

Vertical immersible multi-stage centrifugal pumps

Installation and operating instructions

Serie: DPVCI

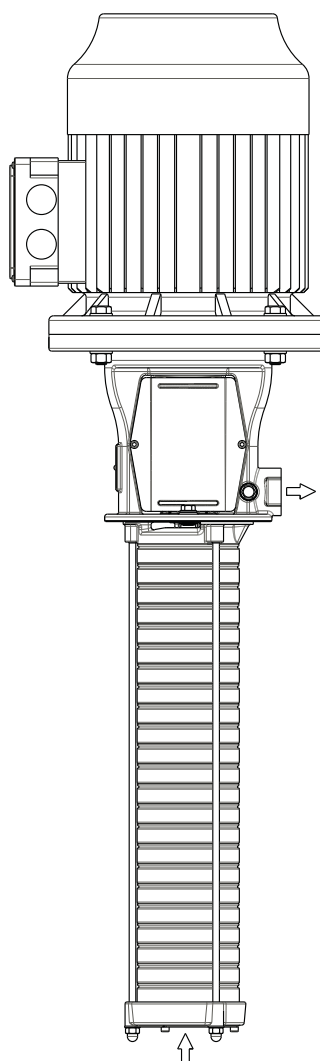


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1 Manual Introduction

1.1 Preface

This manual contains important information for reliable, proper and efficient operation. Compliance with the operating instructions is of vital importance to ensure reliability and a long service life of the product and to avoid any risks.

The first chapters contain information about this manual and safety in general. The following chapters provide information about normal use, installation, maintenance and repairs of the product. The annex contains the declaration(s) of conformity.

- Make yourself familiar with the content.
- Accurately follow the directions and instructions.
- Never change the sequence of the operations to be carried out.
- Keep this manual or a copy of it together with the logbook in a fixed place near the product which can be accessed by all personnel.



READ THE (SUPPLEMENTARY) DOCUMENTATION
Read the installation and operating instructions.



WEEE MARKING
Marking of electrical and electronic equipment in accordance with Article 15(2) of Directive 2012/19/EU.

1.2 Icons and symbols

In this manual and in all accompanying documentation the following icons and symbols are used.



WARNING
Danger of electric Voltage. Safety sign according to IEC 417 - 5036



WARNING
Operations or procedures, if carried out without caution, may cause personal injury or damage to the product.
General hazard sign according to ISO 7000-0434



ATTENTION
Is used to introduce safety instructions whose non-observance may lead to damage to the product and its functions.



ENVIRONMENTAL INSTRUCTION
Remarks with respect to the environment.

2 Identification, service and technical support

2.1 Obtaining data and information

The name plate indicates the type series / size, main operating data and identification number. Please quote this information in all queries and/or repeat orders. Particularly when ordering spare parts. If you need any additional information or instructions exceeding the scope of this manual or in case of damage, please contact DP-Pumps's nearest customer service centre.

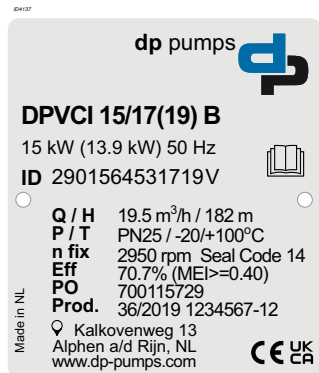


Figure 1: Example: Pump with motor

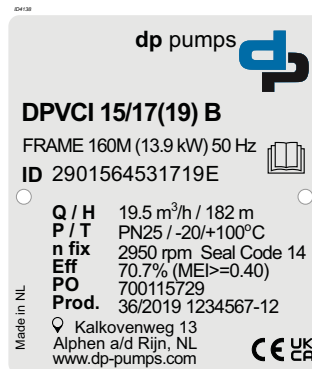


Figure 2: Example: Pump without motor

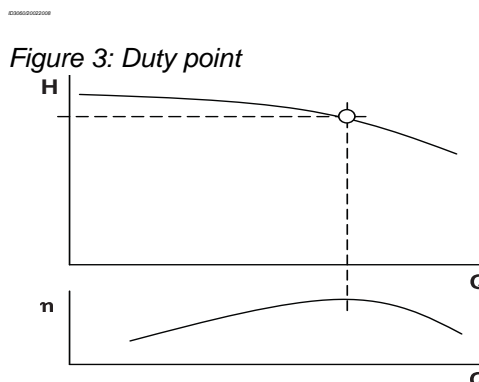


Figure 3: Duty point

Table 1: Description sticker

Indication		Meaning
DPVCI 15/17(19) B		Model key (design version B)
15 kW (13.9 kW)		Nominal motor power ¹ (required power)
Frame 160M		Frame size
50 Hz		Nominal frequency
ID	2901564531719V	Pump ID
Q / H	19.5 m ³ /h 182 m	Optimum capacity running at fixed speed (see fig. 3: Duty point)
P / T	PN25 / -20+100 °C	Pressure class / Temperature range of medium ²
n fix	2950 rpm	Rotation speed indication at which Q/H are given
Eff.	70.7 % (MEI>=0.40)	Efficiency (Minimum Efficiency Index)
PO	700115729	Purchase order number
Prod.	WW/YYYY XXXXXX-XX	Production week/year and production serial number
Seal	Code 14	Mechanical Seal Code, See table 3: Seal code

1. Frame size in case without motor
2. Empty stages will reduce the pressure

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The following address data are available for service and technical support:

DP-Pumps service department Kalkovenweg 13 2401 LJ Alphen a/d Rijn The Netherlands	Tel: +31 172 488388 Internet: www.dp-pumps.com E-mail: dp@dp-pumps.com
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2.2 Seal codes

Table 2: Material code shaft seal

Description	Designation	Code acc. to EN 12756	Material	Note
Spring loaded ring	Ca SiC TuC eCarb-B	B Q1 U3 B	Carbon graphite Silicon carbide Tungsten carbide Carbon graphite	Resin impregnated Sintered pressureless CrNiMo-binder Resin impregnated porous
Seat ring	Ca Ca SiC TuC Ce eSiC-Q7	A B Q1 U3 V Q7	Carbon graphite Carbon graphite Silicon carbide Tungsten carbide Al-oxide Silicon carbide	Antimony impregnated Resin impregnated Sintered pressureless CrNiMo-binder > 99 % Porous
Elastomers	EPDM NBR FPM HNBR	E P V X4	Ethylene propylene rubber Nitrile-butadiene-rubber Fluor carbon rubber Hydrogenated nitrile rubber	
Spring	AISI 316 AISI 304	G F	CrNiMo steel CrNi steel	
Other metal parts	AISI 316 AISI 304	G F	CrNiMo steel CrNi steel	
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Information about seal combinations, types, pressure and temperature see: table 3: Seal code

Table 3: Seal code

Seal code	Shaft seal type	Material mechanical seal	Shaft seal materials ¹	Pressure class shaft seal	Temperature range shaft seal	Approvals
11	MG12-G60	B Q1 E GG	Ca/SiC/EPDM	PN10	-20/+100 °C	
12	MG12-G60	B Q1 V GG	Ca/SiC/FPM	PN10	-20/+120 °C	
13	RMG12-G606	Q1 B E GG	SiC/Ca/EPDM	PN25	-20/+100 °C	WRAS
14	RMG12-G606	Q1 B V GG	SiC/Ca/FPM	PN25	-20/+120 °C	
15	RMG12-G606	U3 U3 X4 GG	TuC/TuC/HNBR	PN25(PN16)	-20/+120(140) °C	
16	RMG12-G606	U3 U3 V GG	TuC/TuC/FPM	PN25(PN16)	-20/+120(140) °C	
17	M37GN2/16-00-R	U3 B V GG	TuC/Ca/FPM ²	PN40	-20/+120 °C	
18	RMG12-G606	U3 B E GG	TuC/Ca/EPDM	PN25(PN16)	-20/+120(140) °C	
19	M37GN2/16-00-R	U3 B E GG	TuC/Ca/EPDM ²	PN40	-20/+120 °C	
20 ³	H7N	Q1 A E GG	SiC/Ca/EPDM	PN40(PN25)	-20/+120(140) °C	HP/HT
21 ³	H7N	Q1 A V GG	SiC/Ca/FPM	PN40(PN25)	-20/+120(140) °C	HP/HT
Tek.: 20110262-Q						

Seal code	Shaft seal type	Material mechanical seal	Shaft seal materials ¹	Pressure class shaft seal	Temperature range shaft seal	Approvals
22 ³	H7N	Q1 A X4 GG	SiC/Ca/HNBR	PN40(PN25)	-20/+120(140) °C	HP/HT
23	RMG12-G606	Q1 B E GG	SiC/Ca/EPDM	PN25	-20/+100 °C	
24	MG12-G60	Q1 Q1 V GG	SiC/SiC/FPM	PN10	-20/+120 °C	
28	MG12-G60	Q1 Q1 X4 GG	SiC/SiC/HNBR	PN10	-20/+120 °C	
29	MG12-G60	Q1 Q1 E GG	SiC/SiC/EPDM	PN10	-20/+100 °C	
30 ⁴	MG12-G60	Q1 Q1 V GG	SiC/SiC/FPM	PN10	-20/+120 °C	
31	107-L60	B V P FF	Ca/Ce/NBR	PN10	-15/+100 °C	
32	107-L60	B V E FF	Ca/Ce/EPDM	PN10	-15/+100 °C	WRAS
33 ⁴	RMG12-G606	Q1 B E GG	SiC/Ca/EPDM	PN25	-20/+100 °C	WRAS
34 ⁵	RMG12-G606 DST	Q1 B E FF	SiC/Ca/EPDM	PN25	-20/+100 °C	
35	RMG12-G6	eCarb-B eSiC-Q7 E GG	eCa/eSiC/EPDM	PN25	-20/+120 °C	WRAS
36	MG12-G6	eCarb-B eSiC-Q7 V GG	eCa/eSiC/FPM	PN25	-20/+120 °C	
37	RMG12-G606	U3 A V GG	TuC/Ca/FPM	PN25(PN16)	-20/+120(140) °C	
38 ⁴	RMG12-G606	U3 U3 V GG	TuC/TuC/FPM	PN25(PN16)	-20/+120(140) °C	
39 ⁴	RMG12-G6	eCarb-B eSiC-Q7 E GG	eCa/eSiC/EPDM	PN25	-20/+120 °C	WRAS
40 ³	4MC	Q1 Q1 E GG	SiC/SiC/EPDM	PN40(PN25)	-20/+120(140) °C	HP/HT
41 ³	4MC	Q1 A E GG	SiC/Ca/EPDM	PN40(PN25)	-20/+120(140) °C	HP/HT
42 ³	4MC	Q1 Q1 V GG	SiC/SiC/FPM	PN40(PN25)	-20/+120(140) °C	HP/HT
43 ³	4MC	Q1 A V GG	SiC/Ca/FPM	PN40(PN25)	-20/+120(140) °C	HP/HT

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1. Apart from the shaft seal other sealings might be assembled with different allowable conditions. If in doubt consult your sales supplier.
2. LHS6 only
3. Mechanical seal can withstand -30/+140 °C@PN25.
4. Only for Seal Options.
5. Equivalent of Seal code 13, but with AISI304 spring material.

2.3 Current

2.3.1 Nominal current DPVCI 2, 4, 6, 10 & 15

The nominal allowable current of the motor is stated on the motor plate. This shows the nominal working range of the motor and can be used to protect the motor.

Measuring the actual current of the pump during operation can be used to pre-set the motor protection switch to protect the pump/motor combination. This current value can also be used to determine the proper electrical equipment such as variable frequency drive, main switch, wiring diameter etc.



WARNING

Not only the motor, but also the pump has to be protected in its application.

2.4 Supplementary documentation

Apart from this manual, the documentation given below is also available:

Table 4: Supplementary documentation

Document	Code
DPVCI 2, 4, 6, 10 & 15	
Technical Data 50/60 Hz	97004475
See also www.dp-pumps.com	

3 Warranty

3.1 Terms of warranty

The warranty period is settled by the terms of your contract or at least by the general terms and conditions of sales.



ATTENTION

Modifications or alterations of the product supplied are only permitted after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.



ATTENTION

The warranty relating to the operating reliability and safety of the product supplied is only valid if the product is used in accordance with its designated use as described in the following sections of this manual. The limits stated in the data sheet must not be exceeded under any circumstances.

The warranty becomes invalid if one or more of the points below occur.

- The buyer makes modifications himself.
- The buyer carries out repairs himself or has these carried out by a third party.
- The product has been handled or maintained improperly.
- The product has non original DP-Pumps spare parts fitted.
- Dry running of the pump.

DP-Pumps repairs defects under warranty when:

- They are caused by flaws in the design, the material or the production.
- They are reported within the warranty period.

Other terms of warranty have been included in the general terms of delivery, which are available upon request.

4 Safety and environment

4.1 General

This DP-Pumps product has been developed using state-of-the-art technology and is manufactured with utmost care and is subject to continuous quality control.

DP-Pumps does not accept any liability for damage or injury caused by not following the directions and instructions in this manual or by carelessness during the installation, use or maintenance of the product. Non-compliance with the safety instructions can jeopardize the safety of personnel, the environment and the product itself. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claims for damages.

Non-compliance can result in:

- failure of important pump/system functions,
- failure of prescribed maintenance or service,
- injury caused by electrical, mechanical and chemical effects,
- leakage to the environment of hazardous substances,
- explosions.

Depending on the application, extra safety measures may be required. Contact DP-Pumps if a potential danger arises during use.



ATTENTION

The owner of the product is responsible for compliance with the local safety regulations and internal company guidelines.



ATTENTION

Not only must the general safety instructions laid down in this chapter on "Safety" be complied with, but also the safety instructions outlined under specific headings.



ATTENTION

The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.



ATTENTION

Children being supervised not to play with the appliance.

4.2 Users

All personnel involved in the operation, maintenance, inspection and installation of the product must be fully qualified to carry out the work involved and be aware of all applicable responsibilities, authorisations and supervisions. If the personnel in question is not in possession of the required know-how, appropriate training and instruction must be provided. The operator may require the manufacturer/supplier to provide sufficient training and/or instructions. The operator is responsible for ensuring that the contents of the operating instructions are fully understood by the responsible personnel.

4.3 Safety provisions

The product has been designed with the greatest possible care. Original parts and accessories meet the safety regulations. Modifications in the construction or the use of non-original parts may lead to a safety risk.



ATTENTION

Make sure that the product operates within its working range. Only then the product performance is guaranteed.

4.3.1 Labels on the product

The icons, warnings and instructions applied to the product are part of the safety provisions. The labels may not be removed or covered. Labels must remain legible during the entire life of the product. Replace damaged labels immediately.

4.4 Safety precautions

4.4.1 During normal use

- For questions regarding the power supply contact the local electricity company.
- Isolate possible hot parts to avoid injury through direct contact.
- For your safety always assemble undeformed coupling guards (when applicable) before putting the pump into use.
- Always close the terminal box of the motor.
- Always close the control panel where applicable

4.4.2 During installation, maintenance and repair

Only authorised personnel may install, maintain and inspect the product and repair electrical components. Observe the local safety regulations.



WARNING
Before proceeding with any installation, maintenance or repair, disconnect the power supply and secure this disconnection.



WARNING
Surfaces of a pump can be hot after continuous or intermittent operation.



WARNING
Secure the area before starting a pump to avoid hazardous situations with rotating parts.



WARNING
Take utmost care when handling dangerous liquids. Avoid danger to persons or the environment when conducting repairs, draining liquids or venting. It is strongly recommended to place a leakage tray under the pump.



WARNING
Immediately after completing the work, all safety-relevant and protective devices must be re-installed and / or re-activated.



WARNING
Please observe all instructions set out in the chapter "Commissioning" before returning the product to service.

4.5 Return to supplier

- Drain the pump.
- Always flush and clean the pump, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
- If the pump has handled fluids whose residues could lead to corrosion damage in the presence of atmospheric humidity or could ignite upon contact with oxygen, the pump must also be neutralised, and anhydrous inert gas must be blown through the pump to ensure drying.
- Always complete and enclose a certificate of decontamination when returning the pump, see chapter 11.2: Certificate of Decontamination. Always indicate any safety and decontamination measures taken.



ATTENTION

If required, a blank certificate of decontamination can be downloaded from the web site at: www.dp-pumps.com/certificates-of-decontamination.

4.6 Environmental aspects

4.6.1 General

The products of DP-Pumps are designed to function in an environmentally friendly way during their entire lifetime. Therefore, when applicable, always use biodegradable lubricants for maintenance.



ENVIRONMENTAL INSTRUCTION

Always act according to the laws, by-laws regulations and instructions with respect to health, safety and the environment.

4.6.2 Product information as per Regulation No. 1907/2006 (REACH)

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see www.dp-pumps.com/reach.

4.6.3 Dismantling

The owner is responsible for the dismantling and environmentally friendly disposal of the product.



ENVIRONMENTAL INSTRUCTION

Ask at the local government about the re-use or the environmentally friendly processing of discarded materials.



WEEE MARKING

Electrical or electronic equipment marked with the adjacent symbol must not be disposed of in household waste at the end of its service life. Contact your local waste disposal partner for returns. If the used electrical or electronic equipment contains personal data, the operator is responsible for deleting it before the equipment is returned.

4.7 Unauthorised modes of operation

Never operate the pump (set) outside the limits stated in the data sheet and this manual (see section 5.7: Working range).

5 Pump Introduction

5.1 Model key

Table 5: Model key Example DPVCI 15/17(19) B

	DP	VC	I	15	/17	(19)	B	
Label	DP							Product Label
Material/Construction		VC						Cast Iron pump foot and top bracket hydr. 1.4301 / AISI 304
Connections			I					5/4" Inner thread
				15				Size (Capacity in m ³ /h at Q _{opt.})
					/17			Number of impellers
						(19)		Number of total stages
							B	Design version
							C	Design version

5.2 Description of the product

The vertical, immersible multi stage centrifugal pump series are designed for pumping liquids for machine tools, condensate transfer, liquid transfer in industrial washing machines and similar applications. The hydraulic assembly is driven by an electric motor.



WARNING

The pump must not be used to transfer inflammable liquids such as diesel oil and petrol.

5.3 Ecodesign

Product information according to Regulation 547/2012 and Directive 2009/125/EC "Ecodesign Directive" (water pumps with maximum shaft power rating of 150 kW, applies only to water pumps marked with the Minimum Efficiency Index MEI, see pump nameplate):

- Minimum Efficiency Index: See nameplate, legend for nameplate. See table 1: Description sticker.
- The reference value MEI of a water pump with the best efficiency is = 0.70.
- Year built: See nameplate, legend for nameplate. See table 1: Description sticker.
- Manufacturer's name or trademark, official registration number and place of production: See manual or order documentation.

- Information about type and size of the item: See table 1: Description sticker.
- Performance curves of the pump, including efficiency characteristics: See documented curve.
- The efficiency of a pump with a corrected impeller is usually lower than that of a pump impeller with a full diameter. A pump with a corrected impeller is adapted to a certain duty point, thereby reducing the energy consumption. Minimum Efficiency Index (MEI) refers to the full impeller diameter.
- The operation of this water pump at different operating points can be more efficient and more economical when it is controlled, for example using a variable speed controller which adjusts the pump operation to the system.
- Information for disassembly, recycling or disposal after the final shutdown: See sub chapter 4.6.3: Dismantling.
- Information about the efficiency reference value or MEI = 0.7 (0.4) benchmark index for the pump on the basis of the pattern in the picture, please visit: <http://www.europump.org/efficiencycharts>.

5.4 Modular selection

To suit almost every application the pump is assembled out of modules which can be selected depending on the required working range.

Basic modules are:

- **Basic pump model**, which defines the capacity, pressure and basic material
- **Sealings**, which define the elastomers, the mechanical seal and the shaft seal type.
- **Electric motor**, which defines all requirements of the motor such as motor size, power, voltage, frequency and all possible motor accessories.

5.5 Operation

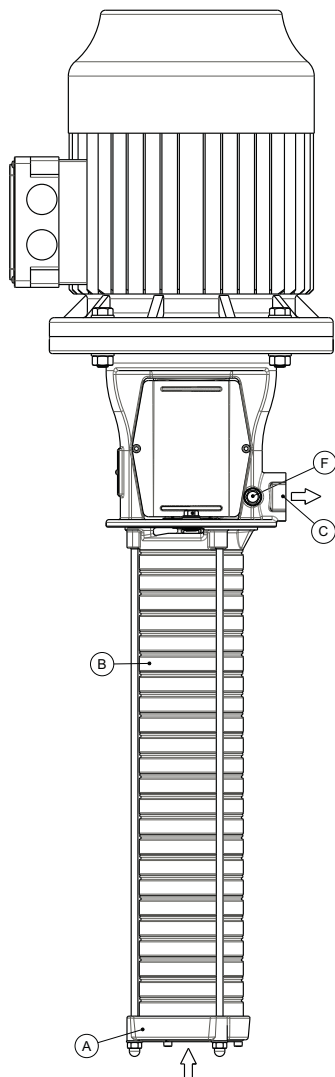


Figure 4: DPVCI 15

During centrifugal operation of the pump an negative pressure is created at the inlet of the impeller. This underpressure enables the medium to enter the pump at the suction connection (A).

A stage (B) consists of an impeller and diffuser or an empty stage. The passage of this stage determines the capacity of the pump. The diameter of the stages is related to the centrifugal forces and its “stage pressure”: the more stages, the more pressure. This total capacity and raised pressure will be guided to the discharge connection (C) of the pump.



ATTENTION

Check the seal. Turn the shaft every three months and just before putting into operation.

5.6 Measuring, draining and venting

The pump is provided with plugs for measuring, venting and to fill the container. Connection (F) is meant to measure the discharge pressure using a G ¼ connection. Connections (F) are meant to vent the pump system when the pump is not in operation. Or to measure the discharge pressure of the pump using a G 1/4 connection or to (re)fill the container.

5.7 Working range

The working range depends on the application and a combination of pressure and temperature. For specific and detailed limits advice the working ranges are described in the chapter 5.4: Modular selection. The overall working range of the pumps can be summarised as follows:

Table 6: Specification of the working range

Pump type	DPVCI	note
Ambient temperature [°C]	-20 up to 40	1
Max. operating pressure [bar]	See pump name plate	
Medium temperature [°C]	-20 up to +120	
Viscosity [cSt]	1-100	2
Density [kg/m ³]	1000-2500	2
Cooling	forced motor cooling	3
Minimum frequency [Hz]	30	
Maximum frequency [Hz]	60	4
Maximum number of starts per hours	up to 11 kW: 300 other: 200	5
IPClass	See motor name plate	
Allowable size of solids pumped	5 µm to 1 mm	6

Source: TPG.nr.: 20210029-A

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1. If the ambient temperature exceeds the above value or the motor is located more than 1000 m above sea level, the motor cooling is less effective and could require an adapted motor power. See table 7: Motor load dep. sea level or amb. temp or please contact your supplier for more detailed advice.
2. Deviation in viscosity and/or density could require an adapted motor power. Please contact your supplier for more detailed advice.
3. The free space above the motor cooling fan must be at least 1/4 of the diameter of the inlet of the cooling fan in order to have a sufficient flow of (cooling) air.
4. Pumps that are intended for 50 Hz operation, may not be connected to 60 Hz power supply.
5. With a standard DM motor.
6. Not suitable for fluids containing abrasive particles.

For minimum flow at medium temperature of 20 °C see table 7: Minimum/maximum capacity (Q_{min}/max); for higher temperatures see figure 5: Minimum capacity vs. temperature (in % of Q optimum)

Table 7: Minimum/maximum capacity (Q_{min}/max)

Size	Design version	Q [m ³ /h]			
		50 Hz		60 Hz	
		2 pole		2 pole	
		Min	Max	Min	Max
2	B	0.2	3.3	0.2	4.0
4	B	0.4	6.5	0.5	7.8
6	B	0.6	9.0	0.8	10.8
10	B	1.1	13.2	1.3	15.8
15	B	1.6	22.5	2.0	27.0
15	C	1.9	22.5	2.3	27.0

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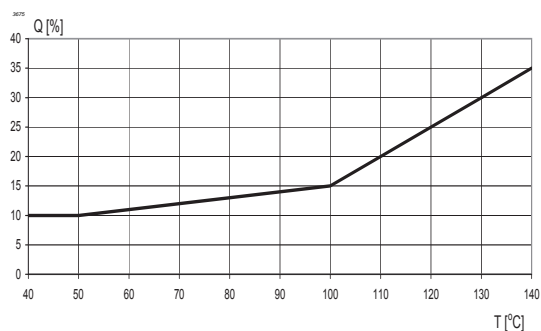


Figure 5: Minimum capacity vs. temperature (in % of Q optimum)



ATTENTION

The pump must never operate against a closed discharge valve.

6 Transport

6.1 Transport

1. Transport the pump in the position as indicated on the pallet or packaging.
2. Make sure the pump is stable.
3. If present, observe the instructions on the packaging.



WARNING

Lift the pump, if necessary using a hoist and suitable slings. Attach the slings to the transport lugs on the packaging, where present.



WARNING

The pump must be lifted according to the current hoist guidelines. Only qualified personnel is allowed to lift the pump.



WARNING

Do not lift the pump by using the frequency converter (if placed), electrical parts or the motor cover. Be sure that the pump is always in balance.



WARNING

Pumps could tilt while lifting. Do not remove the lifting devices from the pump before the pump is placed and mounted correctly.

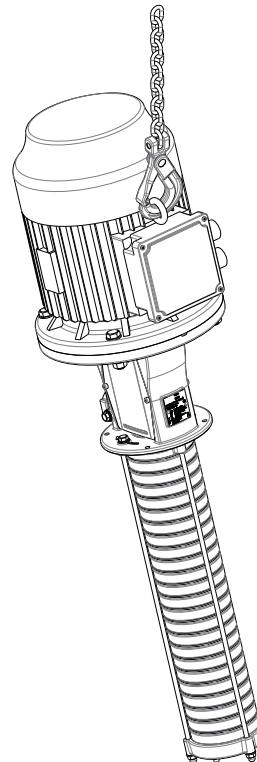


Figure 6: Transport position

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6.2 Storage

Table 8: Storage

Storage	
$t_{\text{ambient}} [^{\circ}\text{C}]$	-10/+40
Max. rel. humidity	80 % at 20 °C not condensing

6.2.1 Inspection during storage

1. Turn the shaft every three months and just before putting into operation.

7 Installation instructions

7.1 Pump location



WARNING

The pump must be installed so that persons cannot accidentally come into contact with hot surfaces.

The pump is designed for tank mounting in vertical position. The pump is positioned in a hole cut into the cover of the tank (upper side) and is secured to the tank by four hexagon head screws through the holes in the mounting flange. It is recommended to fit a sealing gasket between the pump flange and tank.

7.2 Installation dimensions

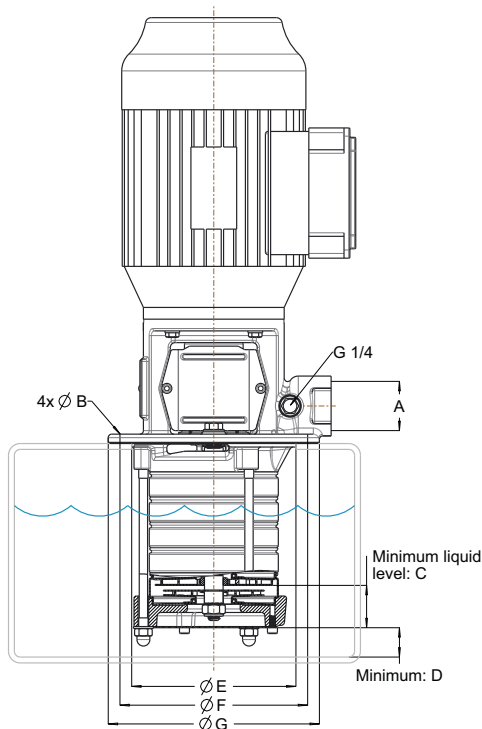


Figure 7: DPVCI 2-15 B / 15 C

Table 9: DPVCI 2-15 B / 15 C

Dimensions	DPVCI 2/4/6 B	DPVCI 10/15 B DPVCI 15 C	
A	G 5/4	G 2	
B	7.5	9	[mm]
C	36	42	[mm]
D	25	40	[mm]
E	140	200	[mm]
F	160	225	[mm]
G	180	250	[mm]

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7.3 Setting up the pump



ATTENTION

Pumps which do not stand steady or stable on their own, should be mounted on a rigid and stable base.



ATTENTION

Locate the pump at the place with the lowest risk for noise nuisance.

1. Place and install the pump on a level, stable surface in a vertical position with the motor on top. Make sure the pump is always mounted with a gasket on the top of the reservoir.
2. Make sure that sufficient air can reach the cooling fan of the motor. For this purpose the free space above the cooling fan should be at least 1/4 of the diameter of the fan cover air intake.
3. It is advised to install a valve on the discharge connection of the pump.
4. To avoid medium flowing back through the pump, when idle, make sure a non-return valve is installed and the inlet is always under liquid level.
5. Make sure that the inlet of the pump is never clogged.

7.3.1 Indicators

20120136-B

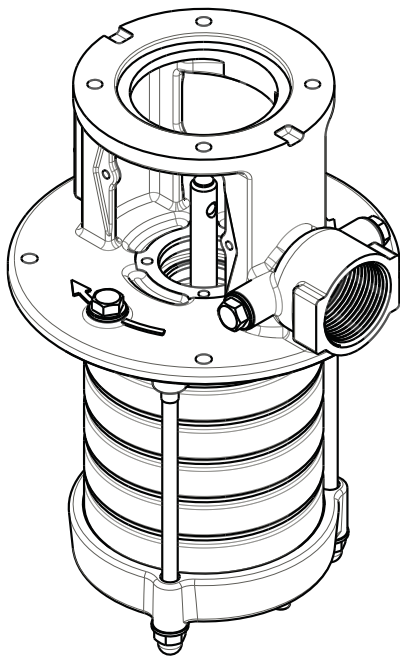


Figure 8: Arrow rotation mark

The arrow on the motor stool indicates the rotating direction of the motor.

7.3.2 Install bypass

Install a bypass if the pump operates against a closed valve. The required capacity of the bypass is at least 10 % of the optimum volume flow. At high operating temperatures a higher volume flow is required. Refer to the table "Minimum volume flows" in the paragraph "Working range".

7.3.3 Permissible forces and moments at the pump nozzles

No piping-induced forces and moments (from warped pipelines or thermal expansion, for example) must act on the pump.

20120136-B

7.4 Check seal

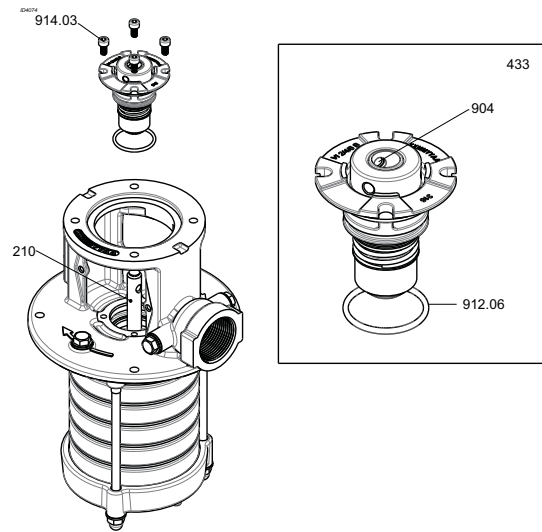


Figure 9: Seal

20120136-C

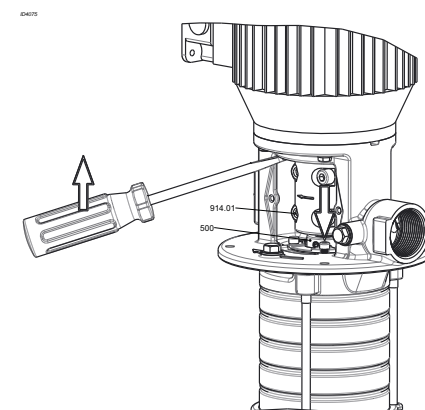


Figure 10: Step 1

Make sure the shaft (210) and cartridge ring (500) is in the lower position. The coupling bolts (914.01) should not be tightened.

20130263-A

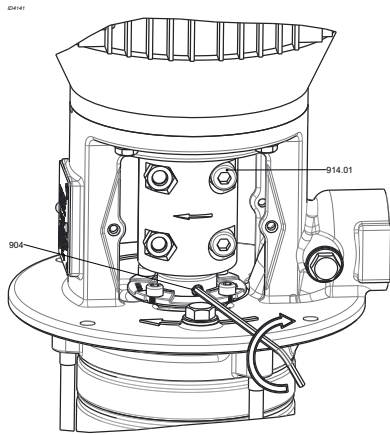


Figure 11: Step 2

Then fasten the grub screws (904) firmly (3X).

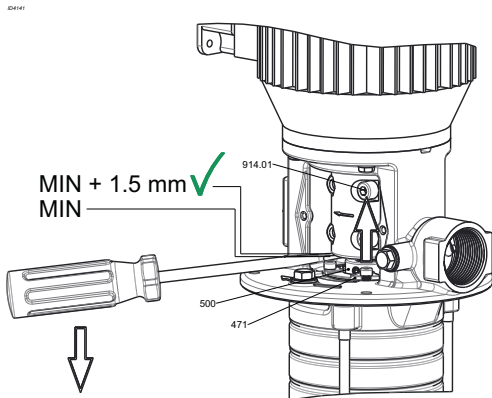


Figure 12: Step 3

Lift the coupling, distance between seal cover (471) and cartridge ring (500) should be 1.5 mm¹. Tighten the coupling bolts (914.01) crosswise according to table 10: Torques

7.5 Mounting a motor on the pump



ATTENTION

It is advised to use a specially designed DP-Pumps motor. Before installing an other brand/standard IEC-standard motor, DP-Pumps has to be consulted to verify the applicability.

1. Contact your DP dealer for special tools.

The motor has to conform to the following conditions:

- Reinforced bearing at driven end (to withstand the axial force)
- Axially fixed rotor (to minimize the axial play of the pumps hydraulic)
- Smooth shaft, no key lock (to improve the coupling grip and to improve the motor balance)

20130264-A

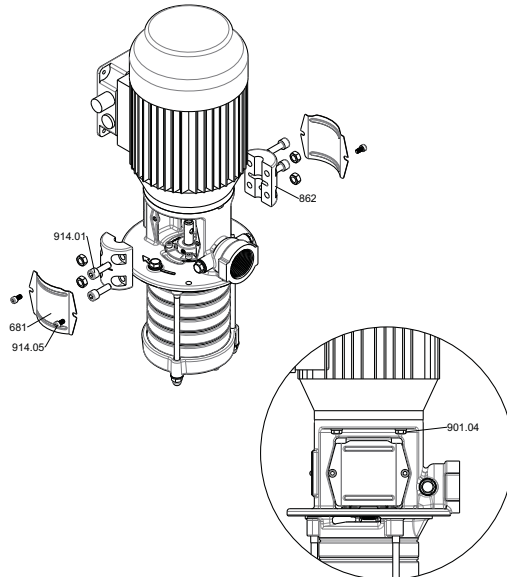


Figure 13: Mounting the motor

20120135-A

- Align the motor on the motor stool
- Fit hexagon head bolts (901.04) and tighten the bolts
- Install coupling (862)
- Fit hexagon socket head cap screws (914.01)
- Install coupling (861)
- Fit hexagon socket head cap screws (914.05)

Table 10: Torques

Part n°	Frame	Thread	Torque [Nm]
901.04	71/80	M6	10
901.04	90-112	M8	10
901.04	132	M12	70
901.04	160/225	M16	70
Part n°	Material	Thread	Torque [Nm]
904	Steel	M6	3
914.01	Aluminium	M8	22
914.01	Cast iron	M10	70
914.03	Steel	M5	4 ⁺²
914.05	Stainless steel		hand tight ¹

TPG: 95000697-BD

1. Torques not mentioned in this table need to be assembled with good mounting practice.

The advised bearings per motor type are:

Table 11: Minimum required motor Driven-end bearing

Bearing type		
Power output [kW]	1 phase 50 Hz	3 phase 50/60 Hz 2 pole
0.25		
0.37	6202 2Z-C3	6203 2Z-C3
0.55	6202 2Z-C3	6203 2Z-C3
0.75	6204 2Z-C3	6204 2Z-C3
1.1	6305 2Z-C3	6204 2Z-C3
1.5	6305 2Z-C3	6305 2Z-C3
2.2	6305 2Z-C3	6305 2Z-C3
3		6306 2Z-C3
4		6306 2Z-C3
5.5		6308 2Z-C3
7.5		6308 2Z-C3
11		7309
15		7309
18.5		7209

TPG: 20101096-K

Or use a thrust bearing housing.

Example may differ upon chosen motor

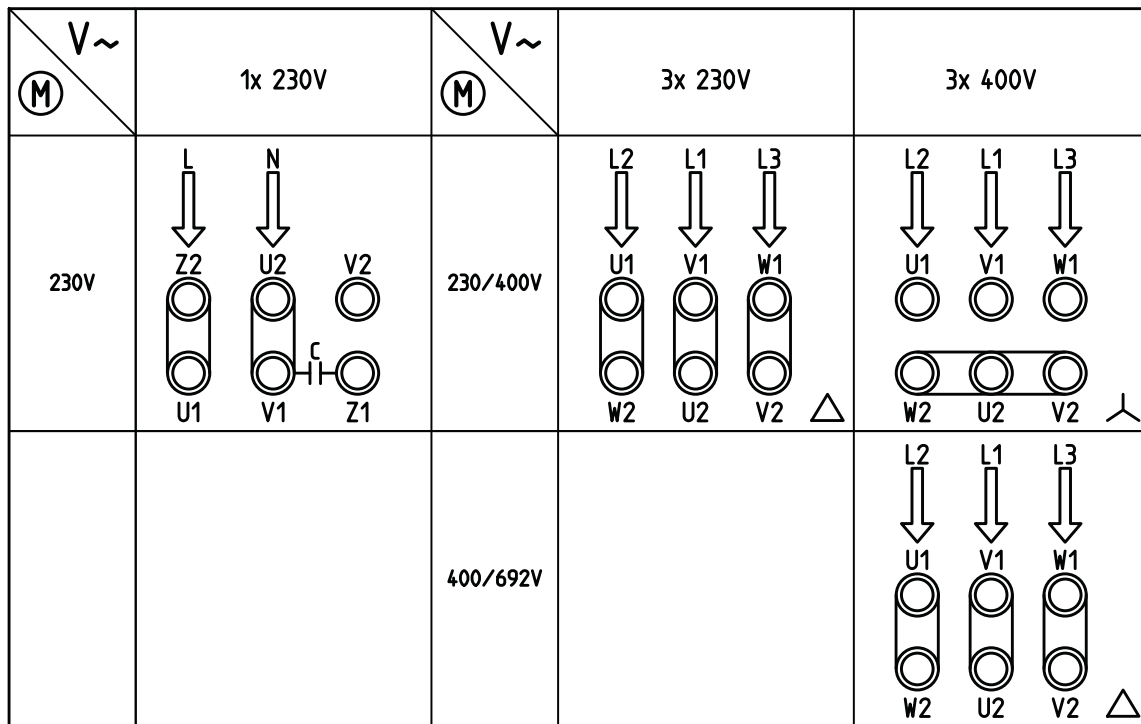


Figure 14: Motor connections

7.6 Electrical installation



WARNING

In accordance with the local regulations only authorised personnel is allowed to electrically connect the motor.



ATTENTION

Connect the motor according to figure 14: Motor connections and always check the rotation direction.

Electrical connections:

- Make sure that the motor specifications correspond with the power supply to which the pump motor is connected. Consult "Electrical diagrams" for the correct connection diagram.
- If your motor is provide with an anti-condensation heater you could find the connection diagram on the motor.
- Connect the motor using a manual motor protector.

PTC connection STM 140 EK:

- Standard motors 3 kW and up are equipped with a PTC thermistor. Consult Table 12: Technical specifications PTC STM 140 EK.
- Connect the PTC to a thermistor relay.

Table 12: Technical specifications PTC STM 140 EK

	Value
t_n [°C]	140
$R_{20\text{ °C}}$ [Ω]	~ 20
$R_{t_n-20\text{ °C}}$ [Ω]	~ 250
$R_{t_n-5\text{ °C}}$ [Ω]	< 550
$R_{t_n+5\text{ °C}}$ [Ω]	> 1330
$R_{t_n+15\text{ °C}}$ [Ω]	> 4000
U_n [VDC]	$2.5 < U < 30$

7.7 Commissioning



WARNING

Pay attention to the direction of the vent hole and take care to ensure that the escaping water does not cause injury to persons or damage to the motor or other components.

7.7.1 Before starting the pump, be sure:

- that all pipe connections are tight;
- that the pump body is partly filled with liquid (partly submerged) see figure 7: DPVCI 2-15 B / 15 C;
- that the strainer is not blocked.

7.7.2 Start the pump as follows:

- Close the isolating valve on the discharge side of the pump;
- If the pump is fitted with a vent valve, this valve must be opened;
- See the correct direction of rotation of the pump on the motor fan cover or on the coupling guard;
- When seen from the top, the pump should rotate clockwise;
- Start the pump and check the direction of rotation;
- Open the discharge isolating valve a little;
- If the pump is fitted with a vent valve, closed the valve until the pump is completely vented;
- Completely open the discharge isolating valve.

The pump has now been vented and is ready for operation.



ATTENTION

The pump is not allowed to run against a closed discharge valve.



ATTENTION

Seen from the top of the motor the pump should rotate clockwise. See 7.3.1: Indicators (B). In case of a 3-phase motor the rotating direction can be changed by exchanging two of the three phases.



ATTENTION

Make sure the pump and piping are installed properly.

7.7.3 After an extended period of non-operation or storage

During first start-up, check the mechanical seals for leakage due to seizure or dehydration of the lubricating film. If so, please proceed as following:

1. Turn shaft manually.

If the mechanical seal is leaking:

1. Disassemble the mechanical seal.
2. Thoroughly clean and decrease the running surfaces.
3. Assemble the mechanical seal again and retry start-up.

If this doesn't solve the shaft leakage, replacement of the mechanical seal is necessary.

8 Operation

8.1 Operation

The pump is controlled externally and therefore does not need any operational guidance.



9 Maintenance

9.1 Introduction



WARNING

Observe the general safety precautions for installation, maintenance and repair.

Regular maintenance is necessary for the correct operation of a pump. Please contact your supplier for maintenance of the pump.

2. Drain each pump and/or the system.
3. Remove all plugs from the pump.
4. Disassemble the cartridge seal and check the running surfaces

9.2 Lubrication

Standard motors and thrust bearing housings, with a maximum power of 7.5 kW, are provided with maintenance free sealed bearings.

The bearings of motors, and (if applicable) thrust bearing housings, with lubricating nipples must be lubricated after 2000 hours. If the pump works under extreme conditions, such as high vibrations and temperatures, the motors, and (if applicable) thrust bearing housings, must be lubricated more often.

Use a lithium based -30 °C / 160 °C bearing lubricant (about 15 grams).

When the pump is delivered without a motor and fitted with an other brand or the standard motor is replaced by an other brand than DP-Pumps, please consult the maintenance instructions of the motor supplier.



ATTENTION

Also follow the instructions in § 7.5: Mounting a motor on the pump.

9.3 Maintaining the pump for an extended period of non-operation

Turn the shaft every three months. This protects the seals from seizure.

Protect the pump against if there is a risk of frost. Proceed as follows:

1. Close all pump valves.

10 Failures

10.1 Failure table



WARNING

Observe the general safety precautions before install, maintenance and repair.

Problem	Possible cause	Possible solution	Checkpoints
Leakage along the shaft.	Running surfaces of the mechanical seal worn or damaged.	Replace the mechanical seal.	Check the pump for dirt - abrasive parts.
	Mechanical seal mounted incorrectly.	Install the mechanical seal correctly. Use water and soap as a lubricant.	
	Elastomers affected by medium.	Use the right rubber compound for the mechanical seal.	
	Pressure too high.	Use the right type of mechanical seal.	
	Shaft worn.	Replace shaft and mechanical seal.	
	Pump has been operating without water too long.	Replace the mechanical seal.	
Pump is vibrating or noisy.	Coupling mounted incorrectly.	Install the coupling in parallel.	
	Faulty setting of the hydraulic assembly.	Adjust the assembly according to the manual.	
	There is no water in the pump.	Fill and vent the pump.	
	No supply.	Make sure there is sufficient supply. Check for blockages in the supply line.	
	Bearings of pump and/or motor worn.	Have the bearings replaced by a certified company.	
	Available NPSH too low (cavitation).	Check liquid level.	
	Pump does not work in its working range.	Select another pump or adjust the system to work within its working range.	
	Pump is standing on an uneven surface.	Level the surface.	
Malfunction.	Internal blockage in the pump.	Have the pump inspected by a certified company.	

Problem	Possible cause	Possible solution	Checkpoints
Pump does not start.	No voltage on the terminal clamps.	Check the power supply.	<ul style="list-style-type: none"> • Circuit • Main switch • Fuses
		Check the motor safety relay	<ul style="list-style-type: none"> • Earth leakage switch • Protective relay
	Thermal motor safety switch triggered.	Reset the thermal motor-safety. Contact the supplier, if this problem occurs more often.	Check if the correct value is set. Find the correct value (I_{nom}) on the motor type plate.
The motor is running, but the pump does not work.	The pump shaft has broken.	Contact the supplier.	
	The coupling between pump- and motor shaft is loose.	Tighten the connecting screws to the recommended torque.	
Pump supplies insufficient capacity and/or pressure.	There is air in the pump.	Vent the pump.	
	Pump rotates in the wrong direction.	Change over L1 and L2 of the three phase supply.	
	Too little water consumption so air bubbles clog up in the pump.	Make sure the consumption increases or use a smaller pump.	
	The impeller or the diffuser is blocked.	Clean the inside of the pump.	
	O-ring between impeller and diffuser is gone.	Replace the O-rings.	
	O-ring not resistant to the medium to be pumped.	Replace O-ring by an O-ring with better resistance.	

11 Annexes

11.1 EU declaration of conformity

D.P. Industries B.V.
Kalkovenweg 13
2401 LJ Alphen aan den Rijn, The Netherlands
Tel: (+31)(0)-172-48 83 88

Declares as the manufacturer in his own responsibility, that the products:

Product: **Vertical immersible multi-stage centrifugal pumps**

Series: **DPVCI**

to which this declaration relates, are constructed in conformity with the following harmonized international standards:

Serial number: 40/2021 1000000-1 - 52/2023 9999999-999

- **ISO 12100:2010**
- **EN 809:1998+A1:2009/AC:2010**

in accordance with the provisions of:

- **Machinery directive 2006/42/EC**
- Ecodesign Directive 2009/125/EC (Regulation 547/2012)
- EC Directive 2011/65/EU (RoHS 2)

The pump is subject to this declaration of conformity as a stand alone product. Make sure the appliance or installation in which the pump is built in, has got a declaration of compliance with the directives listed above, for its complete assembly.



Alphen aan den Rijn
2022-02-02

Authorized representative
M.H. Schaap, Manager Competence Centre Products.

11.2 Certificate of Decontamination

Type: _____

Order number: _____

Delivery date: _____

Applications: _____

Fluid handled: _____

Please tick where applicable:



Corrosive



Oxidising



Flammable



Explosive



Hazardous to health



Seriously hazardous
to health



Toxic



Radioactive



Bio-hazardous



Safe

Reason(s) for return: _____

Comments: _____

The product/accessories have been carefully drained, cleaned and decontaminated inside and outside prior to dispatch/placing at your disposal.

We herewith declare that this product is free from hazardous chemicals, biological and radioactive substances.

- No special safety precautions are required for further handling.
- The following safety precautions are required for flushing fluids, residual fluids and disposal:

26

We confirm that the above data and information are correct and complete and that dispatch is effected in accordance with the relevant legal provisions.

Place, date and signature Address Company stamp



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2022-02

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Original instructions

