



USER MANUAL

A3716, A3800 Online Monitoring Systems



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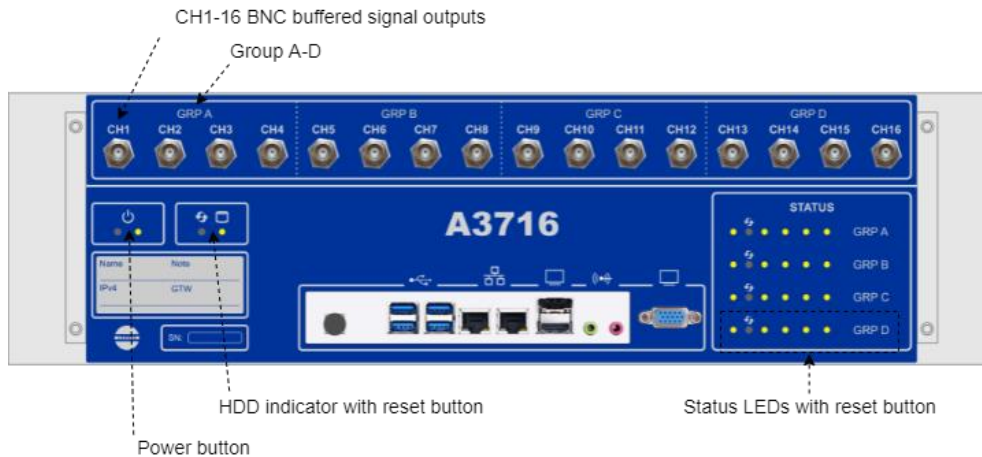
Introduction

This chapter will give you an overview of online monitoring systems – what devices are used for online monitoring and what software helps you with data collection.

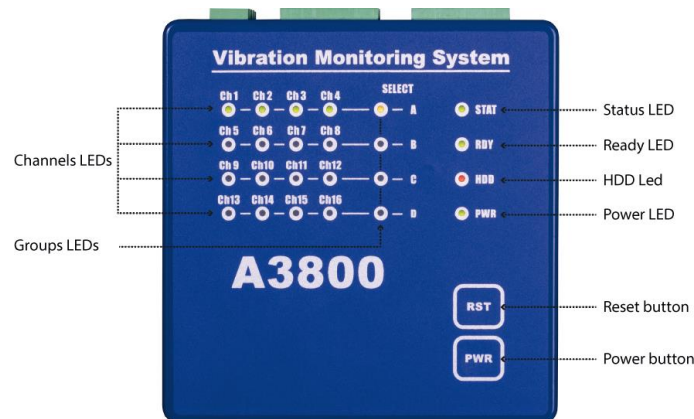
Online monitoring systems are used for reading the vibrations on machines continuously.

We use two types of devices for online monitoring.:

1. First one is online unit **A3716**. This unit contains 4 DSP boards (digital signal processing boards – more information in chapter Adash DSP board). Each board contains 4 input channels (it means A3716 has 16 input channels overall). These channels are divided into groups A – D (as you can see in picture below: GRP A, B, C, D). All of them allow you to measure/collect data simultaneously.

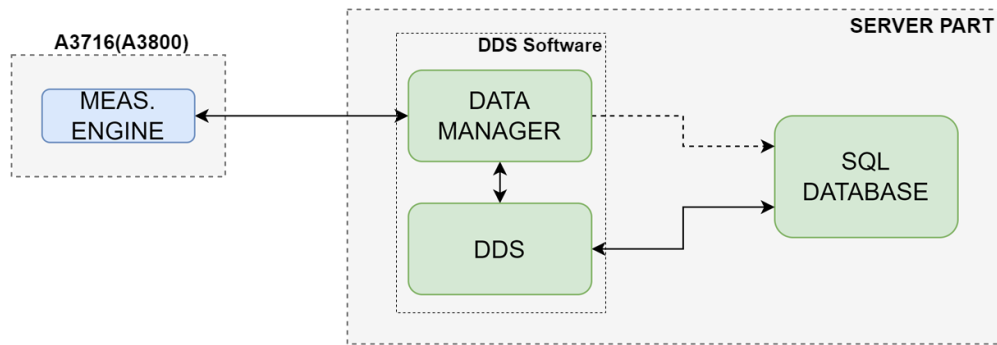


2. Second one is online unit **A3800**. This unit also contains 16 input channels. The difference is that A3800 contains only one DSP board. It means, you can measure only on one channel group simultaneously (for example group A - Channel 1 to 4, or group B - Channel 5 to 8, etc.). Multiplexer is used for switching in between these channel groups. Lighting channels LEDs indicate where measurement is defined (see picture below – measurement defined on group A).



Detailed descriptions of online units are shown in following chapters.

Units A3716 and A3800 are controlled and set by **DDS software**. It basically assures communication between online unit and database. This software also allows you to create a structure (database) for your measurements.



MeasEngine – Every online unit contains this software. It is performing measurements, collects data and provides them to Data Manager (part of DDS).

Data manager – As mentioned above, it is part of DDS software. It is sending configuration commands to MeasEngine. Another important task is to collect data from online units and to save them into database.

DDS (Digital Diagnostic System) – Software for database's (project's) changes and creation. DDS is used for measurements configuration, data visualization and following data analysis.

SQL database – All structures you create in DDS are stored in SQL database. All data you get by measurements are also stored in database.

More details about DDS software are included in DDS guide.

Get started

Basic instructions to get your online unit ready are described in this chapter. You will be able to measure on one channel of online unit. Measured values will be shown in graphs in DDS software.

Online unit is actually PC with Windows operating system. It has its own IP address set during production. You can find it on unit's front panel.

Communication between online unit and PC is always provided by network connection. Following steps will help you proceed further with your online unit.

Turn on your online unit at the beginning. You can do it by power button on the front panel of online unit.

Pay attention mainly to following steps:

- **STEP 1: you need to set IP address for unit correctly, so it can communicate with other PCs (devices) in your network,**
- **STEP 3: installation of Adash server – if you decide to install MySQL server, it needs to be installed correctly otherwise you will not see 'My SQL Server 8' option when you create DDS database.**

STEP 1: Online unit's connection to network

First of all, you need to configure your online unit for network connection. It means, change IP address for online unit itself so it can communicate with other devices in same network.

Online unit A3800 has port with static IP address configuration. Online unit A3716 has two ports for network connection – one for static IP address and second for dynamic (DHCP) IP address.

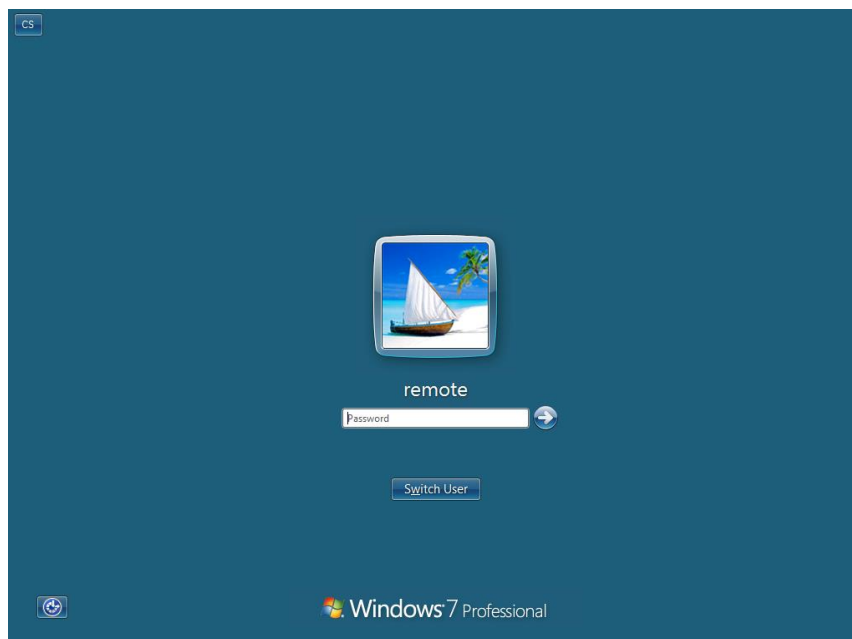
In case you will connect A3716 to network with DHCP port, you can go to STEP 2: Sensor connection immediately. Otherwise please follow guide below.

You have actually two options how to configure IP address for your online unit. First one is using online unit as standalone computer. Second option is to connect online unit with PC through ethernet cable. Particular options are described below.


1. Online unit as a standalone PC

This is the easiest way for IP address change in online unit. You just connect monitor, keyboard and mouse to online unit. Monitor is connected via HDMI port. Mouse and keyboard are connected with USB ports.

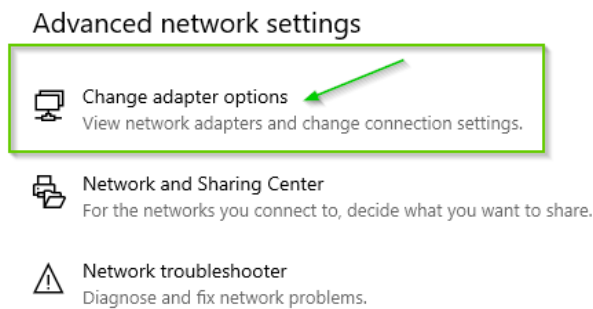
Login parameters (it means username and password) for online unit are both set to 'remote' by default.



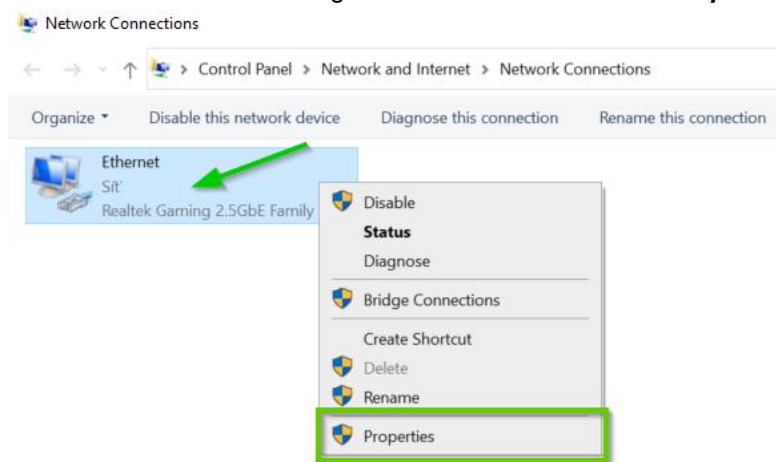
When you are logged in, you need to change IP address to your online unit. Please see following steps how to do it.

Go to Windows start menu on main panel .

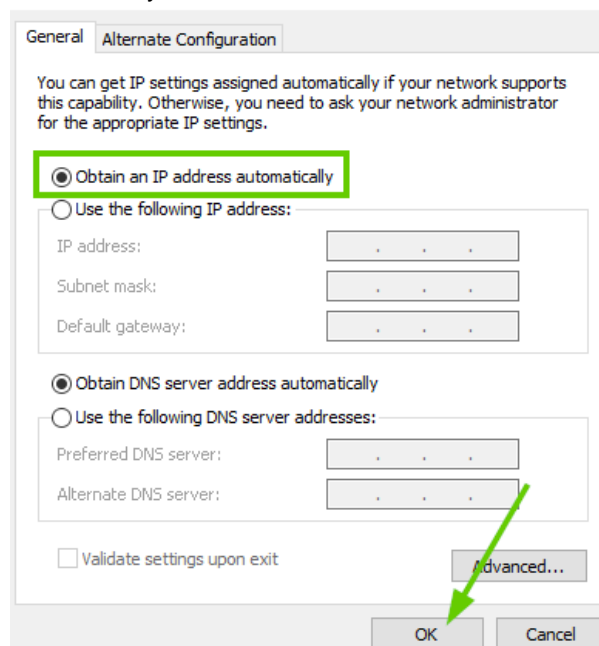
Search for '**Settings**'. Choose '**Network and internet**' and go to '**Change adapter options**' part.



You can see options for Ethernet after click with right mouse button – choose '**Properties**'.

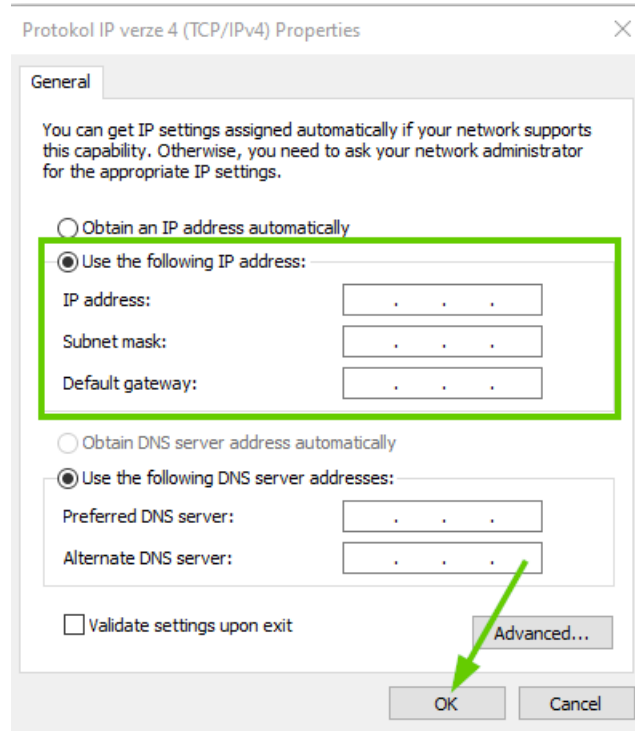


Choose option **TCP/IPv4** and click on '**Properties**'. Now you have two options how to set IP address for unit. First one is set it automatically with DHCP. See below.



Note! If DHCP is used, IP address is assigned to online unit automatically from available range of IP addresses.

Second option how to set IP address for online unit is to choose static IP address for it.



2. Online unit connected to PC with ethernet cable

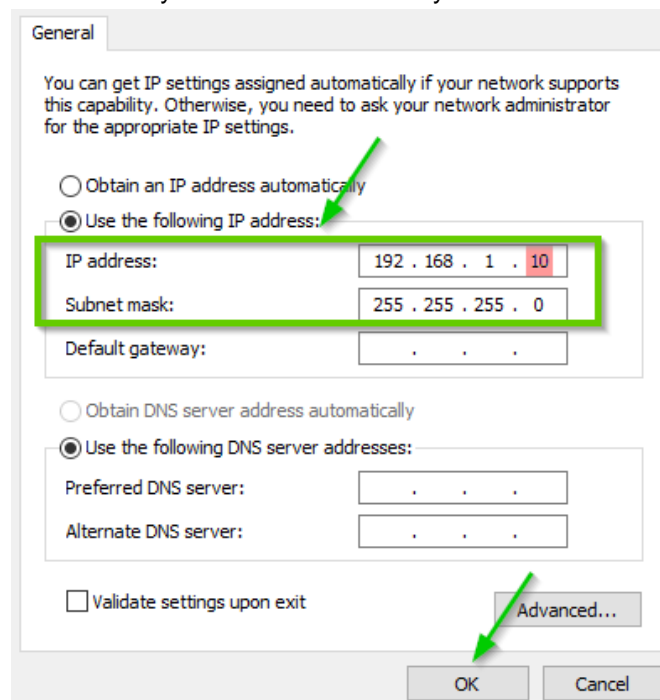
Second option how to change IP address for online unit is to connect remotely. Proceed based on steps below.:

1. Connect online unit with PC through ethernet cable.

2. IP address of your PC needs to be changed according to online unit's IP address.

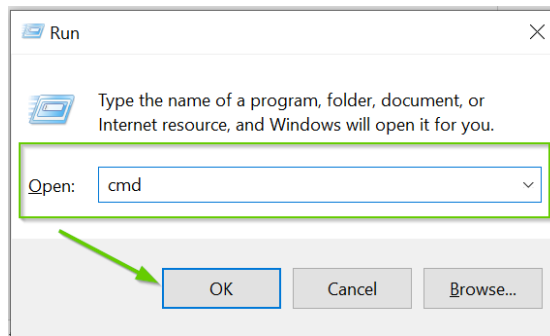
You can do it same way as in previous option (unit as standalone PC), but on your PC.

Choose option '**Use the following IP address**'. First three numbers in IP address are the same as in IP address for online unit (online unit's IP address is on its front panel). Last number has to be different (e.g., 10 as in picture below). Click to field for subnet mask – you should always get subnet mask 255.255.255.0 (it automatically should fill itself when you click into this field). Confirm with OK.

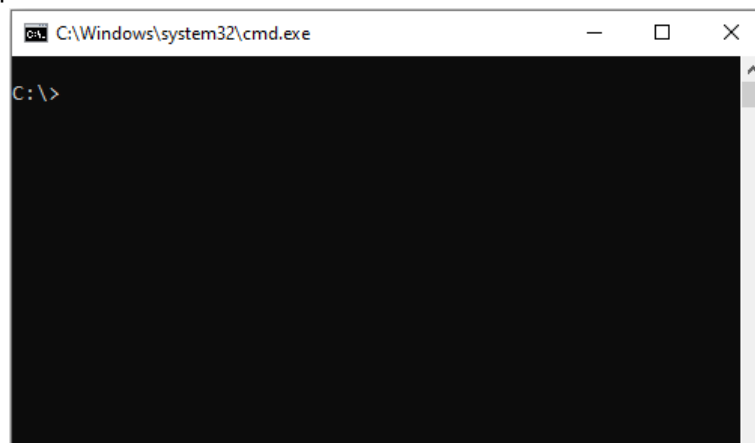


3. Check connection between online unit and PC. You can check this connection by using command line and “ping” test.

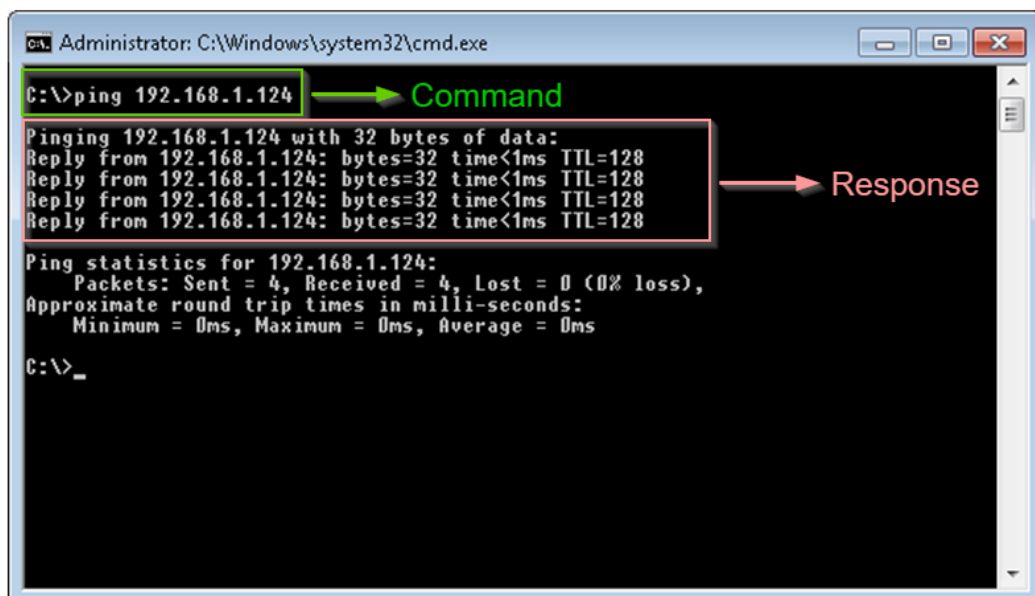
Launch command line - press Win  + R, enter ‘cmd’ and press Enter/OK.



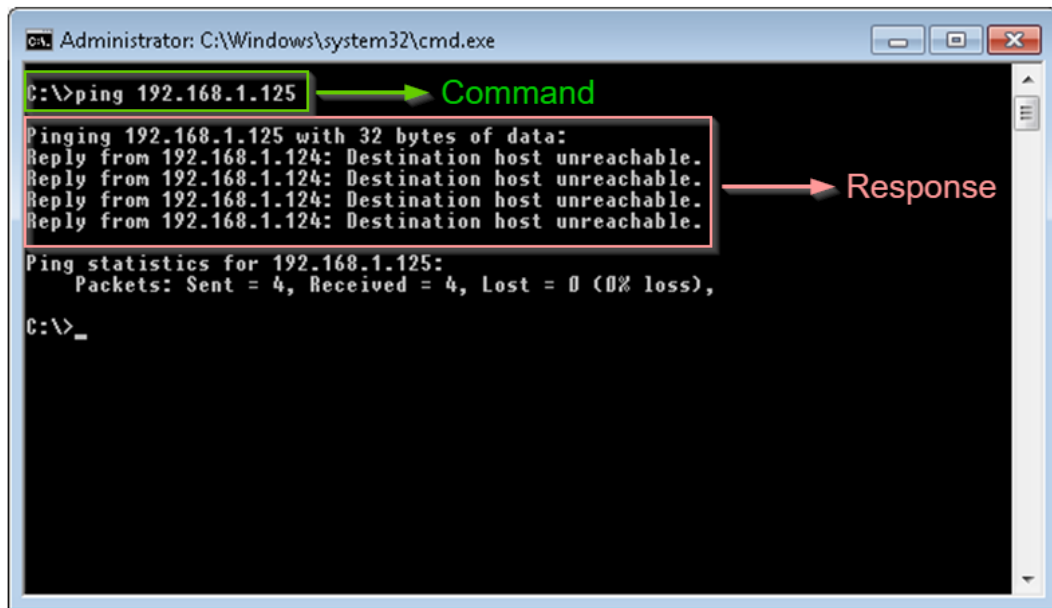
The cmd.exe window appears.



Enter command ‘ping’ with IP address of the online unit (for example ping 192.168.1.124). **If connection is successful**, this computer will respond with list of reply times (like in the picture below).



If connection is not successful, you can see ‘Request time out’ or ‘Destination host unreachable’ (see picture below).



If you did not establish a connection with computer, make sure the computers (online unit and PC) are physically connected by a network cable. Check if the cable is not damaged. Furthermore, make sure that required IP addresses of computers are correct. If you still fail, contact the IT department.

If ping test was successful, connection between online unit and PC was established successfully.

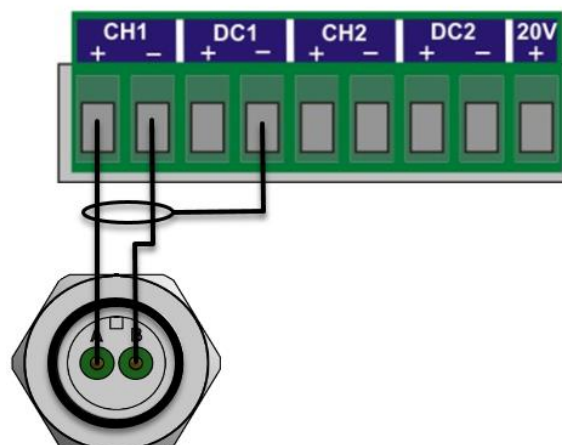
After this you can connect to online unit with remote desktop connection with username/password – **remote/remote**. If you need more information how to connect with remote desktop to your online unit, please see chapter Remote desktop connection .

When you are connected, you change IP address for online unit same as in previous option 'Online unit as a standalone PC' based on your network settings.

STEP 2: Sensor connection

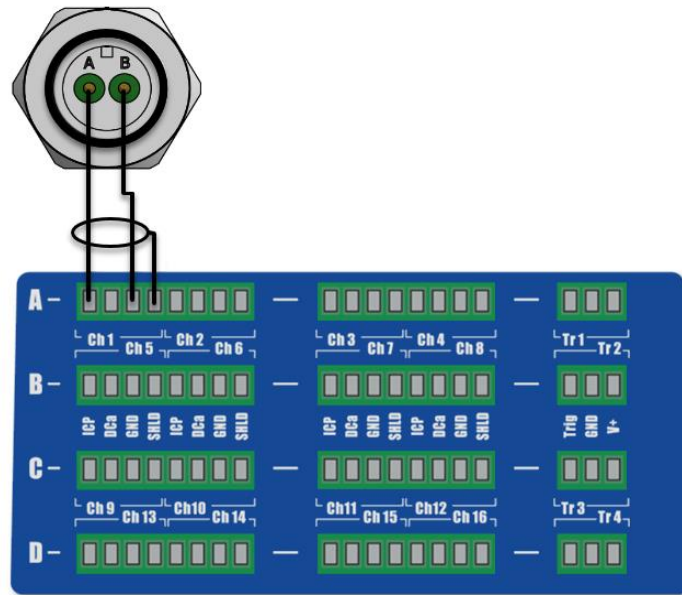
To measure signal (not only noise) you need to connect sensor to your online unit. Commonly used sensor is acceleration sensor 100mV/g with ICP (constant current power source). There is difference in sensor connection for online units. See below:

1) Sensor connection for unit A3716:

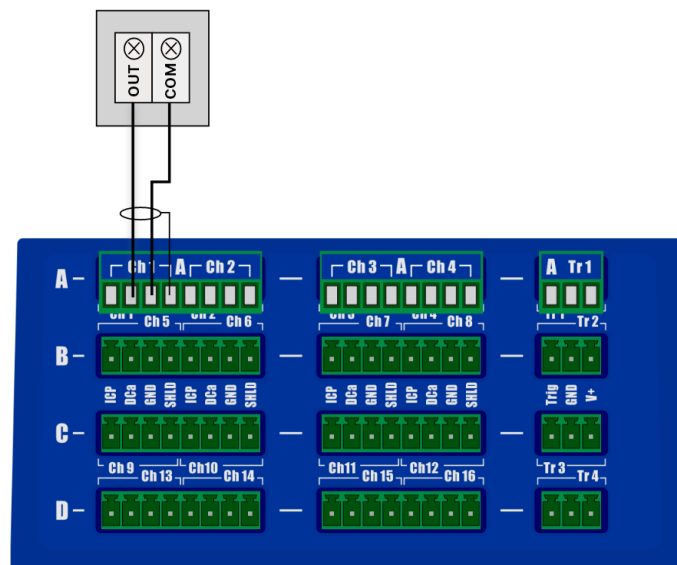


2) Sensor connection for unit A3800:

A3800 sensor connection depends on sensor powering. In case sensor is ICP powered – **ICP is turned ON**, you will connect sensor as in following picture (using input for ICP – first connector for Ch1):.



In case **ICP is turned OFF**, you will connect sensor as below (using input DCa, regardless of whether sensor is AC or DC – second connector for Ch1):.



STEP 3: Server installation

You can install MySQL – Adash server (for smaller projects) or Microsoft SQL server (for larger projects). Keep in mind, that free version of Microsoft SQL server is limited with size 10GB.

Note! Microsoft SQL Express can be used also.

ADASH server (MySQL)

Using of MySQL server: It is advisable to keep in mind that this is intended for server deployment. The computer (where server operates) should not be exposed to accidental power outages or repeated shutdowns. SQL server is very sensitive to these events and database corruption can occur.

Standard port for MySQL: **3306 TCP**

Note! Adash is not responsible for data loss caused by a failure of third-party hardware or software. When using SQL Server, regular backups as well as UPS power backups are recommended.

The latest versions of the Adash Server package no longer support 32-bit architecture. The package requires a 64-bit OS and at least Windows 7 SP1.

Adash server installation (MySQL) can be found on flash drive you received or on Adash website: <https://adash.com/downloads/adash-firmware>

Note! Under 'Adash Firmware' you need to find your type of online unit (A3800, A3716).

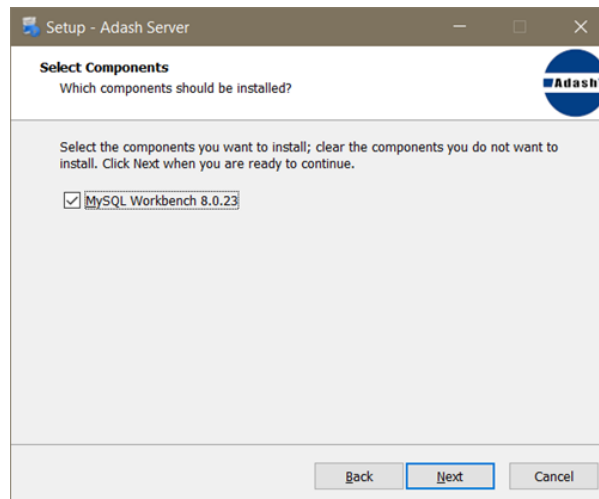
The screenshot shows the Adash website's download page. At the top, there is a navigation menu with links for News & Events, Products, Support, Downloads, About Adash, and Contact Us. A search bar and a 5-year warranty badge are also visible. Below the navigation, there are two main sections for different monitoring systems:

- A3716 Online Monitoring System:** This section includes a download link for 'Firmware for A3716 - version 2.78' and another for 'Adash server - version 2.1.1 (x64)'. Below these links, there is a note: 'The package includes free database server MySQL. Suitable for smaller projects. Use Microsoft SQL Server for larger projects. Warning: SQL server is sensitive to power outages or unexpected shutdowns. We recommend regular backups in combination with UPS power backup. Otherwise there is a risk of data loss.' There is also a link for 'HOW TO UPGRADE FIRMWARE'.
- A3800 Online Monitoring System:** This section includes a download link for 'Firmware for A3800 - version 2.78' and another for 'Adash server - version 2.1.1 (x64)'. The 'Adash server' link is highlighted with a green box. There is also a link for 'HOW TO UPGRADE FIRMWARE'.

Go through installation wizard. Press 'Next' once you read information in particular windows.

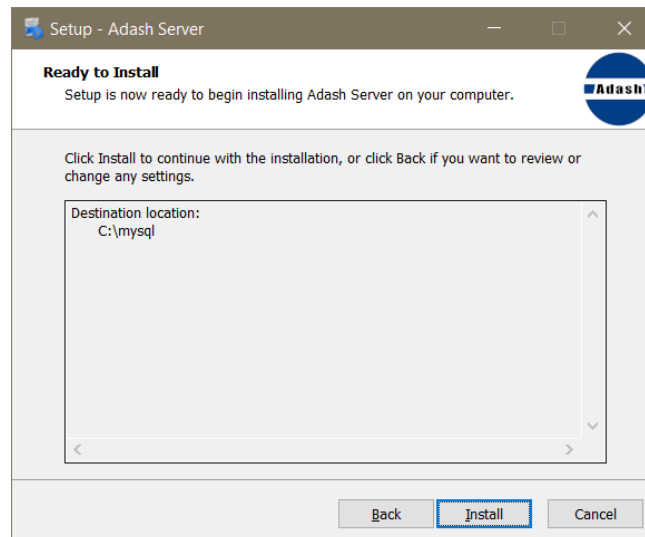


As the last part, there is 'Select components' window. There is check box for 'MySQL Workbench' – you can unmark it.



(Note! If you need to manage SQL database outside of DDS, confirm the installation of MySQL Workbench).

After this step, press 'Install' to start installation itself.



Now you have Adash server installed.

Microsoft SQL server

You can of course decide that Adash server is not the proper server option e.g., to your project size or you just prefer Microsoft SQL server. In this case, you need to pay attention to following instructions.

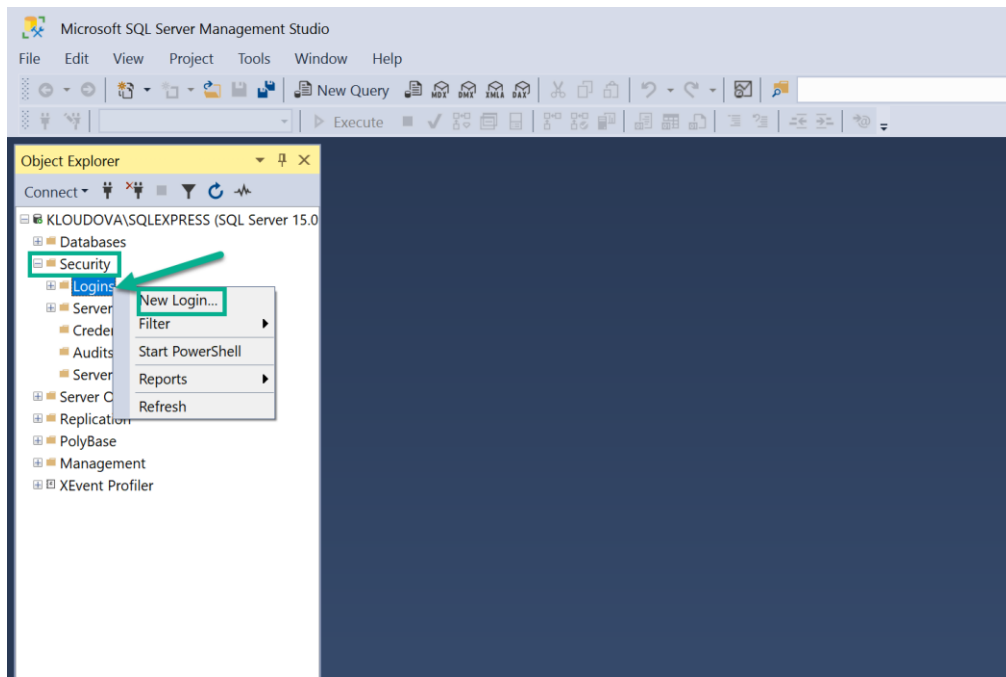
Standard port for Microsoft SQL server: **1433 TCP**

It is necessary to create **SQL user** on the server (if this was not done during Microsoft SQL server installation). Otherwise, you may not be able to connect to the database on this server. Use 'Microsoft SQL server management studio' tool for it.

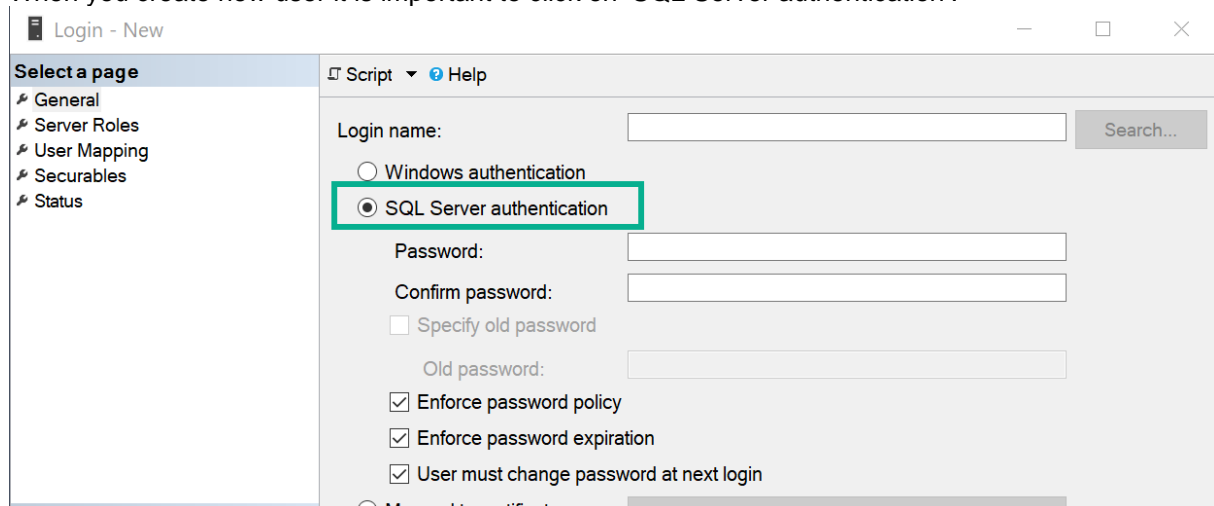
You can see 'Object Explorer' column on the left. Open 'Security' item with double click. You get more items below it.

Click on 'Logins' item with right mouse button and choose option 'New login'. You can create here new user.

Note! Screenshots were made in **Microsoft SQL Server Management Studio 18**. It can be a little bit different in other versions.



When you create new user it is important to click on 'SQL Server authentication'.



Note! Keep in mind, that this can be always set in cooperation with your IT department if you have any troubles to set this up. These guys usually know how to proceed with this SQL user creation. Or you can use Microsoft SQL Express and this user is for you created automatically with the installation.

STEP 4: Insert dongle key

To make software (DDS – described in next steps) run properly you need to insert dongle into USB port of your computer (more details see in DDS license).

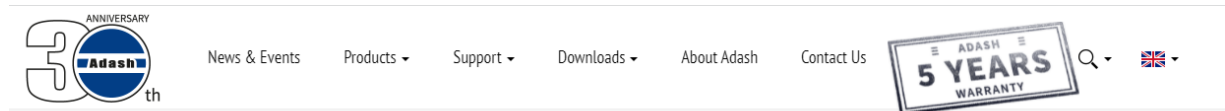
Ports for dongle/DDS: **475 TCP+UDP**

Drivers for dongle need to be installed. Otherwise, it will not run correctly. You can check very easily if the drivers are installed or not.

✓ If drivers for dongle **are installed** in your computer – you can see dongle is lighting.

✗ If drivers **are not installed** (dongle is not lighting) – installation of drivers can start automatically. If it will not start – you can go to website below:

<https://adash.com/downloads/third-parties-software>



Third Parties Software

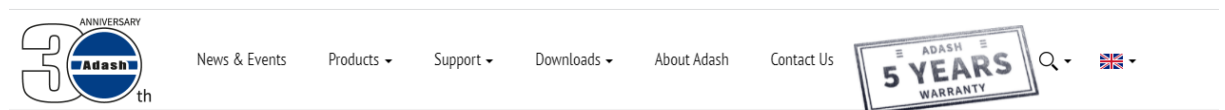
A4900 Vibrio / A4910 Lubri USB driver	DOWNLOAD
A4404 SAB USB driver	DOWNLOAD
USB License Key Driver (Win7, Win8, Win10)	DOWNLOAD

Download drivers and install them to your PC.


STEP 5: Software installation – DDS

DDS installation can be also found on website adash.com:

<https://adash.com/downloads/adash-software>



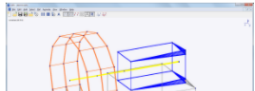
Adash Software



DDS Software

- DDS - version 3.5.3
- RouteDownloader - version 1.5.0.0

[DDS VERSIONS](#) [SEE RELEASE NOTES](#)



ADS Software

- ADS - version 1.9.3

We recommend to install DDS on the server (it means install it to computer with Adash_Server software).

Go through installation wizard.

Now you have DDS installed (free version).

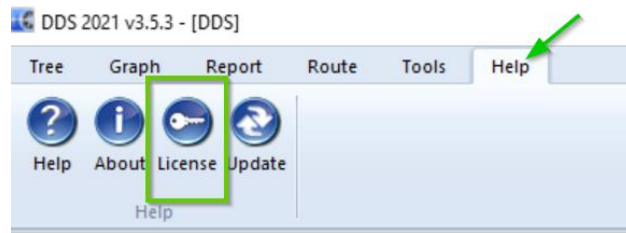
Free version is marked with red ribbon – ‘FREE’ (see picture below). Once you will import your license to DDS, this ribbon disappears.



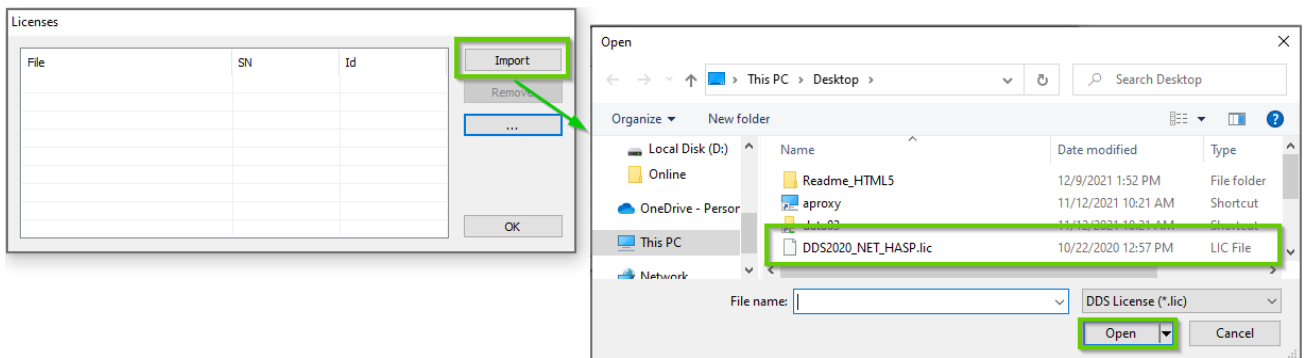
DDS license

License is needed for more options and modules in DDS. This license you have received on USB flash drive. Follow steps below to import your license into DDS:

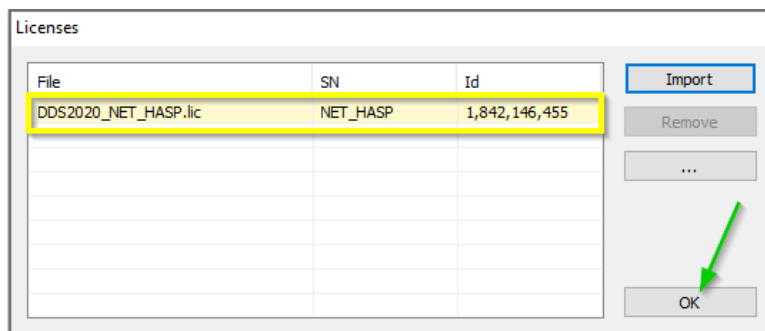
Open DDS and go to tab **'Help'**.



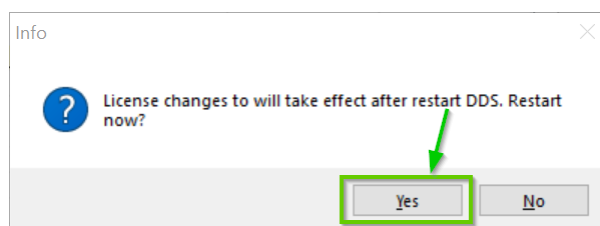
Click on license and you get pop up window below. License can be added by button **'Import'**. Find your license and click 'Open'.



After that, license is shown as in picture below (yellow line). Confirm by OK.:

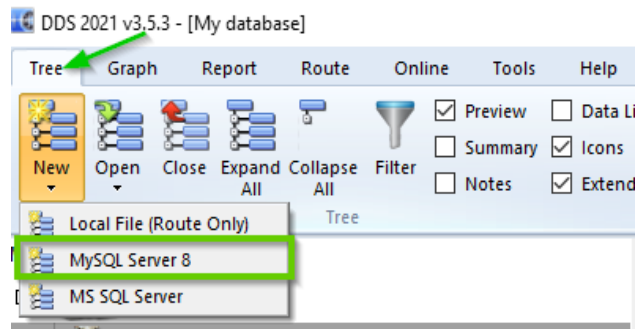


Note! Once license is loaded, DDS rerun is needed (picture below):



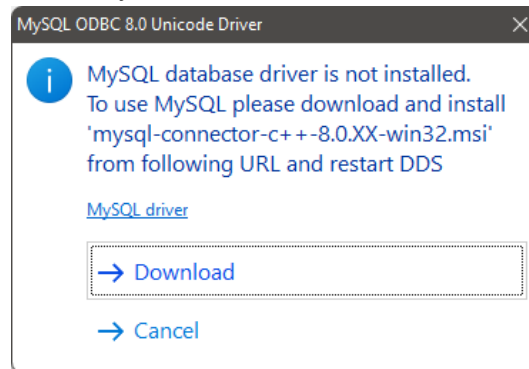
STEP 6: DDS database creation

Structure for your machine's measurements can be created in DDS. Firstly, you need to create **'NEW TREE'** in DDS.



If you have Adash server installed you choose MySQL Server 8. If you decided to install Microsoft server then you choose – MS SQL Server.

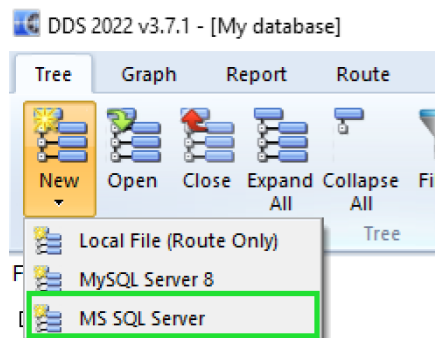
Note! From DDS 3.6.3.0 and newer – in case drivers for MySQL server are not installed, you will see following window when you click on MySQL Server 8.:



You can download the drivers immediately with 'Download' button.

In older DDS versions – if drivers are not installed, you don't have MySQL Server 8 as an option on database creation at all. It is hidden.

In case you have **MS SQL server** choose it when you create new database.:



In version of DDS **lower than 3.7.1.8** – is possible to create database with **MS SQL server** using this option '*Trusted connection*'. **DO NOT use it**. Leave this check box **unmarked** for online databases. It can cause troubles with start/stop of the measurements (it is working a little bit differently – it is using domain user for SQL server – online works as a system service so no windows user is used). You can see it in the picture below. '*Trusted connection*' option is not marked for online database type.

New Database [MS SQL Server] X

Name (DDS):

Database Name (SQL Server):

Server:

Trusted Connection

User:

Password:

Type

Route

Online

OK Cancel

For database creation you need to fill in basic information such as:

- *Name (DDS)* – you can see this name in DDS software,
- *Database name (SQL)* – database name, you can see it on database server (should be without capital letters, special characters, etc.),

(DDS name and SQL name depends on you. You can see it in green frame in the picture below.)

- *Server* – location (name or IP address) where Adash server is installed,
- *Username and Password* (adash/adash),
- *Type*.

Server is set by location of Adash server. In case Adash server is installed on your local computer you write **localhost** as server. Username/password and type is set by default. It is marked with red frame in picture below.

New Database [MySQL Server 8] X

Name (DDS):

Factory

Database Name (SQL Server):

factory database

Server:

localhost

User:

adash

Password:

.....

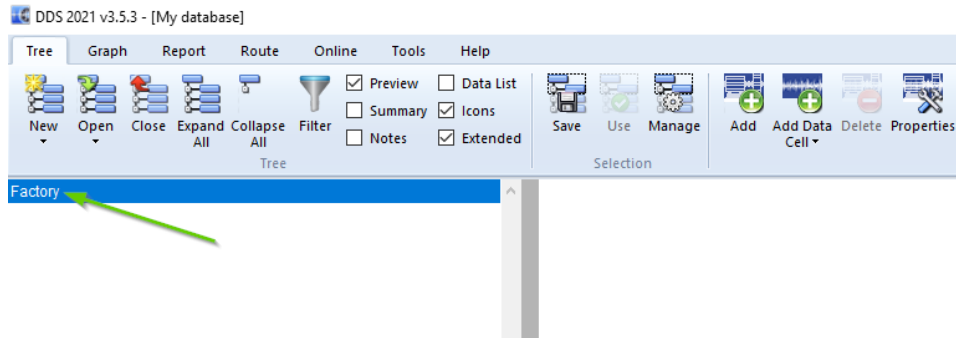
Type

Route

Online

OK Cancel

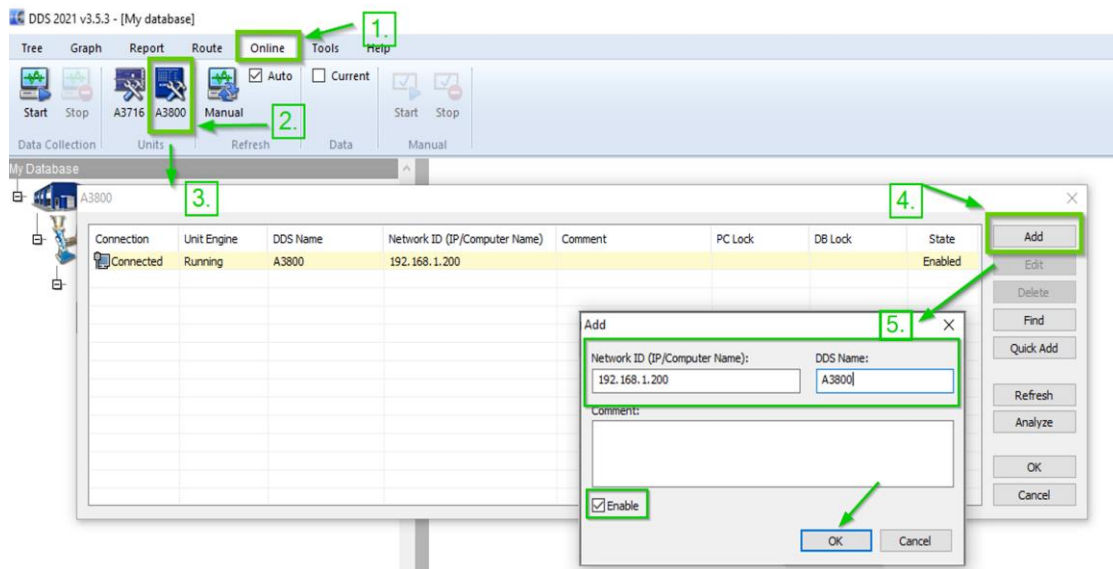
Press OK and now you have the database. New window with your database opens.



Add online unit itself to DDS

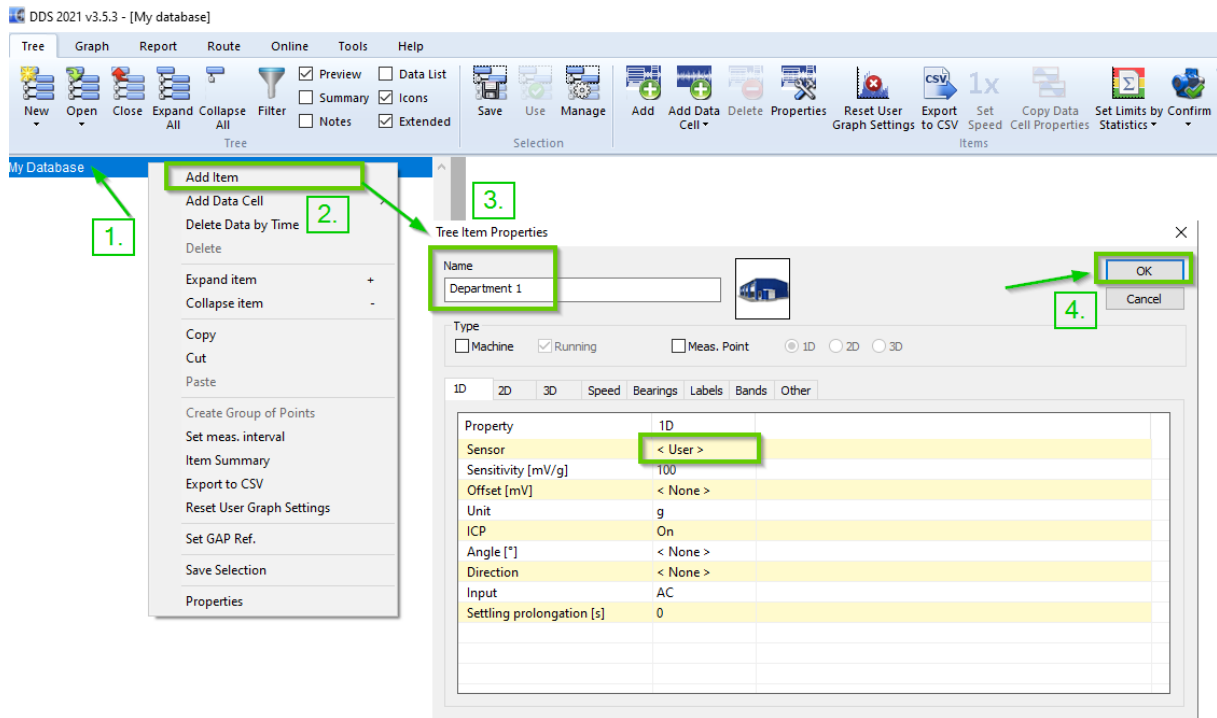
Online unit is added to DDS via tab **'Online'**. You need to add online unit **every time you create NEW database**.

It is necessary to choose online unit type (A3800, A3716). Online unit itself is added by button **'Add'**. Network ID and DDS name needs to be filled in. You can also fill in comment (if needed). Click OK. For better understanding see picture below.



In your database you create departments (e.g., halls, ...) with machines.

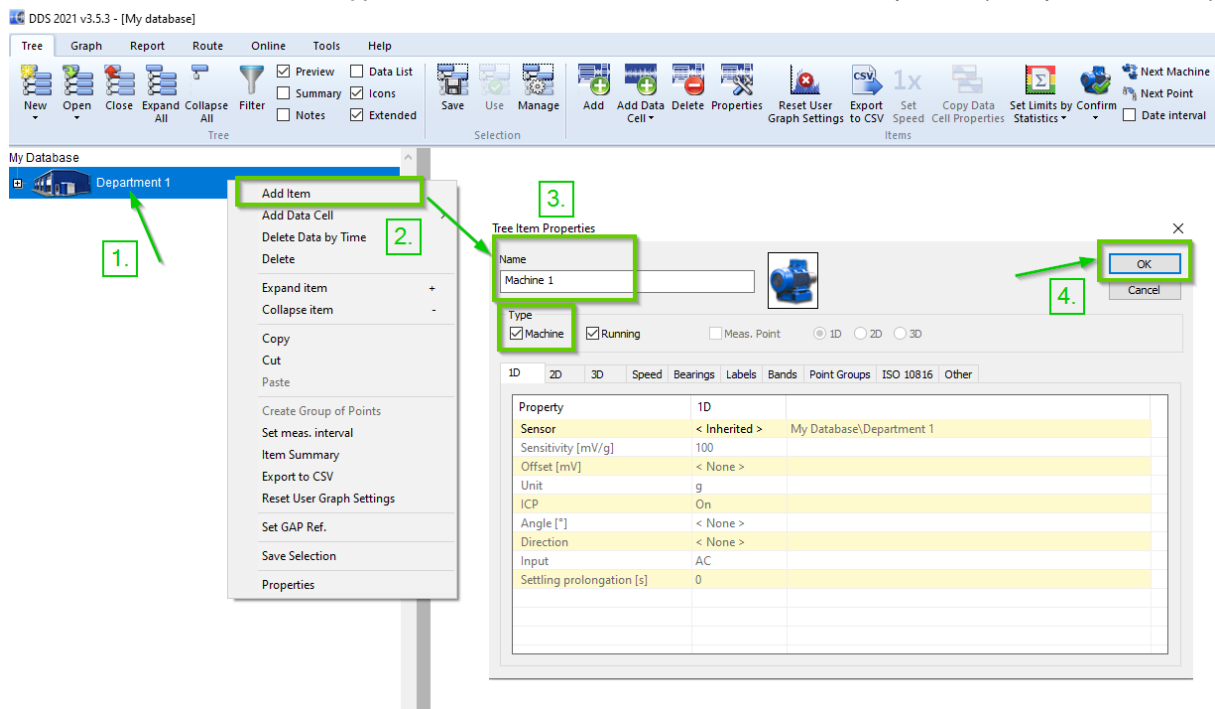
To create department: click with right mouse button on your database (as an example we have used DDS name – My Database). Pick from menu **'Add item'**. Then you are able to set properties for department as name, icon or sensor properties. After OK you see under your database Department 1 (in left column).



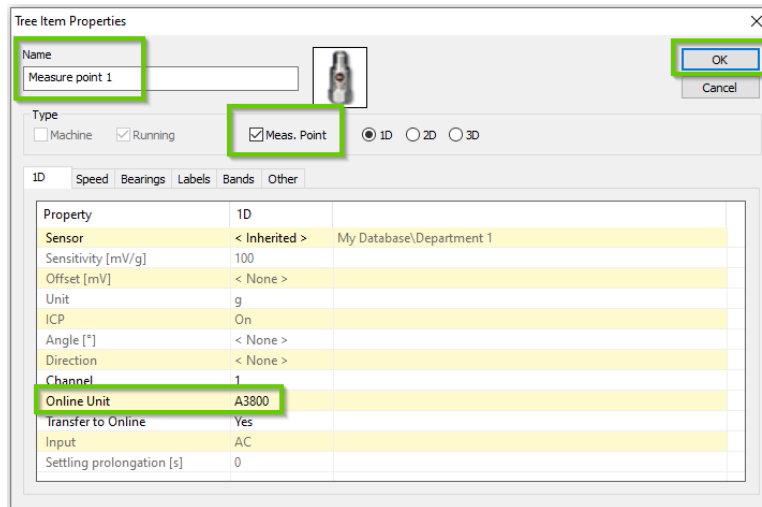
For sensor is important to set **sensitivity** [mostly used: 100 mV/g], **unit** [g] and **ICP**. ICP is set to value 'On' when sensor is connected and ICP powered – *in this case, keep in mind, that sensor needs to be correctly connected to online unit based on scheme in **Sensor connection for unit A3800: first scheme**.*

Same way we are able to create Machines under departments.

Note! We need to choose 'Type' when we create Machines and Measure points. (See picture below.)



Measure points are created same way – click on Machine 1 with right mouse button, *difference*: type will be Meas. point. You need to choose measure point dimension (1D, 2D, 3D). **It is important to choose Online unit** (see picture below) and **channel** where sensor is connected. Channel 1 is first input of online unit.

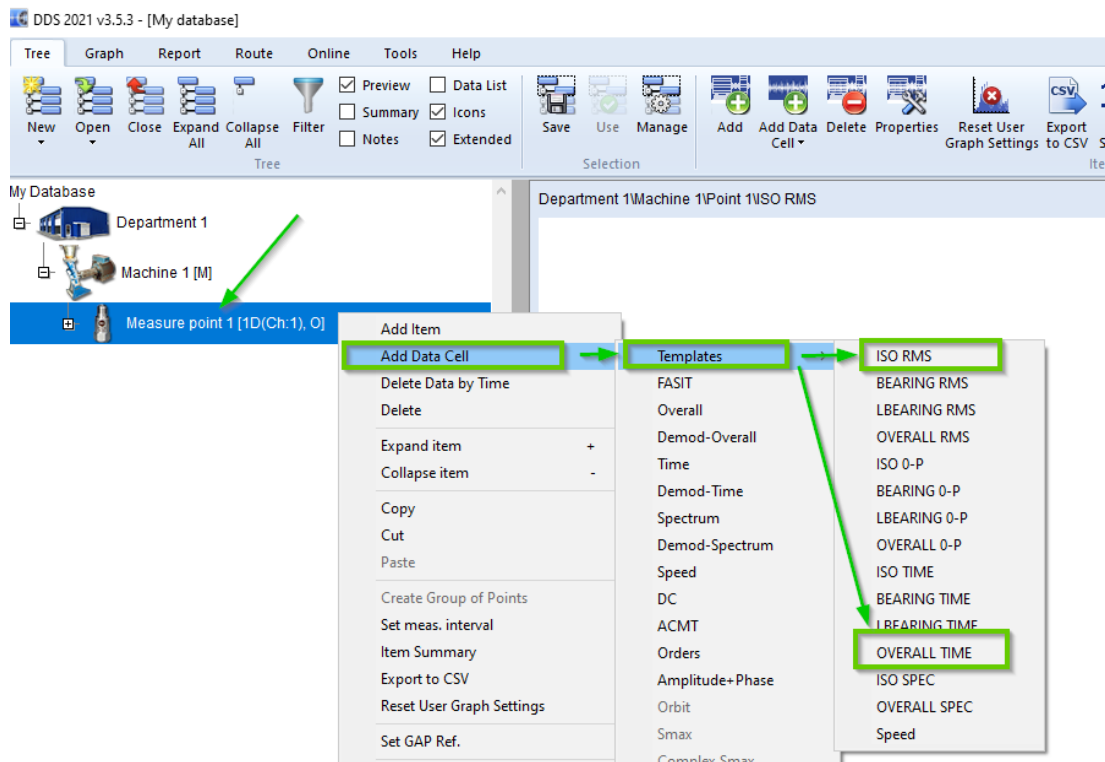


Every measure point needs to have some measurements. You will choose them based on your needs. As an example, we add **'OVERALL TIME'** and **'ISO RMS'**.

Click with right mouse button on measure point.

Choose **'Add Data Cell'**. You can choose predefined measurements from templates or create your own.

(We used predefined measurements from templates as you can see in the picture below.)



In this point:

You have database with one department.

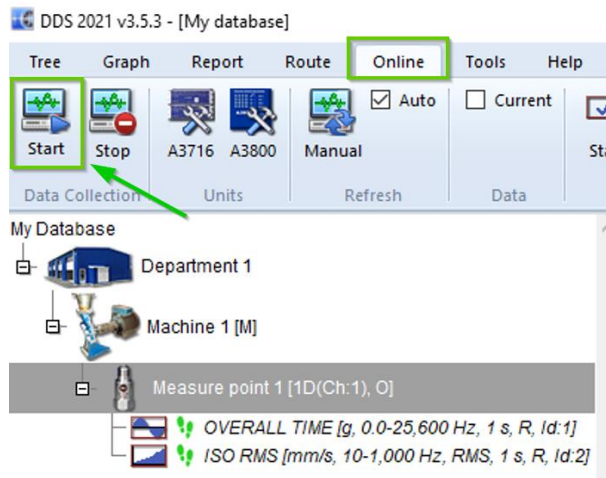
This department has one machine.

This machine has one measure point.

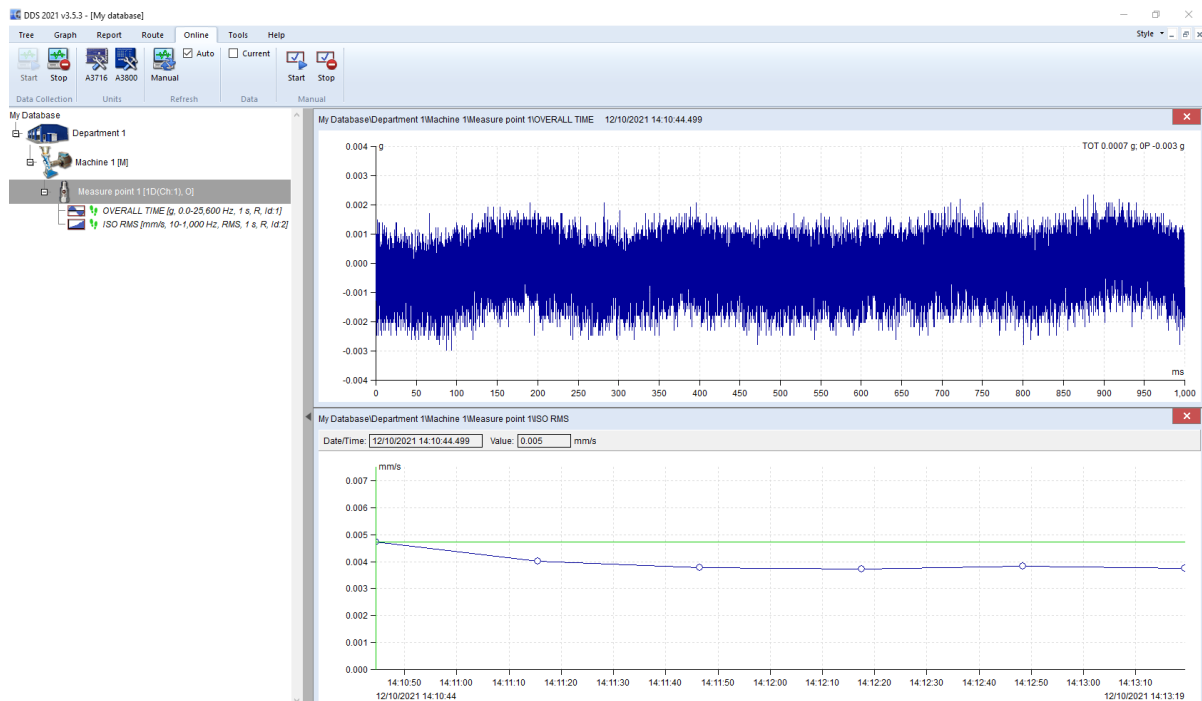
And this measure point has two measurements.

Now you can finally start to collect data (Tab **'Online'** and **'Start'**).

Note! Once you press Start – pop up window will show with message if you want to restart DDS and run it as administrator – Yes (to collect data you need to run DDS as administrator).

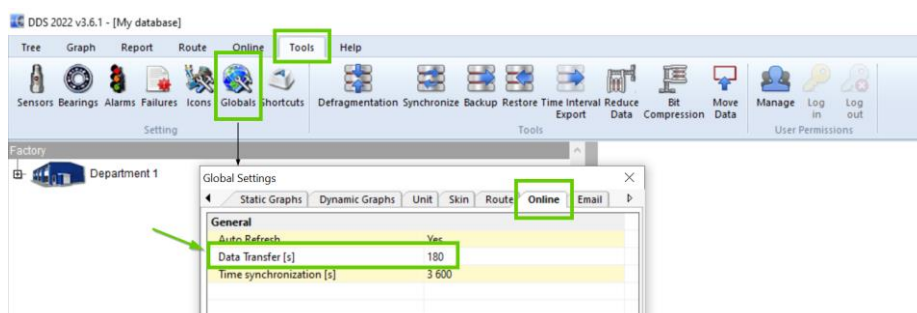


After all steps mentioned above you will have output of your measured data shown in DDS (as in the picture below).



Note! There is “Data transfer” interval set by default to 180 seconds. This means it takes 180 seconds to send data from unit into database (you can see the first data after this interval).

This setting you can find in **DDS – Tools tab – Globals – Online tab – Data Transfer**. *It is not recommended to use shorter time interval than 60 seconds. Server can be overloaded.*



Online unit's hardware

Basic technical terms and detailed description of online units are included in this part.

Adash DSP board

The Adash DSP (Digital Signal Processing) board is the most important part of the instrument. The special chip provides all necessary operations, which are required for achieving of 4 channel synchronous data.

Current loops and industrial use

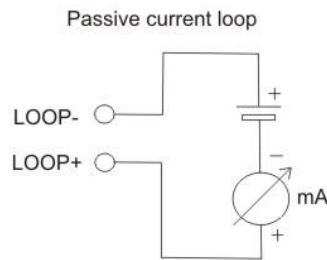
Analog 4-20 mA current loops are commonly used for analog signaling in industrial control instruments. The lowest value in this range is 4 mA. The highest value in this range is 20 mA.

The key advantages of the current loops are:

- the accuracy of the signal is not affected by voltage drop in the interconnecting wiring,
- the loop can supply operating power to the device.

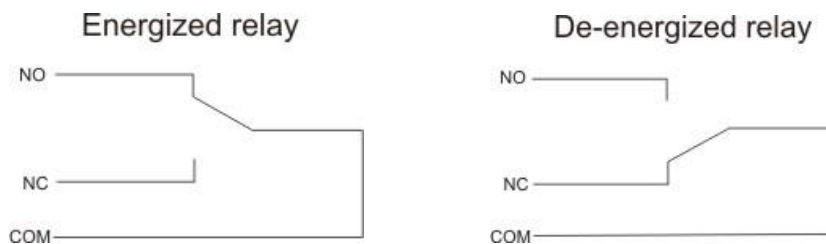
Current loop outputs of actual value are then used in control systems (PLC).

The current loops used in the A3716 are isolated from measuring circuits. They must be externally powered (they use passive mode).



Relay outputs

Two relay initial states exist. Energized and de-energized. Energized relay is initially powered. De-energized relay is initially not powered. Internal connections are seen on the pictures below.



Legend:

NO - normally opened,

NC - normally closed,

COM - common - standard electrical terms.

Latched relay

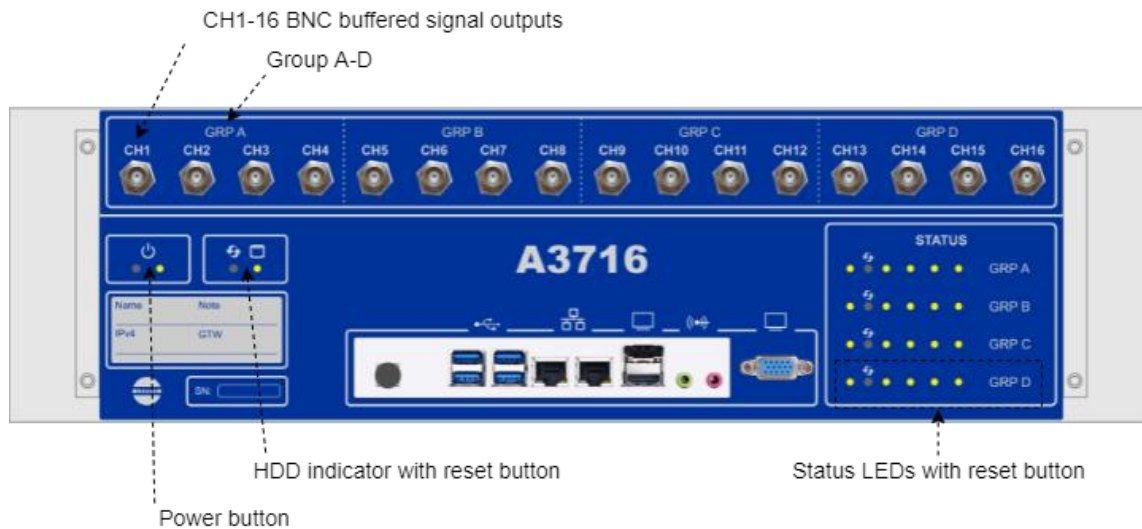
Let's describe it on example:

The factory initial state of the relay is de-energized (i.e. NC and COM is connected). The ISO RMS (10-1000Hz) value is measured on the machine. When the RMS value will exceed 2 mm/s, then the relay will switch on the red light in a control room. When the vibration value will decrease under the 2mm/s, then the relay will switch off the light.

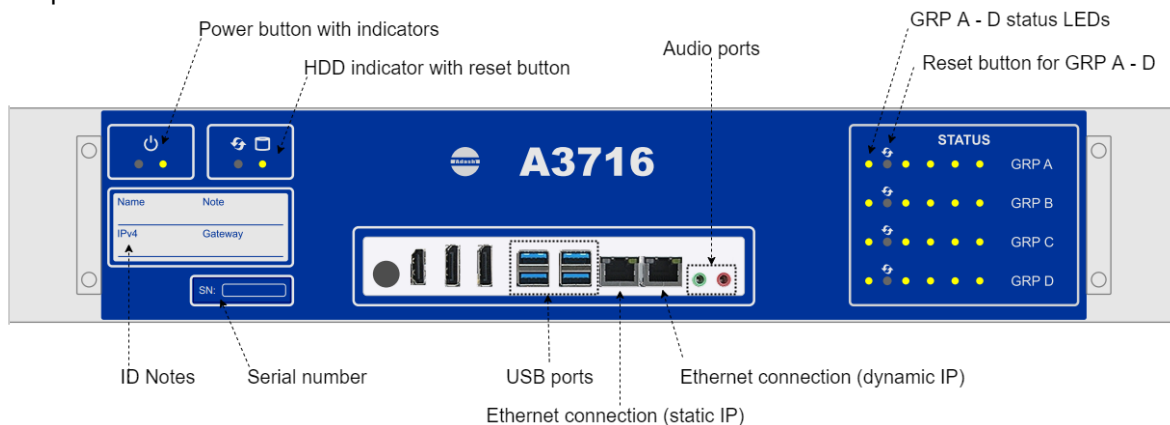
If the LATCH function is chosen, then the relay will not switch off the light when the vibration decreases less than 2mm/s. The relay keeps the switch ON until it is manually switched off (through the use of REL-RST).

Online unit A3716 description

Two types of online unit A3716 exists – type 3U and type 2U. You can see type 3U in following picture. BNC buffered signal outputs are included on the front panel.



Type 2U is a little bit different. You can see it in the picture below. BNC ports are not included on the front panel.



2U – Front panel description

GRP A – GRP D status LEDs enables to monitor each DSP board. Three states can appear:

- **OK** – green light blinks in 0.25sec time interval (four times per sec) – measurement is running
- **OK STANDBY** – green light blinks in 1 sec time interval – measurement is stopped
- **ERROR** – red light.

Reset button enables to reset each Adash DSP board (A, B, C, D).

Power button runs the A3716 unit. There is a status LED as well.

HDD status LED indicates operation state of the hard drive.

Serial number is 6 digits number provided by Adash. If more A3716 unit is used, it helps to recognize them in setting.

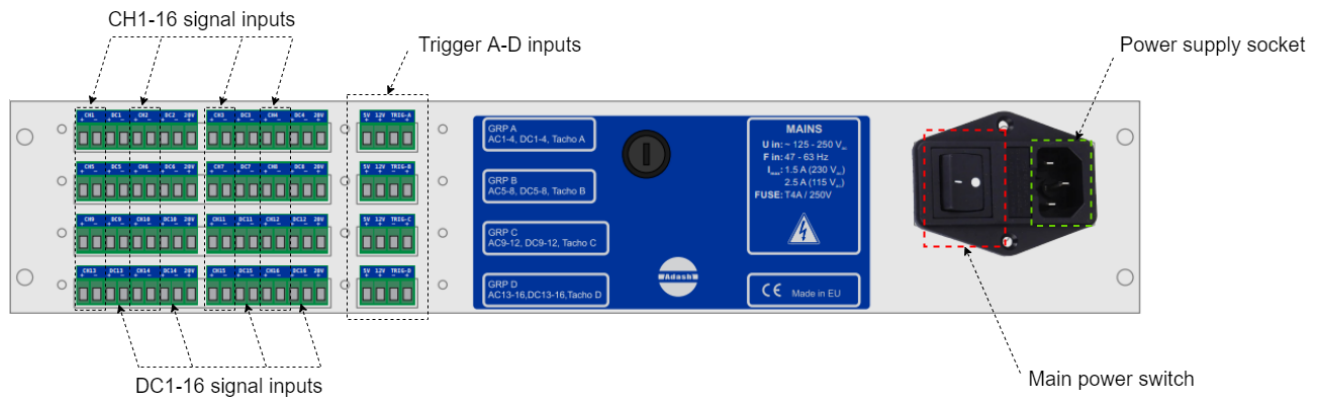
USB ports allows connecting of mouse and keyboard for control of the A3716 unit in case you use the A3716 as a 16 channel vibration analyzer the USB ports.

VGA output allows connecting monitor in case you use the A3716 as a 16 channel vibration analyzer. It is shared with the same output on the front panel.

Ethernet connection to LAN for setting and data transfer.

CH1 – CH16 BNC buffered outputs (A3716/3U only) allows connecting of portable vibration analyzer and performing further analysis on required channel.

2U – Rear panel description



Power supply socket requirements:

U: 100-240 V

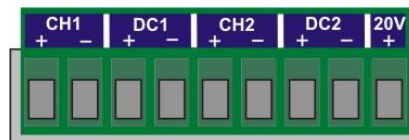
I: 2,5-4,5A

f: 50-60 Hz

CH 1 – 16: AC inputs (ICP® powering available) for AC signals measurement, usually for vibration measurements (acceleration sensor connected). Max. Peak/Peak voltage range is +/- 12 V.

DC 1 – 16: DC inputs for DC signal measurement (e.g. process values like temperature, pressure, flow etc.). Max. voltage range is +/- 24V.

20V output, max.10mA. It is available for external powering of sensors. Use the minus pole from the appropriate input.



TRIG A-D inputs are for trigger connection for GRP A-D.

+5 V: power for tacho (speed) probe (max 100 mA)

NC: not connected

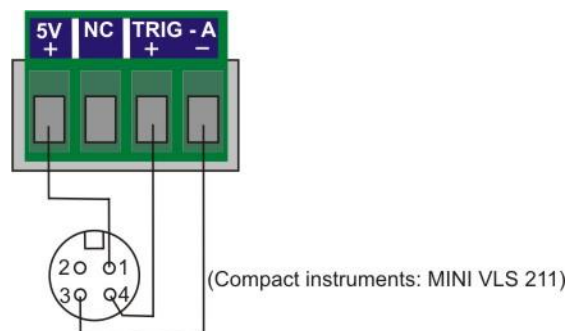
- ground

+ trigger signal input



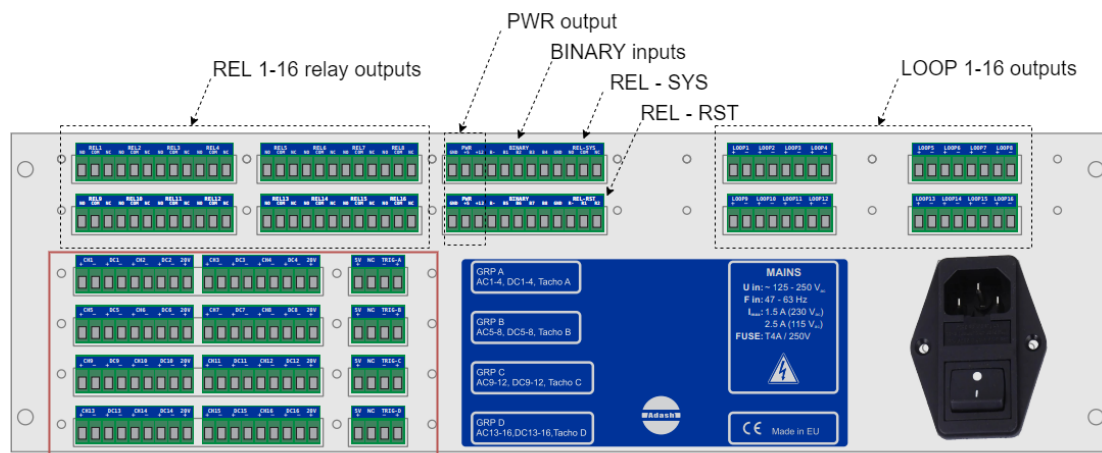
Tacho trigger connection

Tacho trigger input range is + 10V.



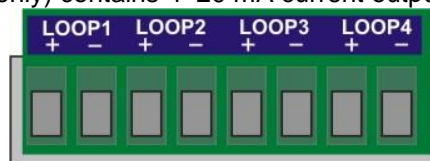
3U – Rear panel description

Version 3U has more inputs/outputs on the rear panel than 2U. You can see it on the following picture.

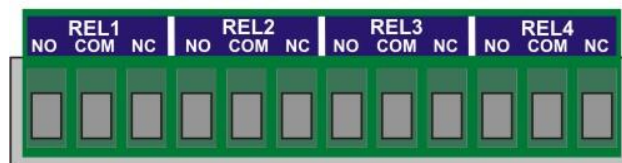


Same as for A3716 version 2U

LOOP 1-16 outputs (A3716/3U only) contains 4–20 mA current outputs clamps.



REL 1-16 Relay outputs (A3716/3U only) contains relay clamps (NO, COM, NC).



PWR output (A3716/3U only) is the source of +5V/1A and +12V/1A voltage outputs. All GND (ground) clamps are shorted (connected together).

BINARY inputs (A3716/3U only) are logical inputs (states 0 or 1)

B- Common negative pole

B1-B8 – Isolated inputs 5-30V/4mA max. The level of voltage on each input defines the logical state.

Logical 0 - DC voltage 0-3V is required

Logical 1 - DC voltage 5-30V is required.

You should avoid the voltage in 3-5V range. The response of the circuit is unclear and unpredictable. It may oscillate and accidentally change logical values.

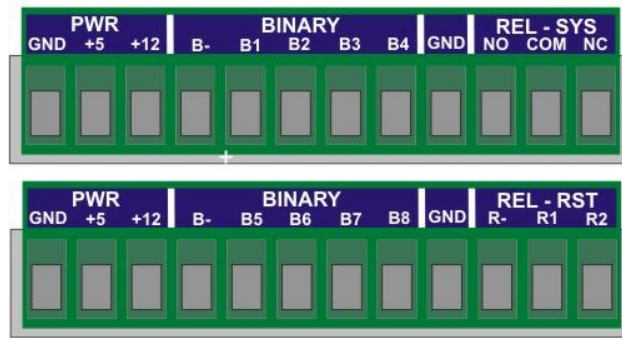
REL - SYS - if the A3716 system is in correct operation then this system relay is energized (A3716/3U only). In case of DSP board error or ICP error - relay is deenergized.

REL - RST resets all latched relays (A3716/3U only).

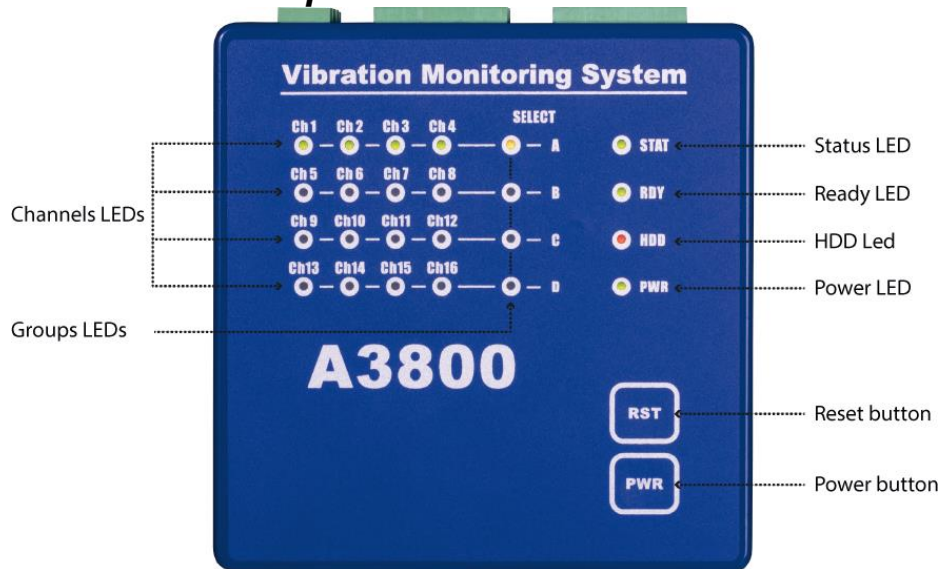
R- Common negative pole.

R1, R2: DC voltage 5-30V/4mA max.

When the voltage appears on R-R1 or R-R2 then all latched relays will be reset. You may have a question: why two clamps are used (R1 and R2)? It enables to reset latched relays by two buttons which could be in two places. E.g. one reset button is near of the A3716 and second reset button is in the control room.



Online unit A3800 description



Front panel description

Channels LEDs indicate on which channels the measurement is defined.
Green color – indicates good condition of the channel input, sensor and cable.
Flashing red color – indicates sensor or cable error.

Groups LEDs indicate which channel group is active for measurement.
Orange color – indicates active group.

Status LED indicates status of A3800 DSP board.
Fast flashing green color (four times per sec) – measurement is running.
Slow flashing green color (one time per sec) – waiting for measurement
Red color – DSP board error.

Ready LED indicates status of A3800 control board.
Green color – control board OK.
Red color – control board error.

HDD LED indicates r/w operation on HDD.
Red color – r/w operation in progress.

Power LED indicates power on of A3800 unit.
Green color – unit is power on.

Reset button – press and hold for at least 5 seconds to reset control board.

Power button – press and hold for at least 5 seconds to switch ON/OFF A3800 unit.

Bottom panel description



Description:

AUDIO I/O: socked for audio 3.5 jack.

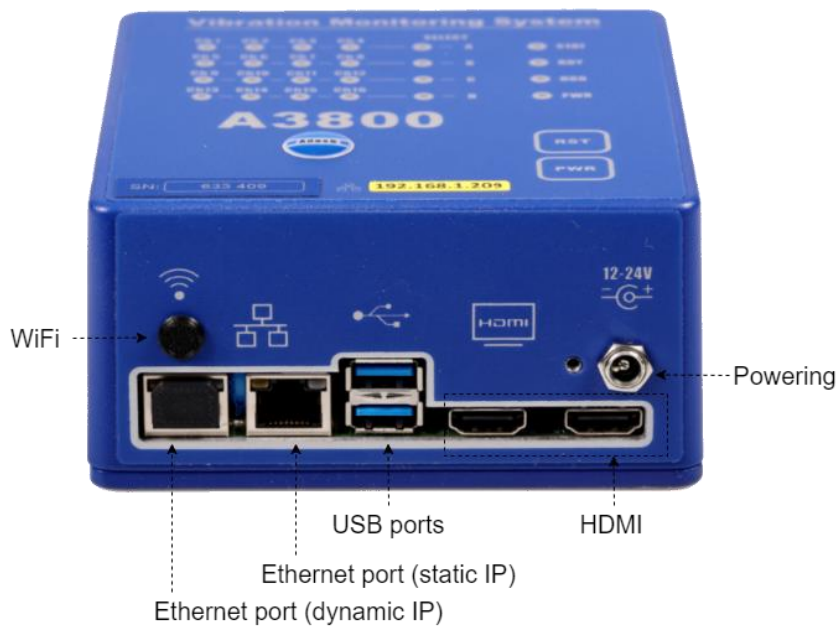
USB 2.0: two USB ports.

ETHERNET: socked for Ethernet connection.

DISPLAY: HDMI display connection

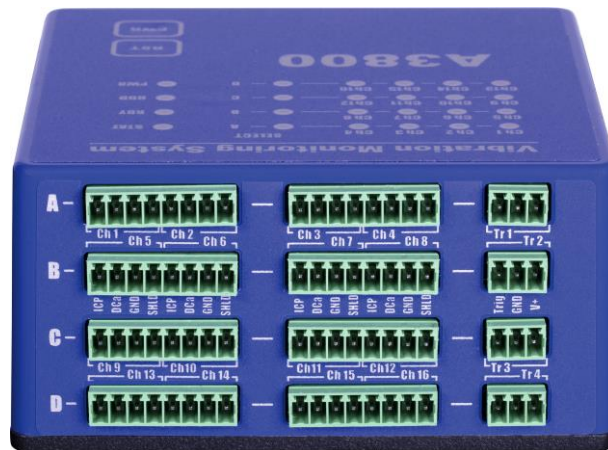
POWER: socked for 12 V DC powering

From year 2022 there is a difference in the bottom panel of A3800. You can see the actual version of bottom panel in the picture below.



Top panel description

The connectors for connecting the sensors are located on the top panel. Connectors are divided into groups A, B, C, D.



- Group A:** AC and DC channels 1 – 4, TACHO input 1.
- Group B:** AC and DC channels 5 – 8, TACHO input 2.
- Group C:** AC and DC channels 9 – 12, TACHO input 3.
- Group D:** AC and DC channels 13 – 16, TACHO input 4.

Input ranges:

AC input: +/- 12 V peak - peak

DC input: +/- 24 V

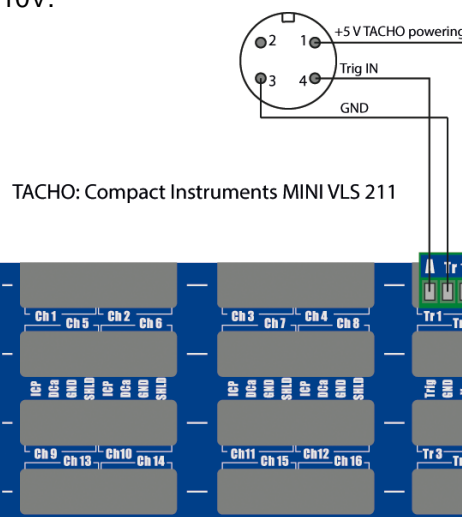
TACHO +10 V

You can see top panel with installed plug-ins (terminal blocks) in picture below.



Tacho trigger connection

Tacho trigger input range is + 10V.



DDS – Digital diagnostic system

As mentioned in the beginning, DDS is a software for database's (project's) changes and creation. DDS is used for measurements configuration, data visualization and following data analysis. DDS installation is described in first chapter of this manual (STEP 5: Software installation – DDS). Basics of DDS database creation are also described in this chapter (STEP 6: DDS database creation). DDS can be run in free or licensed version.

DDS license

It is necessary to have DDS license for online monitoring. Online module is not available in free DDS version.

License for DDS consists of two following parts (for appropriate function of DDS you need both of them):

- license file,
- dongle (hasp) key.

License file: it is the first part of the licensed version. This file you get from Adash. It contains information what kind of license for software you have. It is a file with **.lic** extension.

Dongle key: It is basically the hardware key to which license file is related. It is used for license verification. We have two types of them: **local** (purple) dongle and **net** (red) dongle. What is the difference?

Local dongle is related only to one license. It means, you connect it to your PC and you run DDS version. When you disconnect the dongle and give it to your colleague – he can run licensed DDS but you cannot. **Local dongle enables to run only one license.**

Net dongle is related to more licenses at the same time. For example, we have net dongle related to 5 DDS licenses. You connect the dongle to PC in the network and in this time 5 licensed DDS versions can be used by different 5 clients (**these clients PCs has to be in the same ethernet network as PC where net dongle is connected!**).

Note! Dongle (local and also net) needs to be connected to PC all the time when you work with licensed DDS. Otherwise, DDS is running only in limited FREE version.

When you ordered net dongle, it is necessary to have one PC in the network which will be taken as a 'server'. There is dongle connected and also more software needs to be installed there. See following steps what needs to be installed on server PC and on client PC to make net dongle work correctly.

Net dongle Installation (Server)

1. Install dongle (Sentinel) driver https://adash.com/data/hasp/net_install/haspusersetup.exe
2. Install License Manager https://adash.com/data/hasp/net_install/lmsetup.exe
During installation:
 - Select option: Install as a service
 - Skip installation Hasp HL Drivers at the end (Older driver version)
3. Connect dongle (Sentinel) key to the server
4. Restart the server

DDS Installation (Client)

1. Install dongle (Sentinel) driver https://adash.com/data/hasp/net_install/haspusersetup.exe
2. Install DDS <https://adash.com/downloads/adash-software>
3. Run DDS
4. License
 - if DDS was installed previously or with another license, please import license file DDS2023_123456.lic in DDS menu: **Help/License/Import**
5. If dongle key was not found (DDS runs in Free Mode):
 - Ensure that Client and Server PCs are in the same ethernet network
 - Import the license manually (in DDS Help/License)

- Copy **nethasp.ini** into DDS installation directory (ProgramFiles(x86)\Adash\DDS) and change NH_SERVER_ADDR parameter to your Nethasp Server IP address and restart DDS

Most common issues with NET dongle

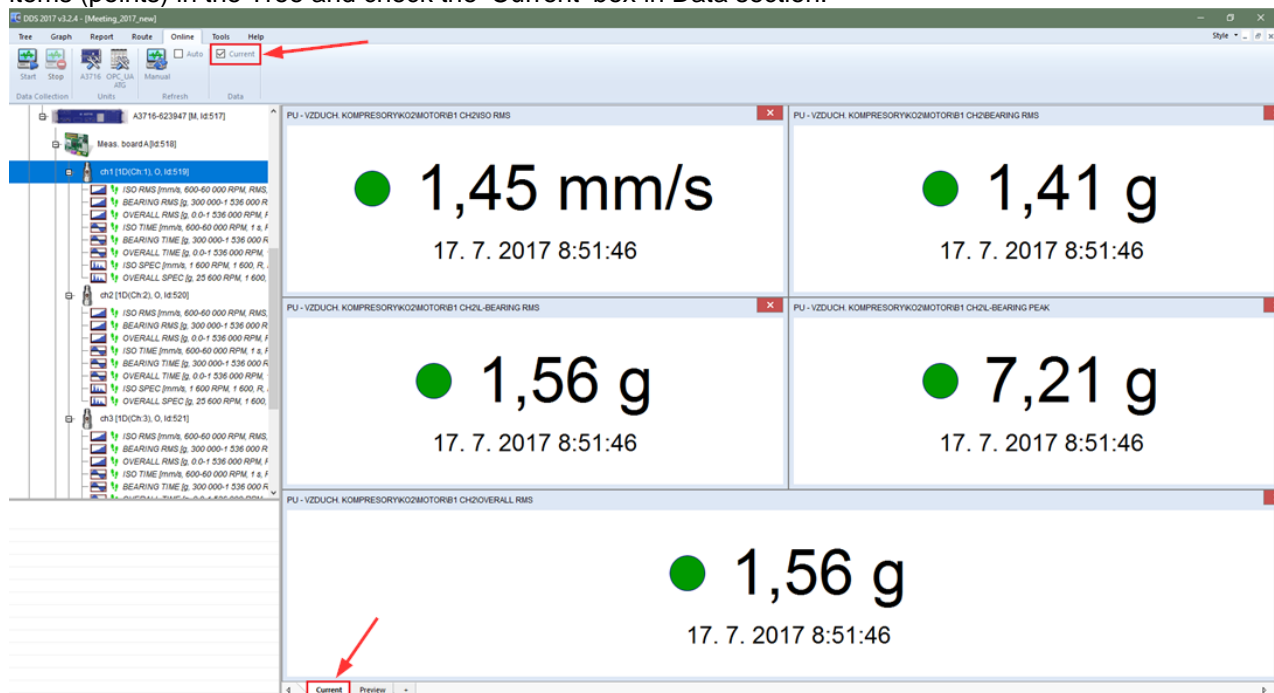
1. *Dongle key is not lighting* – download and install dongle key drivers (see DDS Installation (Client)).
2. *Check if dongle key is connected to your PC* – search for Device manager in your PC and check if dongle key is shown in Universal serial bus controllers (search for Sentinel components).
3. *License is not imported automatically* – import license file manually from Adash flash drive. Go to tab Help – License – Import in DDS.
4. *Service for dongle is not running* – search for 'Services' in your PC and search for 'HASP Loader'. Status for it has to be 'Running'. If there is not service with this name, install license manager and run the service (see Net dongle Installation (Server) part).
5. *Check nethasp.ini file* – check that there is correct server IP address filled into this parameter NH_SERVER_ADDR.

If nothing helped (from the list above), please contact Adash support (support@adash.com) and we will help you with the issue.

Back to DDS now. The most relevant functions of DDS are described below.

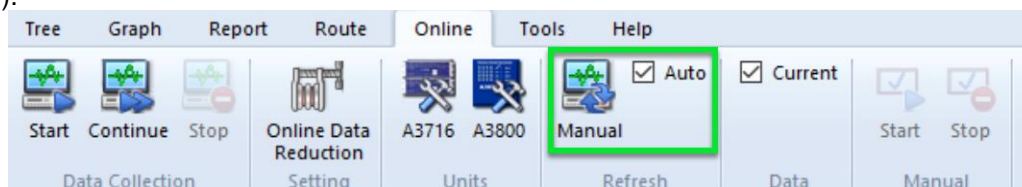
Current data reading

DDS enables to read the current data anytime. The static readings are only available. Select required items (points) in the Tree and check the 'Current' box in Data section.



Graph refresh time interval

Graphs are refreshed manually (Manual button) or automatically (check the 'Auto' box in Refresh section).



Refresh interval is edited in 'Refresh' part under 'Online' tab. Click on 'Manual' or use 'Auto' refresh interval.

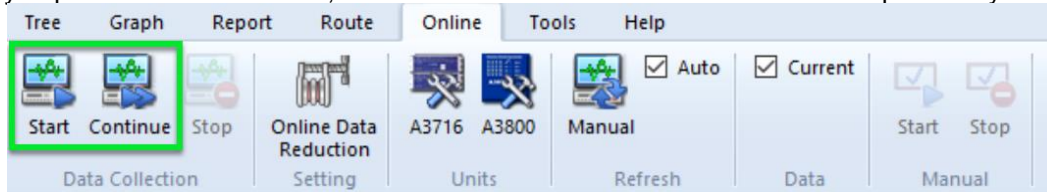
Note! Remember that graph refresh does not make any new readings. Refresh makes readings from database only.

Start/Continue

There is new function in DDS from version 3.7.0. It is in section Data collection under Online tab. It is called 'Continue'. What is the difference between 'Start' and 'Continue' for data collection?

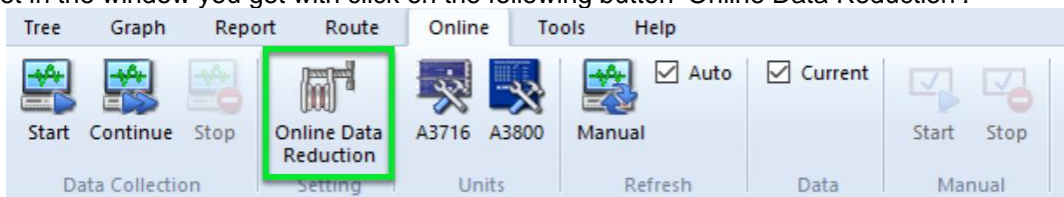
When you press 'Start' button, data collection is started from the beginning. It means that data measured previously are thrown away (if they are not saved of course).

When you press 'Continue' button, data collection continues with data measured previously.



Online Data Reduction

There is a lot of data collected during online monitoring. This function is used to reduce these collected data automatically. The online reduction itself is done in time intervals. These intervals you can set in the window you get with click on the following button 'Online Data Reduction'.



This is the window for online data reduction settings:

Data Reduction ✕

<input type="checkbox"/> Static (short time reduction) Reduce data older than <input type="text" value="10D"/> Min. time between meas. <input type="text" value="10m"/> Keep values with change <input type="text" value="20%"/>	<input type="checkbox"/> Static (long time reduction) Reduce data older than <input type="text" value="20D"/> Min. time between meas. <input type="text" value="1h"/> Keep values with change <input type="text" value="50%"/>
<input type="checkbox"/> Dynamic (short time reduction) Reduce data older than <input type="text" value="10D"/> Min. time between meas. <input type="text" value="3h"/>	<input type="checkbox"/> Dynamic (long time reduction) Reduce data older than <input type="text" value="20D"/> Min. time between meas. <input type="text" value="5h"/>

Other parameters

Reduction frequency <input type="text" value="6h"/>	Maximum reduction time <input type="text" value="30m"/>
<input type="checkbox"/> Shrink DB after reduction	

OK Cancel

The difference between data reduction for online monitoring and the data reduction in Tools (DDS – Tools – Data reduction) is in section 'Other parameters'. You can set there parameters to make reduction automatic. More details can be found in DDS manual (there is explanation of static/dynamic reductions and also the difference between short time and long time reductions).

Reduction frequency – how often the data reduction is done. You can see there is 6 hours in the screenshot above as an example (default value).

Maximum reduction time – data reduction can take a lot of time. During reduction itself there are no data sent to DDS from online unit. That is the reason why we created parameter maximum reduction time. If you set it to 30 minutes and reduction is not completed in this time, it is “paused” for the time interval (interval depends on the parameter reduction time frequency) and continue later.

Shrink DB after reduction – It is mostly used for database type Microsoft SQL. It means that after this process, the original database size is shrunk to smaller size (it means: the original database size without ‘reduced data’ size in this database).

Current loops and relays

Current loops and relays are set only for static measurements.

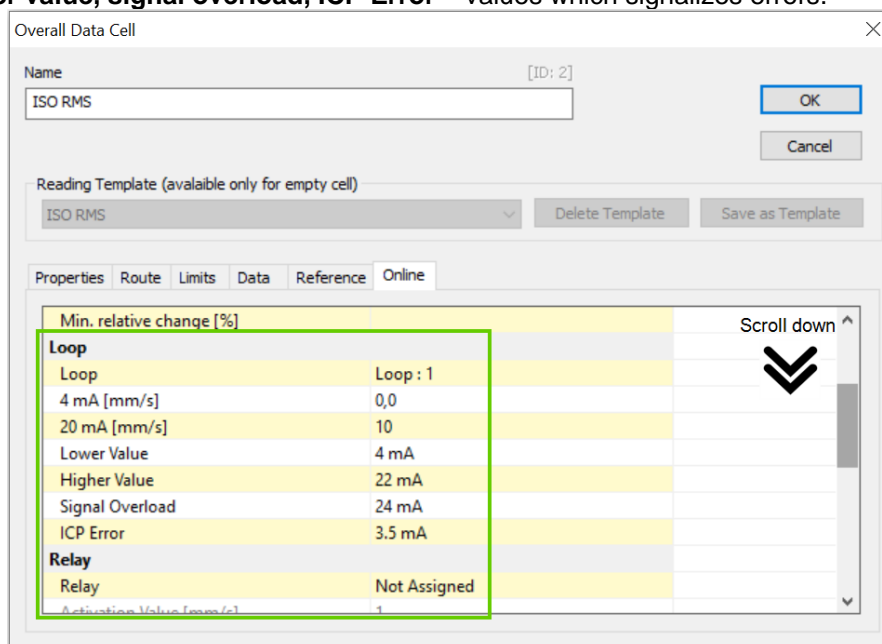
Note! It is possible to buy relay module from Adash. If you buy this module later than your online unit, please contact Adash to help you with module’s configuration.

Loops/relays settings are under ‘Online’ tab in ‘Properties’ of data cell window.

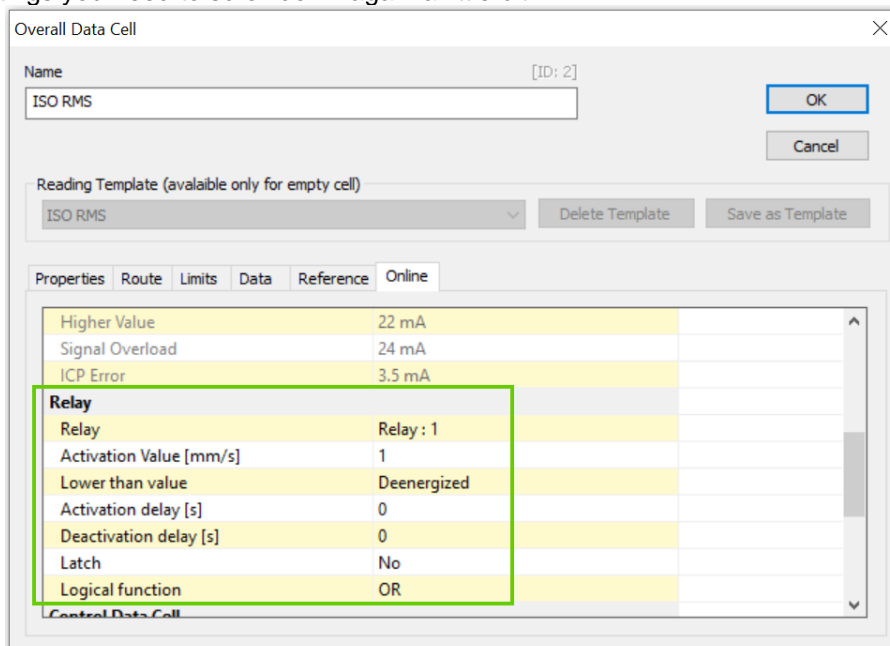
Loop – active current loop where measurement is ongoing,

4 mA [mm/s] and 20 mA [mm/s] – lowest and highest range for current loops values set in mm/s,

Lower/Higher value, signal overload, ICP Error – values which signalizes errors.



For relay settings you need to scroll down again a little bit.



Relay – active relay where measurement is ongoing,

Activation value [mm/s] – once this value is met, relay changes its state,

Lower than value – you can choose if lower values (it means lower than activation value) would be defined as state energized or deenergized,

Activation/deactivation delay [s] – time after activation value is met - before activation/deactivation of relay,

Latch – latch function is used,

Logical function – logical function used (OR, AND – this is used when one relay is assigned to more measurements).

Conditional measurements

Adash allows to set up a conditional measurement by the value of the controlling data cell. For example: controlling data cell for order analysis is speed data cell. Valid interval is 2500-3500 RPM (Min and Max parameters) – the measurement of order analysis is taken only in this interval. Data saving is then controlled by adaptive algorithm (more information in next chapter Data saving modes). Conditional measurements work only within one online unit.

Note! Measurement is saved only when condition is met during whole measured interval. In case condition is not met when conditional measurement is done – measured value is not saved.

Let's explain it on example:

We set condition, e.g. save measurement when measured value is higher than 2500 RPM. Interval for this measurement is 10 seconds. If condition is not met during these ten seconds interval (it means that measured value is not higher than 2500 RPM) then measurement is not saved. Condition was not met for whole time while measurement was running.

Temporary stop of readings

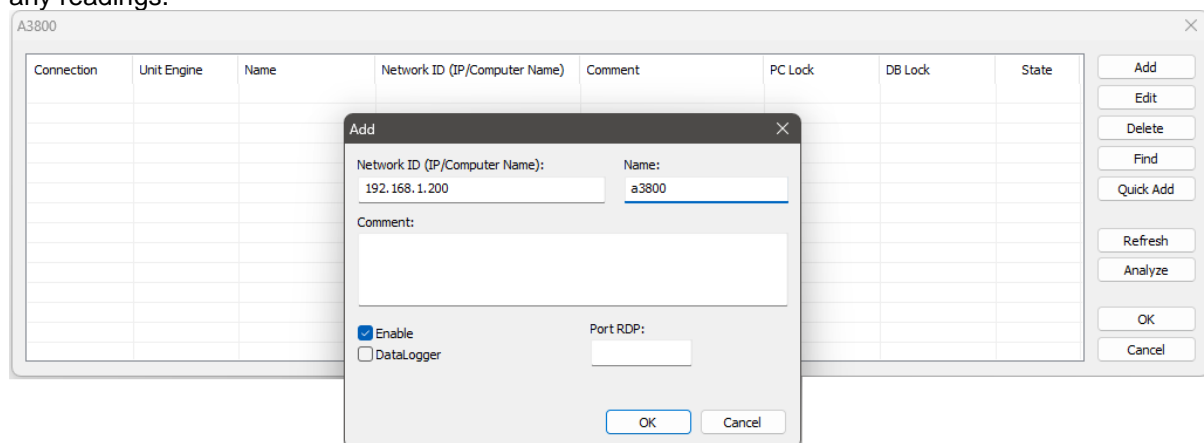
Readings can be stopped easily for whole online unit, for one measure point (it means one channel) or just for one data cell.

Online unit

To stop readings for whole online unit you can follow steps below.

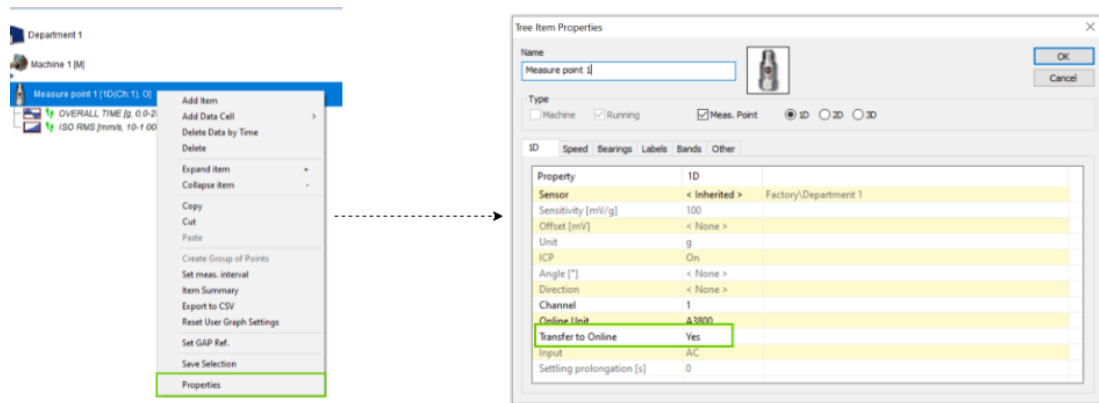
Go to 'Online' tab in DDS – pick your online unit type (eg. A3800) – choose online unit from the list and click on 'Edit' on the right side of this menu window.

Unmark check box '**Enable**' in this 'Edit' window and click OK. After this, online unit will not perform any readings.



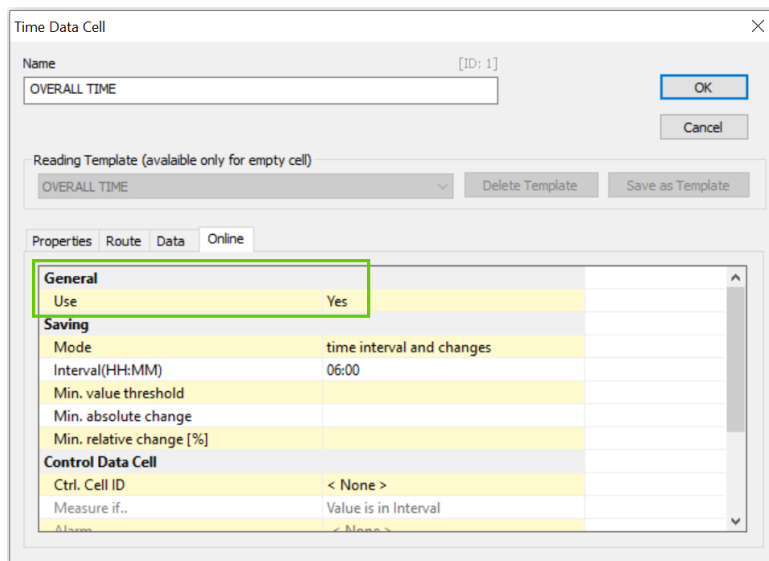
Measure point

If you need to disable (temporarily) all measurements in measurement point, you can simply do it. Open the properties of selected point and set '**Transfer to Online**' to No. It is available for all point dimensions (1D/2D/3D).



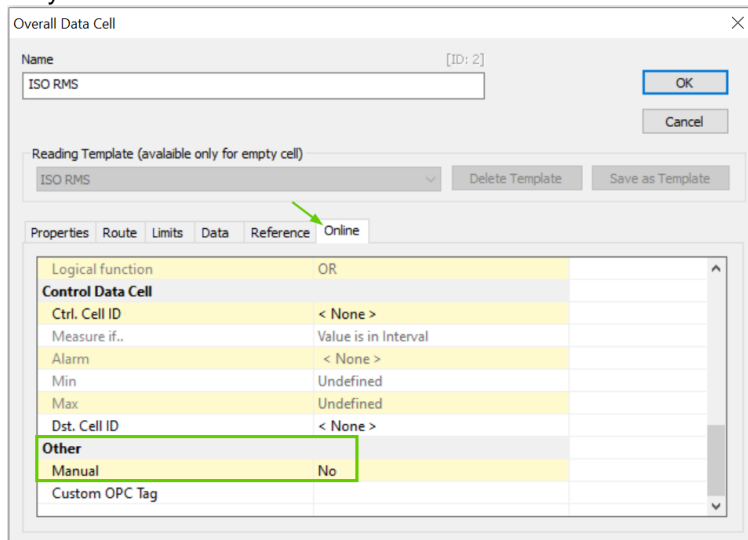
Data Cell

To disable one measurement, open properties of selected data cell, go to Online tab and set the 'Use' to No.

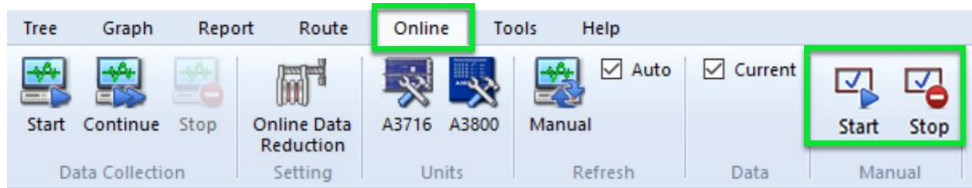


Manually triggered measurements

System allows conditional measurement of selected data cells by manual input. This parameter is under data cell properties. Click on data cell with right mouse button and pick 'Properties' – tab 'Online' – 'Manual' – No (this is default setting) / Yes. If manual is set to No, then measurement is taken in a standard way.



If measurements are set as Manual (value set to Yes), no measurement is performed automatically. Measurement starts only after pressing 'Start' button (Online tab). Pressing of 'Stop' button stops the collection of these data cells.



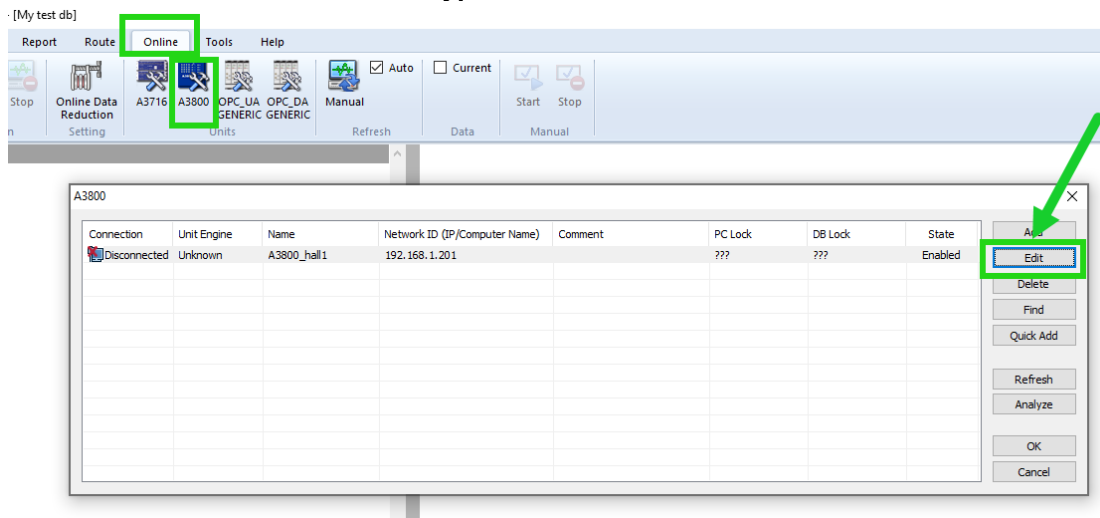
This functionality is available from version 3.3.6 and A3716 firmware ver. 2.67.

DataLogger

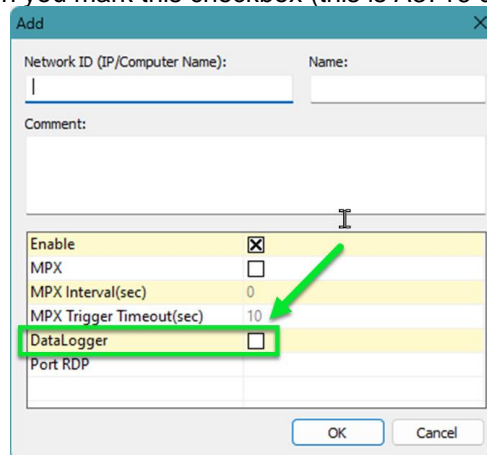
Datalogger is a feature that changes the behavior of saving data on online unit. If Datalogger is enabled: all data (that are waiting for DDS to be downloaded) are continuously being saved to internal hard drive instead of RAM. This allows to keep data after power loss or unit restart.

Where to find datalogger setting?

Go to 'Online' tab – choose online unit type and click on 'Edit'.



DataLogger is turned on when you mark this checkbox (this is A3716 dialog box).



Confirm with OK button.

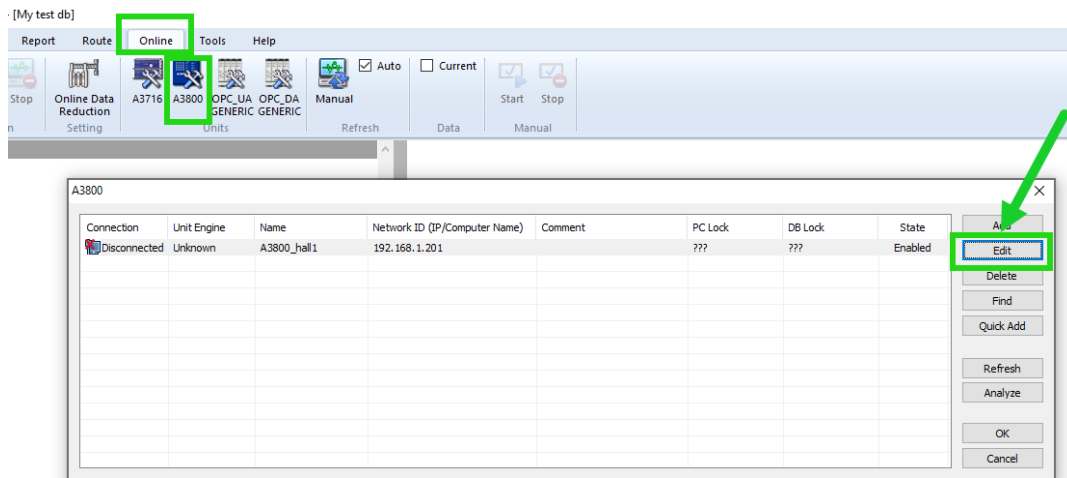
Note! Please remember, if you have datalogger turned on and you start data collection with 'Start' button instead of 'Continue' button – your data will be also lost. Data are being collected from the moment when you press 'Start' (older data are thrown away).

MPX Interval

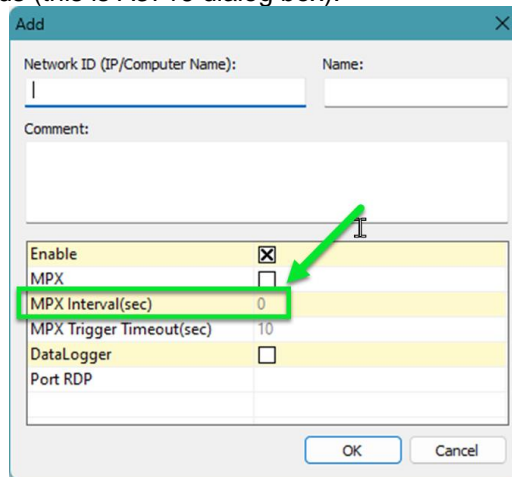
MPX time is a parameter which is used to set time interval for multiplexer switching. When this time interval is exceeded, then multiplexer switch to next measuring channels. For example, when you set

MPX time to 1 minute (you need to fill in 60 seconds), then you measure on first channel group (channels 1-4) for one minute. Afterwards multiplexer switches to second group of channels (channels 5-8, etc.).

MPX time parameter is also in 'Edit' window for online unit. Go to 'Online' tab – choose **online unit type** and click on 'Edit'.



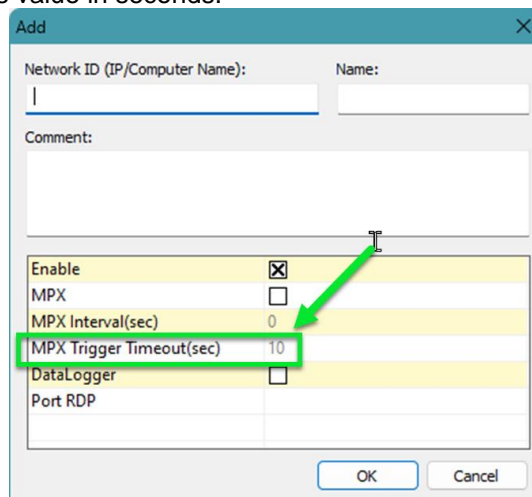
MPX interval is set in seconds (this is A3716 dialog box).



Confirm with OK button.

MPX Trigger Timeout

It is parameter which defines how long multiplexer should wait for trigger before it is switched to another channels group. It is value in seconds.



Confirm with OK button.

Port RDP

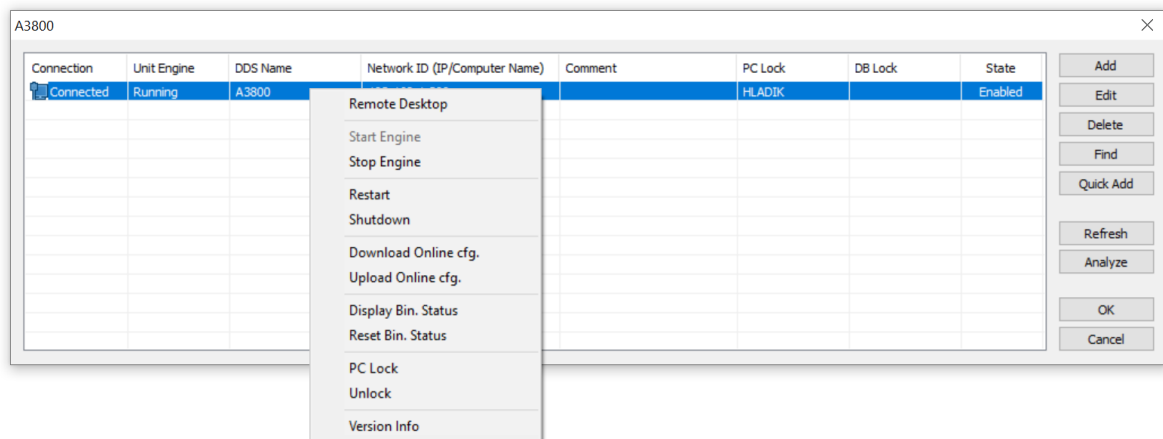
RDP (Remote Desktop Protocol) is a Microsoft proprietary protocol that enables remote connections to other computers, typically it is port **3389**. In case you would like to use different port for remote connections, it needs to be configured in online unit (in production). When different port is used, you can fill in directly in DDS (so you don't need to enter it manually in window for 'Remote desktop connection').

Go to 'Online' tab – choose **online unit type** and click on 'Edit'. Fill in 'Port RDP'. Confirm with **OK**.

Confirm with OK button.

Advanced functions

There is set of advanced functions for online units. Click with right mouse button on selected online unit and you get following options.



Buttons description:

Start Engine - starts MeasEngine of online device.

Stop Engine - stops MeasEngine of online device.

Restart - remotely restarts the online device.

Shutdown - remotely switches off the online device.

Download Online cfg. - downloads the configuration file with setting of adaptive algorithm.

Upload Online cfg. - uploads the configuration file with setting of adaptive algorithm.

Display bin. status - displays internal parameters of adaptive algorithm (relative changes).

Reset bin. status - resets internal parameters of adaptive algorithm (relative changes).

PC Lock - locks the online device only for your computer.

Unlock - unlocks the online device for everybody.

Version Info - displays a detailed description of the device.

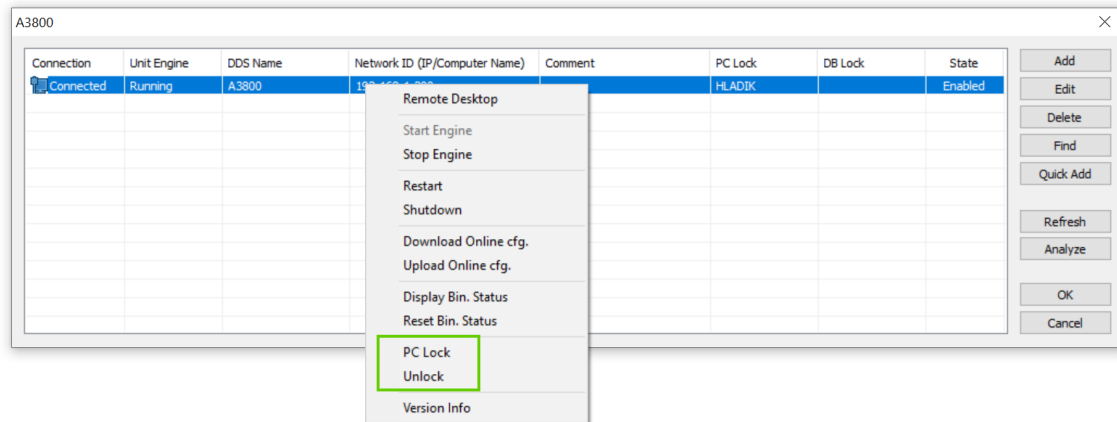
Lock/Unlock

As online unit is accessible to all users in network, it could easily happen that more users use online unit at the same time. To avoid this situation, we use functions Lock/Unlock.

When you use the **Lock function**, your computer and database is registered in the unit as the only one computer which can have access to online data collection. The other users cannot change the configuration in the unit in that moment.

Lock function of the unit is used automatically when data collection is started.

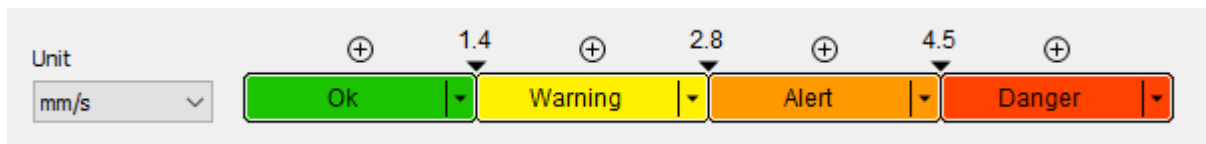
Lock or unlock can be done also manually (Advanced function).



Email notifications

DDS allows sending of email notifications when defined alarms are exceeded. Notifications are being send from the computer running the Data Manager (the computer where the online data collection was started). The Data Manager processes the data in packages, ie once every X minutes downloads the data from all online devices and stores it in a database. Notifications are always processed while downloading this data, and therefore the response speed to direct value increase is proportional to the download interval settings (DDS -> Global Settings / Online / Data Transfer [s]).

Measurement alarm - user can define limit values for static measurements. Alarm is activated (traffic light colors) once the limit values are exceeded. Alarms are assigned to a certain band between limit values as per picture.



Machine alarm – machine has the same alarm value as the measurement with worst alarm (defined under this machine). Data manager sends the email notification immediately once the machine alarm has raised. If the measurement alarm has raised but the machine alarm has not raised, then the notification is delayed and send later. This prevents the mailbox from being flooded with emails from the machine with periodically increasing and decreasing alarm. This interval can be adjusted in DDS -> Global Settings / Email / General / Min. Time Between Emails (in minutes).

Outgoing email server

Data Manager does not create a mail server, but it uses the client's mail server to send notifications. It is necessary to set parameters of outgoing mail server (SMTP server) correctly in order to send notifications. Outgoing mail server settings is located in Tools/Globals Settings/Email. All items have to be entered correctly. Use an Email Test button to check email notification functionality.

Send email if limits exceed – email is being send once machine alarm has raised when YES defined.

Send email when data collection started – email is being send once data collection started when YES defined.

Sender – displayed sender's address. It does not have to be the same as SMTP server user.

Sender Name – displayed sender's name.

Recipient – email address of email notification recipient

Subject – e-mail notification subject

Min. Time Between Emails [min] – minimal time between sending emails. It reduces amount of emails from one machine.

Address – your SMTP server address (for example: smtps://smtp.gmail.com:465). Address requires “smtp://” or “smtps://” prefix to determine correct protocol.

User – user account (for example: my.mail@gmail.com)

Password – user account password

Email Test – sends testing email

DDS update

DDS can't be updated while data collection is running. If you need to update DDS, please keep in mind, that it is **always necessary to stop** data collection first. Then update DDS and start data collection again.

Data saving modes

The online unit A3716 / A3800 measures continuously, which means that if the length of one reading is one second, then a new value is measured every second. This ensures that no event can be overlooked (i.e., no change in vibration level).

If all of these measurements were stored continuously, then the size of the database would grow enormously fast. The computer would be flooded very quickly with data and access to the database would be very slow. Such a situation cannot be tolerated. This is why regulation algorithm was developed (it basically reduces data in every online unit).

Measured value is saved when it is different from the previous measured value. This prevents database from overwhelming. Therefore, each unit controls which data will be stored in the database. Let's explain few important terms in this area.

Basic terminology

Absolute change

Absolute difference between two measured values.:

$$\text{Abs} = |\text{val2} - \text{val1}|$$

Relative change

Relative difference between two measured values. It means absolute change related to original value.:

$$\text{Rel} = (|\text{val2} - \text{val1}| / |\text{val1}|) * 100\%$$

Significant change

Significant change occurs when both conditions of absolute and relative change are higher than set values.

Measurement quantifiers

A quantifier is assigned to every measured value. It is a number that characterizes the measurement. Measurements are saved based on evaluation of the quantifier change.

Static values (overload values, DC, speed, etc.)

Measured value itself is the quantifier.

Time signal, ACMT and spectrum

RMS value is a quantifier for time signal, ACMT and for all types of spectrums (zoom, full, ...).

Orbit, filtered orbit, centerline

The orbit consists of two time signals from which two RMS values are calculated. The quantifier is then created as a complex number whose real component is the RMS from the first channel. The imaginary component is the RMS from the second channel.

Quantifier of filtered orbit is complex number from two RMS values (from channel A and B).

Centerline complex quantifier is consisted of measured DC values from channel A and B.

Smax and complex Smax

Measured value itself is a quantifier. It is complex number for complex Smax.

Amplitude + phase, order analysis and phase shift

Measured value is a quantifier for amplitude + phase (it means complex number).

Overall RMS value (of all orders) is a quantifier for order analysis.

Complex number is also quantifier for phase shift. Amplitude of this quantifier is amplitude A/B ratio.

Phase is phase shift $\varphi_B - \varphi_A$.

FASIT

Values are stored in interval only.

Saving settings

The parameters of saving can be set in DDS for each data cell individually or for more data cells at once using multiselect. Open the data cell properties window and click on the 'Online' tab. The saving parameters are in the 'Saving' section.

The screenshot shows the 'Overall Data Cell' dialog box with the 'Online' tab selected. The 'Saving' section is highlighted with a green box. The parameters are as follows:

Property	Value
Use	Yes
Mode	time interval and changes
Interval(HH:MM)	06:00
Min. value threshold [mm/s]	0,5
Min. absolute change [mm/s]	0,1
Min. relative change [%]	10
Min Interval(HH:MM)	00:00
Loop	Not Assigned

Mode

There are two modes how the unit can control the data saving: **time interval only** and **time interval and changes**.

The first mode, **time interval only**, is simple. Measurements are saved after the time interval between the current time and the last saved measurement elapses. For example, if the interval is defined as 1 hour, a reading is saved every hour. In other words, a new measurement is saved once the interval between the last saved measurement and the current time is 1 hour. The maximum time between readings will not exceed 1 hour.

The second mode is **time interval and changes**. This mode uses the same idea of the time interval as described above but it also adds the condition of significant change. In this mode, measurements are saved in the time interval and when they are significantly changed. To have the significant change, both conditions of absolute and relative change must be met. The measurement value must also be above the threshold limit. This is the recommended mode for data saving.

Max. interval (HH:MM)

Maximum time interval between two saved values in format **HH:MM** (Hours:Minutes)

Following parameters are related to significant change. These parameters are: **minimum value threshold**, **minimum absolute change** and **minimum relative change**. Significant change value is saved when set parameters are met.

When significant change value is saved, new time interval starts in that moment. Even if the previous one did not elapse.

Min. value threshold

The threshold is a parameter, which is used in online systems. The threshold idea came from vibration measured on machines which are not running continuously. These machines (for example

hydroelectric turbines) are run and stopped several times every day. We want to save only running values.

When the machine is turned off, there still remains noise values, which we don't want to save. So, we apply a minimum threshold value. Values below minimum value threshold are considered low and therefore are not evaluated for data saving. There is one exception.

Only the **first** and **last** noise value lower than the threshold is saved. All other measurement values below the minimum value threshold are not saved.

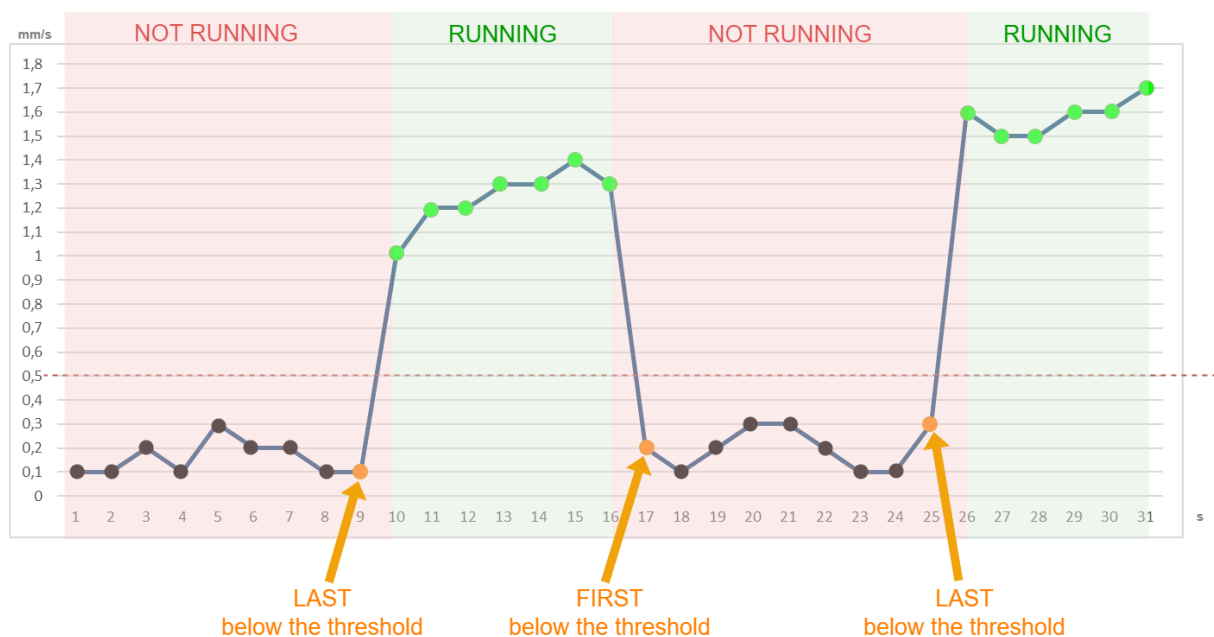
Let's explain it on following example.

The threshold value (for example 0,5 mm/s) prevents saving of very small values (on the level of noise). The threshold value is used also to check if the machine is running.

Values lower than threshold are saved only in this situation:

- the **first** value below the threshold is saved (it is the moment when measured value falls under the chosen threshold),
- the **last** value below the threshold is saved (it is the moment when measured value rises above the chosen threshold value).

To make this explanation clear, see the picture below. Green points are saved as values are above the threshold 0,5 mm/s (machine is running). Orange points are saved also as the values are first or last measured under the threshold. Black points are not saved because these values are below threshold (machine is not running, these are noise values).



Min. relative change, Min. absolute change

A new measurement is saved if **both** conditions of absolute change and relative change are higher than set values. The measurement value must also be higher than the minimum value threshold.

Several data types are measured just in defined intervals without option to use the changes. These data types are MinMax and Density (because they are basically compressed datatypes from their nature) and FASIT.

Min. interval (HH:MM)

Available in DDS version 3.6.3.0 and newer. It is minimum time interval **between two significant changes**. These two values (where significant change occurred) will be saved when this min interval criterium is met. Min interval is not affecting other parameters – **ONLY significant changes**.

Quantifier type (for octave spectrum)

Quantifier is mostly used as a property pointer for some objects (values). Imagine it like this: We have spectrum measured and we will choose RMS as its quantifier. What does it mean? Basically, we will get in the end one RMS value from all spectrum values we have measured. This one value is for us great machine health indicator.

You can set as quantifier type TOT (meaning RMS) or Max in DDS software. All parameters (max, min threshold, abs, rel, ...) are related to this quantifier afterwards.

This quantifier can be also used for relays – you can use it for activation relay value.

Quantifier type you set in **data cell properties – Online** tab and go to **saving** section. Last parameter in this section is quantifier type.

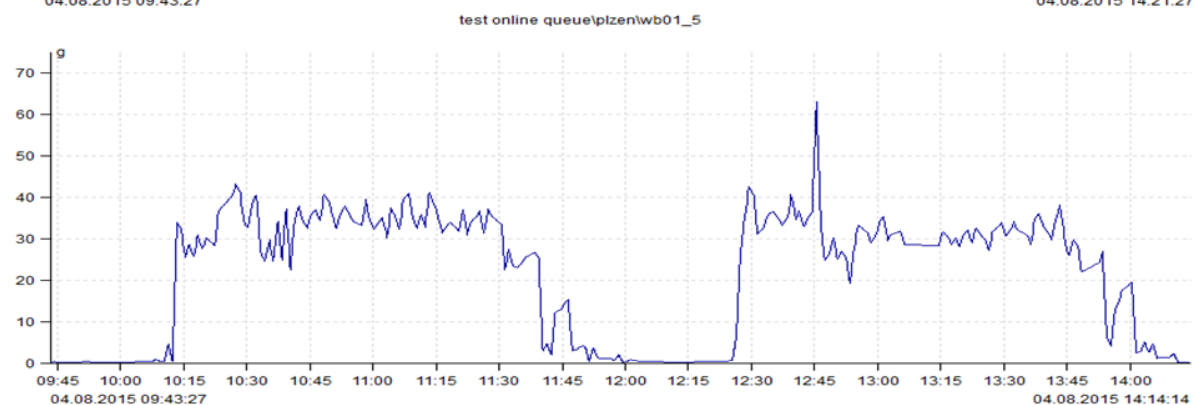
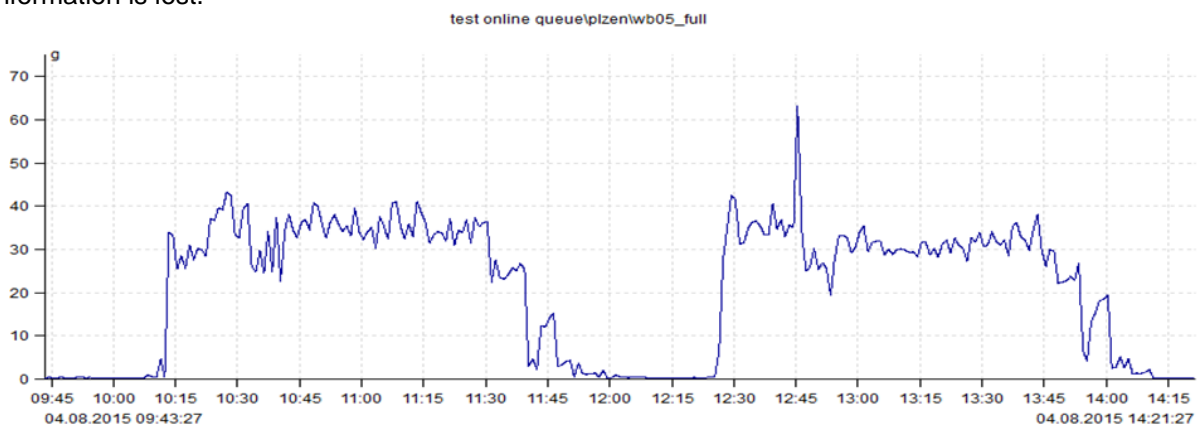
General	
Use	Yes
Saving	
Mode	time interval and changes
Max. interval(HH:MM)	06:00
Min. value threshold [mm/s]	0,0
Min. relative change [%]	10
Min. absolute change [mm/s]	0,5
Min. interval(HH:MM)	< None >
Quantifier type	TOT
Loop	
Loop	Not Assigned

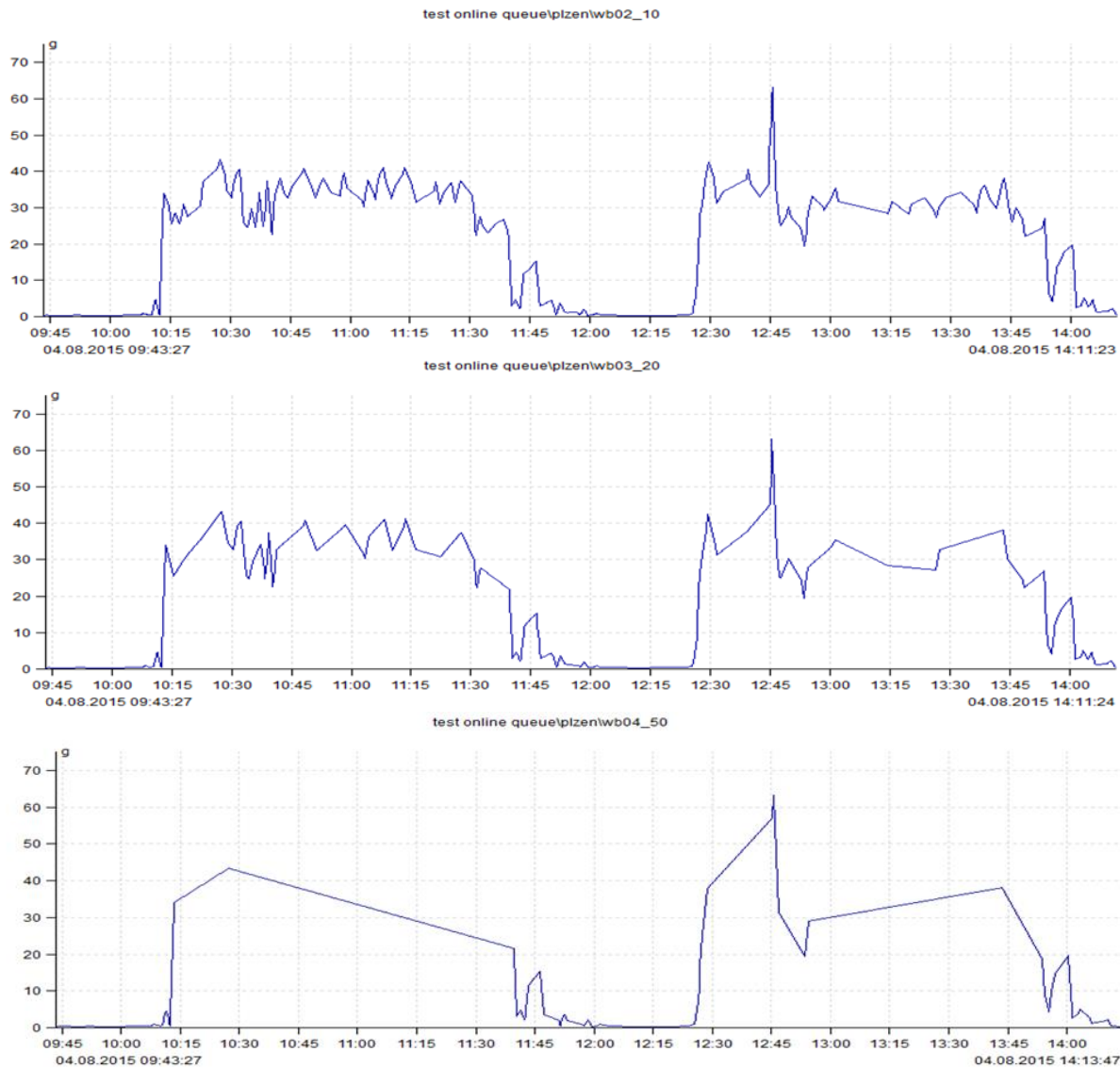
Saving algorithm – how does it work?

When the system runs for the first time the first reading is always saved. The basic function of the algorithm is to save significantly different readings. Significant change is evaluated based on two limit levels – relative (e.g.: 5 %) and absolute (e.g.: 0,1 mm/s). If currently measured value differs from the last saved value by more than 5 % **and also** more than 0,1 mm/s – reading is saved (this is significant change).

Algorithm is also checking time interval between last saved reading and the current one. If the interval is longer than allowed value then the current reading is saved. Even if significant change didn't happen.

Next graphs contain examples of trend with various relative limit levels. The first graph contains full data and next are taken with 5 %, 10 %, 20 % and 50 % relative limit level. As you can see, no information is lost.





Data saving parameters in older firmware and DDS

In DDS version 3.5.3 and older, the data saving parameters were stored in cfg file **C:\A3716\data\online.cfg** for each A3716 itself. This file is still used if A3716 FW version is 027804 (and older) or tree was created in DDS version 3.5.3 (and older).

More information can be found in Appendix 1. How to set new data saving system for older databases is also described in appendix.

Parameters for data saving are described in following chapter.

Queue regulator

Queue regulator evaluates measured value. This evaluation is based on measurement quantifier. It decides whether value is pasted to queue for processing (saved) or not. This decision depends on defined criteria. Algorithm criteria settings are described below.

All readings

Algorithm is set to save all measured values.

Start (first value)

The first measured value after starting of MeasEngine is **always** saved. The first measured value after unblocking the conditional measurement is also **always** saved.

Note! *Conditional measurements – these measurements are performed just in case that measured value meets the set condition (for example, value is higher than specified limit).*

Change (significant value change)

Measurements are ongoing continuously in unit A3716 (no pause between them). Every new measured value is compared with the latest saved value. If there is significant change between these values then this new measured value is saved.

Limit levels of significant change are defined by input parameters. It includes parameters such as **relative change** and **absolute change**.

Let's say that relative change is set to 5%. Absolute change is set to value 0,2 mm/s. We get new measured value as measurements are still ongoing. In case that difference between last saved value and new measured value *is more than 5% and also more than 0,2 mm/s*, then this value change is considered as significant. Our new measured value is saved.

Last (previous value at significant change)

Based on 'Change criterium', measured value is saved when significant change to previous value is reached. But let's imagine situation where this significant change happened suddenly. If the change between the current value and the previous one is significant - the previous one is also saved. Thanks to this, sharp changes in values can be observed in the trend.

Interval (after time interval)

The regulator parameters also define maximum permissible time interval between two values stored in database (e.g. 6 hours). It means, when more time (eg. more than 6 hours) elapsed since last measured value, new value will be saved. No matter if the change between them is significant or not or if the value is higher than minimum value threshold or not.

Time change (system time change)

If new measured value has lower time than last saved value, it means that system time changed. In this case new measured value is automatically saved.

Errors

Value is saved when measurement contains error. The reason is to inform user that any event (error) happened during measurement. The most common errors are ICP error or overload error.

Advanced features

You can find more information about advanced features such as remote desktop connection or virtual unit in this chapter.

Remote desktop connection

Remote desktop connection is a program which allows you to control another PC on the network from your PC.

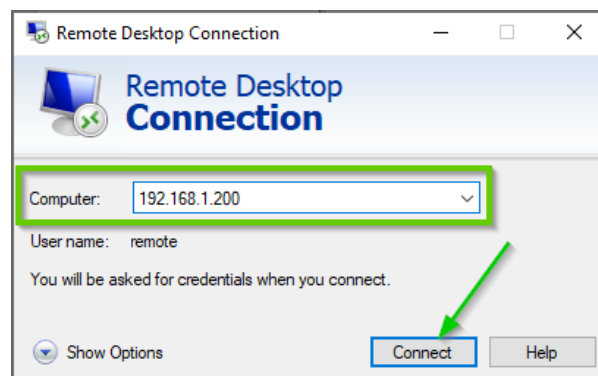
Remote desktop connection can be used when online unit is connected to network. It can be connected with ethernet cable directly to computer or to switch.

Connect unit to your computer. Change IP address of your computer as described above in previous chapter. Now you can use remote desktop connection.

How to connect remotely is described below:

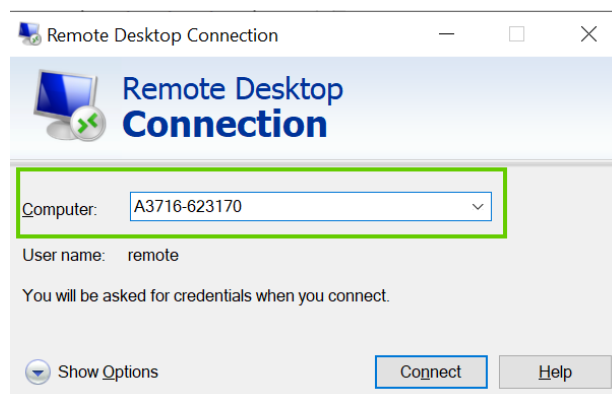
Go to Windows start menu on main panel .

Search for '**Remote desktop connection**'. As a computer you will fill in IP address of your unit. Click '**Connect**'.



You will be asked for **credentials (login parameters)** once you will connect (username, password). Both are set to '**remote**' from production.

If online unit is connected to network with **switch**, it obtains IP address automatically. In this case use online unit's name for connecting. As computer you fill name like this: **A3800-xxxxxx**, xxxxxx is for serial number.



IP address from front panel of online unit could be (and most probably will be) different than the one obtained automatically. Remote desktop would not connect with IP address from production in this case. That is why you can login with units name.

After login you can check what IP address unit obtained when you connect to remote desktop and go to Windows start – open command prompt (cmd) and use command ipconfig.

```

ca Command Prompt
Ping statistics for 192.168.1.124:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\>ipconfig ←
Windows IP Configuration

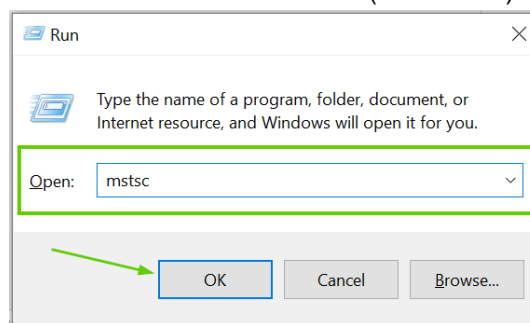
Ethernet adapter Ethernet:

    Connection-specific DNS Suffix . . . :
    Link-local IPv6 Address . . . . . : fe80::bc7f:840a:2dcd:496e%10
    IPv4 Address. . . . . : 192.168.1.59
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.254

C:\>_

```

Faster way to get into 'Remote desktop connection' window is press **Windows** + R on keyboard. You get following window and fill in command '**mstsc**'. Press Enter (or click OK):



And window for remote desktop connection opens.

Connections - unit as a stand-alone PC and Remote desktop connection - are mostly used for setup (IP address settings, values changes, online unit updates, etc.). These connections are also used for working with **Virtual unit** (described later in this manual).

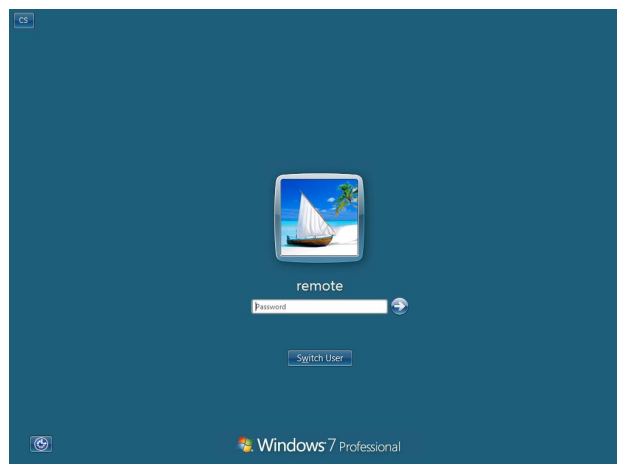
Operating system

Online units run with Windows operating system. You can connect them as a computer when needed (connect monitor, keyboard, mouse through USB ports). Then you can work with Virtual unit or check Online device monitor directly on online unit itself.

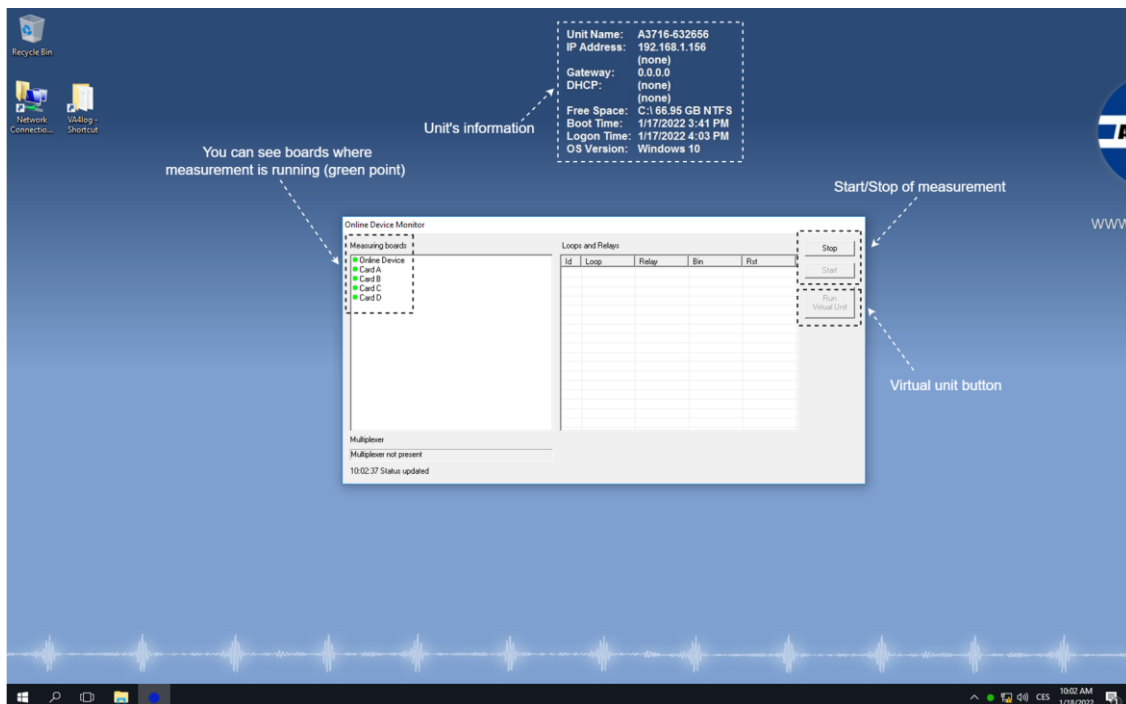
You can login with following credentials:

User: **remote**

Password: **remote**



You can also use Remote desktop connection. This connection allows you to work with Virtual unit or Online device monitor on your computer. This connection was described in previously in this chapter. After login you can see following screen.



Note! You can see that button for Virtual unit is greyed in the picture. You can run virtual unit **only** when measurement in Online device monitor is **stopped**.

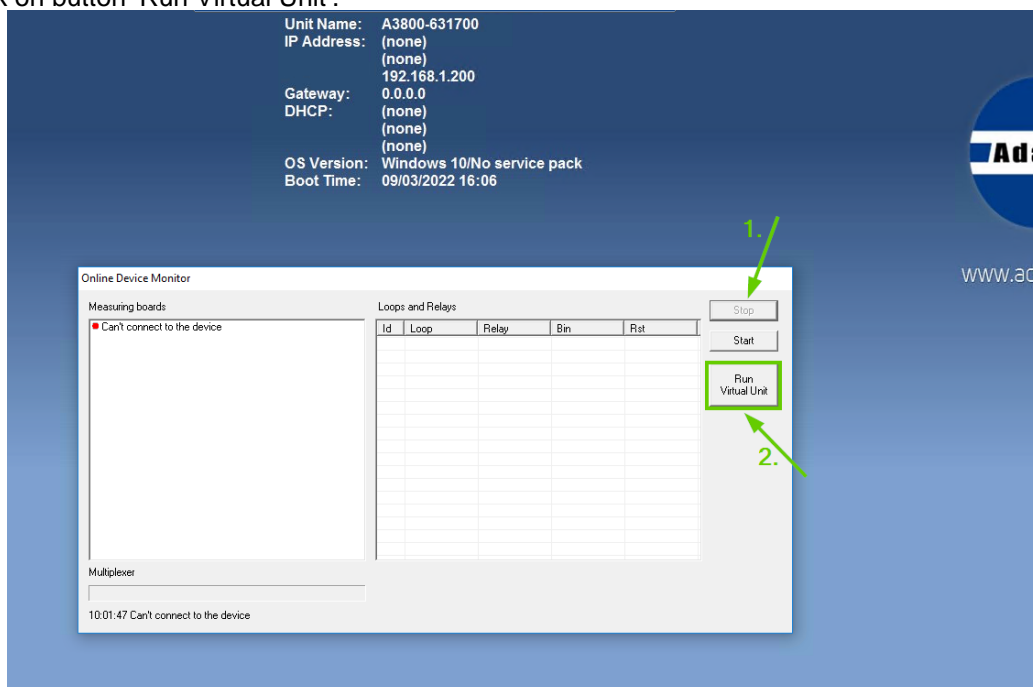
Virtual unit

Virtual unit can be launched via remote desktop connection from your computer. You can start it with button 'Run Virtual Unit'.

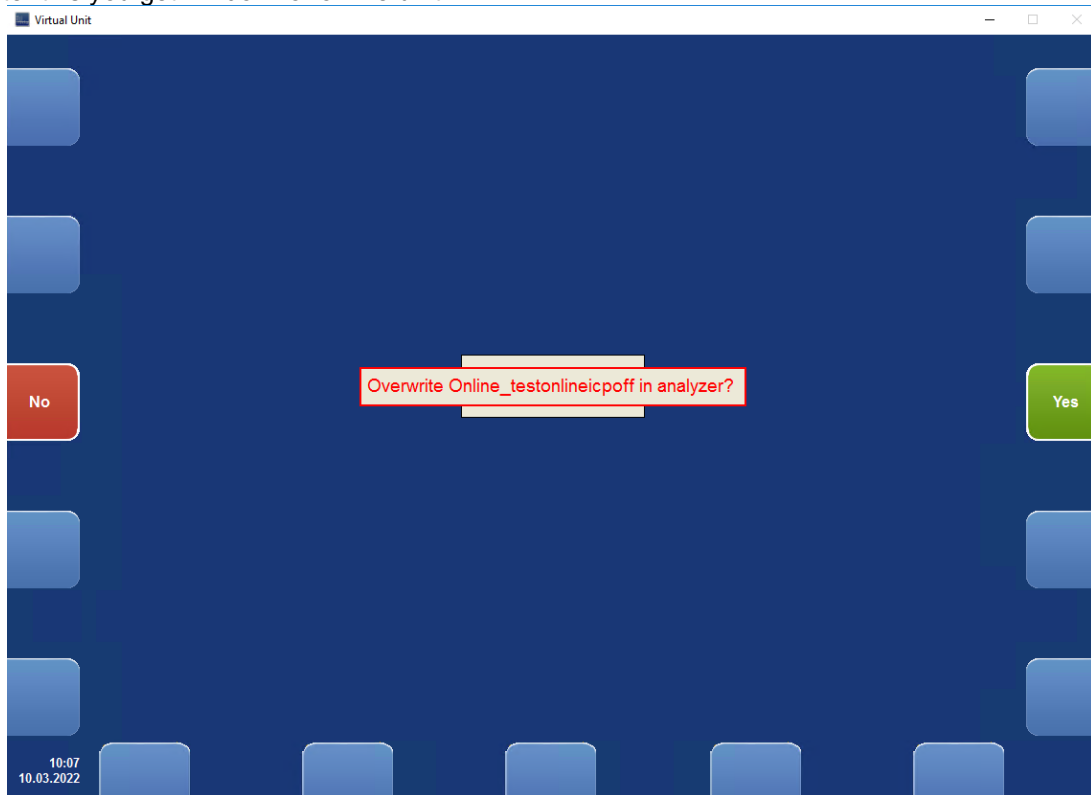
How to run Virtual unit properly?

Once you are connected to online unit via remote desktop you will get window 'Online Device Monitor'. Follow steps below to start working with virtual unit.:

1. Stop measurements.
2. Click on button 'Run Virtual Unit'.



3. After this you get window for online unit:

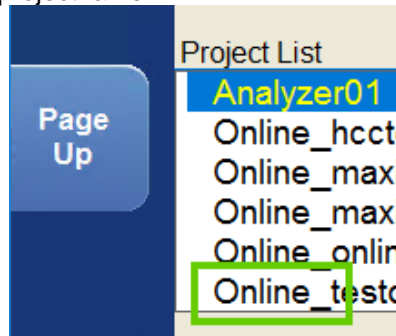


Note! When you launch Virtual unit, you will be **always** asked if you want to overwrite project data from DDS into analyzer (same question is there also for runup). If you would like to analyze data you already measured in DDS - click on **'Yes'** button and you can work with them. *Please note, that in this case, sensor settings are taken from DDS.* If you would like to get data to virtual unit without using DDS measurement - click on **'No'** button. Then you can create new set directly in analyzer and use virtual unit as device (eg. VA5). This is of course possible also when you choose to overwrite data from DDS – you can create new set for current (new) values afterwards.

4. Now you get main screen. You can choose what mode you want to use (analyzer, balancer, runup, etc... – How to work further with particular modes is described in manual for virtual unit itself.).



If you decided to overwrite your DDS project into analyzer, you can find it in analyzer mode saved under name starting with **Online_**projectname.



You can leave virtual unit window with 'Exit' button or close window as usual with × in right top corner.

Note! More information you can find in manual for virtual unit.

A3716 (A3800) update

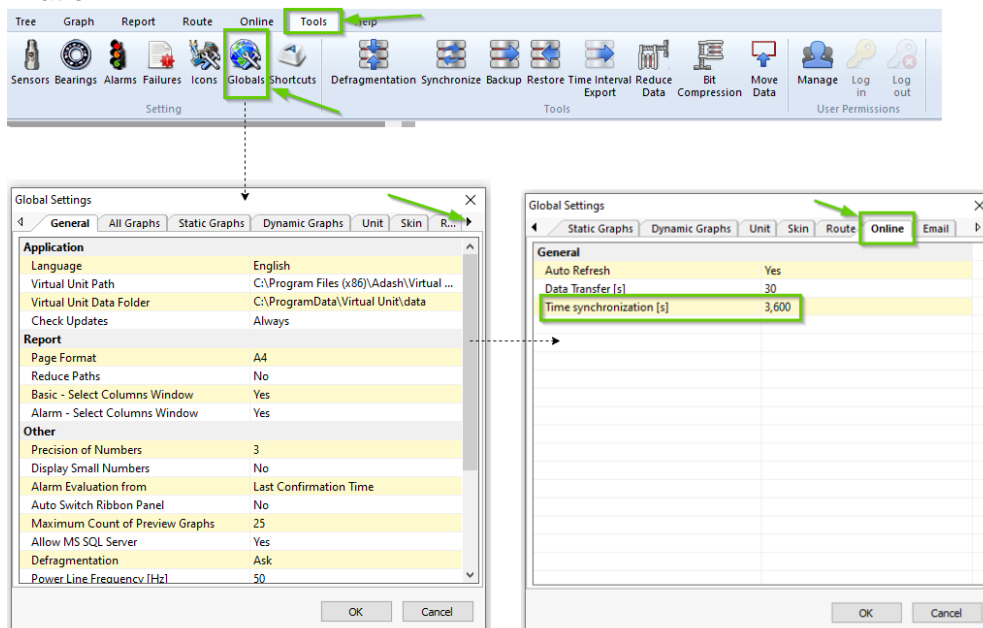
This chapter is appointed for advanced users only.

For unit update please follow steps below:

- Connect a keyboard, a mouse and a monitor to your A3716 device (or you can use remote desktop connection).
- Login as:
 - **User:** remote
 - **Password:** remote
- Copy A3716_ver02##.exe file anywhere to A3716 (eg. folder C:). Use usb flash drive or network to copy it.
- Run it.
- A3716 Setup Wizard will open.
- Choose the language of installation and follow the wizard's instructions.

A3716 (A3800) time synchronization

It is important to keep internal time of all A3716 units up to date. In the beginning set the correct time zone in A3716. The **Data_Manager** synchronizes time in all A3716 units with the time on Adash server. The interval of synchronization you can find in **DDS/Tools/Globals/Online/Time synchronization**.



Errors

The most frequent errors are ICP error, overload error and stream error. All of these errors can be found in the graphs in virtual unit and even in DDS. Only some of them can be found in the monitor. Let's describe where you can find these particular errors and what is causing them.

ICP error

Sensor power failure. This is usually a broken cable to the sensor. There may be also a fault in the ICP power generator inside the hardware. Atypical sensors can cause a false ICP error (DC component of the input voltage must be 4 - 17V)

It is displayed in the monitor for each channel and in the data header of each data cell.

Overload error

Input signal overdrive. The input signal voltage value is higher than the allowed limit for the input channel.

It is displayed in the monitor for each channel and in the data header of each data cell.

Stream error

This error is related to measurement board failure. It is hardware failure. It is displayed in measurement header not in the monitor.

Low speed

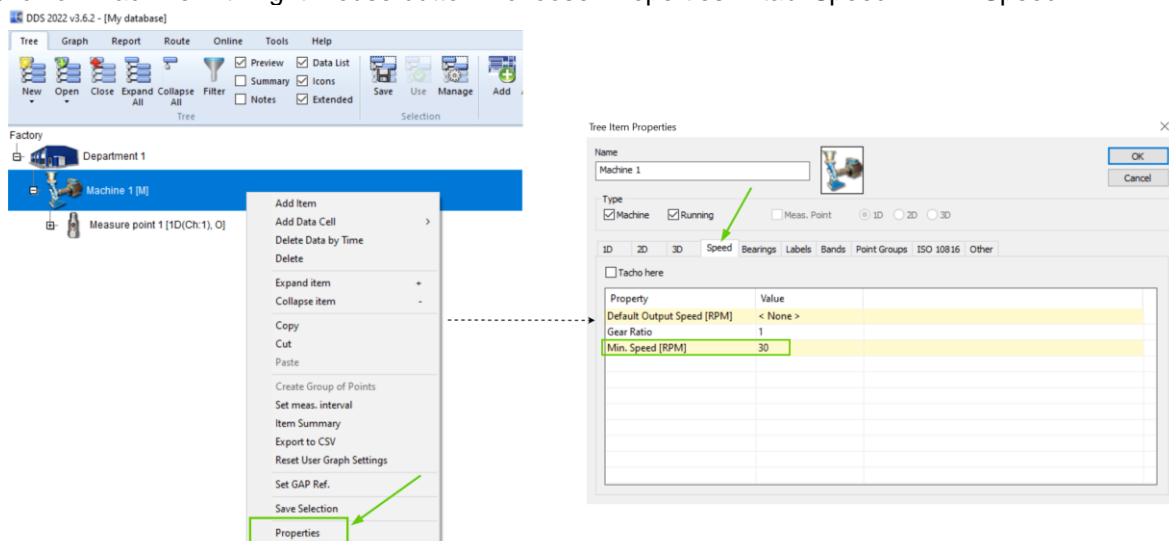
Some measurements require speed. In this case if there is no speed, it is a failure. It can signalize following:

1. the machine does not rotate or it rotates with very low speed,
2. the laser is not aimed correctly, sticker is missing or it is incorrectly reflected,
3. channel fault.

It is displayed in measurement header not in the monitor.

Note! It can happen that speed is very low (as mentioned above) and it is not captured during measurement. You will get this 'low speed' error message. In this case (when speed is very low) you can change 'Minimum speed' parameter. You can find it in DDS. Then you can capture also very low speed values.

Click on machine with right mouse button – choose 'Properties' – tab 'Speed' – Min. Speed.



Measurements requiring speed:

- speed itself (they do not set low speed error, they just set the value to zero),

- FASIT, amp+phase (if it is not user frequency), phase shift (if it is not user frequency), orders, order spectrum, filtered orbit,
- trigger-controlled measurements can set the low speed error (then it signalizes that no trigger events occur) – it is for example wideband, time or orbit measurement.

High speed

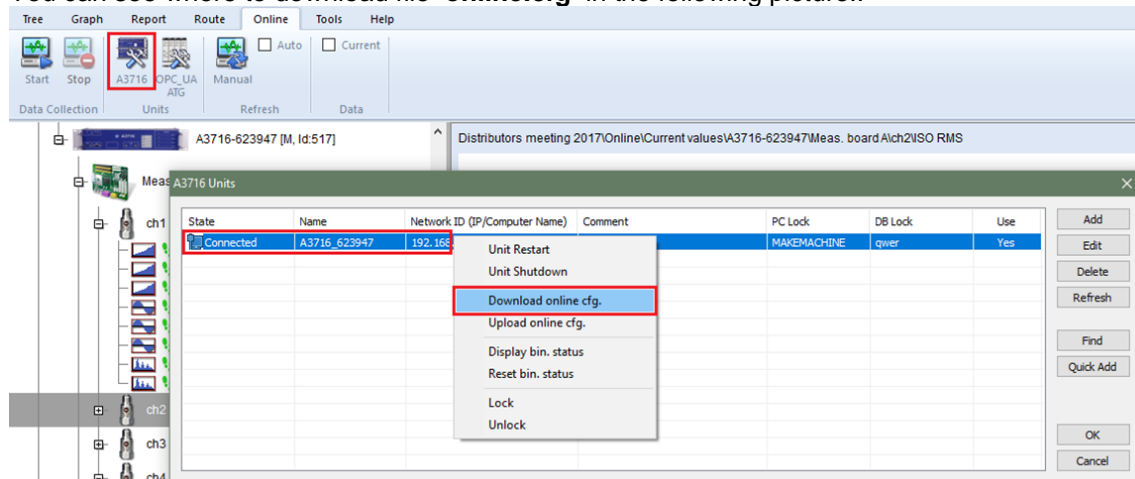
Measurements derived from order analysis have their upper speed limit. If this limit is exceeded, high speed error occurs.

This error is displayed in measurement header not in the monitor.

Appendix 1 – Data saving for older firmware and DDS

You can edit the **online.cfg** directly in the A3716 unit using the remote desktop connection. Or you can download the file to your PC from DDS and then upload it back after editing. New parameters are valid after the restart of MeasEngine (or the A3716).

You can see where to download file '**online.cfg**' in the following picture.:



Code in **cfg.** file looks like this:

```

7 [Regulator]
8 all readings=0
9 short dynamic max samples=4096
10 statics interval save=30
11 short dynamics interval save=600
12 long dynamics interval save=600
13 adaptive=1

```

Find the section **[Regulator]** (as in picture above) and modify parameters (description of particular parameters is below).

all readings

0 = 'check changes algorithm' or 'time interval savings' is used for data storing.

1 = all data will be saved to database (only for limited time recommended, the disc can be full filled very quickly)

adaptive

0 = 'check changes algorithm' is disabled

1 = 'check changes algorithm' is enabled

short dynamic max samples

In terms of data storage algorithm, measurements are divided into three groups: static (single-value measurements), short dynamics measurements and long dynamics measurements. Each has a different saving strategy.

A dynamic measurement is considered short when its number of samples is less than the value of the short dynamic maximum samples value. Significant changes are saved only for statics and short dynamics. Long dynamics are stored only in a time interval.

statics interval save

Maximum time interval between two saved values (in seconds) for statics.

short dynamics interval save

Maximum time interval between two saved values (in seconds) for short dynamics.

long dynamics interval save

Time interval between two saved values (in seconds) for long dynamics. Remember that significant changes are never checked for long dynamics.

min

Values below threshold are saved when time interval elapses only (these values are typically noise values). Only the first noise value lower than the threshold is saved.

The value differs for each physical unit and is stored in following format (unit, value; ...):

min= μ m,5; mm/s,0.5;g,0.3;mV,5;Hz,0.01

abs

The new value is saved if the absolute and relative change (between new and last saved value) is higher than the set value. The abs param is an absolute part of a significant change. The value is stored in the same way as min.

abs= μ m,10;mm/s,0.1;g,0.1;mV,5;Hz,0.5

rel

The rel param is the relative part of the significant change. The 0.05 value means 5 %.

rel=0.05, 0.1, 0.2, 0.5

In A3716 FW version 027804 and newer only the first value is taken account. In older versions the adaptive algorithm uses the values in the row.

Examples***To save all data:***

all readings=1

All readings will be saved. Beware that this option can fill the hard drive very quickly.

To save data only in defined intervals:

all readings=0

adaptive=0

statics interval save=60

short dynamics interval save=180

long dynamics interval save=3600

'Check changes' algorithm is disabled (adaptive=0). Static readings (measurements) will be saved every minute, short dynamics every 3 minutes and long dynamics every hour. Intervals are always in seconds.

Use 'check changes' algorithm

all readings=0

adaptive =1

statics interval save = 21600

short dynamics interval save = 21600

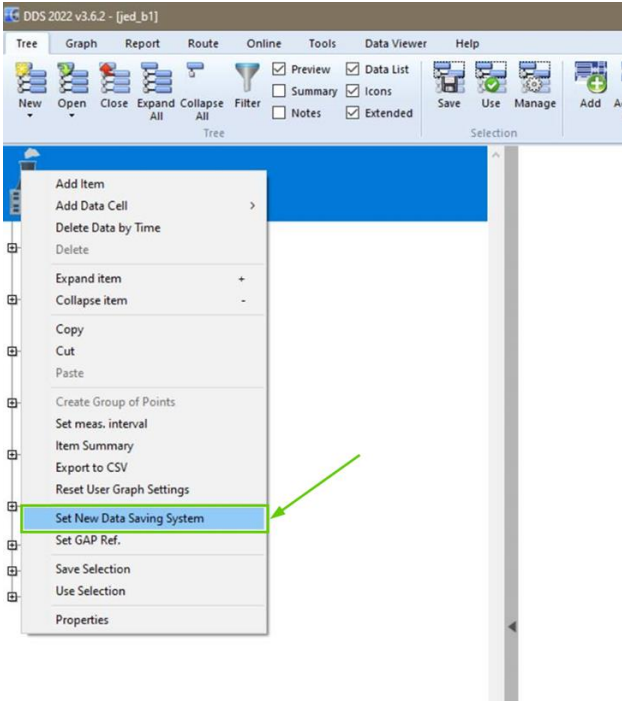
long dynamics interval save=21600

Check changes algorithm is enabled. Static values, short dynamics and long dynamics are saved every 6 hours until there is no significant change in value.

Set new data saving system

After upgrade to firmware versions 2.79 and higher, you would like to use new data saving system also for older databases (created in older DDS and firmware versions). This is not done automatically. Follow these steps to change data saving system for databases created in older versions of firmware and DDS.:

1. Click on any item in the tree with right mouse button.
2. From menu choose option '**Set New Data Saving System**'. Warning messages and question windows will pop up. Click through them.



3. After this change, default values are set to the database. You need to change parameters for it based on your needs and preferences as in the older one.

Appendix 2 - OPC UA (OPC DA)

OPC is for Open Protocol Communication. It was developed for data transferring between different applications in predefined form using predetermined principles.

Each online unit has OPC UA server implemented. It means you can view data in client application. A3716 is partially implemented OPC DA server – it is enabled only upon request and we provide it only on “as-is” basis without support as it lacks as some basic features.

You can use OPC interface only for static measurements (e.g., wideband value, DC, ...), in different words – for measurements represented by one number value.

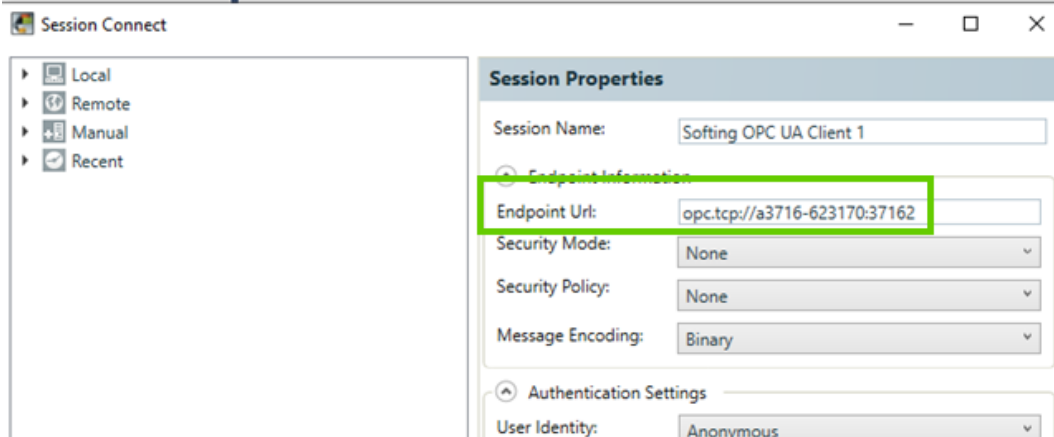
Requirements

Technical requirement is online unit’s firmware on version 2.67 and newer.

OPC UA Connection parameters

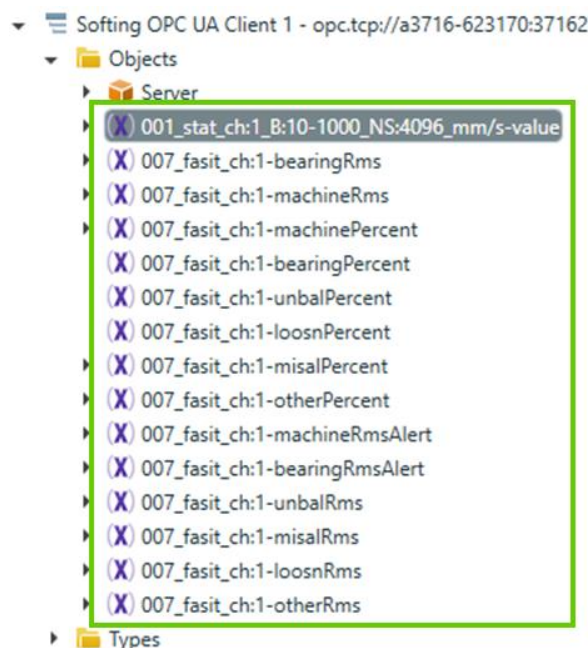
Login is anonymous. No username or password is used. You connect with following URL: <opc.tcp://<A3716/A3800 IP address>:37162>

Instead of IP address of online unit you can use online unit’s name (as in screenshot below).

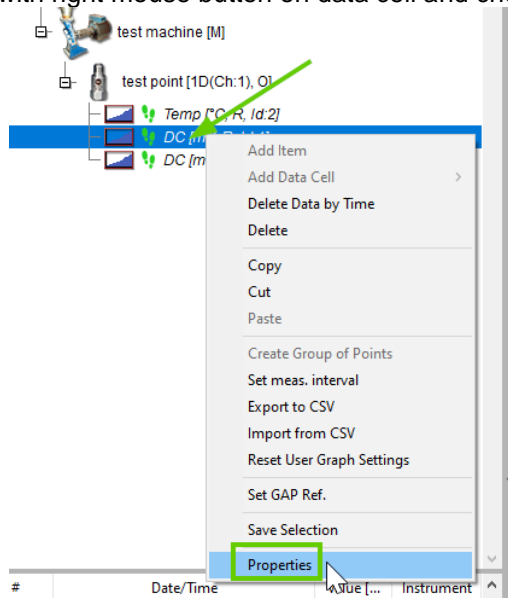


OPC Tags

Rows containing static values are ending with ‘-value’. There are names (OPC tags) like this by default:



OPC UA tag is parameter you can change in DDS based on your preferences. You can find it in Properties of data cell. Click with right mouse button on data cell and choose properties (see below).



Pick 'Online' tab and scroll down to 'Other'.

