



Instruction manual

VCD2

CO detector

EN (English) original instructions

Original instructions

The original manual is written in UK English. All other language versions are translations of the original manual.

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Disclaimer of liability

The manufacturer cannot be held responsible for personal injury, damage to the CO detector or property damage caused by incorrect use, foreseeable misuse, or failure to follow the instructions in this manual. This also applies to unauthorised modifications of the CO detector and the use of non-approved spare parts, tools or accessories

The manufacturer reserves the right to modify this manual without notification beforehand

Customer service

Our customer service department is available 24 hours a day to provide any required technical information and support.

Please have the type plate information of the VCD2 CO detector available when you contact our customer service department (see §3.3).

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Warranty

The equipment supplied by Vitotherm has a one-year warranty covering materials from date of commissioning against defective parts, limited to the delivery of parts only. Warranty is only valid when the installation has been realised in accordance with our instructions and commissioning is executed by a Vitotherm engineer or by Vitotherm authorised personnel.

During the period of the warranty any failures to Vitotherm equipment will be repaired within 10-14 days. Our local service expert for future regular maintenance will be at our daily rate.



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1 Introduction

1.1 About this document

This manual contains instructions and safety information for operation, installation, commissioning, and maintenance of the Vitotherm VCD2 CO detector.

This manual is intended for:

- the owner of the CO detector;
- the worker that operates the CO detector;
- the qualified technician that performs the installation of the CO detector;
- the engineer that is authorised by Vitotherm to perform (re)commissioning, adjustments, troubleshooting, maintenance, and repairs of the CO detector.

1.2 Symbols and labels

1.2.1 Safety warnings

This manual contains safety warnings that may result in injury when ignored. Each safety warning is indicated with a signal word. The signal word corresponds with the level of risk of the described hazardous situation:

Signal word	Level of risk	If not avoided
▲ DANGER!	High	Will result in death or serious injury
▲ WARNING!	Medium	Could result in death or serious injury
▲ CAUTION!	Low	Could result in moderate or minor injury

Safety warnings given at the start of a section apply to the entire section.

Format example of a safety warning:

▲ WARNING!

Contact with live parts can cause electric shocks, burns or even death.

- Only perform work on electrical equipment if you are an authorised electrician.
- ► Before you start working on electrical equipment: Switch off and lock out the power supply isolator and verify that no voltage is present.

1.2.2 Notices

Messages that are not hazard-related are indicated with the signal word **NOTICE**. These messages do not have a safety alert symbol.

Format example of a message that is not hazard-related:

NOTICE

Operating the engine at an oil level below the minimum limit value can damage the engine.

▶ Regularly check the oil level and refill when necessary.

1.2.3 Other symbols



This symbol identifies a reference to an external document, such as an OFM manual.



1.3 Used terms and definitions

Term	Definition
CO detector	The combination of the control panel and the condensate pot.
CO ₂ dosing unit	The pre-installed collection of components that collect, dose, and transport the flue gases from the boiler.
Boiler	The heating appliance to which the CO ₂ dosing unit is connected. A water boiler is the most common type of heating appliance and will be used as the main example in this document.
Boiler house	The building in which the CO detector and boiler are installed.
OEM manual	User manual of the original equipment manufacturer.

1.4 Conformity

Vitotherm CO detectors carry the HortiQ ISSO 86 mark as a proof of compliance to the Eurasian market.

2 Safety

2.1 Introduction

Observe the instructions in this manual before you start working with the CO detector. If you fail to follow the instructions from this manual you can put persons, surroundings, the environment, and the CO detector at risk. Store this manual in an accessible place near the CO detector for future reference.

- Always comply with the information, such as labels and the type plate, attached directly to the CO detector and keep the information in a legible condition.
- ► Always comply with applicable local laws and regulations.



A Vitotherm CO detector is used in combination with an automatic forced draught burner system. Refer to the instruction manual of the burner system for more information.

2.2 Intended use

The Vitotherm CO detector is a carbon monoxide detector for measuring and detecting flue gasses directly from the burner to external applications (e.g. greenhouses).

- The CO detector must only be used in combination with an automatic forced draught burner system.
- The CO detector must always be installed as close as possible to the CO₂-fan and the flue gas exhaust.
- The CO detector must only be used for measuring and detecting flue gasses directly from the boiler.
- The CO detector must only be installed, operated, commissioned, and maintained according to the instructions in this manual.
- The CO detector must only be used for an application in compliance with the requirements in the order confirmation.
- The CO detector must only be used under ambient conditions in compliance with the requirements in the order confirmation.



 The CO detector must only be used in compliance with applicable local laws and regulations.

Safe use of the CO detector is only guaranteed if it is used as intended.

2.3 Reasonably foreseeable misuse

The following is considered foreseeable misuse:

- Operation and use of the CO detector that deviates from the intended use as described in the previous section.
- Failure to comply with the instructions in this manual.
- Failure to eliminate faults, malfunctions or defects of the CO detector that impose safety risks.
- Failure to carry out the inspections and maintenance operations as described in this manual.
- Unauthorized removal or modification of parts or safety components of the CO detector.
- Use of spare parts or accessories that have not been approved by the manufacturer.
- Operation in a closed-off or poorly ventilated room.

2.4 Qualification of personnel

Only authorised personnel is allowed to operate and clean the CO detector. They must possess the following qualifications:

- are legal of age;
- are familiar with and abide by the safety instructions and sections of this manual related to operating the CO detector;
- are familiar with and abide by the applicable local, national and international laws and regulations;
- are officially trained and certified by Vitotherm B.V.;
- have received adequate training to operate and clean the CO detector:
- have obtained authorisation to access the CO detector.

Only authorised technicians are allowed to install and maintain the CO detector. They must possess the following qualifications:

- are legal of age;
- are familiar and abide by the safety instructions and sections of this manual related to installation and maintenance of the CO detector;
- are familiar with and abide by the applicable local, national and international laws and regulations;
- are able to recognize the possible dangers of the CO detector and take the necessary measures to protect persons and property;
- have received adequate training in the safe maintenance of the CO detector;
- have obtained authorisation to access the CO detector.

2.5 Protective measures

2.5.1 Personal protective equipment (PPE)

Personnel that operate the CO detector must equip themselves with the following:		Technicians that install or perform maintenance on the CO detector must equip themselves with the following:		
	Wear foot protection		Wear foot protection	
	Wear eye protection		Wear eye protection	
	Wear ear protection (above 80 dB)		Wear protective gloves	
			Wear head protection (during lifting work)	



2.5.2 Organizational measures

The owner is responsible for carrying out the necessary organizational measures to ensure safe use. Amongst other measures this is achieved by, but not limited to:

- Training and authorising personnel. Vitotherm is responsible for distributing passwords to authorised personnel only.
- Performing hazard assessments of the complete system that incorporates the CO detector and informing personnel of the possible dangers and protective measures.
- Performing good housekeeping in the facility that houses the CO detector.
- Running a preventive maintenance program.

2.6 Residual risks

Despite the safe design and construction of the CO detector and the prescribed protective measures, the CO detector poses residual risks. This manual provides safety messages to indicate these risks. The formatting and appearance of safety messages that are dedicated to a particular section or sentence are explained in §1.2. Overall safety messages are grouped in the following sections.

2.6.1 Electricity

▲ WARNING!

Contact with live parts can cause electric shocks, burns or even death.

- Only perform work on electrical equipment if you are an authorised electrician.
- ► Perform the work on electrical equipment in accordance with the local safety standards.
- ▶ Do not make changes to the CO detector if you are not qualified to do so.
- ► Before you start working on electrical equipment: Switch off and lock out the power supply isolator and verify that no voltage is present.
- Use fuses that correspond with the installed power of the CO detector.
- Regularly check the electrical wiring for loose connections and damage and repair them without delay.

2.6.2 Mechanical

▲ WARNING!

The CO detector contains moving, pressurised, and sharp parts that can crush, cut, or hit.

- Do not operate the CO detector with covers or guards removed.
- Do not operate the CO detector with missing pipework or components.
- Be aware of sharp edges.

2.6.3 Transport and storage

A CAUTION!

The steel components of the CO detector are sensitive to corrosion damage.

► Always store the CO detector in a dry, indoor location.



2.7 Warning labels

Always comply with warning labels and information signs on the CO detector. The warning labels and information signs must be kept legible and must be replaced if necessary. For this purpose, contact the manufacturer.

2.8 Safety precautions

A CO detector is equipped with several safety components that help prevent hazardous situations.



For more information about the integration of the safety components into the system, please refer to the electrical wiring diagram.

2.8.1 Sensor safeguard

The sensor safeguard will deactivate the CO detector in the event of a sensor defect.

2.8.2 Pressure switch

The pressure switch shuts down the CO detector if the air flow over the CO sensor is insufficient.

2.8.3 Limit switch

Optionally, you can connect an ES6 limit switch to the CO detector to monitor the closed position of the chimney valve for 5 minutes after the CO_2 demand ends. The limit switch prevents the CO detector from drawing in unwanted flue gases. The CO detector has a safety chain contact that should be connected to the burner for deactivation in case of a fault.

3 Design and function

The CO detector prevents harmful CO from reaching the external application.

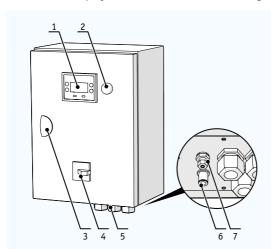
The 3-way valve is activated when there is a demand of CO₂. Clean air is blown over the CO sensor for two minutes. After two minutes, the CO₂ dosing unit measures the flue gasses which are released via the connected CO₂ fan or chimney valve.

When the CO concentration is more than 30 ppm, the CO_2 dosing unit stops releasing CO_2 and after one minute the CO dosing unit is automatically locked. The 3-way valve flushes the CO sensor with clean air until the measured level is 0 ppm. The CO detector needs to be reset before continuing operation.

The Vitotherm CO detector consists of a control panel and condensate pot.

3.1 Control panel

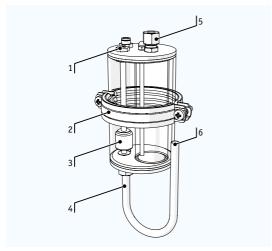
The CO detector is supplied with a control panel. The control panel is equipped with an interface and display, control switch, and indicator light.



- Interface & display
- 2 Failure feedback light
- 3 Key lock
- 4 Control switch
- 5 Cable connectors
- 6 Condensate pot connector
- 7 Outside air



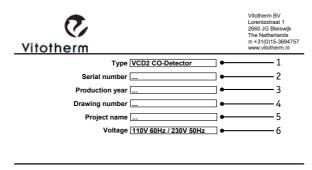
3.2 Condensate pot



- 1 Parker Legris Ø8 mm fitting
- 2 Two-screw pipe clamp
- 3 Floater
- 4 Water lock
- 5 VSH Threaded straight coupling BSP Ø12 mm
- 6 Water outlet

3.3 Type plate

The CO detector is marked in accordance with the applicable legislation requirements.



This CO panel must be installed according to the rules in force.

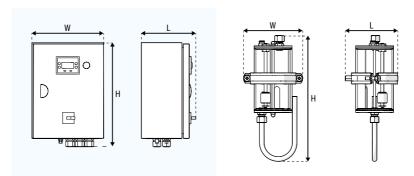
Before the CO panel is installed and put into operation, the instruction manual the working the CO panel the main switch must be switched off at all times.

- 1. Type
- 2. Serial number
- 3. Year of manufacture

- 4. Drawing number
- Project name
- 6. Voltage (V)

3.4 Dimensions

This section contains the standard dimensions of the CO detector.



Туре	L (mm)	W (mm)	H (mm)
VCD2 207		300	430
	138	156	310

3.5 Technical data

This section contains the standard dimensions, materials, and performance data of a Vitotherm CO detector in metric units.

For technical data regarding your specific CO detector, please refer to the type plate (see §3.3) or the order confirmation. For performance data in imperial units, please refer to Appendix C of this manual.

Туре	Voltage	3-way valve	Cupper pipe diameter	Blue PU hose diameter	Material housing
	VAC @ Hz	-	Ø mm	Ø mm	-
VCD2	100 – 230 @ 50/60	Modulating	12	8	Steel



Notes			

4 Installation

This chapter provides instructions for the basic installation of a CO detector onto a boiler or other heating appliance. For information about a custom set-up, please contact Vitotherm.

▲ CAUTION!	The CO detector may only be installed by qualified personnel. Handling the CO detector without the required knowledge and experience may damage the CO detector or cause hazardous situations during installation and use.
▲ WARNING!	The CO detector may only be installed in a sufficiently ventilated boiler house.
NOTICE	The CO detector must always be installed according to national and local laws and regulations.

4.1 Checking the delivery

To check the delivery:

- 1. Transport the CO detector to an accessible place near the boiler.
- 2. Remove the packaging material.
- 3. Check if all parts have been delivered according to the agreed scope. If a part is missing, contact Vitotherm immediately.
- 4. Check all delivered parts for damage.



Damaged parts can affect the correct and safe functioning of the CO detector.

- ▶ Do not install damaged parts.
- ► If any parts are damaged upon delivery, please contact Vitotherm.
- 5. Check if the delivered CO detector will fit in the designated area of the room. For the dimensions of the CO detector, see §3.4



4.2 Electrical connections

All electric cabling is pre-wired to a junction box in the control panel. During installation, this cabling must be connected to the burner panel.

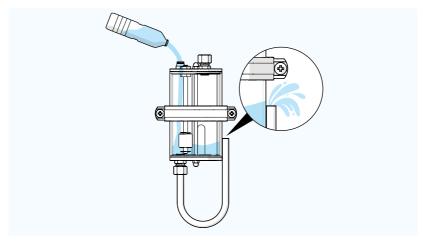
NOTICE	For all electrical connections, the applicable local standards and the connection requirements must be taken into account.
<u> </u>	For more information about the electrical connections and integrated circuits, please refer to the electrical wiring diagram.

4.3 Installing the CO detector

To install the control panel and condensate pot:

- 1. Place the control panel at the designated location, as close as possible to the chimney.
- 2. Place the condensate pot within 50 100 cm below the control panel.
- 3. Determine the location where the cupper measuring tube connects to the chimney. Ensure the distance is maximum 10 meters.
- 4. Drill a hole in the chimney. Use a Ø12 mm steel drill.
- 5. Insert the cupper tube through the drilled hole in the chimney. Ensure the cupper tube inserts 20 cm and reaches the centre of the chimney.
- 6. Install the cupper tube in a downward slope.
- 7. Connect the cupper tube to the top of the condensate pot.
- 8. Connect the supplied glands to the bottom of the control panel.

Fill the condensate pot with water through the PU hose connection until the water lock overflows via the water outlet.



- 10. Connect a PU hose to the top of the condensate pot.
- 11. Cut the PU hose to the appropriate length it should bridge between the control panel and the condensate pot.
- 12. Connect the other side of the PU hose to the bottom of the control panel.
- 13. Install the PU hose in a downward direction.
- 14. Connect a power cord to the terminal block in the control panel. The power cord must consist of a phase, neutral, and earth.
- 15. Connect the control panel to the burner panel and flue gas damper. An overview can be found in Appendix A.



Always check which situation applies to the burner in use.



Notes		





5 Commissioning

Before commissioning the CO detector, make sure it meets the requirements below.



Commissioning of a Vitotherm installation may only be performed by certified personnel.

The CO detector is completely installed according to the instructions in this manual, including:

Electrical wiring is completed according to the provided electrical wiring
diagram, free of errors, so that the electrical pre-start condition circuit (safety
chain) is closed.
Electrical power is available on the CO detector.
Electrical power is the correct voltage supply.
Safety components are functioning correctly and ready for operation (see §2.8).
The condensate pot is connected to the control panel at the correct height (max.
100cm).
The minimum water level is properly adjusted. The minimum water level depends
on the switch point of the float.
Sufficient fresh air is available.
The necessary local work permits are available.
Qualified personnel is available for instructions, system transfer and site
acceptance test.
The CiTiceL sensor is calibrated annually using calibration gas. If calibration
of the CiTiceL sensor is not feasible, it should be replaced annually. The
replacement CiTiceL sensor can be ordered separately and is identified by serial
number 103283.
A safe workspace is available, according to health and safety regulations and
realistic common sense.





6 Operation

This chapter describes the main operational procedures of the CO detector.

6.1 Controls

The CO detector is controlled via the control panel. This panel has several standard control switches and a feedback LED. See §3.1 for an overview of the standard components of the control panel.

6.1.1 Main power switch

The CO detector is activated by using the main power switch on the front of the casing.

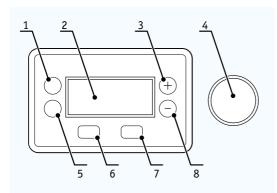
6.2 Switching the CO detector on or off

The CO detector is switched on or off with the main switch. This switch has two options:

- 1 = 0N
- 0 = 0ff.

6.3 Manually operating the CO detector

The CO detector can be manually operated via the Millenium interface on the control panel.



- 1 Non-functional
- 2 Display
- 3 Non-functional
- 4 Failure feedback light
- 5 Non-functional
- 6 Reading in-/outputs
- 7 OK/reset
- 8 Non-functional

6.4 Performing a system reset

A system reset must be performed after a failure in the CO detector has been resolved. This procedure allows the CO detector to be put back into operation.

To reset the CO detector:

Press the OK button on the control panel.

If problems persist, please contact Vitotherm.

6.5 Retrieving a recent occurred error

The most recently occurred error can be retrieved via the control panel.

To retrieve the most recent occurred error:

Press and hold the OK button on the control panel.



Notes	





7 Troubleshooting

System failures are displayed on the control panel. The table below can be used to identify and solve the failure.



- ► It may take a few minutes for a failure to be displayed after the occurrence of the system failure.
- ► For more detailed information about these system failures, please refer to the OEM manual of the Lamtec operating system.

Description	Cause(s)	Solution(s)		
Failure feedback light lights up.	CO concentration is higher	Press and hold the OK button. The display shows the last recorded fault. Press the OK button to rese the CO detector.		
The failure is displayed 120 seconds after the system failure occurs.	than 30 ppm.			
Failure feedback light lights up. The display shows 'sensor failure'.	The wiring is interrupted,	Check the CO sensor and wiring of the CO sensor for		
The failure is displayed 60 seconds after the system failure occurs.	defective.	any damage. If necessary, replace the component(s).		
The display shows 'pump failure'.	To a Company of the Company	Check the pump, pressure		
The failure is displayed 10 seconds after the system failure occurs.	Insufficient air flow over the CO sensor.	switch, and hoses for any damage. If necessary, replace the component(s)		

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Description	Cause(s)	Solution(s)		
The display shows 'fill condensate pot'.	Insufficient water in the	Fill the condensate pot		
The failure is displayed 5 seconds after the system failure occurs.	condensate pot.	with water through the PU hose until the water lock overflows.		
The display shows 'chimney valve not closed'.		Close the chimney valve to activate the ES6 limit switch.		
The failure is displayed 300 seconds after the system failure occurs.	The chimney valve is not closed (completely).			
The display shows 'CO value too high'.		Check the combustion		
The failure is displayed 120 seconds after the system failure occurs.	The measured CO value is too high.	process and the air supply to the burner.		

If problems keep occurring, please contact Vitotherm.

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Notes			





8 Maintenance

▲ WARNING!

Make sure the CO detector is completely shut down before performing maintenance on the CO detector:

- Use the control switch on the control panel to close the fuel supply to the burner.
- Interrupt the mains power supply to the burner system and CO detector.
- ► Shut down the CO detector with the main switch on the casing.



This section contains maintenance instructions for the standard components of a CO detector. For maintenance instructions for any other (optional) components, please refer to the corresponding OEM manual.

8.1 Pre-emptive parts replacement schedule

Certain parts of the CO detector should be replaced every X years to prevent failure of vital components. The table below gives an overview of these maintenance activities and the frequency with which they should be performed.

Task	Interval (years)						To be carried out by	
	1	2	5	8	10	15	20	
Pump		•						
CO sensor			•					
Pressure switch					•			
3-way valve		•						

8.2 Annual Periodic Maintenance

▲ CAUTION!

To guarantee the quality and safety of the CO detector, Vitotherm advises annual Periodic Maintenance (PM) to be performed by their own certified service engineers.

NOTICE

The electronic components are susceptible to static discharge during installation or maintenance.

- Wear an ESD wristband connected to the ground if possible. Alternatively, you can discharge yourself by touching a metal part of the equipment.
- Discharge every tool by touching a metal part of the equipment before use.

8.2.1 Control panel

The following aspects of the control panel should be inspected:

- All electrical connections;
- The cables, for any sign of overload or burns;
- All switches and lights, for correct functioning;

8.2.2 Condensate pot

The following aspects of the condensate pot should be inspected:

- The operation and water level of the float.
- The operation of the pump.
- The operation of the pressure switch.
- The operation of the supply line.



Notes			

9 Decommissioning and disposal

This section contains instructions and information on how to properly decommission and dispose of the CO detector.

▲ CAUTION!

The CO detector may only be decommissioned by qualified personnel. Handling the CO detector and supporting components without the required knowledge and experience may damage the CO detector or cause hazardous situations during installation and use.

9.1 Decommissioning

To decommission the CO detector:

- 1. Shut down the CO detector with the main switch on the control panel.
- 2. Cut off the power source to the control panel.
- 3. Remove the copper pipe from the burner chimney.
- 4. Seal the hole in the burner chimney.

NOTICE

The sealing material for the hole in the chimney depends on the material of the chimney. Always choose a suitable material to seal the hole in the chimney to prevent any leaks.



9.2 Disposal

▲ CAUTION!	Separate and dispose the components of the CO detector into the applicable waste streams based on their material, in accordance with local regulations.
NOTICE	All structural components of a Vitotherm CO detector are made of powder-coated steel and should be disposed of accordingly.
<u> </u>	For more information on how to properly dispose of supplier parts, please refer to the OEM manual.

10 Transport and storage

This section contains instructions and information on how to properly transport and store the CO detector.

10.1 Transport

When transporting the components of the CO detector separately, use suitable hoisting or lifting equipment.

10.2 Storage

▲ CAUTION!

The steel components of the CO detector are sensitive to corrosion damage.

Always store the CO detector in a dry, indoor location.

Do not unpack the CO detector from the optional transport crate until you are ready to install it.

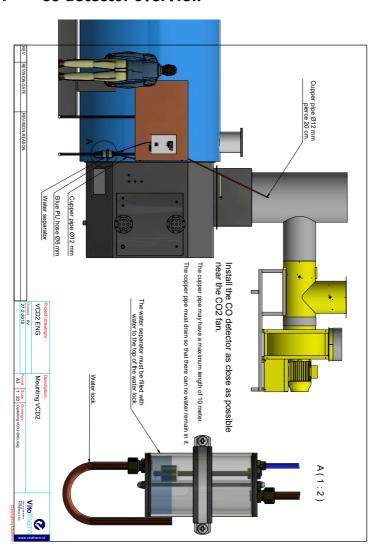
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Notes			

Appendices

A CO detector overview



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B Declaration of conformity



Declaration of conformity Manufacturer: VITOTHERM B.V. Adress: Lorentzstraat 1 2665 / Bellswijk Netherlands Products: CO detector Type: VITOTHERM B.V. CO2 dosing unit types:

Applications:	VITOTHERM CO2 dosing units for greenhouses		
	CO detection in fleugas for CO2 dosing units for greenhouses		
Standards:	Mentioned products are in compliance with the following technical standards:		
	NEN EN-ISO 14120		
	ISSO 86		
Directives:	Mentioned products are according the following European directives:		
	EMC 2014-30-EU		
	MD 2006-42-EG		
	LVD 2014-35-EU		
Protection class IP:	Degree of protection		
	IP54 IP - EN 60529		
Marking of type plate:	The CO detector units are labelled with:		
	CE mark		
	HortiQ		

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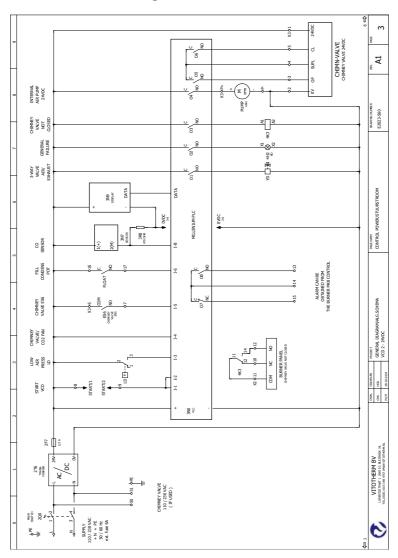
C Technical data (imperial)

Туре	Voltage	3-way valve	Cupper pipe diameter	Blue PU hose diameter	Material housing
	VAC @ Hz	-	Ø mm	Ø mm	-
VCD2	100 – 230 @ 50/60	Modulating	15/32	5/16	S355

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Electrical diagram D



Notes	



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Notes	



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