INSTRUCTIONS

OJ-VCH-HMI3

Setpoint
1105 Pa

Operation mode	Var. pressure
Current speed	94 %
Current pressure	1051 Pa
Analog input	2.5 V
Digital input	On

OJ Drives®
A DRIVES PROGRAMME DEDICATED TO VENTILATION SOLUTIONS

OJ ELECTRONICS

Contents

Notice!
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1. Product presentation

The OJ-VCH-HMI3 is a compact controller with a user-friendly graphical interface, specially developed for the handling of up to 32 OJ DVs in a ventilation system, using constant or variable speed controlled either by pressure, airflow or an external analogue signal. The product is ideal for renovation projects of older, simple ventilation systems. Older systems often consist of a large fan that is either on/off or variable-controlled. With the OJ-VCH-HMI3, you now have the opportunity to offer renovation of existing plants with a downscaling of DVs, which are now reduced in size and included in a cascade solution.

The reasons for switching to several smaller fans are:
• Redundancy
• Access, retrofit kit fits through standard doors, stairwell and elevator
• Standard products, short delivery time
• Optimal use of the existing space
• Easy replacement

Figure 1
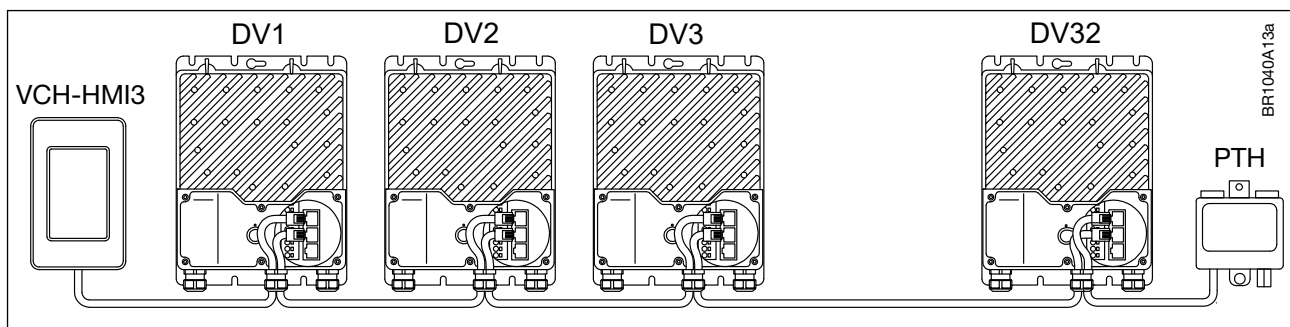
The OJ-VCH-HMI3 - setup, configuration and monitoring of individual OJ-DVs is shown above. (See Fig. 1)

2. Introduction

Read this manual thoroughly and follow the instructions it contains before commissioning the OJ-VCH-HMI3.

• This manual contains important information and must be used when installing, connecting and commissioning the OJ-VCH-HMI3 as well as during maintenance, service and troubleshooting.
• If the instructions contained in this manual are not observed, the liability of the supplier and the warranty shall be voided (see also section 2.4 Prohibition on use).
• Technical descriptions, drawings and figures must not be wholly or partly copied or disclosed to third parties without the permission of the manufacturer.
• All rights are reserved if the product is included in patent rights or other form of registration.

2.1 Key to symbols

Particular attention must be paid to the sections in these instructions that are marked with symbols and warnings.

This symbol is used where there is a risk of severe or fatal personal injury.

This symbol is used where potentially dangerous situations may result in minor or moderate personal injury. The symbol is also used to warn against unsafe and hazardous conditions.

Caution

This symbol is used to indicate important information and in situations which may result in serious damage to equipment and property.

Warning

2.2   **Ensuring safety before installation**
OJ-VCH-HMI3 must only be installed by qualified personnel or people who have received appropriate training and are thus qualified to install the product.
Qualified personnel have knowledge of the relevant installation practices and can perform installation in accordance with relevant local and international requirements, laws and regulations.
Qualified personnel are familiar with the instructions and safety precautions described in this manual.
Unintentional start-up during programming, servicing or maintenance may result in serious injury or damage to equipment and property.
For further information regarding OJ-DV, refer to the OJ DV instructions.

2.3   **Product use**
The OJ-VCH-HMI3 is designed to be used in a system comprising a series of daisy-chained devices, and is not to be used as a stand-alone product. The OJ-VCH-HMI3 can also be used as an OJ-DV-HMI35T operation; for further information see 3.6 Modbus ID.

- OJ-VCH-HMI3 is a compact system touchscreen panel controller used to regulate fan speed.
- OJ-VCH-HMI3 is primarily used in ventilation applications (fans).
- OJ-VCH-HMI3 can also be used in other applications together with the OJ DV.
- OJ-VCH-HMI3 is suitable for stand-alone applications or as part of larger systems/machines.

Warning

2.4   **Prohibition in use**
The OJ-VCH-HMI3 must not be commissioned until the entire machine or product into which it is incorporated has been declared to be in conformity with all relevant national and international regulations.
- The product must not be energised until the entire installation complies with ALL relevant EU directives.
- The product carries a manufacturer's warranty if installed in accordance with these instructions and applicable installation regulations.
- If the product has been damaged in any way, e.g. during transport, it must be inspected and repaired by authorised personnel before being connected to the power supply.
- If the OJ-VCH-HMI3 is installed in machinery with rotating parts – e.g. a ventilation system, transport system, etc. – the entire system must comply with the Machinery Directive.

2.5   **Environment**
The OJ-VCH-HMI3 is intended solely for indoor use an in operating ambient temperature of -10°C to +40°C.
The OJ-VCH-HMI3 has an enclosure rating of IP21

2.6   **Approvals and certifications**
CE marking
OJ Electronics A/S hereby declares under sole responsibility that the product complies with the following European Parliament directives:

- EMC – Electromagnetic compatibility: 2014/35/EU
- RoHS – Hazardous substances: 2011/65/EU

North America
- The enclosure material is UL approved.
- Not intended for installation in the airflow of ventilation-controlled systems.
- Supplied by +24V DC

3. Installation

⚠ **Caution**

Assign each DV its own unique Modbus ID address in the range of 1 to 88 before starting installation; see 3.6 Modbus ID.

3.1 Step by step – start
1. Start: Choose between the 4 application configurations; see 3.2 Application.
2. Wiring: Use the correct cable for cable connection between OJ-VCH-HMI3 and all connected devices; see 3.4 Wring.
3. Mount the OJ-VCH-HMI3 correctly; see 3.3 Mounting

⚡ **Danger**

4. Switch on the main power (see 3.5 Power)
5. Follow the startup wizard in 4.2

3.2 Application
It is important for all application configurations that the recommended cable requirements are followed; see 3.4.1 Cable requirements. All configurations reguire Modbus connection (see chapters 3.4.2 and 3.4.3)

1. **Manual speed control** (Fig. 2)
   - Fans are started from the HMI
   - Speed is entered via the HMI
   - Allows all fans to be operated at a constant speed
   - Option
     - Allows external start switch (see chapter 3.4.6)
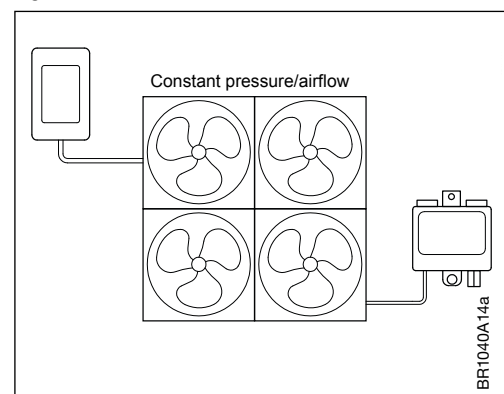   - Allows Alarm Relay (chapter 3.4.7 Connection of Alarm Relay)

Figure 2

Constant speed
BBR1040A15a
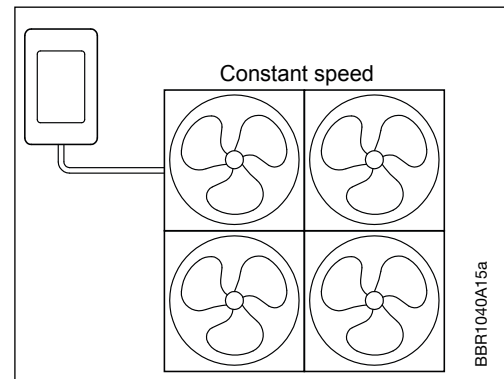
2. **Constant pressure or airflow** (Fig. 3)
   - Requires PTH (see chapter 3.4.4)
   - Fans are started from the HMI
   - Pressure or flow set point is entered via the HMI
   - Allows fans to deliver a constant pressure or airflow
   - Option
     - Allows external start switch (see chapter 3.4.6)
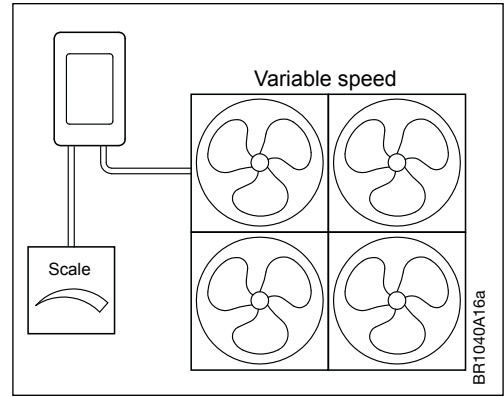   - Allows Alarm Relay (chapter 3.4.7 Connection of Alarm Relay)

Figure 3

Constant pressure/airflow
BR1040A14a

3. **Variable speed** (Fig. 4)
- Requires external analogue signal or potentiometer (see chapter 3.4.5)
- Fans can be started with external signal
- Wiring, see 3.4.5 Analog input connections
- Option
  - Allows external start switch (see chapter 3.4.6)
  - Allows Alarm Relay (see chapter 3.4.7)

Figure 4

4. **Variable pressure or airflow** (Fig. 5)
- Requires external analog signal or potentiometer (see chapter 3.4.5)
- Fans can be started with external signal
- Requires PTH (see chapter 3.4.4)
- Wiring, see 3.4.5 Analog input connections
- Option
  - Allows external start switch (see chapter 3.4.6)
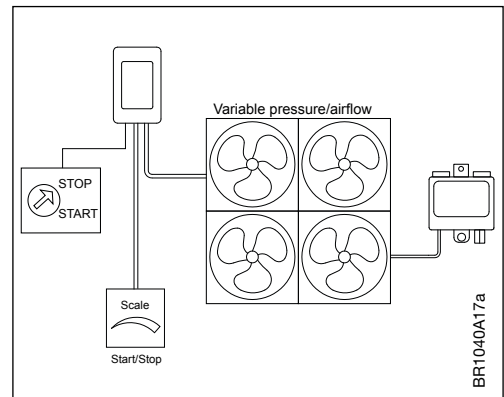 - Allows Alarm Relay (chapter 3.4.7 Connection of Alarm Relay)
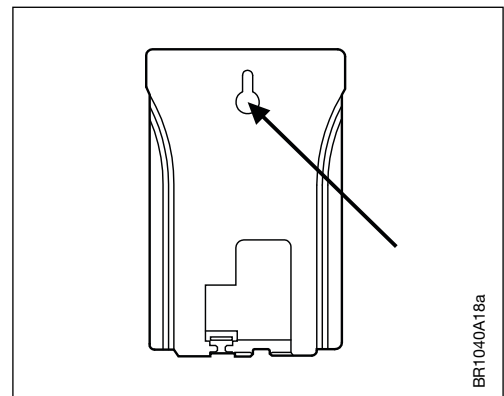
Figure 5

3.3 Mounting
OJ-VCH-HMI3 can be fitted onto a flat surface using a screw or magnets; see below for correct mounting.

3.3.1 Fitting onto a flat surface using a screw.
The rear of the OJ-VCH-HMI3 unit features a keyhole-shaped hole for hanging the unit on a screw that has been screwed into the flat surface. Use a screw with a diameter of no more than 3.5 mm and make sure that it does not protrude from the surface by more than 9 mm. (See fig. 6)
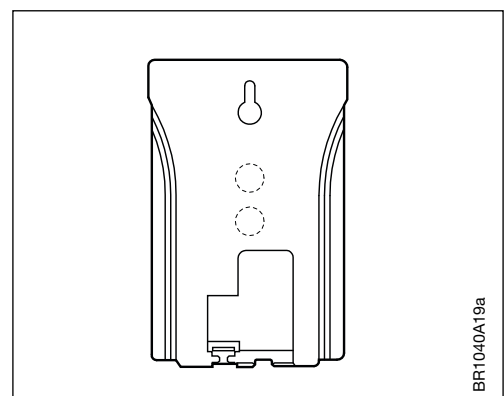
Figure 6

3.3.2 Fitting onto a flat metal surface using magnets.
Use the bumper (protective) cover, which contains two magnets.
The OJ-VCH-HMI3 can be mounted on a vertical flat metal surface. (See fig. 7)

Caution

The surface must be oil-free to ensure correct mounting

Figure 7

3.4   **Wiring**
        All cables and conductors used in the connection between OJ-VCH-HMI3 and the OJ-DV must
        comply with local and national rules and regulations

3.4.1   **Cable requirements**
        A 6-core, unshielded, 30 AWG/0.066 mm^2 telecommunications cable can be used as a Modbus
        cable. The cable must be inserted through the M20/PG9 glands.
        Generally, cable types with copper conductors are recommended.
        For recommended cable dimensions between DVs, refer to the DV instructions.

3.4.2   **Modbus connection with round cable**
        Wiring in the OJ-VCH-HMI3 via terminals 1 (A), 3 (B)
        and 4 (GND), to terminals in the OJ-DV. For further
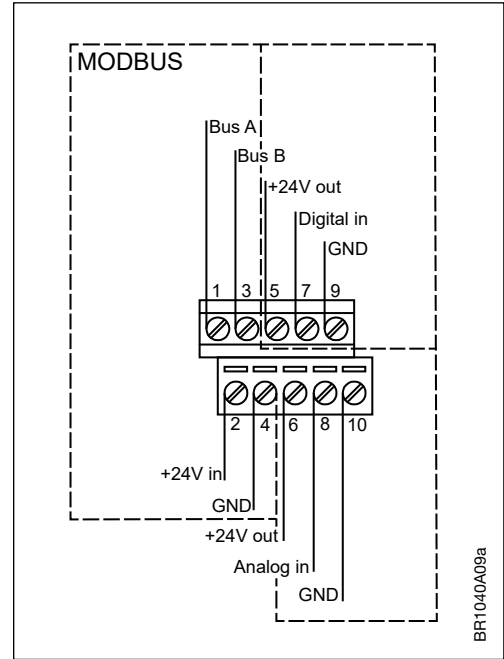   information, refer to the OJ-DV instructions. (See fig. 8)

Figure 8

⚠ **Caution**

For correct mounting see fig. 9. Use OJ-DV port A for
OJ-VCH-HMI3 connection.

3.4.3   **Modbus connection with ribbon cable**
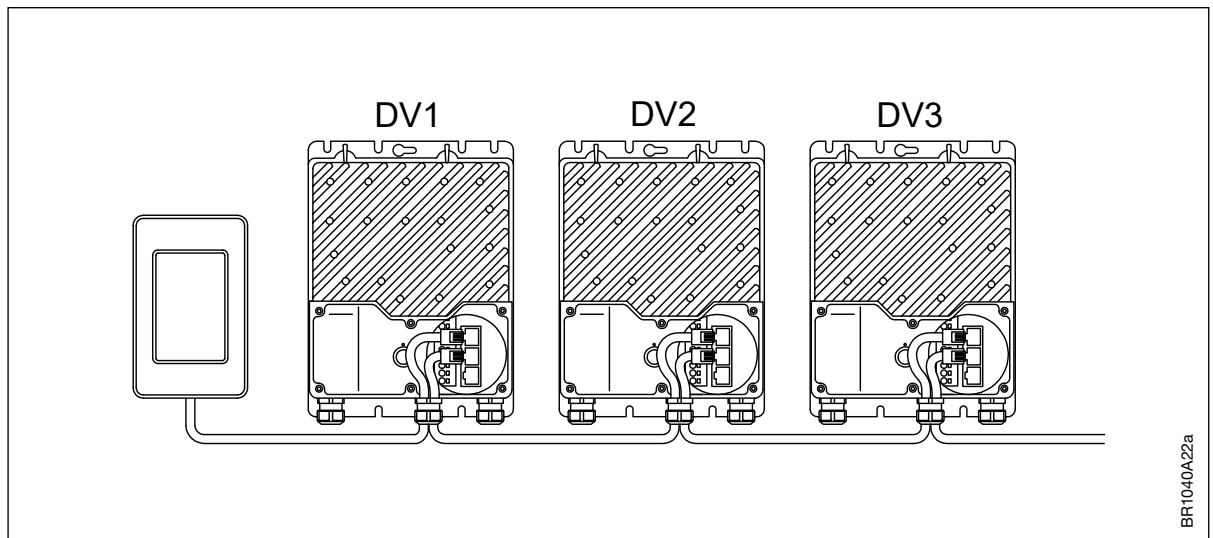   The Modbus connection can be established via the
        RJ12 connection on the rear of the OJ-VCH-HMI3.
        Connect the RJ12 cable to the OJ-VCH-HMI3 plug
        connecter. (See fig. 9)

Figure 9
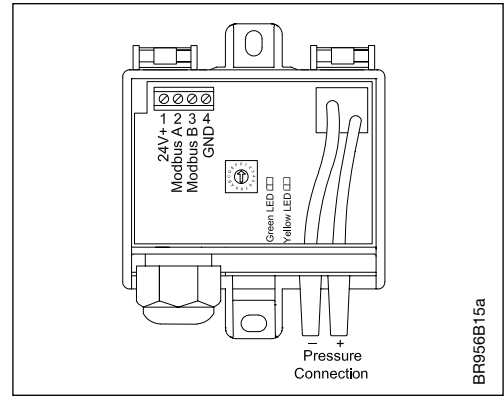

(Fig. 9) The OJ-VCH-HMI3 - setup, configuration and monitoring of individual OJ-DVs is shown
above.

3.4.4 Pressure/Airflow

The PTH-6201- has to be provided with a 24 V DC power supply connected to screw terminals 1 (24V+) and 4 (GND), see fig 10. For further information refer to the PTH instructions.
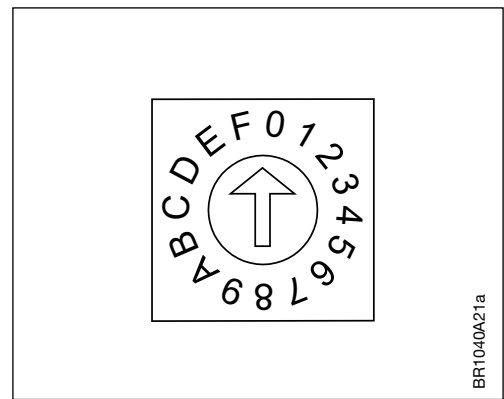
Figure 10

The PTH-6202 or PTH-6502 must be supplied with 24V+ DC connected to OJ-DV port (A)
A rubber membrane is fitted to both the lid and the bottom edge of the enclosure so that the Modbus cable (flat transmission cable) can be routed into the enclosure through the lid opening. For further information refer to the OJ-PTH-6202/6502 instructions. (See fig. 11)

Figure 11
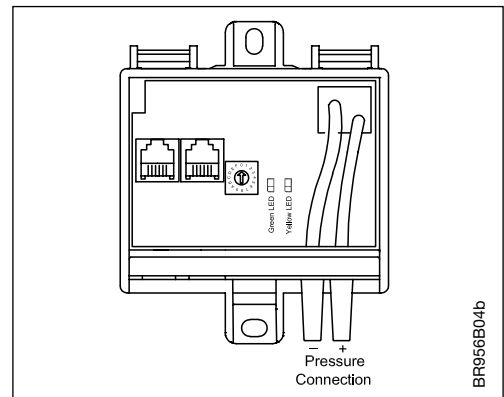
The PTH´s encoder must be set to position "0" to assign the Modbus ID 89. (See fig. 12)

Figure 12

3.4.5 Analog input connections

For connecting the analog control signal (set point), use terminals 6 for 24V source out, 8 for analog input and 10 for GND. (See fig. 13)
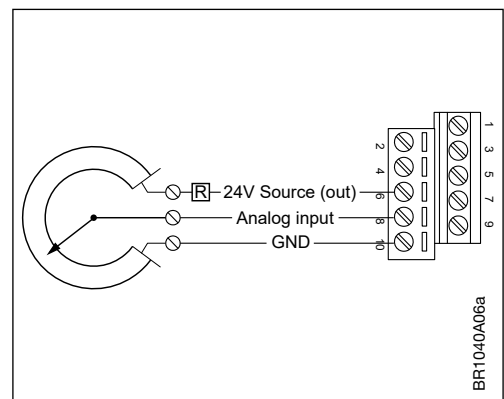
⚠ **Caution**

For full scaling of the analog input signal, use a resistor connected in series with a potentiometer. The resistance has to be 1.2 to 1.4 times higher than the potentiometer – e.g. with a resistance of 12 kΩ, the potentiometer has to be 10 kΩ.

Figure 13

3.4.6 Connection of digital input signal

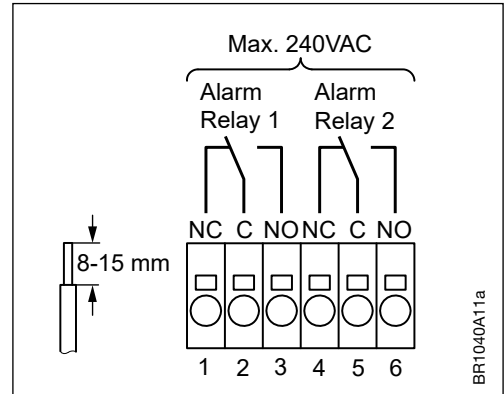For connecting the digital input signal, use terminals 5 and 7. (See fig. 14)

Figure 14
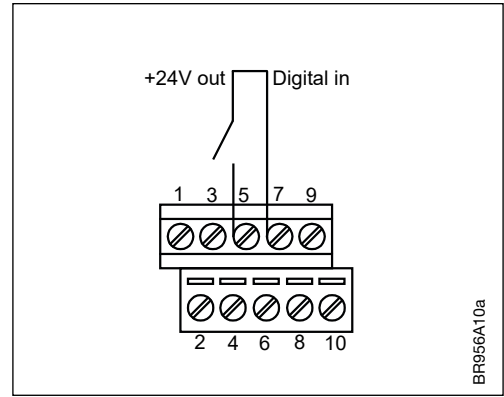
3.4.7 Connection of Alarm Relay in OJ-DV

The system can provide one or more alarms from the DVs. For installation of Alarm modules refer to the instructions for the OJ-DV-IO-Module, see fig 15 for further information.

Figure 15

3.4.8 Cable relief

Use the cable tie as resistance inside the OJ-VCH-HMI3 after the wires have been connected. Place the cable tie around the cable and the cutout (see fig. 16). Tighten the cable tie and cut off the excess length.

Figure 16
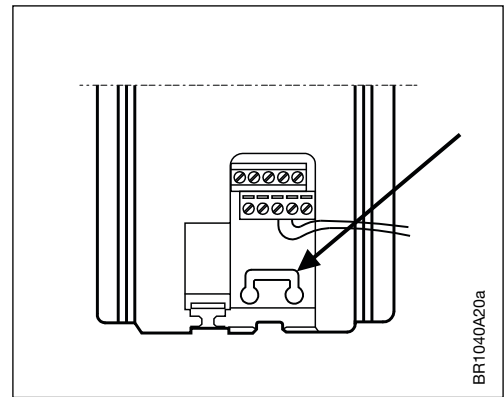
3.5 Power

Caution

To power up the DV, refer to the OJ-DV instructions.

Power to the OJ-VCH-HMI3 and the PTH comes from the RJ12 Modbus cable when connected to terminal "A" in the OJ-DV. (See fig. 17)
Alternatively, the OJ-VHC-HMI must be provided with an external 24 V DC power supply connected to screw terminals 3 (+) and 4 (GND). This could be done by placing an I/O module in the first OJ-DV and the last OJ-DV, if external power is also needed for the PTH.

Figure 17
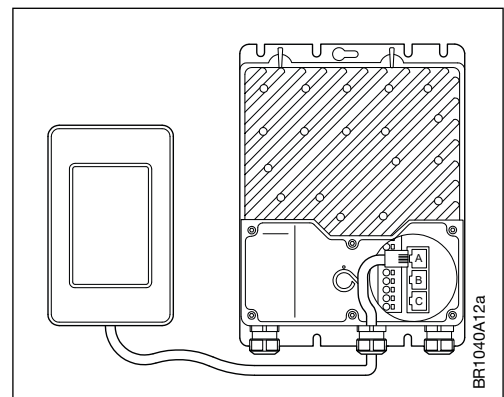
3.6 **Modbus ID**
Before connecting the DVs in series with the OJ-VCH-HMI3, the DVs must have their own unique Modbus ID. The default DV address is 54 and can be changed by using the OJ-VCH-HMI3, OJ-DV-HMI-35T or OJ-DV-PC-Tool. All DVs must have their own unique ID address.
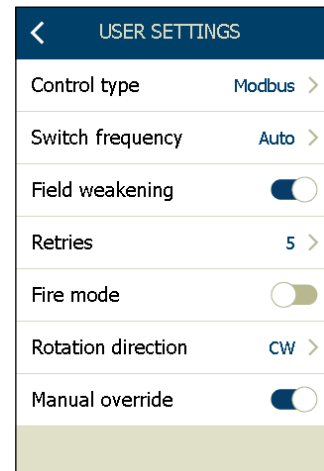
⚠ **Caution**

The system can only be used with Baudrate: 38400 – Parity: None – Stop bits: 1
Use only Modbus addresses up to 88.

3.6.1 **OJ-VCH-HMI3**
Connect the OJ-VCH-HMI3 to the DV port C, using a Modbus cable. Start by touching the OJ-VCH-HMI3 the screen, and press the three lines displayed at the top right. This brings you to the Menu **> User settings >** Activate **Manual override**
Return to the **Menu > Modbus >** change **Address**.

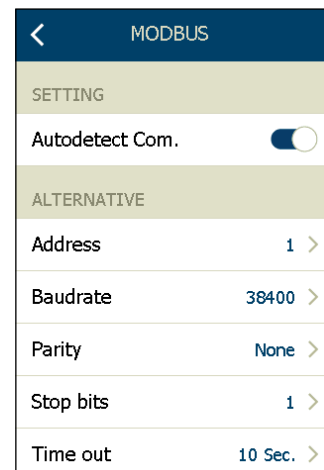| USER SETTINGS	
Control type	Modbus >
Switch frequency	Auto >
Field weakening	⬤
Retries	5 >
Fire mode	◯
Rotation direction	CW >
Manual override	⬤

3.6.2 **OJ-DV-HMI-35T**
Connect the OJ-DV-HMI-35T to the DV port A, using a Modbus cable. Start by touching the OJ-VCH-HMI3 screen, and press the three lines displayed at the top right of the screen. This brings you to the **Menu > Modbus >** change **Address**.

3.6.3 **OJ-DV-PC-Tool**
Connect a USB cable to a USB-to-RS485 converter and subsequently to Modbus connector "B" on the OJ-DV (fig. 1). A converter for USB -> Modbus RS485 communication must be used, e.g. type CNV-USB-RS485I or USB-RS485-WE-1800-BT. To change the DV ID address refer to the OJ-DV-PC-Tool instructions.

MODBUS	
SETTING	
Autodetect Com.	⬤
ALTERNATIVE	
Address	1 >
Baudrate	38400 >
Parity	None >
Stop bits	1 >
Time out	10 Sec. >

4. User guide

4.1 **Wizard**
When the OJ-VCH-HMI3 is first connected to the system, a startup wizard appears. Use the **>** to move forward and **<** to backwards
1. Select **language**, press ">" when selected
2. **Device Scan** - this is the search for devices connected in the system. Make sure all devices in the system are visible on the screen, before you press **Connect (X) Devices**
3. A **Connection** screen appears to confirm the connection. Press ">"
4. **Control mode; Manual** or **Analogue in**, select the system setup. See 3.2 Application
5. A **Start Command** screen shows the options for starting the system.
6. When using an **Alarm Relay**, select which relay to use on DV or DVs with the mounted alarm relay.
7. A **Regulation** screen appears, depending on which **"Regulation"** is chosen: Speed, Pressure or Airflow. This determines which menu is shown next.
8. The settings screen for the chosen setup (Speed – Pressure – Airflow) appears with the default settings. Set the relevant values for the system.

4.2 Homescreen

This screen showes up-to-date system information depending on the selected application. When the display is in "Screen-savermode", one touch will start up the display. The specific contents of the homescreen will depend on the actual configuration of the HMI.

- Setpoint — Current setting – Press to change
- Opreation mode — Readout of the selected application
- Current speed — Operation speed **(x) %**
- Current pressure — Actual pressure **(x) Pa**
- Analog input — Actual setpoint **(x) 0.0 V**
- Digital input — Selected **On** or **Off**

The above status depends on whether the system is running. If the system is stopped, the above settings appear as 0 and 0.00. For alarm see 4.2.9 Alarm and warnings.
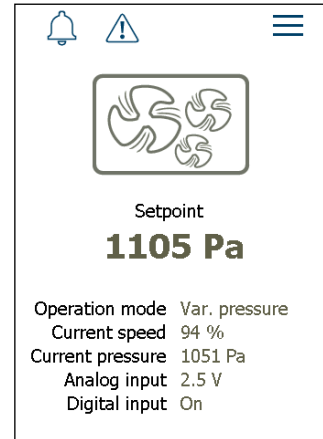
4.3 Main menu

The main menu can be accessed by touching the three lines in the upper right corner of the homescreen.

- Modbus settings
- System settings
- User settings
- System overview
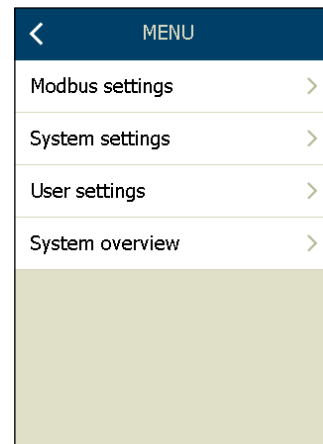
4.3.1 Modbus settings

- This shows the number of connected devices and their connection status.
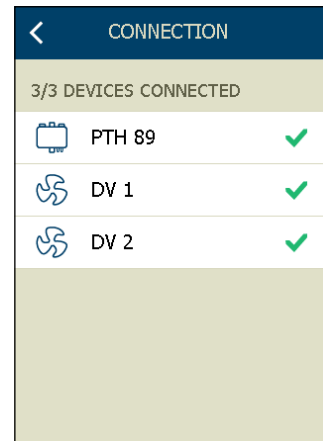
4.3.2 User settings

This screen provides the user with the following possibilities.

- Language — Change language to **English** or **German**
- Information — Readout of HMI version (x)

4.3.3 System settings (password-protected)
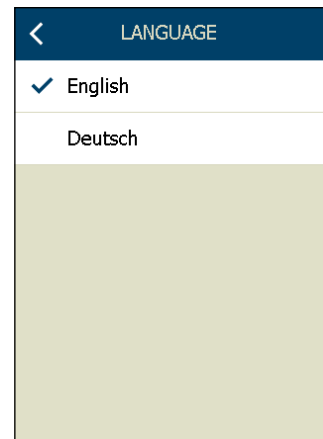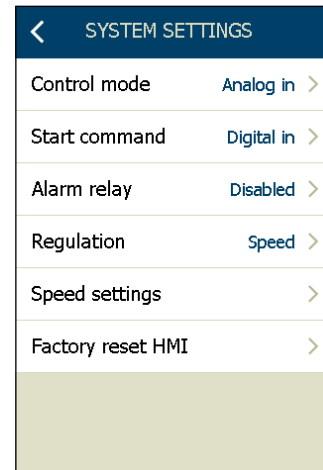
Here you can change the settings entered in the startup wizard. The system allow you to perform a **Factory Reset**: This will reset the OJ_VCH-HMI3 to factory settings and disconnect all devices.

Note that a **PASSWORD** is required to change the settings in the "System settings" menu and thus alter the configuration of the connected devices. Contact your supplier to obtain this password.

SYSTEM SETTINGS	
Control mode	Analog in >
Start command	Digital in >
Alarm relay	Disabled >
Regulation	Speed >
Speed settings	>
Factory reset HMI	>

4.3.4 System overview

This screen shows an overview of the individual products attached to the OJ-VCH-HMI3 and its status. If one or more of the attached DVs and PTH is/are disconnected, then this is also shown in the system overview. Touching an individual DV or the PTH icon shown on the screen will take you to a "Menu" showing:
- Drive status or PTH status
- Warnings and alarms
- SW & configuration

SYSTEM OVERVIEW

DV 1   DV 2   PTH 89
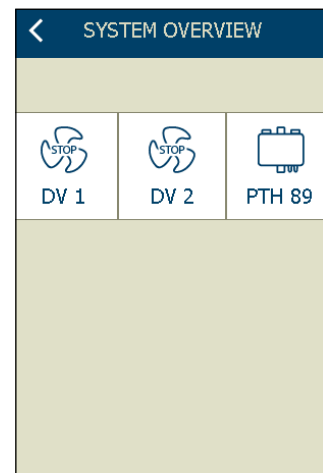
4.3.5 Warnings and alarms:

OJ-VCH-HMI has a built-in warning and alarm notification function, which triggers a warning or alarm if operating or performance problems are detected. Warnings are "non-critical" alarms that reduce motor performance, whereas alarms are "critical" and will stop the operation of devices. Once the alarm situation passes, the alarm can be reset. The system will then automatically reset and the connected devices will restart.

The following icons are shown on the homescreen if a warning or alarm is active. Touching the icons will give a detailed description of the alarm or warning

- Alarm

- Warning

Note: For detailed information regarding alarms and warnings, refer to the OJ-DV instructions.

4.3.6 Protective cover

The OJ-VCH-HMI3 is supplied with a silicon protective cover to protect it against knocks, oil and dirt.

5.   Service and maintenance

5.1   Technical data

Supply voltage .... 24 VDC +/-10%
Cable dimensions .... max. 0.75 mm^2
Relative humidity.. 0–95% (non-condensing)
Operating temperature.. −10°C to +40°C
Enclosure rating .... IP21 (EN 60529)
Port .... 1 x RJ12 (RS485)
10 x screw terminals
Dimensions (without bumper cover) .... 80 x 121 x 42 mm
Dimensions (with bumper cover) .... 86.1 x 127.1 x 50.9 mm
Max. power consumption .... 900 mW
Operating ambient temperature... -10°C to +40°C
Relative humidity.. 0 – 95% rh, non-condensing
IP sealing grade IP21

5.2   Maintenance

The OJ-VCH-HMI3 touch panel contains no parts that require service or maintenance. Contact your supplier in the case of problems.

### 5.3   Disposal and environmental protection

Help to protect the environment by disposing of the packaging and redundant products in an environmentally responsible manner.

Products marked with this symbol must not be disposed of with household waste, but must be delivered to a waste collection centre in accordance with current local regulations.
OJ-VCH-HMI3 contains electronic components and must not be disposed of together with household waste.
OJ-VCH-HMI3 must be disposed of in accordance with applicable local rules and regulations.
OJ-VCH-HMI3 meets the requirements for marking of electronic waste contained in the European WEEE Directive 2012/19/EU.
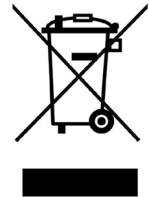
5.4   Liabillity

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5.5   Applied standards

EN 61000-6-2 and EN 61000-6-3 Electromagnetic compatibility (EMC)

5.6   Disclaimer

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