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OPERATOR'S MANUAL

DYNAM

WYLER SOFTWARE TO THE ZEROTRONIC FAMILY



DYNAM

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TABLE OF CONTENT

| | Page |
|---|------------|
| 1 Overview | 6 |
| 2 General | 7 |
| 2.1 Introduction | 7 |
| 2.2 Hardware Requirements | 7 |
| 2.3 Software Requirements | 7 |
| 2.4 Installation of the Software DYNAM | 8 |
| 2.5 Possible configuration with ZEROTRONIC-Sensors | 11 |
| 2.6 Installation of the Sensors / Addressing the Sensors | 14 |
| 2.7 Product Support | 15 |
| 2.8 Description of the software DYNAM | 16 |
| 3 Exercise in five steps | 43 |
| 3.1 Set up of the measuring and display commands for two sensors | 47 |
| 3.2 Installing the module „ANALYZER“, based on part 1 (3.1) | 70 |
| 3.3 Installation of filters for the display | 77 |
| 3.4 Installation of the module DDE; dynamic data exchange with other Windows applications | 81 |
| 3.5 Installation of the module SENDER; transmitting the data to the serial port | 86 |
| 4 Installation of the module "PRINTER" | 92 |
| 5 Printout of the measured results | 92 |
| 6 Ending the DYNAM program | 94 |
| 7 Automatic start of DYNAM with the system start | 94 |
| 8 Calibrating the sensors by using DYNAM | 95 |
| 9 ANNEX | 101 |
| 9.1 Content of the file "DYNAM.INI" | 101 |
| 9.2 Troubleshooting guide | 102 |
| 9.3 Definition of the various Filter-TYPES | 103 |

Änderungen / Modifications:

| Datum / Date | Geändert durch Modified by | Beschreibung der Änderung Description of modifications |
|--------------|-------------------------------|---|
| 8.8.2000 | HEH | Description installation SW DYNAM new |
| 20.01.2003 | HEH/MO | Index included, various adaptations |

INDEX

| Key word | Chapter | Page |
|---|----------|------|
| A | | |
| ANALYZER- command | 2.8.10 | 38 |
| Analyzer- command „Control“ | 2.8.10.1 | 38 |
| Analyzer- command „Graph“ | 2.8.10.3 | 39 |
| Analyzer- command „Number“ | 2.8.10.2 | 38 |
| Analyzer- command „Text“ | 2.8.10.4 | 39 |
| ANALYZER, installing the module ANALYZER | 3.2 | 70 |
| ANNEX | 9 | 101 |
| Automatic start of DYNAM with the system start | 7 | 94 |
| B | | |
| Baudrate / PortName | 2.4 | 9 |
| Baudrate optimal / serial port | 3 | 43 |
| C | | |
| Calibrating the sensors by using DYNAM | 8 | 95 |
| Configuration with ZEROTRONIC-sensors in combination with the handheld terminal LEVELMETER 2000 | 2.5.1 | 11 |
| Configuration with ZEROTRONIC-sensors in combination with the software DYNAM | 2.5.2 | 13 |
| Co-ordinates of the window placement | 3.1.5 | 61 |
| D | | |
| Data(Smooth) / Filter | 3.3 | 77 |
| DDE- command | 2.8.9 | 36 |
| DDE- command „Control“ | 2.8.9.1 | 36 |
| DDE- command „Number“ | 2.8.9.2 | 37 |
| DDE, installation of the module DDE; dynamic data exchange with other Windows applications. | 3.4 | 81 |
| DDE-convention | 3.4 | 82 |
| Defining the mathematical connection | 3.1.3 | 52 |
| Defining the profile of the sensor measuring command | 3.1.2 | 49 |
| Defining the sensor command for the sensors A and B | 3.1.2 | 49 |
| Description of the software DYNAM | 2.5 | 13 |
| Display- command „Bar“ | 2.8.6.3 | 27 |
| Display- command „Control“ | 2.8.6.1 | 26 |
| Display- command „Text“ | 2.8.6.4 | 28 |
| Display command „Number“ | 2.8.6.2 | 26 |
| Display window within the main window by using the Display command „Number“ | 3.1.5 | 62 |
| Display windows | 3.1.5 | 59 |
| DISPLAY, installing the module "DISPLAY" | 3.1.5 | 59 |
| DISPLAY-Command | 2.8.6 | 26 |
| DYNAM.INI | 2.4 | 9 |
| DYNAM.INI | 9.1 | 101 |
| E | | |
| Ending the DYNAM program | 6 | 94 |
| Example it is the measuring command file „SENSOR-WYL“ | 2.8.3.3 | 18 |
| Exercise in five steps | 3 | 43 |
| Exercise, procedure of | 3 | 43 |
| F | | |
| File DYNAM.INI | 2.4 | 9 |
| Filter-Type „0“ | 9.3.1 | 103 |
| Filter-Type „1“ | 9.3.2 | 103 |
| Filter-Type „2“ | 9.3.3 | 104 |
| Filter-Type „3“ | 9.3.4 | 104 |
| Filter-Type „4“ | 9.3.5 | 104 |
| Filter-Type „5“ | 9.3.6 | 104 |
| Filter-Type „6“ | 9.3.7 | 104 |
| Filter-Types / Definition of the various types of filters | 9.3 | 103 |

| | | | |
|--|----------|-----------|----|
| | G | | |
| GENERAL | | 2 | 7 |
| Goal of the exercise | | 3.1 | 47 |
| | H | | |
| Hardware requirements | | 2.2 | 7 |
| | I | | |
| Installation of filters for the display | | 3.3 | 77 |
| Installation of the sensors, addressing the sensors | | 2.6 | 14 |
| Installation of the software DYNAM | | 2.4 | 8 |
| Introduction | | 2.1 | 7 |
| | L | | |
| LEVELMETER 2000 | | 2.5.1 | 11 |
| | M | | |
| Main window, display | | 3.1.5 | 59 |
| Main-Window / Analyzer | | 3.2.2 | 75 |
| Mathematical - command „Accel“ | | 2.8.11.8 | 42 |
| Mathematical - command „Add“ | | 2.8.11.2 | 40 |
| Mathematical - command „Extend“ | | 2.8.11.7 | 42 |
| Mathematical - command „Link“ | | 2.8.11.4 | 41 |
| Mathematical - command „Smooth“ | | 2.8.11.5 | 41 |
| Mathematical - command „Strip“ | | 2.8.11.6 | 42 |
| Mathematical - command „Subtract“ | | 2.8.11.1 | 40 |
| Mathematical - command „Time“ | | 2.8.11.3 | 40 |
| Mathematical -Command | | 2.8.11 | 40 |
| Mathematical command“ for differential measurement [Sensor A - Sensor B] | | 3.1.3 | 52 |
| Measurement and analysis with filters / Filter | | 3.3 | 78 |
| Measuring and analyzing a job with the installed parameters | | 3.2.2 | 74 |
| Measuring channels | | 3.2.1 | 70 |
| Measuring command file / adding measuring command file | | 2.5.3.3.3 | 20 |
| Measuring command file / changing of measuring command file | | 2.5.3.3.2 | 19 |
| Measuring command file / creating measuring command file | | 2.8.3.3 | 18 |
| Measuring command file / deleting measuring command file | | 2.5.3.3.4 | 21 |
| Measuring command file / renaming measuring command file | | 2.5.3.3.5 | 21 |
| Measuring command file / review required measuring command file | | 2.5.3.3.1 | 19 |
| Measuring commands | | 3.1.3 | 52 |
| Measuring groups, defining | | 3.1.4 | 54 |
| Measuring parameters of the measuring channels | | 3.1.4 | 55 |
| Measuring principle of the ZEROTRONIC family | | 2.1 | 7 |
| Measuring task in exercise | | 3 | 43 |
| Measuring with the module DDE | | 3.4 | 83 |
| Module „ANALYZER“ / Filter | | 3.3 | 77 |
| Module „SAMPLER“ / Filter | | 3.3 | 77 |
| Module „SENSOR“ / Filter | | 3.3 | 77 |
| Module DDE | | 3.4 | 81 |
| Mounting in view of connector / connector direction | | 2.6.1 | 14 |
| Mounting of the sensors | | 2.6.1 | 14 |
| | O | | |
| OVERVIEW | | 1 | 6 |
| | P | | |
| PANEL / Description of the PANEL | | 2.8.3 | 17 |
| PANEL installation | | 3.1.1 | 47 |
| PANEL with buttons | | 2.8.3 | 17 |
| PANEL without buttons | | 3.1.1 | 47 |
| PortName, Baudrate | | 2.4 | 8 |
| Possible configuration with Zerotronic Sensors | | 2.5 | 11 |
| Power supply, external | | 2.5.1 | 12 |
| Printer- command „Bar“ | | 2.8.8.5 | 33 |
| Printer- command „Box“ | | 2.8.8.6 | 34 |
| Printer- command „Control“ | | 2.8.8.1 | 30 |
| Printer- command „Date“ | | 2.8.8.7 | 34 |

| | | |
|---|---------|-----|
| Printer- command „Form“ | 2.8.8.9 | 35 |
| Printer- command „Graph“ | 2.8.8.3 | 31 |
| Printer- command „Number“ | 2.8.8.2 | 31 |
| Printer- command „Text“ | 2.8.8.4 | 32 |
| Printer- command „Time“ | 2.8.8.8 | 35 |
| PRINTER commands | 2.8.8 | 30 |
| PRINTER, installation of the module "PRINTER" | 4 | 92 |
| Printout of the measured results | 5 | 92 |
| Product support | 2.7 | 15 |
| S | | |
| Sampler- command „Calibration“ | 2.8.5.3 | 25 |
| SAMPLER, installing the module "SAMPLER" | 3.1.4 | 54 |
| SAMPLER-command | 2.8.5 | 24 |
| SENDER- command | 2.8.7 | 29 |
| Sender- command „Control“ | 2.8.7.1 | 29 |
| Sender- command „Frame“ | 2.8.7.3 | 30 |
| Sender- command „Number“ | 2.8.7.2 | 29 |
| SENDER module installation and transmitting the data to the serial port | 3.5 | 86 |
| Sensor- command | 2.8.4 | 22 |
| Sensor- command „Control“ | 2.8.4.1 | 22 |
| Sensor- command „Control“ | 2.8.5.1 | 24 |
| Sensor- command „Group“ | 2.8.5.2 | 24 |
| Sensor- command „Profile“ | 2.8.4.2 | 23 |
| Sensor measuring commands, defining | 3.1.2 | 49 |
| Serial port / optimal baud rate | 3 | 43 |
| Set up of the measuring and display commands for two sensors | 3.1 | 47 |
| Software requirements | 2.2 | 7 |
| Software requirements | 2.3 | 7 |
| Specific applications | 1 | 6 |
| Structure of the data | 2.8.2 | 16 |
| Structure of the program | 2.8.1 | 16 |
| Support / Product support | 2.7 | 15 |
| T | | |
| Transceiver/Converter (T/C) | 2.5.1 | 12 |
| Troubleshooting guide | 9.2 | 102 |
| W | | |
| What is your goal? | 1 | 6 |
| Window "CURSOR" / Analyzer | 3.2.2 | 75 |
| Window "DATA" / Analyzer | 3.2.2 | 75 |
| Window for the display, defining the window for the display | 3.1.5 | 60 |
| Z | | |
| ZEROTRONIC- family | 2.1 | 7 |
| Zoom-Window / Analyzer | 3.2.2 | 75 |

Manual Measuring Software DYNAM

MANUAL A / General part

1. Overview

The WYLER DYNAM manual will help you starting the measuring software DYNAM and give you a detailed overview over the operating of the program.

The „**Manual**“ includes:

- Introduction with information concerning hard- and software
- Possible configuration with ZEROTRONIC sensors
- Installation of sensors and identification
- Detailed description of the software DYNAM with data structur and module information
- Example in five steps with information on the different elements of use
 - **Installation of the measuring commands for the measurement and the display of two sensors**
Goal of the example
Measurement of two sensors with differential measurement and display of the measured values on the computer monitor
 - **Installation of the module „ANALYZER“**
Goal of the example
Analysing the mesaured values in the ANALYZER
 - **Install filters for the display**
Goal of the example
Setting of filters
 - **Einrichtung Modul „DDE“; dynamischer Datenaustausch mit anderen Windows-Applikationen**
Goal of the example
Use of the function DDE. This means a displayed value is simultaneously exported to an EXCEL file
 - **Installation of the module "SENDER"; Export the date to a serial port**
Goal of the example
Use of the function SENDER. This means a displayed value is exported to the serial port

2. GENERAL

2.1. Introduction

The DYNAM software was developed for calculating and displaying static and dynamic inclinations and profiles under MICROSOFT WINDOWS. The **DYNAM** software is part of the components of the digitised "**ZEROTRONIC**" family developed by WYLER AG. Besides the higher accuracy and the dynamic information data available the system is fully digitised which allows the transmission of the signals over long distances without loss of accuracy. With the software DYNAM all the sensors and instruments of the ZEROTRONIC family can be operated.

The measuring principle of the ZEROTRONIC family is based on a changing of the capacity of a condenser built of two electrodes and a pendulum in form of a shield installed in between. The measured change of capacity is directly influenced by the change of the inclination of the pendulum. This capacity change is the primarily used signal for the angle to be measured. The measuring system is designed to be completely antimagnetic.

With the DYNAM software the data of the connected sensors can be sampled and computed and displayed in various kinds of forms or they can be transmitted. Every one of the connected sensors is a so-called "Sensor measuring channel" which has to be named and can be addressed correspondingly. Besides these channels so called "Mathematical channels" can be defined and need to be named also. Such Mathematical channels can be used to perform different operations, e.g. calculating the difference between two "Sensor measuring channels".

The data generated by measuring or by the mathematical procedure can be displayed in numerical or graphical form on the computer screen, sent to a connected printer, saved in files on hard disc or floppy discs or sent to a serial output port.

The software module ANALYZER allows to open the files with the saved data of measuring channels as well as the mathematical channels and to display the data again in numerical or graphical form on the screen.

All parameters necessary for a measuring task can be installed by the user.

2.2. Hardware Requirements

- Personal Computer or Laptop Intel 80'386 or higher (preferably with co-processor)
- Hard disk min. 50 MB (SW DYNAM requirements approx. 1MB)
- CD ROM
- Monitor VGA, or higher resolution
- Mouse
- Min. 1 free serial communication port (asynchrone, number depending on systems use))

2.3. Software requirements

- MICROSOFT WINDOWS Version 3.1; Win 95/98/NT/2000/XP or higher

2.4. Installation of the Software DYNAM / Adjustment of "DYNAM.INI"

The standard content of the CD shows under "Software" the following directories:

a. **Directory [DYNAM_0] with the file „dyn_f.exe“**

This software is not configured, it is a raw version for a procedure as described in the chapter 3 of this manual

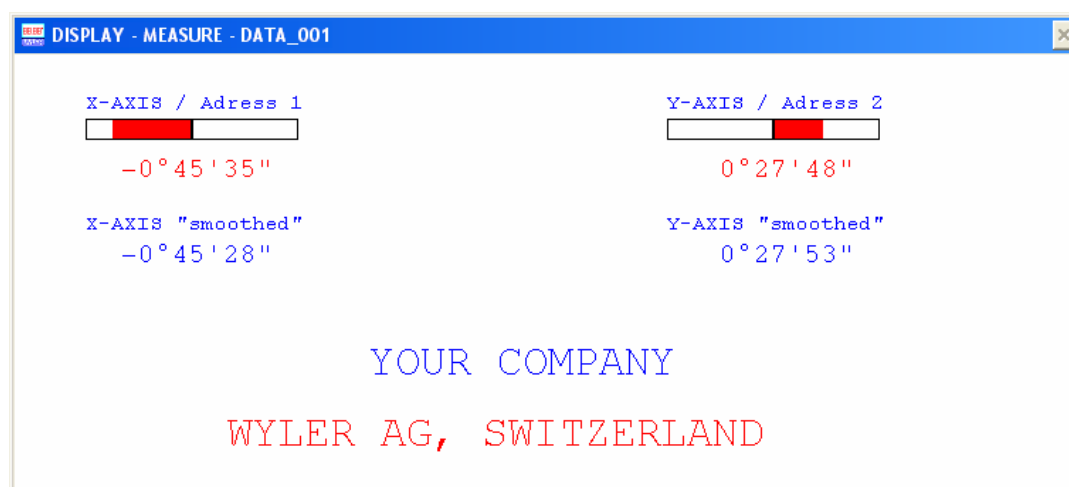
With a doubleclick the installation of the software will automatically be installed. The respective directory can be chosen individual.

b. **Directory [DYNAM_2] with the file „dyn2_f.exe“**

This is a preconfigured installation with two sensors connected to a PC via a Transceiver/Converter.

As shown in the picture below simple measurements, (individual and differential) can be done.

The sensors have the address 1 and 2 and the serial port is set to "COM 2, (See also the description below concerning the „DYNAM.INI" file.)



With a doubleclick the installation of the software will automatically be installed. The respective directory can be chosen individual.

c. **Customer specific configuration**

Depending on the customer's requirement additional directories with DYNAM configurations are included. The respective customer set-up are documented individually.

In case of difficulties please contact

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Adjustment of the serial port and the optimal (maximal) Baud rate

- The parameters set in the file "DYNAM.INI" must now be adjusted to the available processor type and to the respective serial (COM) port of your hardware.
- The DYNAM.INI file must be opened; best with the MS WINDOWS program NOTEPAD.EXE
- The following part should be changed accordingly in the file

File "DYNAM.INI":

```
[WyAngle.DLL]
;
; Definition: Name1={PortName},{Baudrate}
;           Name2={PortName},{Baudrate}
;           ...
;           NameN={PortName},{Baudrate}
;
PortA=COM2,19200 (must later be entered in the „Sensor measuring
                  commands
;

[WyData.DLL]
ProgVolumePath=PROG
DataVolumePath=DATA

[WyPanel.EXE]
Layout=115,16,3,1,0,3,2,1,14
Dlg6Pos=16,235
Dlg5Pos=8,127
Dlg1Pos=80,174
Dlg2Pos=256,128
Dlg3Pos=48,248
Dlg4Pos=16,124
Dlg7Pos=24,187
Dlg8Pos=176,104
Button1=ANALYSE,DATA_001,0,1,0,0,0
Button2=ZERO,NULLDATA,0,0,0,1,0
Button3=MEASURE,DATA_001,0,1,1,0,0

[WySender.EXE]
;
; Definition: Name1={PortName},{Baudrate}
;           Name2={PortName},{Baudrate}
;           ...
;           NameN={PortName},{Baudrate}
;
PortB=COM2,19200 must later be entered in the module „SENDER“

[WySample.EXE]
Dlg1Pos=416,429

[WyEdit.DLL]
Dlg1Pos=183,11
```

Remark: Maximum Baud rate with one COM-Port.

| Processor-Type | Maximum Baud rate | Maximum Sampling Rate | Sampling Time >using e.g. 1 Sensor | Sampling Time > using e.g. 5 Sensors |
|--------------------------|----------------------|-----------------------------|--|--|
| 486DX50/DX2-50 or higher | 57 600 | 30 | 0,04 | 0,20 |
| 486SX25 | 28 800 | 15 | 0,07 | 0,35 |
| 386SX20 | 19 200 | 10 | 0,10 | 0,50 |
| 286 | 9 600 | 5 | 0,20 | 1,00 |

Save the file DYNAM.INI.

Close the program Notepad.EXE.

2.5. Possible configuration with Zerotronic Sensors

2.5.1. Configuration with ZEROTRONIC-sensors in combination with the handheld terminal LEVELMETER 2000

The intelligent measuring and display unit **LEVELMETER 2000** was developed at WYLER AG together with the digital measuring system family ZEROTRONIC. Besides the very high precision the system is fully digitized which allows transmitting the data over long distances without loss of quality. The LEVELMETER 2000 allows connecting all the sensors of the ZEROTRONIC family.

The LEVELMETER 2000 may be used as a **handheld terminal** to display the actual measuring values or to use it as a **service instrument** in a network of sensors.

I) LEVELMETER 2000 used as display instrument for connected angular sensors of the ZEROTRONIC family.

As a handheld terminal for simple configurations the LEVELMETER 2000 can be used for

- Measuring and display unit for individual sensors or for
- differential display of two sensors
- master unit for calibrating sensors or used for
- addressing the individual sensors.

At the LEVELMETER the following parameters can be installed and changed:

- Measuring unit
- Address of sensors and port
- relative base length etc.

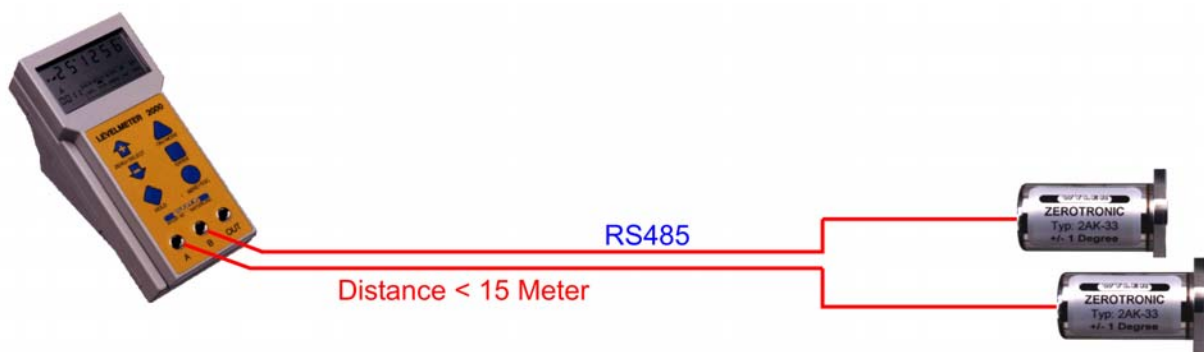
II) LEVELMETER 2000 as „Service-Instrument“ in a Network

In a network using a number of different sensors, connected to a Personal Computer or connected to a Laptop the LEVELMETER 2000 may also be used as a Service Instrument. The Levelmeter may be connected directly to any sensor or to any point in the network. Through the LEVELMETER 2000 different addresses may be called, changed, measurements applied, checked and sensors calibrated.

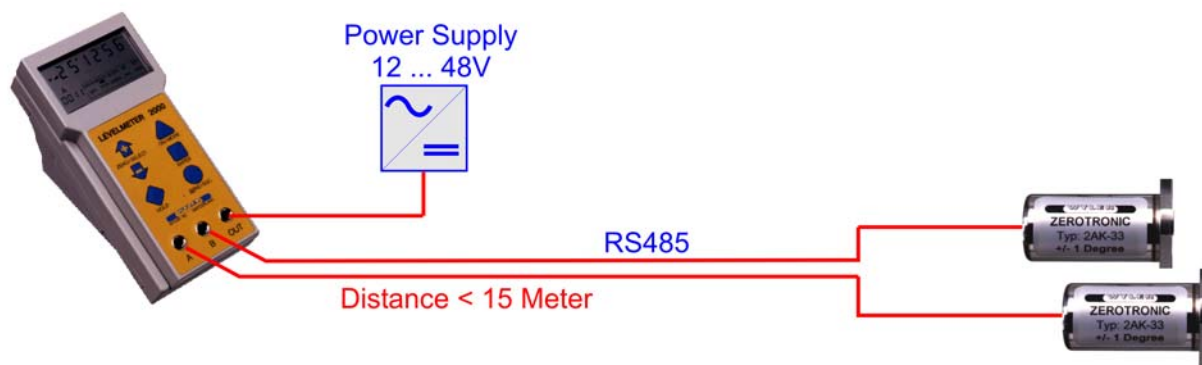
The LEVELMETER 2000 is within the ZEROTRONIC family fully compatible and interchangeable. All the sensor relevant data will remain stored in the sensor head, such as:

- calibration data
- sensor address
- zero point etc.

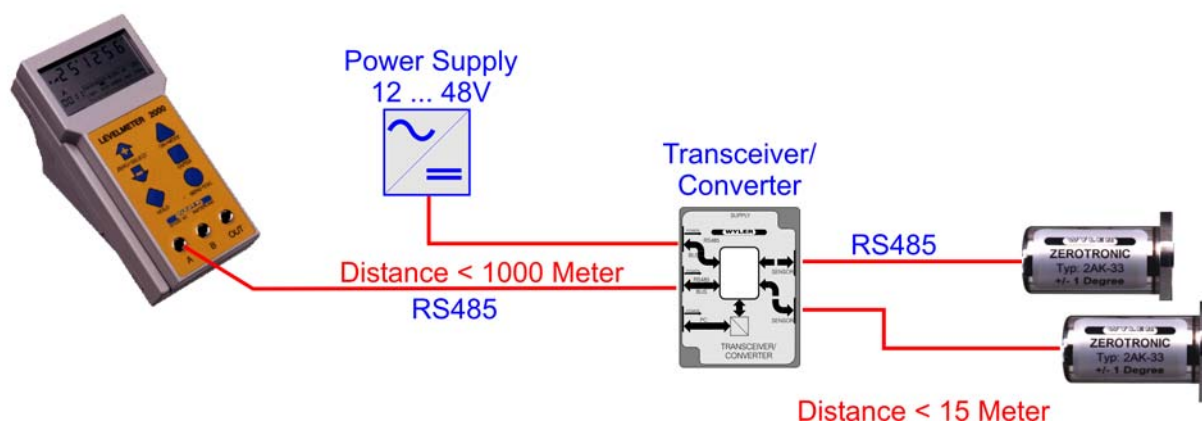
Through a serial RS 232 port it is possible to transmit the respective data to a printer, a PC/Laptop or any other compatible display unit and also to the WYLER flatness measuring software



ZEROTRONIC sensors directly connected to a LEVELMETER 2000

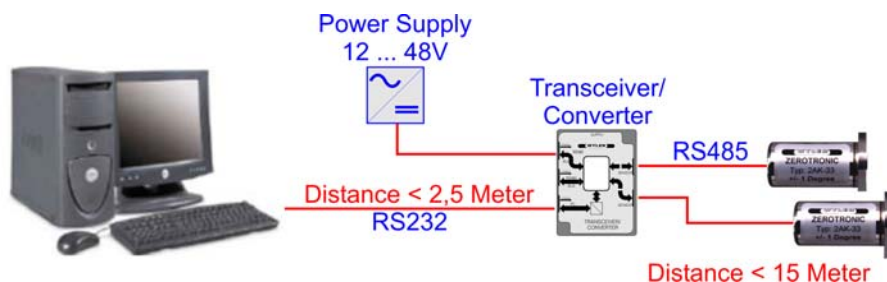


ZEROTRONIC sensors directly connected to a LEVELMETER 2000 with external power supply



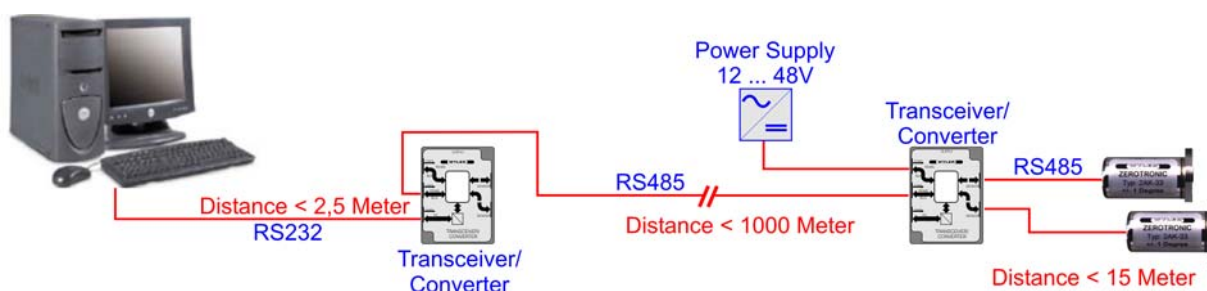
ZEROTRONIC sensors connected via a T/C (Transceiver/Converter) to a LEVELMETER 2000. External power supply through the T/C. Distance from sensors to Levelmeter 2000 is in this configuration possible up to 1000 m. By using additional T/C's it is possible to connect more sensors, however on the Levelmeter 2000 only the measured value of one sensor is possible.

2.5.2. Configuration with ZEROTRONIC-sensors in combination with the software DYNAM



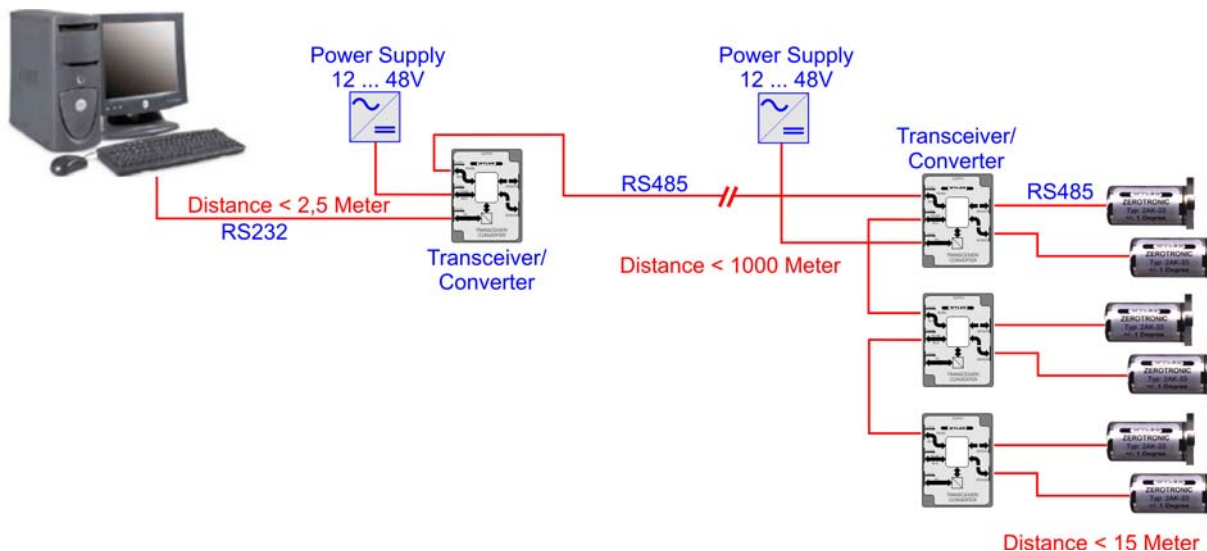
ZEROTRONIC sensors connected to a PC / Laptop via a Transceiver/Converter (T/C). The measured results can be analysed with the software DYNAM or LabVIEW. External power supply through the Transceiver/Converter (T/C)

With such a configuration using 31 T/C's ,up to 62 sensors may be connected



ZEROTRONIC sensors connected to a PC / Laptop via two Transceiver/Converters (T/C). The measured results can be analysed with the software DYNAM or LabVIEW. External power supply through the Transceiver/Converter (T/C), Bus line between the two T/C's is RS485.

With such a configuration using 31 T/C's ,up to 62 sensors may be connected



ZEROTRONIC sensors connected to a PC / Laptop via a number of Transceiver/Converters (T/C), the bus line between the T/C's being RS485. The measured results can be analysed with the software DYNAM or LabVIEW.

External power supply through the Transceiver/Converter (T/C), Bus line between the T/C's is RS485. With such a configuration using 31 T/C's ,up to 62 sensors may be connected

2.6. Installation of the Sensors / Addressing the sensors

2.6.1. Mounting of the sensors

When mounting the sensors it is absolutely important to have flat, clean surface. The sensors are preferably fastened with a torque screw driver (80 Ncm)

2.6.2. Mounting horizontally:



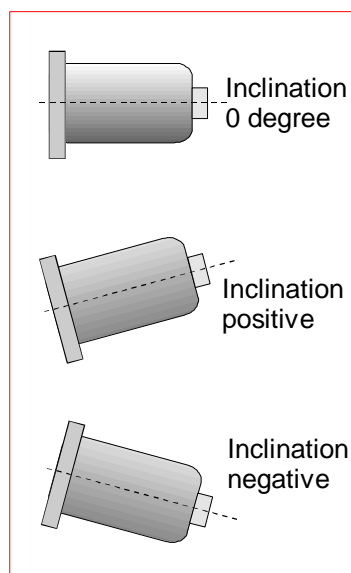
The sensors are to be mounted in such a way that the code on the base is readable. The code has the following meaning:

| | |
|--------|------------------|
| XA-XXX | 1 degree Sensor |
| XB-XXX | 5 degree Sensor |
| XC-XXX | 10 degree Sensor |
| XD-XXX | 30 degree Sensor |
| XE-XXX | 60 degree Sensor |

The letters in the code give some hint to the measuring range. The rest is identification of the sensors.

2.6.3. Mounting in view of connector

In defining the inclination of the sensor the following rule is applied: (View on the sensor when connector is at the right hand side)



2.7. Product support

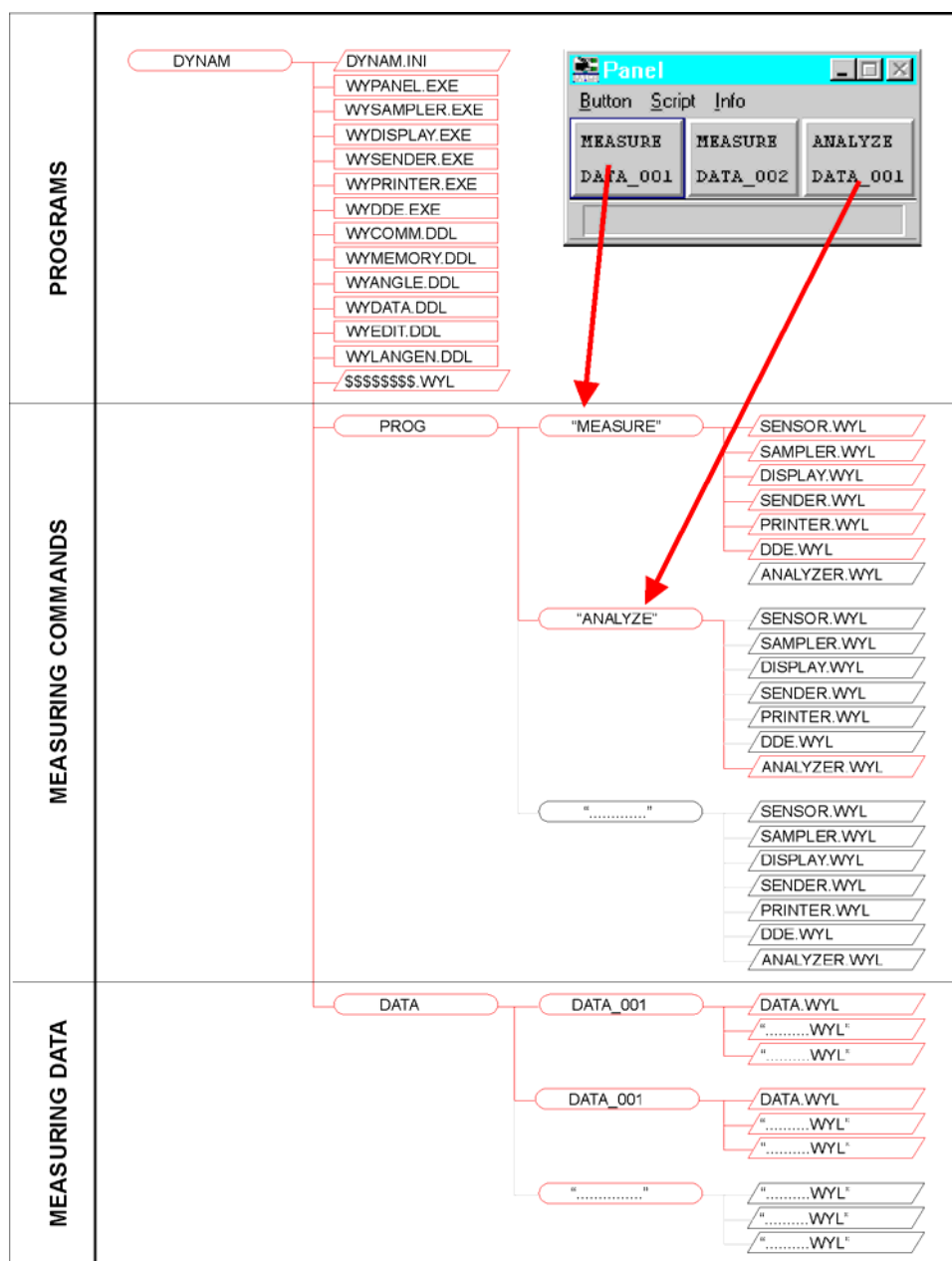
| | |
|-----------|--|
| Remarks: | In case of difficulties when installing the SW DYNAM please contact your local dealer or contact directly WYLER AG in Switzerland: |
| Telephone | 0041 (0) 52 233'66'66 |
| Telefax | 0041 (0) 52 233'20'53 |

2.8. Description of the Software DYNAM

2.8.1. Structure of the program

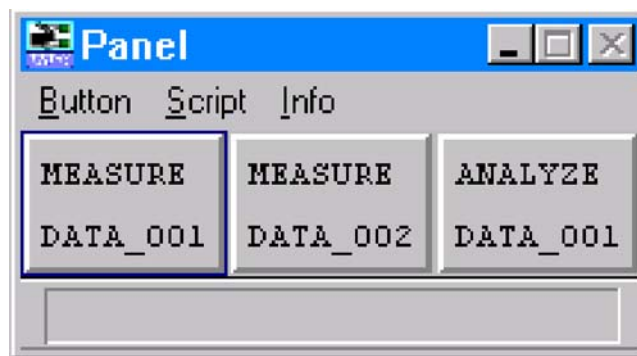
| Windows-Program | Function | Start of the Program | Control of the Program |
|-----------------|----------|----------------------|--------------------------|
| WyPanel.EXE | PANEL | User | User |
| WySample.EXE | SAMPLER | PANEL | SENSOR.WYL + SAMPLER.WYL |
| WyDispla.EXE | DISPLAY | PANEL | DISPLAY.WYL |
| WySender.EXE | SENDER | PANEL | SENDER.WYL |
| WyPrinte.EXE | PRINTER | PANEL | PRINTER.WYL |
| WyDDE.EXE | DDE | PANEL | DDE.WYL |
| WyAnalyz.EXE | ANALYZER | PANEL | ANALYZER.WYL |

2.8.2. Structure of the data



2.8.3. PANEL

2.8.3.1. Description of the PANEL



Sample of a panel with three buttons

2.8.3.2. Overview of the menu

| Button | |
|---------------------|---|
| Start / Stop | Start: The selected button is "pressed". The measuring task according to the Program Volume will be started now. Stop: The active button is "released". The measuring task according to the Program Volume will be stopped now. |
| Create | Generating a button. A Program Volume and a data volume must be named. |
| Delete | Deleting a button. The job description files in the Program Volume as well as the files with measuring data remain available. |
| Options | The following options may be installed with all the buttons: DATA VOLUME QUERY When starting a measurement the file name of the Data Volume may be changed. DELETE DATA QUERY is the question if the files in the Data Volumes may be deleted when starting the new measurement. END OF MEASUREMENT SIGNAL When an automatic measurement is completed an acoustic signal will be available and a dialogue box appears on the screen. |
| Copy Vol | All user files in the Program Volume and all files with measuring data in the Data Volume behind the respective button will be copied |
| Clear Vol | All user files in the Program Volume and all files with measuring data in the Data Volume behind the respective button will be deleted. The button remains available. |
| Exit | Ending the program DYNAM. |

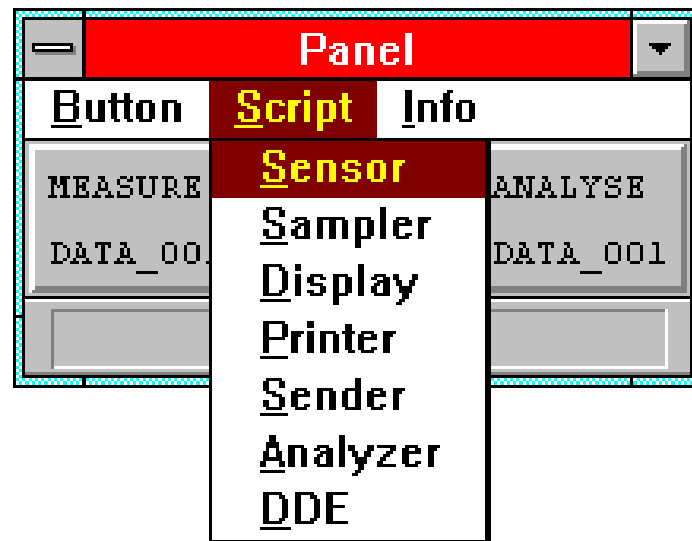
| Script | |
|-----------------|---|
| Sensor | Edit the Sensor parameters selected by the pressed button |
| Sampler | Edit the Sampler parameters selected by the pressed button |
| Display | Edit the Display parameters selected by the pressed button |
| Sender | Edit the Sender parameters selected by the pressed button |
| Printer | Edit the Printer parameters selected by the pressed button |
| DDE | Edit the DDE parameters selected by the pressed button |
| Analyzer | Edit the Analyzer parameters selected by the pressed button |

| Info | |
|--------------|--|
| About | Information about the installed version of DYNAM |

2.8.3.3. Review of the measuring command files

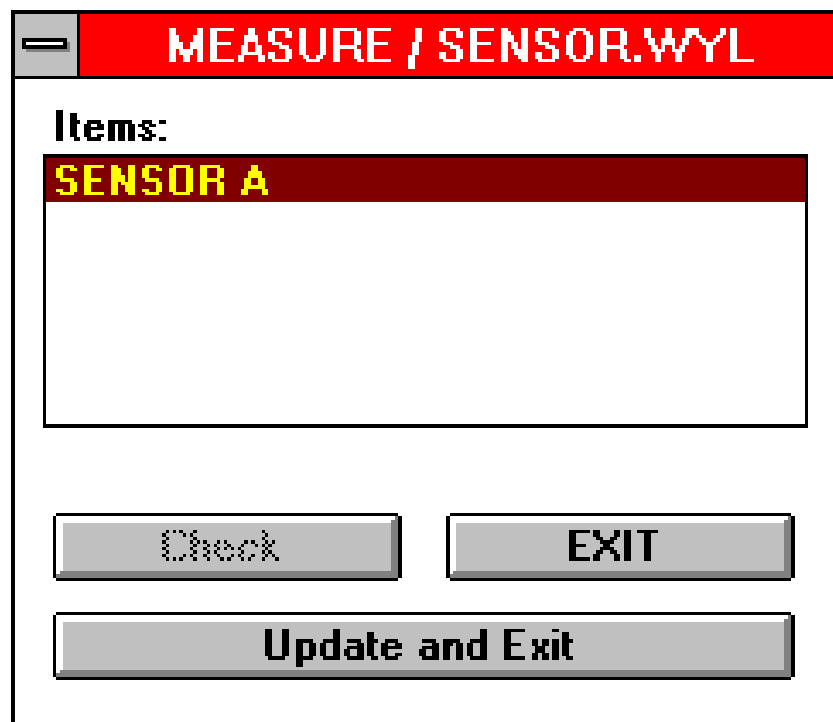
The measuring order files may be reviewed and altered by using the menu „SCRIPT“ of a preselected button.
(Program-Volume)

Select in the menu „Script“ the required measuring command file.



The following dialogue box appears:

in our example it is the measuring command file „SENSOR-WYL“ of the program-volume „MEASURE“.



Below „Items“ the measuring commands of the respective measuring command files will be displayed.

The jobs described under the point's 2.8.3.3.1 to 2.8.3.3.5 can now be done.

The changes in the measuring command files can be saved with „Update and Exit“.

By choosing "EXIT" only the old instructions remain unchanged.

2.8.3.3.1 Review of the measuring commands

With double click to the respective measuring command a new window with the details of the selected parameters appears.

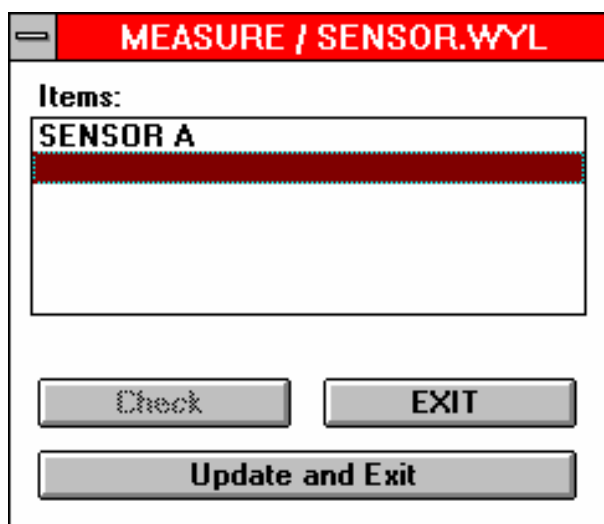
| SENSOR A - MEASURE / SENSOR.WYL / Profile | |
|--|--|
| Sensor Base Length <input type="text"/> | Encoder X-Increment <input type="text"/> Y-Increment <input type="text"/> Z-Increment <input type="text"/> |
| Communication Port <input type="text" value="PortA"/> RS485 Device Address <input type="text" value="50"/> RS485 SubAddress <input type="text" value="1"/> | Position X-Axis <input type="text"/> Y-Axis <input type="text"/> Z-Axis <input type="text"/> |
| Alias Sensors: <input type="text"/> <input type="text"/> | Direction XZ-Y-Offset <input type="text"/> XY-Z-Offset <input type="text"/> |
| <input checked="" type="checkbox"/> Enable | |

2.8.3.3.2 Changing the measuring commands

With double click to the respective measuring command a new window with the details of the selected parameters appears. In this window the required changes can be done.

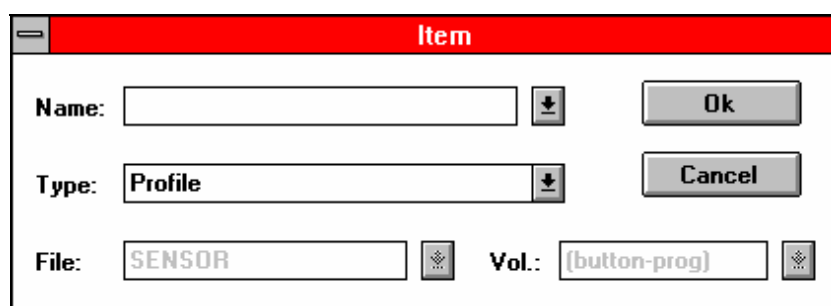
| SENSOR A - MEASURE / SENSOR.WYL / Profile | |
|--|--|
| Sensor Base Length <input type="text"/> | Encoder X-Increment <input type="text"/> Y-Increment <input type="text"/> Z-Increment <input type="text"/> |
| Communication Port <input type="text" value="PortA"/> RS485 Device Address <input type="text" value="45"/> RS485 SubAddress <input type="text" value="1"/> | Position X-Axis <input type="text"/> Y-Axis <input type="text"/> Z-Axis <input type="text"/> |
| Alias Sensors: <input type="text"/> <input type="text"/> | Direction XZ-Y-Offset <input type="text"/> XY-Z-Offset <input type="text"/> |
| <input checked="" type="checkbox"/> Enable | |

2.8.3.3.3 Adding measuring commands



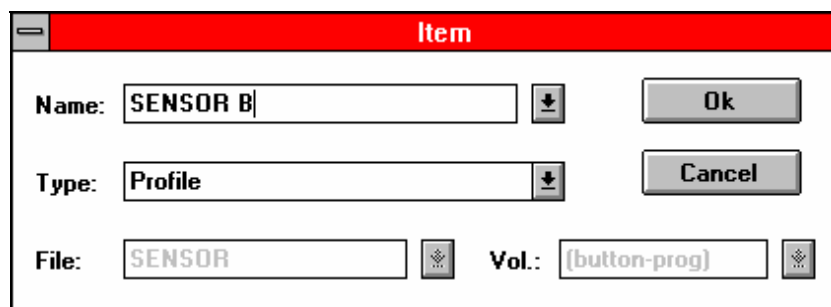
The dialog box has a red title bar with the text "MEASURE / SENSOR.WYL". Below the title bar, there is a section labeled "Items:" containing a list box. The list box has one item, "SENSOR A", which is highlighted with a red background. Below the list box, there are three buttons: "Check", "EXIT", and "Update and Exit".

Double click to the first empty bar in the list of measuring commands will open the dialogue box ITEM:



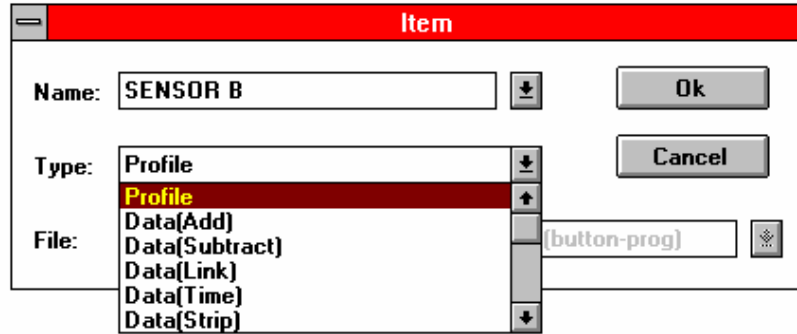
The dialog box has a red title bar with the text "Item". Below the title bar, there are three input fields: "Name:", "Type:", and "File:". The "Name:" field is empty. The "Type:" field has the value "Profile". The "File:" field has the value "SENSOR". To the right of the "File:" field, there is a "Vol.:" field with the value "[button-prog]". There are two buttons: "Ok" and "Cancel".

In the field "Name" the defined name of the new measuring command is to be entered. Maximum length is 16 characters. The name must be different from others. Capital letters will be recognized.

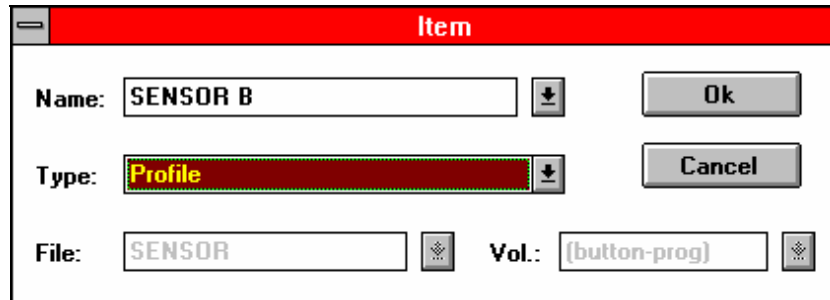


The dialog box has a red title bar with the text "Item". Below the title bar, there are three input fields: "Name:", "Type:", and "File:". The "Name:" field now contains the text "SENSOR B". The "Type:" field still has the value "Profile". The "File:" field still has the value "SENSOR". To the right of the "File:" field, there is a "Vol.:" field with the value "[button-prog]". There are two buttons: "Ok" and "Cancel".

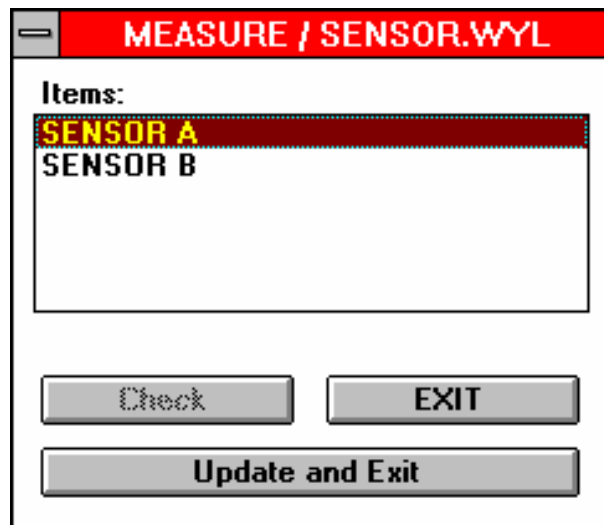
In the filed "Type" the type of the new measuring command is to be entered.



In our example the name is "SENSOR B" and the type is "Profile".



Chose OK to finish the entering and the new measuring command appears in the list of measuring commands.



The measuring command may now be defined with the necessary parameters as described in point 2.8.3.3.2.

2.8.3.3.4 Deleting measuring commands

Select the measuring command to be deleted by simple mouse click and press the <SPACE> bar.

2.8.3.3.5 Rename measuring commands

A measuring command cannot be renamed unless deleted and added from new as described above.

2.8.4. SENSOR commands

These commands will be saved in the file 'SENSOR.WYL'

2.8.4.1. Sensor command „Control“

General command is in 'SENSOR.WYL'

CONTROL - MEASURE / SENSOR.WYL / Control

☒ Enable

| | |
|--------|---|
| Enable | If not activated, all sensor commands are disabled. |
|--------|---|

2.8.4.2. Sensor command „Profile“

Defining the sensors

S1 - MEASURE / SENSOR.WYL / Profile

Sensor
Base Length

Communication
Port
RS485 Device Address
RS485 SubAddress

Alias Sensors:

☒ **Enable**

Encoder
X-Increment
Y-Increment
Z-Increment

Position
X-Axis
Y-Axis
Z-Axis

Direction
XZ-Y-Offset
XY-Z-Offset

| | |
|------------------------------|--|
| Base Length | Length of the used measuring base |
| Communication | |
| Port | Name of the serial port as defined in DYNAM.INI e.g. 'PortA' |
| | <pre> [WyAngle.DLL] ; ; Definition: Name1={PortName},{Baud rate} ; Name2={PortName},{Baud rate} ; . ; NameN={PortName},{Baud rate} ; PortA=COM2,19200 </pre> |
| RS 485 Device Address | RS485 address of the connected sensor |
| RS 485 SubAddress | 1 |
| Alias Sensors | List of sensors mounted on the same base |
| Encoder | incremental encoder |
| X-Increment | Change of position in X-direction per alteration of the phase (in m) |
| Y-Increment | Change of position in Y-direction per alteration of the phase (in m) |
| Z-Increment | Change of position in Z-direction per alteration of the phase (in m) |
| Position | Position of the sensor relative to a reference position |
| X-Axis | Distance in X direction (in m) |
| Y-Axis | Distance in Y direction (in m) |
| Z-Axis | Distance in Z direction (in m) |
| Direction | Direction of a sensor relative to a reference |
| XZ-Y-Offset | Azimuth of the sensors (ddd°mm'ss") |
| XY-Z-Offset | Elevation of the sensors (ddd°mm'ss") |
| Enable | If not activated, all commands are disabled. |

2.8.5. SAMPLER commands

These commands are defined by the program SAMPLER, the data is saved in the file 'SAMPLER.WYL' and the collected measuring values are continuously saved on the hard disk.

2.8.5.1. Sampler command „Control“

General command is in 'SAMPLER.WYL'

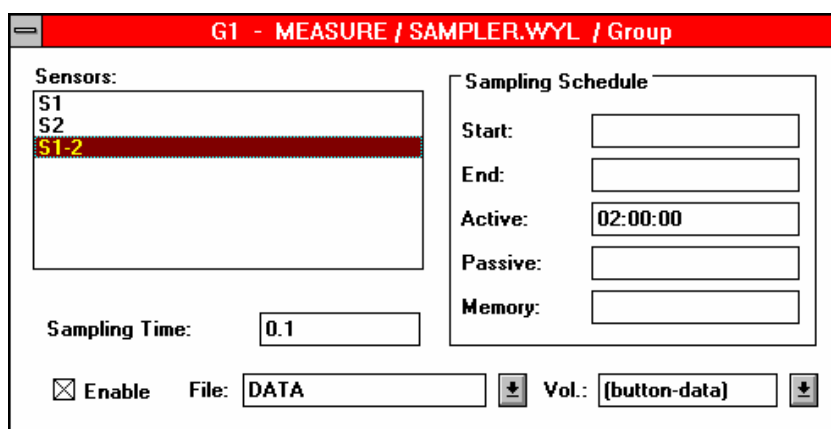


Enable

If not activated, all commands are disabled.

2.8.5.2. Sampler command „Group“

Collecting and saving the measuring values



| | |
|--------------------------|--|
| Sensors | Measuring channels |
| Sampling Time | Measuring interval (ddd hh:mm:ss.ssssss) |
| File | File name on which the data of the measuring channels defined under 'Sensors' is saved. |
| Volume | Data volume on which the file is saved. If (button data) is selected the data volume defined in the button of the panel will be chosen. |
| Sampling-Schedule | |
| Start | Start of the measurement (dd.mm.yy hh:mm:ss.ssssss) |
| End | End of the measurement (dd.mm.yy hh:mm:ss.ssssss) |
| Active | Active measuring time (ddd hh:mm:ss.ssssss); can also be defined within a preset time window (start/end) |
| Passive | Passive measuring time (dd.mm.yy hh:mm:ss.ssssss); can also be defined within a pre-set time window (start/end) |
| Memory | Period of time during which the data will be continuously saved on the hard disk file. After the pre-set time span the file will be covered with new data. (ddd hh:mm:ss.ssssss) |
| Enable | If not activated, all commands are disabled. |

2.8.5.3. Sampler command „Calibration“

Calibrating the sensors

CALIB 1 - CALIB / SAMPLER.WYL / Calibration

Sensors:

SENSOR A

SENSOR B

Range

Unit Arc deg:min:sec

First Angle -12°00'00"

Increment 1°00'00"

Number of References 25

Temperatur
Soll:

Set
Nr.: 0
☒ Single
☐ Multi

Index
Control
Sense

☐ Enable

| | |
|-----------------------------|---|
| Sensors | All measuring channels to be calibrated |
| Range | |
| Unit | Measuring unit for the calibration |
| First Angle | First angular value to be calibrated |
| Increment | Calibration increment (step) |
| Number of References | Number of calibrating steps |
| Temperature | |
| Temperature | Measuring channel of a sensor who delivers the actual temperature |
| Soll (= temp. to be) | Entering the calibration temperature |
| Set | |
| Nr. | Number of the calibration curve (possible is 1 to 5) |
| Single/Multi | If Single is activated one calibration curve only is possible, all others will be deleted. If Multi is activated, the old curve with the same identification number will be deleted and all curves with other numbers will remain in place. |
| Index | Used for automatic calibration, (WYLER test hardware required) |
| Control | Measuring channel to control the dividing head of the calibration set up |
| Sense | Measuring channel to measure the angle of the calibration set up |
| Enable | If not activated, all commands are disabled. |

2.8.6. DISPLAY commands

This command allows the continuous display of the measuring values collected by the program SAMPLER and display the values on the screen in numerical and graphical form. The data is saved in the file 'DISPLAY.WYL'.

2.8.6.1. Display command „Control“

General command 'DISPLAY.WYL'

| | |
|-----------------|--|
| Location | Position of the DISPLAY-window on the monitor. |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |
| Enable | If not activated, all commands are disabled. |

2.8.6.2. Display command „Number“

Numerical display of values in the DISPLAY window.

| | |
|--------------------|---|
| Data | |
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Color | Color of the displayed value |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the displayed value within the DISPLAY window |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |
| Update Time | Update time of the displayed value (ddd hh:mm:ss.ssssss) |
| Enable | If not activated, all commands are disabled. |

2.8.6.3. Display command „Bar“

Display of values as a bar in the DISPLAY-window.

B1 S2 - MEASURE / DISPLAY.WYL / Bar

Data

S2

Type

Angle

↓

Unit

Arc deg:min:sec

↓

Scale

Max

+10°00'00"

Min

-10°00'00"

Update Time:

0.3

☒ Enable

Location

Top

10

Bottom

30

Left

10

Right

400

Color

Red

255

Green

0

Blue

0

Orientation

☒ X-axis

☐ Y-axis

| Data | |
|-------------|---|
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Scale | |
| Max. | Maximum bar size (Unit) |
| Min | Minimum bar size (Unit) |
| Location | Position of the displayed bar within the DISPLAY window |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |
| Color | Color of the displayed bar |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Orientation | |
| X-Axis | Activated: Horizontal bar |
| Y-Axis | Activated: Vertical bar |
| Enable | If not activated, all commands are disabled. |

2.8.6.4. Display-command „Text“

Display of text in the DISPLAY-window

T1 - MEASURE / DISPLAY.WYL / Text

Text

Display-Text

Color

Red

0

Green

0

Blue

0

Location

Top

40

Bottom

60

Left

20

Right

120

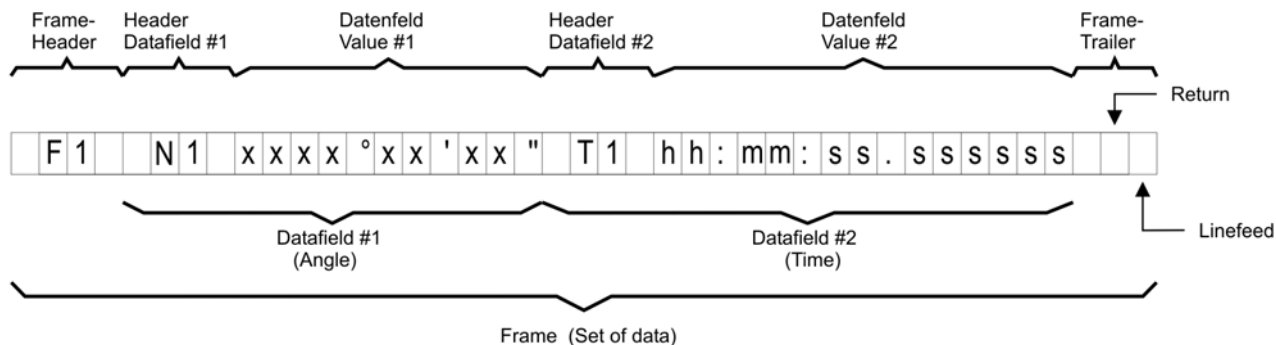
☒ **Enable**

| | |
|-----------------|--|
| Text | Text (max. 16 Characters) |
| Color | Color of the displayed text |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the displayed text within the DISPLAY window |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |
| Enable | If not activated, all commands are disabled. |

2.8.7. SENDER-command

This command allows to send the measuring values collected by the program SAMPLER to the serial port in numerical form. The data is saved in the file 'SENDER.WYL'.

Structure of a "Frames" for the module "SENDER"



2.8.7.1. Sender command „Control“

General command 'SENDER.WYL'

CONTROL - MEASURE / SENDER.WYL / Control

☒ **Enable**

Enable

If not activated, all commands are disabled.

2.8.7.2. Sender command „Number“

Definition of measuring values as number within a pre-set data frame

F1 N1 S2 Angle - MEASURE / SENDER.WYL / Number

Data

S2

Type Angle

Unit g. xxxxxxxx

☒ **Enable**

Frame

F1

Header

Trailer ' '

Position 1 within frame

| Data | |
|-----------------|---|
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Frame | |
| Header | Character to be set in front of the number (0x00 .. 0x1F, ' ' .. '~') |
| Trailer | Character to be set at the end of the number (0x00 .. 0x1F, ' ' .. '~') |
| Position | Position of the data string within the data frame |
| Enable | If not activated, all commands are disabled. |

Page 29 of 104 Pages

2.8.7.3. Sender command „Frame“

Sending of a data frame through the serial port

F1 - MEASURE / SENDER.WYL / Frame

Port / File

Header

Update Time:

Trailer

☒ **Enable**

| | |
|--------------------|---|
| Port/file | <p>Name of the port, as defined in DYNAM.INI</p> <p>e.g. 'PortB'</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <pre>[WySender.EXE] ; ; Definition: Name1={PortName},{Baud rate} ; Name2={PortName},{Baud rate} ; . ; NameN={PortName},{Baud rate} ; ; PortB=COM1,9600</pre> </div> <p>If the name is not defined in the DYNAM.INI file, then the data will be written into a "NAME".TXT file in the respective Data volume.</p> |
| Update Time | Sending interval (ddd hh:mm:ss.ssssss) |
| Header | Character in front of the number (0x00 .. 0x1F, ' ' .. '~') |
| Trailer | Character at the end of the number (0x00 .. 0x1F, ' ' .. '~') |
| Enable | If not activated, all commands are disabled. |

2.8.8. PRINTER commands

This command allows sending the measuring values collected by the program SAMPLER to a printer in numerical and graphical form. The data is saved in the file 'PRINTER.WYL'.

2.8.8.1. Printer-Command „Control“

General command 'PRINTER.WYL'

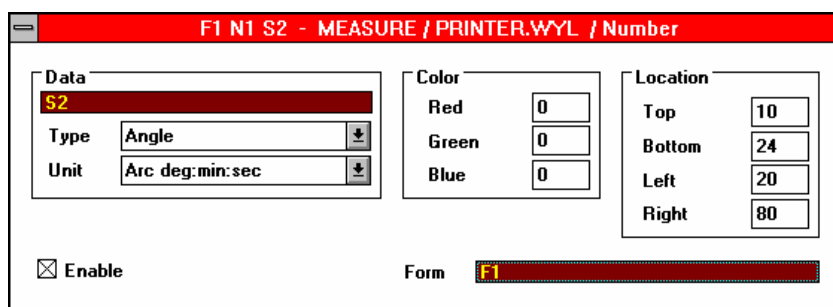
CONTROL - MEASURE / PRINTER.WYL / Control

☒ **Enable**

| | |
|---------------|--|
| Enable | If not activated, all commands are disabled. |
|---------------|--|

2.8.8.2. Printer command „Number“

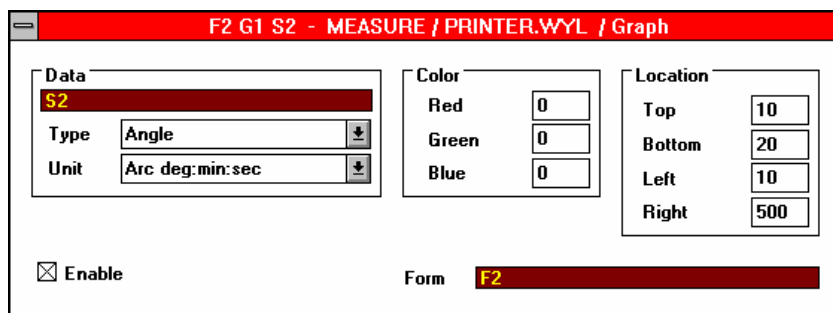
Positioning the measured value as number on a defined print out form.



| | | |
|-----------------|---------------|--|
| Data | | |
| | Data | Measuring channel |
| | Type | Measuring value |
| | Unit | Measuring unit |
| Form | | Printout form |
| Color | | Color of the value |
| | Red | RGB Red portion (0..255) |
| | Green | RGB Green portion (0..255) |
| | Blue | RGB Blue portion (0..255) |
| Location | | Position of the displayed number |
| | Top | Upper distance (in Pica) |
| | Bottom | Lower distance (in Pica) |
| | Left | Distance from left (in Pica) |
| | Right | Distance from right (in Pica) |
| Enable | | If not activated, all commands are disabled. |

2.8.8.3. Printer command „Graph“

Positioning the measured value as graph on a defined print out form.



| | | |
|-----------------|---------------|--|
| Data | | |
| | Data | Measuring channel |
| | Type | Measuring value |
| | Unit | Measuring unit |
| Form | | Printout form |
| Color | | Color of the graph |
| | Red | RGB Red portion (0..255) |
| | Green | RGB Green portion (0..255) |
| | Blue | RGB Blue portion (0..255) |
| Location | | Position of the displayed graph |
| | Top | Upper distance (in Pica) |
| | Bottom | Lower distance (in Pica) |
| | Left | Distance from left (in Pica) |
| | Right | Distance from right (in Pica) |
| Enable | | If not activated, all commands are disabled. |

2.8.8.4. Printer-Command „Text“

Positioning of a text on a print out form

F1 T1 - MEASURE / PRINTER.WYL / Text

Text

Printer-Text

Color

Red

0

Green

0

Blue

0

Location

Top

200

Bottom

220

Left

10

Right

490

☒ **Enable**

Form F1

| | |
|-----------------|--|
| Text | Text (max. 16 characters) |
| Form | Printout form |
| Color | Color of the text |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the text on the print out |
| Top | Upper distance (in Pica) |
| Bottom | Lower distance (in Pica) |
| Left | Distance from left (in Pica) |
| Right | Distance from right (in Pica) |
| Enable | If not activated, all commands are disabled. |

2.8.8.5. Printer command „Bar“

Positioning the measured value as bar on a defined print out form.

F2 B1 S1 - MEASURE / PRINTER.WYL / Bar

Data

S1

Type

Angle

↓

Unit

xxxxxxxxx um/m

↓

Scale

Max

2000 um/m

Min

-2000 um/m

Color

Red

0

Green

255

Blue

0

Orientation

☐ X-axis

☒ Y-axis

Location

Top

10

Bottom

100

Left

10

Right

30

☒ Enable

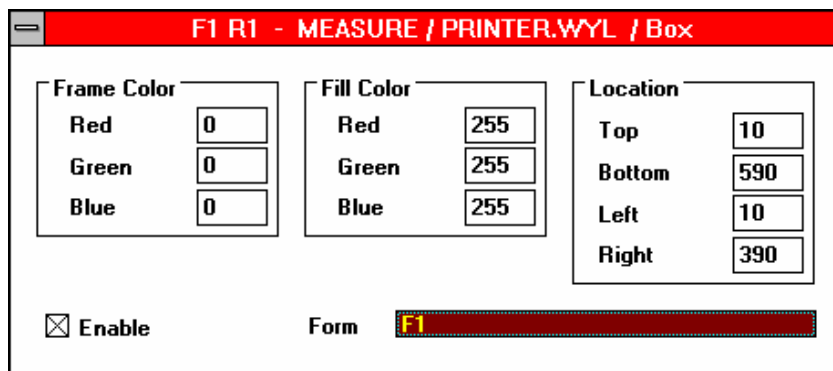
Form

F2

| Data | |
|--------------------|--|
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Form | Printout form |
| Scale | |
| Max. | Maximum bar size (Unit) |
| Min | Minimum bar size (Unit) |
| Color | Color of the printed bar |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Orientation | |
| x-axis | Activated: Horizontal bar |
| Y-Axis | Activated: Vertical bar |
| Location | Position of the bar within the print out |
| Top | Upper distance (in Pica) |
| Bottom | Lower distance (in Pica) |
| Left | Distance from left (in Pica) |
| Right | Distance from right (in Pica) |
| Enable | If not activated, all commands are disabled. |

2.8.8.6. Printer command „Box“

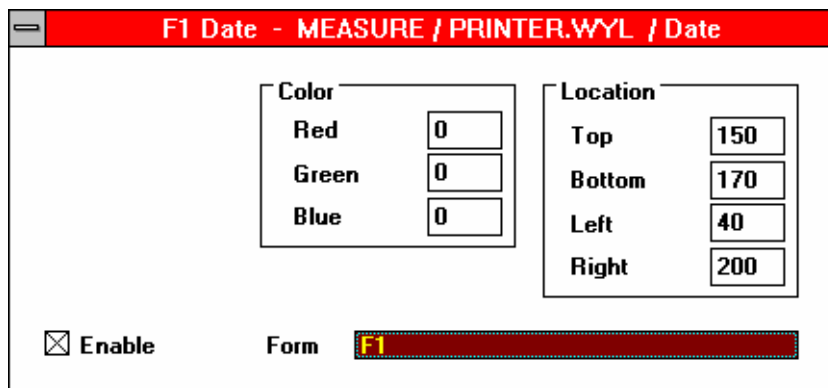
Positioning of a frame on a defined print out



| | |
|--------------------|--|
| Form | Printout form |
| Frame Color | Frame Color |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Fill Color | Fill Color |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the frame within the print out |
| Top | Upper distance (in Pica) |
| Bottom | Lower distance (in Pica) |
| Left | Distance from left (in Pica) |
| Right | Distance from right (in Pica) |
| Enable | If not activated, all commands are disabled. |

2.8.8.7. Printer command „Date“

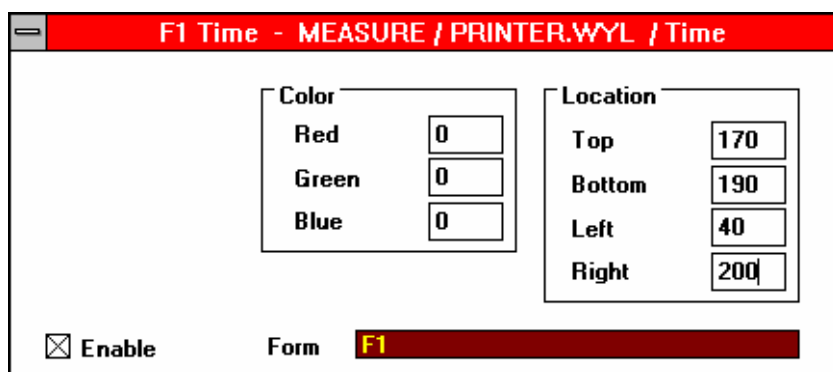
Positioning the actual date on a defined print out form.



| | |
|-----------------|--|
| Form | Printout form |
| Color | Color of the printed date |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the date within the print out |
| Top | Upper distance (in Pica) |
| Bottom | Lower distance (in Pica) |
| Left | Distance from left (in Pica) |
| Right | Distance from right (in Pica) |
| Enable | If not activated, all commands are disabled. |

2.8.8.8. Printer command „Time“

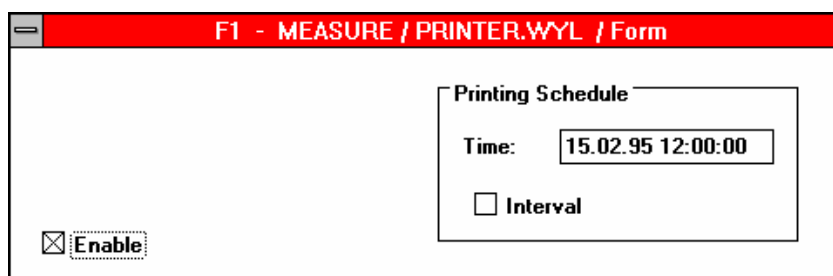
Positioning the actual time on a defined print out form.



| | |
|-----------------|--|
| Form | Printout form |
| Color | Color of the printed time |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the time within the print out |
| Top | Upper distance (in Pica) |
| Bottom | Lower distance (in Pica) |
| Left | Distance from left (in Pica) |
| Right | Distance from right (in Pica) |
| Enable | If not activated, all commands are disabled. |

2.5.8.9. Printer command „Form“

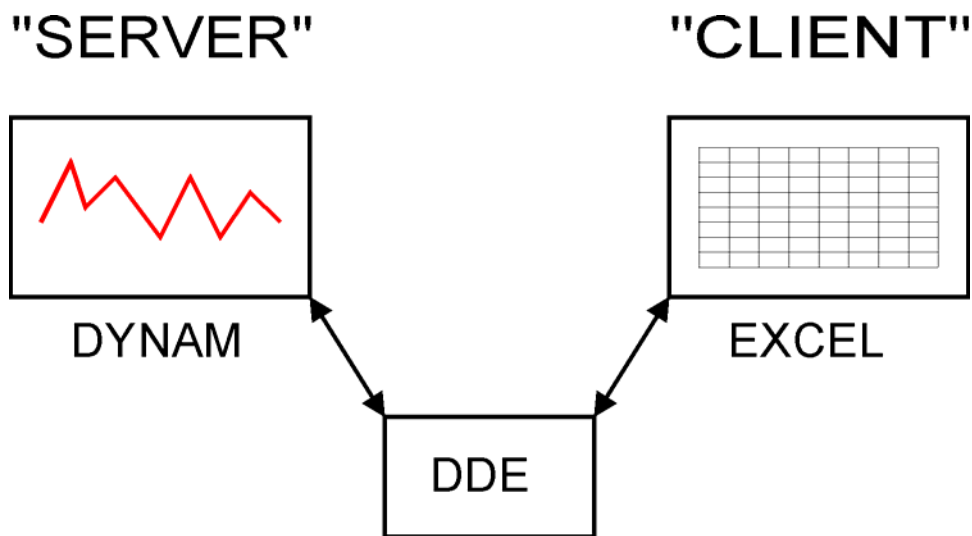
Printing a form



| | |
|--------------------------|--|
| Printing Schedule | |
| Time | Printing time (dd.m.yy hh:mm:ss.ssssss) or printing interval (ddd hh:mm:ss.ssssss) |
| Interval | Active: Printing interval Passive: Printing time |
| Enable | If not activated, all commands are disabled. |

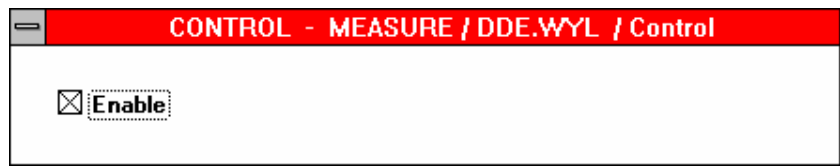
2.8.9. DDE command

This command allows sending the measuring values collected by the program SAMPLER as DDE server to another application (DDE client) in numerical form.



2.8.9.1. DDE-command „Control“

General command 'DDE.WYL'



| | |
|---------------|--|
| Enable | If not activated, all commands are disabled. |
|---------------|--|

2.8.9.2. DDE command „Number“

Definition of measuring values as number

N1 S2 Angle - MEASURE / DDE.WYL / Number

Data

S2

Type Angle ↓

Unit r.rrrrrrrr ↓

Server

Service Dynam

Topic Data

Item ANGLE_S2

☒ Enable

Update Time: 00:01:00

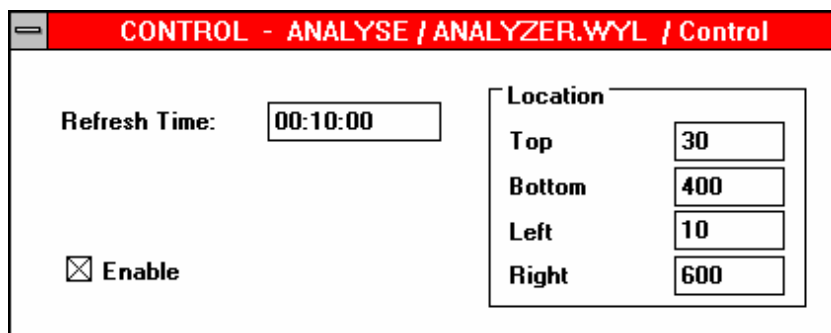
| Data | |
|--------------------|---|
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Server | |
| Service | Identification of the Client (pre-set) |
| Topic | Identification of the Client (pre-set) |
| Item | Identification of the Client (max. 16 Characters, no empty spaces, no special characters (except __,&,%,# etc.) |
| Update Time | Interval of update time (ddd hh:mm:ss.ssssss) |
| Enable | If not activated, all commands are disabled. |

2.8.10. ANALYZER commands

This command allows the display of the measuring values collected by the program SAMPLER and display the values on the screen in numerical and graphical form. The data is saved in the file 'ANALYZER.WYL' and may be displayed at any later time.

2.8.10.1. Analyzer command „Control“

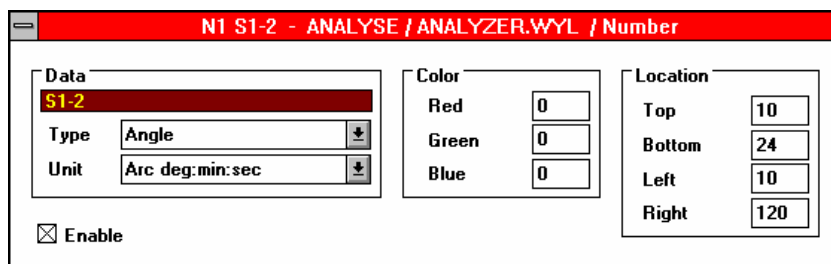
General command 'ANALYZER.WYL'



| | |
|---------------------|---|
| Refresh Time | Display refreshing interval (ddd hh:mm:ss.ssssss) |
| Location | Position of the ANALYZER window on the monitor |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |
| Enable | If not activated, all commands are disabled. |

2.5.10.2. Analyzer command „Number“

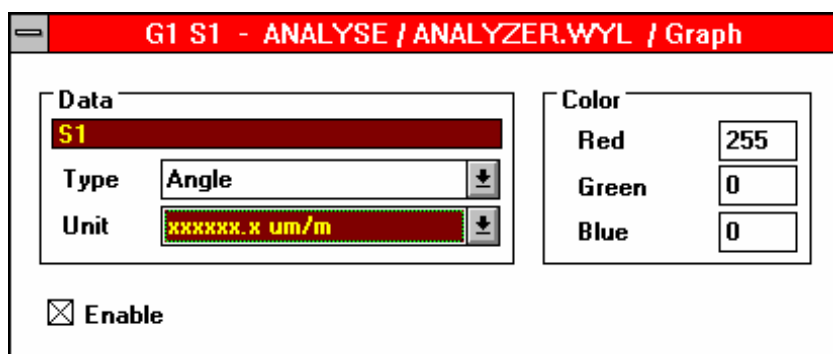
Numerical display of values in the ANALYZER window.



| | |
|-----------------|--|
| Data | |
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Color | Color of the displayed value |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the displayed value within the ANALYZER window |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |
| Enable | Update time of the displayed value (ddd hh:mm:ss.ssssss) |

2.8.10.3. Analyzer command „Graph“

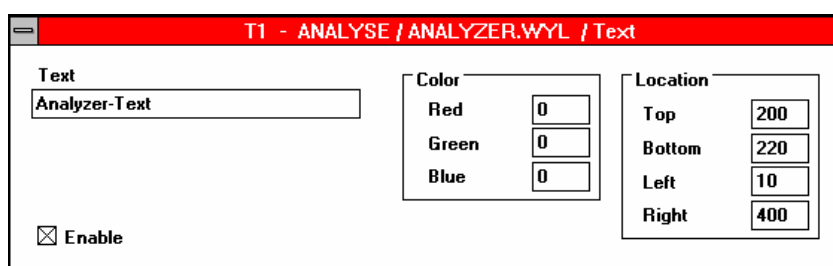
Display of values as curves in the ANALYZER window



| | |
|--------------|----------------------------|
| Data | |
| Data | Measuring channel |
| Type | Measuring value |
| Unit | Measuring unit |
| Color | Color of the curve |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |

2.8.10.4. Analyzer command „Text“

Display of text in the ANALYZER window



| | |
|-----------------|---|
| Text | Text (max. 16 Characters) |
| Color | Color of the displayed text |
| Red | RGB Red portion (0..255) |
| Green | RGB Green portion (0..255) |
| Blue | RGB Blue portion (0..255) |
| Location | Position of the displayed text within the ANALYZER window |
| Top | Upper distance (in Pixel) |
| Bottom | Lower distance (in Pixel) |
| Left | Distance from left (in Pixel) |
| Right | Distance from right (in Pixel) |

2.8.11. MATHEMATICAL command

Mathematical commands may be applied in any command file

With this the additional treatment of the measuring values is possible

2.8.11.1. Mathematical command „Subtract

Subtracting the values from two measuring channels

| S1-2 - MEASURE / SENSOR.WYL / Data[Subtract] | |
|--|----------------------------------|
| Data 1 | Data 2 |
| S1 | S2 |
| Factor | <input type="text" value="1.0"/> |

| | |
|---------------|--|
| Data 1 | Measuring channel; operand of the function „Data 1 minus Data 2“ |
| Data 2 | Measuring channel; operand of the function „Data 1 minus Data 2“ |
| Factor | Factor with which the result can be multiplied |

2.8.11.2. Mathematical command „Add“

Adding the values from two measuring channels

| S1+2 - MEASURE / SENSOR.WYL / Data[Add] | |
|---|----------------------------------|
| Data 1 | Data 2 |
| S1 | S2 |
| Factor | <input type="text" value="1.0"/> |

| | |
|---------------|---|
| Data 1 | Measuring channel; operand of the function „Data 1 plus Data 2“ |
| Data 2 | Measuring channel; operand of the function „Data 1 plus Data 2“ |
| Factor | Factor with which the result can be multiplied |

2.8.11.3. Mathematical command „Time“

Changing of the measuring interval of a measuring channel

| S2' - MEASURE / SENSOR.WYL / Data[Time] | |
|---|--------------------------------|
| Data | Sampling Time: |
| S2 | <input type="text" value="2"/> |

| | |
|----------------------|--|
| Data | Measuring channel |
| Sampling Time | New measuring interval (ddd hh:mm:ss.ssssss) |

2.8.11.4. Mathematical command „Link“

Connecting the measuring values of several measuring channels

S1~ - MEASURE / SENSOR.WYL / Data[Link]

| | |
|--|---|
| Main Data <div style="background-color: #800000; color: yellow; padding: 2px; border: 1px solid black;">S1</div> | Linked Data <div style="background-color: #800000; color: yellow; padding: 2px; border: 1px solid black;">S2</div> <div style="background-color: #800000; color: yellow; padding: 2px; border: 1px solid black;">S3</div> |
|--|---|

| | |
|--------------------|-----------------------------------|
| Main Data | Measuring channel (Main) |
| Linked Data | Measuring channels (to be linked) |

2.8.11.5. Mathematical command „Smooth“

Filtering the measuring values of a measuring channel

S2 F0 20 - MEASURE / SENSOR.WYL / Data[Smooth]

Data

S2

Smoothing Window **Samples**

Smoothing Type

| | |
|-------------------------|--|
| Data | Measuring channel |
| Smoothing Window | Number of values to be smoothed (1 .. 50) |
| Smoothing Type | Filter-Type (0 .. 5) 0: Average (equal weight of each value) 1: Average (sorted, linear increasing weight) 2: Average (sorted, progressive increasing weight) 3: Finite Response Filter (FIR N = 15 Fg = 0.1) (16 values) 4: Finite Response Filter (FIR N = 31 Fg = 0.1) (32 values) |

2.8.11.6. Mathematical command „Strip“

Limiting the measuring values of a measuring channel to a defined time limit

S1^ - MEASURE / SENSOR.WYL / Data[Strip]

Data

S1

Lower Limit

Time:

01.01.95 00:00:00

☐ Relative

Upper Limit

Time:

31.01.95 23:59:59

☐ Relative

| | |
|--------------------|---|
| Data | Measuring channel |
| Lower Limit | Lower limit |
| Time | Time (dd.mm.yy hh:mm:ss.ssssss) or time frame (ddd hh:mm:ss.ssssss) |
| Relative | Active: Time (duration) Passive: Point of time |
| Upper Limit | Upper limit |
| Time | Time (dd.mm.yy hh:mm:ss.ssssss) or time frame(ddd hh:mm:ss.ssssss) |
| Relative | Active: Time (duration) Passive: Point of time |

2.8.11.7. Mathematical command „Extend“

Extend the measuring values of a measuring channel to a infinite time frame

S3<..> - MEASURE / SENSOR.WYL / Data[Extend]

Data

S3

| | |
|-------------|-------------------|
| Data | Measuring channel |
|-------------|-------------------|

2.8.11.8. Mathematical command „Accel“

Definition of an angular alteration out of a position alteration of a sensor (acceleration)

S1'' - MEASURE / SENSOR.WYL / Data[Accel]

Data

S1

| | |
|-------------|-------------------|
| Data | Measuring channel |
|-------------|-------------------|

3. Exercise in five steps

Remark: The following exercise is meant to get familiar with the system respectively with the different modules and should help making changes if required.

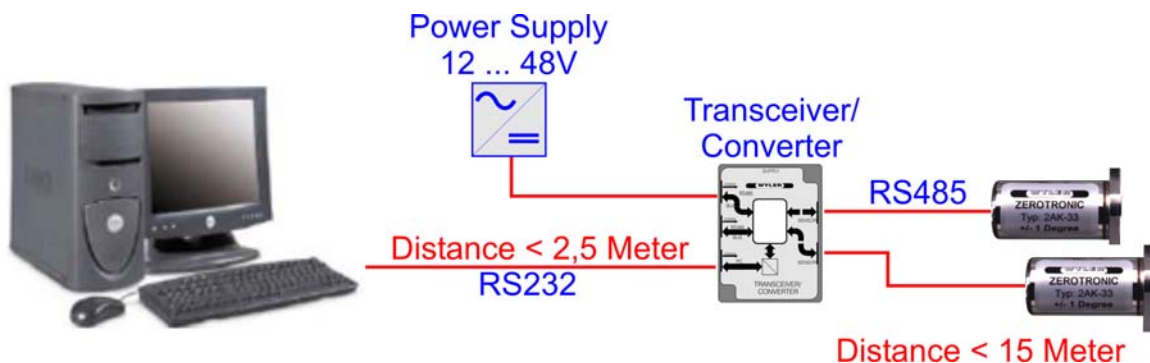
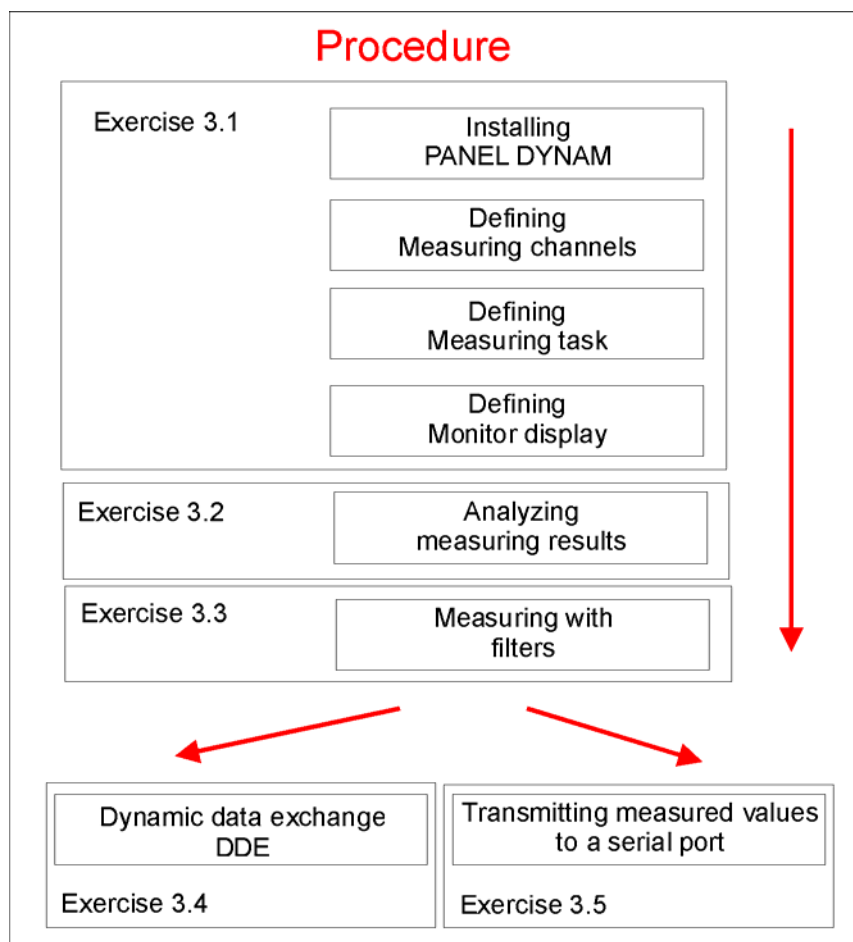
Installation of the software:

The installation of the software DYNAM is to be done according the point 2.4.

With double click to the file „dyn_f.exe“ in the subdirectory \SOFTWARE\DYNAM_0 on the CD the software without measuring set-up must be installed for the example. A new icon with the name WYPANEL is generated

Attention: Please pay attention to the serial port connection and the optimal Baud rate !!!

The following exercises are built up in five steps. The graph below gives an overview over the individual parts.



Configuration for the example

3.1. Set up of the measuring and display commands for two sensors

Goal:

The goal is to measure with the two sensors, measure the difference between the two sensors and display the result on the computer's monitor.

3.2 Installation of the module ANALYZER, based on 3.1

Goal:

Analyze the results of the measuring task defined in 3.1 in the ANALYZER

3.3 Installation of filters for the display

Goal:

Extend the measuring examples of point 3.1 and 3.2 by using filters for measuring

3.4 Installation of the module "DDE"; dynamic data exchange with other Windows applications

Goal:

Extend the measuring examples of point 3.1, using the module DDE and transferring the data to an EXCEL file.

3.5 Installation of the module "SENDER; transfer the data to a serial port.

Goal:

Extend the measuring examples of point 3.1, using the module SENDER and transferring the data to a serial port.

The following **hardware and software** components must be available:

2 Sensors ZEROTRONIC, measuring range +/- 10 Arcsec.

| | | | |
|-------------------|-----------|----------------------|-----|
| Sensor addresses: | SENSOR A: | RS485 Device Address | 20* |
| | | RS485 Subaddress | 1 |
| | SENSOR B: | RS485 Device Address | 21* |
| | | RS485 Subaddress | 1 |

1 Transceiver T/C

1 External power supply

1 PC with two serial ports COM1 and COM2

1 Disk with the software DYNAM without any command files

Remark:

*) When the sensor address is not known it can be found out by using the Levelmeter 2000
Every sensor has a "RS485 Device Address", when leaving the company. In our example "Sensor A" with the address 20 and "Sensor B" with the address 21. The "RS485 SubAddress" usually is "1". For two channel sensors the SubAddress is used to identify the two channels.

Measuring task:

1. Measurement and immediate display of the values of both sensors „SENSOR A“ and „SENSOR B“ complete with the difference between the two sensors „SENSOR A-B“
Display in degrees, minutes and seconds
2. Analyses of the measurement
3. „Smoothing“ of the measured values by using filters
4. Exchange of the measured data with other Microsoft Windows applications via DDE / Dynamic Data
5. Sending the measured data to a serial port in numeric form

Adjustment of the serial port and the optimal (maximal) Baud rate in the file "DYNAM:INI":

- The parameters set in the file "DYNAM.INI" must now be adjusted to the available processor type and to the respective serial port (**PortName, Baudrate**) of your hardware.
- The DYNAM.INI file must be opened; best with the MS WINDOWS program NOTEPAD.EXE
- The following part should be changed accordingly in the file

"DYNAM.INI":

```
[WyAngle.DLL]
;
; Definition: Name1={PortName},{Baudrate}
;           Name2={PortName},{Baudrate}
;           ...
;           NameN={PortName},{Baudrate}
;
PortA=COM2,19200 (must later be entered in the „Sensor measuring
                  commands
;

[WyData.DLL]
ProgVolumePath=PROG
DataVolumePath=DATA

[WyPanel.EXE]
Layout=115,16,3,1,0,3,2,1,14
Dlg6Pos=16,235
Dlg5Pos=8,127
Dlg1Pos=80,174
Dlg2Pos=256,128
Dlg3Pos=48,248
Dlg4Pos=16,124
Dlg7Pos=24,187
Dlg8Pos=176,104
Button1=ANALYSE,DATA_001,0,1,0,0,0
Button2=ZERO,NULLDATA,0,0,0,1,0
Button3=MEASURE,DATA_001,0,1,1,0,0

[WySender.EXE]
;
; Definition: Name1={PortName},{Baudrate}
;           Name2={PortName},{Baudrate}
;           ...
;           NameN={PortName},{Baudrate}
;
PortB=COM2,19200 must later be entered in the module „SENDER“

[WySample.EXE]
Dlg1Pos=416,429

[WyEdit.DLL]
Dlg1Pos=183,11
```

Remark: Maximal Baud rate with one COM-Port.

| Processor-Type | Maximum Baud rate | Maximum Sampling Rate | Sampling Time >using e.g. 1 Sensor | Sampling Time > using e.g. 5 Sensors |
|--------------------------|-------------------|-----------------------|------------------------------------|--------------------------------------|
| 486DX50/DX2-50 or higher | 115 200 | 60 | 0,02 | 0,10 |
| 486DX33 | 57 600 | 30 | 0,04 | 0,20 |
| 486SX25 | 28 800 | 15 | 0,07 | 0,35 |
| 386SX20 | 19 200 | 10 | 0,10 | 0,50 |
| 286 | 9 600 | 5 | 0,20 | 1,00 |

If simultaneous measurements are conducted through several COM ports, the maximum Baud rate must be lowered accordingly.

Save the file DYNAM.INI.

Close the program Notepad.EXE.

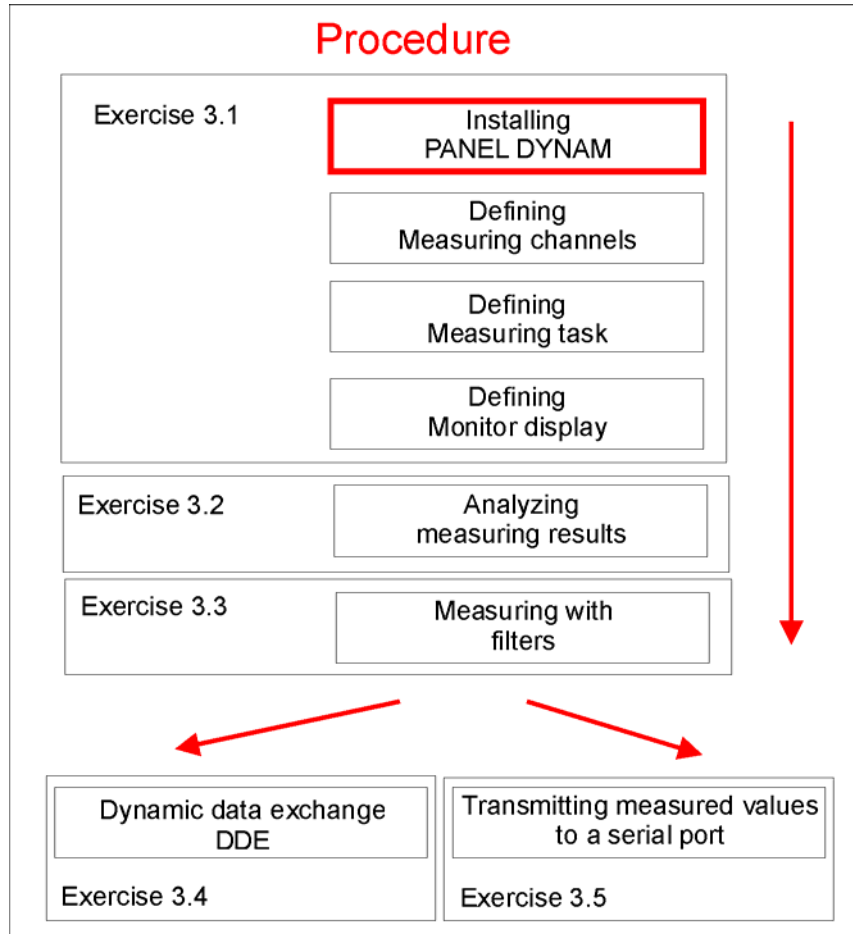
3.1. Set up of the measuring and display commands for two sensors

Goal:

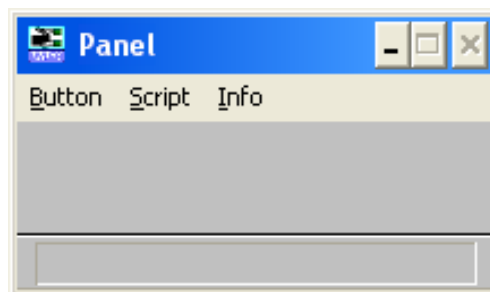
The goal is to measure with the two sensors, measure the difference between the two sensors and display the result on the computer's monitor.

3.1.1. Installing the elements of the panel

At the beginning of the exercise the panel must be installed. As a button's name we chose „MEASURE“.



When the software DYNAM is properly installed you can start the program with double click to the icon "DYNAM_EX". On the monitor the panel appears **without any buttons**.



Attention

The software DYNAM_EX is prepared for an example and does not contain any measuring commands

We start with the installation of the buttons

- **MEASURE**

- **ANALYSE**

These buttons are needed for the example.

The pulldown-Menu „BUTTON“ is to be opened and a mouse click to „CREATE“ will open a dialogue box "Create Button". The following is to be entered:

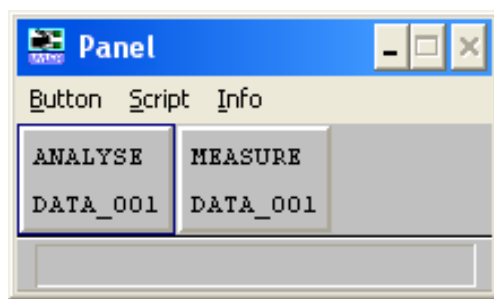
| | |
|----------------|-----------------|
| Identification | to be entered |
| Prog Volume | MEASURE |
| Data Volume | DATA_001 |

Confirm with "OK" and in the panel a button is created with the name „MEASURE / DATA_001“.

Repeat the same procedure for creating a button "ANALYSE"

| | |
|----------------|-----------------|
| Identification | to be entered |
| Prog Volume | ANALYSE |
| Data Volume | DATA_001 |

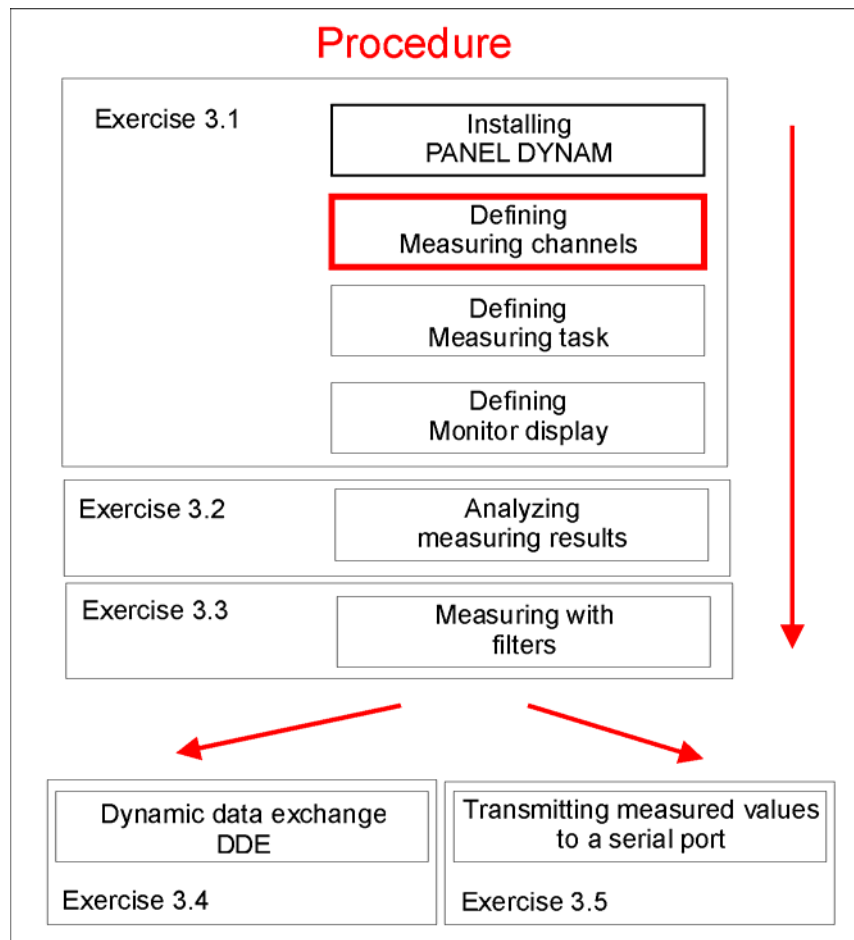
The panel should look as follows:



3.1.2. Defining the sensor command for the sensors A and B

In the following it is described how to define the various sensors as well as the mathematical connections between the sensors

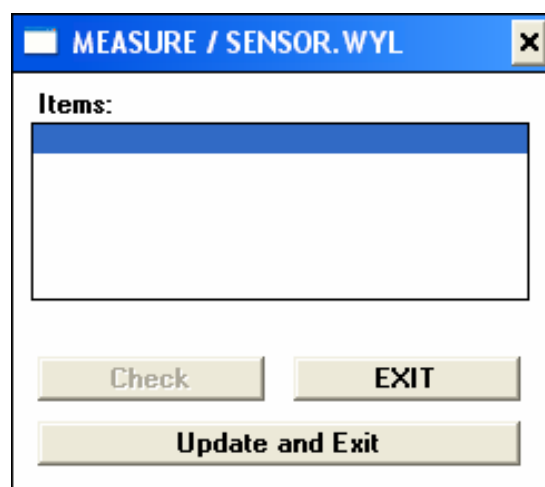
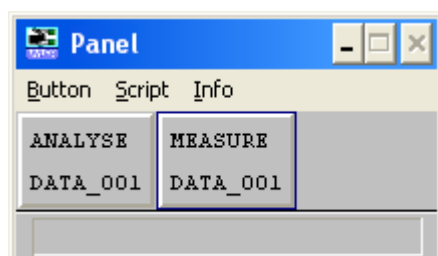
All sensors connected as well as sensors with mathematical connections need to be defined.



I) Defining the Sensor measuring commands

Activate the button „MEASURE“ in the Panel with a **simple** mouse click.

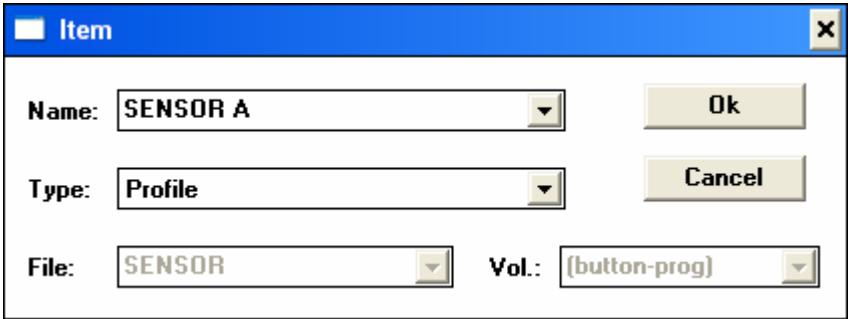
A click to Script in the menu bar of the Panel will open a pull down menu, here SENSOR must be activated by a click and a dialogue box appears:



The name of the first "Sensor measuring command" is to be defined as follows:
Double click to the area below Items will open a new dialogue box [Item]

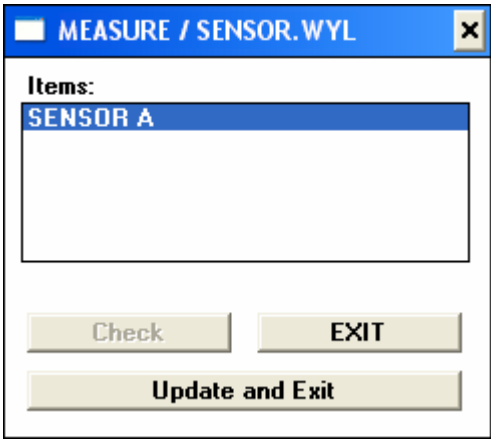
The following information is to be typed:

Name: **SENSOR A** (max. 16 characters, in our example "SENSOR A")
Type: **Profile**; (Can be chosen with a pull down menu)
File: default (SENSOR)
Volume: default (button prog)



Chose Ok to accept the entering. The command will now be entered in the list below "Items" and the information is saved in the respective file

With this operation only the name and the type of command is defined.



The "SENSOR A" is registered in the box [MEASURE / SENSOR.WYL]

II) Defining the profile of the sensor measuring command

In the next step the profiles of the sensor measuring commands must be defined.

A double click to the bar **SENSOR A** below Items in the box [MEASURE / SENSOR.WYL] will open the next box with the name [SENSOR A - MEASURE / SENSOR.WYL / PROFILE]

In this box the respective information concerning the Sensor A must be entered

In our example it is the following:

Port: **PortA** (see point 2.4/"Installation of the software DYNAM")
 RS485 Device Address: **20** (Sensor-Address RS485)
 RS485 Subaddress: **1**

The rest remains empty

With „Alt+F4“ the box may be closed.

Repeat the same procedure for the second sensor, which is to be named "**SENSOR B**"

Name of the sensor B:

The following information is to be typed:

Name: **SENSOR B** (max. 16 letters)
 Type: **Profile**; (Can be chosen with a pull down menu)
 File: default (SENSOR)
 Volume: default (button prog)

Profile of the sensor B:

In our example it is the following:

Port: **PortA** (see point 2.4/"Installation of the software DYNAM")
 RS485 Device Address: **21** (Sensor-Address RS485)
 RS485 Subaddress: **1**

The rest remains empty

Chose "Update and Exit" for correct saving of the data. The dialogue box will be closed.

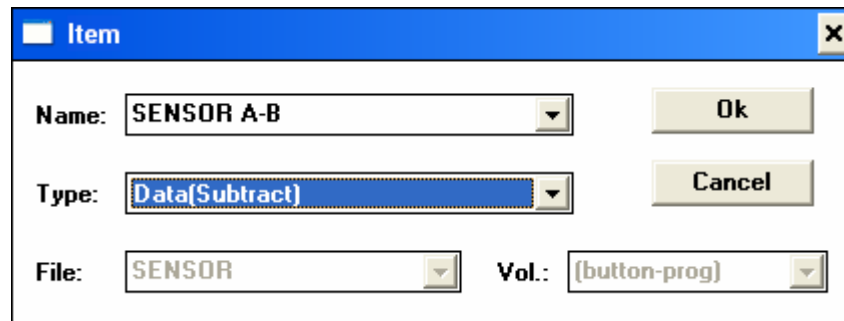
3.1.3. „Mathematical command“ for differential measurement [Sensor A - Sensor B]

In our example a **differential measurement** is planned. It is an additional measuring command (SENSOR A - SENSOR B) to be defined.

I.) Defining the name of the "measuring command"

The following information is to be typed:

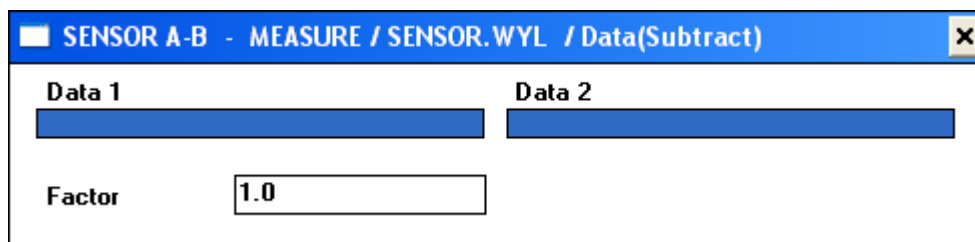
Name: **SENSOR A - B**
 Type: **Data (Subtract)**; (Can be chosen with a pull down menu)
 File: default (SENSOR)
 Volume: default (button prog)



Chose Ok to accept the entering.

II.) Defining the mathematical connection

In the box "MEASURE / SENSOR.WYL" the SENSOR A _ SENSOR B must be activated by mouse click. A new box appears [SENSOR A-B - MEASURE / SENSOR.WYL / Data (Subtract)]



By double clicking the bar below "Data 1" the dialogue box "Item" will be displayed.
 The following information is to be typed:

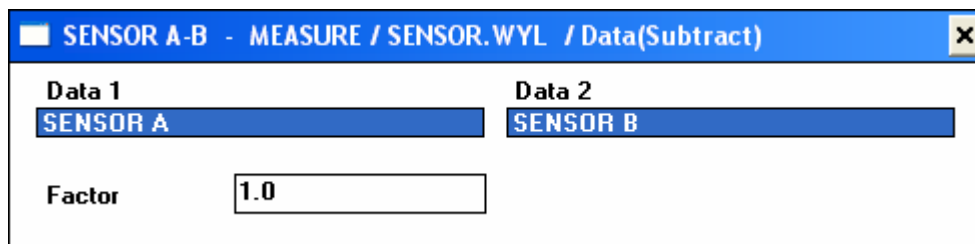
Name: can be chosen with double click, in our example we chose first **Sensor A**
 Type: default (**Profile**)
 File: default (**Sensor**)
 Volume: default (**button prog**)

Chose Ok to accept the entering.

The same procedure must be done for the second sensor, respectively for the "mathematical sensor"

Name: can be chosen with a pull down menu in our example we chose **Sensor B**
 Type: default (**Profile**)
 File: default (**Sensor**)
 Volume: default (**button prog**)

In the dialogue box **"FACTOR"** a value may be entered. With this value the mathematical result of the subtraction will be multiplied. If e.g. a factor 0.5 is entered the result will be multiplied by 0.5 (divided by 2). In our example we chose the value 1.0 (No changing of the result)



| SENSOR A-B - MEASURE / SENSOR.WYL / Data(Subtract) | |
|--|---------------|
| Data 1 | Data 2 |
| SENSOR A | SENSOR B |
| Factor | 1.0 |

Chose "Update and Exit" for correct saving of the data. The dialogue box will be closed.

Remarks:

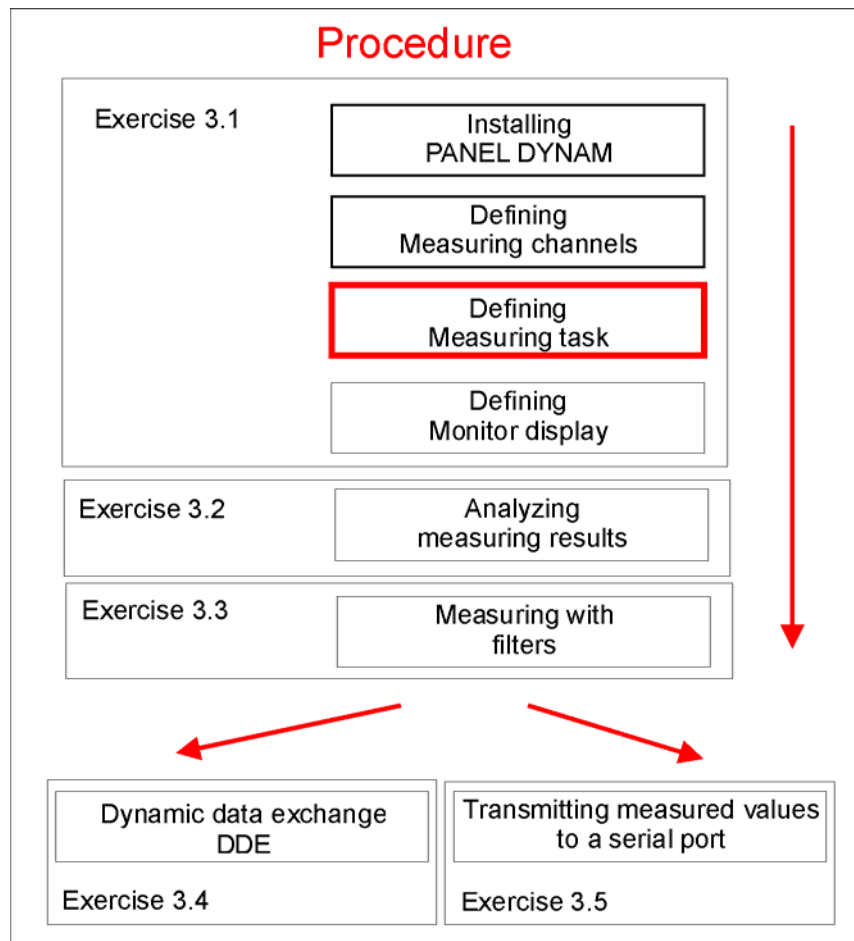
- "UPDATE and EXIT":** The changes will be saved and the dialogue boxes will be closed.
- "CHECK":** Not available yet, In future to be used for checking the configuration.
- "EXIT":** The changes will not be saved and the dialogue boxes will be closed.

All the measuring commands for „Sensor A“ and „Sensor B“ as well as for the difference between the two sensors are now defined.

3.1.4. Installing the module "SAMPLER"

As the next step the commands for the module SAMPLER must now be defined, beginning with the definition which measuring channels are used for the defined task.

The commands will be saved in the file "SAMPLER.WYL" and controlled by the program SAMPLER by continuously monitoring the data and saving the data on the hard disk.



I.) Defining the measuring groups (Sampler command "Group")

By clicking to Sampler in the pull down menu Script of the Panel a dialogue box [MEASURE / SAMPLER.WYL] appears. A double click to the marked area below Items will open a new box [Item].

In this box the respective information must be entered

| | |
|---------|--------------------------------------|
| Name: | e.g.. "GROUP 1" (max. 16 characters) |
| Type: | Group |
| File: | default (Sampler) |
| Volume: | default (button prog) |

The screenshot shows two overlapping windows from the WYLER software. The background window is titled 'MEASURE / SAMPLER.WYL' and has a blue header bar. It contains an 'Items:' label above a large empty text area. At the bottom, there are three buttons: 'Check', 'EXIT', and 'Update and Exit'. The foreground window is titled 'Item' and also has a blue header bar. It contains four input fields: 'Name:' with the value 'GROUP 1', 'Type:' with the value 'Group', 'File:' with the value 'SAMPLER', and 'Vol.:' with the value '[button-prog]'. To the right of these fields are two buttons: 'Ok' and 'Cancel'.

Chose Ok to accept the entering

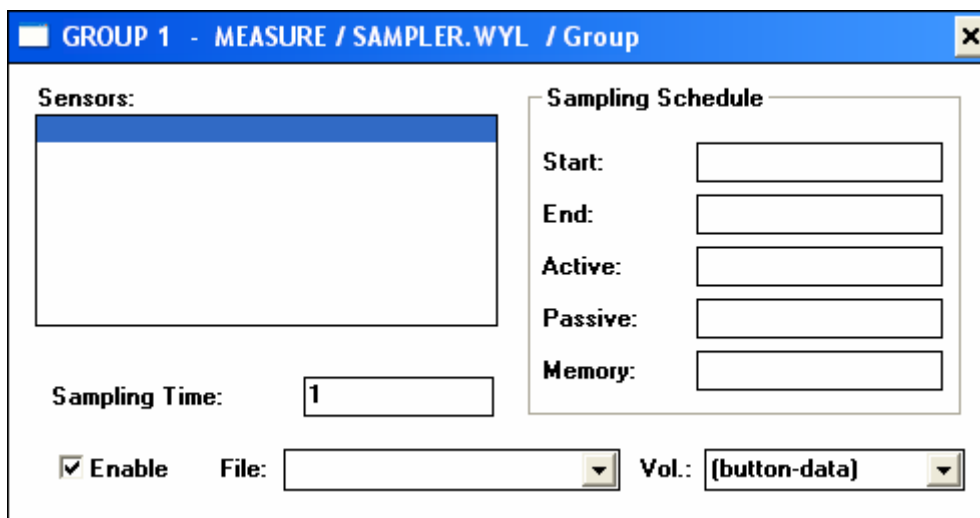
II.) Defining the measuring parameters of the measuring channels

First must be defined what type of measurement is required. In our example we have defined this task as follows (page 40):

Task:

Measuring and continuous display of the measuring results of two sensors „SENSOR A“ and „SENSOR B“ on the monitor of the computer. Measuring and continuous display of the measuring results of the difference of the two sensors (SENSOR A-B). Display the results in degrees, Arcmin. and Arcsec.

The name "GROUP 1" is now automatically entered in the box "MEASURE / SAMPLER.WYL". With double click to the field "GROUP 1" the dialogue box for defining the measuring parameters will be opened.



The measuring channels „SENSOR A“, „SENSOR B“ and „SENSOR A - B“ can now be entered in the list "Sensors".

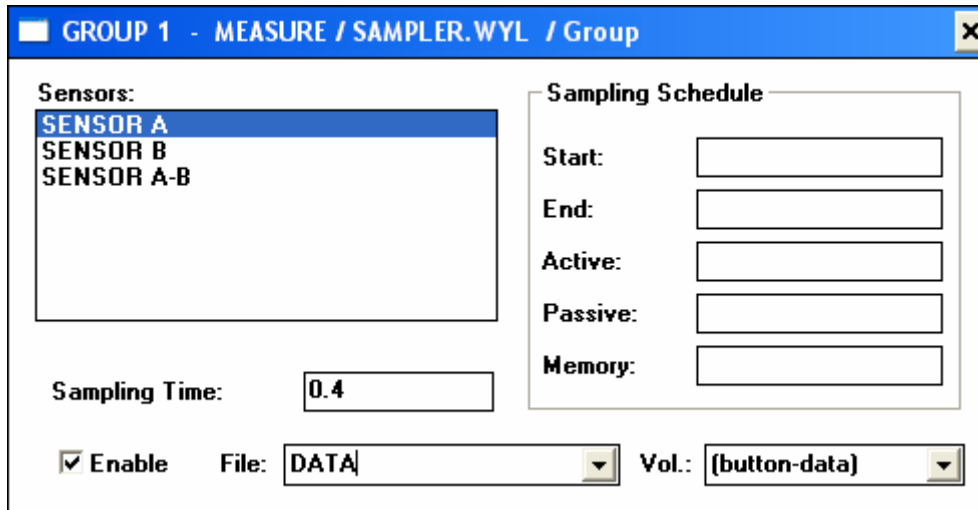
Double click to the area below "Sensors" will open the dialogue box [Item]

The following information is to be entered:

| | |
|---------|--|
| Name: | SENSOR A (Can be chosen with a pull down menu) |
| Type: | default (Profile) |
| File: | SENSOR |
| Volume: | default (button prog) |

The same procedure must now be repeated for the measuring channels „SENSOR B“ and „SENSOR A-B“

The box should now look as follows:



GROUP 1 - MEASURE / SAMPLER.WYL / Group

Sensors:

- SENSOR A
- SENSOR B
- SENSOR A-B

Sampling Schedule

Start:

End:

Active:

Passive:

Memory:

Sampling Time:

☒ Enable File: Vol.:

Remark: So far only the measuring channels „SENSOR A“ and „SENSOR B“ as well as the measuring channel „SENSOR A-B“ of the measuring group is defined.

In the dialogue box [GROUP 1 - MEASURE / SAMPLER.WYL / Group] additional parameters must be defined as follows:

| | |
|---------------------------------------|---|
| Start: | no data to be entered |
| End: | no data to be entered |
| Active: | active measuring time after starting the measurement, in our example no data to be entered |
| Passive: | no data to be entered |
| Memory: | no data to be entered |
| Sampling Time: 0.4, (zero point four) | this means that every 0.4 sec. a measurement will be done (see below) |
| File: | DATA |
| Volume: | (button prog) |

Different possibilities exist for defining the measuring time, either by defining start and end time or by defining the active measuring time.

If e.g. in the field start: the following is stated "04.06.94 12:05:30" then this means that the required measurement starts on June 4, 1994 at 12 o'clock five minutes and thirty seconds. Additional details see in point 2.5.5.2, Sampler command "Group"

Remarks:

Sampling Rate:

- a) Depending on the type of the measurement. In general it can be said that the smaller the sampling time, the higher the dynamic information.
- b) Should the measurement with the set rate of 0.4 per sec. not work properly due to limitations of the available PC the sampling time must be increased accordingly. (see also "setting the Baud rate")

File Name:

- a) File-Name, is the name of the file in which the measuring data is saved.

When the entered information is accepted by „Update and Exit“ the measurement could be started. The measuring data would be collected and saved in the file "Data". **The display is still missing.**

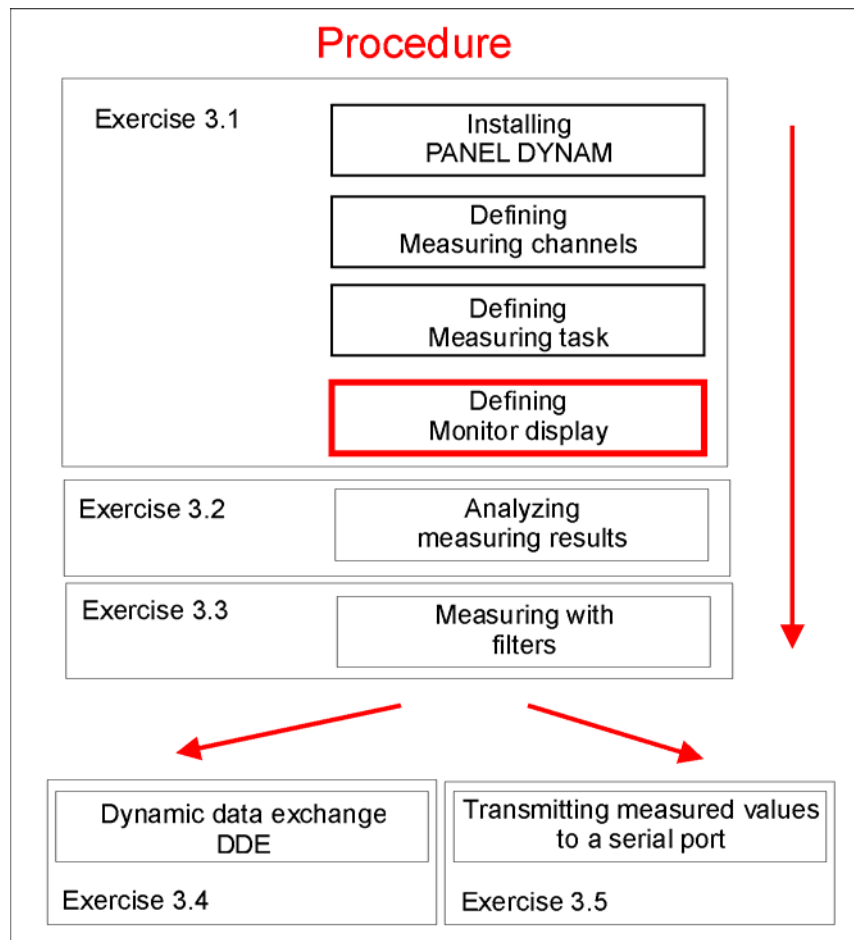
Remarks:

The file with the measuring data will be saved under Data Volume. The definition "button-prog" means that the file is saved under the Volume defined by the start button. Various measuring groups may be installed, each with a different volume respectively file name.

3.1.5. Installing the module "DISPLAY"

The display of the measuring data on the monitor is now to be installed. Such a display is composed of

- the main window, (outer frame of the display)
- the display windows (in numerical or graphical form)

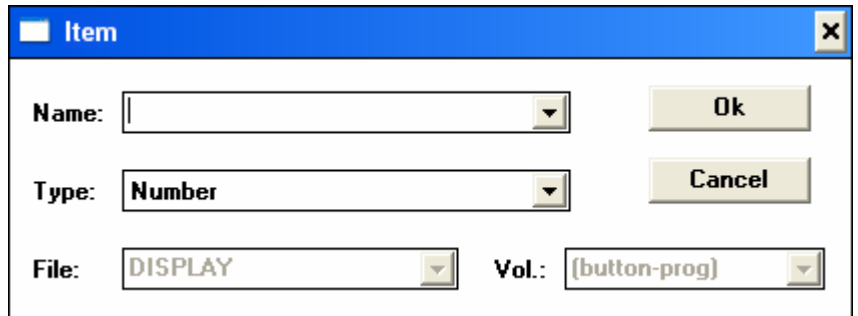
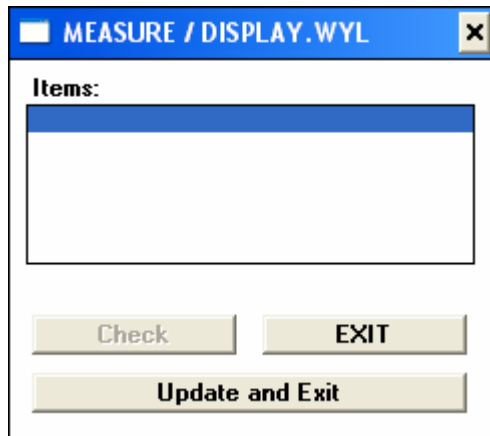


I.) Defining the window for the display

As a first step the Item "CONTROL" is to be installed. With this Item it is possible to define the display on the screen according to the personal requirements and assure that the same display is installed after every new program start.

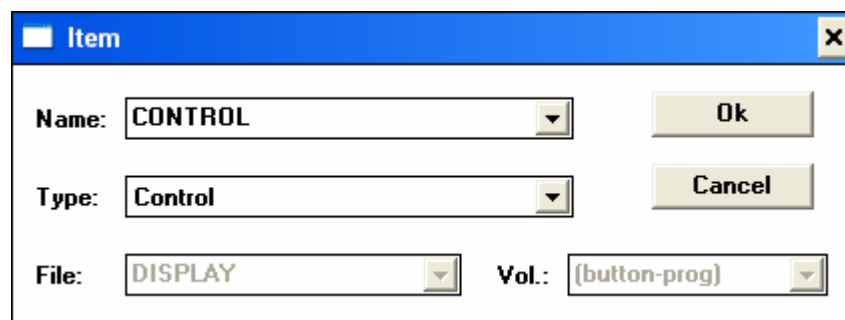
Procedure:

By clicking to Display in the pull down menu Script of the Panel a dialogue box [MEASURE / DISPLAY.WYL] appears. A double click to the marked area below Items will open a new box [Item].



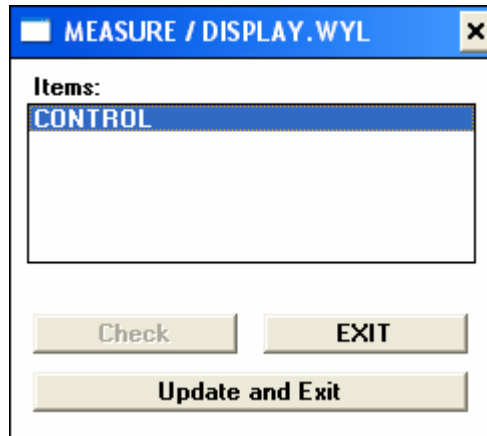
In this box the respective information must be entered

| | |
|---------|---|
| Name: | CONTROL |
| Type: | (Can be chosen with a pull down menu) possible forms for the display of the data e.g.. display in numerical form (Number) display in graphical form (BAR) CONTROL etc. |
| File: | For the positioning of the window we chose CONTROL default (DISPLAY) |
| Volume: | default (button prog) |

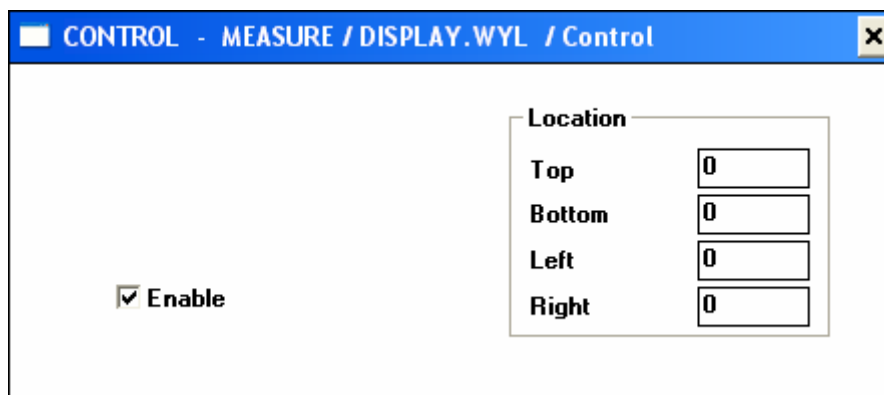


Chose Ok to accept the entering.

The screen should now look as follows:

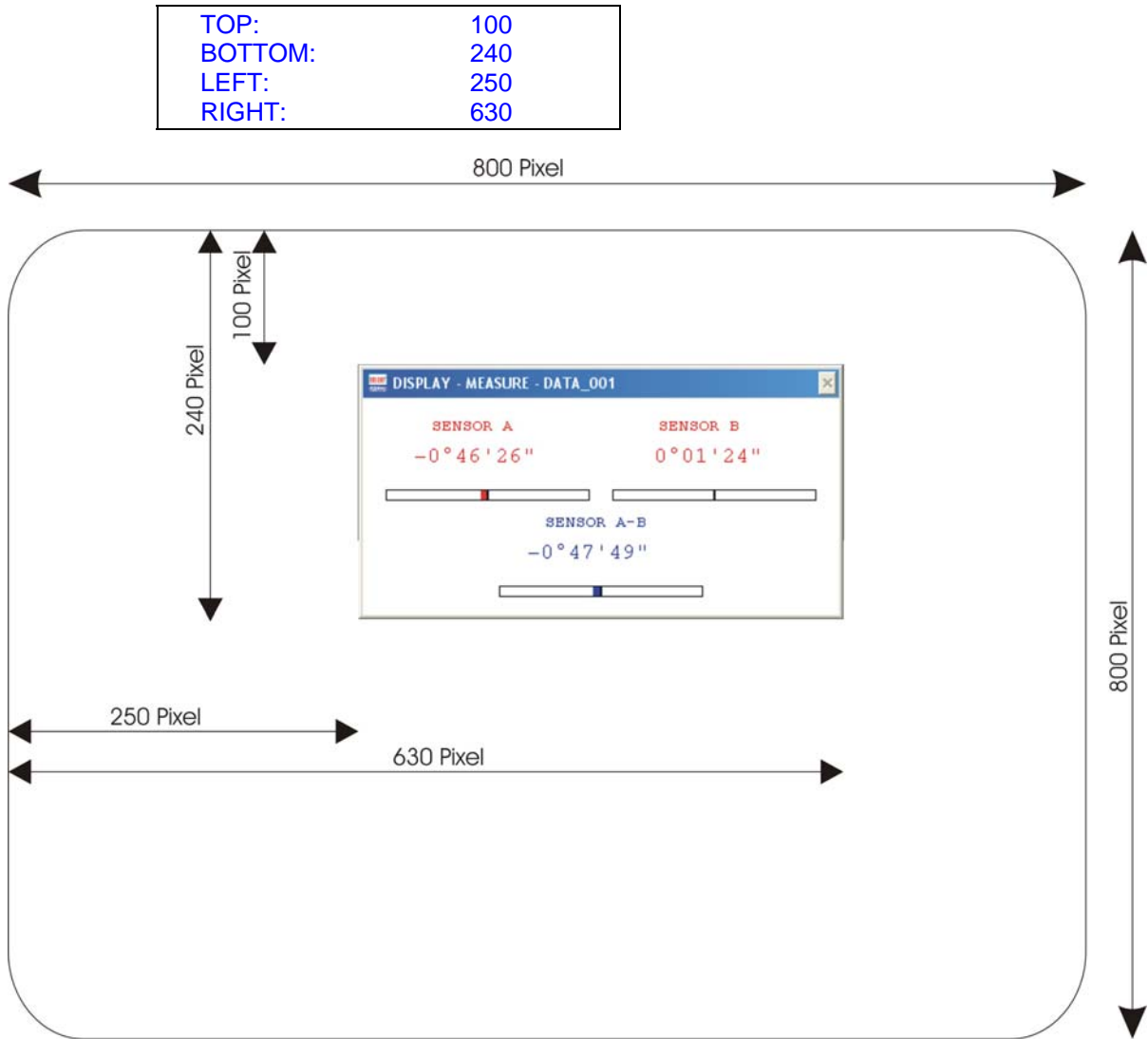


The window must now be positioned. With a double click on the new Item CONTROL a new dialogue box will be opened. [CONTROL - MEASURE / DISPLAY.WYL / CONTROL]



In this box the co-ordinates of the main window can be defined. The connection between the screen resolution and the size of the window. The positions are defined in "Pixels" using the upper left corner as reference. If no co-ordinates are entered the window may be defined by mouse draw and the last position will be saved after a new program start.

As an example the following data may be entered for positioning a window in the upper part of the monitor when a screen resolution of 800 x 600 is available.



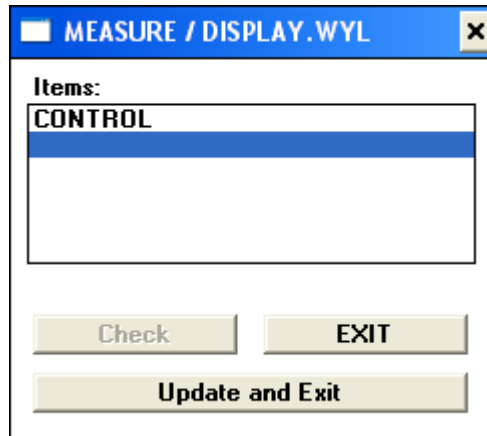
| CONTROL - MEASURE / DISPLAY.WYL / Control | |
|--|---|
| <input checked="" type="checkbox"/> Enable | Location |
| | Top <input type="text" value="100"/> |
| | Bottom <input type="text" value="240"/> |
| | Left <input type="text" value="250"/> |
| | Right <input type="text" value="630"/> |

Close the box with "Alt+F4"

Remark:
The defined location is meant to be rough positioning only. If later a display window is defined the main window will automatically adjust itself.

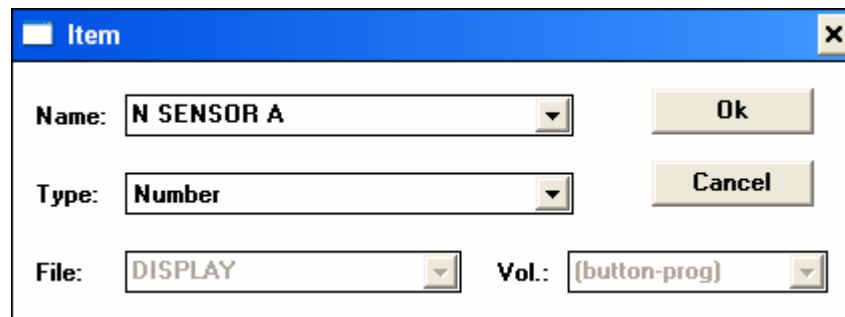
II.) Definition of a display window within the main window by using the Display command „Number“

Double click to the first free field below "CONTROL" in the dialogue box [MEASURE / DISPLAY.WYL]. A new box [Item] appears.



The following is to be typed for the SENSOR A

| | |
|---------|---|
| Name: | e.g. display " N SENSOR A " (for „numerical display“; max. 16 characters) |
| Type: | (Can be chosen with a pull down menu) possible forms for the display of the data e.g.. display in numerical form (Number) display in graphical form (BAR) CONTROL etc. |
| | For our example we chose display in numerical form (Number) |
| File: | default (DISPLAY) |
| Volume: | default (button prog) |



Chose Ok to accept the entering.

Remark: With this operation we only have defined the name of the display command.

The dialogue box will be closed.

It must now be defined which sensor respectively which measuring channel in what form is to be displayed. With double click to the Item "N SENSOR A" in the dialogue box [MEASURE / DISPLAY.WYL] a new dialogue box will be opened [N SENSOR A - MEASURE / DISPLAY.WYL / Number].

MEASURE / DISPLAY.WYL

Items:

| |
|-------------------|
| CONTROL |
| N SENSOR A |

Check EXIT

Update and Exit

N SENSOR A - MEASURE / DISPLAY.WYL / Number

Data:

Type:

Unit:

Color:

| | |
|-------|--------------------------------|
| Red | <input type="text" value="0"/> |
| Green | <input type="text" value="0"/> |
| Blue | <input type="text" value="0"/> |

☒ Enable Update Time:

Location:

| | |
|--------|--------------------------------|
| Top | <input type="text" value="0"/> |
| Bottom | <input type="text" value="0"/> |
| Left | <input type="text" value="0"/> |
| Right | <input type="text" value="0"/> |

First the field data must be activated with a double click. The well-known box Item appears. In the field "Name" a pull down menu is available in which the various already defined measuring channels are visible. We chose SENSOR A and confirm this with Ok.

The following parameters must be entered:

- Type
- Unit
- Color
- Location
- Update Time

For our example we define as follows:

- | | |
|---------------|---|
| - Type | Angle |
| - Unit | Arc deg:min:sec; (Display in degrees, Arcmin., Arcsec.) |
| - Location | TOP: 40 BOTTOM: 60 LEFT: 20 RIGHT: 200 |
| - Update Time | 0,3 (Monitor screen update in sec.) |
| - Color | e.g. 255; (display red; Windows-convention) |

N SENSOR A - MEASURE / DISPLAY.WYL / Number

Data:

Type:

Unit:

Color:

| | |
|-------|----------------------------------|
| Red | <input type="text" value="255"/> |
| Green | <input type="text" value="0"/> |
| Blue | <input type="text" value="0"/> |

☒ Enable Update Time:

Location:

| | |
|--------|----------------------------------|
| Top | <input type="text" value="40"/> |
| Bottom | <input type="text" value="60"/> |
| Left | <input type="text" value="20"/> |
| Right | <input type="text" value="200"/> |

Saving with „Update and Exit“

Remarks:

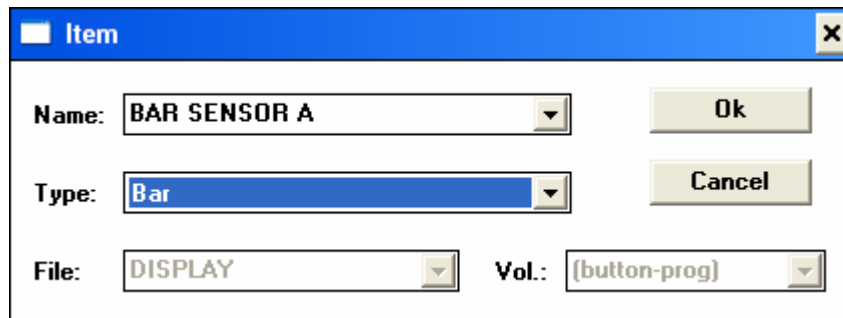
- The positioning of the display is defined within the main window
- The parameters for the definition of the position of the display window are depending on the screen size and the resolution. The screen resolution influences the size of the characters (writing and numbers) The numbers in "Location" must be entered in "Pixels". The reference is the upper left corner of the surrounding window.
- Due to the great variety of monitors and resolutions the proper parameters (TOP, BOTTOM, LEFT, RIGHT) must be found out individually.

The measuring results should also be displayed in graphical form.

By clicking to Display in the pull down menu Script of the Panel a dialogue box [MEASURE / DISPLAY.WYL] appears. A double click to the marked area below Items will open a new box [Item].

The following is to be typed for the SENSOR A

| | |
|---------|--|
| Name: | e.g. display " BAR SENSOR A " (for „bar display") |
| Type: | (Can be chosen with a pull down menu) possible forms for the display of the data e.g.. display in numerical form (Number) display in graphical form (BAR) CONTROL etc. |
| | For our example we chose display in numerical form (Bar) |
| File: | default (DISPLAY) |
| Volume: | default (button prog) |

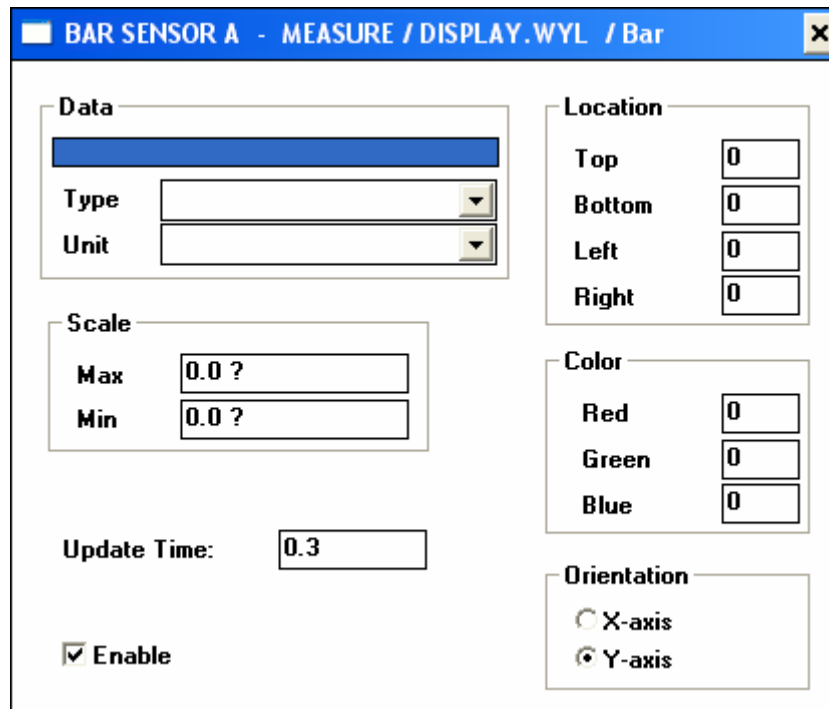


The 'Item' dialog box contains the following fields:

- Name:** BAR SENSOR A
- Type:** Bar
- File:** DISPLAY
- Vol.:** (button-prog)
- Buttons:** Ok, Cancel

Chose Ok to accept the entering.

It must now be defined which sensor respectively which measuring channel in what form is to be displayed. With double click to the Item "BAR SENSOR A" in the dialogue box [MEASURE / DISPLAY.WYL] a new dialogue box will be opened [BAR SENSOR A - MEASURE / DISPLAY.WYL / Bar].



The 'BAR SENSOR A - MEASURE / DISPLAY.WYL / Bar' dialog box contains the following sections:

- Data:**
 - Type: [dropdown]
 - Unit: [dropdown]
- Scale:**
 - Max: 0.0 ?
 - Min: 0.0 ?
- Update Time:** 0.3
- Enable:** ☒ Enable
- Location:**
 - Top: 0
 - Bottom: 0
 - Left: 0
 - Right: 0
- Color:**
 - Red: 0
 - Green: 0
 - Blue: 0
- Orientation:**
 - ☐ X-axis
 - ☒ Y-axis

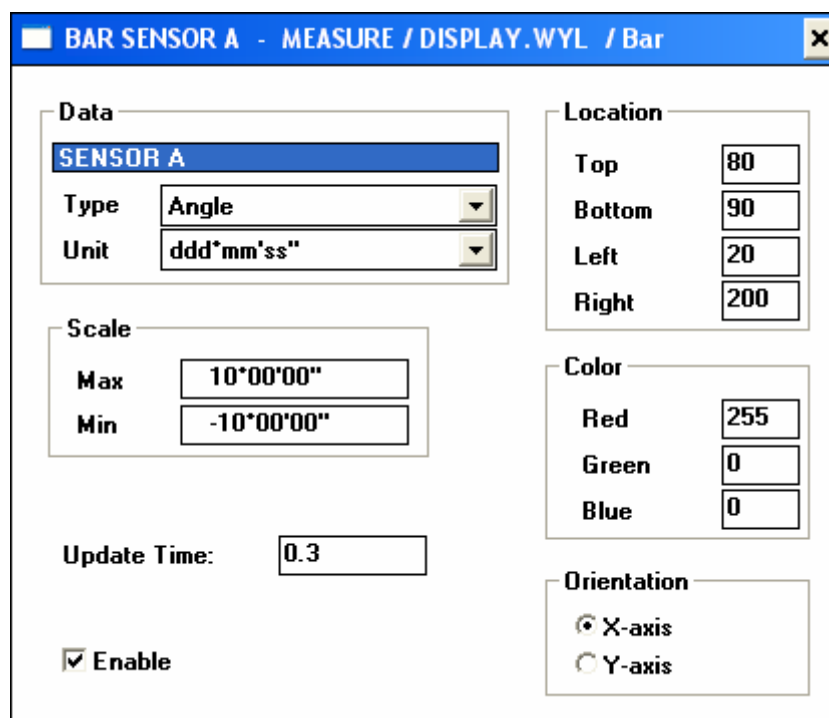
First the field "data" must be activated with a double click. The well-known box Item appears. In the field "Name" a pull down menu is available in which the various already defined measuring channels are visible. We chose SENSOR A and confirm this with Ok.

The following parameters must be entered:

- Type
- Unit
- Scale
- Update Time
- Location
- Color
- Orientation

For our example we define as follows:

| | |
|----------------|--|
| - Type | Angle |
| - Unit | Arc deg:min:sec; (Display in degrees, Arcmin., Arcsec.) |
| - Scale | MAX: 10° 00' 00" |
| | MIN: - 10° 00' 00" (Important: Watch for minus-sign) |
| - Update Time | 0,3 (Monitor screen update in sec.) |
| - Location | TOP: 80 |
| | BOTTOM: 90 |
| | LEFT: 20 |
| | RIGHT: 200 |
| - Color | e.g. 255; (display red; Windows-convention) |
| - Orientation: | X - AXIS |



Saving with „Update and Exit“

As a next step a **text** should be incorporated in the display.

By clicking to Display in the pull down menu Script of the Panel a dialogue box [MEASURE / DISPLAY.WYL] appears. A double click to the marked area below Items will open a new box [Item].

In this box the respective information must be entered

| | |
|---------|---|
| Name: | e.g. "TEXT SENSOR A" (max. 16 characters) |
| Type: | (Can be chosen with a pull down menu) possible forms for the display of the data e.g.. display in numerical form (Number) display in graphical form (BAR) Text etc. |
| | For the positioning of the window we chose Text |
| File: | default (DISPLAY) |
| Volume: | default (button prog) |

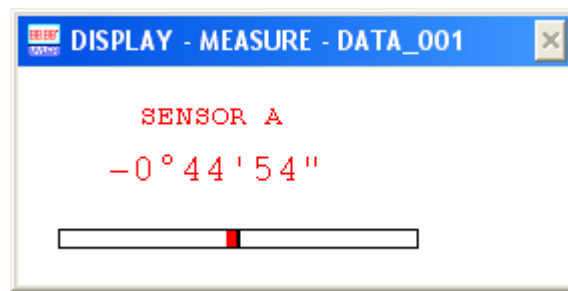
Chose Ok to accept the entering.

It must now be defined which sensor respectively which measuring channel with what text should be identified. With double click to the Item "TEXT SENSOR A" in the dialogue box [MEASURE / DISPLAY.WYL] a new dialogue box will be opened [TEXT SENSOR A - MEASURE / DISPLAY.WYL / Text].

| | |
|------------|---|
| - Text | SENSOR A (Text to be displayed) |
| - Color | e.g. 255; (display red; Windows-convention) |
| - Location | TOP: 15 |
| | BOTTOM: 30 |
| | LEFT: 60 |
| | RIGHT: 200 |

Saving with „Update and Exit“

We can now check whether the set up was so far successful. With a double click to the button MEASURE / Data_001 in the Panel the measuring program will be started and the display in numerical and graphical form should appear as follows:



Every 0.3 seconds the screen will be updated. (According to the "Update Time" set)

The display window may now be drawn with the mouse to the desired position. Due to the "Control" Item the new position will be saved for future use.

When opening the Item "Control" through the Script command in the panel the new positions can be looked at.

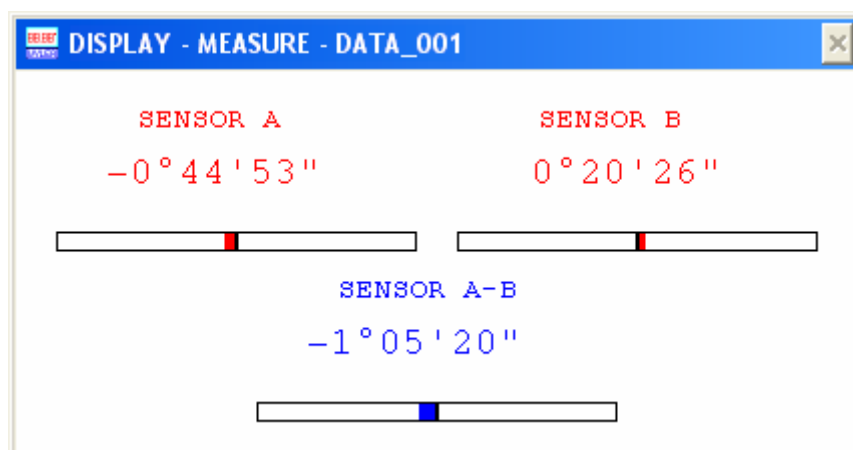
With the same procedures the display for the SENSOR B and the measuring channel SENSOR A - SENSOR B is to be installed. The following data may be used depending on screen resolution and monitor.

| SENSOR A | TOP | BOTTOM | LEFT | RIGHT | COLOUR |
|----------|-----|--------|------|-------|---------|
| Text | 15 | 30 | 60 | 200 | 255 RED |
| Number | 40 | 60 | 20 | 200 | 255 RED |
| Bar | 80 | 90 | 20 | 200 | 255 RED |

| SENSOR B | TOP | BOTTOM | LEFT | RIGHT | COLOUR |
|----------|-----|--------|------|-------|---------|
| Text | 15 | 30 | 260 | 400 | 255 RED |
| Number | 40 | 60 | 220 | 400 | 255 RED |
| Bar | 80 | 90 | 220 | 400 | 255 RED |

| SENSOR A-B | TOP | BOTTOM | LEFT | RIGHT | COLOUR |
|------------|-----|--------|------|-------|----------|
| Text | 100 | 115 | 160 | 300 | 255 BLUE |
| Number | 125 | 145 | 120 | 300 | 255 BLUE |
| Bar | 165 | 175 | 120 | 300 | 255 BLUE |

If everything was entered correctly the window should look as follows after the start of the measurement.



If it looks like above **congratulations**, you have successfully completed part 1 of the exercise

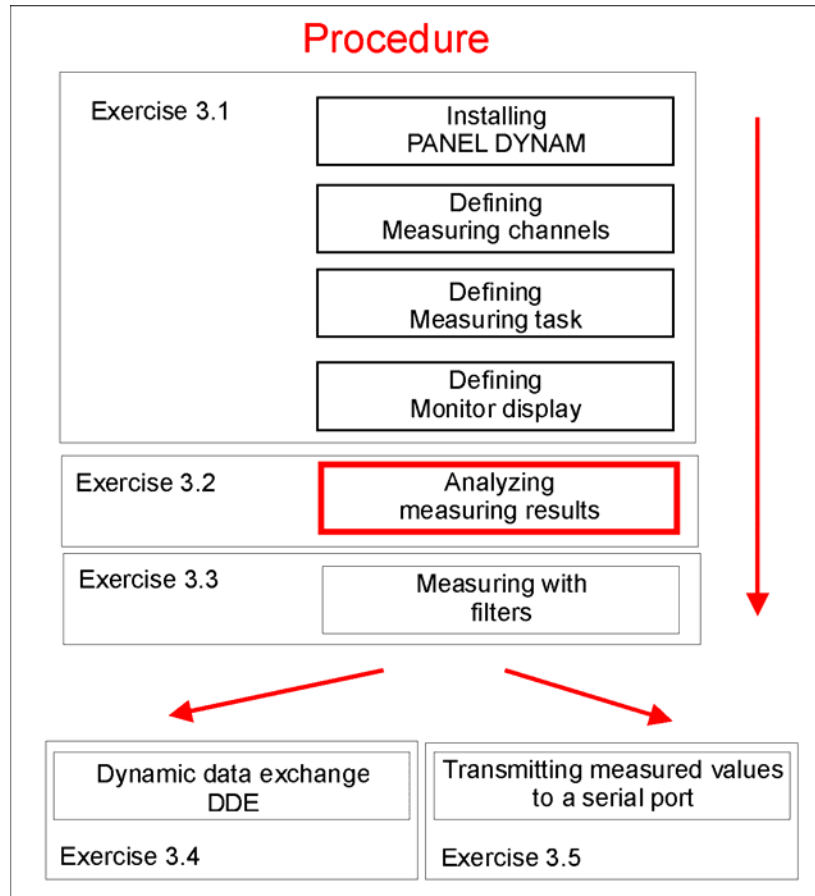
3.2. Installing the module ANALYZER, based on part 1 (3.1)

3.2.1. Installation of the measuring channels to be displayed

Goal:

Analyzing the measuring results collected with the set up of example 3.1 in the module ANALYZER

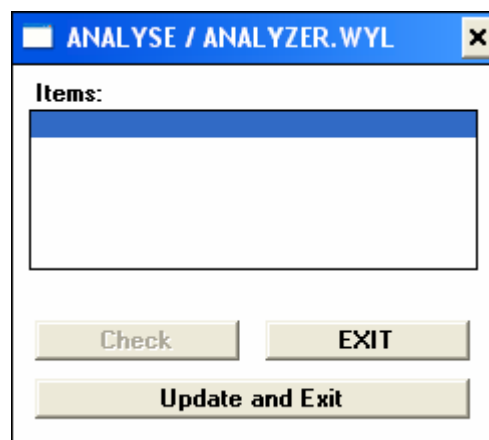
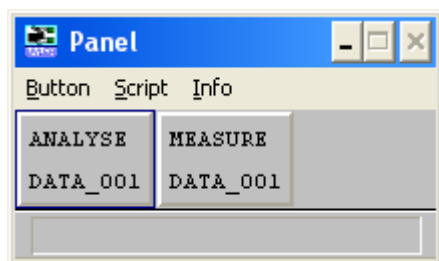
In order to display in graphical form the measured results of the two sensors and the difference between the two sensors in relationship to the measuring time span the module ANALYZER must be defined and activated.



As a first step the Item "CONTROL" is to be installed in the Analyzer command file.

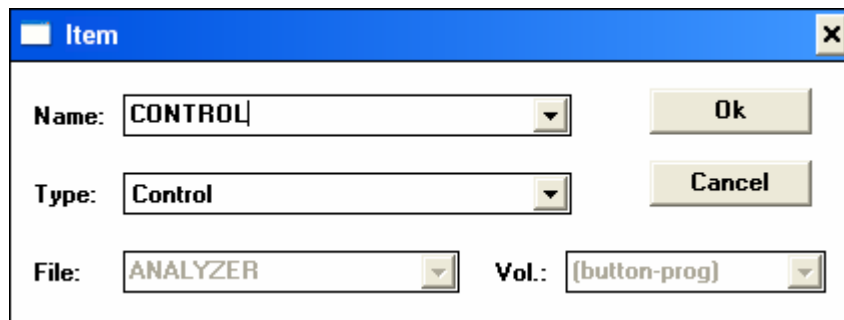
Procedure:

By clicking to Analyzer in the pull down menu Script of the Panel a dialogue box [ANALYSE / ANALYZER.WYL]. appears. A double click to the marked area below Items will open a new box [Item].



In this box the respective information must be entered

| | |
|---------|---|
| Name: | CONTROL |
| Type: | (Can be chosen with a pull down menu) possible forms for the display of the data e.g.. display in numerical form (Number) display in graphical form (BAR) CONTROL etc. |
| File: | For the positioning of the window we chose CONTROL default (ANALYZER) |
| Volume: | default (button prog) |



Chose Ok to accept the entering.

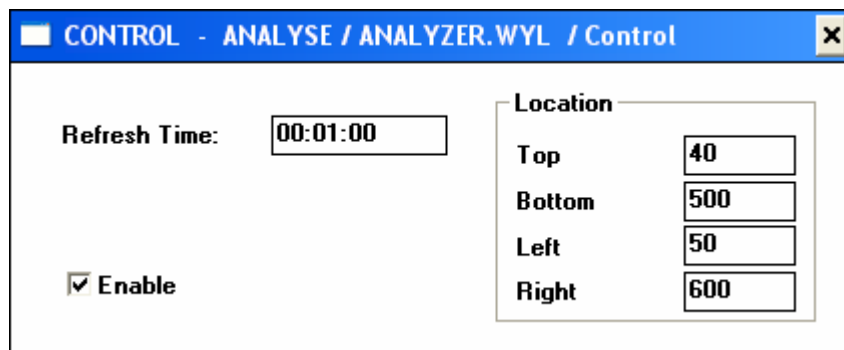
Remark:

With this operation only the name of the Analyzer-command „Control“ is defined

It must now be defined how the Analyzer window should be positioned on the screen. With double click to the Item "CONTROL" in the dialogue box [ANALYSE / ANALYZER.WYL] a new dialogue box will be opened [CONTROL - ANALYSE / ANALYZER.WYL / Control]

The following parameters can be entered depending on the resolution of the monitor:

| | |
|---------------|----------|
| Refresh Time: | 00:01:00 |
| Top: | 40 |
| Bottom: | 500 |
| Left: | 50 |
| Right: | 800 |



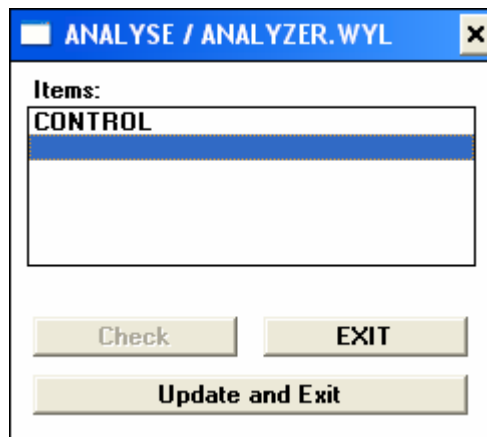
Saving with „Update and Exit“

Remark:

The defined location is meant to be rough positioning only. If later a display window is defined the main window will automatically adjust itself.

The measuring channels, which are to be displayed in the Analyzer, must now be defined.

By clicking to Aalyzer in the pull down menu Script of the Panel a dialogue box [ANALYSE / ANALYZER.WYL] appears.



A double click to the marked area below "CONTROL" will open a new box [Item].

The following is to be typed for the SENSOR A

Name: e.g. display "**GRAPH SENSOR A**" (for „graphical display")

Type: (Can be chosen with a pull down menu)

possible forms for the display of the data

e.g.. display in curve form (Graph)

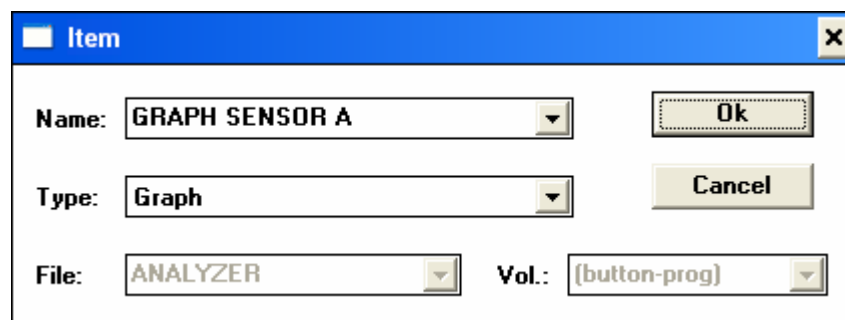
display as area (2D), not installed yet

etc.

For our example we chose display in curve form (**Graph**)

File: default (ANALYZER)

Volume: default (button prog)

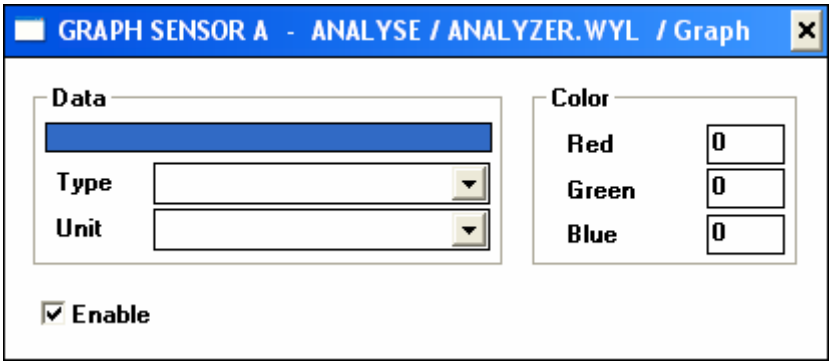


Chose Ok to accept the entering.

Remark:

With this operation only the name of the command „Analyzer“ is defined

It must now be defined which sensor respectively which measuring channel in what form is to be displayed. With double click to the Item "BAR SENSOR A" in the dialogue box [ANALYSE / ANALYZER.WYL] a new dialogue box will be opened [GRAPH SENSOR A - ANALYSE / ANALYZER.WYL / Graph].



First the field "data" must be activated with a double click. The well-known box Item appears. In the field "Name" a pull down menu is available in which the various already defined measuring channels are visible. We chose SENSOR A and confirm this with Ok.

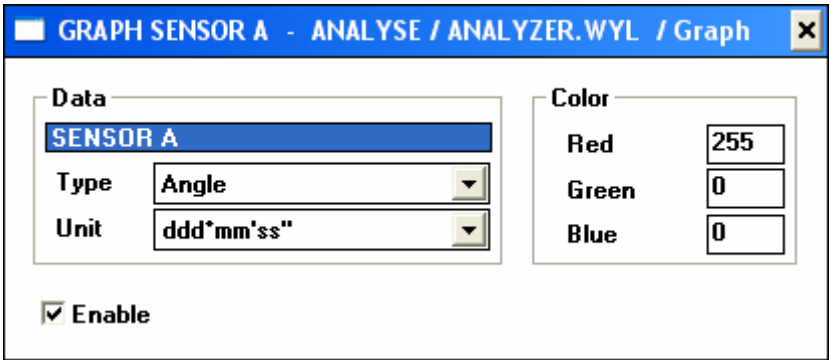
[GRAPH SENSOR A - ANALYSE / ANALYZER.WYL / Graph]] is activated again. In the field "Data" "SENSOR A" is now displayed.

The following parameters must be entered:

- Type
- Unit
- Color

For our example we define as follows:

| | |
|---------|--|
| - Type | Angle |
| - Unit | ddd° mm' ss" |
| - Color | red 255; (display red; Windows-convention) |

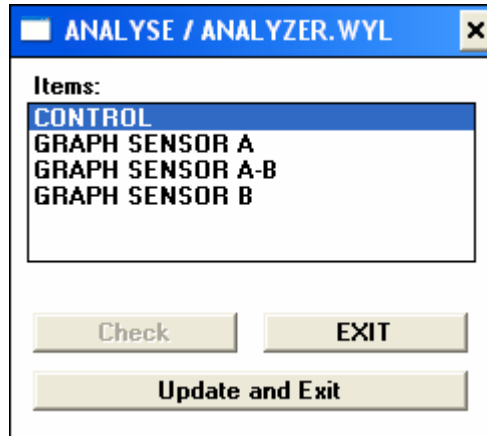


Saving to [ANALYSE / ANALYZER.WYL] with „Update and Exit“

If not to be saved: "Exit" only.

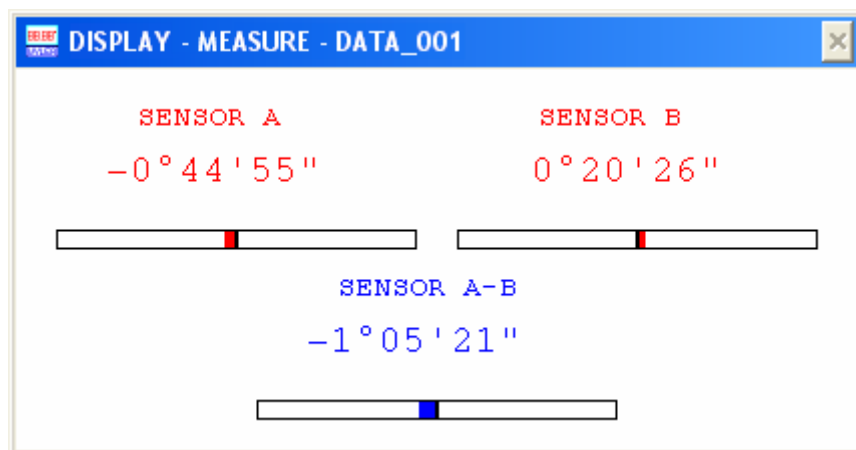
With the same procedures the display for the SENSOR B and the measuring channel SENSOR A - SENSOR B is to be installed. Like done in the module DISPLAY it is useful to add a "control" Item.

At the end the dialogue box [ANALYSE / ANALYZER.WYL] should look like below:



3.2.2. Measuring and analyzing a job with the installed parameters

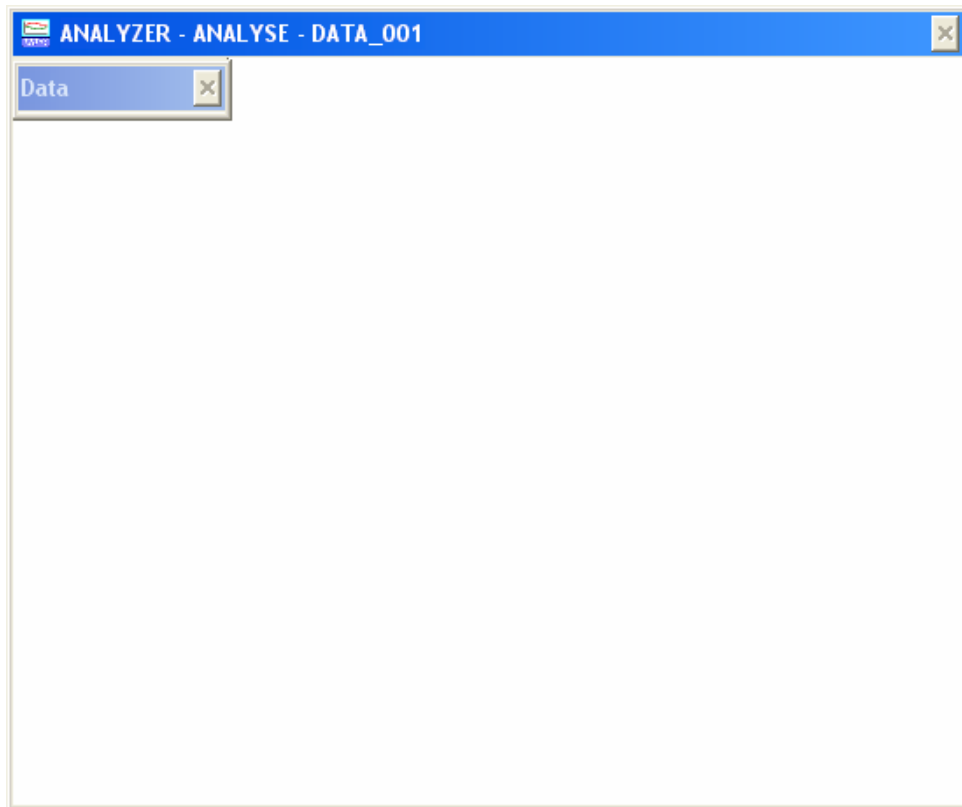
For starting a measurement a double click to the button "MEASURE" in the Panel must be applied.



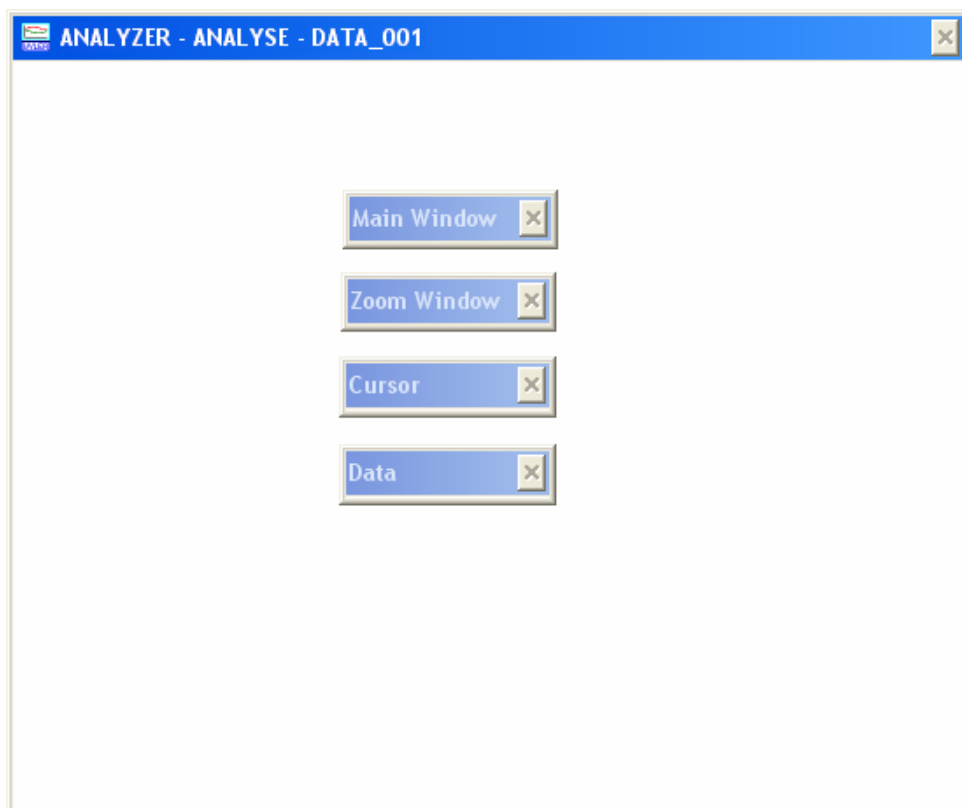
When the measurement should be terminated a double click to the button "MEASURE" will stop the measurement, the measuring display will disappear.

With double click to the button "ANALYSE" the Analyzer window will be opened. (Check the correct Volume)

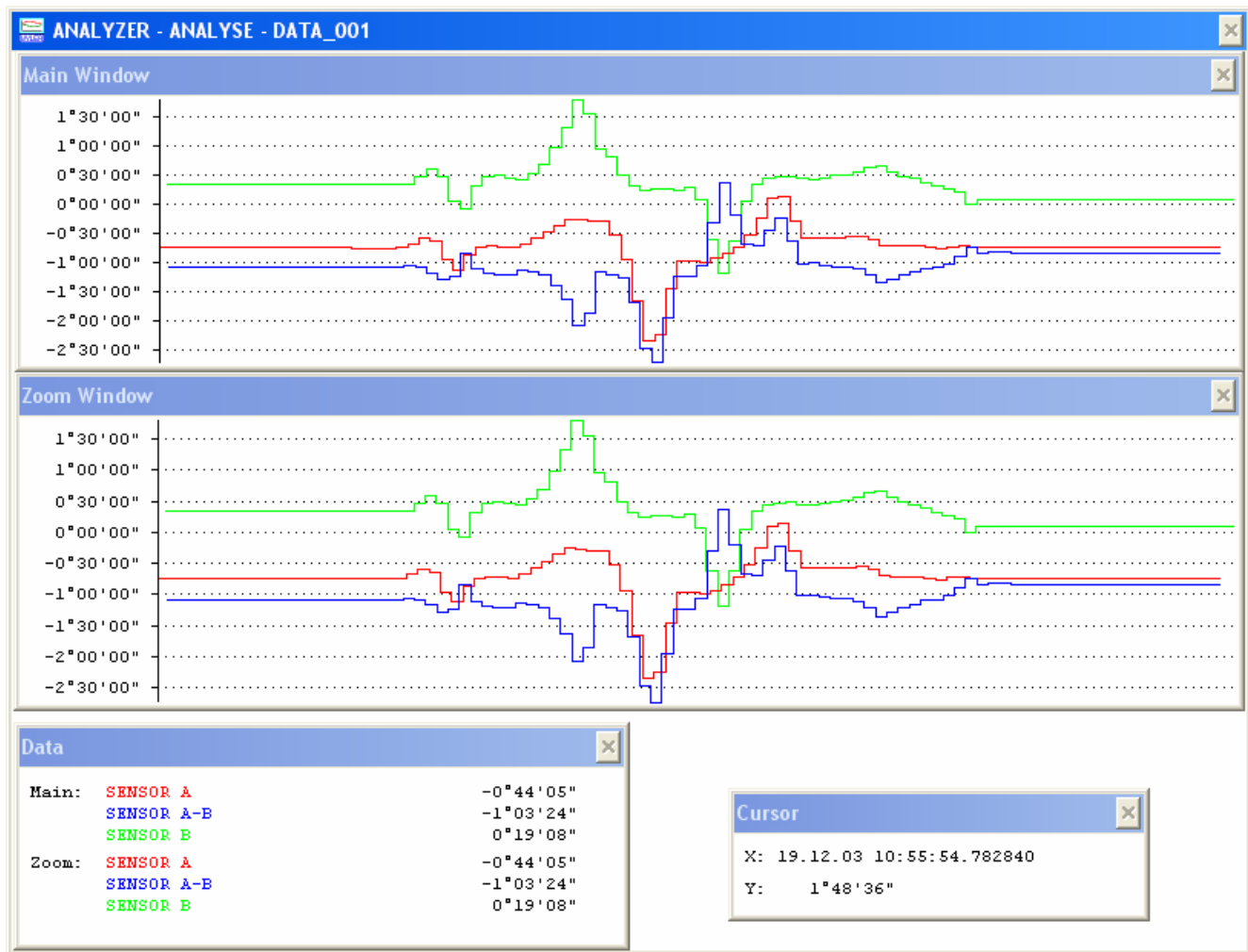
The following picture is displayed on the monitor (depending on the operating system)



Using the mouse the four reduced size windows laying one over the other (Main Window, Zoom Window, Cursor und Data) can be placed as required



After that the individual windows must be placed properly on the monitor. The so place window's coordinats are saved in the module [CONTROL] . When starting the Analyzer tool the next time the windows appear as set before.



Within the main "ANALYZER" window the additional four windows should also be seen:

- **Main-Window**, The complete measuring curve from beginning to the end is displayed.
- **Zoom-Window**, here portions of the main window is displayed. The portions may be selected by mouse click at the desired begin and end.
Also within the Zoom window the same procedure may be applied.
- **Window "DATA"**, here statistical interesting data is displayed, e.g. average values within the selected window.
- **Window "CURSOR"**, here the position of the mouse cursor is defined (X and Y axis, e.g. time and corresponding angle)

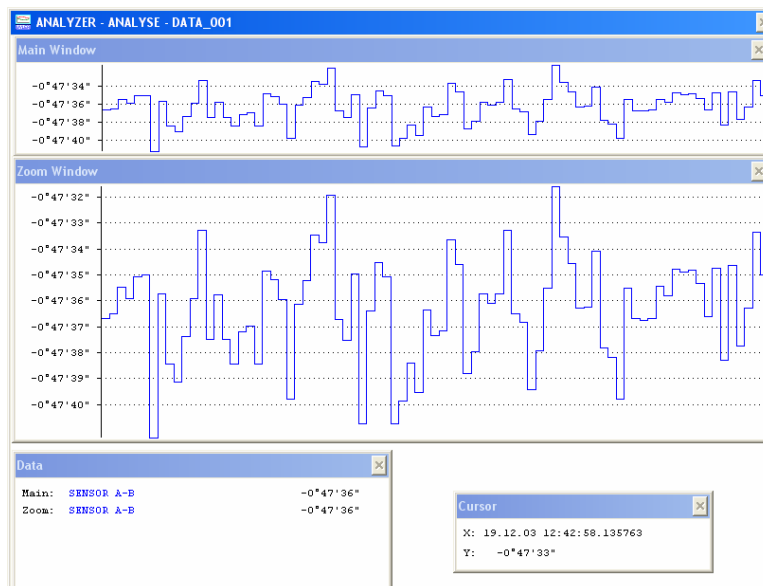
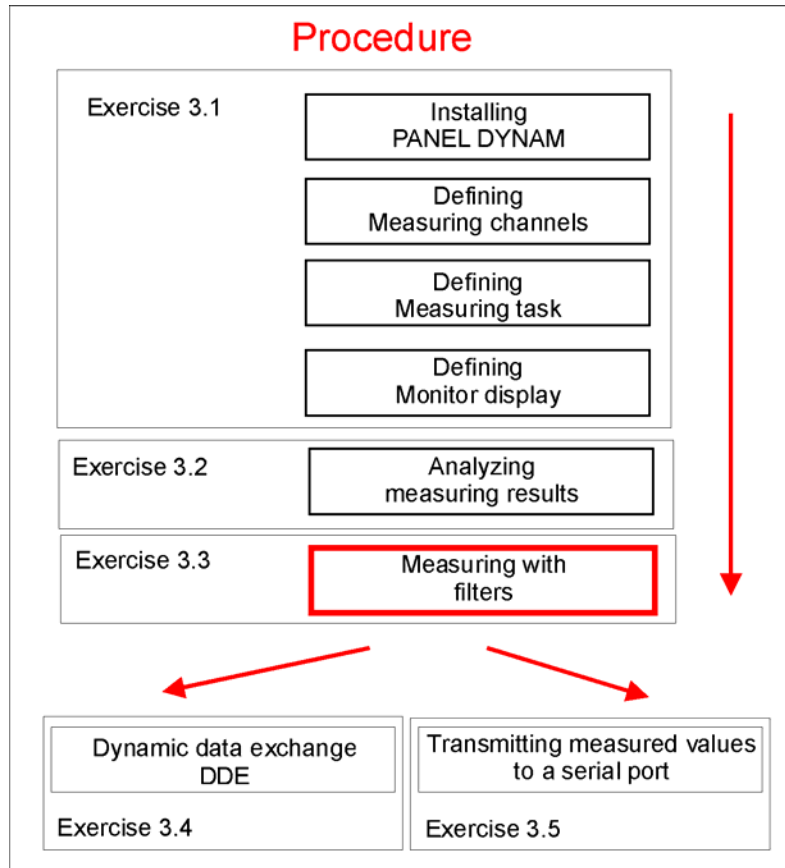
Congratulations, you have successfully completed part 2 of the exercise

3.3. Installation of filters for the display

Goal:

Extend the examples 3.1 and 3.2 by using filters

The displayed results e.g. numerical display, display of the ANALYZER can be altered by using a filter. (For filter type see point 9.3, "Definition of various filter types")



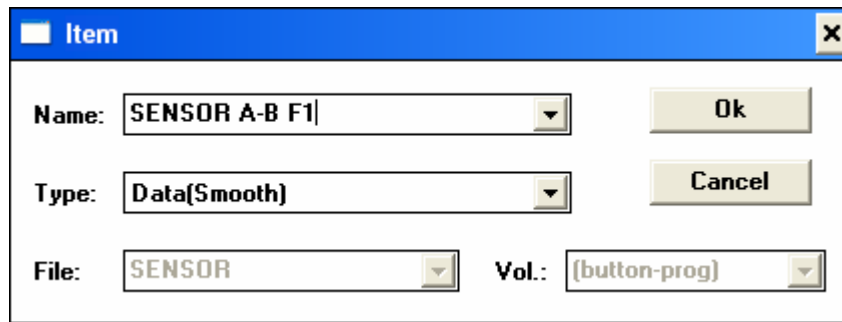
In the display above „ANALYSE - ANALYZER - DATA_001“ a relatively large noise in the result of the measurement "Sensor A - B". For suppressing this noise a filter can be implemented. For our example we chose a **Filter Type "1"**

The filtered measuring channel is to be treated like regular channel.

This measuring channel with filter must be defined as measuring command in the modules „SENSOR“, „SAMPLER“ and „ANALYZER“

I) Module „SENSOR“

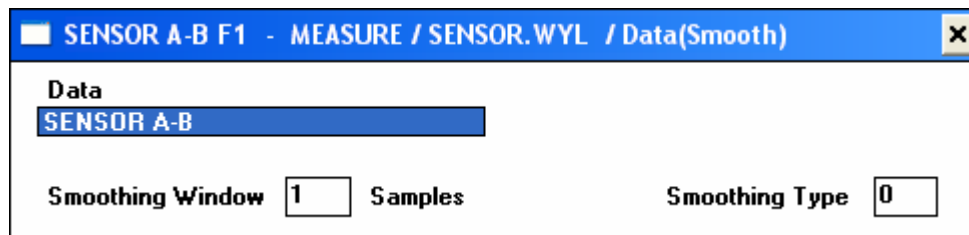
As a first step the new measuring channel „SENSOR A-B F1“ must be defined in the menu MEASURE/SENSOR.WYL as below:



Different to the definition of the measuring channel „SENSOR A-B“ the **type** of the new measuring channel must be defined by using the pull down menu and click to the mathematical command „Data(Smooth)“

After confirming with Ok the new sensor „SENSOR A-B F1“ can be opened with double click. In the dialogue box [SENSOR A-B F1 - MEASURE / SENSOR.WYL / Data(Smooth)] the following information must be entered:

- | | |
|--------------------|---|
| - Data | chose „SENSOR A-B“ from the menu |
| - Smoothing Window | 20 (this means that 20 measured values will be used for calculating the filtered value) |
| - Smoothing Type | 1 (for Filter-Type 1) |

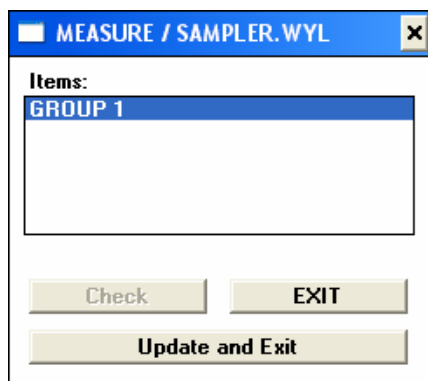
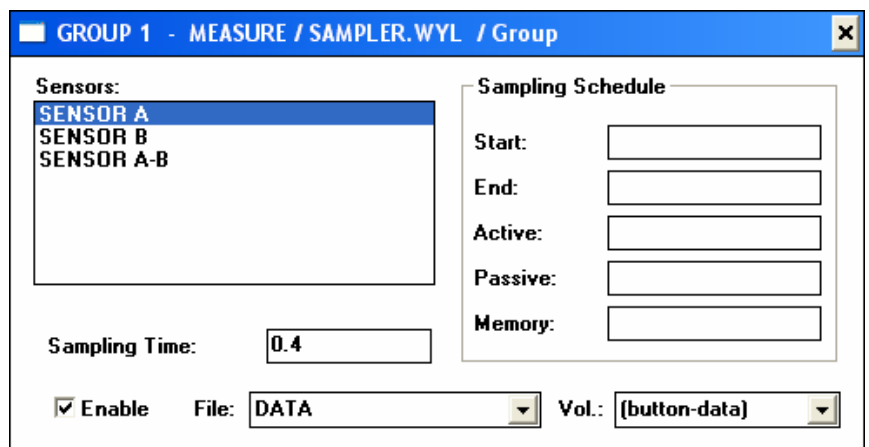


Saving with „Update and Exit“

II) Module „SAMPLER“

Also the measuring channel must be activated in the module „SAMPLER“

By clicking to Sampler in the pull down menu Script of the Panel a dialogue box [MEASURE / SAMPLER.WYL] appears. Double click to the item "GROUP 1" will open the well known dialogue box:

Double click to the area below "SENSOR A-B activates the dialogue box and the new measuring channel „SENSOR A-B F1“ can be selected by using the pull down menu.

GROUP 1 - MEASURE / SAMPLER.WYL / Group

Sensors:

SENSOR A
 SENSOR B
 SENSOR A-B
 SENSOR A-B F1

Sampling Schedule

Start:
 End:
 Active:
 Passive:
 Memory:

Sampling Time:

☒ Enable File: Vol.:

The procedure may now be repeated for „SENSOR A“ and „SENSOR B“ if their results should also be filtered as well.

If finished the result must be saved with „Update and Exit“

III) Module „ANALYZER“

For analyzing the measurements filtered and unfiltered (original data) the new measuring channel „SENSOR A-B F1“ and if required the channels „SENSOR A F1“ and „SENSOR B F1“ must be installed in the module ANALYZER. Before the new channels can be installed **first a measurement must be taken**. Because only after such a measurement the measuring channels can be activated.

By clicking to Aalyzer in the pull down menu Script of the Panel the well-known dialogue boxes appear. Similar to the already made changes the new sensors respectively the new measuring channels may be installed.

ANALYSE / ANALYZER.WYL

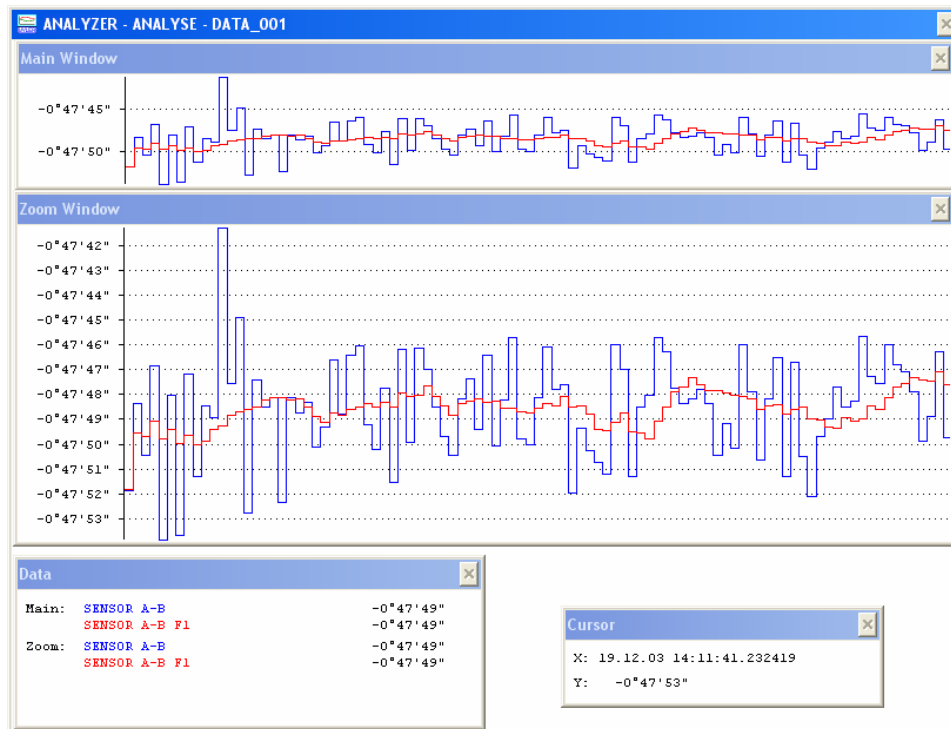
Items:

CONTROL
 GRAPH SENSOR A
 GRAPH SENSOR A-B
 GRAPH SENSOR A-B F1
 GRAPH SENSOR B

IV) Measuring and analyzing with "filters"

Now a measurement can be started in the known procedure. In order to make the filter effect more visible in the ANALYZER only the „SENSOR A-B“ and „SENSOR A-B F1“ should be activated. This means in all the other measuring channels the ENABLE sign should be deactivated. (Using the button „ANALYSE“ and opening the menu Script, Aalyzer)

Remarks: The new measuring channel „Sensor A F1“ cannot be activated in the ANALYZER if no new measurement is done



Since both channels „SENSOR A-B“ and „SENSOR A-B F1“ are activated both curves are visible in the window. One displays the original data (SENSOR A-B) and the other the filtered data „SENSOR A-B F1“

Depending on the measuring task and the conditions a respective type of filter must be chosen. (See point 9.2 Definition of various filter types)

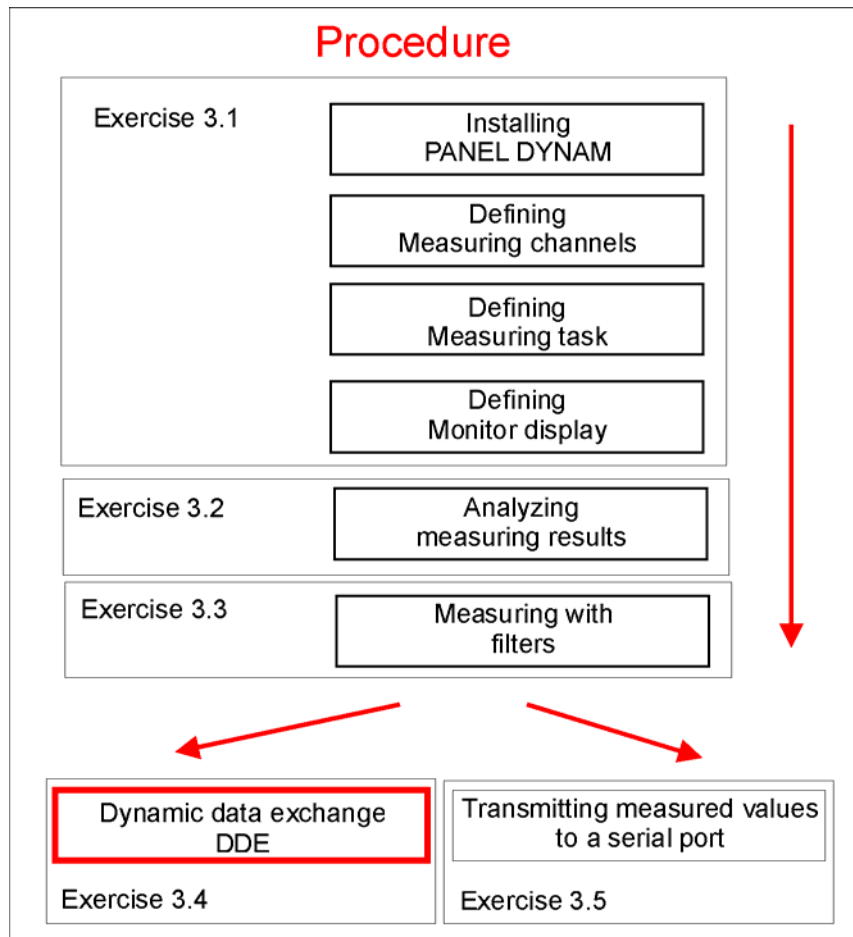
Congratulations, you have successfully completed part 3 of the exercise

3.4. Installation of the module DDE; dynamic data exchange with other Windows applications.

Goal:

Extending the example 3.1 with the function DDE. This means that the displayed values will be transmitted simultaneously to an EXCEL file.

If the actual measured data should be transmitted to an other Windows application (DDE Clients) the **module DDE** must be installed and activated.



Task defining:

The measured angular value of the measuring channel "**SENSOR A-B**" is to be made available **every 10 sec.** in the format "rad x,xxxxxxx" for transmitting to other Windows applications (e.g. EXCEL)

The value should be made available under "DYNAM", "DATA", "ANGLE_DIFF_A_B"

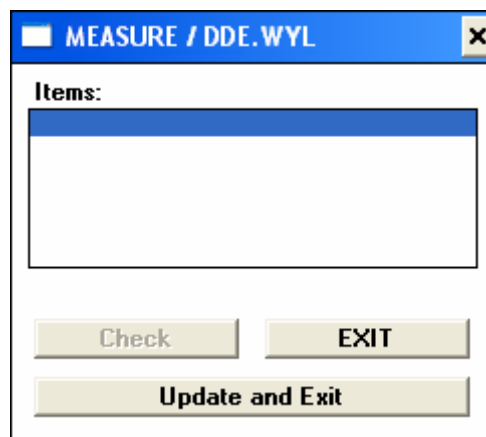
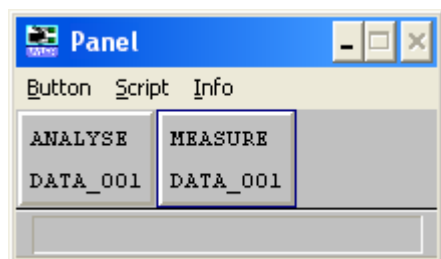
DDE Convention:

User text: "DYNAM"
Theme: "DATA"
Element: "ANGLE_DIFF_A_B"

I) DDE-Command

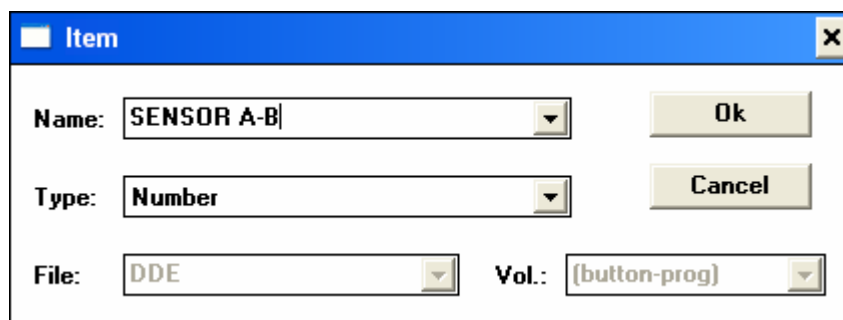
With a **single mouse click** the button measure must be activated.

A click to Script in the menu bar of the Panel will open a pull down menu, here DDE must be activated by a click and a dialogue box appears. Double click to the area below Items will open a new dialogue box [Item]



The following information is to be typed:

| | |
|-------|---|
| Name: | chose a name, max. 16 characters e.g. "SENSOR A-B" |
| Type: | "Number" |



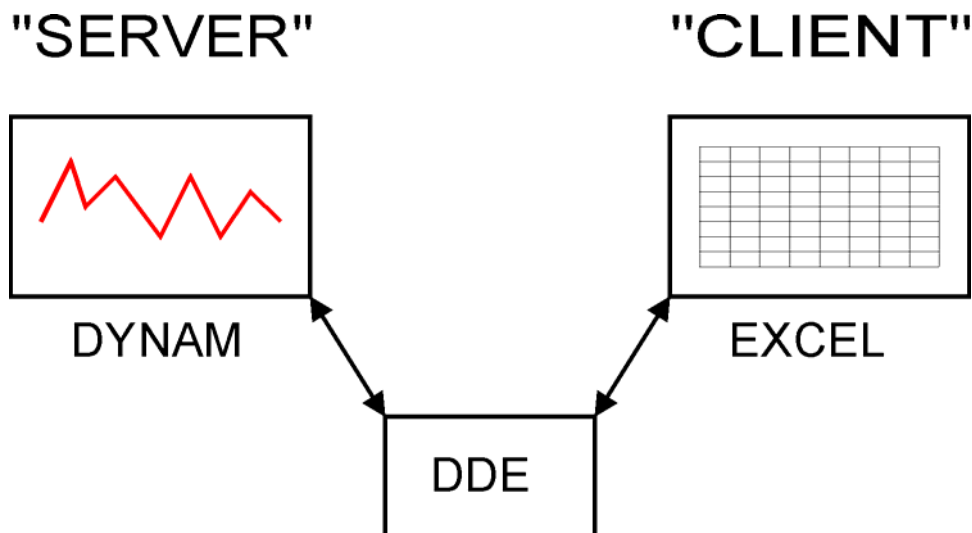
Chose Ok to accept the entering.

Below "Items" the name "SENSOR A-B" will be entered in the box "MEASURE/DDE.WYL" With double click to the name "SENSOR A-B" a new dialogue box will be opened.

The following information is to be typed:

| | |
|--------------|---|
| Data: | Use pull down menu "Sensor A-B" |
| Type: | Use pull down menu "Angle" |
| Unit: | Use pull down menu "r,rrrrrr rad" |
| Service: | default "Dynam", see below |
| Topic: | default "Data" , see below |
| Item: | "ANGLE_DIFF_A_B" , see below |
| Update Time: | 10 , this means every 10 sec. a value is ready to be called. |

Chose Ok to accept the entering.



Explanations to the fields SERVICE / TOPIC / ITEM:

On the right side of the dialogue box [SENSOR A-B - MEASURE / DDE.WYL / Number] below "Server" the fields SERVICE / TOPIC / ITEM are available. These fields are used for identification of the server application DYNAM looking from the client (e.g. EXCEL) for getting the data.

The identification of the "Item" may be chosen free. (Max. 16 characters are allowed, no empty space, no special characters)

II) Measuring with the module DDE

For **checking the application DDE** the application EXCEL must be running. Start a measurement to make sure that values are available.

Open in EXCEL a spreadsheet and go with the cursor to any field in which the data from the DYNAM application is supposed to be entered. In this field the following formula must be entered:

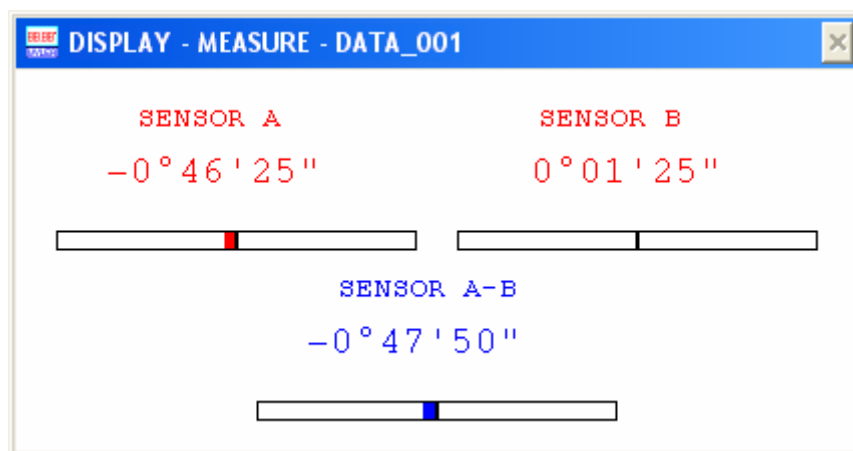
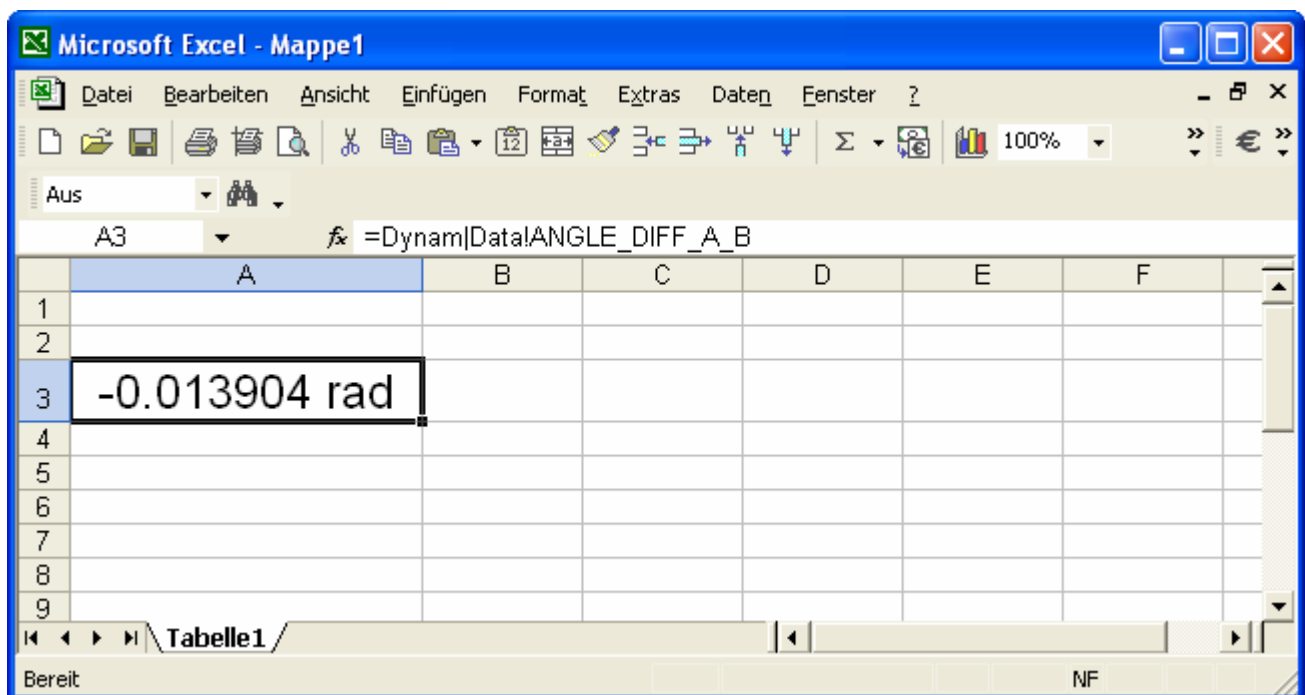
=Dynam!Data!ANGLE_DIFF_A_B

To be confirmed with ENTER.

Remark: The character "!" may be generated in EXCEL with "ALT + 124"

If all entering are correct and the measurement is running in the defined field of EXCEL the actual measuring value is displayed. (Using the defined update time)

The screen may look as follows:



When a measurement was stopped and started from new, the EXCEL procedure must be activated from new as well.

By using MACRO PROGRAMMING the required data sheets may be created. In these sheets the collected data may be displayed according to the requirements. E.g. as shown below:

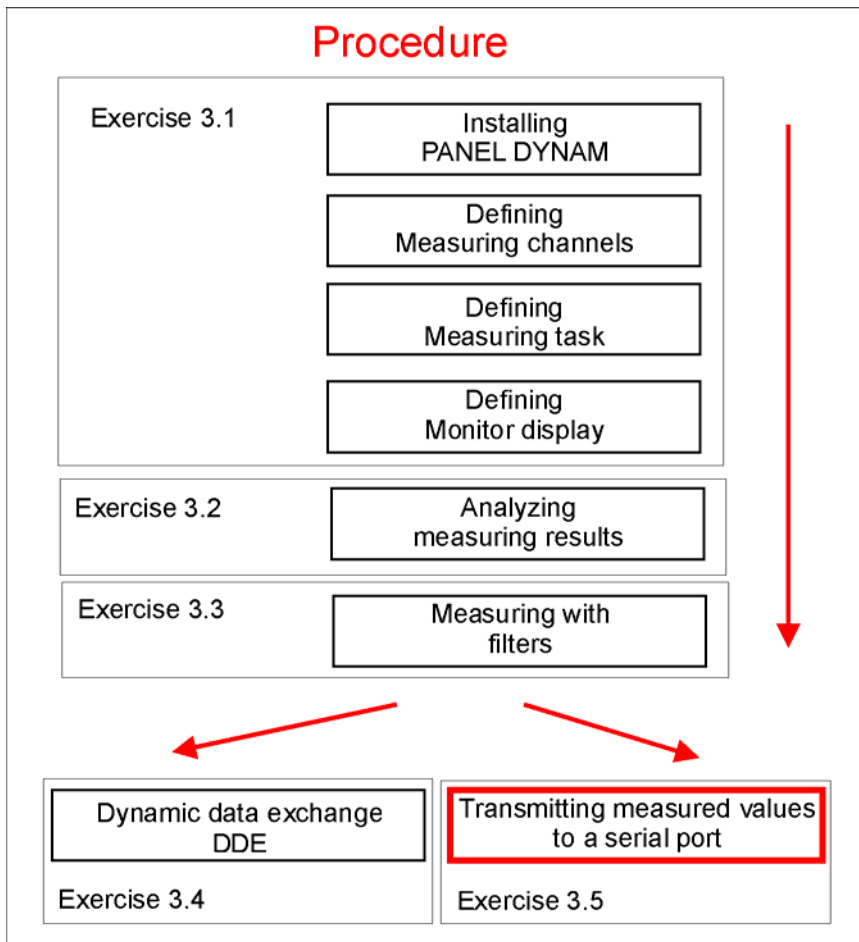
MEASURING RESULTS DYNAM

| | | | |
|---------------|----------------|--------------------|------|
| Interval: | hh:mm:ss | Actual value DYNAM | |
| | 00,00,10 | 17,40 | µm/m |
| Time interval | Date: | Value | |
| 00,00,10 | 23,02,94 08,22 | 17,00 | µm/m |
| 00,00,20 | 23,02,94 08,22 | 18,50 | µm/m |
| 00,00,30 | 23,02,94 08,22 | 18,00 | µm/m |
| 00,00,40 | 23,02,94 08,22 | 17,90 | µm/m |
| 00,00,50 | 23,02,94 08,22 | 17,60 | µm/m |
| 00,01,00 | 23,02,94 08,23 | 17,20 | µm/m |
| 00,01,10 | 23,02,94 08,23 | 17,50 | µm/m |
| 00,01,20 | 23,02,94 08,23 | 17,90 | µm/m |
| 00,01,30 | 23,02,94 08,23 | 18,10 | µm/m |
| 00,01,40 | 23,02,94 08,23 | 18,40 | µm/m |
| 00,01,50 | 23,02,94 08,23 | 17,40 | µm/m |

Congratulations, you have successfully completed part 4 of the exercise

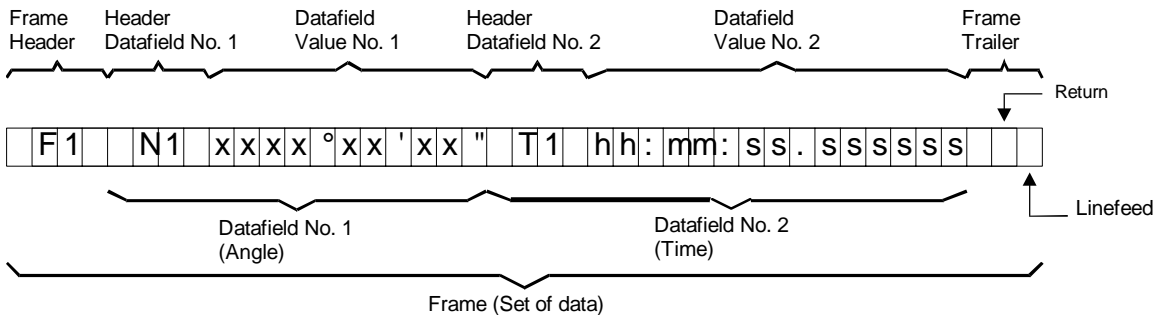
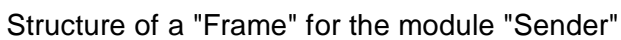
3.5. Installation of the module SENDER; transmitting the data to the serial port

If the actual measured data should be transmitted to the serial port the **module SENDER** must be installed and activated.



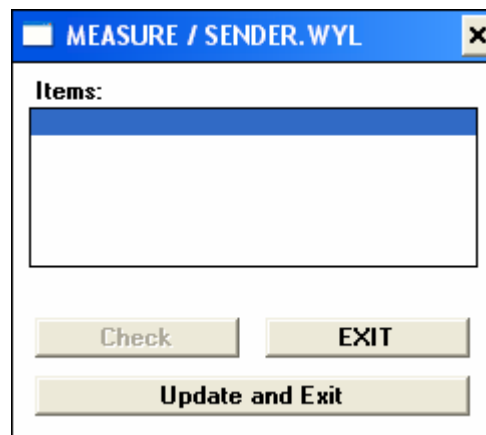
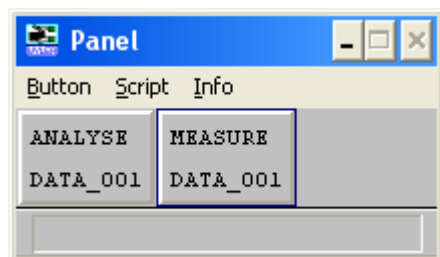
Task defining:

The measured angular value of the measuring channel "**SENSOR A-B**" is to be made available **every 2 sec.** At the serial port COM1 with a Baud rate of 115200.



I) Preparations

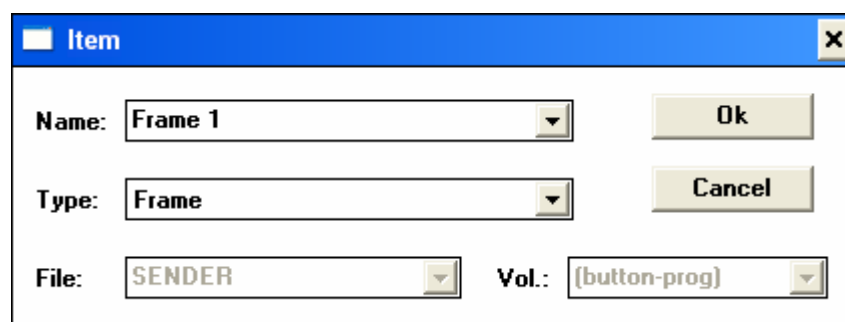
With a **single mouse click** the button measure must be activated. A click to Script in the menu bar of the Panel will open a pull down menu, here SENDER must be activated by a click and a dialogue box appears. Double click to the area below Items will open a new dialogue box [Item]



II) Installation of the frame (Data frame)

The following information is to be typed:

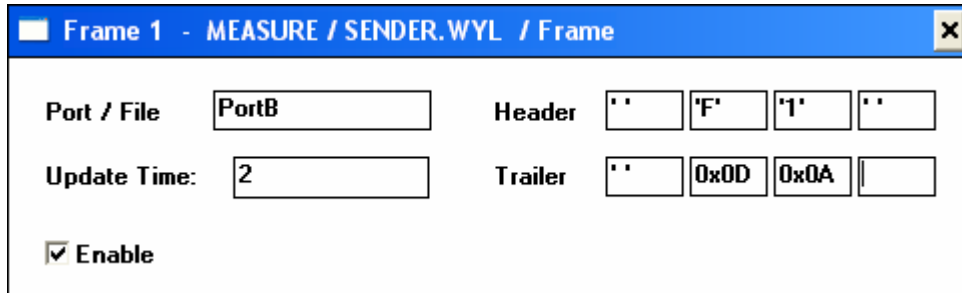
| | |
|---------|-----------------------|
| Name: | Frame 1 |
| Type: | Frame |
| File: | default (SENDER) |
| Volume: | default (button prog) |



Chose Ok to accept the entering.

In the box "MEASURE/SENDER.WYL" below "Items" the name "Frame 1" is to be entered. With double click to the name "Frame 1" a new dialogue box appears in which the following information is to be typed:

| | |
|--------------|---|
| Port: | PortB |
| Header : | ' ' 'F' '1' ' ' |
| Update Time: | As defined 2 , this means, every 2 sec. The actual value will be transmitted to the defined port |
| Trailer: | ' ' 0x0D 0x0A |



Remark: - The character apostrophe " ' " is identical with the ASCII-Code ALT + 039
 - Between the two apostrophes an empty space must be placed

The serial port of the sender must be defined in DYNAM.INI
 Entering in DYNAM.INI under [WySender.EXE]:

PortB=COM1,115200 (serial port and Baud-Rate)

See also 2.5.7.3/"Sender-Command „Frame“

Remarks:

Please make sure that the two modules "WyAngle.DLL" and "WySender.EXE" do not use the same port.

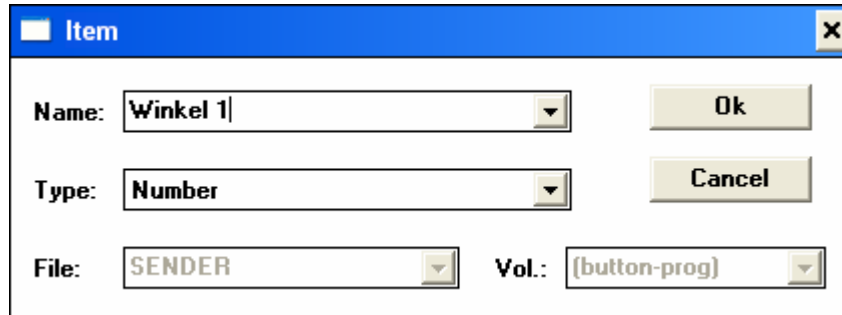
Remarks:

If in DYNAM.INI the definition „PortB=COM1,115200“ is not available automatically a text file with the definition "PortB.TXT" will be generated in the respective data volume. (E.g. in: Data_001) This is important if the data should be reworked in a text file.

III) Installation of the "Data field #1" (Definition of the format of the measuring value)

Double click below "Items" to a free field in the box "MEASURE/SENDER.WYL" and the dialogue box "Item" opens in which the following information is to be typed:

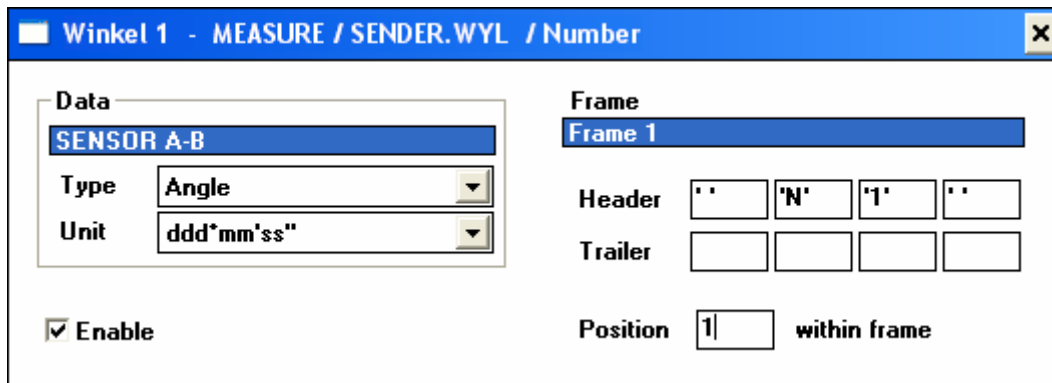
| | | |
|---------|-----------------------|--------------------------|
| Name: | Angle 1 | (or in German: Winkel 1) |
| Type: | Number | |
| File: | default (SENDER) | |
| Volume: | default (button prog) | |



Chose Ok to accept the entering.

The name Angle 1, (Or in German: Winkel 1) will be entered under Items. With double click to the name defined a new dialogue box appears in which the following information must be entered:

| | |
|-----------|--|
| Data: | Pulldown-Menu chose "Sensor A-B" |
| Type: | Pulldown-Menu chose "Angle" |
| Unit: | Pulldown-Menu chose "Arc deg:min:sec" |
| Frame: | Activate with double click, use pulldown-Menu chose "Frame 1" |
| Header: | ' ' 'N' '1' ' ' |
| Trailer: | leave blank |
| Position: | Defines the position of the data fields to be sent within a data frame In our case only the number "1" must be entered. |

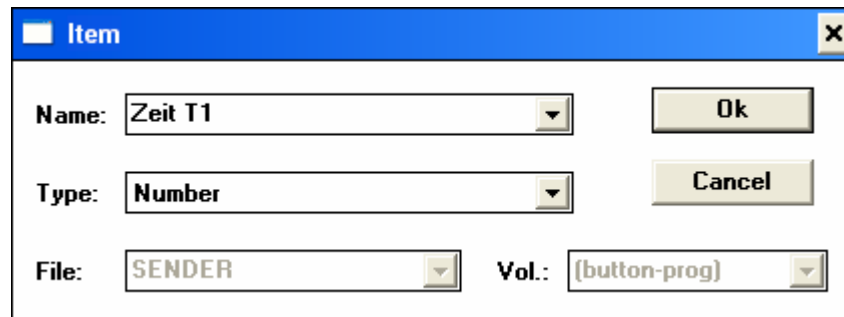


Closing the box and saving the data with „**ALT+F4**“

IV) Installation of the "Data field #2" (Definition of the time corresponding to the measuring value)

Double click below "Items" to a free field in the box "MEASURE/SENDER.WYL" and the dialogue box "Item" opens in which the following information is to be typed:

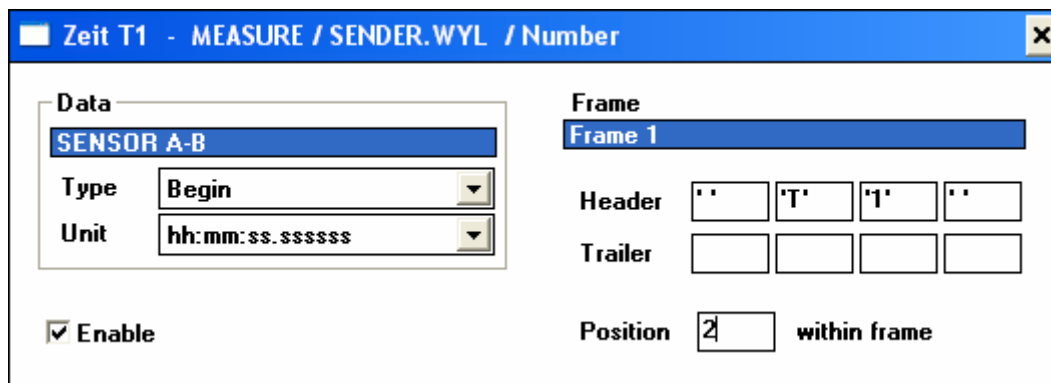
| | | |
|---------|-----------------------|-------------------------|
| Name: | Time T1 | (or in German: Zeit T1) |
| Type: | Number | |
| File: | default (SENDER) | |
| Volume: | default (button prog) | |



Chose Ok to accept the entering.

The name Time T1, (Or in German: Zeit T1) will be entered under Items. With double click to the name defined a new dialogue box appears in which the following information must be entered:

| | |
|-----------|--|
| Data: | Pulldown-Menu chose "Sensor A-B" |
| Type: | Pulldown-Menu chose "Begin" |
| Unit: | A Pulldown-Menu chose "hh:mm:ss.ssssss" |
| Frame: | Activate with double click, use pulldown-Menu chose "Frame 1" |
| Header: | ' ' 'T' '1' ' ' |
| Trailer: | leave blank |
| Position: | Defines the position of the data fields to be sent within a data frame In our case only the number "2" must be entered. |



Chose "Update and exit"



When starting the measurement with the button "MEASURE" the measured values with the corresponding time will be available at the **serial port COM1** every 2 sec.

| | | | | |
|----|----|----------|----|-----------------|
| F1 | N1 | 0°03'18" | T1 | 08:13:35.649001 |
| F1 | N1 | 0°03'14" | T1 | 08:13:37.649001 |
| F1 | N1 | 0°03'21" | T1 | 08:13:39.649001 |
| F1 | N1 | 0°03'25" | T1 | 08:13:41.649001 |
| F1 | N1 | 0°03'18" | T1 | 08:13:43.649001 |

etc.

Congratulations, you have successfully completed part 5 of the exercise

4. Installation of the module "PRINTER"

If the actual measured data should be transmitted in numerical form to a connected printer, the **module PRINTER** must be installed and activated.

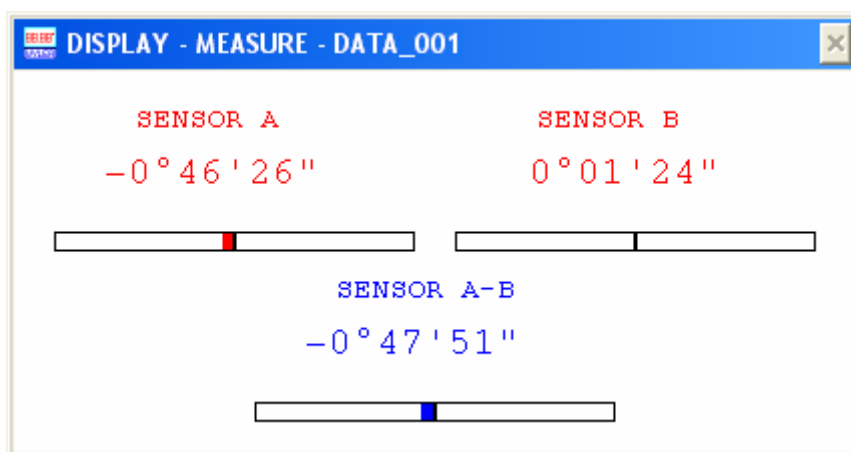
NOT AVAILABLE YET

As an alternative the data may be transmitted via the module DDE to a spreadsheet in e.g. EXCEL and from there printed directly.

5. Printout of the measured results

Because the module "PRINTER" is not available yet the results of a measurement may easily be made available with a print screen as follows.

On the screen the following display is as an example seen:



The desired printout must be copied into the "Clipboard" and then pasted in the Windows program "WRITE". In this text editing program additional text may be added to the DYNAM output, such as e.g.

- Title
- Date of measurement
- Other comments

There are two possibilities for the definition of the DYNAM printout area and the respective transfer to the "Clipboard":

Printout of the total monitor screen: use: **"PRINT SCREEN"**

Printout of a selected window: use: **"ALT + PRINT SCREEN"**.
The selected window must be active.

In our example only a selected window should be incorporated in printout of a Write document.

MEASURING PROTOCOL

Measuring task:Difference between object A and object B

Measuring File:DATA_001

Date of measurement:24.12.1999

Responsible for measurement:P. Miller

DISPLAY - MEASURE - DATA_001

SENSOR A

-0°46'26"

SENSOR B

0°01'24"

SENSOR A-B

-0°47'51"

Signature:

Date:

The document may now be saved under a text format, Write document.

Once the module "PRINTER" is available the printing can be done directly from DYNAM.

6. Ending the DYNAM program

It is at any time possible to end the DYNAM application by mouse click to "Exit" in the menu "Button" in the "PANEL". Make sure that any DYNAM application was closed before properly.

7. Automatic start of DYNAM with the system start

As soon as all the parameters as described above in pt. 2.2 are set, the DYNAM program may be installed with an automatic start procedure under the Windows program "AUTOSTART".

In order to do so it is necessary to copy the application "DYNAM" from the Program group DYNAM to the group AUTOSTART. Chose OK.

The icon "Script" is now in the group AUTOSTART visible.

Advantage of the autostart:

As soon as the system is started the measuring will begin. Important in case of a power failure when continuously is measured.

In case of the AUTOSTART no password is allowed.

After the start of the system the latest saved window display is shown. The measurement will continue.

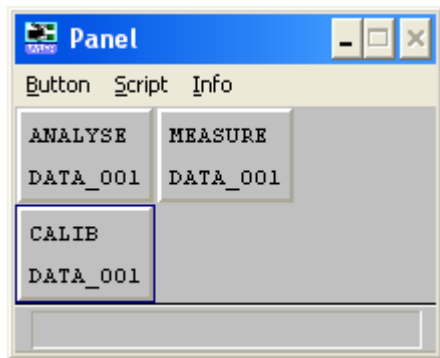
8. Calibrating the sensors by using DYNAM

| | | | |
|-----------------|--|-----------------------|-------|
| Task: | Calibrating the sensors A and B throughout a defined measuring range | | |
| Pre-set: | Address "RS485 Device Address" and "RS485 Subaddress" are pre-set by WYLER | | |
| Example: | Calibrating the sensors A and B with a measuring range of +/- 10° on a suitable calibrating instrument (Sine bar, Index table etc.) The sensors are already configured according to the previous example in such a way that a regular measurement is possible. Sensor addresses: | | |
| | Sensor A: | RS485 Device Address: | 20 |
| | | RS485 SubAddress: | 1 |
| | | Port: | PortA |
| | Sensor B: | RS485 Device Address: | 21 |
| | | RS485 SubAddress: | 1 |
| | | Port: | PortA |

Procedure:

I) Defining the sensors and installation of the calibrating channel

It is recommended to generate in the Panel a separate push button "CALIB"

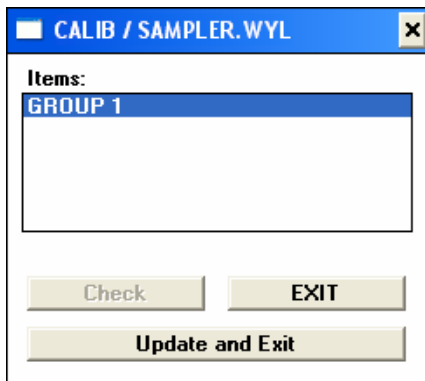
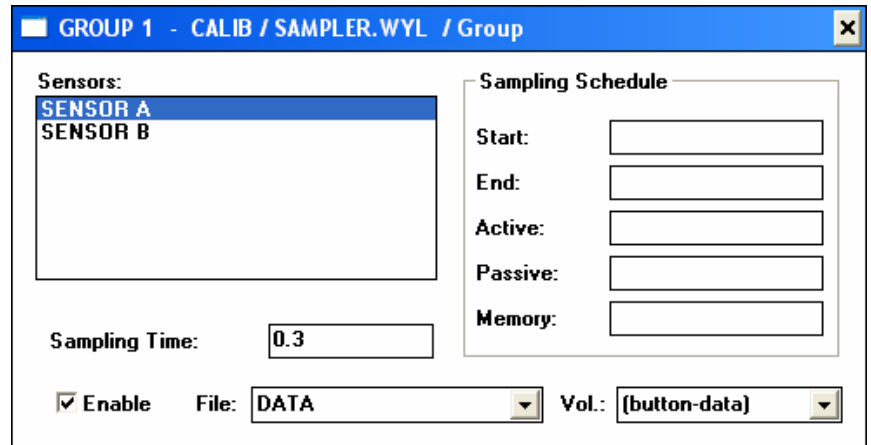


Remarks:

For the proper calibration of a sensor a minimum of 6 supporting points of the calibration curve is required.

As mentioned above the sensors A and B must be installed again according to our example under the button "CALIB".

- Defining sensor A and B (Sensor profile) in module "SENSOR" under "CALIB
- Defining sensor A and B in module "SAMPLER" under "CALIB for measuring (In addition to the calibrating channel)

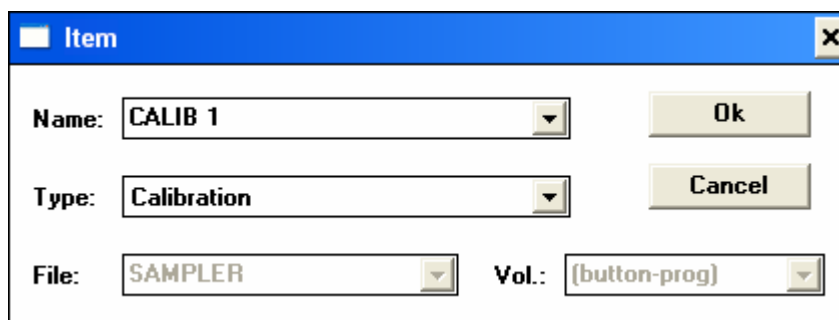



In the menu SAMPLER a new additional measuring channel for the calibration must be installed.

By clicking to Sampler in the pull down menu Script of the Panel and double click to the marked area below Items will open a new box [Item].

The following information is to be typed:

| | |
|---------|---|
| Name: | e.g. CALIB 1 |
| Type: | " Calibration " use pull down menu |
| File: | default (SAMPLER) |
| Volume: | default (button prog) |

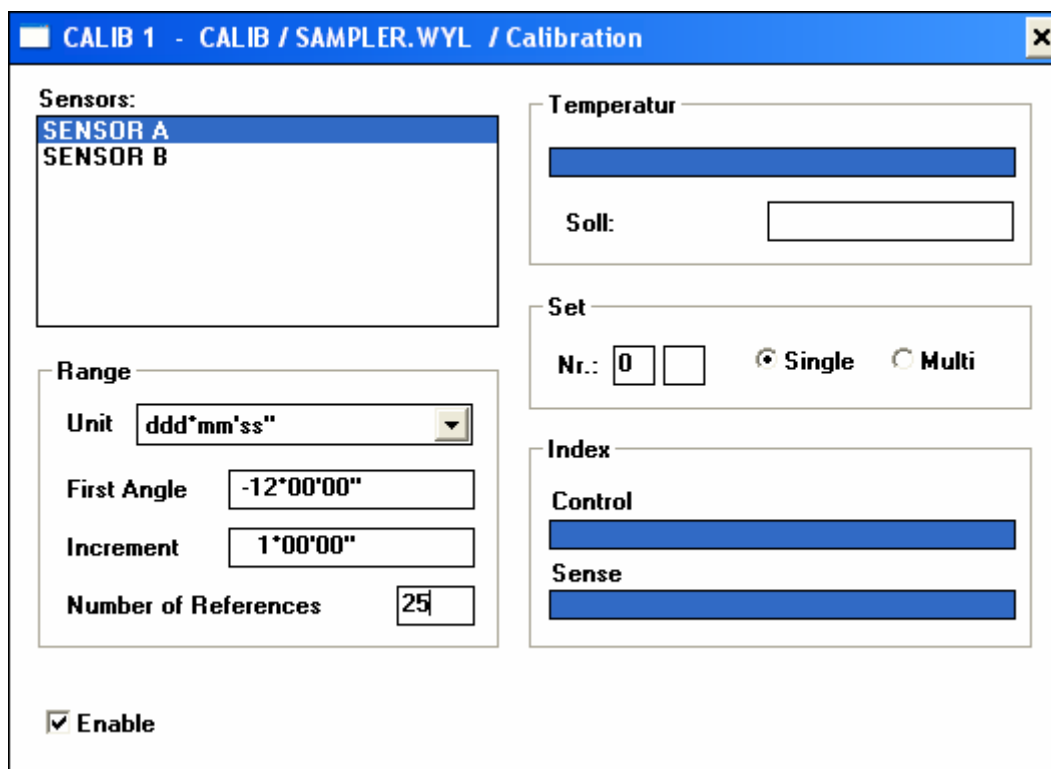


Chose Ok to accept the entering.

Double click to the calibration channel CALIB 1 will open a dialogue box [CALIB1 - CALIB / SAMPLER.WYL / Calibration] in which the data for the calibrating of the sensors A and B must be entered.

The following information is to be typed:

| | |
|--------------|--|
| Sensors: | Use double click to open the dialogue box item and chose from the pull down menu „ SENSOR A “ and „ SENSOR B “ |
| Range: | - Unit: e.g. Arc deg:min:sec - First Angle: - 12° 00' 00" - Increment: 1° 00' 00" - Number of references 25 |
| Temperature: | leave blank (only to be used when calibrating with different temperatures) |
| Set: | 0 |
| Index | leave blank (only to be used when calibrating with different temperatures) |



Chose Ok to accept the entering.

The module DISPLAY may now be installed individually according to the previously learnt.

Remarks to the above entries:

General

- For a correct calibration it is important to establish **at least seven calibrating points** throughout the whole measuring range.
- The ZEROTRONIC sensors will regularly be supplied with 3 calibration curves incorporated, each at another temperature. (see picture). By newly calibrating the sensors with the Levelmeter 2000 all the existing curves are lost.

"Sensors":

A number of different sensors may be defined, all of which will be calibrated at the same time with the same calibration data.

"First Angle":

- This is the angular value to be installed when starting the calibration procedure. This is the largest angle on the **minus** side because the calibration increment can only be added in the positive direction.
- It is important to calibrate a sensor to a larger degree than the required angular range is. E.g. if the range is $\pm 10^\circ$ then the calibration should reach to $\pm 12^\circ$. This is to ensure that the linearity at the end of the range is still sufficient.

"Increment":

Angular size of a step between the calibration points. It is recommended to use about min 25 calibration steps over the whole range for a sensor with a measuring range of ± 10 degrees.

"Number of references":

Number of calibration steps in total beginning with the first angle.

| | | |
|----------|-------------------------|-----------------------|
| Example: | - First Angle: | - $12^\circ 00' 00''$ |
| | - Increment: | $1^\circ 00' 00''$ |
| | - Number of references: | 30 |

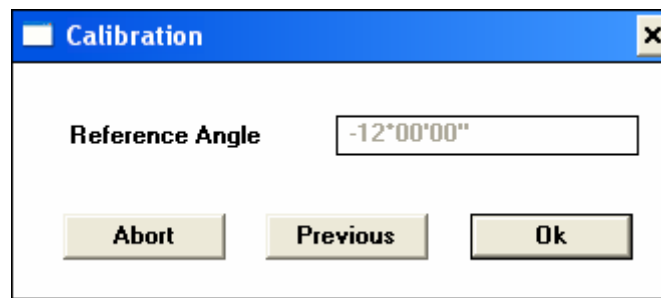
| | | |
|---------|----------|-----------------------|
| Result: | 1. Step | - $12^\circ 00' 00''$ |
| | 2. Step | - $11^\circ 00' 00''$ |
| | 3. Step | - $10^\circ 00' 00''$ |
| | 25. Step | + $12^\circ 00' 00''$ |

This sensor would be calibrated from $- 12$ degrees to $+ 12$ degrees

II). Starting the calibration procedure

Everything is now ready to start the calibration process of the two sensors.

By using the push button "CALIB" in the panel the process starts and a dialogue box "CALIBRATION" appears.



The sensors should now be placed to the required calibration position. In our example the first position is - 12°00'00". The procedure follows now the respective dialogue.

Important:

Parallel to the calibration process the regular measuring process must be activated as well.

The required calibration angle must be available on a calibrating tool with the necessary accuracy, such as e.g. a sine bar, index table etc. The sensors must be mounted properly. For mounting the sensors see also point 2.7 "Installation of the sensors/Addressing the sensors"

Meaning of the operating buttons:

ABORT:

Activating ABORT stops the calibrating process, the calibration data will be lost.

PREVIOUS:

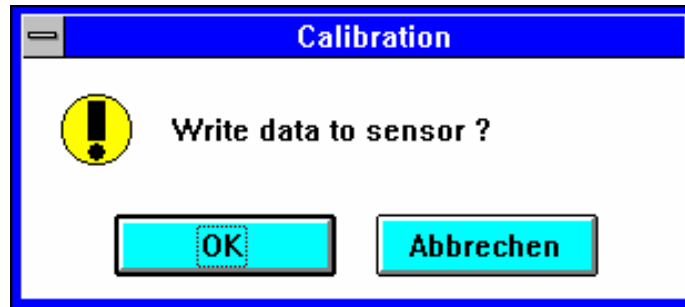
The latest calibration step will be repeated.

OK:

The calibration process will get started for the value defined in the box. After 10 seconds the average value of the measured data will be saved as calibration value. (the time, 10 sec. depends on the pre-set sampling time)

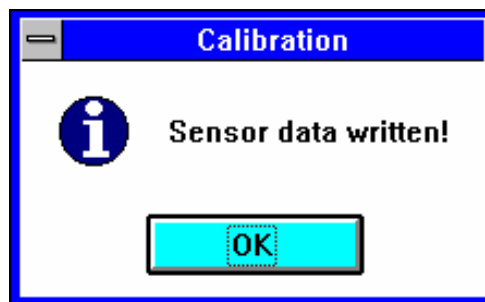
III) Saving the calibration data

After the calibrating process, respectively after the last value is collected the following dialogue box appears:



Use OK for proper saving of the data. When using "Abbrechen" (Cancel) the calibration process will be stopped without destroying the calibration values to that point.

When all the calibration data is **successfully saved** in the sensors the following dialogue box appears:



Should the process **not** have been **successful**, the message "Sensor data NOT written" appears. In such a case the calibrating process and the set up must be checked and the calibrating process must be repeated.

IV) Deactivate the calibration channel

After the successful calibration of the sensors it is absolutely necessary to deactivate the calibration channels. To do so open the calibrating channel "CALIB 1" must be opened in the Sampler under Script in the PANEL and the check box "Enable" must be deactivated or the calibration channel " CALIB 1" can be deleted completely.

If a separate push button "CALIB" was created for the calibration process it is also possible just to deactivate the button but it is important not to accidentally touch it later.

V) Calibrating at different temperatures

For effective temperature compensation the sensor may be calibrated at up to 6 different temperatures. These calibrating curves will be stored in the sensor head.

If this calibration procedure is required the respective set up must be activated in the dialogue box „CALIB 1 - CALIB/SAMPLER.WYL/Calibration“. In the box „Set“ the fields „Single“ and „Multi“ need to be checked correctly.

| | | | | |
|----------|----------------------------|-----|---|------------------|
| Example: | 1. Calibration (standard): | Nr. | 0 | checked „Single“ |
| | 2. Calibration: | Nr. | 1 | checked „Multi“ |
| | 3. Calibration: | Nr. | 2 | checked „Multi“ |

9. ANNEX

9.1. Content of the file "DYNAM.INI"

As described earlier in the point "Installing WYLER software DYNAM" the file DYNAM.INI may have to be changed according to customer specifications. Such a change may be needed if the connection of the serial port is different from the original installation. If the sensors are connected to COM1 instead of COM2 then it is important to activate COM1 in the DYNAM.INI and deactivate COM2.

Below the file content is shown:

```
[WyAngle.DLL]
;
; Definition: Name1={PortName},{Baud rate}
;             Name2={PortName},{Baud rate}
;             ...
;             NameN={PortName},{Baud rate}
;
PortA=COM2,19200           (must later be entered in the
                           „Sensor measuring commands
;
[WyData.DLL]
ProgVolumePath=PROG
DataVolumePath=DATA

[WyPanel.EXE]
Layout=0,0,2,2,0,3,1,1
Dlg6Pos=24,184
Dlg5Pos=8,127
Dlg1Pos=296,24
Dlg2Pos=256,128
Dlg3Pos=48,248
Dlg4Pos=16,124
Dlg7Pos=40,76
Dlg8Pos=176,104
Button1=ANALYSE,DATA_001,0,0,0,0
Button2=CALIB,DATA_001,0,0,0,0
Button3=MEASURE,DATA_001,0,0,0,0

[WySender.EXE]
;
; Definition: Name1={PortName},{Baud rate}
;             Name2={PortName},{Baud rate}
;             ...
;             NameN={PortName},{Baud rate}
;
PortB=COM2,19200           must later be entered in the
                           module „SENDER“
;
[WySample.EXE]
Dlg1Pos=210,115

[WyEdit.DLL]
Dlg1Pos=189,159
```

9.2. Troubleshooting guide

- | | |
|---|--|
| System is not starting; Measurement not active: | <ul style="list-style-type: none">- Sensors are not connected correct- Wrong serial port (COM2, instead COM1) DYNAM.INI to be changed- Power supply not connected, or excitation to low- Both modules WyAngle.Dll and WySender.Exe occupy the same port. They must use different ports. |
| Display bar not functioning: | <ul style="list-style-type: none">- Wrong volume/file applied- Scale setting of "+/-" not correct, watch for "-" in lower scale- Baud rate not adjusted properly or sampling rate too high. (See pt. 2.4)- Computer performance too low |
| Date or time entry can not be done correctly: | <ul style="list-style-type: none">- Check set-up in the Windows System configuration |
| Placement of the individual Windows can not be saved: | <ul style="list-style-type: none">- "Control" item not adjusted correctly (See Pt. 3.1.5, installation of the module DISPLAY |
| Module "SENDER" not working: | <ul style="list-style-type: none">- Characters not correct (') or no space left open- Port in DYNAM.INI not adjusted properly- Baud rate not correct |
| Module DDE not working: | <ul style="list-style-type: none">- DYNAM not started- Wrong characters () (ALT+124) |
| Calibration process not working: | <ul style="list-style-type: none">- Sensors not connected properly- Range of measurement not correct- Calibration steps not in proper relation to the range- To many or not enough steps (Min. 6 calibrating points) |

9.3. Definition of the various Filter-TYPES

9.3.1. Filter-Type „0“

Floating average values 'SmoothingWindow'
All measured values are weighted the same

| e.g. 20 measuring values | measured value | weight | distribution |
|--------------------------|----------------|--------|--------------|
| | 1 | 1 | ***** |
| | 2 | 1 | ***** |
| | 3 | 1 | ***** |
| | 4 | 1 | ***** |
| | 5 | 1 | ***** |
| | 6 | 1 | ***** |
| | 7 | 1 | ***** |
| | 8 | 1 | ***** |
| | 9 | 1 | ***** |
| | 10 | 1 | ***** |
| | 11 | 1 | ***** |
| | 12 | 1 | ***** |
| | 13 | 1 | ***** |
| | 14 | 1 | ***** |
| | 15 | 1 | ***** |
| | 16 | 1 | ***** |
| | 17 | 1 | ***** |
| | 18 | 1 | ***** |
| | 19 | 1 | ***** |
| | 20 | 1 | ***** |

9.3.2. Filter-Type „1“

Floating average values 'SmoothingWindow'
Values will be sorted, the smallest and the largest values (20% of all the values have no weight).
Towards the middle of the numbered values, the values have an increasing weight

| e.g. 20 measuring values | measured value | weight | distribution |
|--------------------------|----------------|--------|--------------|
| smallest | 1 | 0 | |
| | 2 | 0 | |
| | 3 | 1 | ** |
| | 4 | 2 | **** |
| | 5 | 3 | ***** |
| | 6 | 4 | ***** |
| | 7 | 5 | ***** |
| | 8 | 6 | ***** |
| | 9 | 7 | ***** |
| | 10 | 8 | ***** |
| | 11 | 8 | ***** |
| | 12 | 7 | ***** |
| | 13 | 6 | ***** |
| | 14 | 5 | ***** |
| | 15 | 4 | ***** |
| | 16 | 3 | ***** |
| | 17 | 2 | **** |
| | 18 | 1 | ** |
| | 19 | 0 | |
| largest | 20 | 0 | |

9.3.3. Filter-Type „2“

Floating average values 'SmoothingWindow'

Values will be sorted, the smallest and the largest values (20% of all the values have no weight).

Towards the middle of the numbered values, the values have a progressively increasing weight

| e.g. 20 measuring values | measured value | weight | distribution |
|--------------------------|----------------|----------------------|--------------|
| smallest | 1 | 0 | |
| | 2 | 0 | |
| | 3 | 0.4375 ² | 0.191 |
| | 4 | 0.8754 ² | 0.766 * |
| | 5 | 1.3125 ² | 1.722 *** |
| | 6 | 1.7516 ² | 3.068 ***** |
| | 7 | 2.1875 ² | 4.785 ***** |
| | 8 | 2.62536 ² | 6.892 ***** |
| | 9 | 3.0625 ² | 9.378 ***** |
| | 10 | 3.5 ² | 12.250 ***** |
| | 11 | 3.5 ² | 12.250 ***** |
| | 12 | 3.0625 ² | 9.378 ***** |
| | 13 | 2.62536 ² | 6.892 ***** |
| | 14 | 2.1875 ² | 4.785 ***** |
| | 15 | 1.7516 ² | 3.068 ***** |
| | 16 | 1.3125 ² | 1.722 *** |
| | 17 | 0.8754 ² | 0.766 * |
| | 18 | 0.4375 ² | 0.191 |
| | 19 | 0 | |
| largest | 20 | 0 | |

9.3.4. Filter-Type „3“

Finite Response Filter (FIR N = 15 Fg = 0.1) ('SmoothingWindow' not used)

see also literature: "Halbleiter-Schaltungstechnik / U. Tietze und Ch. Schenk, 9. Auflage S. 820"

| | | |
|---------------------|---------------------|---------------------|
| a0 = a15 = -0.00101 | a1 = a14 = -0.00521 | a2 = a13 = -0.01269 |
| a3 = a12 = -0.01214 | a4 = a11 = +0.01830 | a5 = a10 = +0.08914 |
| a6 = a9 = +0.17962 | a7 = a8 = +0.24399 | |

9.3.5. Filter-Type „4“

Finite Response Filter (FIR N = 31 Fg = 0.1) ('SmoothingWindow' not used)

see also literature: "Halbleiter-Schaltungstechnik / U. Tietze und Ch. Schenk, 9. Auflage S. 820"

| | | |
|----------------------|----------------------|----------------------|
| a0 = a31 = -0.00165 | a1 = a30 = -0.00146 | a2 = a29 = -0.00037 |
| a3 = a28 = +0.00225 | a4 = a27 = +0.00593 | a5 = a26 = +0.00823 |
| a6 = a25 = +0.00548 | a7 = a24 = -0.00461 | a8 = a23 = -0.01979 |
| a9 = a22 = -0.03195 | a10 = a21 = -0.02944 | a11 = a20 = -0.00261 |
| a12 = a19 = +0.04987 | a13 = a18 = +0.11780 | a14 = a17 = +0.18175 |
| a15 = a16 = +0.22058 | | |

9.3.6. Filter-Type „5“

Not linear Filter 'LM2000'

('SmoothingWindow' not used)

Special development by WYLER for quick display of dynamic movements

9.3.7. Filter-Type „6“

Not linear Filter 'LM2000+'

('SmoothingWindow' not used)