

INSTRUCTIONS

OJ DRHX PC-Tool



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OJ Drives®

DEDICATED SOLUTIONS FOR ROTARY HEAT EXCHANGERS


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1. General

These instructions describe the OJ-DRHX-PC-Tool. The OJ-DRHX-PC-Tool is a PC-based tool for controlling, setup and configuration of OJ DRHX products. This document is designed to present basic information about the tool.

As the PC-Tool has several access levels, users may not have access to all levels.

Note: These instructions describe User, Service and Engineering access levels.

The OJ DRHX product series can be configured by means of the OJ-DRHX-PC-Tool via connection to Modbus RJ12 connector "B" on the OJ-DRHX.

1.1 Product programme

PRODUCT TYPE	
OJ-DRHX-PC-Tool Ver. 1.7 and newer	OJ-DRHX-PC-Tool: Program for configuration of OJ DRHX products

1.2 Features

OJ-DRHX-PC-Tool enables you to read out and configure drive and rotor parameters:

- For factory setup
- For on-site setup
- For reading out log data and saving them in a file
- For on-site diagnostics during service
- For on-site updating of software/firmware
- For configuring motor parameters and entering new settings
- For controlling the motor controller and motor
- For testing the drive and rotor

2. Installation

2.1 System requirements

To use the OJ-DRHX-PC-Tool, you must have an IBM-compatible personal computer that meets the following minimum system requirements (Windows 7 or later):

- Internet connection for downloading the installation files or a USB port and USB memory stick
- Microsoft .NET Framework 4 Client Profile
- 2 Mb available space on the hard drive

The OJ-DRHX-PC-Tool only supports the Windows platform and cannot be used with IOS or Android.

2.2 Program installation

- The OJ-DRHX-PC-Tool can be downloaded from <http://www.ojelectronics.com>
- Download the file to your local hard drive
- Execute the msi file
- An installation wizard will guide you through the installation process
- A program icon will appear on your desktop once the installation process has been completed

2.3 USB-to-RS485 connection

The OJ-DRHX-PC-Tool is connected by means of a USB cable to a USB-to-RS485 converter and subsequently to Modbus connector "A" or "B" on the OJ DRHX (fig. 1).

A converter for USB -> Modbus RS485 communication must be used, e.g. type CNV-USB-RS485I or USB-RS485-WE-1800-BT.

Follow the steps below:

- Consult the OJ DRHX instructions for information on opening the front cover to access the Modbus connector.
- Comply with the OJ DRHX safety instructions while working on the unit.
- Connect the Modbus cable to either the RJ12 "A" or "B" connector or to the spring terminals marked "A", "B" and "GND".
- Connect the Modbus cable to the USB-to-RS485 converter.

- Connect the USB cable to the USB-to-RS485 converter.
- Connect the USB cable to a USB port on the PC.
- Connect the supply power to the OJ DRHX.
- Start the OJ-DRHX-PC-Tool.

The connection is a point-to-point connection (PC to drive)

- Provides access to all connected drives in a network by changing the Modbus ID
- Prevents active Modbus communication from other devices (PC-Tool is the only master on the Modbus)

When using USB-RS485-WE-1800-BT

- Modbus A: Orange wire
- Modbus B: Yellow wire
- Modbus GND: Black wire



Note

When connecting the OJ DRHX to the PC, the PC should not be grounded, due to the potential difference between supplies. Most power supplies grounds ground to the PC.
If grounded it may lead to failure of the USB port.

Fig. 1



3. Access levels

The OJ-DRHX-PC-Tool has three Access Levels. The number of functions available depend on which access level you have installed on your PC. See Table 1

TABLE 1				
Functionality		Version		
		User Level	Service Level	Engineering Level
Basic control (Operate, basic control settings)		X	X	X
Basic Controller Config (Configure tab)			X	X
Basic User Data Settings			X	X
Readout of Software version/ Alarms		X	X	X
Communication settings		X	X	X
Device Communication Settings			X	X
Update Firmware			X	X
User Config	Download			X
	Upload			X
Motor / Rotor Config	Download			X
	Upload			X
Log	Read from device, Open/save/Export file	X	X	X
Editing config. files	Motor / Rotor			X
	User			X

End User Level 0

The Basic version of the PC Tool is available from the OJ-DRHX-PC-Tool downloads found the OJ Electronics homepage.

Service Level 1

For configuration of the OJ DRHX in the field a “Service access level” file is needed.

Engineering Level 3

The highest access level, allowing the user to fine tune the OJ DRHX.

Direct business partners can contact OJ Electronics to obtain the higher levels.

To install the higher Access level, place the Access level file on the computer, close the OJ-DRHX-PC-Tool program, right click on the Access level file and click on “**merge**” and follow the instructions. The OJ-DRHX-PC-Tool will be upgraded when restarted.

4. Functions

The Functions and parameters that are available, depend on which Access level is installed.

- Setup: Communication parameters for the connected OJ DRHX
- Operate: Operation of the connected OJ DRHX. Log of the connected OJ DRHX (Log to File).
- Configure: Setup Drive/Motor Type and Controller Configuration i.e. speed and direction.
- Log: Log data for the connected OJ DRHX.
- Firmware & Config: Update of Firmware
- Motor/Fan/User Config: View and change the motor, fan and user configuration files
- Info: The connected OJ DRHXs type, software, configuration files and alarm log
- About: OJ-DRHX-PC-Tool version and contact information.

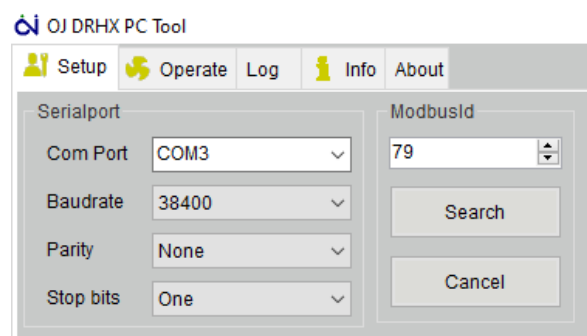
5. Setup

Setup is used to connect and change the communication protocols to the OJ DRHX.

User Access Level 0 allows the user to connect to OJ DRHX via the default or preset Alternative Modbus address

Default Modbus Address

ID: 54
Baudrate: 38400
Parity: None
Stop bits: One

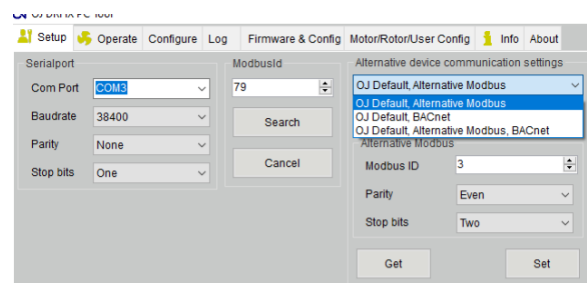


Service and Engineering Access levels also allow the user to change the communication settings used by the connected OJ DRHX.

When connected to the OJ DRHX via the Default Modbus address, click on “Get” under the “Alternative device communication settings”.

The following three choices will be available in the drop-down menu.

- OJ Default, Alternative Modbus
- OJ Default, BACnet
- OJ Default, Alternative Modbus, BACnet



5.1 OJ Default, Alternative Modbus

The default Alternative Modbus settings are:

Modbus ID: 3
Baud rate: 115200
Parity: Even
Stop bits: Two

Alternative Modbus Communication Parameters

	Range
Address	0 – 247
Baud rate	9.600, 19.200, 38.400, 57.600, 115.200
Parity	None, Even, Odd
Stop bits	One, Two

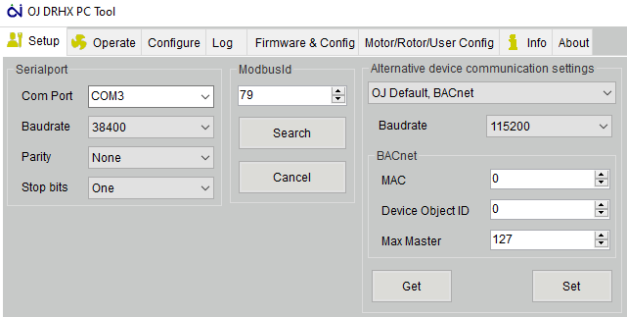
5.2 OJ Default, Alternative Modbus

The default BACnet MS/TP settings are:

- Baud rate: 115200
- MAC: 0
- Device Object ID: 0
- Max Master: 127

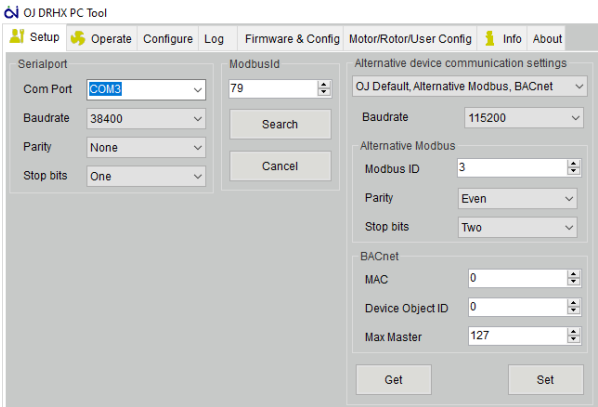
BACnet MS/TP Communication Parameters

	Range
Baud rate	9.600, 19.200, 38.400, 57.600, 115.200
MAC	0 - 127
Device Object ID	0
Max Master	1



5.3 OJ Default, Alternative Modbus, BACnet

It is also possible to set an Alternative Modbus and BACnet Address at the same time.



6. Operate

This is available for all Access levels.

Operate can be used to control and monitor the attached OJ DRHX and motor.

When using Protocol control, only the OJ-DRHX-PC-tool can be connected.

The Operate tab, can be used to monitor the normal running of the DRHX when Analog control is being used. To override and take control of the DRHX the speed control needs to be changed to Autodetect or Modbus.

The top left of the screen is used to control the connected OJ DRHX

When Speed control is set to Modbus or Auto detect protocol, it is possible to operate the connected DRHX via the OJ-DRHX-PC-Tool.

The connected DRHX can be started and stopped by clicking on the green start icon which then becomes a red stop icon.

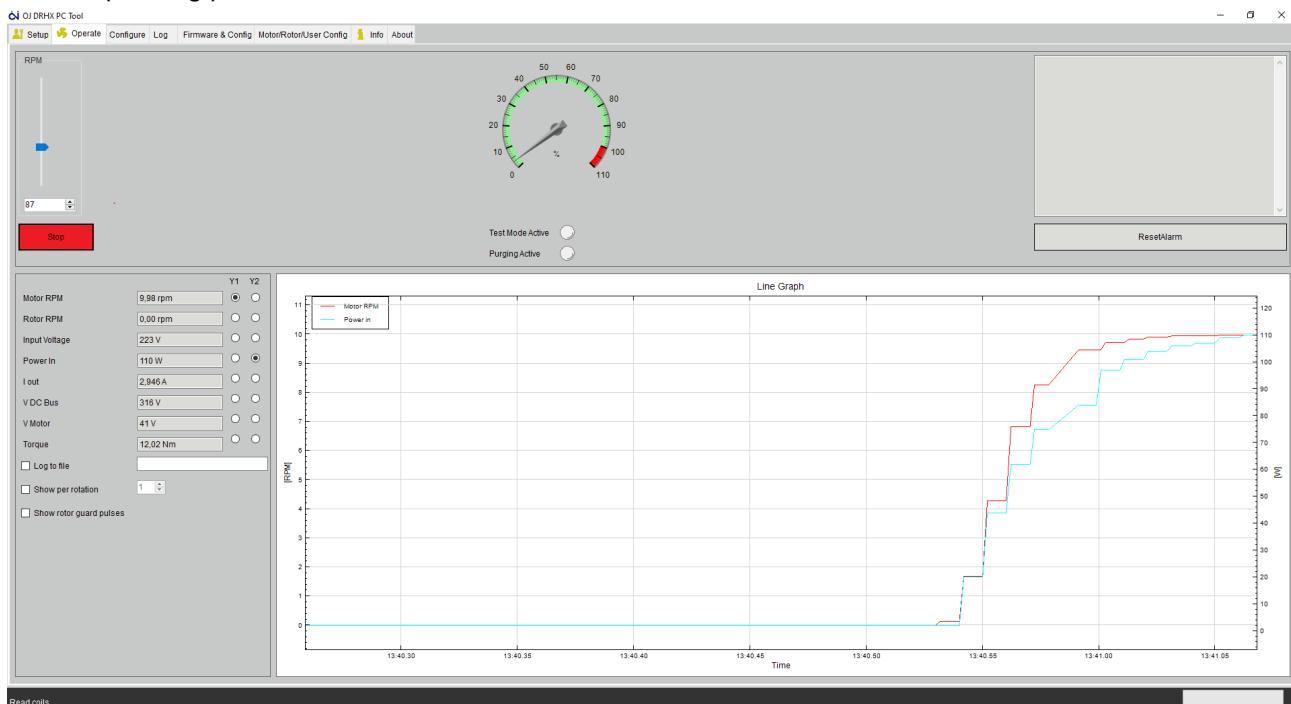
The speed is set between the minimum and maximum RPM or Hz (depending on the attached motor type) by entering a value in the box just above the Start/Stop icon or using the slide control. The speed can be seen as a percentage on the dial 0% = minimum set speed.

The box in the right hand upper corner shows when an alarm has been given. To reset the alarm click on the Reset Alarm box.

The lower part of the screen shows the actual operating parameters for the connected OJ DRHX.

- Motor RPM
- Rotor RPM
- Input Voltage
- Power In
- I out
- V DC Bus
- V Motor
- Torque

The Line Graphs two Y axis (Y1 and Y2) can be chosen by clicking on the circles next to the operating parameters.



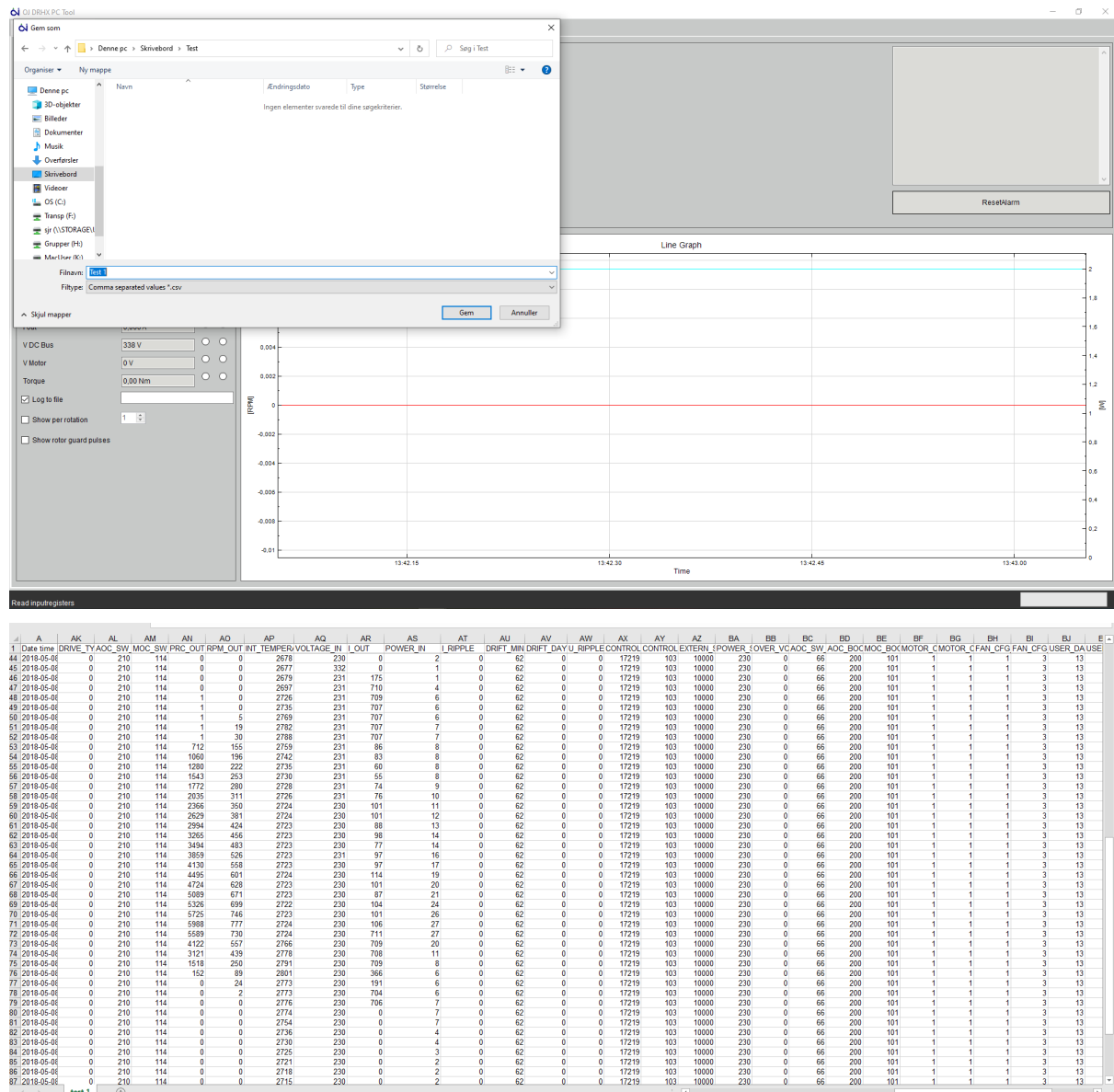
6.1 Log to file

This is not the same as the “Log” tab.

Underneath the operating parameters, the “Log to file” function can be enabled. This is used to log the operation of the connected OJ DRHX. The computer needs to be connected to the drive whilst logging the data. Click on the box next to Log to file, this will open a box where a .csv file can be saved on the computer.

The OJ DRHX can be controlled via the OJ-DRHX-PC-Tool or 0-10V whilst the log is being taken.

The “Log” registers sixty five different parameters; time, speed, errors, torque, activation of digital inputs/outputs and the software installed. The file can be used when testing the DRHX with a rotor, e.g. showing the torque values, when in closed loop (using the internal rotor guard and above 25 rpm)



If the OJ DRHX or motor does not perform as it should, let the log run until the issue occurs or as long as possible, at least twenty minutes. This saved file can then be sent to OJ Electronics to help with analysis. To stop the log, click on the tick in the box.

7. Configure

The Configure screen is used to set the control parameters, the input/output signals for the connected OJ DRHX.

Configure is made up of:

- Controller Config
- Basic user data settings

7.1 Controller Config

- Min RPM [RPM] (min. 1 RPM)
- Max RPM [RPM] (max. 400 RPM)
- Ramp up time [s] (min. 30s max. 300s)
- Ramp down time [s] (min. 30s max. 300s)
- Boost current [A] (1.5 x max current)
- Boost time [s] (max 20s)
- Pulley size [mm]¹
- Rotor size [mm]¹
- Rotor guard
 - Disabled
 - Internal
 - External
 - Internal and External
- Holding torque [% of max] (max 20%)
- Purging interval [s] (max 30000s)
- Purging rotations (max 5000)
- Speed Compensation
 - Linear (Modbus Control)
 - Non Linear (Modbus Control)

Controller Config	
Min RPM [RPM]	1,00
Max RPM [RPM]	250,00
Ramp up time [s]	60
Ramp down time [s]	60
Boost current [A]	1,251
Boost time [s]	20
Pulley size [mm]	0
Rotor size [mm]	0
Rotor guard	Internal
Holding torque [% of max]	0,0
Purging interval [s]	600
Purging rotations	10
Speed Compensation	Linear (Modbus Contr)

Get Set

¹ The Pulley and Rotor size are not necessary for the function of the OJ DRHX. This is used in an equation for calculating the Rotor's RPM, seen on the "Operate" tab or in the display of the DRHX-1XXX-MAD5.

7.2 Basic user data settings

- Digital input 1
- Digital input 2
- Digital input 3
- Relay output 1
- Rotation direction
- Speed Control source
 - Communication Protocol
 - Analog Input
 - Autodetect
- K-factor
- Start/Stop source
 - Analog input > 1.1V
 - Digital input
- Number of retries
- Speed Resolution
 - Low Resolution (1 digit after dot)
 - High Resolution (2 digit after dot)

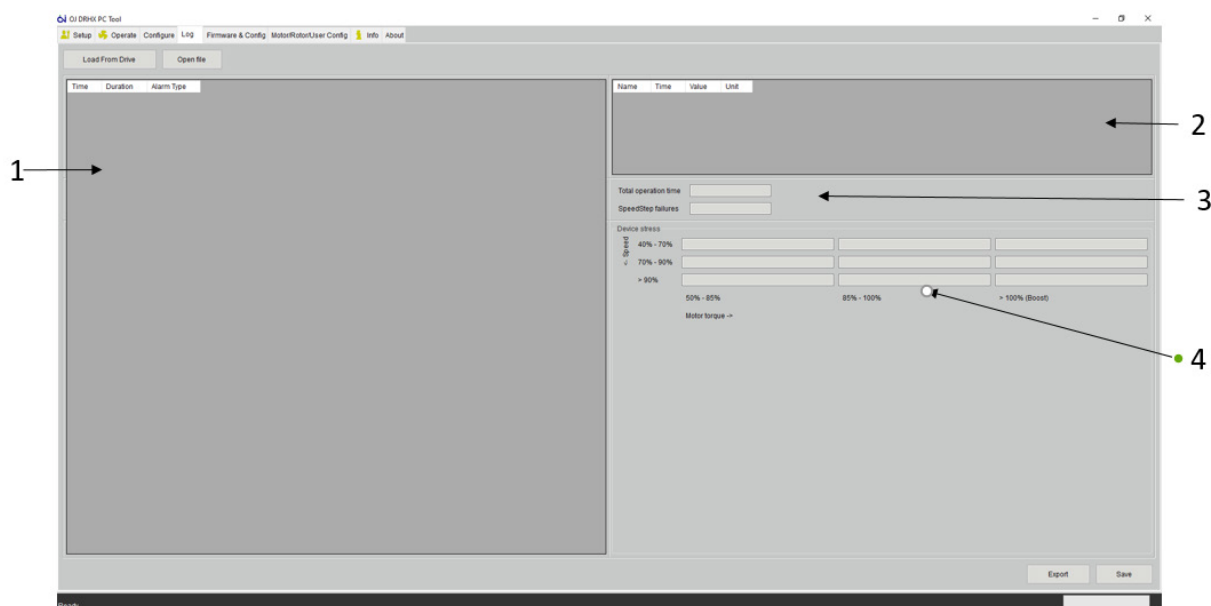
Basic user data settings	
Digital input 1	Alarm Reset
Digital input 2	Enable external rotor guard
Digital input 3	External rotor guard signal
Relay output 1	Alarm
Rotation direction	Clockwise
Speed control source	Autodetect
K-factor	100
Start/Stop source	Analog input > 1,1V
Number of retries	5
Speed Resolution	High Resolution (2 digit after dot)

Digital Input options		
Option	Description	Default
Disabled	Not used	
Start/Stop	Used when Start/Stop source is set to digital	
Alarm Reset	Used to reset the OJ DRHX after an Alarm	DI 1
Rotation direction	Change rotation direction from the direction set in Controller Configuration.	
TestFunction	Sets the digital input as a test function (used with the DRHX-1790-MAN59)	
External rotor guard signal	Signal from attached external rotor guard	DI 3
Enable external rotor guard	A bridge between the digital input and ground will enable the external rotor guard	DI 2

Relay Output Options			
Option	Description	Position / Terminals	
Disabled	Not in use	NC / 9 & 8	
Started	Signal given on start	NO / 9 & 10	
Alarm	Signal given on alarm	NC / 9 & 8	Default
Running	Signal given when motor reaches minimum RPM and goes off when the motor RPM is half way between minimum RPM and Stop	NO / 9 & 10	

8. LOG

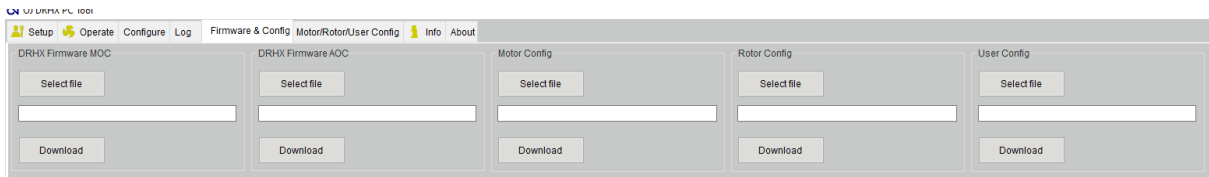
The Log can either be loaded from a connected OJ DRHX (Load from Drive) or imported from a Log file stored on a computer (Open file), which has been saved using the Save icon in the bottom right of the screen. The Log can also be exported as a readable csv or txt file by clicking on the Export icon.



1. The **Alarm register**: showing how much running time has passed, duration and type of alarm.
2. The highest maximum values and how long the motor has been running when the value was recorded.
 - Temperature
 - Voltage over the DC Bus
 - Voltage ripple
3. **Total operation time**: in days, hours and minutes (Actual running time, not commissioning date)
SpeedStep failures: shows the number of times the internal rotor guard has detected a belt failure.
 There has to be five of these failures within a 60-minute time period before an alarm is given.
4. **Device Stress**: As a percentage of the maximum speed, against the motor torque.

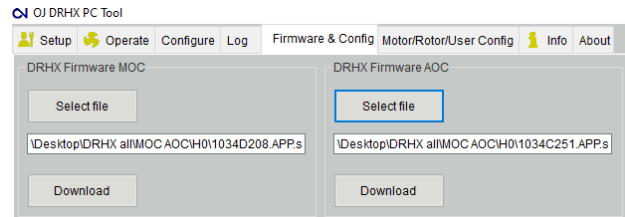
9. Firmware & Config

The Firmware & Config is used for updating the MOC, AOC, Motor, Rotor and User Configuration. Connect the OJ-DRHX-PC-Tool to the DRHX



9.1 AOC and MOC Firmware update

To update or reinstall the Application Oriented Controller (AOC) and Motor Oriented Controller (MOC), the firmware has to be stored on the connected computer.



Select the MOC and the AOC firmware.

The MOC firmware has the letter D or F in the middle, for the DRHX-1XXX-MXX5:

- 1014D2xx.APP.s 1014F3xx.APP.s

For the DRHX-1790-MAN5:

- 1014B2xx.APP.s

The AOC firmware has the letter C in the middle, for the DRHX-1XXX-MXX5. The DRHX-1XXX-MMN5 does not have an AOC:

- 1014Cxxx.APP.s

For the DRHX-1790-MAN5:

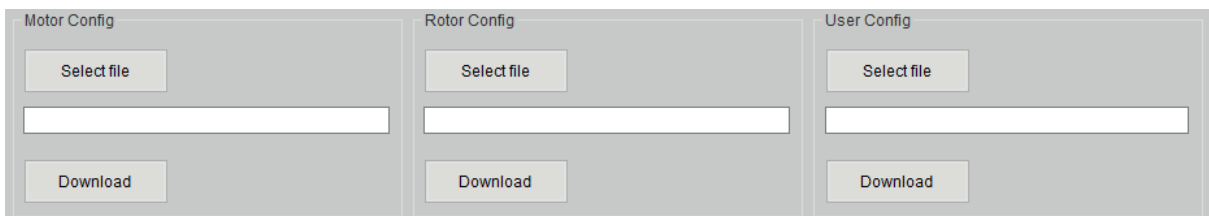
- 1014Axxx.APP.s

When the firmware has been selected the File Version will appear. Click on the “Download” Icon. In the bottom right of the screen there is a process bar and a Line counter in the bottom left, when the download process is finished Ready will be shown. Wait until the MOC has finished downloading before starting the AOC

9.2 Motor, Rotor and User Configuration Updates.

Installing a new or updated version of a Motor Configuration File (MCF), Rotor Configuration File (RCF) and User Defined File (UDF) is as with the MOC and AOC firmware.

Save the files to the connected computer. Select the file and click on “Download”. Wait until “Ready” is shown in the bottom left hand corner of the program.

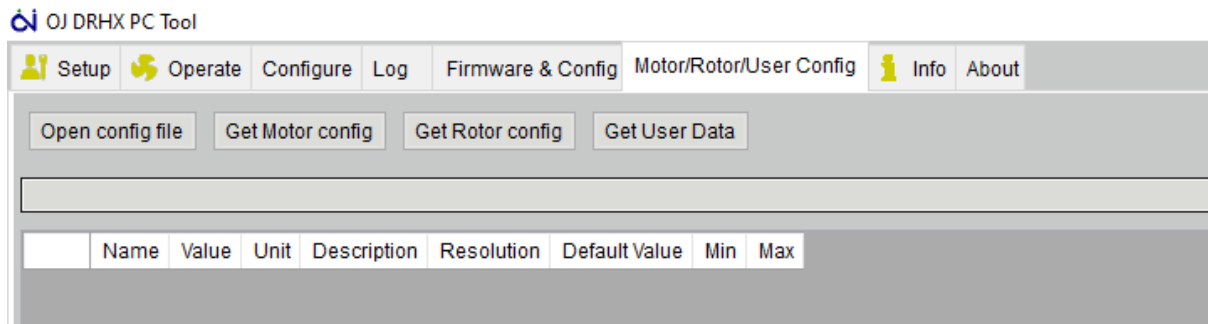


10. Motor/Rotor/user Config.

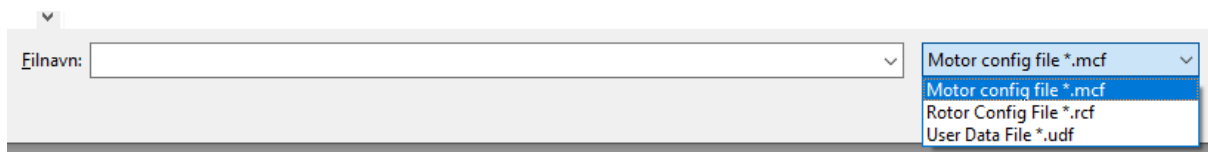
The Motor/Rotor/User Config tab can only be used by the Engineering access level.

This allows the user to see the motor (mcf), rotor (rcf) and user defined (udf) files and fine tune the parameters within these files.

Files stored on the computer can be opened by clicking on “Open config file”.



If looking for a rotor config or user data file and it does not show in the place that it has been saved click on the dropdown menu in the bottom left of the box. The different types of file will only appear when chosen.



To retrieve the mcf, fcf and udf from a connected OJ DRHX, click on the respective “Get Motor config”, “Get Rotor config” and “Get user Data”.

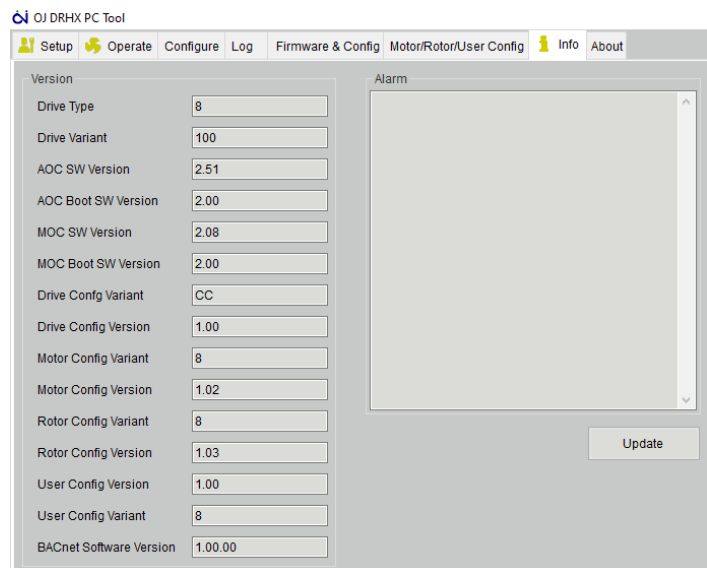
The file can be downloaded directly to a connected OJ DRHX, “Send config to drive”. It is a good idea to save any changes to files back to the computer, “Save config to file”.

11. INFO.

This page shows the information about the Firmware, Configuration files installed in the OJ DRHX and the drive type, set by the dip switches, of stepper motor attached.

The left hand side of the page shows:

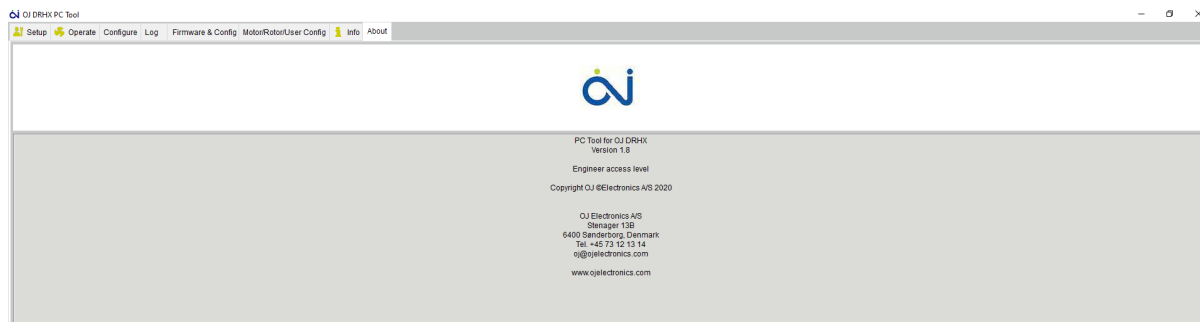
- Drive Type
- Drive Variant
- AOC SW Version
- AOC Boot SW Version
- MOC SW Version
- MOC Boot Version
- Drive Config Variant
- Drive Config Version
- Motor Config Variant
- Motor Config Version
- Rotor Config Variant
- Rotor Config Version
- User Config Version
- User Config Variant
- BACnet Software Version



The right hand side of the page shows any active alarms on the DRHX.

12. About

The version and access level and contact information for the OJ-DRHX-PC-Tool are shown on this page.



13. Troubleshooting

Troubleshooting		
Symtom	Cause	Action
No communication with the OJ DRHX	Lacking supply power	Check for voltage on OJ DRHX terminals "L" and "N".
	No connection/communication between PC and RS485 USB converter	Check the USB connection
		Check that the correct Com port has been selected in the Set-up in the OJ-DRHX-PC-Tool
		Check that another RS-485 connection is not active
	No connection/communication between the USB-to -RS485 converter and the OJ DRHX	Check that the RJ12 plug connector is correctly attached to the RJ12 terminal connectors of the OJ DRHX.
		Check that the wires in the spring terminals A, B and Gnd are secure.
	Drive cannot be found on Modbus network	If the alternative protocol address cannot connect to the OJ DRHX, unless deactivated, the OJ DRHX constantly listens at 38.4 kbaud, no parity, one stop bit and Modbus ID 54.
		Use the "Search" function under "Modbus ID" on the Setup page of the PC-Tool
		Check that the PC-Tool is not already open

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