

Manual

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Universal Transmitter Model Messenger

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Transportation Damages!

Please inspect the instrument immediately after receiving for potential shipping damages.



For any claims to the transportation insurance or warranty repair, it is absolutely required to notify transportation damages immediately after receiving the instrument. In case of obvious damages of the outer packaging, the carrier must give a receipt for this damage to make demands for the insurance. In case of a delayed announcement the insurance will not pay for damages and Chemtronic Waltemode GmbH will not assume liability for these damages.



**Manufacturer and owner of all rights model Messenger:
Galvanic Applied Sciences Inc., Lowell MA, USA**

Revised manual by Chemtronic Waltemode GmbH

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WARRANTY CONDITIONS

The warranty for this product takes place according to the legal provisions. As places of warranty we explicitly name Galvanic Applied Sciences Inc. (Lowell USA) or Chemtronic Waltemode GmbH, Monheim am Rhein (Germany). In case of warranty service at the customer site, we will charge additional expenses e.g. travel expenses, overnight cost, etc. Consumable parts as well as wearing parts e.g. lamps, gaskets, etc. are not covered by warranty. Improper use, gross negligence, use of the system outside of the technical specifications, missing or improper maintenance will cause a loss of the warranty claim. Please pay attention to our general terms of contract.

Non-warranty

Chemtronic Waltemode GmbH takes no responsibility or warranty for technical or editorial mistakes or omissions in this document. The information in Chemtronic Waltemode GmbH reserves all rights to make changes to this document without announcement. Chemtronic Waltemode GmbH is by no means liable for any consequential damages or miscellaneous damages, which occur during the use or storage of the system. Some countries do not allow the limitation of liability, so that this exclusion is possibly not valid for you.

Improper installation / operation of the system

Warranty is void if the system is installed improperly, handled improperly, used outside of the technical specifications (of the instrument), or damaged by gross negligence.

Storage

Please inspect the instrument immediately after receiving for potential shipping damages.

If the instrument has already been unpacked for inspection or testing, or if the instrument has been removed from the process and it is not to be installed or reinstalled for more than 1 day, the following procedure should be observed:

1. If the instrument has been in service, the wetted portion should be thoroughly cleaned than thoroughly dried.
2. In case the original packing material is not available place the instrument in a sealed heavy plastic bag with a desiccant added to assure clean dry storage.
3. The instrument should then be stored in a protected area until time of installation.

Shipment of the instrument

Please clean the instrument carefully before shipment (e.g. for revision / repair). Please use fixed packaging material to protect the instrument against any shipping damages.

SAFETY INSTRUCTIONS

Pay attention to the following general safety instructions during use and operation of the system. Ignoring these instructions or special warnings inside of this manual can damage the sensor, cause inaccurate measurements, and possibly result in unsafe installations. Chemtronic Waltemode GmbH will not take any responsibility for consequences arising from ignoring the safety instructions and warnings.

For all chemical liquids

The product you measure is may be toxic or otherwise harmful to human health. Observe appropriate precautions when handling and disposing the liquid. Review the appropriate published material safety data sheets regarding the safe handling and disposal of all reagents or standards.

Electrical installation

Qualified technical personnel must install the electrical installation of the system. This instrument requires an input of 90-260VAC at 50-60 Hertz (unless otherwise specified). A 24VDC/AC power supply is optional.

Hazardous area

DO NOT INSTALL the system in hazardous area without the optional Ex-proof equipment. Operation of non Ex- proof systems in hazardous area will cause a high risk.



Using the system in hazardous areas (Ex Zone I / Ex Zone II) will only be safe with the installation of the optional special Ex-proof designs including all required certifications



Maintenance

Always disconnect the instrument from power during maintenance, replacement of components, installation of additional components or any other operations at the open instrument. Only qualified technical personnel must perform this work.

Operating the instrument with open enclosure

Only qualified technical personnel should operate the instrument when the enclosure is open. Take care that no moisture enters the enclosure.



Some components inside the instrument are energized with voltages, which can cause lethal shocks in case of contact. Be careful during installation, handling and operation of the instrument.



Improper installation / operation of the system

Warranty is void if the system is installed improperly, handled improperly, used outside of the technical specifications (of the instrument), or damaged by gross negligence.

BEFORE INSTALLATION AND STARTUP

System Inspection

Check to ensure that all components of the instrument have arrived safely. Included should be: the Messenger Transmitter, the Sensors and the cable sets and Manual.

The Messenger versions without display and with LCD include typically additional a Cd- Rom with Messenger Graph Software and an Interface adapter Model USB-Nano.

If there is any damage to the equipment or if anything is missing please contact us immediately. Save the packing material for future system storage or shipping!



Please read the additional safety instructions before installation and start-up!



General Installation guidelines

1. Transmitter and Sensors are sensitive components, do not drop and handle with care.
2. Follow the wiring diagram (pay attention to sensors manual) during installation of the system.
3. The process temperature and pressure cannot exceed the specification of the delivered Sensor.
4. Avoid air and gas bubbles inside the sensor, they cause disturbances. Noise and drift of the measurement would be the result (the bubbles are not expected at a pressure upwards of 2 bar in aqueous solutions).
5. Please do not use the system in case of any visible mechanical damages!
6. The Messenger enclosure fits IP65 / Nema 4x protection class we recommend a dry / dust free area.
7. The ambient temperature for the transmitter must be in a range of -10°C to 50°C (use dry purge air above 40°C)
8. AC power consumption of the Messenger Transmitter is less than 50 Watts
9. Transmitter relay ratings for alarms and external devices are 2 A at 250V~ maximum
10. Do not operate with open enclosure. Exposed electronics will promote the risk of electrical shock and might cause damage to the system.
11. Do not alter cable length. The instrument was calibrated with a specified cable length. Altering cable length can cause unstable signal and void instrument calibration.
12. Ship the instrument in the original packing material to avoid damage to the sensor or transmitter.
13. Mishandling of the system is not covered under warranty. Do not disconnect the interior wiring of the sensor.
14. Proper instrument grounding: The instrument must be grounded to avoid electrical shock hazards to personnel, damage to the unit and erroneous operation.



WARNING: MAKE SURE THE AC POWER MAINS ARE SWITCHED OFF OR OTHERWISE DISCONNECTED BEFORE YOU BEGIN WIRING THE SYSTEM TO AVOID THE POSSIBILITY OF ELECTRICAL SHOCK. IT IS A GOOD PRACTICE TO INSTALL A MAIN POWER CUTOFF SWITCH NEAR THE SYSTEM WITH EXTERNAL MAIN FUSES.



THE SYSTEM REQUIRES AN AC-GROUND (EARTH GROUND) AND ALL SENSORS CONNECTED TO THE TRANSMITTER MUST BE GROUNDED

Please note. The following points are important to avoid damages of the Sensors at high temperature applications:

- Please connect purge air (cooling) before process insertion (dry, oil- & dust free instrument air)
- Leave air output open
- Do not interrupt the air cooling
- Remove the Sensor immediately from the process in case air purge is not guaranteed!

General Information

Introduction

Monitek Messenger is a compact, highly efficient, and expandable system that is designed to interface to a broad range of Monitek / Galvanic / Chemtronic sensors. It also has the capability to interface with multiple and different sensors at the same time. It's modular design approach enables several applications to be customized for a variety of measurements, such as Turbidity, Suspended solids, Color and % Concentration using optical in-line Sensors. The Messenger may be linked with Personal Computer, Laptop or Netbook operating Windows XP / Vista / 7 or a Panel PC (also called a TPC), the GUI (Graphical User Interface) offers completely menu-driven screens that are easy to understand and also has online help. The GUI interface is designed to allow three access levels (Operator, Technician and Factory) to prevent an unskilled operator from changing any critical parameter in the setup of the transmitter. The interface is intuitive with no need for programming codes or program numbers. The system also includes some self-check operations as well as the ability to access the basic measurement values without the use of a multi-meter or even physically accessing the electronics. The system includes the ability to perform field calibrations while the instrument is installed in the process and is operating. It comes factory pre-configured to your application. For most accurate setup we recommend that the user calibrate on his process sample condition. Please refer to Process calibration

Icons used in this User's Manual



Important notice!



Cautions indicate situations that could damage the Monitek Messenger or sensor. Cautions are printed in mixed case characters in boldface font

Specifications:

Sensors:	MoniTurb-F, MoniTurb-FS, MoniSpec-AD, AP2, LAS, MoniSpec A, MoniTurb-S, TS2, Model 22, Model 25 Probes (includes CSK, CSH, CSS), Model 450, 210 with external power supply, more
Number of Sensors:	1 to 4 sensors. Each sensor may be linked to a separate 8 points Calibration table with 1st order or Curve fit linearization technique.
Area Classification:	General Purpose (optional Hazardous area Zone 1 & 2)

Environmental:

Operating Temp:	-14 °F to 122 °F (-10 °C to 50 °C), air purge required for cooling above temperatures of 104°F (40°C)
Humidity:	0 to 95% RH, non condensing

User Interface:

Alarms:	Low High Alarms and General Fault Alarm are user programmable, latching or non-latching, energized or de-energized with alarm delay and hysteresis.
Display:	Optional, 4 lines by 20 Characters backlight LCD.
Programming:	Using PC, Laptop, Netbook or touch screen Panel PC.
Analog Outputs:	2x 0/4-20mA Isolated. Optional 2 additional outputs 0 to 1000 Ohm
Internal Relays:	Optional, 4 relays fully programmable rated 2A/250VAC
Digital Inputs:	Four Digital Inputs, fully programmable with activate levels of 5 to 24 VDC
Digital Output:	RS-232 or RS-485 using Modbus RTU protocol.
Input Power:	90 to 260 VAC 50/60 Hz optional 24V
Power consumption:	less than 50 watts
Case Material:	304 Stainless Steel
Approvals	CE / CSA

Different versions: Messenger Transmitter



Version without display



Version with alpha numeric LCD



Version with Panel PC (TPC)

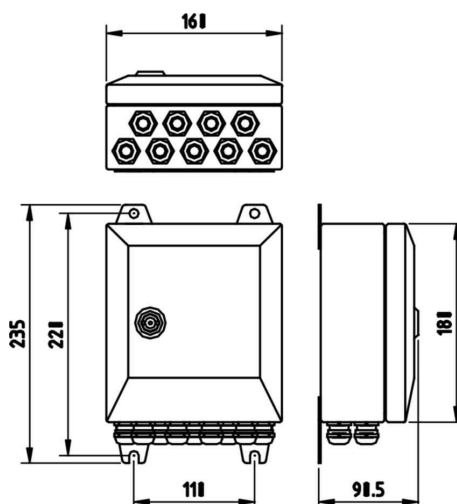


A PC / Laptop or Netbook is required for configuration / calibration of the versions without display and with LCD- display.

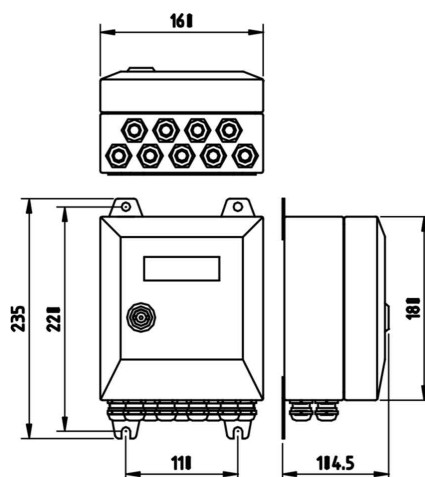
The Panel PC (TPC) version allows configuration and calibration without external equipment. The operation is will be done via touch screen of the Panel PC.

Dimensional Drawings

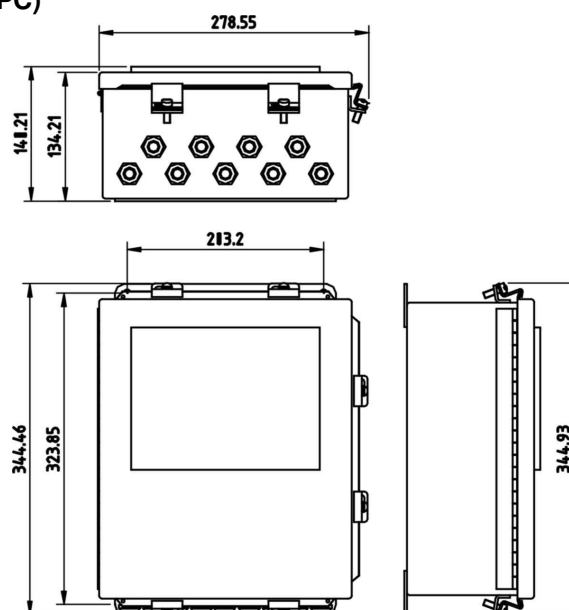
Messenger (without display)



Messenger (with numeric LCD)



Messenger (with Panel- PC / TPC)



Jumper Positions Model Messenger



All jumpers are typically factory configured according to sensor and application. Please contact our service before you change any jumper position! Some components inside the instrument are energized with voltages, which can cause lethal shocks in case of contact. Be careful during installation, handling and operation of the instrument. Disconnect from supply power.



A Firmware (JP10)

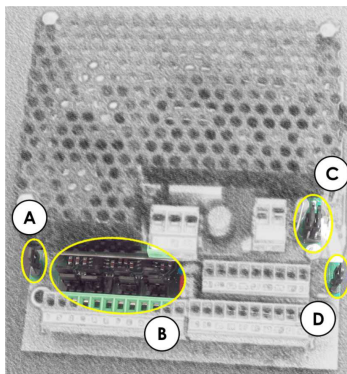


Figure 128

This jumper (JP10) is used to unlock the hardware for a firmware update. Firmware updates should be done by Service personal only!

- Standard jumper position (JP10) = not jumpered (open)

B Signal Gain (JP1 to JP8)

- Jumper positions (JP1 to JP8) = depending on application, see next page for details.

C Lamp current (JP11 & JP12)



Position for lamp current 1A



Position for lamp current 350mA & less



Read chapter „Sensor List for Model Messenger“ before changing JP11, JP12 jumper position! Only qualified technical personnel must perform this work.

- Jumper positions (JP11 & JP12) = depending by Sensor

D System Reset (JP9)



Only qualified technical personnel must perform this work. This Jumper allows a complete system reset by hardware, take notice al user programmed settings will be lost!

- Standard jumper position (JP9) = not jumpered (open)

Jumper Positions (Gain Setting)

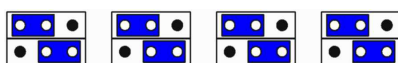


**Only qualified technical personnel must perform this work.
Please contact our service before you change any jumper position!
Some components inside the instrument are energized with voltages, which
can cause lethal shocks in case of contact. Be careful during installation,
handling and operation of the instrument. Disconnect from supply power.**

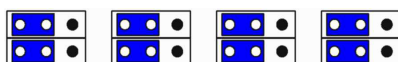


You can change the hardware gain of the Messenger transmitter in case the “optimize signal” values are to high or to low. See chapter “Optimize Signal”.

Jumper Positions „low gain“



Jumper Positions „high gain“



**Jumpers are located directly behind the connectors for the signal inputs.
See wiring diagram at Page 13**

Each signal input can be configured individually:

JP1 and JP5	=	1. Signal Input
JP2 and JP6	=	2. Signal Input
JP3 and JP7	=	3. Signal Input
JP4 and JP8	=	4. Signal Input

Software Installation (Messenger Graph)



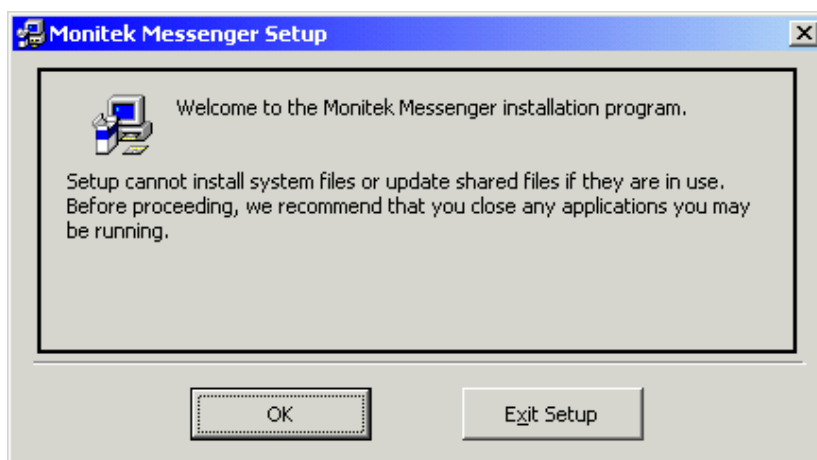
The Software Installation is not required at Panel PC (TPC) version of the Transmitter. Panel PC version arrives with installed Software!

System Requirements

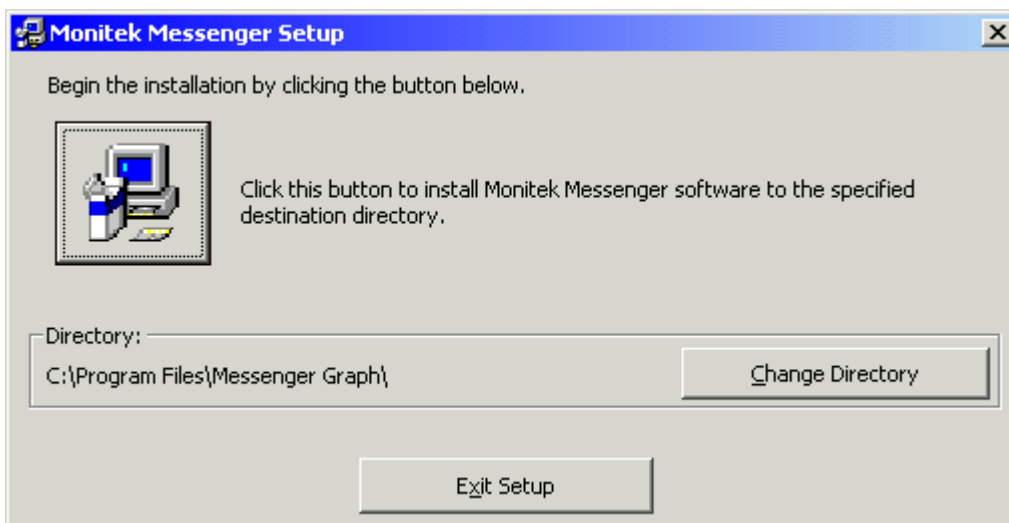
Supported Operating Systems	Windows XP, Vista, 7
RAM	32MB
Hard Disk Space	5MB

Installation procedure Messenger Graph Software

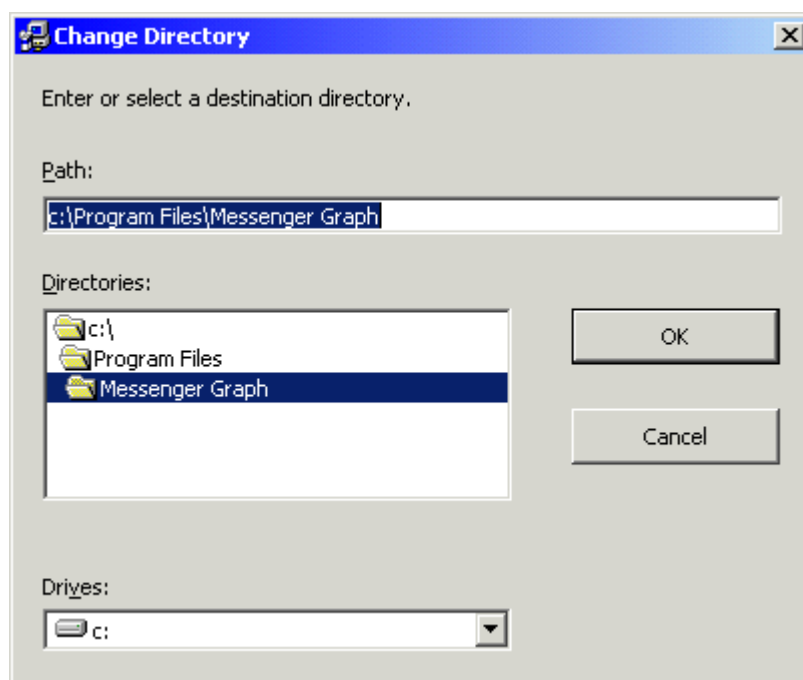
- I. Close any open programs that are running on your computer before starting the installation.
- II. Double click on setup.exe.
- III. As the installation progresses, follow the instructions on the screen. Some Windows system files will be updated to newer versions during installation of Messenger software. If these updates are done, you will be required to reboot your PC. If so, repeat steps 1 through 2 of the installation procedure to continue with the installation. Once the installation of Messenger software is complete, you will be required to restart your computer once again for proper functioning of the software.
- IV. Welcome screen shown below will appear, Click OK to continue the installation process. To abort the installation process click Exit Setup.



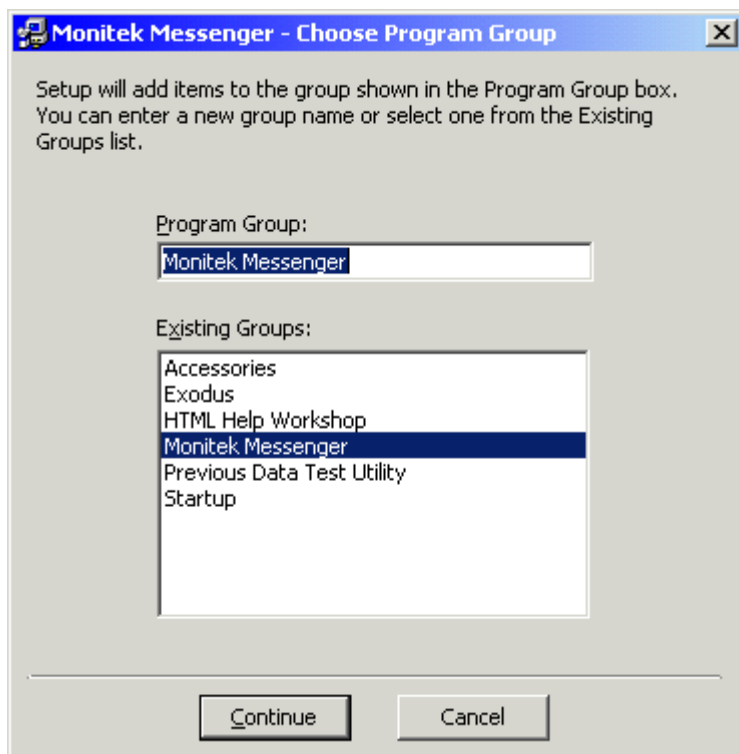
V. Choose the Destination location.



VI. To change the default destination location click on Change Directory. Choose new destination location using the following screen.



VII. Choose the program group under which the application has to appear.



VIII. Click Continue.

IX. Dialog showing the status of the files being copied will be displayed.

X. On Completion of Installation Process Message "Installation process complete" will appear.

XI. Click on OK to finish the installation process.

RS-232 Interface

RS-232 Pins - at Messenger

Messenger Pins		PC / Laptop	
16	DSR (-)	4	DTR
17	TX (Out)	2	RX (In)
18	RX (In)	3	TX (Out)
19	GND	5	GND

Reference Pins RS232 - at PC / Laptop / Netbook (9 Pin Sub-D)

Pin	Signal	Dir	Funktion
1	DCD/RLS D	IN	Carrier Detect
2	RXD	IN	Receive Data
3	TXD	OUT	Transmit Data
4	DTR	OUT	Data Term Ready
5	GND		Ground
6	DSR	IN	Data Set Ready
7	RTS	OUT	Request to Send
8	CTS	IN	Clear to Send
9	RI	IN	Ring Indicator

RS-485 Pins – at Messenger

Messenger Pin		PC / Laptop	
13	(-)	--	--
14	(+)	--	--
15	GND	--	--

Interconnections to PC / Laptop (USB)

Using the optional USB to **RS485** Interface Converter Model USB Nano



An interface converter USB to RS232 can not be used to configure or calibrate the transmitter model Messenger! Using this type of converter will cause a crash of the Messenger Graph Software!

The interface converter USB- Nano is used to configure / calibrate the Transmitter via USB-interface. Please do not access the menu "Measurements Screen" if you use this converter this may crash of the Messenger Graph software!

1. Install the software "Messenger Graph" to your computer.
2. Connect the RS485-converter to the USB- interface of your computer.
3. Install the driver software of the RS485- converter model USB- Nano.

Take notice:

Restart your computer before you proceed with item 3 otherwise you may get problems with configuration.

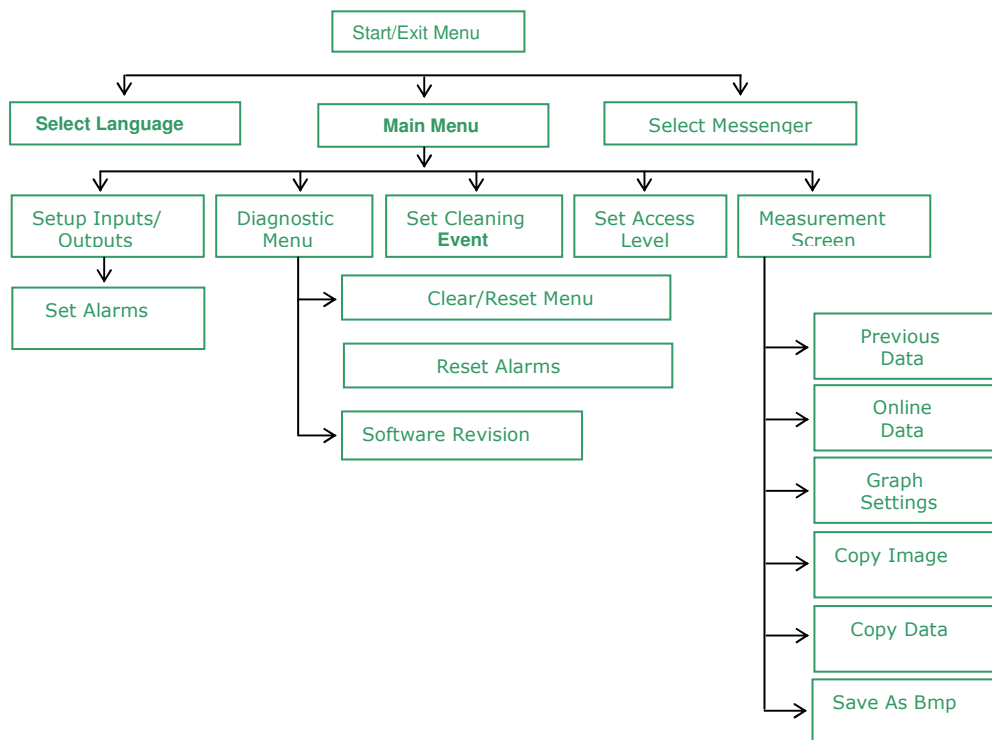
4. Start the Windows Control Panel and select System, Hardware, Device Manager, COM and LPT.
5. Assign a COM port, COM1, COM2, COM3 or COM4 to your interface converter (we recommend COM1).
6. Close Device Manager and Control Panel.
7. Connect transmitter mod. Messenger to Interface converter model USB- Nano.
 USB- Nano connector A: to terminal 13 model Messenger
 USB- Nano connector B: to terminal 14 model Messenger
 USB- Nano Shield: to terminal 15 model Messenger
8. Start the software „Messenger Graph“.
9. Call up the "Main Menu" and select the sub- menu
 Inputs/Outputs – Set COM Port. Please proceed directly with step 10 in case your COM port is assigned to COM1.
10. Enter the in item 4 selected Port (COM-COM4) and enter:
 Baud 57600, Modbus- Normal. Please proceed directly with step 10 in case your COM port is assigned to COM1.
11. Return to the START/EXIT-Menu and select „GO ONLINE“.
 Background of button „GO ONLINE" and the dot in the upper right corner, change to green color.



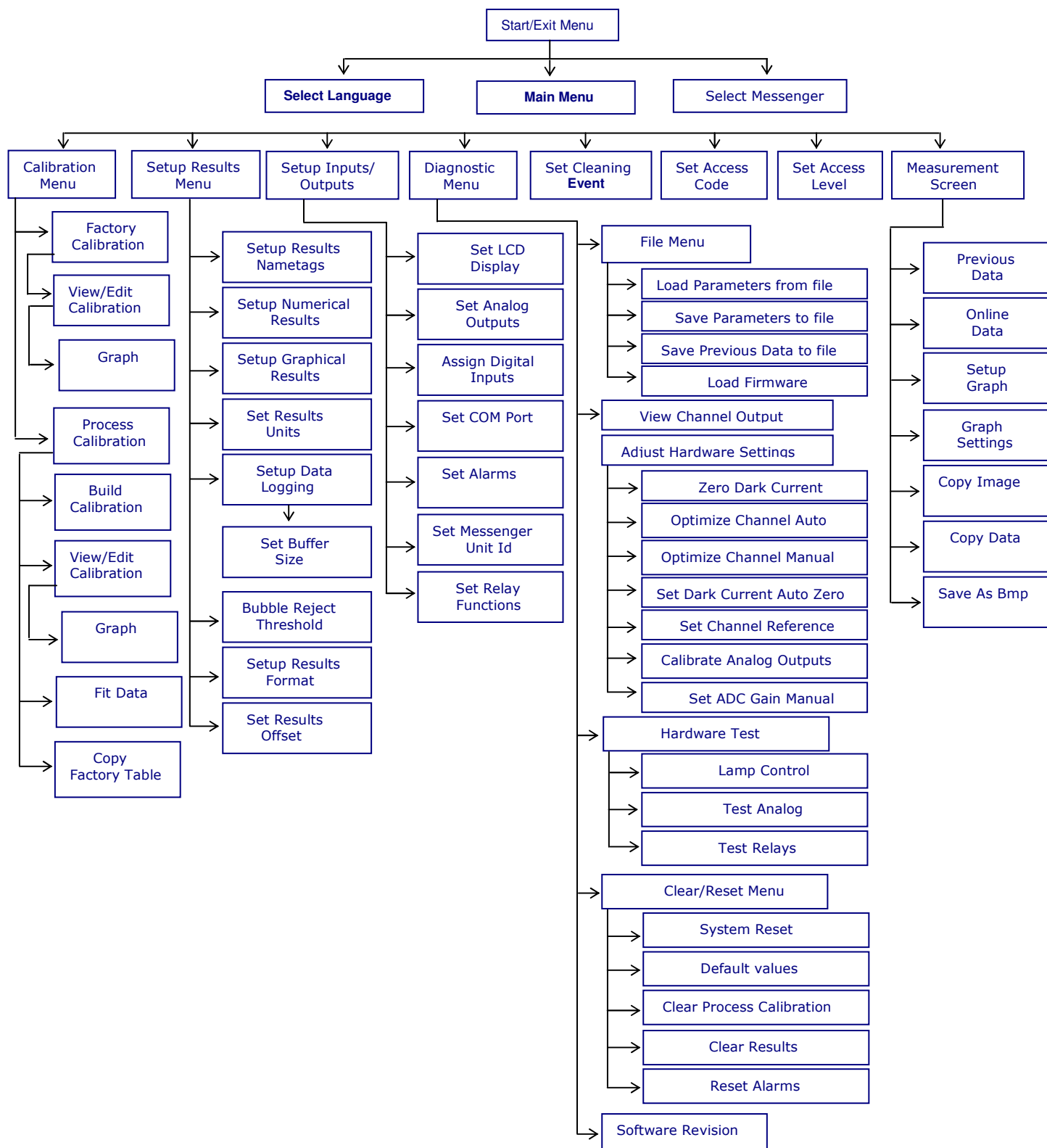
**Some Windows Installations may come up with the message:
 „Invalid procedure call or argument“.
 Confirm the Message with the OK button.
 Take notice, the dot in the upper right corner has to stay green.**

Menu layout and Operation

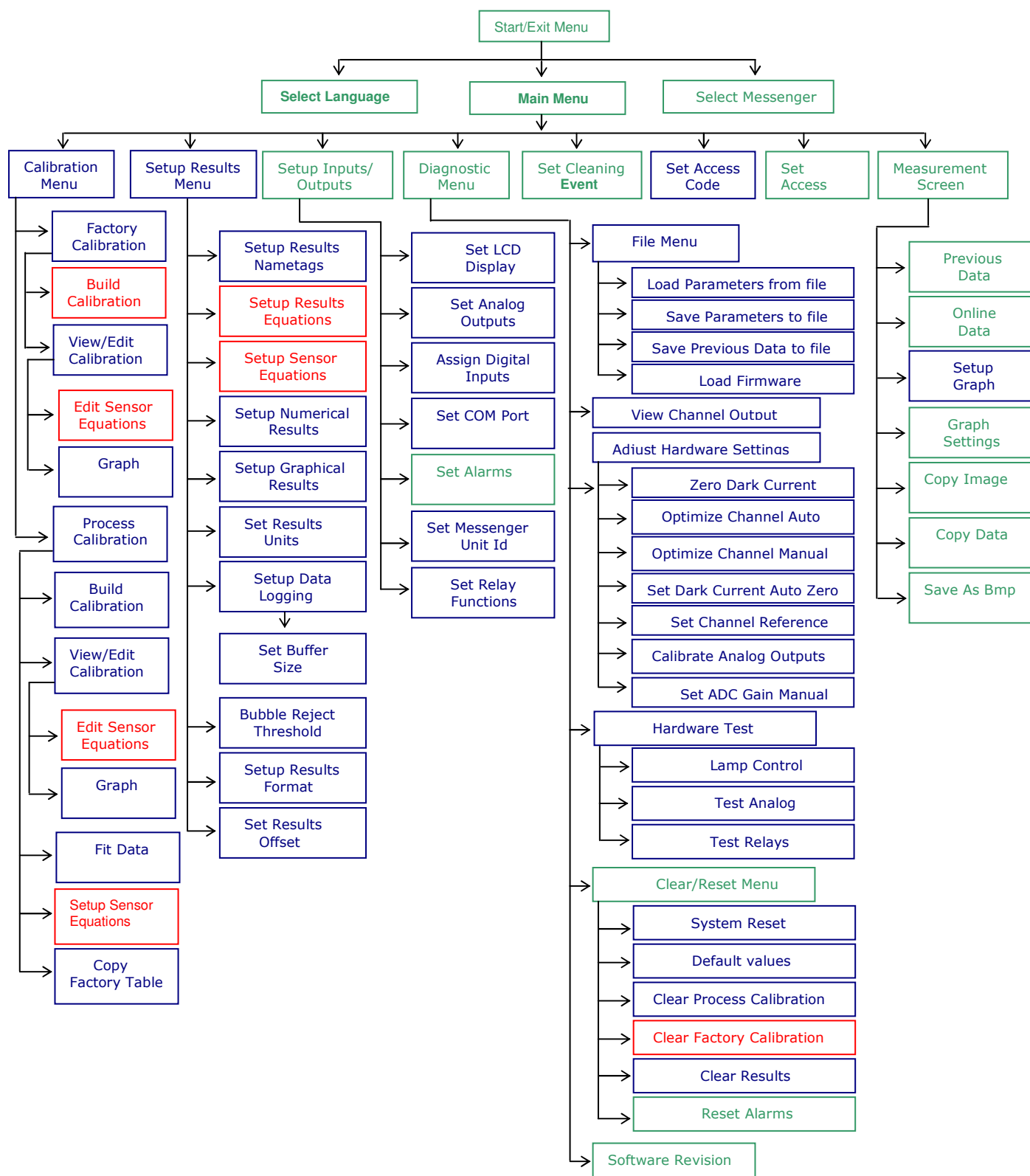
Messenger Software Navigation Tree (Operator)



Messenger Software Navigation Tree (Technician)



Messenger Software Navigation Tree (Factory Level)



Setup and Calibration



Take notice, there is typically no new calibration required in the first 18 month after start up. Sensor and transmitter arrives with factory calibration.



Sample #	Data	Value
1	0.0954	0
2	1.3629	5
3	2.6172	10
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0

Buttons: Edit Sensor Equations, GRAPH, BACK

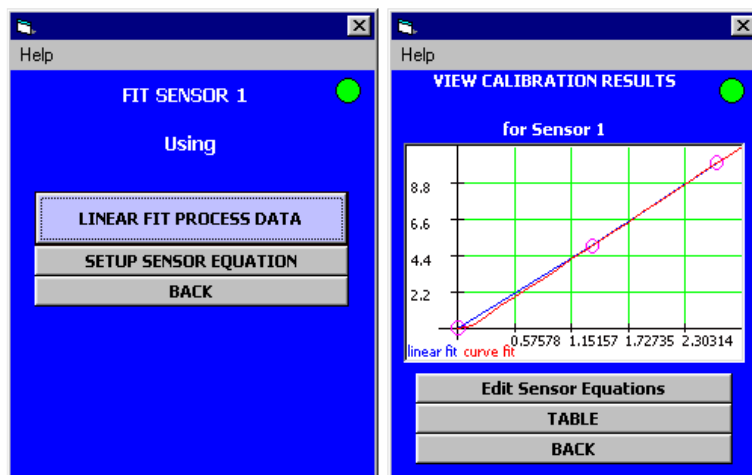
The system is calibrated at the factory using clean laboratory standards. A user calibration under process conditions may be required to optimize results. The system has TWO types of calibration that can reference sample measurements: Factory and Process Calibration. The factory calibration is to be used as reference. Calibration may be done in the field using sample conditions; the user may alter the data acquired by the system in the View / Edit calibration screen. Up to 8 data points may be entered and the user may select either a Linear fit or a curve fit equation. For a range where the upper and lower limits are known the curve fit gives the best fit, if the range is extended, select the Linear fit for best approximation.

Field Calibration and Curve Fitting

Buttons: Read New Data, STORE New Value, BACK

MONITEK MESSENGER includes a feature that allows the user to calibrate the instrument in-line. Once the instrument is installed and operating, data points can be taken and stored using the View/Edit Data selection from the Calibration menu. First select a sample point from 1 to 8 then the user can select "Read New Data", and the MONITEK MESSENGER will read the current value and store it.

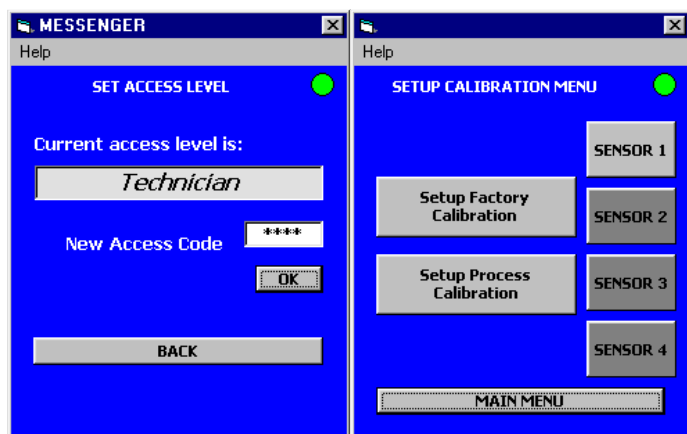
At the same time that the user saves that sample into the MONITEK MESSENGER, a manual sample should be taken from the process. This sample should be analyzed for the appropriate content in the laboratory. Once the laboratory has established the value, the user can come back to the "View/Edit Calibration" Data screen and select the appropriate sample point. The user should then enter the laboratory value for that data point. The MONITEK MESSENGER has now stored the proper laboratory value to the actual Data value that the instrument was reading when the sample was taken. This should be repeated for several values at different ranges of the expected operational span of the process.



Once at least three values have been stored, the system can perform a curve fit. Select Curve Fit from the Calibration menu and the MONITEK MESSENGER will fit a Linear fit or a curve fit through the data points that are entered into the sample data table. The MONITEK MESSENGER will then display the curve, and that calibration curve will become the active curve for the instrument. The MONITEK MESSENGER can be calibrated and programmed to read the same value on the front panel as the concentration value that was determined by the laboratory. This unique method is the ideal way to calibrate an in-line device because it takes into account the real dynamics of the process and allows the device to read out in the same units that the user will receive from the laboratory.

To Access Process Calibration you need to enter "Technician Access" level and to Access Factory Calibration data you need to enter Factory access level. The following procedure explains in step how a Process Calibration may be done:

- Set the Access Level to Technician and then select Calibration menu.



Access Levels and Codes

The system has three Access levels:

Operator:
Technician: Default Access code 1234
Factory: Reserved for Factory

- Select "Setup Process Calibration" and Then "Build Calibration"
- Up to FOUR sensors may be configured in the Messenger. Typically Sensor #1 corresponds to Result # 1 and Sensor # 2 corresponds to Result # 2 and similar setup for 3 and 4.

- At least three data calibration points are needed to get a good representation of the data curve. If you are only doing Turbidity then all you need is to calibrate sensor #1. Enter the value for the sample in the cell and then press “Read New Data”, you may want to repeat pressing “Read New data” until you feel that the number is fairly the same between successive reads. Press “Store New Value” to store selected values.

Help

BUILD PROCESS CALIBRATION TABLE

Sample #

Sensor 1 1

User Value OLD 0

Data 0.0954

Read New Data

STORE New Value

BACK

- You may proceed to enter the various calibration data points by selecting Sample # (1...8) and entering the corresponding values.
- When done go “BACK” to previous menu and select “View/Edit Calibration”.
- In View Calibration Results the user may review or edit the calibration data and then view graph to review the shape of calibration curve as shown below.
- The system will show the Linear fit and curve fit curves. User may select which curve fit represents his process better.

Help

VIEW CALIBRATION RESULTS

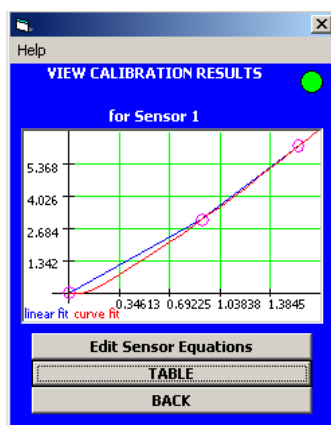
for Sensor 1

Sample #	Data	Value
1	0.1378	0
2	0.9146	3.05
3	1.5733	6.1
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0

Edit Sensor Equations

GRAPH

BACK



- Using “Fit Data” menu you may select either to use the Factory or Process calibration for sample analysis. You may select “Factory Calibration” data as reference but in most cases the process calibration is more accurate it represents the sample, not the factory standards.



Take Notice:

Fit data is required after each calibration. This function calculates a new calibration curve and writes it to the memory of the Messenger transmitter!



- You may repeat the above procedure for the various sensors that are connected to the system.

Analog Outputs and Alarms

The system includes TWO analog outputs that may be set as 0-20 mA or 4-20 mA or 20-0 and 20-4 mA (Reverse acting). Two additional analog outputs may be added as an option. Also OPTIONAL the user may add "Relay and Digital Inputs card" with four SPDT relays for process alarms or controls, the same board includes 4 digital inputs for additional control by external devices like a PLC (Programmable Logic Controller) or other equipment. The Analog Outputs (4-20 mA) have been calibrated at the factory and may be trimmed or re-adjusted by the user under the "Adjust Hardware settings" screen menu. These analog outputs values are a direct function of whatever values are on the display. The 4-20mA outputs operate over a wide range, a minimum of 25 to 1000 Ohm load.

The alarm contacts are also controlled by the display value. The alarm values are selected and Setup in the "Setup Inputs/Outputs" menu.



Take Notice:

Alarm relays and digital inputs are optional!

	Bubble Reject	Filter Delay
Channel 1	5 %	5 sec
Channel 2	5 %	5 sec
Channel 3	5 %	5 sec
Channel 4	5 %	5 sec

Buttons: Set Default Values, BACK

The Monitek Messenger also includes a feature that allows the customer to dampen the response of the system, by including added signal filtration. A unique bubble reject feature is also available; this feature allows the system to reject spurious signals caused by bubbles presence. The factory default is set for 5% and Filter response to 5 sec. The Bubble Reject feature control may be accessed from the Setup Results menu.

Display Units



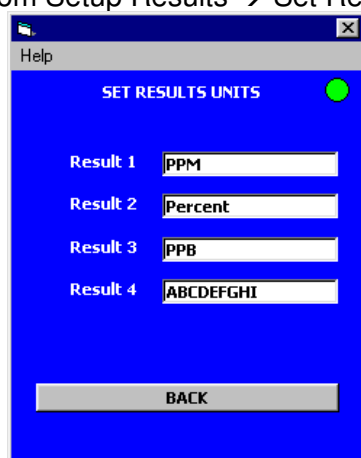
**This Units are shown at Panel PC screen or configuration Software only!
If you have a transmitter with LCD – display, please configure Nametag, measurement unit, and decimal resolution as well in menu “Set LCD- Display”.**

To display the process variable or sample Analysis the user should select MEASUREMENT SCREEN.



An interface converter USB to RS485 can not be used to configure the Measurement Screen Menu! Using the converter to access this Menu may cause a crash of the Messenger Graph Software!

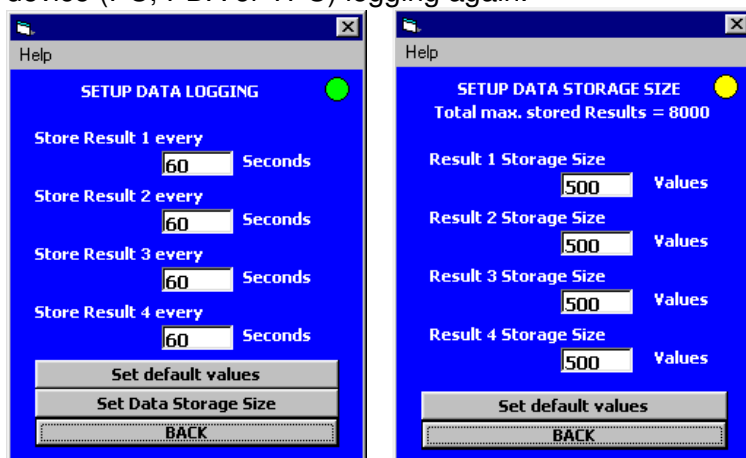
The display units are the units of measure that the user wants to appear on the display. This bears no relation to the calibration values, it is simply a tag displayed below the sample process result variable. This is selected from Setup Results → Set Results Units.



Up to NINE characters may be entered.

Data Trending Display and RS-232 Output.

The system includes memory storage of process results data. This data is stored and will NOT be lost if power is disconnected from the transmitter. This feature is meant to allow operations personnel to check on recent changes or trends in the process by displaying the trends directly on the display of the linked device (PC, PDA or TPC) logging again.



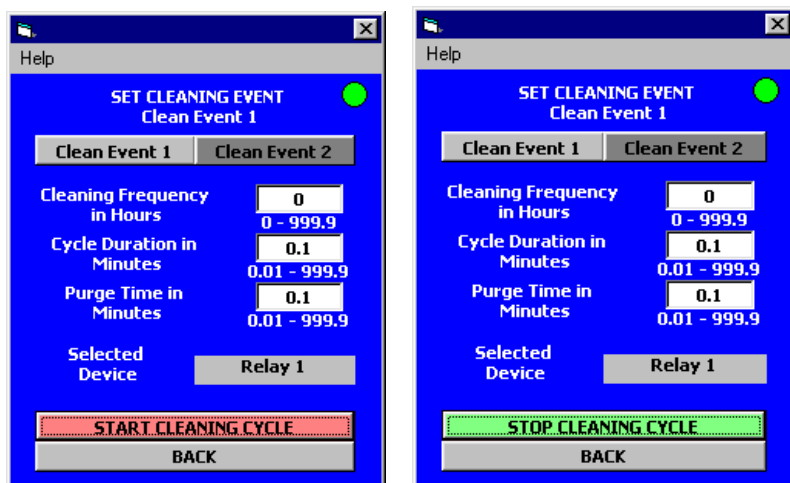
The Maximum number of data pints stored is 6000. The user may allocate all the 6000 points to one sensor (Result) or may divide them as needed.

Based on the default setup of one data point every 60 seconds and 500 points per result, the Messenger will continuously have the last 8 hours of sample data.

Selecting Measurement Screen and then selecting Graph Data for displaying results display the data trend. The Graph settings (Setup Graphical Results) may be accessed under "Setup Results menu" where maximum and minimum values for the y-axis (the process variable) as well as the time interval for data collection and display. The system will then display whatever data is in storage and the time span on the x-axis will be whatever the selected logging span duration. Plotting the data does not erase or corrupt the data, so the user can actually re-plot the data and zoom in or out on the y-axis by entering different values.

Self-Cleaning Interval

The interval between automatic self-cleaning cycles is selected from the "Set Cleaning Event" option on the System menu. The value is entered in minutes. The MONITEK MESSENGER holds the display and all outputs at the previous value while the self-cleaning cycle is underway. Once the self-cleaning cycle is complete, the instrument returns to normal operation. The self-cleaning cycle can always be initiated or tested by selecting the "Start Clean Cycle" option from the Set Cleaning Event Menu.

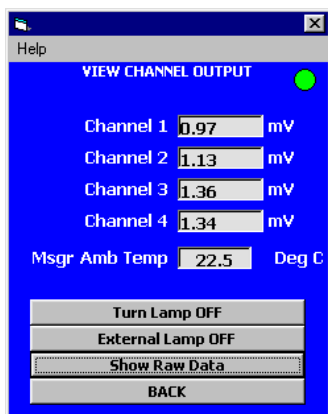


When manually starting a cleaning cycle make sure you have the variables set properly and a device selected.

Note: The Monitek Messenger provides the electronic control for the signals needed to activate cleaning jets. The user must provide the appropriate hardware, including sensor with cleaning jets, a solenoid valve to switch either pressurized air or cleaning solution (water for example) to the cleaning jets in the flow cell.

System and Troubleshooting

View Channel Output Display



The MESSENGER includes a feature that allows the user to display the primary measurement values (in mV) of the system directly on the screen. The “View Channel Output” option in the “Diagnostics menu” will display the Channels signals i.e. the direct beam value, scatter beam or other signal connected. The scatter beam and direct beam values are the amount of light being received by each of the direct and scatter beam detectors respectively. Forward scatter turbidity is defined as the ratio of the amount of light scattered at 12° to incident divided by the amount of light making it directly across the optical gap. As more suspended solids or oil droplets are present, more light is scattered and less is transmitted, making the ratio of these two become larger. The ratio value is determined by dividing the scattered beam by the direct beam. This is the same value that is recorded in the Sampled column of the View / Edit calibration Data screen.

Factory Calibration



The user may elect to switch to factory calibration if his measurement data using the process calibration are not correlating. The factory calibration data may be copied into the “Process Calibration” menu by selecting “Copy factory table”. A data fit, on this transferred factory data may now be performed by selecting “Fit Data”, the unit will use the factory calibration data to report the cell sample analysis. At the factory, Formazin standards were used to create the calibration data table. The Sensor is calibrated with at least 3 data points: a nominal 0 FTU / EBC standard, a full-scale standard and a mid point standard. This feature is included to allow easier troubleshooting by referencing known and factory verified calibration.



Take notice, there is typically no new calibration required in the first 18month after start up. Sensor and transmitter arrives with factory calibration.



Toggling Between Factory and User Calibration



The user can activate the field calibration or the factory calibration. Selecting “Fit Data” menu allows the user to select which calibration the system uses to Display results. This is intended to give the user the ability to switch between Factory and Process Calibration as a method of checking the existing primary calibration or performing new primary calibration.

Default parameters:

Take extreme care when you are trying to DEFAULT all the parameters.

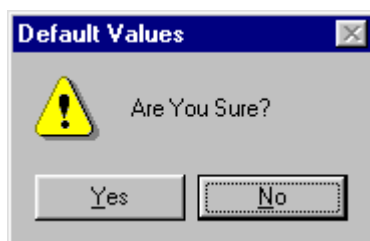
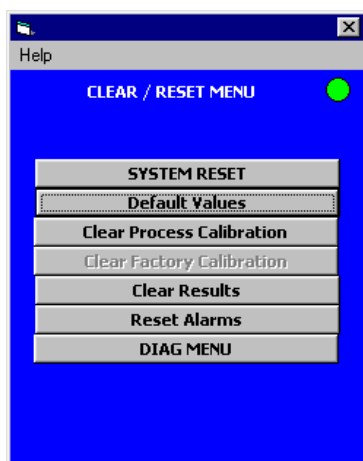


This Option will DEFAULT ALL Parameters. We strictly recommend contacting our service before you proceed with this Menu!

Consult factory before proceeding with this menu, as the system will require you to either re-enter manually all the parameters or load back the setup file to go back on line.



Make sure that you have saved the setup before proceeding with “Default values” option.



Error and Warning Messages

Error/Warning Messages	Description
Restart the program to change language.	For New Language settings to take effect Restart the Messenger Application
CAUTION! Download-Program required. Messenger will be stopped. Continue anyway?	"Flip" Program is required to load the Firmware. Messenger Device should be stopped to load the Firmware
Save these values?	Existing Parameters have changed. Do you want to save the NEW Parameters
Normalize to 0	Normalize means to set in relation to a selected channel. If this channel is "0", it would result in a "Divide by Zero"!
Warning: All Data in the Messenger will be defaulted to factory settings, Are you sure?	ALL the existing PARAMETERS & PREVIOUS DATA will be lost and Messenger will be defaulted to factory settings
Value out of range	Entered value exceeds the specified range of the parameter
Invalid File Format	Selected file (*.pda) is corrupt
Saving these values will cause in Loss of "Previous Data"	Changing the existing parameters will clear "Previous Data"
Invalid File Extension	Selected file doesn't have .pda extension
No Data Available	Currently there is no "Previous Data" stored
No More Data Points	There are no more data points in the current DATA frame to Navigate
Are you sure you want to clear stored Results	"PREVIOUS DATA" of Selected Result will be cleared
Are you sure you want to clear all stored Results	"PREVIOUS DATA" of ALL Results will be cleared
Port not available	The Selected Comport (RS-232 / RS-485) is used by another Application
Overflow! Reduce gain?	If you try to auto-set the gain, the signal has to be in range. If gain is already high, it has to be reduced to fit signal to range.
Fill blank fields!	Entered data contain NULL values
Please go online	Connect to Messenger Device
Entered code is not correct.	Entered Access Code doesn't match
Unit ID must be an integer between 0 and 255.	Entered Unit ID value is out of range
Invalid Data	Entered Data is Not Valid Ex: - characters entered instead of Numeric value
Are you sure you want to exit this program?	Exits the Application
NO RESPONSE: Please check device ID# or run the search function	Currently no Device exists in the Network with the specified ID. Navigate to Select Messenger and Run the Search Function which gives the List of Devices present in the Network
Changing language requires closing of the program. Are you sure?	Switching to a different Language requires restarting the Application.
All data in the Messenger will be overwritten with data from this device. Are you sure?	Loading the parameters from .pda file will cause ALL the current parameters to be Overwritten.
Access codes cannot be modified in OFFLINE mode	To modify the Access codes switch to ONLINE mode.

You are OFFLINE. Please load file first	To Edit the parameters in OFFLINE mode you need to First load the .pda File.
NO RESPONSE	Communication between GUI and Messenger Device has failed. Verify the connections.
Lower Limit cannot exceed upper Limit	Entered parameter Lower Limit value exceeds the upper limit value.
Optics Fault	Optical Fault has occurred
Lamps Fault	Lamp Fault has occurred
Fault: -- mA	Fault is registered at Analog output. Where -- Represents the fault current.

List of Codes displayed in STATUS BAR of MEASUREMENTS SCREEN are shown below.

1	Alarm 1 Active
2	Alarm 2 Active
3	Alarm 3 Active
4	Alarm 4 Active
CC1	Cleaning Event1 Active
CC2	Cleaning Event2 Active

For Example: -

Code in STATUS BAR “1,3,CC1” indicates that Alarm1, Alarm2 and Cleaning Event1 are currently Active

List of Messages displayed on LCD Display.

OpticFlt	Optical Fault has occurred
LampsFlt	Lamp Fault has occurred
Data Transfer...	Data Transfer between Messenger and GUI in Progress

Software Upgrading

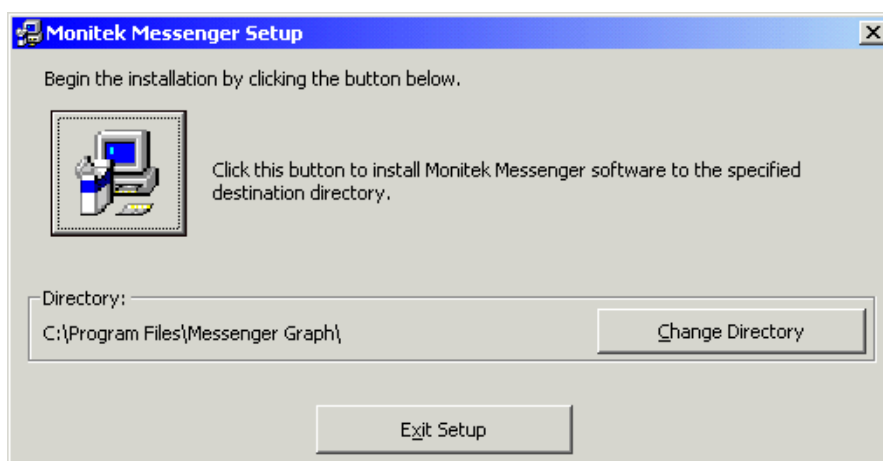
Firmware



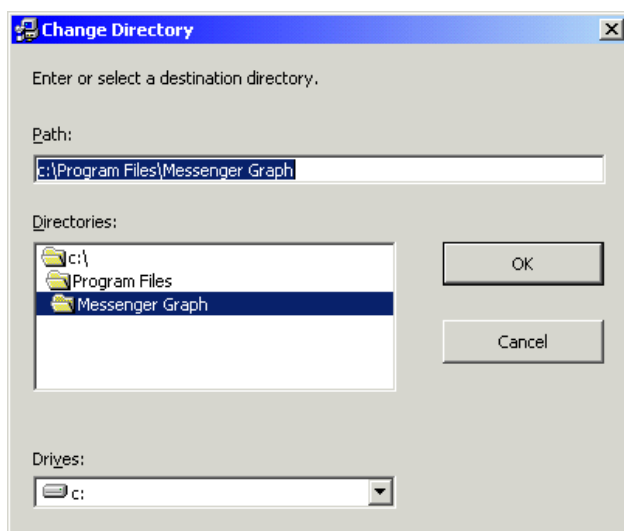
Firmware updates must be done in factory or by our service personnel!

PC Version (Messenger Graph Software)

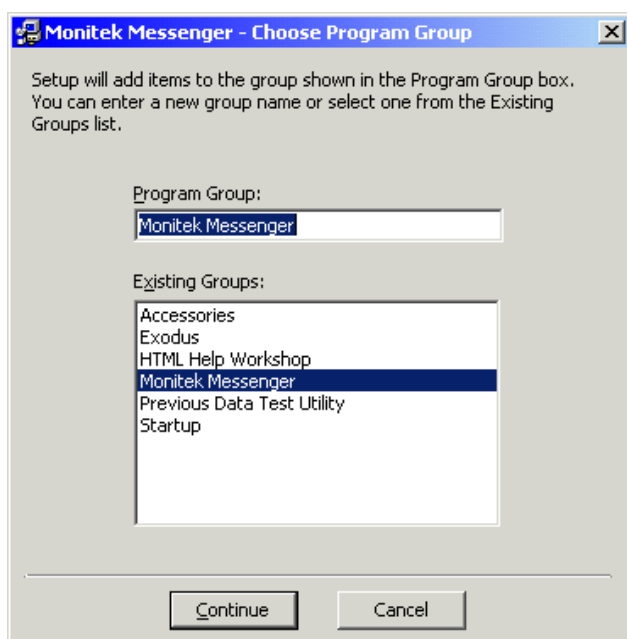
- I. Close any open programs that are running on your computer before upgrading.
- II. Double click on setup.exe.
- III. Welcome screen shown below will appear, Click OK to continue the installation process. To abort the installation process click Exit Setup.



- IV. Choose the Destination location.
- V. To change the default destination location click on Change Directory. Choose new destination location using the following screen.

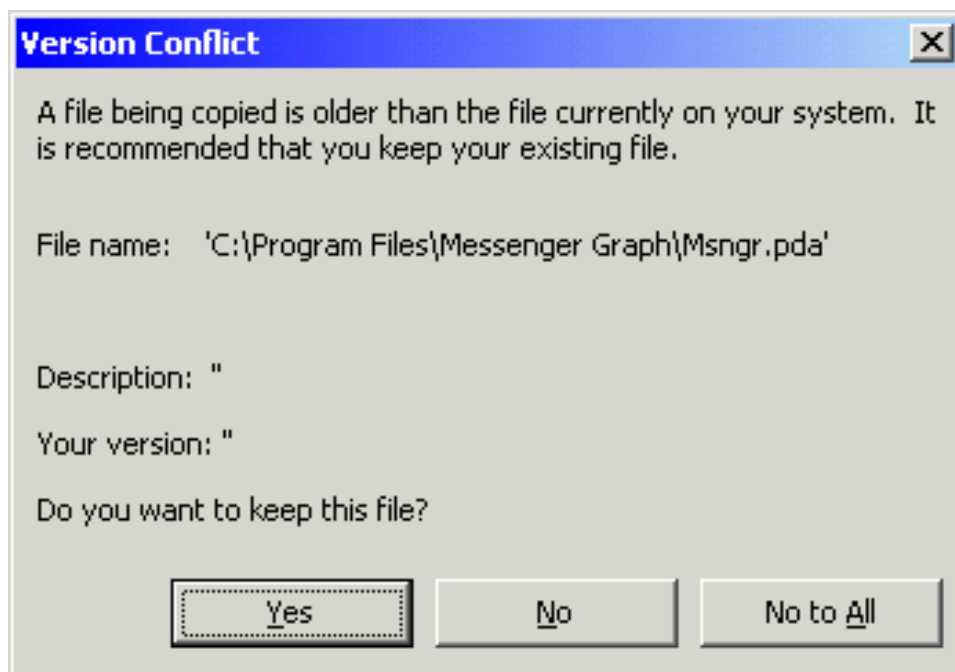


VI. Choose the program group under which the application has to appear.



VII. Click Continue.

VIII. Dialog appears indicating Application files already exist.



- IX. Click "No to All".
- X. Dialog showing the status of the files being copied will be displayed.
- XI. On Completion of Installation Process Message "Installation process complete" will appear.
- XII. Click on OK to complete the installation process.

OPTIONAL LAMP control board

Using the OPTIONAL lamp(s) control board the user may power up to three sensors. The sensors may be Flow cells using Lamps or Probes using LED's.
The Board has jumpers for selecting the type of sensor to power.

Jumpers J4, J5 and J6 are for selecting either a LAMP device (1A current) Jumper INSTALLED or a probe device (340 mA) Jumper removed.



CONNECTING A PROBE DEVICE TO A CHANNEL THAT IS CONFIGURED FOR A LAMP DEVICE WILL DAMAGE THE PROBE.

External Lamp Control Connector Pin out:

1	+5V at 4 A MAX (from Power supply)
2	GND (-) (from Power supply)
3	DEVICE #1 (LAMP/PROBE)
4	DEVICE #1 (LAMP/PROBE)
5	DEVICE #2 (LAMP/PROBE)
6	DEVICE #2 (LAMP/PROBE)
7	DEVICE #3 (LAMP/PROBE)
8	DEVICE #3 (LAMP/PROBE)
9	LAMP ON/OFF (H/L) Control FROM Messenger Pin 29 (Orange wire)
10	LAMP FAULT (L) signal TO Messenger Pin 30 (Yellow wire)
11	GND (-) connects to Messenger Pin 31 (Black wire)

JUMPERS J1 thru J3 (ACTIVE)

These jumpers control activation of the fault detection for each of the connected devices:
Example if you have a device (Lamp or probe) connected to pins 3 and 4 then you may enable fault detection for this device by placing a jumper in position 1 (JP1) i.e.:

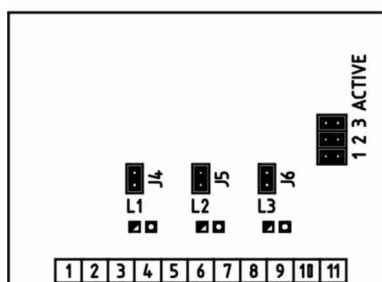
Connect Jumper #1	to enable Fault signal from	Device #1
Connect Jumper #2	to enable Fault signal from	Device #2
Connect Jumper #3	to enable Fault signal from	Device #3

Device Fault is Signaled when Device is OPEN or when the current to the Device drops below 200mA (Fault Setup is done using "LAMP CONTROL" menu using the graphical user interface software).

On board LED's:

RED LED is ON when Fault is detected
Green LED is ON when power is ON (Control from Messenger)

Drawing Lamp control board:



1	+ 5 V	Power from Power supply I _{max.} 4 A
2	GND	Ground from Power supply
3	Lamp #1	
4		
5	Lamp #2	
6		
7	Lamp #3	
8		
9	Lamp On/Off	Control from Messenger
10	Lamp Fault	Signal to Messenger
11	GND	Ground to Messenger
1 2 3 ACTIVE	Fault Activation	Jumper installed = Fault Activation is on Jumper removed = Fault Activation is off
L1 J4	Lamp Current Selection	Jumper installed = Lamp Current = 1 A Jumper removed = Lamp Current = 34 mA
L2 J5		
L3 J6		
☒	LED Red	LED is on when Fault is detected
☐	LED Green	LED is on when Power is on

Internationalization

Select Language

Messenger Software Supports 4 Languages English, German, French and Spanish.

- I. Run the Messenger Application
- II. Choose > **Select Language** to switch to different language

Note: - Selected language should match with Regional settings of the computer

On-Line Help menus and related contents

This section describes the HELP menus and related contents.

Software HELP menus

Main Menu

This menu helps in navigating to various Messenger options.

Choose **Main Menu**

- Calibration Menu
- Setup Results Menu
- Setup Inputs/Outputs
- Diagnostic Menu
- Set Cleaning Event
- Set Access Code
- Set Access Level
- Measurements screen

Set Calibration Menu



Take notice, there is typically no new calibration required in the first 18month after start up. Sensor and transmitter arrives with factory calibration.



This menu is used to correlate raw data collected from the sensors (photo detectors) corresponding to a specific standard or sample concentration. Up to 8 different calibration data points can be stored for each of the four sensors read by the instrument. From this information the instrument can construct a lookup table.

Choose **Main Menu** > **Calibration Menu**

Select the **Sensor**, which needs to be calibrated.

You have two calibration tables, Factory calibration and Process calibration tables. Choose the desired calibration table, which needs to be changed by selecting the respective button

- Factory Calibration
- Process Calibration

Note: Factory calibration table can be altered / viewed using **FACTORY** level Access permissions.

Process Calibration

- Build Calibration
- View/Edit Calibration
- Fit Data
- Copy Fact Table

Build Calibration

For each Sensor, up to 8 different samples can be used during the calibration process.

Select the Sensor number by choosing the **Sensor** Toggle Button.

Select the Sample number by choosing the **Sample** Toggle Button.

Enter the **User Value** (Ex: - Known concentration value of a Standard) in the text box provided.

This value can also be changed using **View/Edit Calibration** menu.

Choose **Read New Data** to capture the data.

Choose **Store New Value** to store the data.

Repeat steps 2 to 5 for each sample.

View / Edit Calibration

The selected Sensor number appears on the top. The data present in the selected process calibration table can be viewed/edited using the following option.

To edit **user value** or **data**, Tap/Click on the cell.

Choose **Graph** to view the curve fit based on the **Fit Type** selected.

Choose **Edit Sensor Equations** to alter the Sensor Equations.

Fit Data

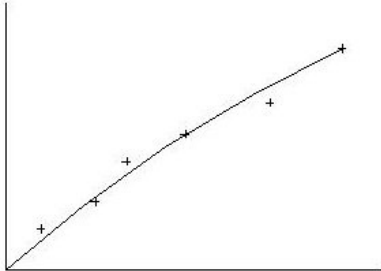
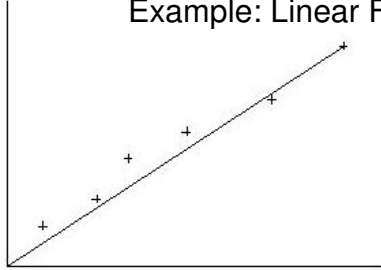


Take Notice:

Fit data is required after each calibration. This function calculates a new calibration curve and writes it to the memory of the Messenger transmitter!

Choose the type of Curve Fit to be performed on the Calibration data. There are 4 options available.

- Linear Fit Process Data
- Curve Fit Process Data
- Linear Fit Factory Data
- Curve Fir Factory Data

Requires a minimum of 3 Samples. Typically used for high concentration (absorption) measurement.	Example: Curve Fit 
Requires a minimum of 2 Samples. Typically used for low concentration (scatter light turbidity / colour) measurement.	Example: Linear Fit 

Copy Factory Table

The selected sensor's factory calibration table is copied to process calibration table.

Factory Calibration

- Build Calibration
- View/Edit Calibration

Build Calibration

For each Sensor, up to 8 different samples can be used during the calibration process.

Select the Sensor number by choosing the **Sensor** Toggle Button.

Select the Sample number by choosing on the **Sample** Toggle Button.

Enter the **User Value** (Ex: - Known concentration value of a Standard) in the text box provided.

This value can also be changed using **View/Edit Calibration** menu.

Choose **Read New Data** to capture the data.

Choose **Store New Value** to store the data.

Repeat steps 2 to 5 for each sample.

View / Edit Calibration

The selected Sensor number appears on the top. The data present in the selected factory calibration table can be viewed/edited using the following option.

To edit **user value** or **data**, Tap/Click on the block.

Choose **Graph** to view the curve fit based on the **Fit Type** selected.

Choose **Edit Sensor Equations** to alter the Sensor Equations.

Setup Results

The Setup Results are used for formatting the output that is to be displayed to the user, which is captured from different sensors

Choose **Main Menu > Setup Results Menu**. You will see different Options to format the output

- Setup Results Nametags
- Setup Results Equations
- Setup Sensor Equations
- Setup Numerical Results
- Setup Graphical Results
- Set Results Units
- Setup Data logging
- Bubble Reject Threshold
- Set Results Format
- Set Results Offset

Setup Results Nametag (Panel PC version only)



**This Nametag is shown at Panel PC screen or configuration Software only!
If you have a transmitter with LCD – display, please configure Nametag,
measurement unit, and decimal resolution as well in menu “Set LCD- Display”.**

Choose the **Result (1...4)** Text box to specify the Nametags to be displayed for results captured in the Measurements Screen.

For Example: - If the data captured in Result1 is Turbidity then the Nametag for Result1 can be given as "Turbidity"

Setup Results Equation



Only qualified technical personnel must perform this work.

Please contact our service for detailed information



Choose the **Result (1...4)** text box to specify the Result Equations.

Rules for Result Equations:

1. An Equation can consist of 5 terms combined by operators.
2. Each term can be a sensor or logarithm of sensor and can have a numerical factor.
3. The fifth term is +/- offset and can only be added.

For Example: -

The Equation is constructed by "term1 [op] term2 [op] term3 [op] term4 + offset" where each term can be a sensor or the logarithm of sensor and has a numerical factor (i.e. 3.67LogSEN4).

The operators [op] can be +, -, *, / .

Setup Sensor Equation

Choose the **Sensor (1...4)** text box to specify the Sensor Equations.



Only qualified technical personnel must perform this work.

Please contact our service and ask for the correct equation for you sensor.



Rules for Sensor Equations:

1. An Equation can consist of 5 terms combined by operators
2. Each term can be a channel or logarithm of channel and can have a numerical factor
3. The fifth term is +/- offset and can only be added

For Example: -

The Equation is constructed by "term1 [op] term2 [op] term3 [op] term4 + offset" where each term can be a channel or the logarithm of channel and has a numerical factor (i.e. 3.67LogCH1).

The operators [op] can be +, -, *, / .

Setup Numerical Display (Panel PC version only)



The Font Size takes effect Panel PC screen or configuration Software only!
If you have a transmitter with LCD – display you will get a fix Font Size in this display.

You can format the Numerical display. Check on relevant **Show Result** checkboxes to select which results need to be displayed during the Numerical display in Measurements screen.

Choose **Font Size** Toggle Button to specify the Font Size (Small / Medium/ Large) with which the results need to be displayed.

- When all results are selected for display Font size can be only **small**.
- When 3 results are selected for display Font size can be **Small/Medium**.
- When 2 or less results are selected for display Font size can be **Small / Medium / Large**.

Choose **Show All** when all results need to be displayed.

Setup Graphical Display (Panel PC version only)



This Menu takes effect to Panel PC screen or configuration Software only!
If you have a transmitter with LCD – display, please configure the results you like to see as well in menu “Set LCD- Display”.

You can format the Graphical display in Measurements screen. Check on **Show Result** checkboxes to select which of the results need to be displayed during the Graphical display.

Choose **Range of Values** to specify the Lower & Upper Limits of the Graph.

Choose **Time Step in Minutes** to specify the time duration with which the X-Axis Scale needs to be displayed.

Choose **Show Color** to select the color with which the result should be displayed on the graph.

Note: Time Step in seconds can be specified by entering decimal values Ex: - 0.1, 0.2.

Set Results Units (Panel PC version only)



**The defined units are shown at Panel PC screen or configuration Software only!
If you have a transmitter with LCD – display, please configure Nametag,
measurement unit, and decimal resolution as well in menu “Set LCD- Display”.**

Choose the **Result (1...4)** Text box to specify the units to be displayed for results captured in the Measurements Screen.

For Example: - If the data captured in Result1 is Turbidity then the unit of Result1 can be given as "FTU".

Setup Data Logging

You can specify the Time Interval (Sec) with which the data needs to be stored in buffer for each result.

Choose **Store Result1 (1...4)** text box to specify the time in seconds.

Choose **Set Buffer Size** to Specify the Buffer Size for each Result

In order to default the values Choose Set **Default Values** (i.e. 60 Seconds).

Note: Changing Data Logging rate clears the PREVIOUS DATA of the selected Result.

Setup Storage Size

Choose **Result Storage Size (1.... 4)**; specify the storage size of each result.

If the data to be stored exceeds the Result storage size, Existing data is overwritten.

Choose **Default Values** (i.e. 500)

Note:

Total maximum stored results can't exceed 8000.

Changing the Buffer Size clears PREVIOUS DATA of ALL Results.

Bubble Reject Threshold

Bubble Reject Filter is used to smooth system response when bubbles are passing and based on a data averaging and acts upon a threshold limit set by the user in %change detection.

Choose **Bubble Reject** textboxes to specify the % Threshold.

Choose **Filter Delay** textboxes to specify the delay in sec.

Set Results Format

You can format the results displayed in Measurements screen.

Choose **Number of Decimal Places** for each Result to specify the precision with which the result needs to be displayed in Measurements Screen.

Choose **Allow Values** for each Result to specify whether **POS** (Positive values) or **ALL** (Positive and Negative values) to be displayed in Measurements Screen.

Set Results Offsets (manual zero adjust)

Choose **OFFSET TO RESULT (1...4)** text box to specify the Offset.

You can enter a positive or negative offset to adjust the zero reading for each result.

Example:

Your displayed result is 10ppm (at ultra pure water) instead of 0ppm.
Then you must enter an offset of (-10) to get a 0ppm reading.

Setup Inputs / Outputs Menu

You can configure the Inputs / Outputs of the Messenger Device.

Choose **Main Menu > Setup Inputs / Outputs Menu**. You will see the following Options.

- Set LCD Display
- Set Analog Outputs
- Assign Digital Inputs
- Set Alarms
- Set Messenger Unit ID
- Set Relay Functions

Set LCD Display (Version with LCD- display only)

LCD version, Enter nametag, measurement unit and decimal resolution

The LCD display Contains 4 Lines, which can be configured to display Results, Sensors, and Temperature. The Buttons “DECs” allow changing the decimal point.

Choose **Line (1...4)**. Enter the text,(Results nametag and measurement unit) which needs to appear on the Line.

Select the **Signal (Results / Sensors / Ambient)** that needs to appear along with the selected **Precision** (Decimal Point).

In order to adjust the contrast of the LCD, Choose "+" / "-" to increment or decrement the value. The default contrast value is 115.

The Maximum text that can be displayed on a Line is 20 characters. When a Signal is assigned only 11 characters of text entered will be displayed and the remaining characters get truncated.

Set Analog Outputs

The system has up to FOUR independent and assignable Analog 0/4 -20 mA loops, which can be connected to External Devices. Each output will operate from a user-defined RESULT equation. The sub-menus allow you to set all the necessary parameter values for Low and High limits and the required mode for the analog output.

Over range:

Analog Outputs can flag abnormal conditions or upset conditions that can be caused by Malfunction of Optics or by some material coating over the windows. We can assign a range of mV for normal operation. If the range exceeds, a fault is registered and an appropriate error message (OPTICS FAULT) will be displayed on the LCD and Measurements Screen.

How to configure Analog Outputs?

- To configure the Analog Output, Choose the **ANALOG OUT** (Out 1-4).
- Choose **Output** Toggle Button ([Not Assigned](#) / [Result1](#) / [Result2](#) / [Result3](#) / [Result4](#)) to specify the user defined RESULT equation needs to be assigned to ANALOG OUTPUT.
- Choose **Mode** Toggle Button to Specify the Mode ([0/4-20mA](#)) Loops.
- Choose **Low**, **High** text boxes to specify the Low and High mV.
- Choose **Overrange** toggle button to specify the channel (CH1...4) Assign the range of mV for normal operation by choosing the **Low** mV and **High** mV.

Note:

In case any of the Analog Output is not used, make sure that **OUTPUT**, **OVERRANGE** parameters are **"NOT ASSIGNED"**.

Assign Digital Inputs



Take Notice:
Alarm relays and digital inputs are optional!

Choose Cleaning Event 1...2

Set Cleaning Frequency in Hours = 0

Specify the **Cycle Duration**, and **Purge Time**. Save the settings. Activate the Relay through Assign Digital Inputs. The Cleaning Cycle gets activated ONLY ONCE.

Note: Whenever you are trying to activate a Cleaning Event through **Assign Digital Inputs** make sure that the Cleaning Frequency in Hours is 0. Failing to do so may cause malfunctioning of the Cleaning Event.

Set Alarms



Take Notice:
Alarm relays and digital inputs are optional!

You can setup Alarm set conditions. Each Alarm can have a **HYSTERESIS** and a **TIME DELAY** (the condition must be met for at least this time before the alarm is reported). The alarm mode (LOW, HIGH, LOW LATCH, HIGH LATCH) can be selected per individual Alarm.

Alarms can be assigned to the following signals

- Result1
- Result2
- Result3
- Result4
- Ambient Temp
- General Alarm

The different Alarm Types are

- Low
- Low Latch
- High
- High Latch

Choose on the **Alarm (1- 4)**.

Specify the signal to which the Alarm needs to be assigned to, by Choosing on the **Assigned Signal** Toggle Button.

Choose **Type** Toggle Button to specify the type of Alarm.

Choose Limit text box to specify the mV. Choose **Delay on Make/Break** Text box to specify the delay in which the condition needs to be met at least before the alarm is reported.

Choose on **Hysteresis** to Specify the Hysteresis value

The Hysteresis value will not have any affect for High and Low Latches.

In case any of the Alarms are not used, make sure that **Type** and **Assigned Signal** are "**NOT ASSIGNED**".

Set Messenger Unit ID

The UNIT ID is necessary when multi-units are connected on the same bus.

Choose **Unit ID** to specify the ID of the Messenger. The Unit ID should lie between 1...255.

Choose **Messenger Tag** to specify the extra information for easy identification when multiple devices are connected in the network.

Set Relay Functions

This menu allows the user to assign the FUNCTION of the Relay.

Functions available are:

- NOT ASSIGNED
- Alarm 1
- Alarm 2
- Alarm 3
- Alarm 4
- General Fault
- Cleaning device 1
- Cleaning device 2

Relay functions in 2 states

- Active ON
- Active OFF Fail -Safe

ACTIVE ON:

As long as assigned function is TRUE The Relay stays in activated state.

For Example:

The Alarm 1...4 are selected and thresholds are defined in the Set Alarm menu. If we set an Alarm on Result 1 exceeding a threshold of 100 and we assign Relay #1 as an indicator of such Alarm condition, the Relay#1 is activated when this threshold is reached or exceeded based on the Alarm mode latching or NON-latching. It would reset when the Result is back below the threshold defined.

Active OFF Fail Safe:

As long as the Assigned signal is FALSE the Relay stays in activated state

For Example:

The Alarm(s) 1...4 are selected and thresholds are defined in the Set Alarm menu. If we set an Alarm on Result 1 exceeding a threshold of 100 and we assign Relay #1 as an indicator of such Alarm condition, the Relay#1 is NOT activate as long as the Alarm condition is TRUE.

Diagnostic Menu

This menu is provided with diagnostic tools.

Choose **Main menu > Diagnostic Menu**, you will see a list of Diagnostic options.

- File menu
- View Channel Output
- Adjust Hardware settings
- Hardware Test
- Software Revision
- Clear Reset Menu

File Menu

The parameters set by the user can be saved and these can be retrieved at a later point of time.

Save Parameters to File

Choose **Save Parameters to File**. You will see a dialog pop up Specify the name of the file in which the parameters need to be saved. These files will be stored with .pda extension and are referred as PDA Files.



Take notice:

The menu “Save Parameter to File” does not save all parameter. It does not provide a complete backup for technical reasons. Parameter like “optimize gain”, “dark current” and “channel reference” will be lost.

Load Parameters from File

Choose **Load Parameters from File**. You will see a dialog pop up. Select the file in which the parameters have been stored earlier. During the process of reading the data from the File and Transferring to Messenger Device, the percentage of data that has been transferred will be displayed on the button.

Load Firmware

Choose **Load Firmware** to prepare the Messenger Device ready for Installation of Firmware.



This menu is for service personal only!

View Channel Outputs

Here you can view the outputs from all the 4 channels and Messenger Ambient Temp.

Raw Data:

Raw Data is channel mV displayed irrelevant of ZERO DARK CURRENT.

Channel Signal:

Channel signal is Channel mV displayed after we subtract the ZERO DARK CURRENT.

Choose Show Raw Data / Show Channel Signal Toggle Button to switch between the display of Raw data and Channel signal.

Adjust Hardware Settings

- Zero Dark Current
- Optimize Channel Auto
- Optimize Channel Manual
- Set Dark Current Auto Zero
- Set Channel Reference
- Calibrate Analog Outputs
- Set ADC-GAIN Manual

Zero Dark Current



Dark current is the constant response exhibited by a photo sensitive detector during periods when it is not actively being exposed to light.

Choose **"ZERO CHANNELS"** to store the dark current. The lamps are turned OFF and the system will take a reading for ALL the channels and stores it as Dark current.

Choose **"Restore Defaults Settings"** to set the Zero Dark Current to 0.

Optimize Channel Signal Auto



Only qualified technical personnel must perform this work.

Please contact our service for detailed information



The Messenger Device is provided with Multi Stage Amplification. The Primary stage of Amplification is done with help of Front End Amplifiers and Secondary stage of Amplification is done with in the Analog to digital converter (ADC) that has an Internal amplifier.

The Front End Amplifiers setting can be done using Optimize **Channel Auto**.

%Range is related to the set point i.e. 100% which is 2000mv and 120% is 2500 mV which is the range of the ADC Converter.

Raw mV displays the current channel mV

Choose Channel (CH1...4)

When a Channel is selected and the **Optimize Gain key** is entered, the Messenger will try to set the Gain (Increase or decrease) to adjust the output level of the amplifier to 2000 mV (with range set at 100%) or higher if the 100% is higher, this relates to the A/D input of 2500 mV (80 to 120%).

Choose **Restore Default Settings** to restore the %Range to the default value i.e. 100.

The TRIMPOTS of the Front End Amplifier can be selected manually using Optimize Channel Manual.



Take notice:

The measurement lamps will be switched of if you access this menu!

Please access the menu "Optimize Channel Signal Auto" after leaving this menu to switch lamps on again.

Optimize Channel Signal Manual



Only qualified technical personnel must perform this work.

Please contact our service for detailed information



This shows the TRIMPOT settings on the front end Amplifier Range 0 to 100.
Choose **Channel (1...4)** and Tap/Click on "+" or "-" In order to increment or decrement the TRIMPOT Settings.

Auto Zero Dark Current

Choose **Auto Zero Frequency in Hours** text box to specify the Time Interval (Hours) at which the Dark current should be made zero.

Store Channel Reference



Only qualified technical personnel must perform this work.

Please contact our service for detailed information



Using this option you can store a reading from a channel, which allows us to store an initial reference reading for the channel.

For Example:

When doing a color measurement with a single channel (detector) the equation for sensor may look like the following

$\text{LOG REF CH1} - \text{LOG CH1}$. Where LOG REF CH1 is a constant as it relates to the initial energy level with clear water in the cell.

Store Reference:

Choose CH (1...4).

When a channel is selected and STORE REFERENCE key is entered the current reading of the channel will be stored as Reference

When a channel is selected and RESET REFERENCE key is entered the Reference value will be defaulted to zero.

Normalization:

Choose CH (1...4).

Choose the channel (CH1 / CH2 / CH3 / CH4) with which the selected channel needs to be normalized and Normalized Key is entered. The Channel gets normalized.

Note:

Normalized Channel values are displayed in Green color.

Calibrate Analog Outputs

You can Calibrate Analog Outputs or adjust the 0/4- 20 mA loop, this is like a trim pot adjustment.



The analog outputs are typically factory pre set. This menu is for service personnel only!

For example, the 4mA to 4.00mA (Zero setting) and 20mA to 20.00 (Factor setting) as the technician sets these loops he can iterate between the zero and factor to adjust the 4-20 mA exactly to the right levels.

Choose **CH (1...4)**

Choose **Zero** Setting and Tap/Click on "+" or "-" in order to increment or decrement by 0.025.

Choose **Factor** Setting and Tap/Click on "+" or "-" In order to increment or decrement by 0.0005 value.

ADC-GAIN Manual

This is a secondary stage of Amplification setting on the ADC chip where we have a FRONT end Amplification setting using the electronic trim pots which can be adjusted using **Optimize Channel Auto** or **Optimize Channel Manual**.

ADC gain setting allows a second stage of amplification when we are looking at very low signals and we need to amplify further beyond the front-end range adjustment allowed.

This of course will cause a higher offset voltage and may reduce the range of the detection because of this offset potential that is due to the multi-stage amplification and the initial offset potential of the front-end op-amps.

The settings are defaulted to 1 but may be adjusted to 2,4,8,32,64,128

Choose **Channel (1...4)** and Tap/Click on the "+" or "-" in order to increment or decrement the gain setting.

Hardware Test

This menu is used for testing of hardware

- Lamp Control
- Test Analog Outputs
- Test Relays

Lamp Control

Take notice:



The lamp intensity is typically preset. The lamp current depends by sensor. Please see chapter "Sensor List for Model Messenger" to see correct lamp current for your sensor. A wrong current will reduce live time or damage the measurement lamp in you sensor.



You can view the current lamp's status and Lamp Intensity.

MAIN FAIL in Lamp Status indicates Lamp Failure.

Choose **Lamp Intensity** text box to specify the percentage of Intensity.

Choose Display Fault Toggle (**INT LAMP / EXT LAMP / BOTH LAMPS**) button to explicitly generate Faults.

Choose **Turn Lamp ON / Turn Lamp OFF** Toggle Button to specify Whether Lamp needs to be Switched ON / OFF.

Choose External **Lamp ON / External Lamp OFF** Toggle button to specify whether External Lamp needs to be ON/OFF.

Test Analog Outputs

This Menu displays the mV of the FOUR Analog Outputs. A Fault in the Analog Output is displayed as "**FAULT: 2mA**" where 2mA is the current assigned during the fault condition. You can also test the Analog outputs using this option.

For Example: -

Set **Analog Out1** to the following parameters

OUTPUT = Result1

Low = 0mV, High = 100mV

Mode = 4-20mA

OVERRANGE = CH1

Low mV = 0, High mV = 150

Choose **Analog OUT1**

Enter the 50mV in the Analog Output text box and choose the "**Update Outputs**" key. The current observed at the Analog OUT1 should be 12mA.

Choose **Restore Previous** to restore the Analog Outputs to previous values before the entry of 50mV.

Test Relays

This Menu displays the current status of the FOUR Relays i.e. Signal to which Relay has been assigned and whether it is switched ON / OFF.

Choose the ON / OFF Toggle button to Switch ON / OFF the Relay.

Clear/Reset Menu

- System Reset
- Default Values
- Clear Process Calibration
- Clear Factory Calibration
- Clear Results
- Reset Alarms

Choose **System Reset** to reset the Hardware.

Choose **Default Values** to default the parameters of the Messenger.

On Selection of Default Values, Factory calibration table will not be defaulted.

Clear Process Calibration

Choose **Sensor (1...4)**.

On Selection of Sensor, choose **Copy From Factory Table** key. Factory calibration table contents of the Selected Sensor are copied to the Process calibration table.

On Selection of Sensor, choose **Clear Table** key. Process calibration table contents of Selected Sensor are defaulted to 0.

Clear Factory Calibration

Choose **Sensor (1...4)**

On Selection of Sensor when **Clear Table** key is entered. Factory calibration table contents of selected sensor are defaulted to 0.

Clear Results

Choose **Clear Results (1-4)** to Clear the Historic data stored in the buffer.

Reset Alarms

This menu displays the status of the 4 Alarms.

ACTIVE in the status block with RED background indicates Alarm is ON

In order to clear the Alarm, choose the Alarm with **ACTIVE** in the Status block and choose **Clear ALARM** key.

Software Revision

The Menu displays the current Version Number of GUI and Messenger.

The Messenger Version will be displayed only when GUI is connected Online.

Set Cleaning Event

You can program up to TWO cleaning events.

A cleaning event is an automatic cycle that allows the optics to be CLEANED by the introduction of a cleaning solution to flow through the cell.

For each Cleaning Event, you can specify the **Cleaning Frequency**, **Cycle Duration** and **Purge Time** (Time to allow the Sample to flow and purge out the cleaning solution). A Relay can be assigned to a Cleaning Event, which will be active only during the Cycle Duration. Cleaning Events can be activated in 2 ways, automatically or through Assigned Digital Inputs.

Automatic Mode:

Choose Cleaning Event 1...2

Specify the **Cleaning Frequency**, **Cycle Duration**, and **Purge Time**. The Cleaning Event gets activated.

Once you save the settings.

Assign Digital Inputs:

Choose Cleaning Event 1...2

Set Cleaning Frequency in Hours = 0

Specify the **Cycle Duration**, and **Purge Time**. Save the settings. Activate the Relay through Assign Digital Inputs. The Cleaning Cycle gets activated ONLY ONCE.

Whenever you are trying to activate a Cleaning Event through Assign Digital inputs make sure that the Cleaning Frequency in Hours is 0. Failing to do so may cause malfunctioning of the Cleaning Event.

Set Access Code

You can set Personal Access code for Operator, Technician and Factory Levels preventing unauthorized personnel from altering key parameters that affect the operation of the unit.

Choose **Operator** text box. An Interface pops up Specify the Operator Password.

Choose **Technician** text box. An Interface pops up Specify the Technician Password.

Choose **Factory** text box. An Interface pops up Specify the Factory Password.

Set Access Level

You can enter the Access code based on the access code entered access level changes.

Choose New Access Code text box. An Interface pops up Specify the new Access code.

Note: On entering incorrect access code the Access Level will be defaulted to Operator.

Measurements Screen (Panel PC version only!)



An interface converter USB to RS485 can not be used to configure the "Measurement Screen" menu! Using the converter to access this menu may cause a crash of the Messenger Graph Software!

- Previous Data
- Online Analysis
- Alarm Status

Previous Data

Choose OPTIONS button  on the top right corner of the measurements screen, a popup menu appears.

Choose **Previous Data**.

Entire Previous Data is retrieved. Most recently logged data is displayed as first frame of graph.

Choose **Previous "<"** and **Forward ">"** buttons on the bottom of the graph to scroll through the Previous Data.

Note: This operation may take some time to read the data from device and process the data.

Choose **Numerical / Graph / Bar Toggle** button to switch between display formats.

How can you view value of data point on a graph area?

Tap on the data point you want to view on the graph area, Crosshair appears displaying the X-axis and Y-axis data.

Choose Previous "<" and Forward ">" buttons to scroll through the data in the currently displayed frame.

Tap outside the graph area to remove the crosshair.

How can you customize the Numerical and Graphical display?

Graph settings can be configured using the following screen

- Setup Numerical Display
- Setup Graphical Display
- Graph Settings

Online Analysis (Panel PC version only)

You can view data being captured by Messenger Device ONLINE.

The data captured from the Messenger Device can be viewed in 3 different formats.

- Numerical Display
- Graphical Display
- Bar Chart Display

Numerical Display and Graphical Display can be customized using the Setup Graphical Display, Setup Numerical display Menus.

Choose Numerical / Graph / Bar Toggle button to switch between the displays.

Alarm status (Panel PC Version only)



Take Notice:
Alarm relays and digital inputs are optional!

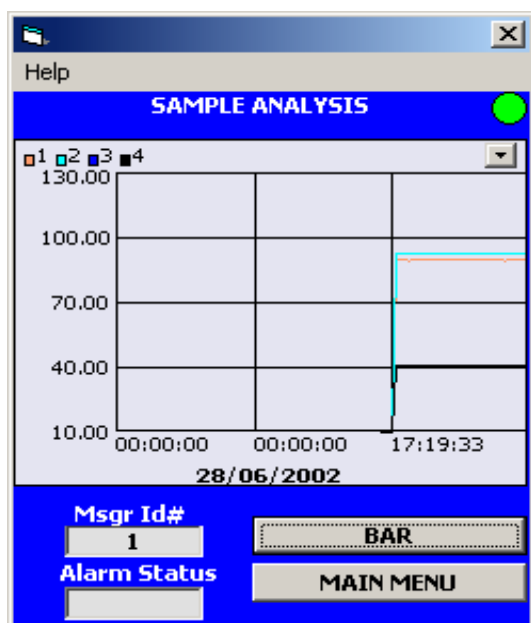
Status of Alarms is represented on the bottom of the Measurements screen.

Codes displayed in Alarm Status are shown below.

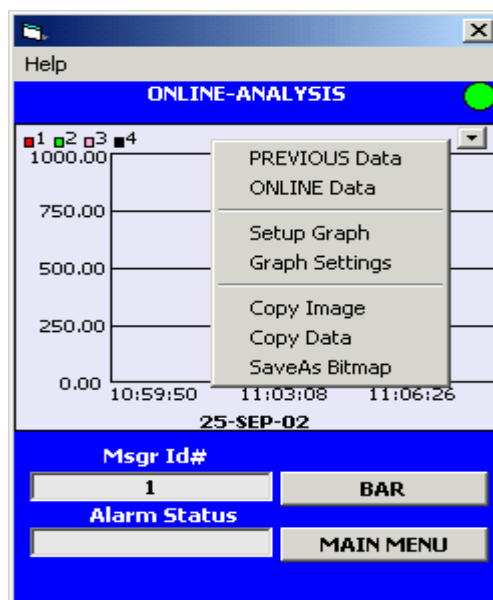
- 1 - Alarm 1 Active
- 2 - Alarm 2 Active
- 3 - Alarm 3 Active
- 4 - Alarm 4 Active
- CC1 - Cleaning Event1 Active
- CC2 - Cleaning Event2 Active

Graph/Chart Recorder (Panel PC version only)

1. Run the Messenger Application.
2. Navigate to **Main Menu >Measurements Screen** and Choose GRAPH view.



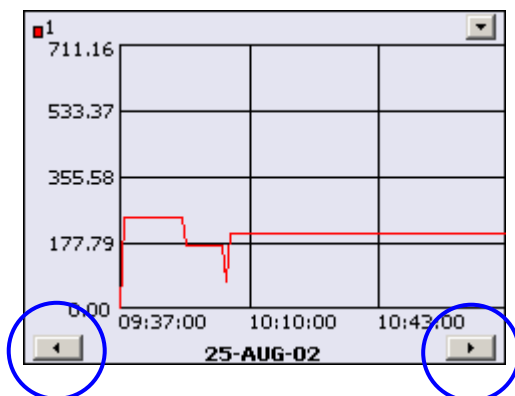
3. Choose the Button on TOP Right corner of Graph. Which displays a Popup Menu with a list of options.



View Previous Data (Panel PC version only)

On Selection of **Previous Data** Menu. Results Selected in SETUP GRAPH DISPLAY will be pulled from the Messenger and Displayed.

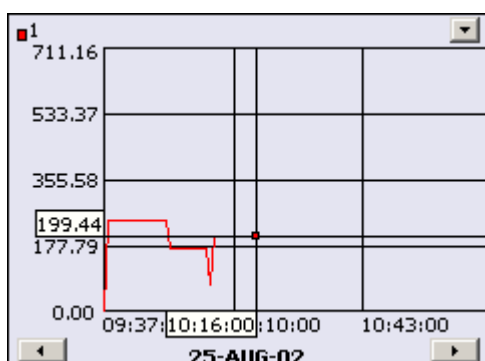
Once the data is retrieved from the Messenger, the data is plotted on the Graph.



Choose the **FORWARD** and **BACK** buttons to navigate through the DATA SETS. Each data set displayed contains 100 points or as many available in that group. Data Sets are grouped based on DATE.

POINT UNDER CURSOR

Choose the point you want to view by Tap/Click on the graph area. A Cross Wire with corresponding x, y values is displayed as shown below.



Choose the FORWARD and BACK buttons to navigate through the Points displayed on the Graph.

Note: To remove the Crosswire Tap/Click outside the Graph Plotting area

When Cross wire is present the BACK and FORWARD buttons move the cross wire through DATA POINTS in the absence of cross wire the BACK and FORWARD buttons help in moving through the DATA SETS

View ONLINE DATA

Choose this option to get Online Data from Messenger.

Setup Graph Display

Choose **Setup Graph Display** a Dialog appears as shown below.

SETUP GRAPHICAL DISPLAY OF RESULTS

Range of Values

0 to 100

Time steps in Minutes

Show Result: 1 2 3 4

Select Color : [Red] [Green] [Black]

Show ALL

BACK

Range Of Values

Specify the Lower Limit & Upper Limit of the Graph.

Select Color

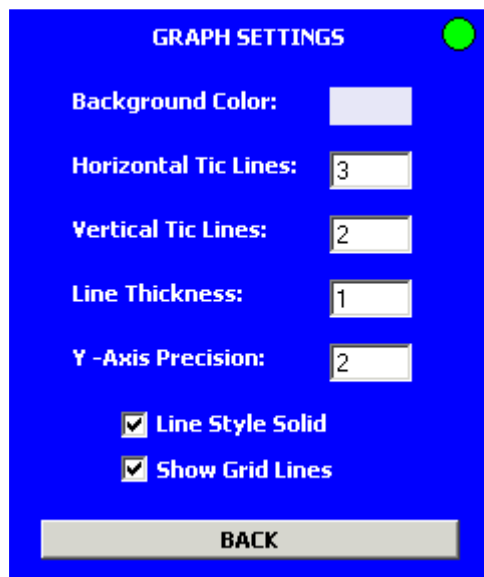
Click on **Select Color** of Result (1,2,3,4). A dialog pops up displaying the list of colors. Select the color.

Show Result

Check the results that should be displayed on Graph. After changing the above options Press on the **BACK** button the graph is displayed with new selections taking into affect.

Graph Settings (Panel PC Version only)

Choose **Graph Settings** a Dialog appears as shown below.



GRAPH SETTINGS

Background Color:

Horizontal Tic Lines:

Vertical Tic Lines:

Line Thickness:

Y -Axis Precision:

☒ Line Style Solid

☒ Show Grid Lines

BACK

Background Color

Click on the background color. A dialog pops up displaying the List of colors. Choose the Color.

Horizontal Tic Lines

Specify the number of Horizontal tics to be displayed on the Graph.

Note: For tics greater than 10 the labels may overlap

Vertical Tic Lines

Specify the number of Vertical tics to be displayed on the Graph

If tic lines is ≤ 2 the display is HH:MM:SS

If tic lines is > 2 and < 6 the display is MM:SS

If tic lines is > 6 the display is SS

Where HH Represent Hours, MM represent Minutes, SS Represent Seconds.

Note: for tics greater than 9 the labels may overlap

Line Thickness

Specify the Line thickness.

Note: Display may not be proper if line thickness is greater than 3

Y-axis Precision

Specify the precision with which the y-axis data needs to be displayed.

Line Style Solid

Select this option if line style needs to be *solid*. If it is not selected, the line style will be *dashed*.

Show Gridlines

Select this option to Show/Hide Gridlines.

Copy Image

This feature is used to capture the graph as Image and transfer it to the Clipboard.

The transferred Clipboard Image can be pasted in Word Document or in any other applications that support Image clipboard.

To use this Choose **Copy Image**

Copy Data

This feature is used to capture the data present in the Graph and transfer it to the clipboard.

The Transferred clipboard data can be pasted in Word / Excel or any other applications that support clipboard.

To use this feature choose **Copy Data**.

SaveAs Bitmap

This feature is used to capture the Graph Image and save as a Device Independent Bitmap.

To use this feature Choose **Save As Bitmap**. Specify the Name of the File and Location.

Sensor List for Model Messenger

The Messenger Transmitter allows the use of many different types optical sensors used for concentration or colour measurement.

Take notice:

This list includes the most common sensors compatible with model Messenger. If you do not find your Sensor, please contact us or read the manual of your sensor for detailed information.

Sensor Model	Lamp Current		
	1 A	300 mA	70 mA
MoniTurb-F	◆		
MoniTurb-S	◆		
MoniTurb-FS	◆		
MoniSpec-A	◆		
MoniSpec-AD	◆		
MoniSpec-AT	◆		
AP2			◆
22-... / 25...		◆	◆
LAS		◆	
210 (TSW)*			
MoniSpec-UV**			
MoniSpec-UVd**			

* optional external power supply required

** optional external UV power supply required

Technical Data

Model Monitek Messenger

Universal Transmitter, Monitek Product Line of Galvanic Applied Sciences Inc.



- Configuration via PC, Laptop or Netbook
- Optional with implemented Panel PC
- Menu - based, intuitive User Interface
- Instruction Manual available via Help Function
- Serial Interface RS 232C / RS 485 (Modbus RTU Protocol)
- Simultaneous Use of up to 4 Sensors
- Sensors for Turbidity, Colour or Absorption measurement
- Fully Programmable Units (ppm, EBC, FTU, g/l, % TS...)
- Two Independent, fully programmable Cleaning Cycles
- Linearization of Measurement Values
- Integrated Data Logger for up to 8000 measurement Values
- Recovery via Back-up File

Description:

The universal transmitter model Messenger can be used with all optical sensors of the Monitek series. The Messenger allows the simultaneous use of multiple sensors. Hereby you can use up to four single channel sensors. Even different sensors can be used with one transmitter. The measurement results can be linked together using almost any mathematical equation. This ensures an easy setup of e.g. dosage systems. The programming / calibration of the system will be done via a PC, Netbook or Laptop using the menu-based software. Only one PC or Panel- PC is required to configure an instrument in a network of up to 255 Messengers. Using the Messenger with an integrated Panel- PC allows the paperless recording or displaying of the measurement results as bar- or line graph's.

Applications:

- Scatter light turbidity measurement
- Absorption turbidity measurement
- Single channel colour measurement
- Dual channel colour measurement

Operational areas:

- Chemical industry
- Petrochemical industry
- Pulp & Paper
- Beer and beverages

Technical Data:

Supply voltage:	90-260 VAC, 50-60 Hz optional: 24 V AC/	optional digital inputs:	4x 5V High
Power consumption:	DC	Reproducibility:	± 1 %
Relay capacity:	maximum 50 VA	Temperature:	-10°C to 50°C
Analogue output:	4 Relays fully programmable (48V / 2A)	Enclosure / Protection:	1.4301 / IP65 (NEMA 4X)
Interfaces:	Up to 4x 0/4 - 20mA (isolated)	optional hazardous area:	ATEX Zone I / Zone II
	RS 232C / RS 485 Modbus RTU		

Declaration of Conformity (CE)

Declaration of Conformity

The Manufacturer of the Products covered by this Declaration is



41 Wellman St., Lowell, MA 01851 USA
Email: liquidparts@galvanic.com
Tel: + 978-848-2701, Fax: + 978-848-2713

The Directives covered by this Declaration: 2004/108/EC
2006/95/EC

The Products covered by this Declaration

Monitek Messenger Transmitter Model # MSG-LD

The Basis on which Conformity is being Declared

The manufacturer hereby declares under his sole responsibility that the products identified above comply with the protection requirements of the EMC directive and with the principal elements of the safety objectives of the Low Voltage directive listed above and that the following standard have been applied: EN / CSA /UL 61010-1

EN 61000-6-2: 2005

EN 61000-6-4: 2007

The technical documentation required to demonstrate that the products meet the requirements of the Low Voltage and EMC directives have been compiled and are available for inspection by the relevant enforcement authorities. The CE mark was first applied in: 2010.

Technical Documentation is available for inspection at these addresses:

Chemtronic Waltemode GmbH
Niederstrasse 14
D-40789 Monheim
Germany

ANAEL, SAS
15, rue Nobel
Zone Industrielle
F-45700 VILLEMANDEUR
France

Authority: V.P. and General Manager, Jack Cotter

Attention!

The attention of the specifier, purchaser, installer or user is drawn to the special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives.

Details of these special measures and limitations are available on request, and are also contained in the product manuals.

Rev. A effective July 29, 2010