



-power in control



## AWC 500 Getting started



DEIF A/S · Friesenborgvej 33 · DK-7800 Skive  
Tel: +45 9614 9614 · Fax: 9614 9615  
Info@deif.com · [www.deifwindpower.com](http://www.deifwindpower.com)

Language: EN-GB

# Table of Contents

1. Revision .....	1
2. Configuring the AWC 500 .....	2
2.1. Software .....	2
2.2. Power connection .....	3
2.3. Establishing programming connection .....	3
2.4. Access via Ethernet port .....	3
3. Programming .....	12
3.1. IEC61131-3 (CODESYS) programming .....	12
4. Additional configuration .....	12
4.1. Changing advanced network configuration.....	12
4.2. Changing network configuration via SSH .....	13
4.3. Changing password .....	14
4.4. Setting to local time and date .....	14
4.5. Accessing via the Service port .....	15
4.6. Update firmware .....	19
4.7. View logs.....	21
4.8. Create factory reset .....	22

## 1. Revision

Revision	Author	Date	Description
D	LVI	2013-06-21	Updated to PCM5·1 OS 2.0.0.4
E	HCH	2017-10-24	Updated to PCM5·1 OS 3.0.3.0 and PCM5·2 OS 1.4.0.0
F	LVI	2018-03-05	Updated to PCM5·2 OS 2.0.0.0
G	LVI	2018-04-11	References and descriptions related to PCM5·1 removed

## 2. Configuring the AWC 500

### 2.1. Software

#### 2.1.1. Download the AWC 500 software from the DEIF FTP server

AWC 500 CODESYS and C/C++ Development packages, firmware, PC tools and drivers can be downloaded from the DEIF FTP server:

<ftp://support.deif.com> under /AWC\_500.

To get access to the FTP server, please contact DEIF AWC 500 support via email:

**[awc500support@deif.com](mailto:awc500support@deif.com)**

#### 2.1.2. System requirements

The general system requirements for the development PC to install the Development packages, PC tools and drivers are:

- Microsoft Windows 7 64 bit version
- Microsoft Windows 8 64 bit version
- Microsoft Windows 10 64 bit version (Recommended)

As the AWC 500 supports SSH (Secure Shell) and SFTP (Secure File Transfer Protocol) as basic communication protocols, it can be access from any system supporting these protocols.

#### 2.1.3. PC tools

The tools WinSCP and PuTTY are used throughout the documentation for configuring the AWC 500. Both WinSCP and PuTTY are located on the DEIF FTP server under /AWC\_500/PC tools.

##### **PuTTY — SSH client (Linux command shell)**

The free tool PuTTY can be recommended for Linux command shell access (SSH communication). Its official web-site is: <http://www.chiark.greenend.org.uk/~sgtatham/putty/>

##### **WinSCP – SFTP client (for file transfer)**

For secure file transfer (SCP or SFTP communication) e.g. for configuration as well as updating software the free tool WinSCP can be recommended. The official web-site is: <http://winscp.net>

## 2.2. Power connection

To program the AWC 500, attach 24 V (18...36 V) power supply to the Power supply terminals of the PCM/PDM module. See the **Installation instructions** document for details.



The AWC 500 system software is operational within 10 seconds from power on. The AWC 500 is tolerant to sudden power off by design, the file system is robust to this and persistent parameters are automatically stored in nonvolatile memory. No special shutdown procedure is required.

## 2.3. Establishing programming connection

The AWC 500 is configured and programmed via the Ethernet port on the PCM5-2 module – both for development (direct access) and when installed on site (remote). Configuration is mainly performed via the AWC 500 webpage. Special configuration can be performed by editing configuration files stored on the AWC 500 file system, accessed via the SSH (Linux command shell) or SFTP (file transfer).

For service purposes by DEIF or direct access to the AWC 500 in special cases, the Service port is used for SSH (Linux command shell) access via USB serial communication.

## 2.4. Access via Ethernet port

The PCM module must be connected to your development computer via an Ethernet cable directly or an Ethernet network. The PCM default only offers secure connections.

### 2.4.1. Default IP configuration

By default, the AWC 500 is supplied with the following network configuration (static IP address) on Ethernet port 1 (eth1):

IP:	192.168.20.13
Mask:	255.255.255.0
Gateway:	192.168.20.12

Ethernet port 2 (eth2) is by default configured for DHCP.

### 2.4.2. Default user and password

The AWC 500 is by default supplied with one user account:

	user name	passwor d
Administrator	"root"	"deif7800"

It is possible to add additional users.

Make sure your PC has been set up to same subnet range e.g. by giving your computer the IP 192.168.20.2:

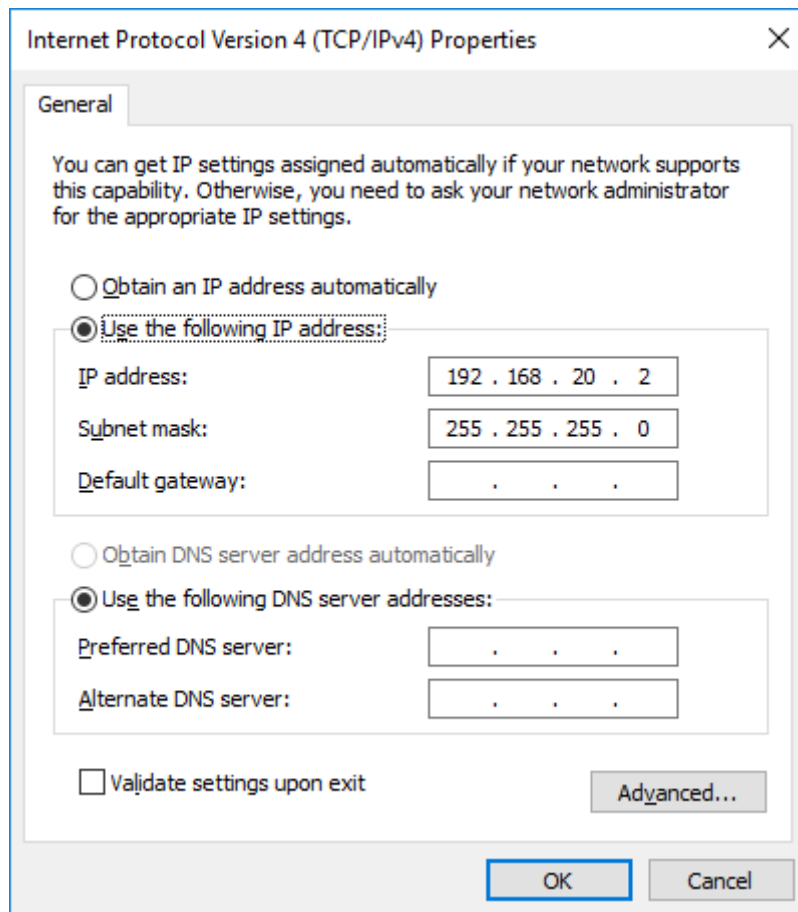


Figure 2.1: An example of a network configuration from a development computer configured to communicate with an AWC 500 system.

### 2.4.3. Testing connection

To test the connection open a webbrowser and enter the IP (<https://192.168.20.13>) of the AWC 500. This will show the AWC 500 webpage:

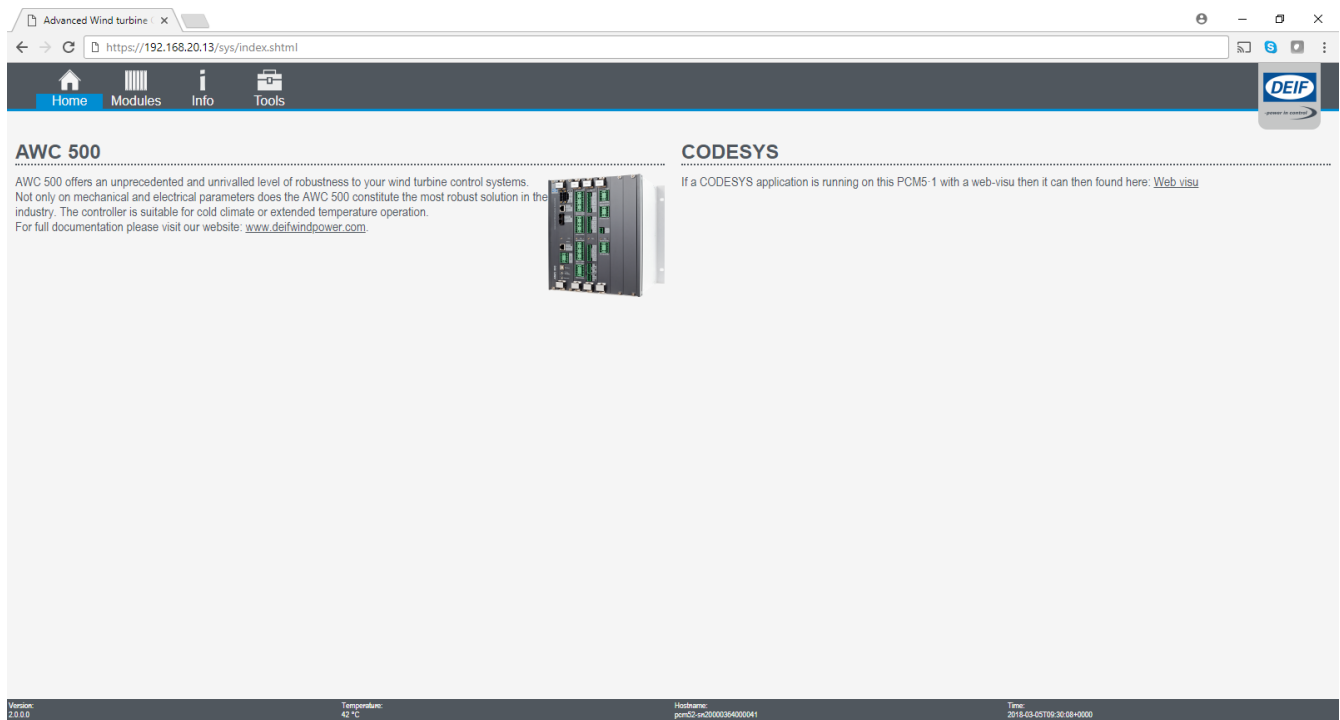


Figure 2.2: AWC 500 webpage to perform configuration of the AWC 500 system

## 2.4.4. View modules

Press the "Modules" and an overview of the available modules are shown.

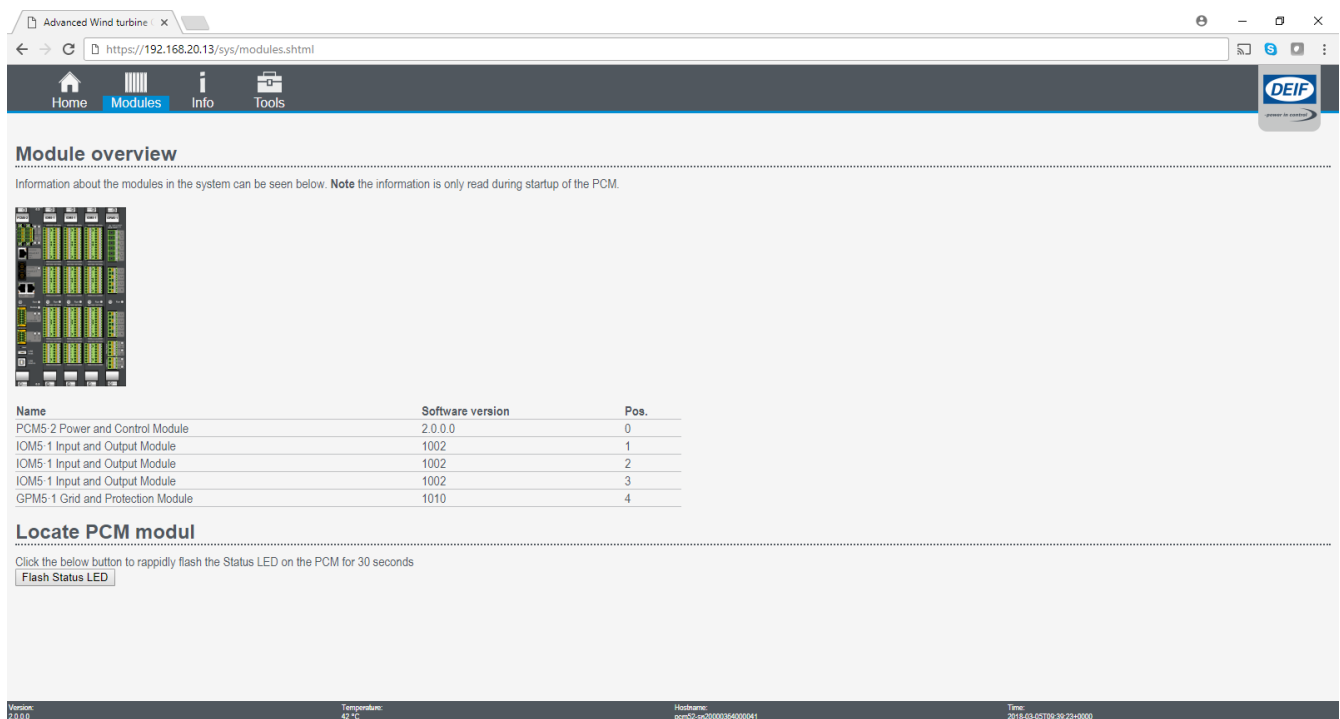


Figure 2.3: The module list gives an overview of EtherCAT modules found and firmware of each module.

## 2.4.5. View information

Press the "Info" and a summary of system information is shown.

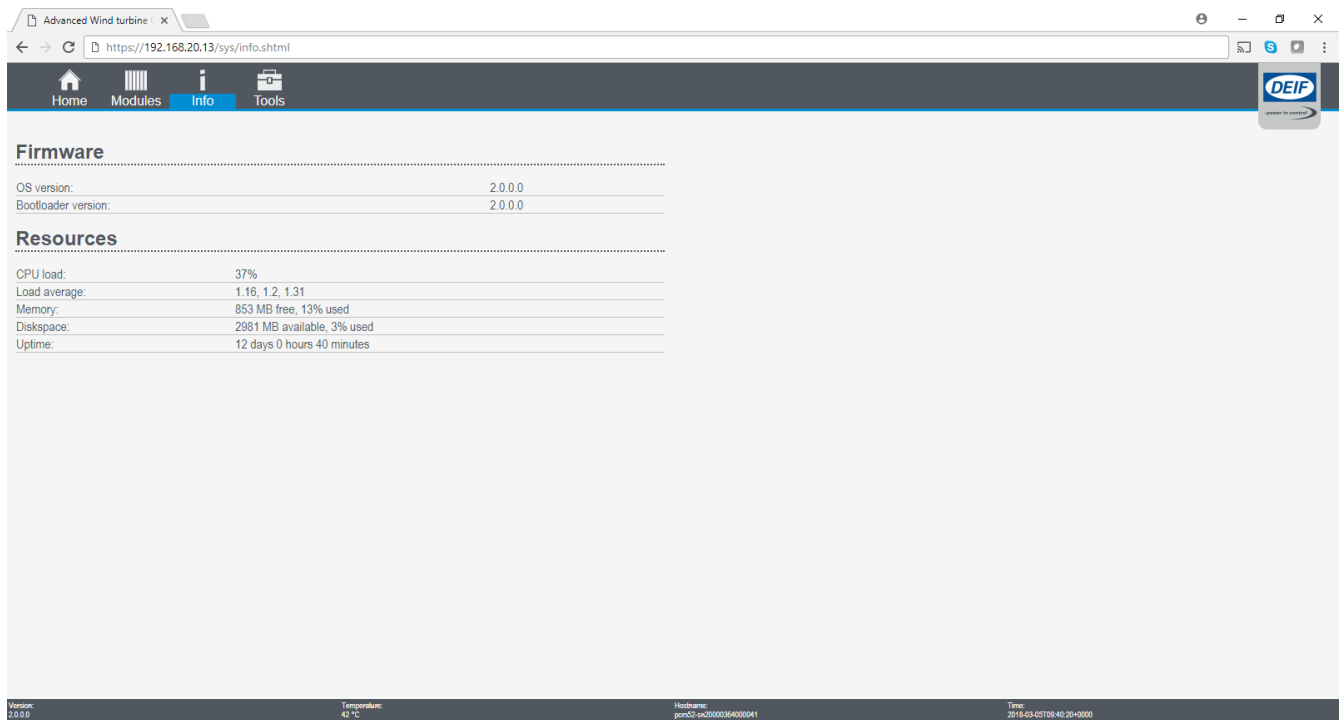


Figure 2.4: Summary of system information.

## 2.4.6. View network configuration

Under "Tool→Network configuration" the controller ip and gateway address etc. can be viewed and optionally changed. See the sections "Changing advanced network configuration" for further information.

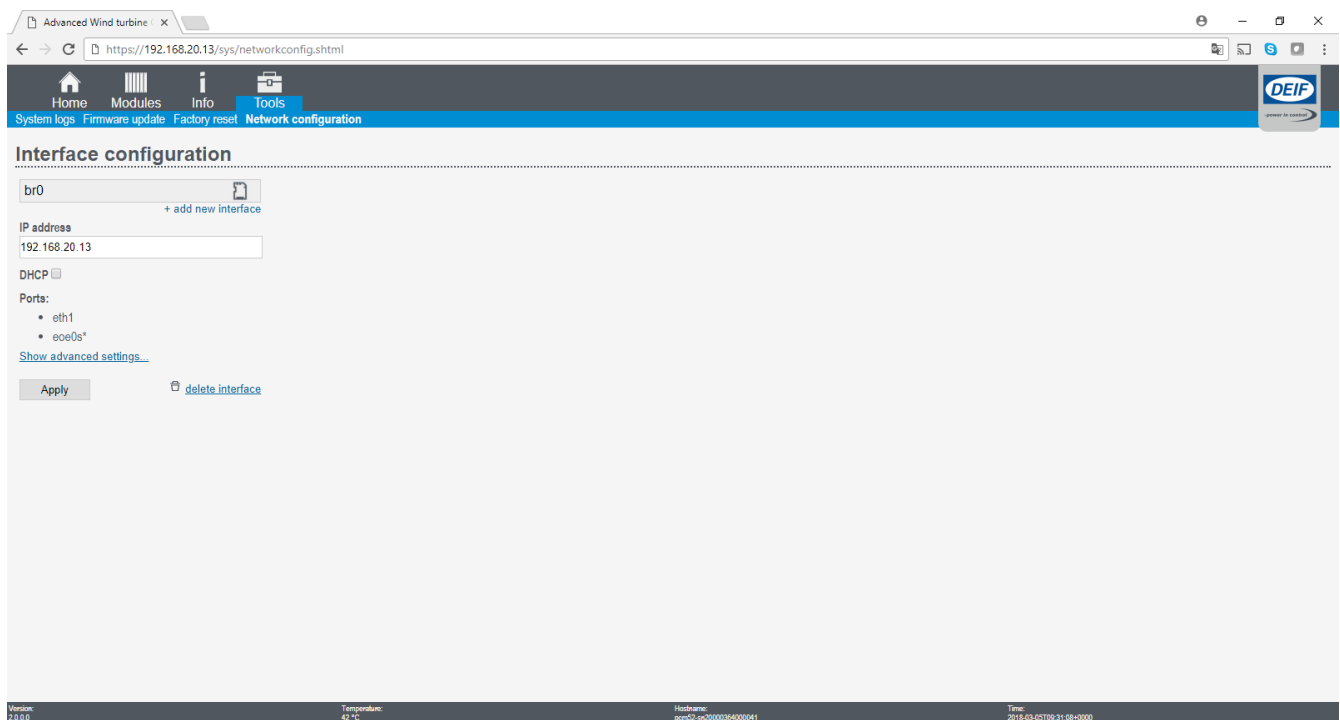
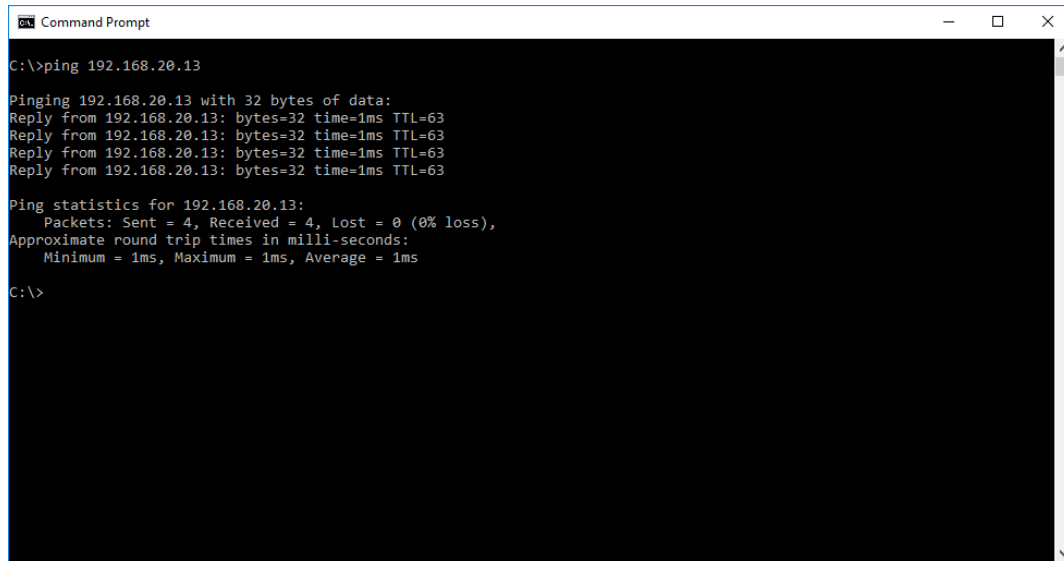


Figure 2.5: Network configuration.

### 2.4.7. Testing connection with "ping"

The connection can be tested by sending a ping to the AWC 500:



```
Command Prompt
C:\>ping 192.168.20.13

Pinging 192.168.20.13 with 32 bytes of data:
Reply from 192.168.20.13: bytes=32 time=1ms TTL=63
Reply from 192.168.20.13: bytes=32 time=1ms TTL=63
Reply from 192.168.20.13: bytes=32 time=1ms TTL=63
Reply from 192.168.20.13: bytes=32 time=1ms TTL=63

Ping statistics for 192.168.20.13:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

Figure 2.6: Use "ping" to test the communication to AWC 500.

If no connection, please check the Ethernet cable, power to the AWC 500, firewall settings of the PC, alternatively the AWC 500 may have been configured with another ip address, than the default. Refer to section "Accessing via Service port - View existing IP address" about this.

If the network settings are OK, then continue with the section "Programming".

Continue below to see how to make connection to the AWC 500 from via the SSH client (PuTTY) or the SFTP client (WinSCP).

### 2.4.8. Create connection with PuTTY



Open PuTTY

In the PuTTY Configuration windows enter IP address, ensure Connection type is SSH, and port is 22, then open:

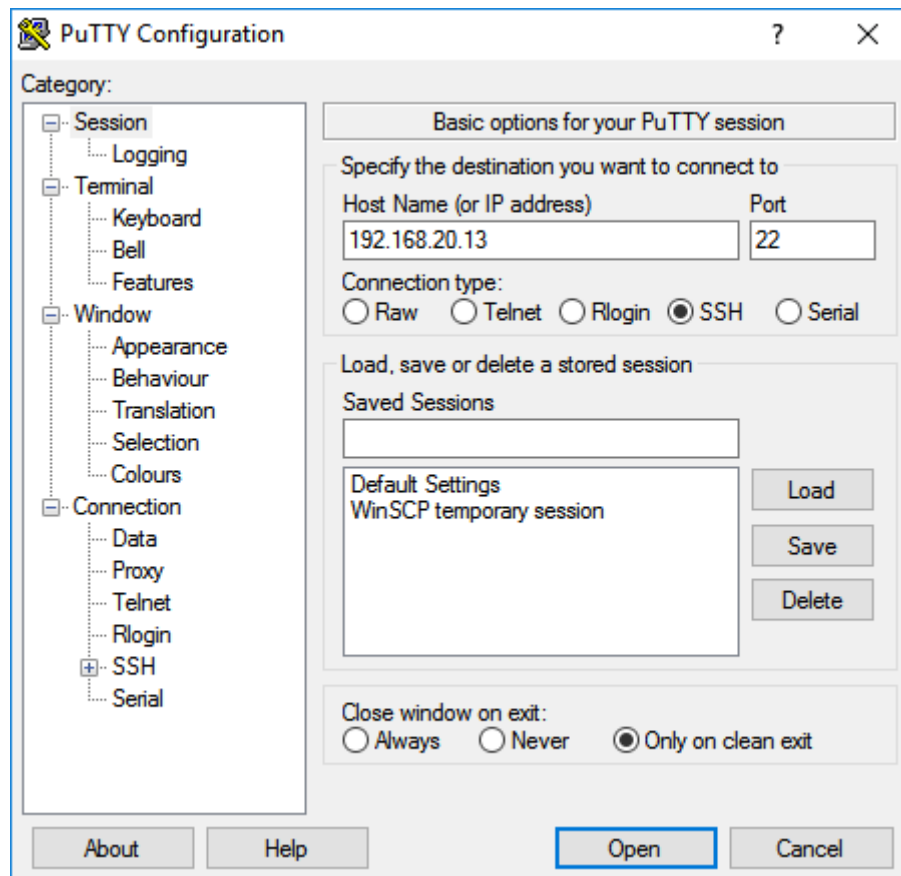


Figure 2.7: An example of the SSH configuration needed in PuTTY to interact with the PCM.

This opens the Linux command shell, prompting for user name –first type "root" [ENTER] – followed by password – type "deif7800" [ENTER] – to log in:

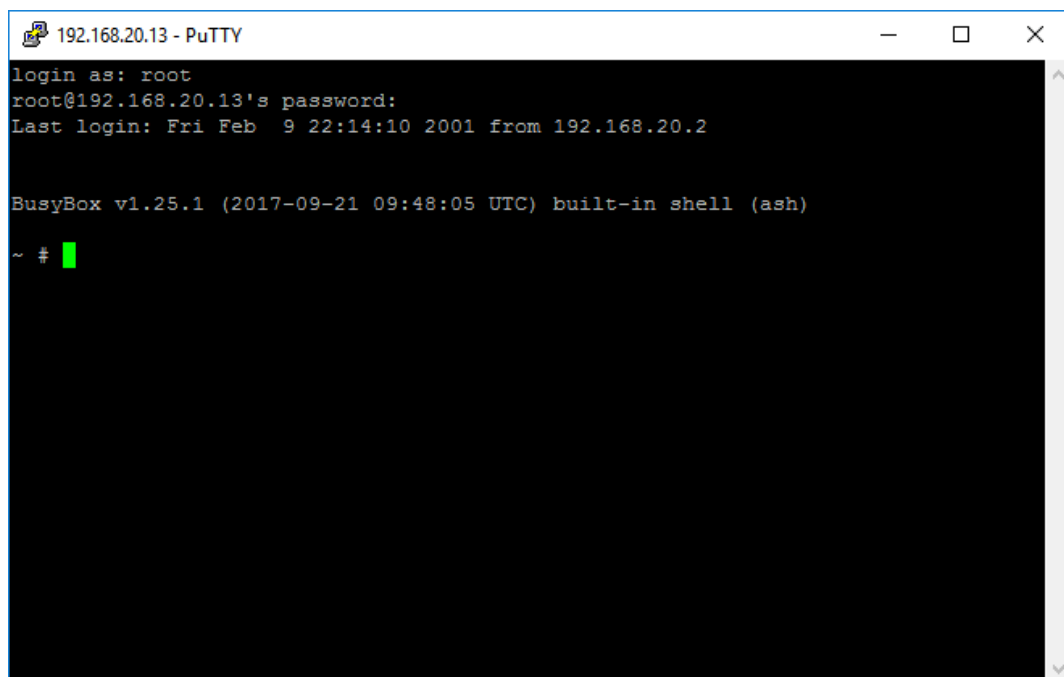


Figure 2.8: Linux command shell

### 2.4.9. Create connection with WinSCP



Open WinSCP

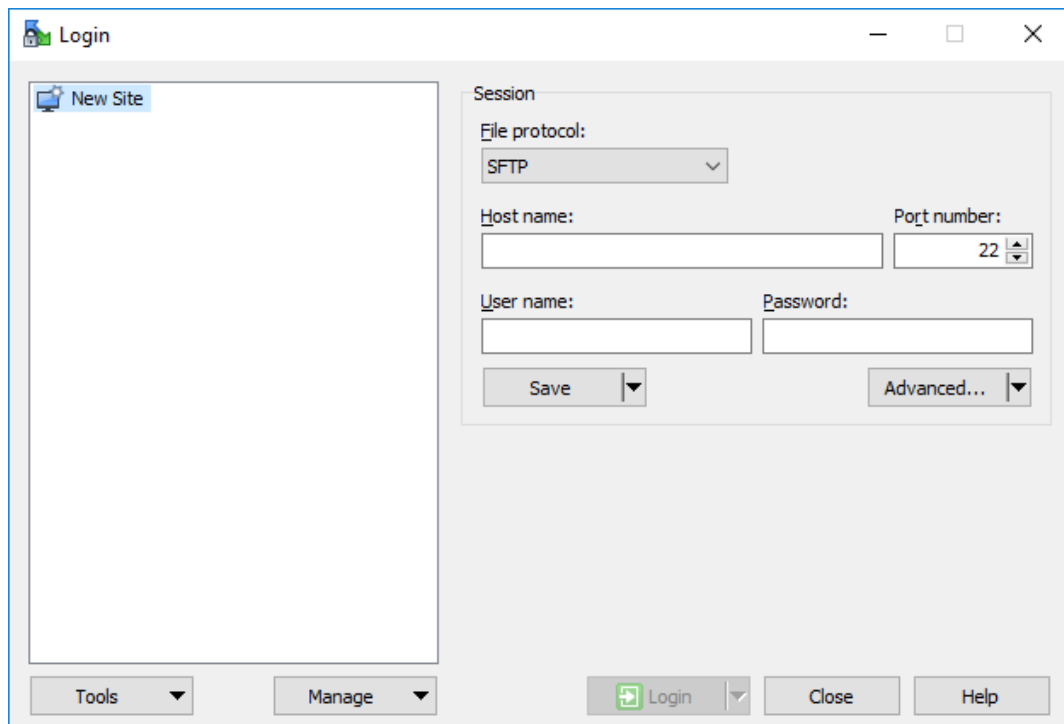


Figure 2.9: An example of the SFTP configuration needed in WinSCP to interact with the PCM.



**When using file transfer, make sure transfer to temporary filenames is disabled.**

To disable file transfer to temporary filenames in WinSCP, go to "Tool", select "Preferences" and click on "Endurance":

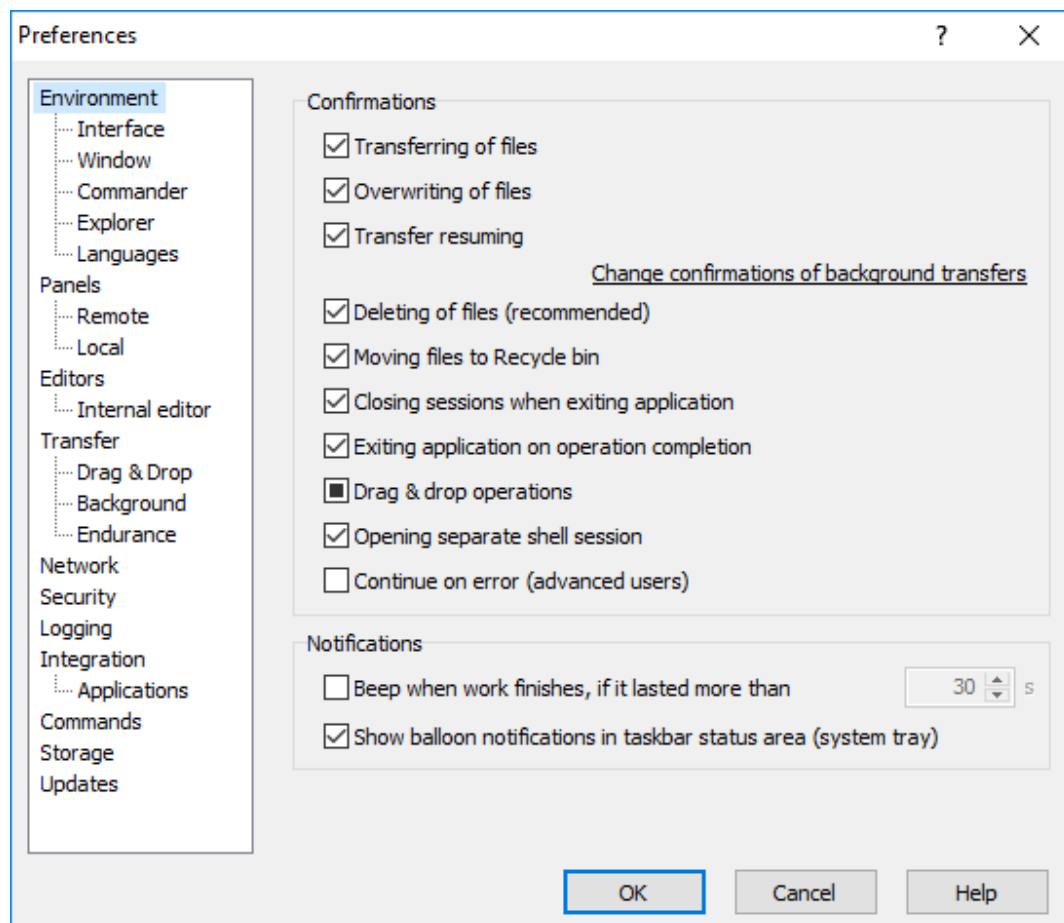


Figure 2.10: Change preferences in WinSCP

Then disable transfer to temporary file:

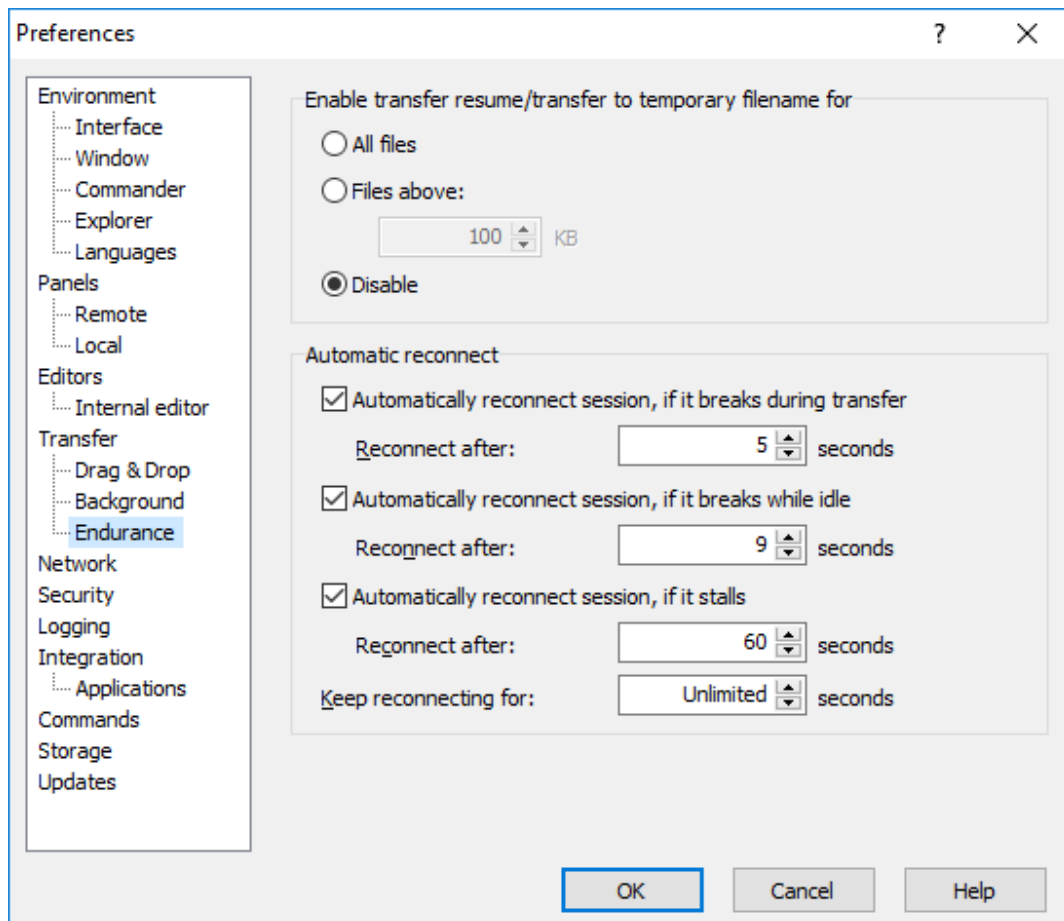


Figure 2.11: Disabling transfer to temporary files in WinSCP

Creating a session to AWC 500 go to "Session" and fill in "Hostname", "User name" and "password". Save ("Save...") the session for later or press "Login":

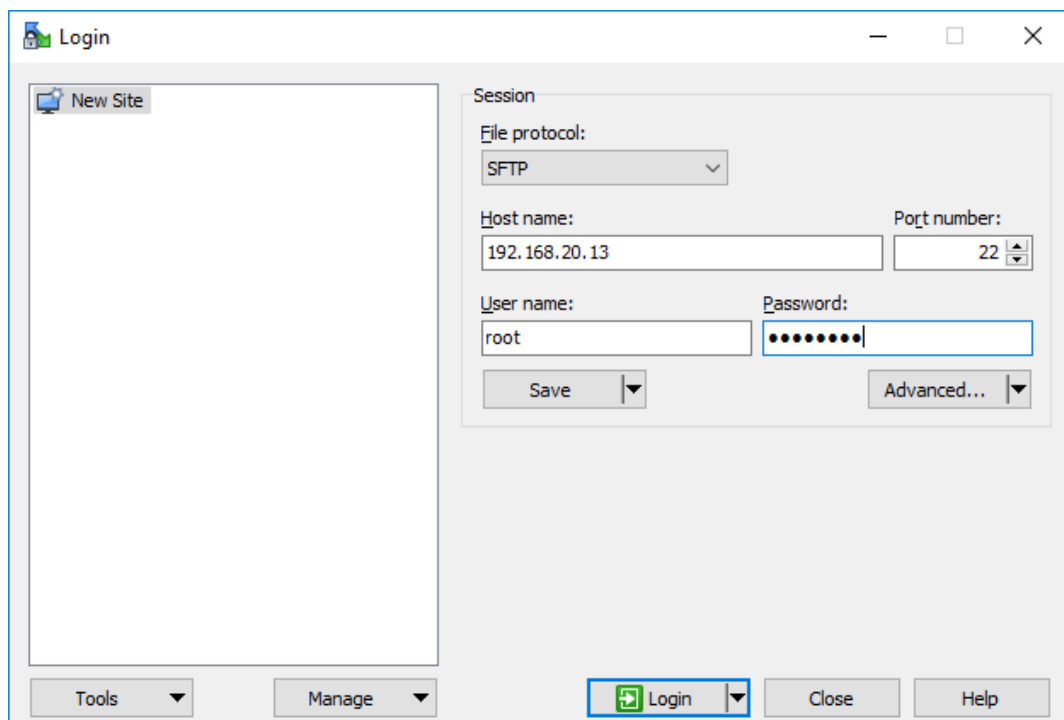


Figure 2.12: Creating a session in WinSCP

This will open a session:

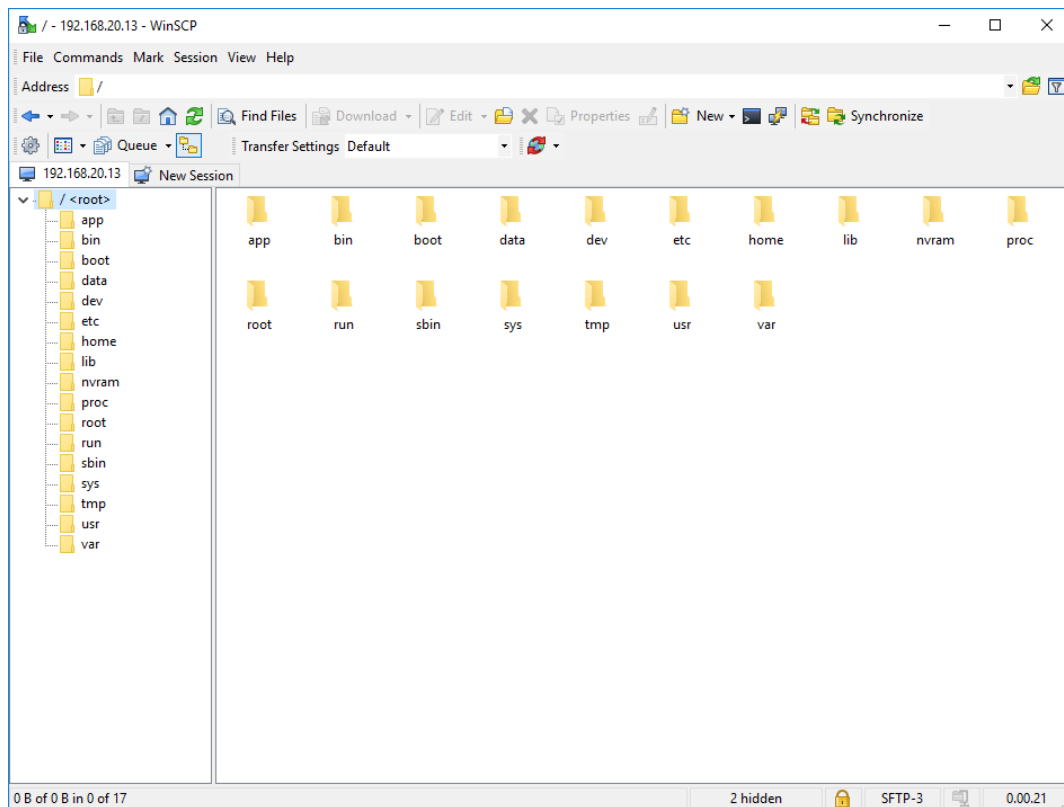


Figure 2.13: Access to the files system of AWC 500 via SFTP with WinSCP

## 3. Programming

### 3.1. IEC61131-3 (CODESYS) programming

#### 3.1.1. Getting started with the AWC 500 and CODESYS

Please refer to the document:

**4189340814 AWC 500 CODESYS Development package** for a guide to installation of the AWC 500 CODESYS Development package and the first steps to get started using it.

#### 3.1.2. More about IEC61131-3 programming

More detailed description about the CODESYS programming system and the integration with AWC 500 can be found in the document:

**4189340738 AWC 500 IEC61131-3 programming**

## 4. Additional configuration

### 4.1. Changing advanced network configuration

Under "Tool→Network configuration" the network interface configurations for each port (eg. eth1 or eth2) or bridged connections between ports (eg. br0) can be adapted.

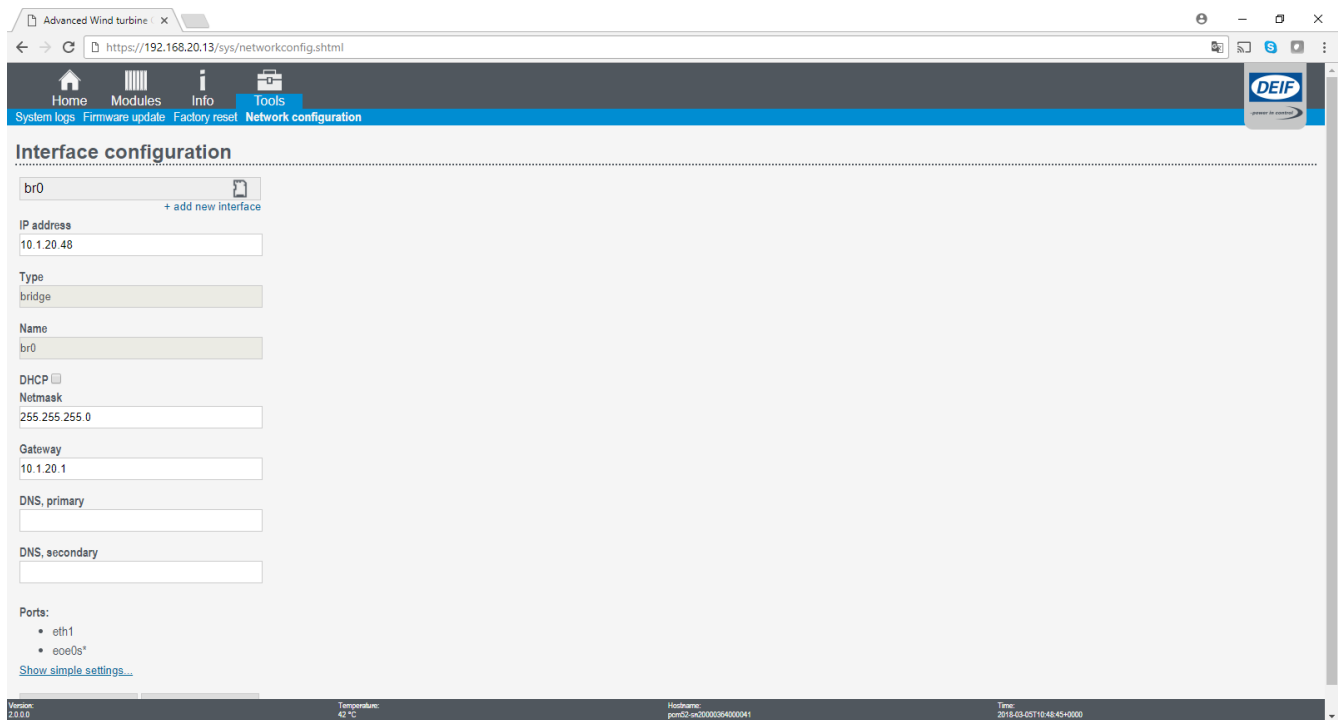


Figure 4.1: Network configuration.

## 4.2. Changing network configuration via SSH

It is highly recommended to use the AWC 500 webpage to configure the network settings. However the SSH command `difconfig` is supported by all OS versions 1.5.0.0 and above for PCM5-2.

### 4.2.1. Reset IP to factory default

```
difconfig reset
```

This script will delete interface file and switch to factory default.

Example of use:

```
~ # difconfig reset
```

Reboot the OS to apply the new configuration.

### 4.2.2. Change IP to DHCP

```
difconfig add <name> --dhcp
```

This script will set the network configuration for eth1 or eth2 to dhcp client mode. Commonly, eth1 is set for static IP and eth2 is set for DHCP.

Example of use:

```
~ # difconfig add eth2 -dhcp
```

Network configuration of eth2 changed to DHCP

Reboot the OS to apply the new configuration

To check the change, issue:

```
~ # difconfig read eth2
```

```
Name : eth2
Type : dhcp
IP : 0.0.0.0
Netmask: 0.0.0.0
```

### 4.2.3. Change static IP address

```
difconfig add <name> --ipaddr <addr> --netmask <addr> --gateway <addr>
```

This script will set the network configuration to use static ip.

Example of use:

```
~ # difconfig add eth1 --ipaddr 192.168.20.13 --netmask 255.255.255.0
-gateway 192.168.20.1
```

To check the changes, issue:

```
~ # difconfig read eth1
Name : eth1
Type : static
IP : 192.168.20.13
Netmask: 255.255.255.0
Gateway: 192.168.20.1
```

### 4.2.4. Changing hostname

By default the hostname consists of the serialnumber of the PCM5-2. To change it create a file named hostname in /data/sysconf containing the new name.

## 4.3. Changing password

The user has the full responsibility for the security level of the AWC 500 system, but it is highly recommended to change the password before putting the systems into a production environment. Thus to change password establish a connection to the PCM:

Use "passwd" to change the "root" password:

Root:

```
~ # passwd
Changing password for root
New password: [Typing new password]
Retype password: [Retype the password]
Password for root changed by root
```

### 4.4. Setting to local time and date

When supplied the AWC 500 has UTC time as default time. The time in the unit can both be set via the command shell, or via NTP (Network time protocol). See the Operative system software document for details on setting up NTP.

Set the date and time with the following command:

```
date [yyyymmddHHMM]
```

Display the data with following command:

```
date
```

Write the current time to the HW RTC, this is done automatically on reboot and ones each hours.

```
hwclock -w
```

Example:

```
~ # hwclock -r
Thu May 12 09:53:48 2011 0.000000 seconds
~ # date 201105120954
Thu May 12 09:54:00 UTC 2011
~ # date
Thu May 12 09:54:03 UTC 2011
~ # hwclock -w
~ # hwclock -r
Thu May 12 09:54:11 2011 0.000000 seconds
~ #
```

## 4.5. Accessing via the Service port

To configure the AWC 500 via the Service port, the development PC is connected via Standard USB-B cable.



- The USB driver is automatically installed from Windows Update, when connecting the USB cable to the AWC 500. If no connection to Windows Update is available the driver can be manually installed.\*

### 4.5.1. Manual installation the AWC 500 USB serial driver

The USB serial driver for Microsoft Windows 7, 8 and 10 is available for download at the DEIF FTP Server:

AWC\_500/PC tools/USB\_Service\_Port\_Driver/CP210xVCPInstaller\_x64.exe

### 4.5.2. Create connection to the Service port

Use a "terminal program" for the serial connection. The default communication parameters are:

Speed:	115,200 bps
Data bits:	8
Stop bits:	1
Parity:	None
Flow control:	None

In the following the connection using PuTTY is shown:

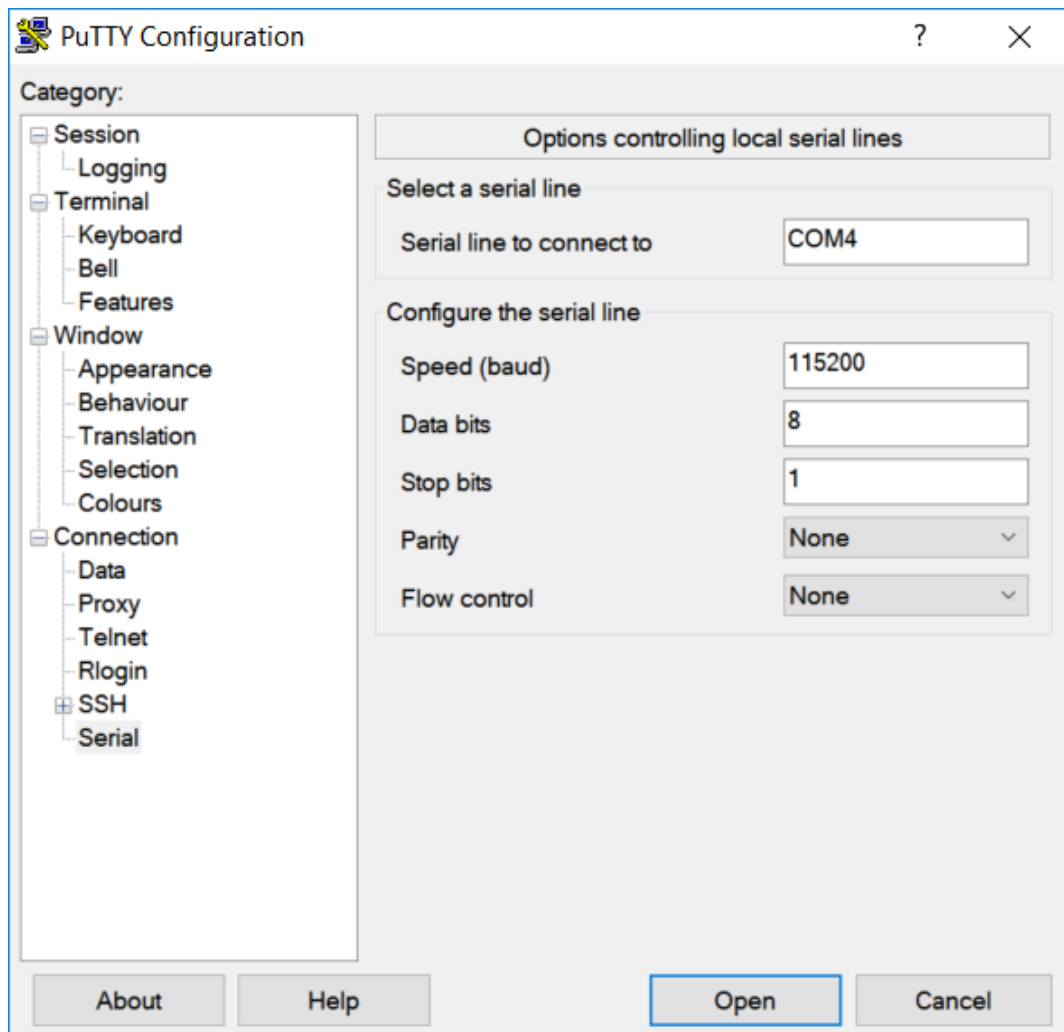


Figure 4.5: An example of the serial configuration needed in PuTTY to interact with the PCM.

Connect to the AWC 500 using the USB-B cable.

Open PuTTY and configure it to serial communication, see figure 4.6.

1. Select the serial radio button
2. Change the com port to match the USB-cable
3. Set communication speed
4. Click open

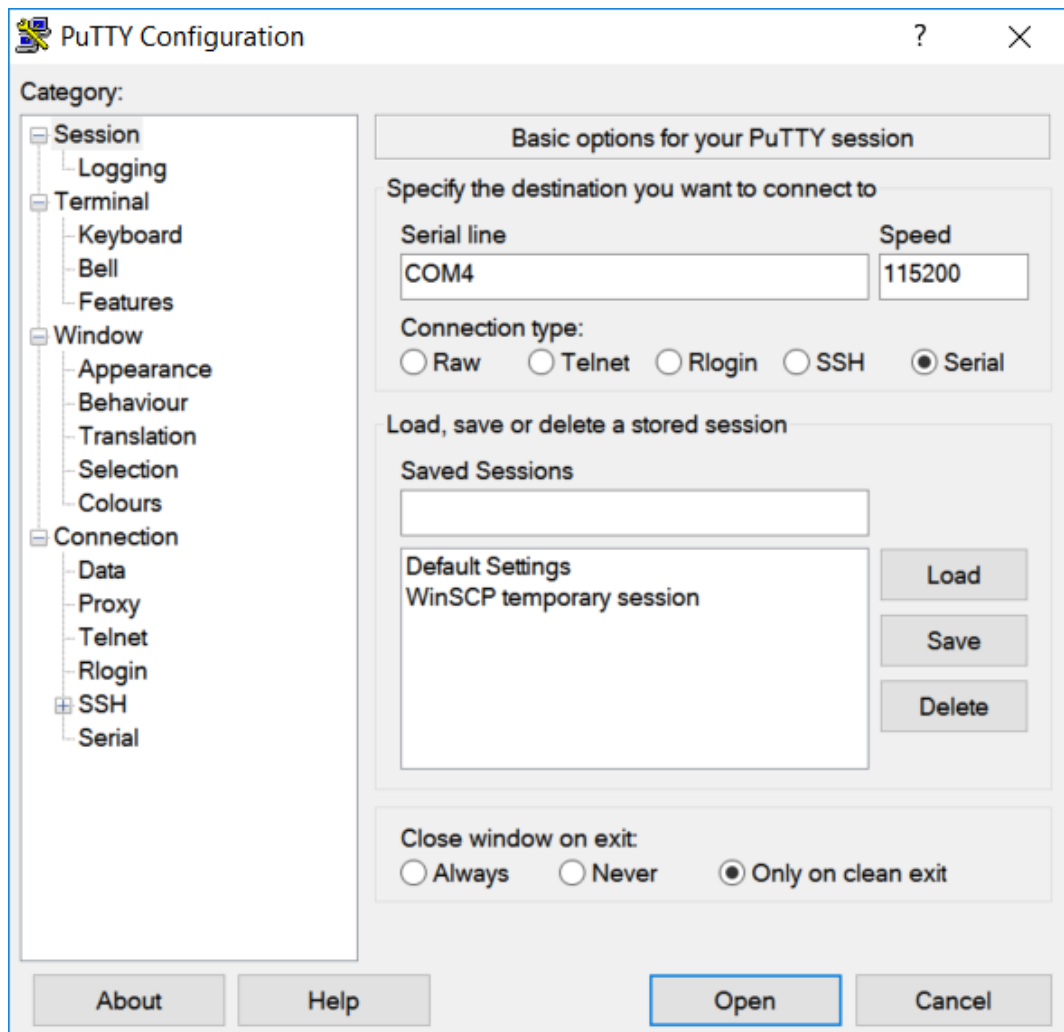


Figure 4.6: Configure PuTTY

In the newly opened terminal window enter root and press enter, and then enter root password and press enter again (default root password is: deif7800), Figure 4.7 shows AWC 500 after logging in as a root user.

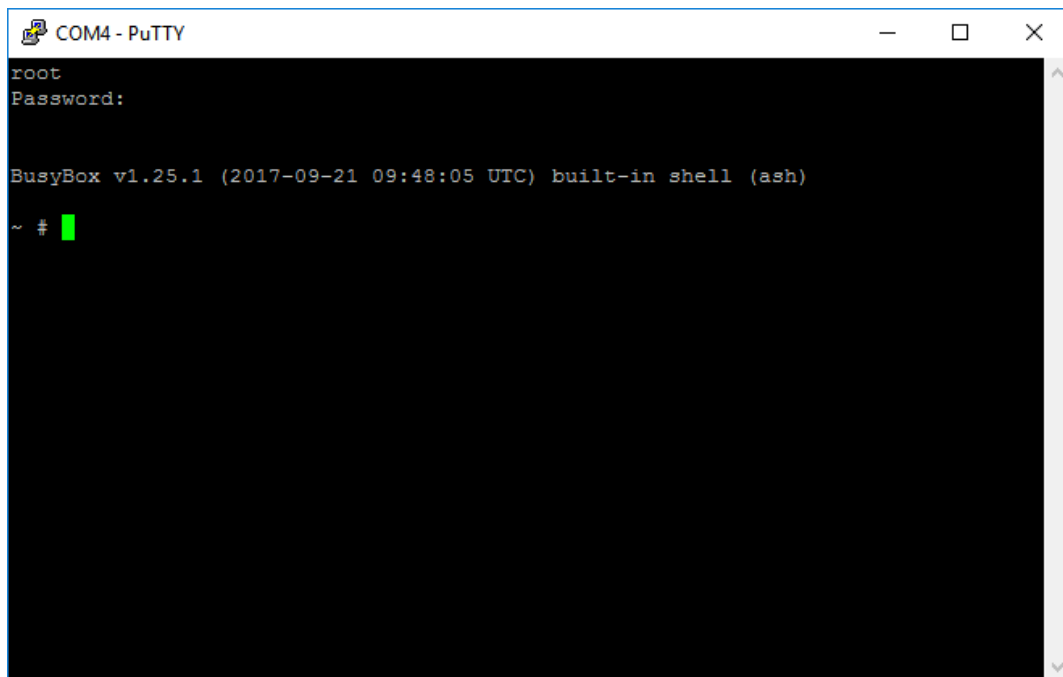


Figure 4.7: PuTTY terminal

### 4.5.3. View existing IP address

To view current IP address type:

```
ifconfig
```

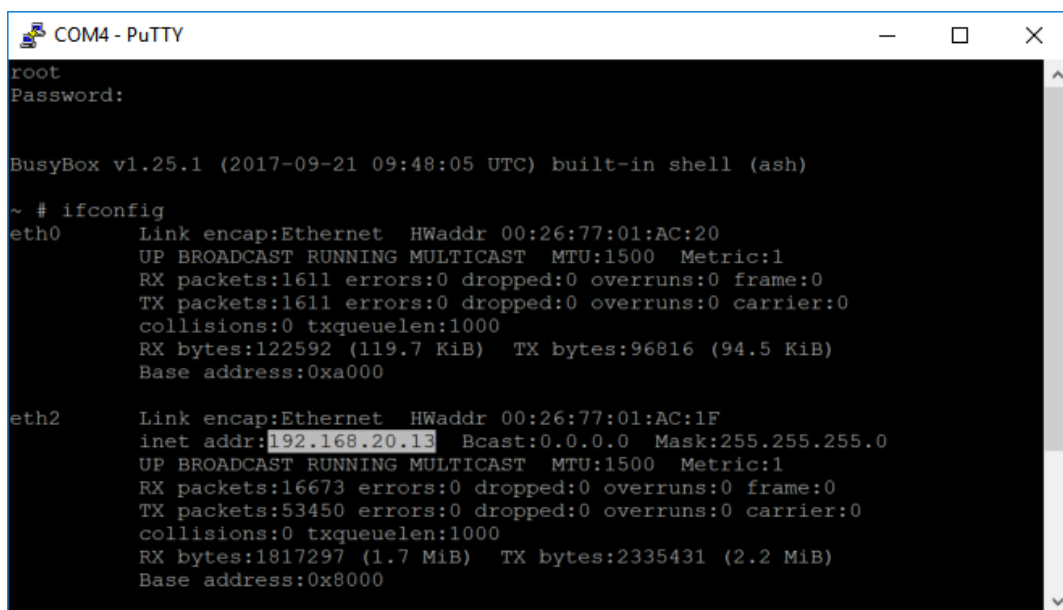


Figure 4.8: View current IP address

The AWC 500 can now be accessed via Ethernet on the above IP address.

To reset the IP address to factory default use the command:

```
difconfig reset (see section "Reset IP to factory default")
```

or

```
factory-reset -n
```

The AWC 500 then has a new IP-configuration. Reboot the AWC 500 for the changes to take effect.

To reboot the AWC 500, type: `reboot`

Wait 10 seconds and the AWC 500 is ready for connections at the default IP-address 192.168.20.13 and can be accessed via the Ethernet port.

## 4.6. Update firmware

The firmware can be updated via webpage. (<https://192.168.20.13>)  
Click "Tools→Firmware update" on the webpage.

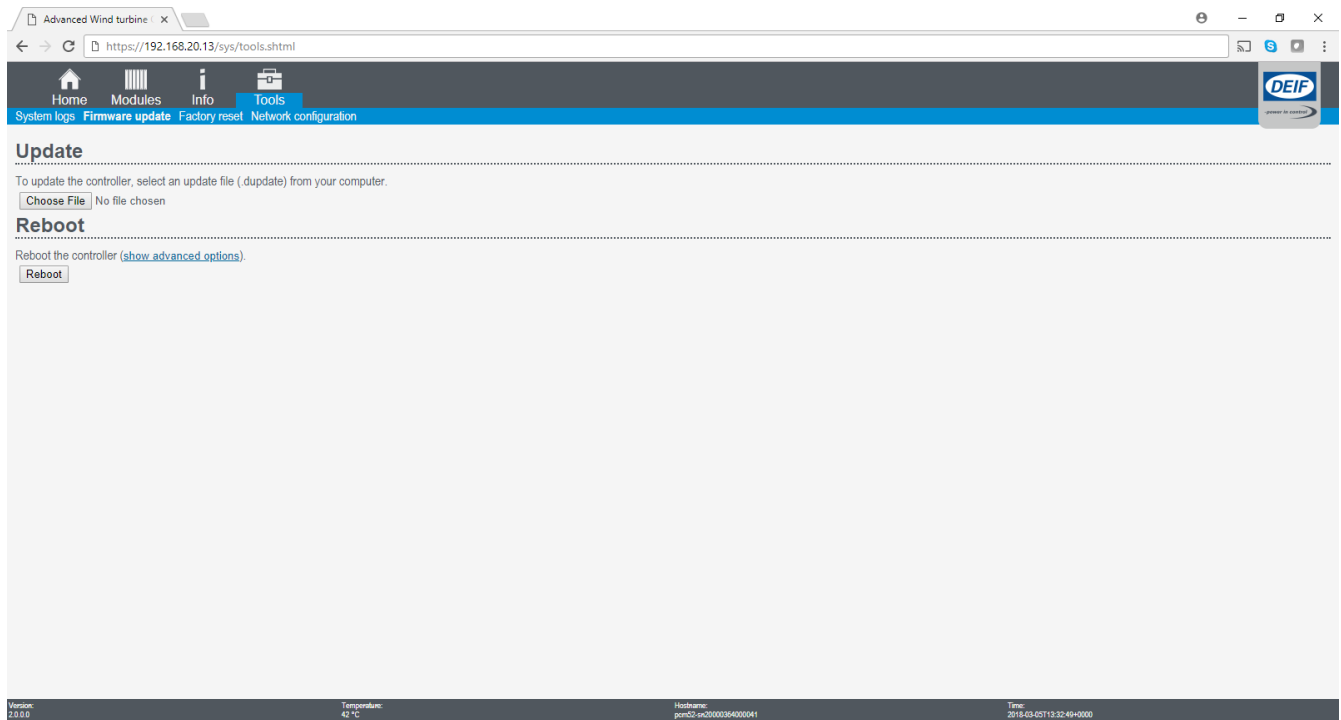


Figure 4.9: Firmware update page

Next, click "Choose File" button to select the dupdate file on the local PC. (E.g. DEIF-AWC-500-PCM52-bootloader-and-OS\_v2.0.0.0.dupdate)

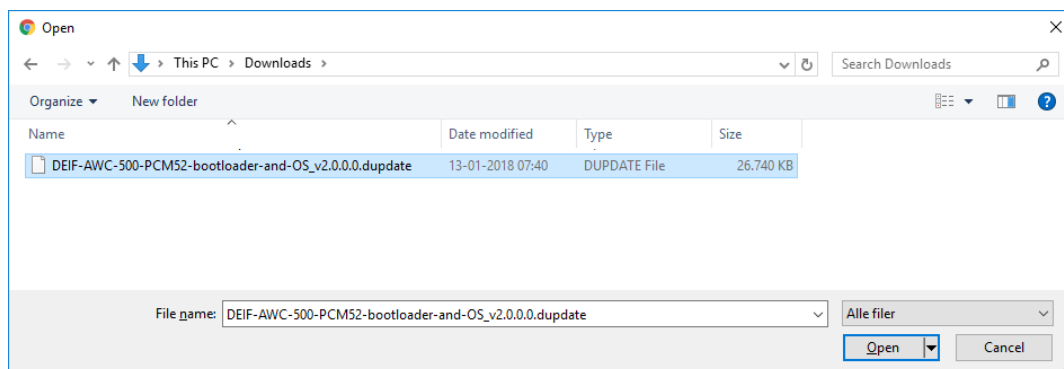


Figure 4.10: Select file

It might ask for the username and password to continue.

Next, click "Upload" button, it will start uploading the firmware. When the loading process is complete, a line of green text will be printed out on the webpage to indicate the upload is successful.

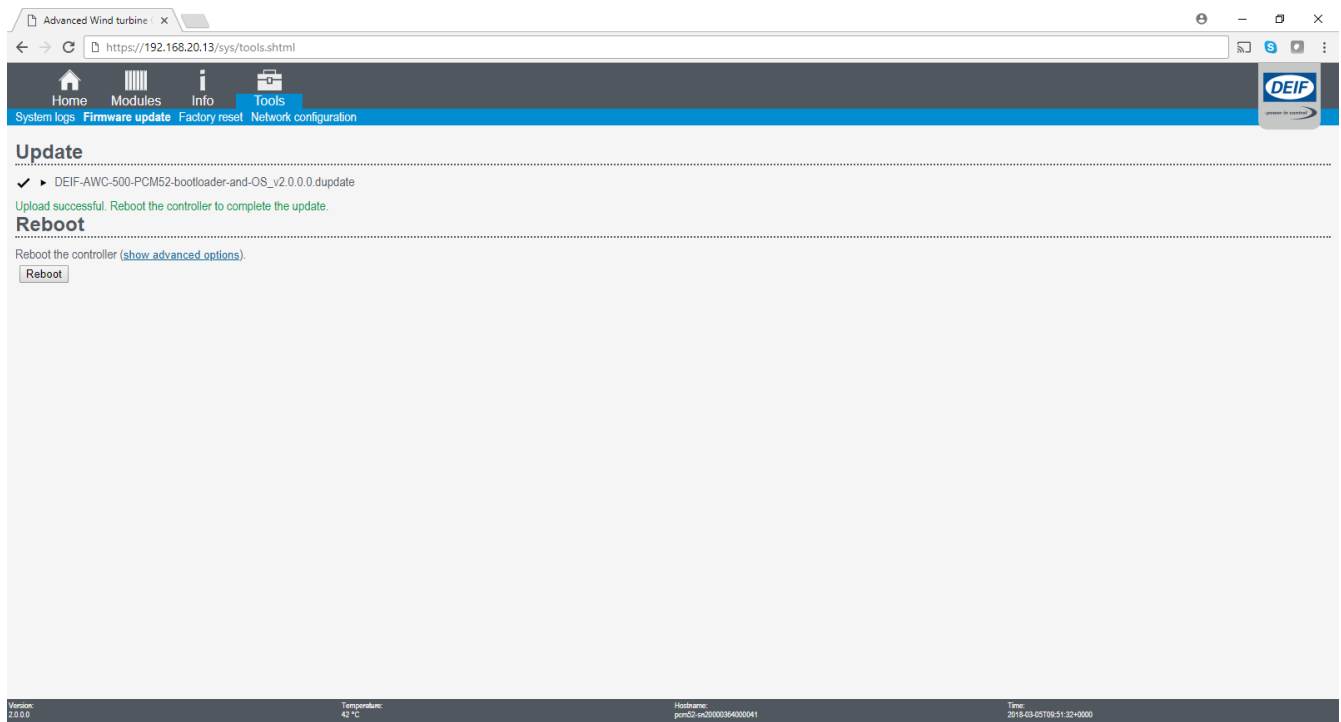


Figure 4.11: Upload successful

The firmware update only takes effect when you reboot the system. Click "Reboot" button, a pop-up window is displayed asking you to confirm the reboot. Click "OK" to start the reboot process.

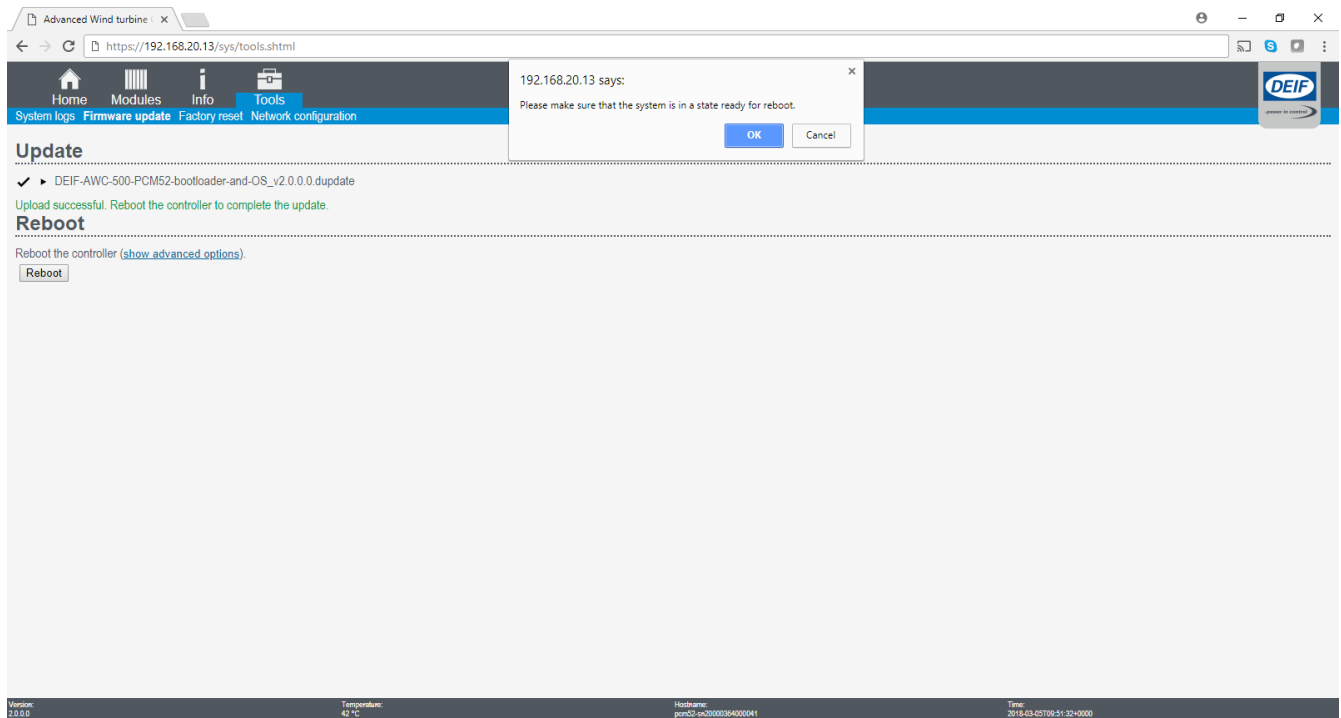


Figure 4.12: Reboot

Wait for the reboot process to be finished. Then reload the webpage, the updated version number can be found on the lower left corner of the page.

Want more details about the updating process, check out the system logs on the webpage (Refer to "View logs" section).

## 4.7. View logs

Logs are presented in "System logs" section on the webpage. Go to "Tools→System logs"

Advanced Wind turbine - X

https://192.168.20.13/sys/logging.shtml

Home Modules Info Tools

System logs Firmware update Factory reset Network configuration

### System logs

1 out of 20 logs selected (select all | remove all)

dupdate Select logs to display

Last 10 minutes

```

2018-03-05T09:50:52.921391+0000 dupdate: Validating checksums stored in sha256sum.txt
2018-03-05T09:50:54.434977+0000 dupdate: fwupdate: OK
2018-03-05T09:50:54.435020+0000 dupdate: kernel.lib: OK
2018-03-05T09:50:54.435024+0000 dupdate: rootfs.sfs: OK
2018-03-05T09:50:54.435042+0000 dupdate: run_update.sh: OK
2018-03-05T09:50:54.435048+0000 dupdate: u-boot.bin: OK
2018-03-05T09:50:54.435048+0000 dupdate: uqe_iram.bin: OK
2018-03-05T09:50:54.435051+0000 dupdate: version.txt: OK
2018-03-05T09:50:54.436173+0000 dupdate: All checksums OK
2018-03-05T09:50:54.465283+0000 dupdate: Erasing /dev/mtd2
2018-03-05T09:51:00.310247+0000 dupdate: Writing /dev/mtd2
2018-03-05T09:51:02.637113+0000 dupdate: 3+1 records in
2018-03-05T09:51:02.637155+0000 dupdate: 3+1 records out
2018-03-05T09:51:02.704547+0000 dupdate: Writing target file /boot/os.b/kernel.lib
2018-03-05T09:51:03.844115+0000 dupdate: Writing target file /boot/os.b/rootfs.sfs
2018-03-05T09:51:07.121092+0000 dupdate: Writing target file /boot/os.b/uqe_iram.bin
2018-03-05T09:51:07.234102+0000 dupdate: Writing target file /boot/os.b/version.txt
2018-03-05T09:51:07.304261+0000 dupdate: OK
2018-03-05T09:51:07.389459+0000 dupdate: + tar -x -C /tmp/dupdate-dfSqRP -f *dupdate.R8Eb5c
2018-03-05T09:51:07.389500+0000 dupdate: + ./run_update.sh
2018-03-05T09:51:07.389504+0000 dupdate: + rm -f /tmp/dupdate-dfSqRP
2018-03-05T09:51:07.389507+0000 dupdate: SUCCESS: dupdate.R8Eb5c
  
```

Auto refresh ☒ download

### Feedback log

The feedback log is a compressed file that contains additional debug information.

Version: 2.8.0.0 Temperature: 42 °C Hostname: port02-nd00000364000041 Time: 2018-03-05T09:53:01+0000

Figure 4.13: dupdate log

Here, you can select different kinds of logs to display on the page. Click "inverted triangle" icon to get more logs. You can also select all logs or remove all.

Advanced Wind turbine - X

https://192.168.20.13/sys/logging.shtml

Home Modules Info Tools

System logs Firmware update Factory reset Network configuration

### System logs

1 out of 20 logs selected (select all | remove all)

dupdate Select logs to display

app-svscan

boot

devd

fwram

```

2018-03-05T09:50:54.435046+0000 dupdate: u-boot.bin: OK
2018-03-05T09:50:54.435048+0000 dupdate: uqe_iram.bin: OK
2018-03-05T09:50:54.435051+0000 dupdate: version.txt: OK
2018-03-05T09:50:54.436173+0000 dupdate: All checksums OK
2018-03-05T09:50:54.465283+0000 dupdate: Erasing /dev/mtd2
2018-03-05T09:51:00.310247+0000 dupdate: Writing /dev/mtd2
2018-03-05T09:51:02.637113+0000 dupdate: 3+1 records in
2018-03-05T09:51:02.637155+0000 dupdate: 3+1 records out
2018-03-05T09:51:02.704547+0000 dupdate: Writing target file /boot/os.b/kernel.lib
2018-03-05T09:51:03.844115+0000 dupdate: Writing target file /boot/os.b/rootfs.sfs
2018-03-05T09:51:07.121092+0000 dupdate: Writing target file /boot/os.b/uqe_iram.bin
2018-03-05T09:51:07.234102+0000 dupdate: Writing target file /boot/os.b/version.txt
2018-03-05T09:51:07.304261+0000 dupdate: OK
2018-03-05T09:51:07.389459+0000 dupdate: + tar -x -C /tmp/dupdate-dfSqRP -f *dupdate.R8Eb5c
2018-03-05T09:51:07.389500+0000 dupdate: + ./run_update.sh
2018-03-05T09:51:07.389504+0000 dupdate: + rm -f /tmp/dupdate-dfSqRP
2018-03-05T09:51:07.389507+0000 dupdate: SUCCESS: dupdate.R8Eb5c
  
```

Auto refresh ☒ download

### Feedback log

The feedback log is a compressed file that contains additional debug information.

Version: 2.8.0.0 Temperature: 42 °C Hostname: port02-nd00000364000041 Time: 2018-03-05T09:53:20+0000

Figure 4.14: More logs

To get additional debug information, the feedback log is available to download.

Click "Download feedback file" button to get the compressed feedback log file. Unzip the file to access

the individual files.

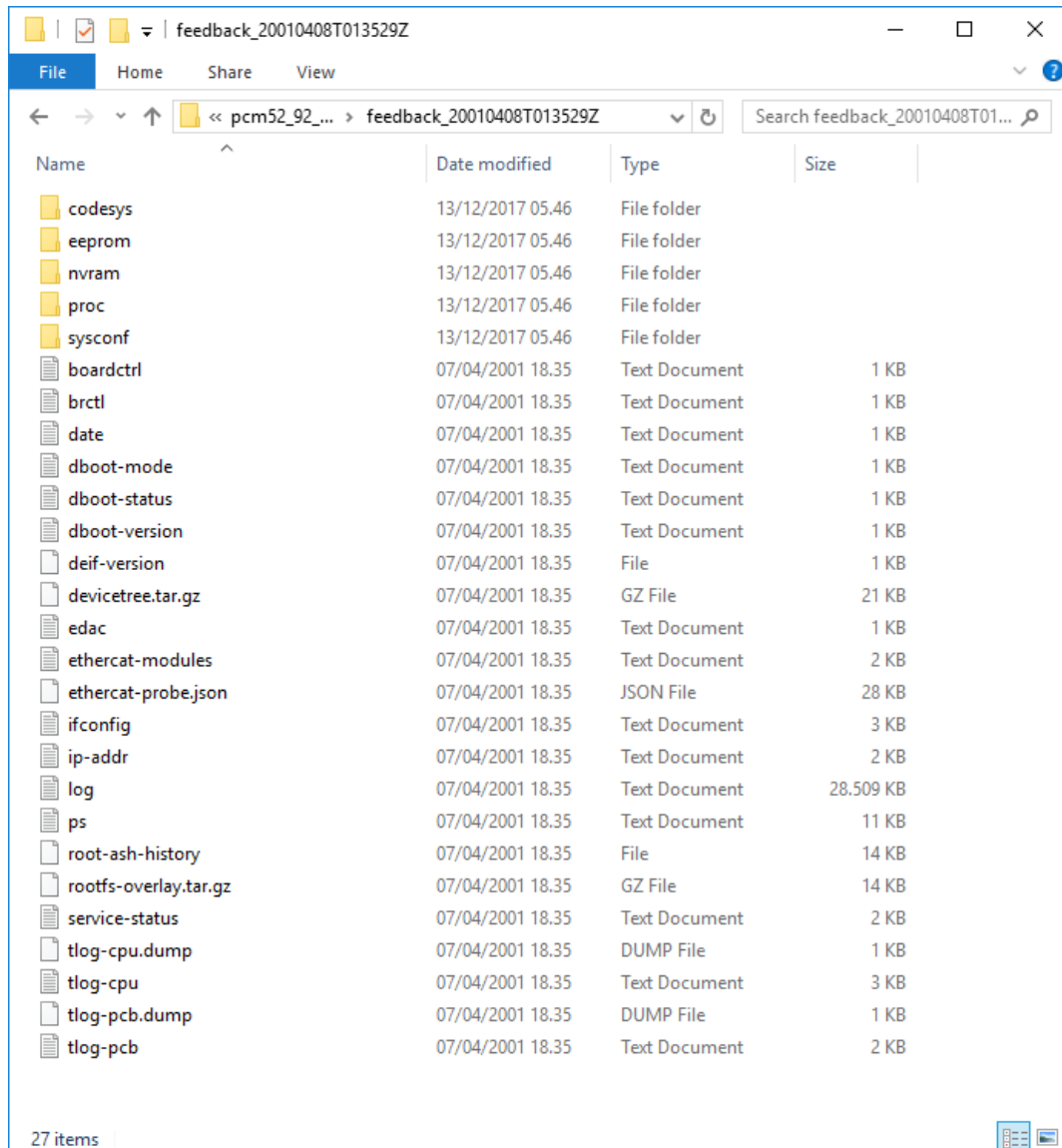


Figure 4.15: Feedback file folder

## 4.8. Create factory reset



**Warning:** Factory reset will restore AWC 500 to its factory settings, please make sure to back up important information prior to performing the reset.

A factory reset can be performed in three ways: 1) Go to "Tools→Factory reset". Click "Perform Factory Reset" button, a pop-up window is displayed, click "OK" to start factory reset process.

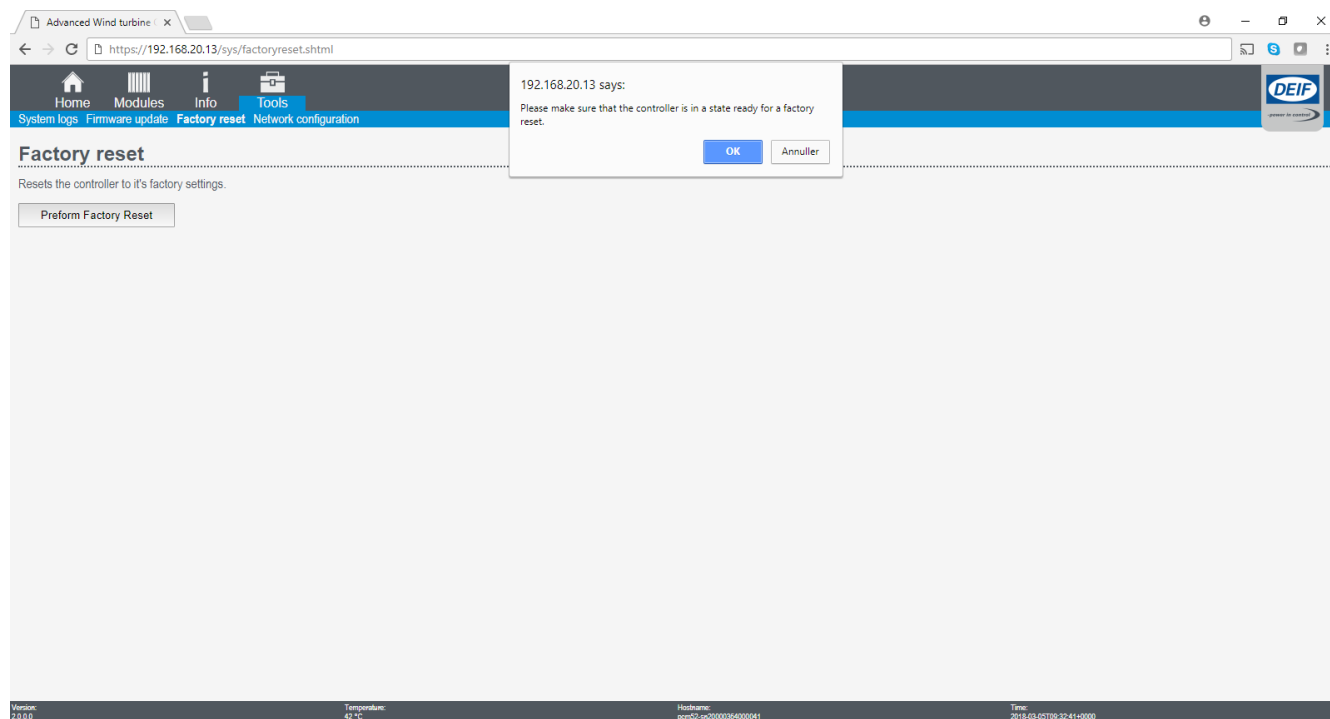


Figure 4.16: Factory reset

2) On the front of the PCM5-2 module a reset button pinhole is located above the USB host connector. Use a paper-clip to push the reset button until the Status LED stops blinking red. 3) or via SSH using the command `factory-reset`

DEIF A/S reserves the right to change any of the above.