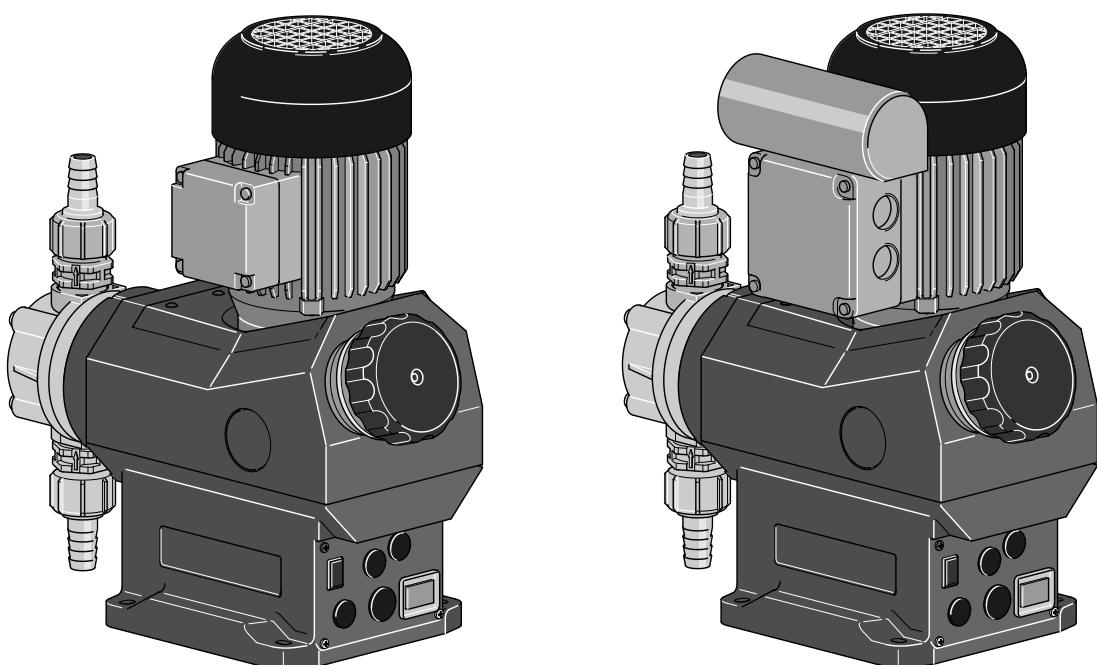


Operating instructions

Metering pumps

Vario C, VAMC

EN



Please carefully read these operating instructions before use. · Do not discard.
The operator shall be liable for any damage caused by installation or operating errors.
The latest version of the operating instructions are available on our homepage.

Supplementary information



Fig. 1: Please read!

Read the following supplementary information in its entirety! Should you already know this information, you will benefit more from referring to the operating instructions.

The following are highlighted separately in the document:

- Enumerated lists

→ Operating guidelines

⇒ Outcome of the operating guidelines

- see (reference)

Information



This provides important information relating to the correct operation of the unit or is intended to make your work easier.

Safety notes

Safety notes are identified by pictograms - see Safety Chapter.

Validity

These operating instructions conform to current EU regulations applicable at the time of publication.

State the identity code and serial number

Please state identity code and serial number, which you can find on the nameplate when you contact us or order spare parts. This enables the device type and material versions to be clearly identified.

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1 Identity code

Product range Vario, Version c

VAMC	Capacity
	Performance data at maximum back pressure and type: refer to nameplate on the pump housing
	Material of dosing head/valves
PPE	Polypropylene with EPDM seal
PCB	PVC with EPDM seal
PVT	PVDF with PTFE seal
SST	Stainless steel with PTFE seal
	Dosing head design
0	no valve spring (standard)
1	with 2 valve springs, Hastelloy C4
	Hydraulic connector
0	Standard connection - Union nut with hose connection
1	Union nut and PVC insert
2	Union nut and PP insert
3	Union nut and PVDF insert
4	Union nut and stainless steel insert
5	Union nut and PVC tube nozzle
6	Union nut and PP tube nozzle
7	Union nut and PVDF tube nozzle
8	Union nut and stainless steel tube nozzle
	Design
0	with ProMinent® logo (standard)
M	Modified
	Motor connector
-	refer to nameplate on motor
	Stroke sensor
0	No stroke sensor
3	with stroke sensor (Namur)
	Setting the stroke length
0	Manual (standard)

2 Safety Chapter

General



WARNING!

We should like to remind the operator of the pump that he has a duty to use the advice on safety and operation of the pump for operating instructions for his staff.

Identification of safety notes

The following signal words are used in these operating instructions to denote different severities of danger:

Signal word	Meaning
WARNING	Denotes a possibly dangerous situation. If this is disregarded, you are in a life-threatening situation and this can result in serious injuries.
CAUTION	Denotes a possibly dangerous situation. If this is disregarded, it could result in slight or minor injuries or material damage.

Warning signs denoting different types of danger

The following warning signs are used in these operating instructions to denote different types of danger:

Warning signs	Type of danger
	Warning – high-voltage.
	Warning – danger zone.

Intended use

- Only use the pump to meter liquid feed chemicals.
- Only use the pump after it has been correctly installed and started up in accordance with the technical data and specifications contained in the operating instructions.
- Observe the general limitations with regard to viscosity limits, chemical resistance and density - see also ProMinent® resistance list (In the product equipment catalogue or at www.prominent.com!)
- All other uses or modifications are prohibited.
- The pump is not intended for the metering of gaseous media and solids.
- The pump is not intended to meter extremely hazardous media or media harmful to life.
- The pump is not intended to meter flammable media.
- The pump is not intended to meter oxidants without the use of suitable protective equipment.
- The pump is not intended for the metering of explosive media.
- The pump is not intended for operation in areas at risk from explosion.
- The pump is not intended for unprotected outside use.
- The pump is only intended for industrial use.
- The pump should only be operated by trained and authorised personnel.
- You have a responsibility to adhere to the information contained in the operating instructions at the different phases of the unit's service life.

Qualification of personnel	Action	Qualification
	Storage, transport, unpacking	Instructed person
	Assembly	Technical personnel, service
	Planning hydraulic installation	Qualified personnel who have a thorough knowledge of metering pumps.
	Hydraulic installation	Technical personnel, service
	Installation, electrical	Electrical technician
	Operation	Instructed person
	Maintenance, repair	Technical personnel, service
	Decommissioning, disposal	Technical personnel, service
	Troubleshooting	Technical personnel, electrical technician, instructed person, service

Explanation of the terms:

Technical personnel

A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognise possible dangers based on his/her technical training, knowledge and experience, as well as knowledge of pertinent regulations.

Note:

A qualification of equal validity to a technical qualification can also be gained by several years employment in the relevant work area.

Electrical technician

Electrical technicians are deemed to be people, who are able to complete work on electrical systems and recognise and avoid possible dangers independently based on their technical training and experience, as well as knowledge of pertinent standards and regulations.

Electrical technicians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations.

Electrical technicians must comply with the provisions of the applicable statutory directives on accident prevention.

Instructed person

An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.

Service

Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent or Pro-Maqua to work on the system.

Safety information

**WARNING!****Warning of hazardous feed chemical**

Should a dangerous feed chemical be used: it may escape from the hydraulic components when working on the pump, material failure or incorrect handling of the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Adhere to the material safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.

**WARNING!****Danger from hazardous substances!**

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacturer of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

**WARNING!****Danger of electric shock**

A mains voltage may exist inside the pump housing.

- If the pump housing has been damaged, you must disconnect it from the mains immediately. It may only be returned to service after an authorised repair.

**CAUTION!****Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

**CAUTION!****Warning of feed chemical spraying around**

An unsuitable feed chemical can damage the parts of the pump that come into contact with the chemical.

- Take into account the resistance of the wetted materials and the ProMinent Resistance List when selecting the feed chemical - see the ProMinent Product Catalogue or visit ProMinent.



CAUTION!

Danger of personnel injury and material damage

The use of untested third party parts can result in personnel injuries and material damage.

- Only fit parts to metering pumps, which have been tested and recommended by ProMinent.



CAUTION!

Danger from incorrectly operated or inadequately maintained pumps

Danger can arise from a poorly accessible pump due to incorrect operation and poor maintenance.

- Ensure that the pump is accessible at all times.
- Adhere to the maintenance intervals.

Isolating protective equipment

All isolating protective equipment must be installed for operation:

- Drive front cover
- Motor fan cowling
- Motor terminal box cover
- Plug (Pos. 9 in Fig. 6 in Chap. "Repair")

Information in the event of an emergency

In the event of an electrical accident, disconnect the mains cable from the mains or press the emergency cut-off switch fitted on the side of the system!

If feed chemical escapes, also depressurise the hydraulic system around the pump as necessary. Adhere to the safety data sheet for the feed chemical.

Sound pressure level

Sound pressure level LpA < 70 dB according to EN ISO 20361

at maximum stroke length, maximum stroke rate, maximum back pressure (water)

3 Carrying out repairs

Safety information



WARNING!

Only return the metering pump for repair in a cleaned state and with a flushed liquid end - refer to the chapter "Decommissioning"!

Only return metering pumps with a completed Decontamination Declaration form. The Decontamination Declaration constitutes an integral part of an inspection / repair order. A unit can only be inspected or repaired when a Declaration of Decontamination Form is submitted that has been completed correctly and in full by an authorised and qualified person on behalf of the pump operator.

The "Decontamination Declaration Form" can be found at www.prominent.de.



WARNING!

Warning of hazardous feed chemical

Should a dangerous feed chemical be used: it may escape from the hydraulic components when working on the pump, material failure or incorrect handling of the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Adhere to the material safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.



CAUTION!

Warning of feed chemical spraying around

An unsuitable feed chemical can damage the parts of the pump that come into contact with the chemical.

- Take into account the resistance of the wetted materials and the ProMinent Resistance List when selecting the feed chemical - see the ProMinent Product Catalogue or visit ProMinent.



CAUTION!

Warning of feed chemical spraying around

PTFE seals, which have already been used / compressed, can no longer reliably seal a hydraulic connection.

- New, unused PTFE seals must always be used.



CAUTION!

Danger of personnel injury and material damage

The use of untested third party parts can result in personnel injuries and material damage.

- Only fit parts to metering pumps, which have been tested and recommended by ProMinent.

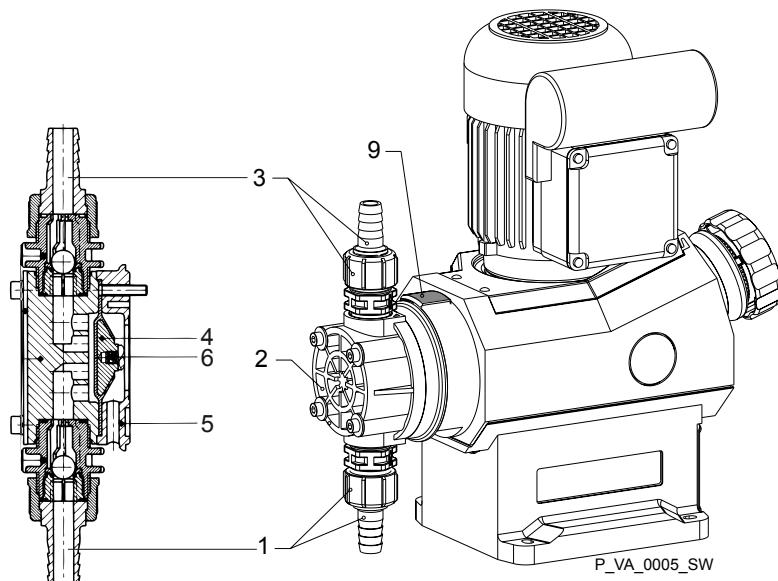


Fig. 2: Liquid end parts

- 1 Suction connector
- 2 Dosing head
- 3 Pressure connector
- 4 Diaphragm
- 5 Backplate
- 6 Slide rod
- 9 Plug

- If necessary take protective measures.
 - Adhere to the material safety data sheet for the feed chemical.
 - Ensure that the system is at atmospheric pressure.
1. ➤ Empty the liquid end (turn the liquid end upside down and allow the feed chemical to run out; flush out with a suitable medium; flush the liquid end thoroughly when using hazardous feed chemicals!)
 2. ➤ Turn the stroke adjustment dial as far as 0% stroke length when the pump is running (the drive axle is then difficult to turn).
 3. ➤ Switch off the pump and secure it to prevent it being switched on again.
 4. ➤ Unscrew the hydraulic connectors on the discharge and suction side.
 5. ➤ Remove the screws.

- 6.** Loosen the dosing head (2) and the backplate (5) from the pump housing - but only loosen!
- 7.** Hold the pump housing with one hand and clamp the diaphragm (4) with the other hand between the dosing head (2) and the backplate (5).
- 8.** Loosen the diaphragm (4) from the drive axle with a gentle backwards turn of the dosing head (2), diaphragm (4) and backplate (5) in an anticlockwise direction. (Possibly hold the slide rod (6) using an appropriate wrench through the opening for the plug (9).)
- 9.** Unscrew the diaphragm (4) completely from the drive axle.
- 10.** Clean the sealing surfaces.
- 11.** Place the diaphragm (4) into the backplate (4).
- 12.** Position the dosing head (2) so that the suction connector (1) lies above the leakage hole of the backplate (5).
- 13.** Insert the screws and manually tighten the diaphragm in a clockwise direction up to the slide rod (6).
- 14.** Switch the pump on.
- 15.** Set the stroke length to 100%.
- 16.** Place the dosing head (2) with the screws onto the diaphragm (4) and the backplate (5) - the suction connector must be pointing downwards in the pump's subsequent fitting position.
- 17.** When the pump is running, rotate the liquid end as far to the right until the suction connection (1) is pointing vertically downwards.
- 18.** Now disconnect the pump from the power supply so that the slide rod (6) comes to a standstill approximately at the rear end position.
- 19.** Gently tighten the screws (1) and then tighten them diagonally. See below for the tightening torque.
- 20.** With PP types with bleed valve: Allow the cover of the liquid end to rest in the dosing head, then press the grip on the bleed valve into the dosing head.

**CAUTION!****Leakage possible**

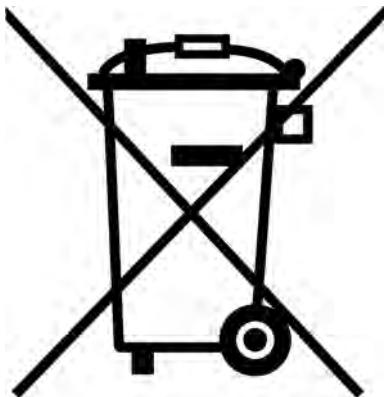
- Check the tightening torque of the screws after 24 hours of operation!
- With PP dosing heads, recheck the tightening torque again after three months!

Tightening torque

Data	Value	Unit
Tightening torque for screws:	4.5 ... 5.0	Nm

4 Information on disposal

Sign indicating EU collection system



In accordance with the European Directive 2012/19/EU on waste electrical and electronic equipment, this device features the symbol showing a waste bin with a line through it. The device must not be disposed of along with domestic waste. To return the device, use the return and collection systems available and observe the local legal requirements.

5 Technical Data

Only for "M - modified" design:



WARNING!

Risk of personal injuries

Please observe the "Supplement for modified version" at the end of the chapter!

It replaces and supplements the technical data!

5.1 Performance data

The capacity at maximum back pressure can be found on the nameplate on the housing.

VAMC Type	Suction lift	Permissible priming pressure, suction side
	m WS	bar
10008, 10016, 07026, 07042	7	2.8
07012, 07024, 04039, 04063	6	1.7

All figures refer to water at 20 °C.

The suction lift applies to filled suction line and filled liquid end - when installed correctly.

5.2 Precision

Precision

Data	Value	Unit
Reproducibility	±2	% *

* - when installed correctly, under constant conditions, at least 30% stroke length and water at 20 °C

5.3 Shipping weight

Material version	Shipping weight
	kg
PVT	6.0
SST	7.2

5.4 Wetted materials

Material version	Liquid end	Suction/pressure connector	Seals	Balls	Valve seat
PPE	PP	PP	EPDM	Glass	PP
PCB	PVC	PVC	FPM-B	Glass	PVC
PVT	PVDF	PVDF	PTFE	Ceramic	PTFE
SST	Stainless steel 1.4404/1.4571	Stainless steel 1.4581/1.4571	PTFE	Stainless steel 1.4404	PTFE

Diaphragm is PTFE coated.

5.5 Ambient conditions

5.5.1 Ambient temperatures

Pump, compl.

Data	Value	Unit
Storage and transport temperature	-10 ... +50	°C
Ambient temperature in operation (drive + motor):	-10 ... +45	°C

5.5.2 Media temperatures

Material version	PPE	PCB	PVT	SST
Long-term temperature* [°C]	-10 ... +50	-10 ... +45	-10 ... +50	-10 ... +50
Max. temperature for 15 min** [°C]	100	60	100	120

* at max. operating pressure

** at max. 2 bar

5.5.3 Air humidity

Air humidity

Maximum air humidity*:

95% rel. humidity

*non-condensing

5.6 Motor data

Electrical data

The key electrical data for the motor can be found on the nameplate on the motor.

 **Motor data sheets, special motors, special motor flanges**
 – Further information on motors can be found on our homepage under motor data sheet.

5.7 Stroke sensor "Sigma"



Install the sensor according to the chapter "Installation, electrical".

Namur sensor (identity code characteristic "stroke sensor": 3)

5–25 V DC, in accordance with Namur or DIN 60947-5-6, potential-free design.

Data	Value	Unit
Nominal voltage *	8	VDC
Power consumption - active surface uncovered	> 3	mA
Power consumption - active surface covered	< 1	mA
Rated switching distance	1.5	mm

* $R_i \sim 1 \text{ k}\Omega$

Cable colour	Polarity
blue	-
brown	+

5.8 Sound pressure level

Sound pressure level

Sound pressure level LpA < 70 dB according to EN ISO 20361

at maximum stroke length, maximum stroke rate, maximum back pressure (water)

5.9 Supplementary information for modified versions

(With identity code specification "Version": "M" - "modified")

Technical data

Technical data of pumps in the modified version can deviate from those of the standard pumps. They can be queried by stating the details of the serial number.

During operation with an automatic stroke length adjustment control together with a variable speed motor, the stroke rate must not fall below 30 strokes / min. Otherwise technical problems occur, because the mechanical resistance of the stroke adjustment spindle becomes too high.

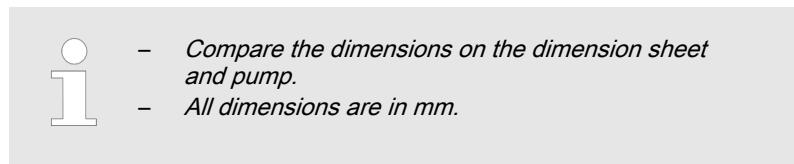
motor

The motor data sheets for the modified version are valid. They may deviate from the standard motor data sheets.

Spare parts

With a modified version, it is absolutely necessary to specify the details of the serial number requesting and ordering the spare and replacement parts.

6 Dimensional Drawings



Dimensional drawing of Vario C

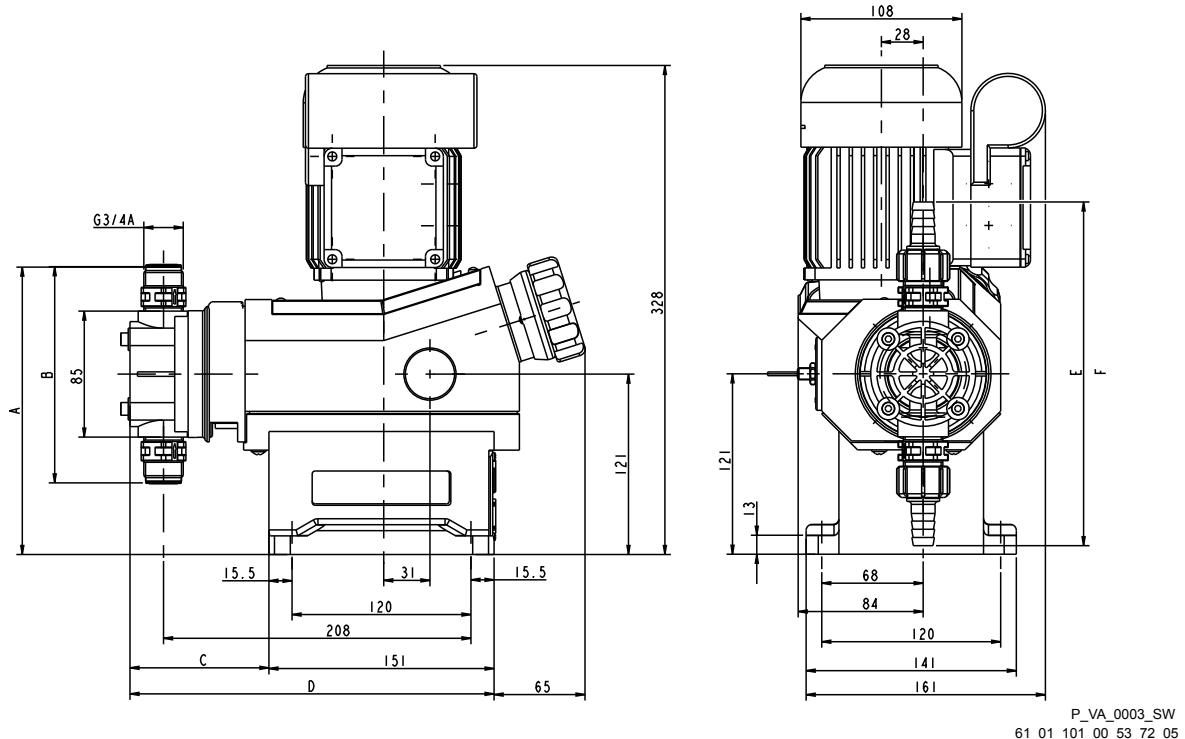


Fig. 3: Dimensional drawing of Vario C

Material ver- sion	A	B	C	D	E *	F **	Connector
PCB	191	142	92	243	226	176	DN10
PPE	191	142	92	243	226	178	DN10
PVT	191	142	95	246	228	180	DN10
SST	190	140	90	241	226	180	DN10

* with hose nozzle

** with insert

7 Diagrams for Setting the Capacity

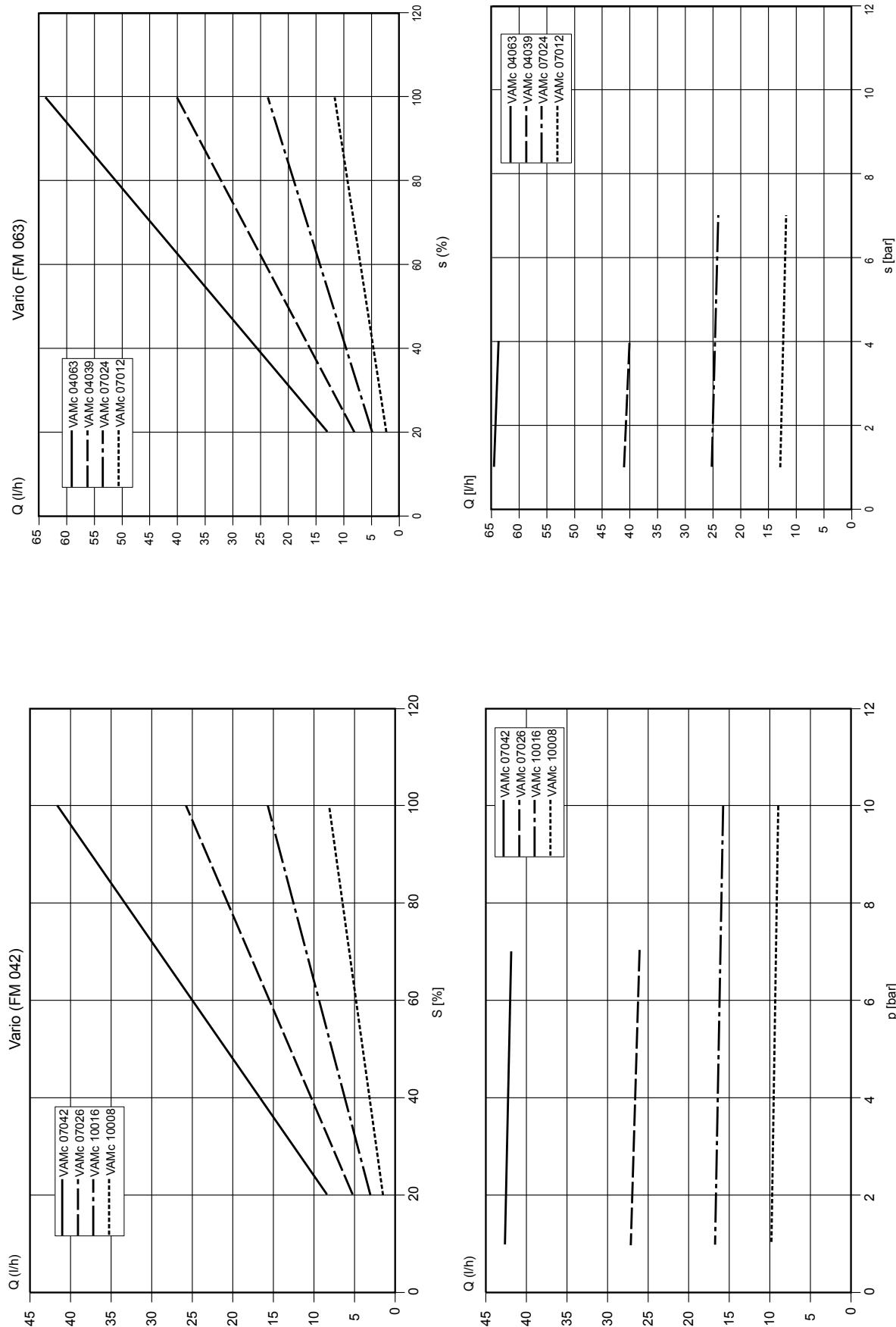


Fig. 4: Capacity Q at minimum back pressure dependent on the stroke length s and capacity Q dependent on the back pressure p .

8 Wear parts Vario C, VAMC

The spare parts kit generally includes the wear parts for the liquid ends.

8.1 Spare parts kits

Scope of delivery PPE, PCB, PVT:

- 1 diaphragm
- 1 suction valve, complete
- 1 discharge valve, complete
- 2 valve balls
- 1 sealing sets complete (cover rings, ball seat housings)

Scope of delivery SST:

- 1 diaphragm
- 2 valve balls
- 1 complete sealing set (cover rings, gaskets, ball seat)

Tab. 1: Types 10008, 10016, 07026, 07042

Liquid end	Material version	Order no.
FM 042 - DN 10	PPE	910753
FM 042 - DN 10	PCB	910754
FM 042 - DN 10	PVT	1003641
FM 042 - DN 10	SST	910751

Tab. 2: Types 07012, 07024, 04039, 04063

Liquid end	Material version	Order no.
FM 063 - DN 10	PPE	910758
FM 063 - DN 10	PCB	910759
FM 063 - DN 10	PVT	1003642
FM 063 - DN 10	SST	910756

8.2 Diaphragms

Tab. 3: Diaphragms for ...

Liquid end	Order no.
FM 042, Types 10008, 10016, 07026, 07042	811458
FM 063, Types 07012, 07024, 04039, 04063	811459

9 Declaration of Conformity for Machinery

In accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Appendix I, BASIC HEALTH AND SAFETY REQUIREMENTS, section 1.7.4.2. C.

We,

- ProMinent GmbH
- Im Schuhmachergewann 5 - 11
- DE - 69123 Heidelberg,

hereby declare that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us.

Any modification to the product not approved by us will invalidate this declaration.

Tab. 4: Extract from the Declaration of Conformity

Designation of the product:	Metering pump, Vario C product range
Product type:	VAMc...
Serial number:	see nameplate on the device
Relevant EC directives:	EC Machinery Directive (2006/42/EC) Compliance with the protection targets of the Low Voltage Directive 2014/35/EU according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC EC EMC Directive (2014/30/EU)
Harmonised standards applied, in particular:	EN ISO 12100:2010 EN 809:1998 + A1:2009 + AC:2010 EN 6100-6-2:2005 + AC:2005 EN 6100-6-3:2007 + A1:2011 + AC:2012
Date:	20.04.2016

You will find the EC Declaration of Conformity to download on our home-page.



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