

Original Operating Instructions

V-VC 40 | 50 | 75 | 100 | 150

Vacuum pump



**Elmo
Rietschle**

by Gardner Denver



**V-Serie
V-Series**

**Drehschieber
Rotary Vane**



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Foreword

1 Foreword

1.1 Principles

These operating instructions:

- are a part of the following oil-flooded rotary vane vacuum pumps, V-VC 40, V-VC 50, V-VC 75, V-VC 100 and V-VC 150.
- describe how to use them safely and properly in all life phases.
- must be available where the equipment is used.

1.2 Target group

The target group for these instructions is technically trained specialists.

1.3 Supplier documentation and accompanying documents

Document	Contents	No.
Supplier documentation	Operating Instructions	BA 231
	Declaration of Conformity	C 0045
	Declaration of harmlessness	7.7025.003.17
Spare parts' list	Spare parts document	E 231
Data sheet	Technical data and graphs	D 231 D 231-30
Info sheet	Water vapour compatibility for oil-flooded vacuum pumps	I 200
Info sheet	Storage guidelines for machines	I 150
Info sheet	Storage guidelines for lubricants	I 100
Manufacturer's declaration	EU Directive 2011/65/EU (RoHS II)	—




1.4 Abbreviations

Fig.	Figure
V-VC	Vacuum pump
m ³ /h	Suction capacity
mbar (abs.)	Final vacuum, operating vacuum
IV	Version with reduced final vacuum
XD	Variant for increased water vapour compatibility

1.5 Directives, standards, laws

See Conformity Declaration

1.6 Symbols and meaning

Symbol	Explanation
▷	Condition, pre-requisite
####	Instructions, action
a), b),...	Instructions in several steps
⇒	Results
 [-> 14]	Cross reference with page number
	Information, note
	Safety symbol Warns of potential risk of injury Obey all the safety instructions with this symbol in order to avoid injury and death.

1.7 Technical terms and meaning

Term	Explanation
Machines	Pump and motor combination ready to be connected
Motor	Pump drive motor
Vacuum pump	Machine to create a vacuum
Rotary vane	Machine's design or active principle
Suction capacity	Vacuum pump volume flow related to the condition in the suction connection
Final pressure (abs.)	The maximum vacuum that a pump reaches when the suction opening is closed. Given as absolute pressure.
Permanent vacuum	The vacuum or the suction range at which the pump operates permanently. The permanent vacuum or intake pressure is \geq than the final vacuum and $<$ than the atmospheric pressure.
Noise emission	The noise emitted at a specific loading given as a figure, sound pressure level dB(A) as per EN ISO 3744..





1.8 Copyright

Passing on or copying this document, using and providing information on its contents are prohibited unless expressly permitted.

2 Safety

The manufacturer is not responsible for damage if you do not follow all of this documentation.

2.1 Warning instruction markings

Warning	Danger level	Consequences if not obeyed
	immediately imminent danger	Death, severe bodily injury
	possible imminent danger	Death, severe bodily injury
	possible hazardous situation	Slight bodily injury
	possible hazardous situation	Material damage

2.2 General

These operating instructions contain basic instructions for installation, commissioning, maintenance and inspection work which must be obeyed to ensure the safe operation of the machine and prevent physical and material damage.

The safety instructions in all sections must be taken into consideration.

The operating instructions must be read by the responsible technical personnel/ operator before installing and commissioning and must be fully understood. The contents of the operating instructions must always be available on site for the technical personnel/ operator. Instructions fixed directly onto the machine must be obeyed and must always remain legible. This applies for example to:

- Symbols for connections
- Data and motor data plate
- Instruction and warning plates

The operator is responsible for observing local regulations.

2.3 Designated use

The machine must only be operated in such areas as are described in the operating instructions:

- only operate the machine in a technically perfect condition
- do not operate the machine when it is only partially assembled
- the machine must only be operated at an ambient temperature and a suction temperature of between 12 and 40 °C
Please contact us for temperatures outside this range.
- the machine may convey, compress or extract the following media:
 - Air
The air sucked in may contain water vapour but no water or other liquids. For water vapour compatibility see Info I 200
 - all non-explosive, non-flammable, non-aggressive and non-poisonous dry gases and gas air mixtures

2.4 Unacceptable operating modes

- extracting, conveying and compressing explosive, inflammable, aggressive or poisonous media, e.g. dust as per ATEX zone 20-22, solvents as well as gaseous oxygen and other oxidants
- extracting, conveying and compressing explosive, inflammable, aggressive, oxidative or poisonous media, e.g. dust as per ATEX zone 20-22, solvents
- using the machine in non-commercial plants if the necessary precautions and protective measures have not been taken in the plant
- installing in environments that are at risk of explosions
- using the machine in areas with ionising radiation
- back pressures on the outlet side of more than +0,1 bars
- modifications to the machine and accessories

2.5 Personal qualifications and training

- Ensure that people entrusted with working on the machine have read and understood these operating instructions before starting work, particularly the safety instructions for installation, commissioning, maintenance and inspection work.
- Manage the responsibilities, competence and monitoring of staff
- all work must only be carried out by technical specialists:
 - Installation, commissioning, maintenance and inspection work
 - Working with electricity
- personnel being trained to work on the machine must be supervised by technical specialists only

2.6 Safety-conscious work

The following safety regulations apply in addition to the safety instructions and intended use listed in these instructions:

- Accident prevention regulations, safety and operating regulations
- the standards and laws in force

2.7 Safety notes for the operator

- hot parts of the machine must not be accessible during operation or must be fitted with a guard
- People must not be endangered by the free extraction or discharge of pumped media
- Risks arising from electrical energy must be eliminated.
- The machine must not be in touch with inflammable substances.
Danger of fire by hot surfaces, discharge of pumped media or cooling air

2.8 Safety instructions for installing, commissioning and maintenance

- The operator will ensure that any installation, commissioning and maintenance work is carried out by authorised, qualified specialists who have gained sufficient information by an in-depth study of the operating instructions.
- Only work on the machine when it is idle and cannot be switched on again
- Ensure that you follow the procedure for decommissioning the machine described in the operating instructions.
- Fit or start up safety and protective devices again immediately after finishing work.
- Conversion work or modifications to the machine are only permissible with the manufacturer's consent.
- Only use original parts or parts approved by the manufacturer. The use of other parts may invalidate liability for any consequences arising.
- Keep unauthorised people away from the machine

2.9 Guarantee conditions

The manufacturer's guarantee or warranty will no longer apply in the following cases:

- Improper use
- Not complying with these instructions
- Operation by insufficiently qualified staff
- Using spare parts that have not been approved by **Gardner Denver Schopfheim GmbH**
- Unauthorised modifications to the machine or the accessories supplied by **Gardner Denver Schopfheim GmbH**

3 Transport, storage and disposal

3.1 Transportation

3.1.1 Unpack and check the delivery condition

- a) Unpack the machine on receipt and check for transport damage.
- b) Notify the manufacturer of transport damage immediately
- c) Dispose of the packaging in accordance with the local regulations in force.

3.1.2 Lifting and transporting

WARNING

Death or limbs crushed as a result of the items being transported falling or tipping over.

- ▷ When transporting with the lifting device remember:
 - a) Select the lifting device suitable for the total weight to be transported.
 - b) Ensure that the machine cannot tip and fall.
 - c) Do not stop under a suspended load.
 - d) Put the goods to be conveyed on a horizontal base.

Lifting device/ Transporting with a crane

WARNING

Bodily injury resulting from improper operation

- a) Loads crosswise to the ring level are not permitted.
- b) Avoid impact stress.

- a) Tighten the eyebolts (Fig. 1/1) firmly.
- b) The machine must be suspended on the eyebolt using the lifting device for lifting and transporting.

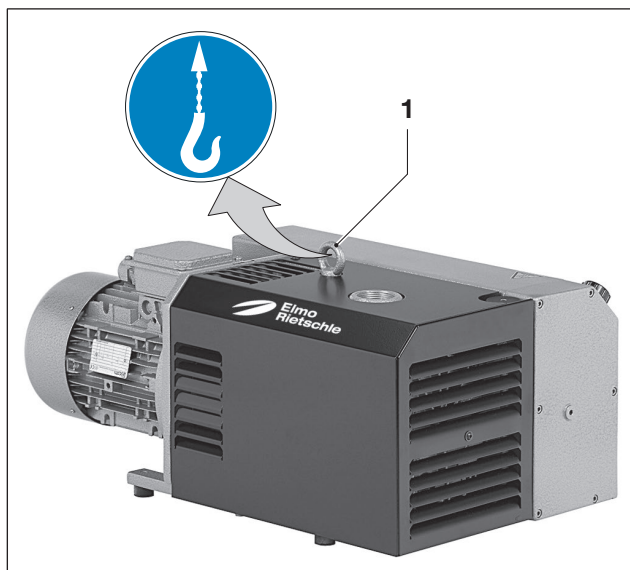


Fig. 1 Lifting and transporting

1 Eyebolt

3.2 Storage

NOTICE

Material damage caused by improper storage.

- ▷ Ensure that the storage area meets the following conditions:
 - a) dust free
 - b) vibration free

3.2.1 Ambient conditions for storage

Ambient conditions	Value
Relative humidity	0 % to 80 %
Storage temperature	- 10 °C to +60 °C



For long-term storage (more than 3 months), it is useful to use a preservation oil rather than operating oil.
See Info “Machine storage guidelines” I 150 and I 100

3.3 Disposal

WARNING

Danger from inflammable, corrosive or poisonous substances.

Machines that come into contact with hazardous substances must be decontaminated before disposal.

- ▷ When disposing ensure the following:
 - a) Collect oils and grease separately and dispose of in accordance with the local regulations in force.
 - b) Do not mix solvents, cold cleaner and paint residues
 - c) Remove components and dispose of them in accordance with the local regulations in force.
 - d) Dispose of the machine in accordance with the national and local regulations in force.
 - e) Parts subject to wear and tear (marked as such in the spare parts list) are special waste and must be disposed of in accordance with the national and local waste laws.

4 Set up and operation

4.1 Setup

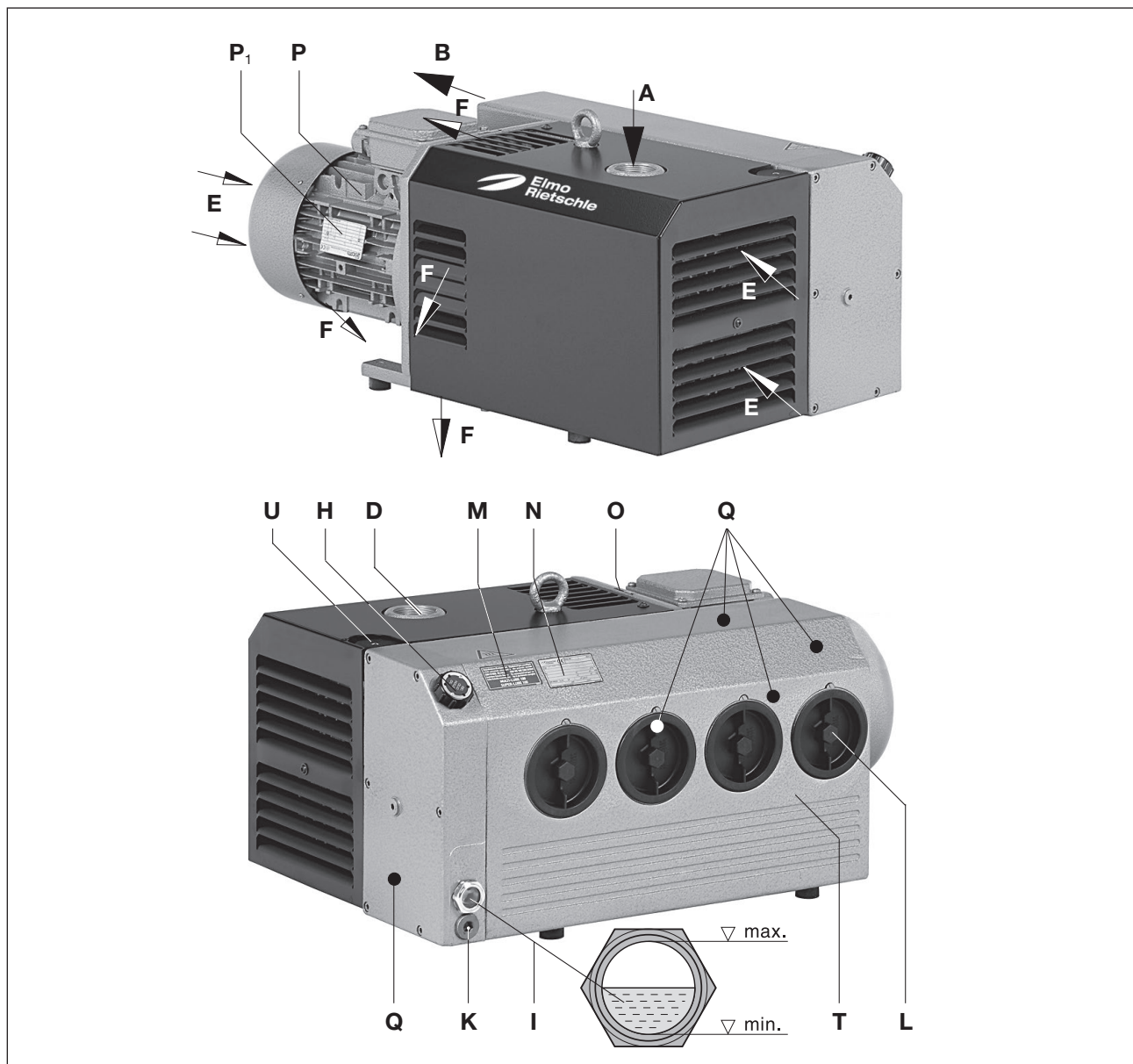


Fig. 2 Vacuum pump V-VC 40 - V-VC 150

- | | | | |
|----------|-----------------------|----------------------|--------------------------|
| A | Vacuum connection | M | Oil recommendation plate |
| B | Exhaust air outlet | N | Data plate |
| D | Suction flange | O | Rotation direction arrow |
| E | Cooling air inlet | P | Drive motor |
| F | Cooling air outlet | P₁ | Motor data plate |
| H | Oil filling point | Q | hot surfaces > 70 °C |
| I | Oil sight glass | T | Oil remover housing |
| K | Oil discharge point | U | Gas ballast valve |
| L | Oil separator element | | |
- V-VC 40/50/75 -> 3 x • V-VC 100/150 -> 4 x

4.1.1 Data plate

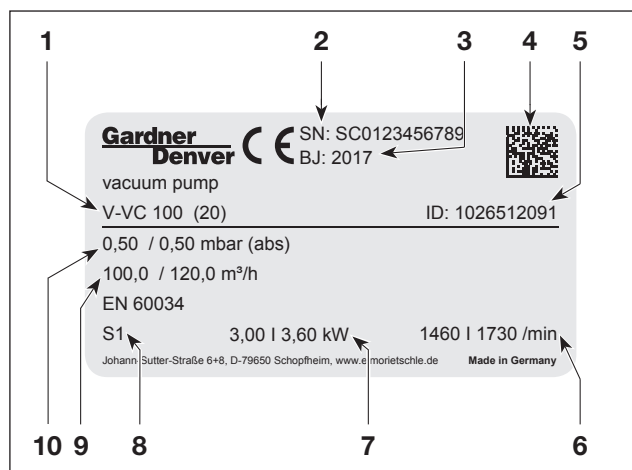


Fig. 3 Data plate

- 1 Type/ Size (mechanical version)
- 2 Serial number
- 3 Year of construction
- 4 Data Matrix Barcode
- 5 Item no.
- 6 Speed 50 Hz/60 Hz
- 7 Motor output 50 Hz/60 Hz
- 8 Operating mode
- 9 Suction capacity 50 Hz/60 Hz
- 10 Ultimate vacuum (abs.) 50 Hz/60 Hz

Following information are encrypted in the barcode:

- Material number (MA)
- Production order (PR)
- Serial number (SC)

4.2 Description

V-VC 40, V-VC 50, V-VC 75, V-VC 100 and V-VC 150 150 have a micro filter on the intake side and an oil and oil mist separator for the return of the oil to the oil system on the outlet side. The vacuum pump is housed in a sound cover. A fan between the pump housing and the motor cools the air in the pump housing and cools the circulating oil.

An integral non-return valve prevents the evacuated system from being ventilated after the pump has stopped. If the machine has been idle for more than two minutes the connected pipe should be ventilated to atmospheric pressure.

A gas ballast valve fitted as standard (Fig. 2/U) prevents condensation of water vapour in the inside of the pump when low amounts of steam are sucked in when the pump is at operating temperature. A reinforced gas ballast (optional) can be used if there is a higher amount of water vapour.

The pumps are driven by standard flanged three-phase motors using a coupling.

Design „XD“: The functional parts are more resistant against water steam and solvents. In addition, glass-fibre reinforced slide gates (GF) are used that are made of epoxy resin. The gas ballast quantity was increased. Generally, the oil sump temperature was clearly increased compared with the standard design.

Design „IV“: The pump is optimised to reach an increased final pressure and has no gas ballast valve. This variant is especially suitable as backing pump for the operation of a booster pump.

4.3 Areas of application

These oil-flooded rotary vane vacuum pumps V-VC 40, V-VC 50, V-VC 75, V-VC 100 and V-VC 150 are suitable for producing vacuums. The nominal suction capacity with free suction is 40, 50, 70, 100 and 150 m³/h at 50 Hz. Data sheet D231 / D231-30 shows the dependency of the suction capacity on the intake pressure. These types are suitable for the evacuation of closed systems or for a continuous vacuum within the following intake pressure ranges:

Standard pump: 0.5 to 500 mbar (abs.)

Design „IV“: < 100 mbar (abs.)

Design „XD“: 3.0 to 500 mbar (abs.)

If the machine is operated continuously outside these ranges there is the risk of oil leaking through the outlet opening. When evacuating closed systems the volume to be evacuated must be no more than 2 % of the nominal suction capacity of the vacuum pump.

For permanent operation of > 100 mbar (abs.) the next larger motor output must be used.



If the unit is switched on more frequently (at regular intervals of about 10 times an hour) or at higher ambient temperatures and intake temperatures, the excess temperature limit of the motor winding and the bearings may be exceeded.

Please contact the manufacturer should the unit be used under such conditions



If it is installed in the open air the unit must be protected from environmental influences, (e.g. by a protective roof).

5 Installation

5.1 Preparing for installation

Check the following points:

- Machine freely accessible from all sides
- Do not close ventilation grids and holes
- Sufficient room for installing and removing pipes and for maintenance work, particularly for installing and dismantling the machine
- No external vibration effects
- Do not suck any hot exhaust air from other machines into the cooling system.



The suction flange (Fig. 2/D), oil filling point (Fig. 2/H), oil sight glass (Fig. 2/I), oil outlet (Fig. 2/K), gas ballast (Fig. 2/U) and the oil removing device housing (Fig. 2/T) must be easily accessible. The cooling air inlets (Fig. 2/E) and the cooling air outlets (Fig. 2/F) must be at least 30 cm away from adjacent walls. Cooling air coming out must not be sucked in again. For maintenance work there must be a space of at least 40 cm around the machine.

5.2 Installation

NOTICE

The machine may only be operated when it is set up horizontally.

Material damage resulting from the machine tipping over and falling.

When installed at more than 1000 m above sea level a reduction in power is noticeable. In this case we would ask you to contact us.

Ensure that the foundation complies with the following conditions:

- Level and straight
- The bearing surface must be at least the same size as the machine
- The bearing surface must be able to bear the weight of the machine



It is possible to install the machine on a firm base without anchoring. When installing on a substructure we recommend fixing with flexible buffers

5.3 Connecting pipes



WARNING

Sealing or constricting of the exhaust air outlet (Fig. 2/B) may lead to severe or fatal injuries!

In the aggregate an inside pressure can be higher and higher, which leads to the destruction of components!

NOTICE

Material damage resulting from the forces and torques of the pipes on the unit being too high.
Only screw pipes in by hand.

The suction capacity of the vacuum pump is reduced if the suction pipe is too narrow and/or too long.

Counter pressures on the outlet side are only permissible up to + 0.1 bar.

Prevent liquids accumulating in the exhaust line.

- a) The vacuum connection (Fig. 2/A) can be found on the suction flange (Fig. 2/D).
- b) The discharged air can be freely blown out through the exhaust air hole (Fig. 2/B) or conducted away using a hose or pipe.

5.4 Filling with lubricating oil

NOTICE

The pumps are delivered with first oil filling. With this, it can happen that the oil has a dark colour due to graphite leaching.

- a) Fill the lubricating oil (for suitable types see the "Maintenance" section) via the oil filling point (Fig. 2/H) up to the upper edge of the sight glass (Fig. 2/I).
- b) Close the oil filling points.

5.5 Connecting the motor



DANGER

Danger of death if the electrical installation has not been done professionally.

The electrical installation must only be done by a qualified electrician observing EN 60204. The operating company has to provide the main switch.

- a) The motor's electrical data is given on the data plate (Fig. 2/N) or on the motor data plate (Fig. 2/P₁). The motors comply with DIN EN 60034 and are in protection class IP 55 and insulation class F. The appropriate connection diagram is located in the motor's terminal box (not for the plug connection version). Compare the motor data with the data of the existing mains network (current type, voltage, network frequency, permitted current value).
- b) Connect the motor via the motor protection switch (for safety reasons, a motor protection switch is required and the connecting cable must be installed via a cable fitting to provide strain relief).

We recommend using motor protection switches with delayed switch off, depending on possible excess current. Temporary excess current can occur when the machine is started cold.

NOTICE

Power supply

The conditions at the installation location must match the information on the motor data plate. Without derating the following is permissible:

- $\pm 5\%$ Voltage deviation
- $\pm 2\%$ Frequency deviation

6 Commissioning and decommissioning

6.1 Commissioning

WARNING

Improper use

May lead to severe or fatal injuries. Therefore be sure to obey the safety instructions.



CAUTION

Hot surfaces

When the machine is at operating temperature the surface temperatures on the components (Fig. 2/Q) may go above 70 °C. You must avoid touching the hot surfaces (marked with warning plates).



CAUTION

Noise emission

The highest noise pressure levels measured as per EN ISO 3744 are given in Section 9. When spending a long time in the vicinity of the running machine use ear protectors to avoid permanent damage to your hearing.

CAUTION

Oil aerosols in the extracted air

In spite of the air oil removing system separating the oil mist to a large extent, the extracted air contains a small residue of oil aerosols. Breathing in these aerosols all the time could damage your health. Therefore you must ensure that the installation room is well ventilated.

6.1.1 Checking the rotation direction

- ▷ The drive shaft direction of rotation is shown by the rotation direction arrow (Fig. 2/O) on the motor flange.
- a) Start the motor briefly (max. two seconds) to check the direction of rotation. When looking at the motor fan, it must rotate clockwise.

NOTICE

Incorrect direction of rotation

Operating in the wrong direction of rotation leads to damage to the machine.

Use a phase sequence indicator to check the direction of rotation (**anti-clockwise rotating field**).

- b) After correcting the direction of rotation if necessary, start the motor again and stop it again after 2 minutes in order to top missing oil up to the upper edge of the sight glass (Fig. 2/I). This topping up at the filling point (Fig. 2/ H) must be repeated until all the oil pipes have been filled completely. The filling point must not be open when the pump is running.

6.2 Decommissioning/ storing

Stop the machine

- a) Switch the machine off.
 - b) If available close the cut off device in the suction and pressure pipe.
 - c) Disconnect the machine from the electricity source.
 - d) Depressurise the machine:
Open the pipes slowly.
⇒ The pressure reduces slowly.
 - e) Remove the pipes and hoses.
 - f) Seal the connections for suction and pressure nozzles using adhesive foil.
- 📄 see also Section 3.2.1, Page 11

6.3 Re-commissioning

- a) Check the condition of the machine (cleanliness, cabling etc.).
 - b) Drain the preserving agents.
- 📄 For installation see Section 5 Page 15
- 📄 For commissioning see Section 6.1 Page 18

7 Maintenance and repair



DANGER

Danger of death from touching live parts.

Before maintenance work disconnect the machine by pressing the main switch or unplugging it and ensure that it cannot be turned on again.



WARNING

Hot surfaces and equipment

During maintenance work there is the danger of getting burnt on hot components (Fig. 2/Q) and by the machine lubricating oil. Wait for the machine to cool down.

7.1 Ensuring operational safety

Regular maintenance work must be carried out in order to ensure operational safety.

Maintenance intervals also depend on the operational demands on the machine.

With any work observe the safety instructions described in Section 2.8 "Safety notes for installation, commissioning and maintenance".

The whole unit should always be kept in a clean condition.

7.2 Maintenance work

Interval	Maintenance to be carried out	Section
monthly	Check the pipes and screws for leaks and to ensure they are seated properly and if necessary seal again or tighten up.	—
monthly	Check the terminal box and cable inlet holes for leaks and if necessary re-seal.	—
monthly	Clean the ventilation slots on the machine and the motor cooling ribs.	—
depending on how dirty the discharged medium is.	Clean intake air filter Clean gas ballast valve filter	7.2.1
at least once a year	Check for coupling wear	7.2.2
daily	Check the oil level	7.2.3
500 - 2000 h	Change the oil	
2000 h	Change the oil separator elements	7.2.4

7.2.1 Air filtering

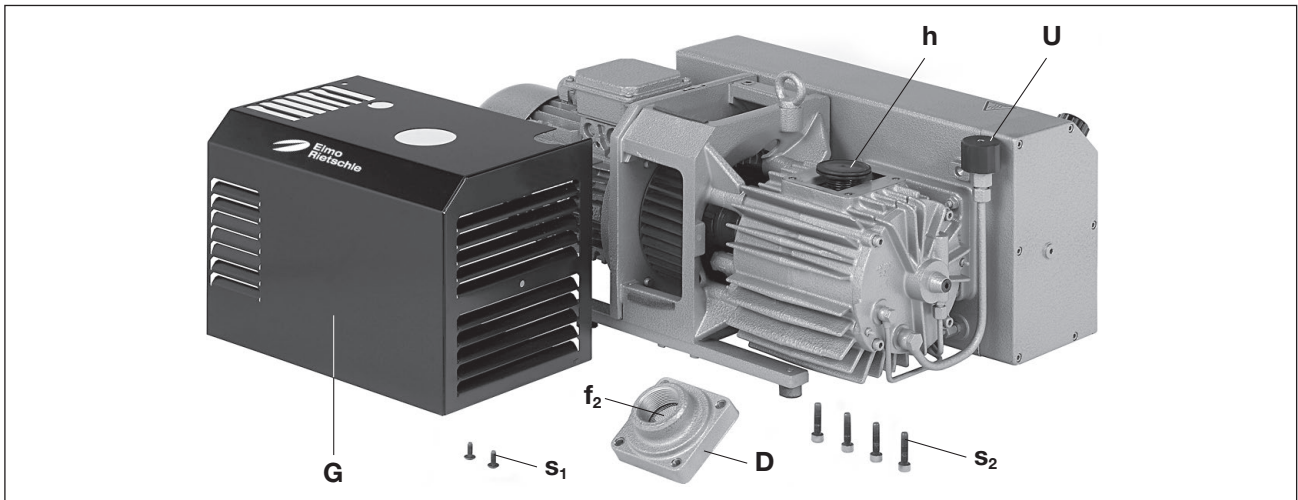


Fig. 4 Air filtering

- D** Suction flange
- G** Cover
- U** Gas ballast valve
- f₂** Micro filter
- h** Valve
- s₁** Lens flange screw
- s₂** Screws

NOTICE

Insufficient maintenance on the air filter
 The power of the machine lessens and damage may occur to the machine.

Intake air filter:

The micro filter (Fig. 4/f₂) must be cleaned by rinsing out or purging or replaced more or less often depending on how dirty the discharged medium is. Remove the cover (Fig. 4/G) after undoing the screws (Fig. 4/s₁) and remove the suction flange (Fig. 4/D) after undoing the screws (Fig. 4/s₂). Re-assemble in reverse order. After that check the function of the valve. For this purpose fit a shut-off device (enclosed volume min. 1 litre) on the suction side and starts vacuum pump shortly. Afterwards the vacuum achieved must remain constantly.

Gas ballast valve filter:

The pumps work with a gas ballast valve (Fig. 4/U). The inbuilt filter disc Fig. 5/f₃) and micro filter discs Fig. 5/f₄) must be cleaned more or less often by purging through is. By undoing the countersunk screw (Fig. 5/g₁) and removing the plastic cover (Fig. 5/h₁) the filter parts can be removed for cleaning. Re-assemble in reverse order.

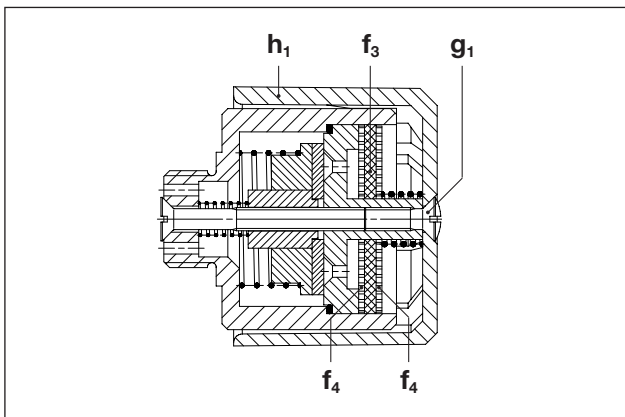


Fig. 5 Gas ballast valve

- h₁** Cover
- f₃** Filter disc
- g₁** Countersunk screw
- f₄** Micro filter discs

7.2.2 Coupling

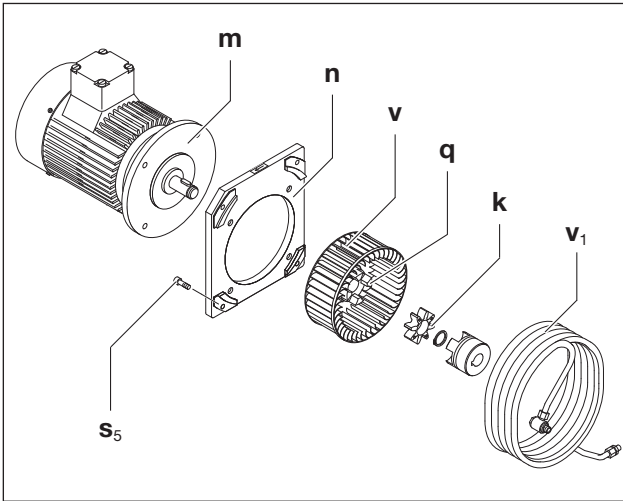


Fig. 6 Coupling

- k** Coupling sprocket
- m** Motor
- n** Motor flange
- q** Coupling half on the motor side
- s₅** Screws
- v** Fan
- v₁** Cooling coil (only with V-VC 150)

The coupling sprocket (Fig. 6/k) is subject to wear and must be checked regularly (at least once a year). When doing this the cooling coil (Fig. 6/v₁) must be cleaned each time by purging.

CAUTION

Defective coupling sprocket

Defective sprockets may lead to the rotor shaft breaking.

To check the coupling switch the motor (Fig. 6/m) off and ensure that it cannot be switched on again. Undo the screws (Fig. 6/s₅) on the motor flange (Fig. 6/n). Remove the coupling half on the motor side (Fig. 6/q) and the motor flange (Fig. 6/n) axially and suspend with a lifting device. If the sprocket (Fig. 6/k) is damaged or worn, then replace it. The fan (Fig. 6/v) should also be checked for damage from time to time and replaced if necessary.

NOTICE

Frequent starting up and high ambient temperature

The service life of the sprocket (Fig. 6/k) is reduced as a result of this.

Re-assemble in reverse order.

7.2.3 Lubrication

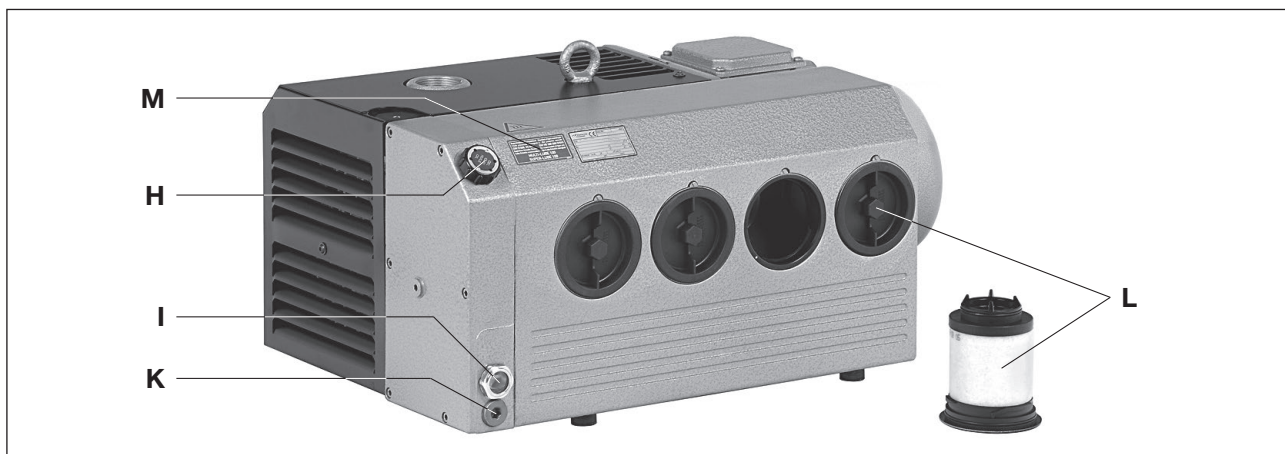


Fig. 7 Lubrication and removing oil

- H** Oil filling point
- I** Oil sight glass
- K** Oil discharge point
- L** Oil separator element
V-VC 40 / 50 / 75 -> 3 x
V-VC 100 / 150 -> 4 x
- M** Oil recommendation plate

NOTICE

Always change the oil when the machine is at operating temperature and in an atmospherically ventilated area.
If it is not completely emptied the amount that can be refilled is reduced.

The waste oil must be disposed of in compliance with the local environmental protection regulations.
If you are going to use another oil type, empty the oil removing device housing and oil cooler completely.

The oil level must be checked at least once a day, if necessary top the oil up to the upper edge of the sight glass (Fig. 7/I) First oil change after 500 hours of operation. Subsequent oil changes after 500-2000 hours of operation. Reduce the change intervals accordingly depending on how contaminated the discharged medium is.

We recommend using Elmo Rietschle oils (also see Oil recommendation plate (Fig. 7/M)) as operating agent.

Elmo Rietschle oil types:

MULTI-LUBE 100 – Standard oil based on mineral oil
SUPER-LUBE 100 – Synthetic oil, for longer oil change intervals at high thermal oil load (e.g. ambient or intake temperatures above 30 °C, insufficient cooling, 60 Hz-operation).

ECO-LUBE 100 – Synthetic oil for the food and pharmaceutical industry with H1 certificate

The viscosity of the oil used must comply with ISO VG 100 as per DIN ISO 3448.

7.2.4 Oil removal

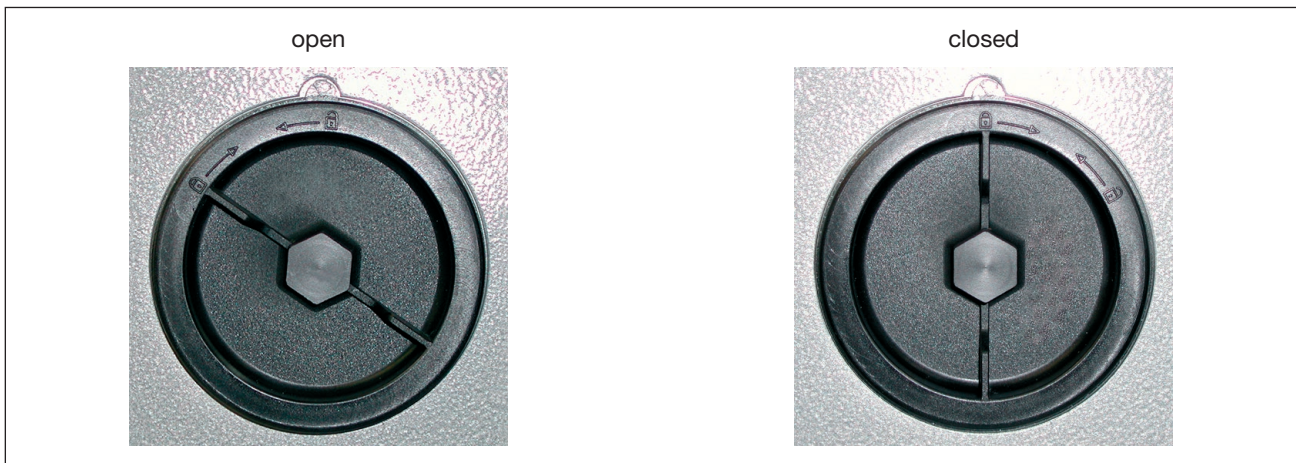


Fig. 8 Air oil remover



WARNING

Heavily contaminated air oil removing devices lead to increased pump temperatures and in extreme cases may cause the lubricating oil to ignite spontaneously.

The oil separator elements (V-VC 40/50/75 → 3x, V-VC 100/150 → 4x) can become contaminated by dust particles after they have been running for some time (power consumption and pump temperature increase). Replace these components (Fig. 7/L) every 2000 operating hours or when the filter resistance is 0.7 bar (see pressure gauge → Accessories, Checking with short term, atmospheric suction) because it is not possible to clean them.

Reduce the change intervals accordingly depending on how contaminated the discharged medium is. Changing: Undo the air oil removers (Fig. 7/L) with a ring spanner (spanner width 19 mm or 3/4”) rotating counter clockwise. Insert new air oil removers with the open lock symbol (see Fig. 8) with the arrow ▼ on the insert and fix turning clockwise (until it clicks into place).

7.3 Repair/ Service

- a) For on site repair work the motor must be disconnected from the mains by a qualified electrician so that it cannot be started up again accidentally. For repairs use the manufacturer, its branch offices or authorised dealers. Please contact the manufacturer for the address of the service centre responsible for you (see Manufacturer's address).

Fig. 9 Clearance certificate 7.7025.003.17

NOTICE

For each machine that is sent to an Elmo Riet-schle Service centre for inspection, maintenance or repair, a fully completed, signed declaration of harmlessness must be enclosed. The declaration of harmlessness is part of the supplier's documentation.

- b) After a repair or re-commissioning, the actions listed under "Installation" and "Commissioning" must be carried out as for initial commissioning.

7.4 Spare parts

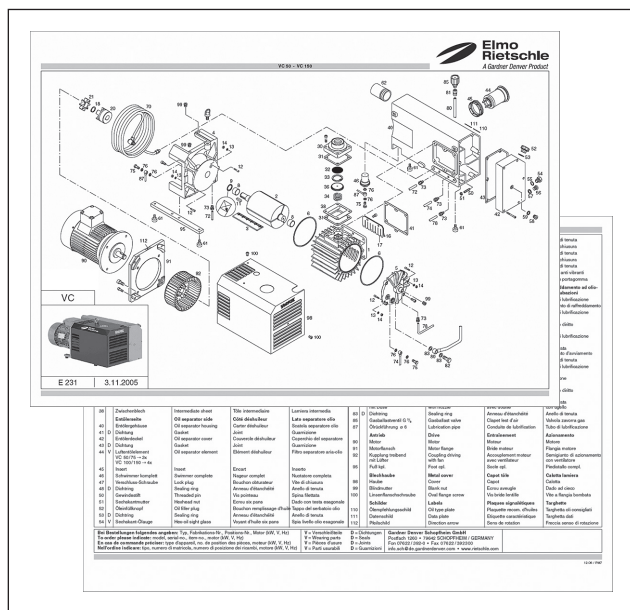


Fig. 10 Spare parts list

Order spare parts in accordance with the:

- **Spare parts list:**
 E 231 → V-VC 40 - V-VC 150
 - Download the PDF file:
<http://www.gd-elmorietschle.com>
 → Downloads
 → Product Documents → V-Series
 → Data Sheets, Manuals and Service Documents
 → V-VC
 → Service Documents
 - Parts subject to wear and gaskets are indicated separately on the list.
- **Web site:**
<http://www.service-er.de>
 - Select the type, size and design.

NOTICE

Only use original spare parts or parts approved by the manufacturer. The use of other parts may lead to malfunctions and invalidate liability or the guarantee for any consequences arising.

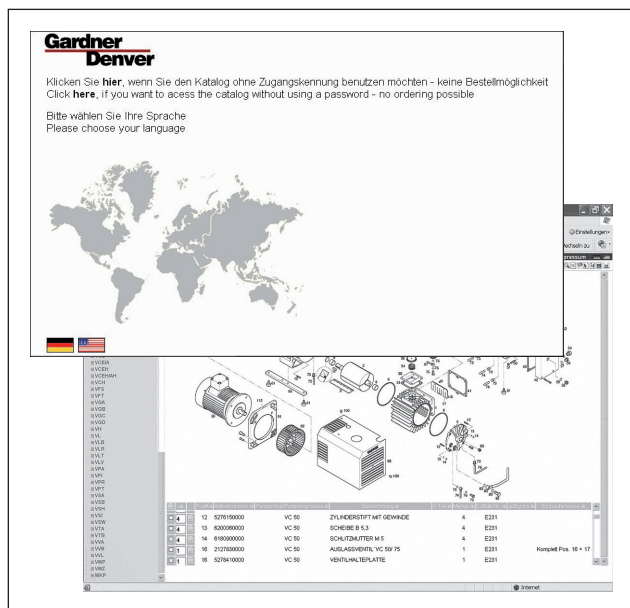


Fig. 11 Web site:
<http://www.service-er.de>

8 Malfunctions: Causes and elimination

Fault	Cause	Troubleshooting	Important
Machine is switched off by the motor protection switch	Mains voltage/ Frequency does not correspond with the motor data	Check by qualified electrician	Section 5.5
	Connection to motor terminal board is not correct		
	Motor protection switch is not set correctly		
	Motor protection switch is triggered too quickly	Use a motor protection switch with an overload-dependent delayed switch off that takes into consideration the short term excess current at start up (version with short circuit and overload trigger as per IEC/EN 60947-4-1 or VDE 0660 Part 102)	
	Vacuum pump or its oil is too cold	Note the ambient temperature and the intake temperature	Section 2.3
	The lubricating oil is too viscous	The oil viscosity must comply with ISO VG 100 as per DIN ISO 3448	Section 7.2.3
	The air oil removers are dirty.	Change the oil separator elements	Section 7.2.4
	The back pressure in the exhaust line is too high.	Check the hose or the pipe	Section 5.3
Permanent operation >100 mbar (abs.).	Use next largest motor output	Section 4.3	
Suction capacity is insufficient	The suction pipe is too long or too narrow	Check the hose or the pipe	Section 5.3
	Leak on the suction side of the vacuum pump or in the system	Check the pipework and screw connections for leaks and to ensure that they are firmly seated.	Section 7.2
	The intake filter is dirty	Clean or replace the intake filter	Section 7.2.1

Malfunctions: Causes and elimination

Fault	Cause	Troubleshooting	Important
Final pressure (max. vacuum) is not reached	Leak on the suction side of the vacuum pump or in the system	Check the pipework and screw connections for leaks and to ensure that they are firmly seated.	Section 7.2
	Incorrect oil viscosity	The oil viscosity must comply with ISO VG 100 as per DIN ISO 3448	Section 7.2.3
Machine gets too hot	Ambient or intake temperature is too high	Ensure it is being used properly	Section 2.3
	Cooling air supply is obstructed	Check environmental conditions	Section 5.1
		Clean ventilation slots	Section 7.2
	The lubricating oil is too viscous	The oil viscosity must comply with ISO VG 100 as per DIN ISO 3448	Section 7.2.3
	The air oil removers are dirty.	Change the oil separator elements	Section 7.2.4
The back pressure in the exhaust line is too high.	Check the hose or the pipe	Section 5.3	
Exhaust air contains visible oil mist	The air oil remover devices are not inserted correctly or the O rings are missing.	Check that it is correctly seated	Section 7.2.4
	Unsuitable oil is being used	Use suitable types	Section 7.2.3
	The air oil removers are dirty.	Change the oil separator elements	Section 7.2.4
	Ambient or intake temperature is too high	Ensure it is being used properly	Section 2.3
	Cooling air supply is obstructed	Check environmental conditions	Section 5.1
Clean ventilation slots		Section 7.2	

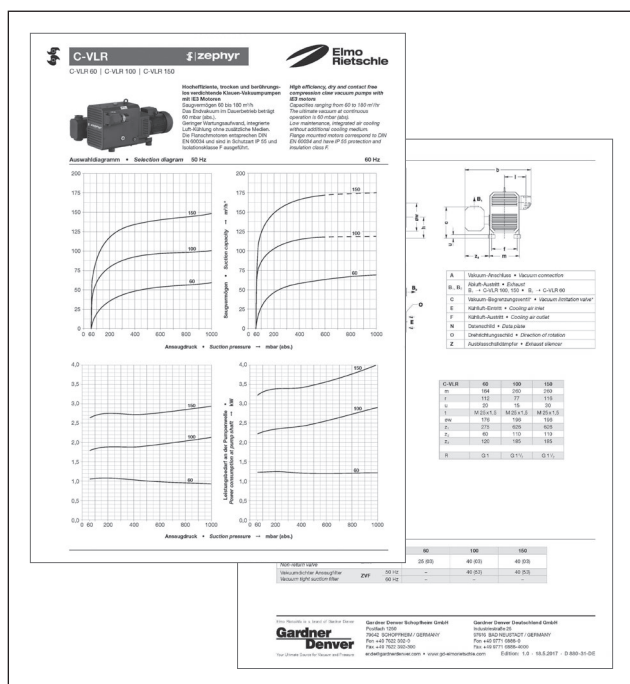
Fault	Cause	Troubleshooting	Important
The vacuum pump produces a abnormal noise (The blades making a hammering noise when starting from cold is normal if it disappears within two minutes as the operating temperature increases)	The pump housing is worn (chatter marks)	Repair by manufacturer or authorised workshop	Elmo Rietschle Service
	The vacuum adjustment valve (if available) is vibrating	Replace the valve	Section 7.4
	Blades are damaged	Repair by manufacturer or authorised workshop	Elmo Rietschle Service
	Vacuum pump or its oil is too cold	Note the ambient temperature and the intake temperature	Section 2.3
	The lubricating oil is too viscous	The oil viscosity must comply with ISO VG 100 as per DIN ISO 3448	Section 7.2.3
Water in lubricating oil	Pump sucks in water	Install water interceptor upstream of the pump	—
	The pump sucks in more water vapour than is suitable for its water vapour compatibility	Contact the manufacturer for increased gas ballast	—
	Pump only works for a short time and therefore does not reach its normal operating temperature	Let the pump continue to run with a closed suction side after extracting the water vapour until the water has evaporated from the oil	—
Please contact Elmo Rietschle Service for other malfunctions or those that cannot be eliminated.			

9 Technical Data

V-VC		40	50	75	100	150	
Sound pressure level (max.) EN ISO 3744 Toleranz ±3 dB(A)	dB(A)	50 Hz	66	66	66	70	72
		60 Hz	70	70	70	72	74
Weight *	kg	50 Hz	55	55	71	115	115
		60 Hz	55	55	71	115	115
Length *	mm	50 Hz	585,5		639,5	707	707
		60 Hz	585,5		639,5	724	724
Width	mm	316,5		316,5	406	406	
Height (without terminal box)	mm	267	267/330**	267/330**	297/360**	297/360**	
Vacuum connection		G 1 1/4		G 1 1/4	G 1 1/2	G 1 1/2	
Exhaust air outlet		G 1 1/4		G 1 1/4	G 2	G 2	
Correct amount of oil	l	3.0		3.0	3.0	3.5	

* The length and the weight may differ from the information listed here depending on the motor manufacturer.

** Design „XD“ with additional gas ballast valve



You will find more technical data on the data sheets **D 231** and **D 231-30**

- Download the PDF file:
D 231 → V-VC 40 - V-VC 150
D 231-30 → V-VC 50 XD - V-VC 150 XD
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 → Product Documents → V-Series
 → Data Sheets, Manuals and Service Documents
 → V-VC
 → Data sheets

NOTICE

Subject to technical changes.

Fig. 12 Data sheet



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Denver

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