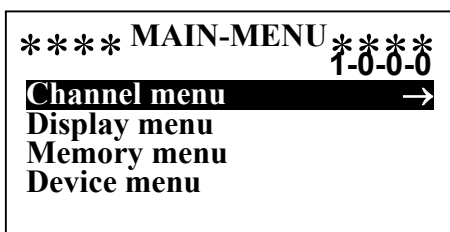


- Function keys (red keys) from measuring value display**
- ch1, ch2, ch3, calc** Channel display, individually selectable: on / off.
- peak + ch1, ch2, ch3, calc** Peak value display for selected channel individually selectable: on / off.
- prog + ch1, ch2, ch3, calc** Programming menu for selected channel
- Function keys from memory menu**
- stop** Stop memory
- start** Start memory

#### Function keys from menu levels

1,2,3,4,5,6

Corresponding menu line can be selected directly via the keys 1 to 6. (e.g.: measuring channel menu via key 1).

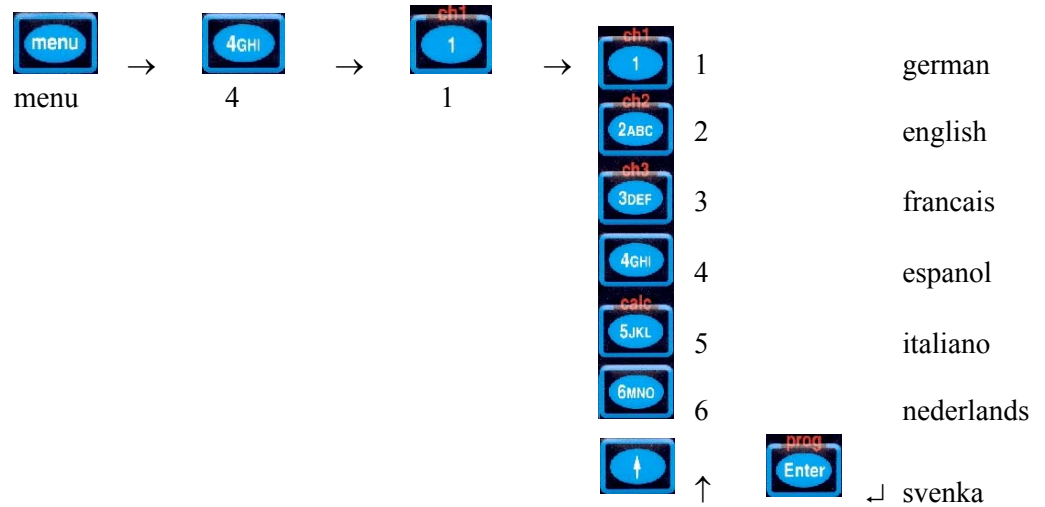


- Line 1
- Line 2
- Line 3
- Line 4

## Language and contrast via function keys

### Adjustments

#### Language



#### Contrast



adjustments in

steps of 10%

### Measuring display

Display 4 channel

p1	0.0
[bar]	
p2	200.0
[bar]	
Q1	0.001
[l/min]	
dp1	-200.
[bar]	

p1 ISDS channel

p1	0.0
[bar]	
p2	200.0
[bar]	
Q1	0.001
[l/min]	
dp1	-200.
[bar]	

Display 2 channel

p1	0.0
[bar]	
p2	200.0
[bar]	

Display 1 channel

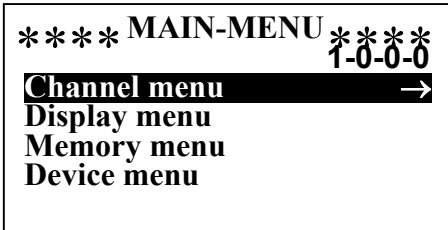
p1	0.0
[bar]	

The contents and the appearance of the menus shown can be different at your instrument. This is depending on the system adjustments, which you have carried out



**!!! Attention:** Input of signal type, measuring range and calibration value are very important, they influence the displayed measuring value directly. Enter the mentioned data from the sensor correctly.

## Main menu



The main menu is the starting point for all adjustments and alterations.

To access the main menu, press the key “menu” after the instrument has been switched on.

Use the measuring channel menu to enter data relating to the type of sensors being used, the measuring range and the measured variables.

Use the display menu to select the mode of display for each channel.

Use the memory menu to enter details relating to the taking and storing of a test.

Use the instrument menu to enter adjustments to the setup of the unit e.g. date, time language, etc..

When the main menu opens, it will default to the measuring channel menu. An arrow appears to the right of the line. This means, that a submenu is available.

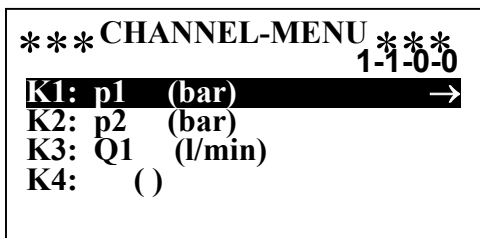
Use the arrow key to select the submenu ↓.

Press the key **Enter** to enter the submenu.

To revert to a previous menu step, press **C**.

### 3.1 Measuring channel menu 1-1

#### 3.1.1 Measuring channel menu



- << Menu level
- << Chapter number
- << Pressure channel 1
- << Pressure channel 2
- << Frequency channel
- << Calculated channel not defined



with ISDS on channel 2 p2


Select the requested channel with the arrow keys ↓, ↑ and **Enter** or with a **ch** key, **ch1** or **ch2** the corresponding channel 1 or 2 (measuring channel analog), **Ch3** corresponding channel 3 (measuring channel frequency), **Ch4** corresponding channel 4 (measuring channel calculation)

### 3.1.2 Measuring channel 1, 2 analog

```

*** CHANNEL 2 1-2-1-0
Meas.var. : p2 (bar)
Sens.Type : (0-20mA)
M.Rng.min : 0.000
M.Rng.max: 200.0
    
```

- << Menu level
- << Chapter number
- << Measured variable p(mbr), p(bar) and so on. See \*
- << Sensor type 0 – 20 mA or 4 to 20 mA
- << Measuring range Min Display value at 0 or 4 mA
- << Measuring range Max Display value at 20 mA
- << Zero point Zero point alignment, sensor will be started.

 **Note :**  
Select with the arrow keys **↓** or **↑** and **Enter** or with a **ch** key the menu level and select then with the arrow keys **↓** or **↑** the requested adjustment or measuring range input via keyboard. Confirm with **Enter** or go back with the key **C**

with ISDS p2


```

M.Rng.max: 200.0
Linearisation: yes
    
```

- << Linearisation you can select from max. 4 tables.

Example: Calibration of a turbine with different viscosity  
 Table 01 at 2 cst  
 Table 02 at 30 cst  
 Table 03 at 200 cst.

\*Displayable measuring variables: p(mbar), p(bar), p(psi), p(Pa), T(°C), T(°F),  
 (analog) Q(l/min), Q(GPM), n(U/min), n(rpm), U(mV),  
 U(V), I(mA), I(A) F(kN), M(Nm), s(mm),  
 v(m/s), v(°/s), m(kg), m(t)

 **Note :**  
If a sensor with sensor detection is connected, the parameters cannot be changed. (Exception: table linearisation).

### 3.1.3 Measuring channel 3 frequency

```

*** CHANNEL 3 1-3-3-0
Meas.var. : Q1 (l/min)
Sens.Type : w/o direct.
Cal. value : 100.0
    
```


- << Menu level
- << Chapter number
- << Measured variable Q(l/min) Q(GPM) n(U/min) n(rpm) f(Hz)
- << Sensor type without direction, (cannot be changed)
- << Cal.-value at volume flow rate: enter calibration value according the measuring protocol, calibration value is also mentioned on the label Q Sensor Hydrotechnik
- Revolution: Input of impulses/revolution
- Frequency: Always enter 1

### 3.1.4 Measuring channel 4 calculated channel

```

*** CHANNEL 4 1-4-1-0
Meas.var. : K1-K2
Align.diff : 000.0
    
```

- << Menu level
- << Chapter number
- << Measured variable UNDEF K1-K2 K1+K2 dk1/dt dk3/dt K1xK3/600
- << d-alignment Alignment of channel 1 and 2

 **Note :**  
At the difference and sum formation, you must pay attention, that this happens with the same measuring sizes

Procedure: Example pressure transducer.  
 Connect the sensor to the measuring point 1 or 2 and afterwards charge them with them with the expected pressure. Adjust the measuring value display via the menu “d-alignment”. Connect the sensors to the measuring points 1 and 2 and start the measurement. Due to this, the measuring errors of the sensors among each other are minimised in the adjusted measuring value range



## 3.2 Display menu 2-1

### 3.2.1 Display menu

```

*** DISPLAY MENU ***
                2-1-0-0
Select.chan. →
Def. MinMax
Delete MinMax
Contrast      : 50%
Display rate  : 1.00s
    
```

<< Menu level  
 << Chapter number  
 << Channel selection K1, K2, K3, K4 **yes-no** and K1-K4 **all**  
 << Definition MinMax K1, K2, K3, K4 **yes-no** and K1-K4 **all**  
 << Delete MinMax delete background memory with Enter  
 << Display contrast Value input 00 %, 10 %, 20 % to 90 %  
 << Display rate 0,25 s, 05 s, 1,0 s, 2,0 s

### 3.2.2 Channel selection and definition MinMax

```

K1 (p1) : yes
K2 (p2) : yes
K3 (Q1) : no
K4 (dp1) : no
K1 - K4 : all
    
```



Note :

Select with the arrow keys **↓** or **↑** and **Enter** or with a **ch** key the menu level and select then with the arrow keys **↓** or **↑** the requested adjustment (yes-no) or (all). Confirm with **Enter** or go back with the key **C**

## 3.3 Memory menu 3-1

### 3.3.1 Memory menu

```

*** MEMORY MENU ***
                3-1-0-0
start memory →
delete memory
INPUT PARAMETER
VIEW PARAMETER
memopy status
    
```

<< Menu level  
 << Chapter number  
 << Start memory M01: Name of measuring series, note:, start  
 << Delete memory all, M01:, M02:, M03: to M5:  
 << Enter parameter Memory ch., scanning rate, memory time, trigger  
 << Display parameter Channels, scanning rate, memory time, trigger  
 << Memory status Needed: \_\_\_\_\_, free: \_\_\_\_\_ value in Byte

### 3.3.2 Start memory

```

*** START MEMORY ***
M01: 200104-09:35
Note : nnnnnnn
start
    
```

<< Menu level  
 << Name of measuring M01 to M05: Name of measuring series,  
 series Advise: always date  
 << Note Input via the keyboard after **Enter** **↓** **Enter**  
 e.g.: V via 3 x key **dtuv** **uv**. Capital-Small key **start**.  
 << Start Memory will be started or waiting for  
 trigger conditions

### 3.3.3 Delete memory

```

***DELETE MEMORY***
                3-2-1-0
all
M01: 200101-09:20
M02: -----
M03: -----
M04: -----
M05: -----
    
```

<< All  
 << Series of measurement 1 query after pressing Enter:  
 Delete memory  
 Yes → key Enter  
 No → key C

### 3.3.4 Enter memory parameter


```
* MEMORY PARAMETERS *
                               3-3-1-0
Memory Channel →
Scanning rate
Storing time
Trigger
```

- << Menu level
- << Chapter number
- << Memory channel K1, K2, K3, K4 **yes-no** and K1-K4 **all**
- << Scanning rate Time basis: ms s min, value: 000
- << Memory time Time basis: s min h, value: 000, Max. time \_\_ \*
- << Trigger

### 3.3.4a Enter trigger

```
*** TRIGGER ***
                               3-3-4-1
Trigger : p1
Type trig. : LOWER
Trig. Value : 200.0
Pretrigger : 60%
```

- << Menu level
- << Chapter number
- << Trigger none, key, p1,p2, Q1 (channel 1 to 3)
- << Trigger type smaller, bigger
- << Trigger value 000 (e.g.: 200 bar channel p)
- << Pre-trigger 00 (1 to 100 %)



 **Attention :**  
 If the trigger condition is reached before the pre-trigger is completely filled-up, only the memory difference between pre-trigger and 100% will be filled. That means, the total memory time won't be reached

After the start of the memory, a ring memory in size of the pre-trigger will be filled-up and actualises its self, continuously in the background. With trigger conditions, the adjusted memory time will be stored to 100%.

### 3.3.5 Display of memory parameters

```
* MEMORY PARAMETERS *
                               3-4-1-0
Channels : p1 p2 Q1
                               dp1
Scanning rate : 10 ms
Stor. Tme : 10 sec
Trigger : p1
                               3-4-1-0
Trigger : p1
Type trig. : LOWER
Trig. value : 200.0
Pretrigger : 60%
<
```

Display of the adjusted parameter for the planned memories.  
 All 4 channels  
 p1 (pressure), p2 (pressure), Q1 (volume flow rate),  
 dp1 (pressure difference)  
 Scanning rate 10ms, Memory time 5 min, Trigger p1 < 165 bar  
 Pre-trigger 66 %.

> < It's possible to switch over the display layout.  
 (more than 8 lines are needed for this menu level.)  
 Switching over with the keys  

### 3.3.6 Memory status

```
** MEMORY STATUS **
                               3-5-1-0
required : 1000
free : 22000
```

<< Memory status Needed: \_\_\_\_\_, free: \_\_\_\_\_  
 Memory value in: Number of sentences, one sentence per scanning  
 Example **needed**:  
 Scanning rate 1 sec., Memory time 100 sec = 100 sentences  
 Example **free**: (free memory locations)  
 Number of sentences depended on the selected memory channels  
 (analog \* 1, digital \* 3). 115.000 sentences at ch1, 57.500 sentences at  
 ch1ch2, 38.300 sentences at ch3, 23.000 sentences at ch1ch2ch3ch4, no  
 sentences if also ch1ch2 has been selected.

### 3.4 Instrument menu 4-1

```

*** DEVICE MENU ***
4-1-0-0*
Language
Date / Time
ISDS
Company Name
RS 232
chapter number:ves
    
```

```

<< Menu level
<< Chapter number
<< Language Selection *
<< Date / time Enter date / time via keyboard
<< ISDS SensID?: yes - no, unit: SI - US^
<< Company name Company: Enter text °
<< RS 232 Transferring rate 9600, 19200, 38400, 57600
<< Chapter number Display: yes - no
    
```

\* german, english, francais, espanol, italiano, nederlands, svenska

^ taking over of the US - SI units after the instrument has been switched on and off.

° input via keyboard after **Enter** **↓** **Enter** e.g.: V via 3 x key **87uv** **87uv**. Capital-Small key **start**.

## 4. Connections and PIN configuration

### 4.1 Sensor connections:

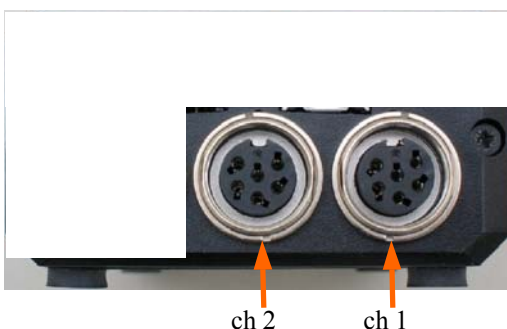
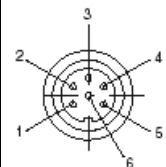
All in- and outputs are not galvanic separated: Due to this, they are in connection with each other via the negative pole of the power supply / via the measuring connection of the sensors, as well as via the common power supply.

### 4.2 Channel 01 to 02 Analog inputs:

8 analog inputs:	Channel 1 to 2 (ch1 to ch2)
Current input:	0-20 mA possible to switch to 4-20 mA, $R_i = 105 \Omega$ , $C_i = 10 \text{ nF}$ .
Measuring rate:	1ms
Measuring accuracy:	+0,2 % of the end value
Resolution:	10 Bit
Variation of temperature:	+0,1 % v.EW/10 °C
Crosstalk:	in the adjacent channel at max. resolution of 1 digit
Exceeding of end value:	>10 % of the end value
Connector:	6 pole plug box
ISDS:	Company specific, serial data transmission..
Supply voltage:	18 VDC max. 100 mA

Pin No.	Function	Ri.	Ci.	Limit	Protection type
1	20 mA Signal	105 Ohm	10 nF	5,6 VDC	VDR,Transildiode
2	Masse				
3	Ub*			100 mA	Current limiting. PTC
4					
5	Schild				
6	ISDS	1k Ohm	100 pF	5,6 VDC	Transildiode

Pinbelegung  
Draufsicht

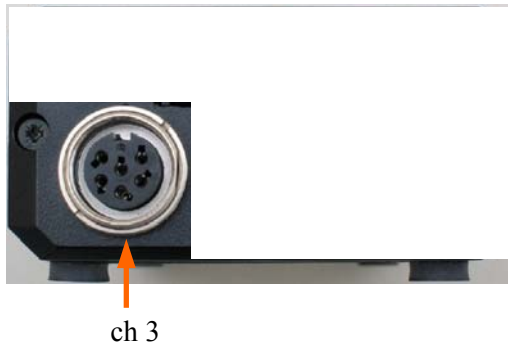
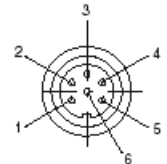


### 4.3 Channel 3 Frequency input:

1 frequency	Channel 3 (ch3)
Frequency signal:	>0,5 Hz –5 kHz
Input level:	>3,5-30 VDC rectangle
Measuring accuracy:	±0,2 %
Connector:	6 pole plug box
ISDS:	Company specific, serial data transmission
Power supply:	Supply voltage (minus 2 VDC max. 100 mA)

Pin No.	Function	Ri.	Ci.	Limit	Protection type
1	Frequency signal	4,7 kOhm	100 pF	30 VDC	VDR, break-down diode
2	Masse				
3	Ub*			100 mA	Current limiting PTC
4					
5	Shield				
6	ISDS	1 kOhm	100 pF	5,6 VDC	Transildiode

Pinbelegung Draufsicht



### 4.4 RS232 / USB

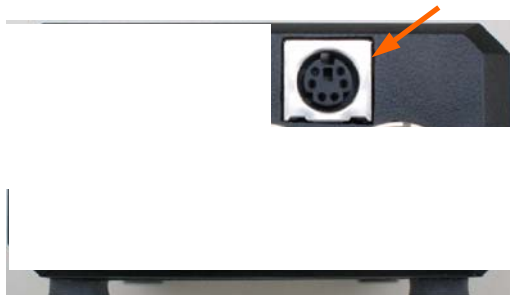
The real data exchange between PC and measuring instrument effects via the RS 232 interface. Firmware-Update.

Interface on 9.600, 19200, 38400 and 57600 Baud, can be adjusted via the menu.

The protocol for the DFÜ according to software HydroComsys/WIN.

The online - date transmission will be supported up to a scanning rate of ≥10ms.

Data transmission max. 57,6 kbps



USB via USB Serial adapter

## 5 *General*

### 5.1 **Guarantee information**

The guarantee is valid for 12 months.

In principle, the general terms of business are valid.

The right to claim under guarantee becomes invalid, when repairs or interventions are carried out by person, not authorised by HYDROTECHNIK.

Within the twelve months of guarantee, we will remove free of charge damages or defects, which can be proved to be based on a works mistake, as far as the customer informs us immediately after having detected it, but within 12 months at the latest.

The fulfilling of the guarantee is done in a way, that defective parts are repaired or replaced by suitable parts of our choice, free of charge.

**Please return any instrument for repair under guarantee, along with a copy of your invoice to:**

**HYDROTECHNIK – Service**

## 6 Maintenance

Your measuring instrument is a precision instrument, which will work without trouble for many years, if it is handled properly. In the case of faults, please do not try to repair the instrument yourself!

Contact our service team:

Address: HYDROTECHNIK GmbH  
Holzheimer Straße 94-96  
D-65549 Limburg

Phone.: 06431 – 4004 0  
Fax: 06431 – 45308  
Internet: <http://www.hydrotechnik.com>  
E-Mail: [info@hydrotechnik.com](mailto:info@hydrotechnik.com)



HYDROTECHNIK GmbH  
Holzheimer Straße 94 – 96  
D-65549 Limburg  
Tel.: 0 64 31 – 40 04 0  
Fax: 0 64 31 – 4 53 08

*We recommend, to calibrate your instrument regularly.*

*Hydrotechnik has an efficient calibration laboratory.*

*Please contact us; we can offer you a calibration at manufacturers work for your measuring instruments and sensors, as well as a DKD calibration for your pressure sensors and volume flow rate sensors.*

**In case of a repair, we need your help.**

**Please fill out this page as detailed as possible, so that we can find the error in a very short time and this will also reduce the time for reparation.**

**For questions, please inform us, which person we can contact:**

<b>Company:</b>
<b>Department:</b>
<b>Name:</b>
<b>Phone:</b>
<b>Fax:</b>

⊗ Please mark with an "X"

<p><b>Claimed item:</b></p> <p><input type="radio"/> Instrument</p> <p><input type="radio"/> Sensor</p> <p><input type="radio"/> Cable</p> <p><input type="radio"/> Power supply</p>	<p><b>Used PC:</b></p> <p><input type="radio"/> Pentium 1</p> <p><input type="radio"/> Pentium 2</p> <p><input type="radio"/> Pentium 3</p> <p><input type="radio"/> Pentium 4</p>	<p><b>Operationsystem:</b></p> <p><input type="radio"/> Windows 95 / 98 / SE</p> <p><input type="radio"/> Windows NT</p> <p><input type="radio"/> Windows 2000</p> <p><input type="radio"/> Windows XP</p>	<p><b>With software:</b></p> <p>HydroComsys/WIN:</p> <p>Version.....</p>
--	--	--	--

**Notes for error description:**

**Please do not change the adjustments on the measuring instrument, if an error has been occurred.**

**Please describe shortly your measurement tasks, the connection of the sensors, instrument adjustments, like memory parameter, trigger, who many measuring values have been registered, type of your printer, etc..**

**Your error description.**