

## Analog Outputs on a recordum airpointer

### Hardware

Advantech ADAM 4025 Modules can be used to add analog outputs to the airpointer. Each module supports 4 analog outputs, each are used to supply 4-20mA. In the airpointer software the number of analog outputs is limited to 16. Additionally digital outputs can be controlled to supply status signals. Actually we support one failure status and one operational status per analog signal. The test was done with ADAM 4069 relays modules supplying 8 relays per module. Please be aware that these modules are too bulky to be mounted inside the airpointer, best praxis is to mount it close to the data system receiving the analog signals. For the connection to the airpointer just a standard RS232 cable is needed.

### Software

In the airpointer LinLog is the software responsible for external connected instrumentation. These could be meteorological sensors, PM monitors or ADAM modules. The other software involved is LinOut. This software is supplying data collected or measured in the airpointer to the outside world. The process to supply a signal to an analog output is working in the following way: LinOut is collecting the actual value of the signal from the software measuring the signal. The signal and its status bytes are checked and converted to a 0-100% value depending on the analog output range configured. The status signals are handled in the following way: As soon any failure status bit is set on a signal, FS status will be set. Checking the operational status of the signal, the BS status will be set as soon the unit is on internal zero or span or the maintenance mode is active. The analog value and the status information is send to LinLog and LinLog is setting the ADAM modules to the according outputs. The normal update cycle is 5 seconds.

### Configuration

#### Hardware

Mount your ADAM modules, including an RS232 to RS485 converter and a little power supply and wire them up. Use the Advantech ADAM-4000-500-Utility program to give each module a unique address. Note the address on the module for easier identification. Please be aware that LinLog will configure all analog outputs to 4-20mA!

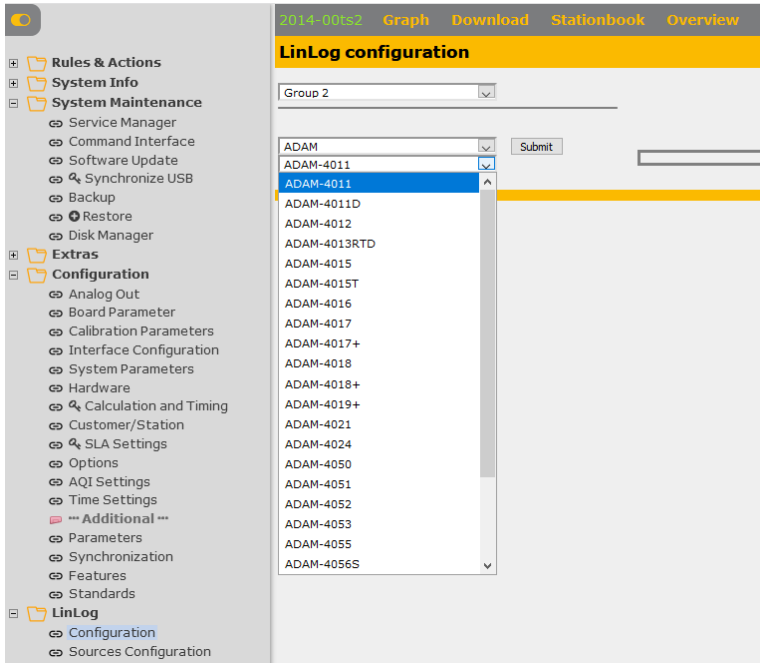


# Configure ADAM Modules in LinLog

Setup modules in LinLog

Chose ADAM and the module type form the list in Configuration -> LinLog -> Configuration.

*Hint: On some browsers it is necessary to choose a different brand first before you can click on ADAM!?*

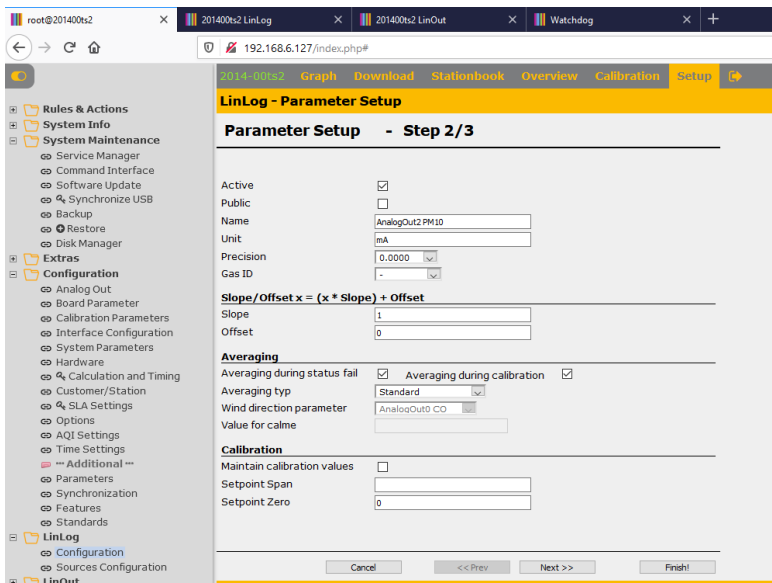


Setup all modules to the same COM port.

Even if it takes some minutes give each output signal a detailed name like: AnalogOut 2PM10

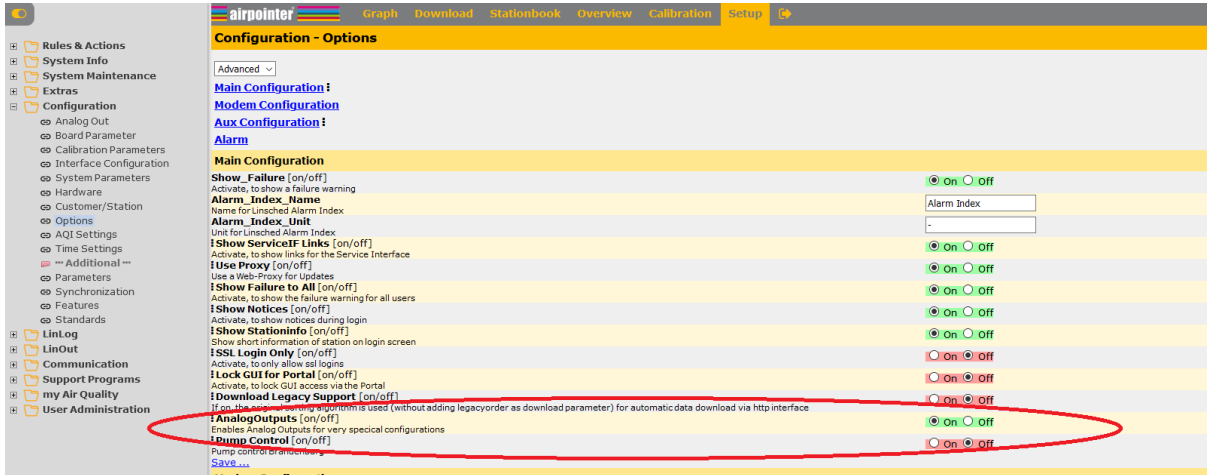
You can do this after clicking on the <Parameter Setup> button.

If you skip this step you can be sure that nobody remembers after a few year what signal is coming out here!



## Enable AnalogOut handling

Use Setup -> Configuration -> Options, enable "Advanced", find AnalogOutputs in Main Configuration and enable it. Press on <save>. A new entry "Analog Out" will appear, if not press <ctrl>F5 to reload your browser.



## Find Parameter IDs

It is mandatory that you understand the meaning of our id's to be able to setup the analog outputs. In the airpointer each signal has a unique id this is simply a number that is only used once in the airpointer. The LinSens is using fixed numbers between 1 and 8000, while LinLog is using numbers above 10000. To avoid the same id means different signals in the airpointers life after reconfiguration, a number is only used once. That means if you have configured an ADAM module, you remove it and add it again it will have new numbers as id! You can find a list with all parameters used in your system in Setup -> Configuration -> Parameters: Internal\_Id is the id we have to use now. Now you understand why you have added the detailed name, your ids are much easier to find now.

*Hint: You may wonder what greyed values are. This are values not used anymore, you can get rid of it by using Setup -> Configuration -> Synchronization*

ID	Internal Id	Name	Visible	Overview	Group	Parameter
109122	109122	AnalogOut0 CO [mA]	<input type="checkbox"/>	<input type="checkbox"/>	5	1
108972	108972	AnalogOut0 NO [mA]	<input type="checkbox"/>	<input type="checkbox"/>	4	1
109146	109146	AnalogOut0 Temp [mA]	<input type="checkbox"/>	<input type="checkbox"/>	6	1
109152	109152	AnalogOut1 [V]	<input type="checkbox"/>	<input type="checkbox"/>	6	2
108978	108978	AnalogOut1 NO2 [mA]	<input type="checkbox"/>	<input type="checkbox"/>	4	2
109128	109128	AnalogOut1 PM2.5 [mA]	<input type="checkbox"/>	<input type="checkbox"/>	5	2
109158	109158	AnalogOut2 [V]	<input type="checkbox"/>	<input type="checkbox"/>	6	3
108984	108984	AnalogOut2 NOx [mA]	<input type="checkbox"/>	<input type="checkbox"/>	4	3
109134	109134	AnalogOut2 PM10 [mA]	<input type="checkbox"/>	<input type="checkbox"/>	5	3
109164	109164	AnalogOut3 [V]	<input type="checkbox"/>	<input type="checkbox"/>	6	4
108990	108990	AnalogOut3 O3 [mA]	<input type="checkbox"/>	<input type="checkbox"/>	4	4
109140	109140	AnalogOut3 SO2 [mA]	<input type="checkbox"/>	<input type="checkbox"/>	5	4

ID	Internal Id	Name	Visible	Overview	Group	Parameter
109170	109170	DigitalOut0 NOX FS [digit]	<input type="checkbox"/>	<input type="checkbox"/>	7	1
109218	109218	DigitalOut0 PM2.5 FS [digit]	<input type="checkbox"/>	<input type="checkbox"/>	8	1

## Configure Analog Out

The screenshot shows the 'airpointer' web interface. The top navigation bar includes 'Graph', 'Download', 'Stationbook', 'Overview', 'Calibration', and 'Setup'. The left sidebar contains a tree view with categories like 'Rules & Actions', 'System Info', 'System Maintenance', 'Extras', 'Configuration', 'LinLog', 'Communication', 'Support Programs', and 'User Administration'. The main content area is titled 'Configuration - Analog Out' and features a dropdown menu set to 'Advanced'. Below this, there is a list of links for 'Analog Out 1' through 'Analog Out 16'. The configuration table for 'Analog Out 1' is as follows:

Parameter	Value	Constraint
AnalogOut_01_note	O3 Ausgang	
AnalogOut_01_id	108648	[0 ≤ value ≤ ]
AnalogOut_01_min	0	
AnalogOut_01_max	400	
AnalogOut_01_out_id	108990	[0 ≤ value ≤ ]
AnalogOut_01_BS_id	109200	[0 ≤ value ≤ ]
AnalogOut_01_FS_id	109194	[0 ≤ value ≤ ]

For each analog out put you have to setup a set of 7 parameters.

AnalogOut\_xx\_note: Type in a header to this output like, "Ozone" or "O3 Ausgang" that's O3 Output in German.

AnalogOut\_xx\_id: That is the Internal\_id of the signal you want to be shown as analog output.

AnalogOut\_xx\_min: This is the lowest point of your analog output range, in most cases it is 0.

AnalogOut\_xx\_max: This is the highest point of your analog output range.

AnalogOut\_xx\_out\_id: That is the Internal\_id of the analog output you want to use. (on the ADAM 4025)

AnalogOut\_xx\_BS\_id: That is the Internal\_id of the digital output you want to use for operational status.

AnalogOut\_xx\_FS\_id: That is the Internal\_id of the digital output you want to use for failure status.

Best praxis is to have two browser windows open, one with this setup and the other with the parameter list. In this way you can copy and paste the id's.

## Check the setup

Of course at the end you need to measure the current output for each signal, but using the service interface of LinOut and LinLog can be a big help:

**LinOut Service Interface, normal Operation**  
[Home](#) [Actual](#) [APP Interface](#) [AnalogOut](#) [Software](#) [RS232](#)

**Analog Out Data**

n	Note	Parameter	Value	Unit	Time	Analog range	percent out	mA out	FS out	BS out
0	O3 Ausgang	O3	-2.2	ppb	20201015 14:21:50	0.0 - 400.0 ppb	-0.6 %	3.91 mA	0	0
1		CO	0.6	ppm	20201015 14:21:50	0.0 - 20.0 ppm	3.0 %	4.48 mA	0	0
2		SO2	183.5	ppb	20201015 14:21:50	0.0 - 1000.0 ppb	18.4 %	6.94 mA	0	0
3		NO	108.0	ppb	20201015 14:21:50	0.0 - 1000.0 ppb	10.8 %	5.73 mA	0	0
4		NO2	1636.1	ppb	20201015 14:21:50	0.0 - 1000.0 ppb	100.0 %	20.00 mA	0	0
5		NOx	272.0	ppb	20201015 14:21:50	0.0 - 1000.0 ppb	27.2 %	8.35 mA	0	0
6		PM2.5	88.7	µg/m³	20201015 14:21:50	0.0 - 1000.0 µg/m³	8.9 %	5.42 mA	0	0
7		PM10	150.5	µg/m³	20201015 14:21:50	0.0 - 1000.0 µg/m³	15.1 %	6.41 mA	0	0
8	Air Temperature	Air Temp	10.9	°C	20201015 14:21:50	-20.0 - 80.0 °C	10.9 %	5.74 mA	0	0

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20201015 14:21:53

(Luckily this are generated test data only and not the air I am sitting in 😊)

**LinLog Service Interface, normal Operation**  
[Home](#) [Raw values](#) [Actual](#) [Calibration](#) [Average 1](#) [Average 2](#) [Average 3](#) [Software](#) [RS232](#) [USB List](#)

**Actual Values Grp4 ADAM-4024**

Number	Parameter	Value	Value_all	Unit	Status: BS-FS-SS	Time	ID
G4P1	AnalogOut0 NO	5.7072	-	mA	0 0 0	20201015 14:24:51	0
G4P2	AnalogOut1 NO2	20.0000	-	mA	0 0 0	20201015 14:24:51	0
G4P3	AnalogOut2 NOx	8.3232	-	mA	0 0 0	20201015 14:24:51	0
G4P4	AnalogOut3 O3	3.9152	-	mA	0 0 0	20201015 14:24:51	0

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20201015 14:24:51