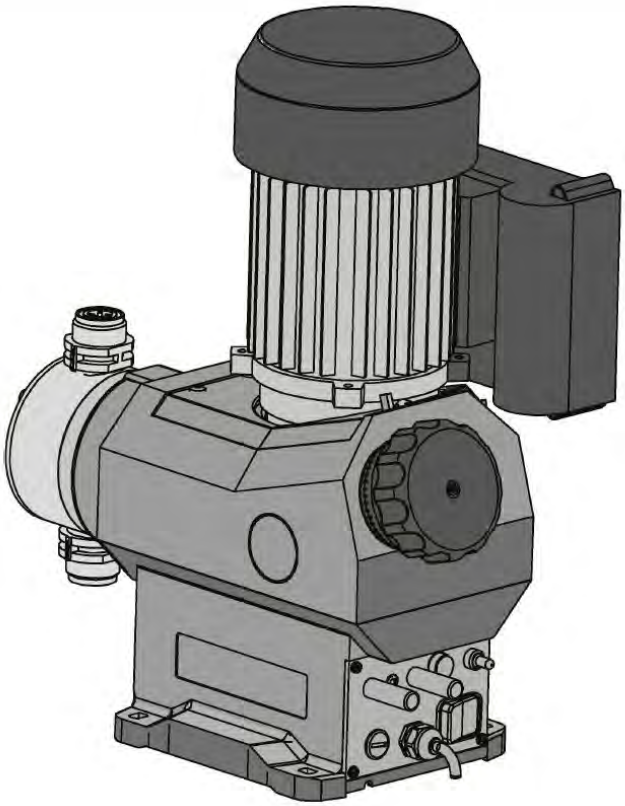
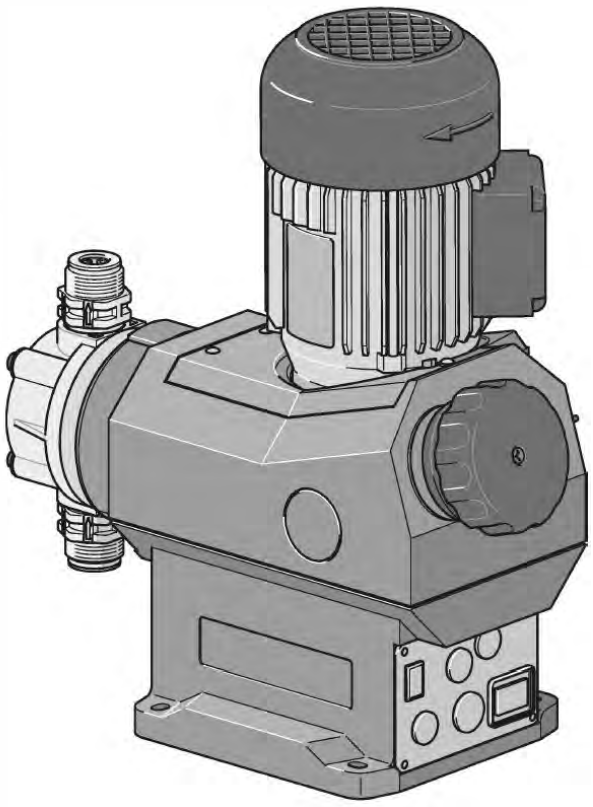
Operating instructions

Metering pump
Vario d, VAMd

EN





Target group: trained, qualified personnel, unless otherwise required.

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.

General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. The document is always aimed equally at women, men and gender-neutral persons. We kindly ask readers for their understanding in this simplification of the text.

Supplementary information

→ Please read the supplementary information in its entirety.

Information



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

Warning information

Warning information includes detailed descriptions of the hazardous situation, see ↳ *Chapter 2.2 'Labelling of Warning Information' on page 5*.

The following symbols are used to highlight instructions, links, lists, results and other elements in this document:

Tab. 1: More symbols

Symbol	Description
1. →	Action, step by step.
⇨	Outcome of an action.
↳	Links to elements or sections of these instructions or other applicable documents.
■	List without set order.
[Button]	Display element (e.g. indicators). Operating element (e.g. button, switch).
'Display/GUI'	Screen elements (e.g. buttons, assignment of function keys).
`CODE`	Presentation of software elements and/or texts.

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1 Product identification Vario d, VAMd

Tab. 2: design with motor: 3-phase, 400 V, 50 Hz

Order no.	Nominal pressure *	Nominal pump capacity *
1118827	12	17
1118828	10	25
1118829	12	42
1118830	9	39
1118831	7	63
* refer to nameplate for precise back pressure and pump capacity. Material version: PVT - see "Technical data" chapter.		

Tab. 3: design with motor: 1-phase, 230 V, 50 Hz

Order no.	Nominal pressure *	Nominal pump capacity *
1118502	12	17
1118501	10	25
1118500	12	42
1118544	9	39
1118503	7	63
* refer to nameplate for precise back pressure and pump capacity. Material version: PVT - see "Technical data" chapter.		

2 Safety chapter

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 – automatic start-up.
	Warning – high-voltage.
	Warning – danger zone.

2.1 Intended use

- Only use the pump to meter liquid feed chemicals.
- Only start up the pump once 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 catalogue or at *www.prominent.com*!
- All other uses or modifications are prohibited.
- The pump is not designed to meter gaseous media and solids.
- The pump is not intended to meter extremely hazardous media or media harmful to life.
- The pump is not designed to meter flammable media.
- The pump is not intended to meter oxidants without the use of suitable protective equipment.
- The pump is not designed to meter explosive media.
- The pump is not intended for operation in areas at risk from explosion.
- The pump is not intended for unprotected use outdoors.
- The pump is only intended for industrial use.
- The pump should only be operated by trained and authorised personnel.
- You have a duty to observe the information contained in the operating instructions during the different phases of the unit's service life.

2.2 Labelling of Warning Information

Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed warning information and are provided as clear step-by-step instructions.

The warning information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



DANGER!

Nature and source of the danger

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

Description of hazard

– Denotes an immediate threatening danger. If the situation is disregarded, it will result in fatal or very serious injuries.



WARNING!

Nature and source of the danger

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

– Denotes a possibly hazardous situation. If the situation is disregarded, it could result in fatal or very serious injuries.



CAUTION!

Nature and source of the danger

Possible consequence: Slight or minor injuries. Material damage.

Measure to be taken to avoid this danger.

– Denotes a possibly hazardous situation. If the situation is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.



NOTICE!

Nature and source of the danger

Damage to the product or its surroundings.

Measure to be taken to avoid this danger.

– Denotes a possibly damaging situation. If the situation is disregarded, the product or an object in its vicinity could be damaged.



Type of information

Hints on use and additional information.

Source of the information. Additional measures.

– *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

2.3 Users' qualifications



WARNING!

Danger of injury with inadequately qualified personnel!

The operator of the plant / device is responsible for ensuring that the qualifications are fulfilled.

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone

Training	Definition
Instructed personnel	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.
Trained user	A trained user is a person who fulfils the requirements made of an instructed person and who has also received additional training specific to the system from ProMinent or another authorised distribution partner.
Trained qualified personnel	A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.
Electrician	Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on his/her technical training and experience, as well as knowledge of pertinent standards and regulations. Electricians should be specifically trained for the working environment in which the are employed and know the relevant standards and regulations. Electricians must comply with the provisions of the applicable statutory directives on accident prevention.
Customer Service department	Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.



Note for the system operator

The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to!

2.4 Safety information



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 manufacture 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!

Warning of personal injury and material damage

Only with Basic Type: The pump can start pumping again as soon as it has cooled down after overheating.

– Take this into account when operating the pump.



WARNING!

Danger of electric shock

Supply voltage may be present inside the pump housing.

– Safely and quickly disconnect the pump from the mains/power supply if the pump housing has been damaged.

  Only return the pump to operation after an authorised repair.



CAUTION!

Warning of feed chemical spraying around

Feed chemical may spray out of the hydraulic components if they are tampered with 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.
– Ensure that the system is at atmospheric pressure before commencing any work on hydraulic parts of the system.



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.

2.5 Isolating protective equipment

All isolating protective equipment must be installed for operation:

- Power end front cover
- Motor fan cowling
- Motor terminal box cover
- Plug

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.

2.6 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)

3 Repair

- **User qualification:** trained user *Chapter 2.3 'Users' qualifications' on page 7*

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 manufacture 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.

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CAUTION!

Warning of feed chemical spraying around

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– 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.

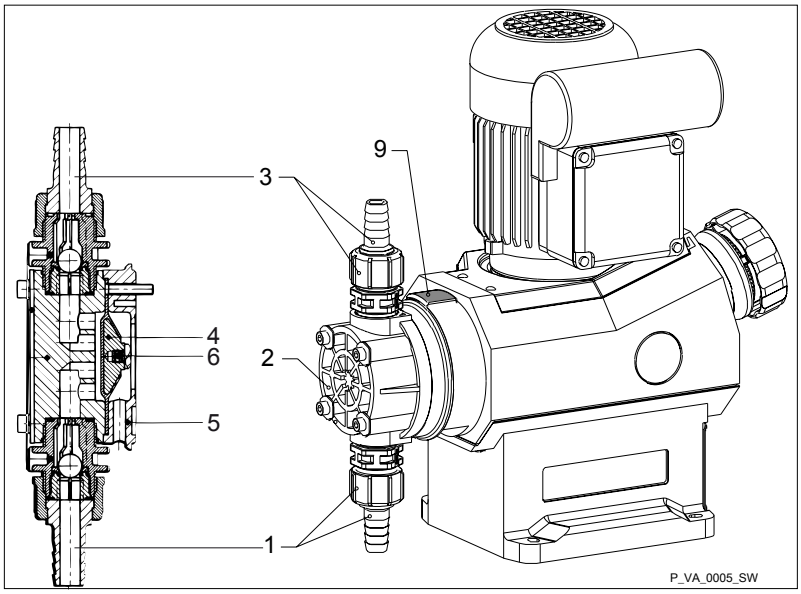


Fig. 1: Liquid end parts

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

- Put in place protective measures, if necessary.
- Adhere to the material safety data sheet for the feed chemical.
- Ensure that the system is at atmospheric pressure.

1. Drain the liquid end.

   Turn the liquid end upside down and allow the feed chemical to drain out.

   Use a suitable medium to rinse the pump. Thoroughly rinse the liquid end.

2. With the pump running, move the stroke adjustment dial to the stop at 0% stroke length.

   ⇨ The drive axle is then difficult to turn.

3. Switch off the pump and secure it to prevent it from being switched on again.
4. Unscrew the hydraulic connectors from the pressure and suction side.
5. Remove the screws.
6. Loosen the dosing head (2) and the backplate (5) from the pump housing.
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.

   You may need to use an open-ended spanner to hold the slide rod (6) through the opening for the plug (9).
9. Fully unscrew the diaphragm (4) from the drive axle.
10. Clean the sealing surfaces. Only use new seals.
11. Place the diaphragm (4) into the backplate (5).
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 screw the diaphragm clockwise onto the slide rod (6) until hand-tight.
14. Switch on the pump.
15. Set the stroke length to 100%.
16. Attach the dosing head (2) with the screws to the diaphragm (4) and the backplate (5).

    Make sure that the suction connector points downwards when the pump is in its subsequent fitting position.
17. When the pump is running, rotate the liquid end to the right until the suction connector (1) points vertically downwards.
18. Now disconnect the pump from the mains/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 crosswise. See below for the tightening torque.
20. With PP types with vent valve: Allow the cover of the liquid end to engage in the dosing head, then press the grip of the vent valve into the dosing head.

Leakage is possible at this point

21. - Check the tightening torque of the screws after 24 hours of operation.
    - With PP dosing heads, check the tightening torque again after three months.

Tightening torque for screws: 4.5 ... 5.0 Nm.

4 Technical data

Only with "M - modified" design:

Please observe the ”Supplementary information for modified design“ at the end of the chapter.

The supplementary information replaces and supplements the technical data.

4.1 Performance data

The dosing rate for 50 Hz at maximum back pressure can be found on the nameplate of the pump housing.

	Pump capacity at max. back pressure				Suction lift	Permissible suction lift priming pressure	Suction and pressure side connector	Shipping weight
Pump type	bar	l/h	ml/stroke	Strokes/ min.	mWS	bar	G - DN	kg
12017	10/12*	16.6	3.6	77	7	2.8	3/4 - 10	6.6/8.6*
12026	10/12*	26.2	3.6	122	7	2.8	3/4 - 10	6.6/8.6*
12042	10/12*	42.0	3.6	195	7	2.8	3/4 - 10	6.6/8.6*
10025	10	24.8	5.4	77	4	1.7	3/4 - 10	6.6/8.6*
09039	8.5	39.4	5.4	122	4	1.7	3/4 - 10	6.6/8.6*
07063	6.5	63.0	5.4	195	4	1.7	3/4 - 10	6.6/8.6*
06047	5.5	47.4	10.2	77	3	0.8	1 - 15	7.5/13.5*
05075	4.5	75.0	10.2	122	3	0.8	1 - 15	7.5/13.5*
04120	3.5 (2.3**)	120.0	10.2	195	3	0.8	1 - 15	7.5/13.5*

* Data for material version SST

The maximum possible starting pressure is 20 ... 50% of the specified max. operating pressure when the single-phase AC motor is switched off by the mains power supply.

** The value in brackets gives the maximum permissible starting pressure with “Pause” function or with a single stroke with external control.

4.2 Accuracy

Accuracy

The accuracy is ± 2% with correct installation, under constant conditions, a minimum stroke length of 30% and water at 20 °C.

4.3 Wetted materials

Tab. 4: Liquid end

Material version	Liquid end	Suction/pressure connector	Seals	Balls	Valve seat
PP1	PP	PP	EPDM	glass	PP
PVT	PVDF	PVDF	PTFE	Ceramic	PTFE
SST	Stainless steel 1.4571/1.4571	Stainless steel 1.4581/1.4571	PTFE	Stainless steel 1.4404	PTFE

The diaphragm is coated with PTFE.

4.4 Ambient conditions

4.4.1 Ambient temperatures

Pump, complete

Data	Value	Unit
Storage and transport temperature:	-10 ... +50	°C
Ambient temperature in operation (pump part):	-10 ... +40	°C
Ambient temperature in operation (control):	-10 ... +50	°C

4.4.2 Media temperatures

Material version	PP1	PVT	SST
Long-term temperature* [°C]	-10 ... +50	-10 ... +50	-10 ... +50
Max. temperature for 15 min** [°C]	100	100	120
* at max. operating pressure ** at max. 2 bar			

4.4.3 Air humidity

Air humidity

Maximum air humidity:	95% relative air humidity, non-condensing

4.5 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)

4.6 Supplementary information for modified design

(With identity code feature “Design”: "M" - "modified")

Technical data

The technical data of pumps with a modified design can deviate from that of the standard pumps. The technical data can be requested by stating the serial number.

Motor

The motor data sheets for the modified design apply but may deviate from the standard motor data sheets.

Spare parts

With a modified design, it is essential that spare parts and wear parts are requested and ordered by specifying the serial number of the pump.

5 Dimensional drawings

- *Compare the dimensions on the dimension sheet and pump.*
- *All dimensions are in mm.*

Dimensional drawing of Vario d

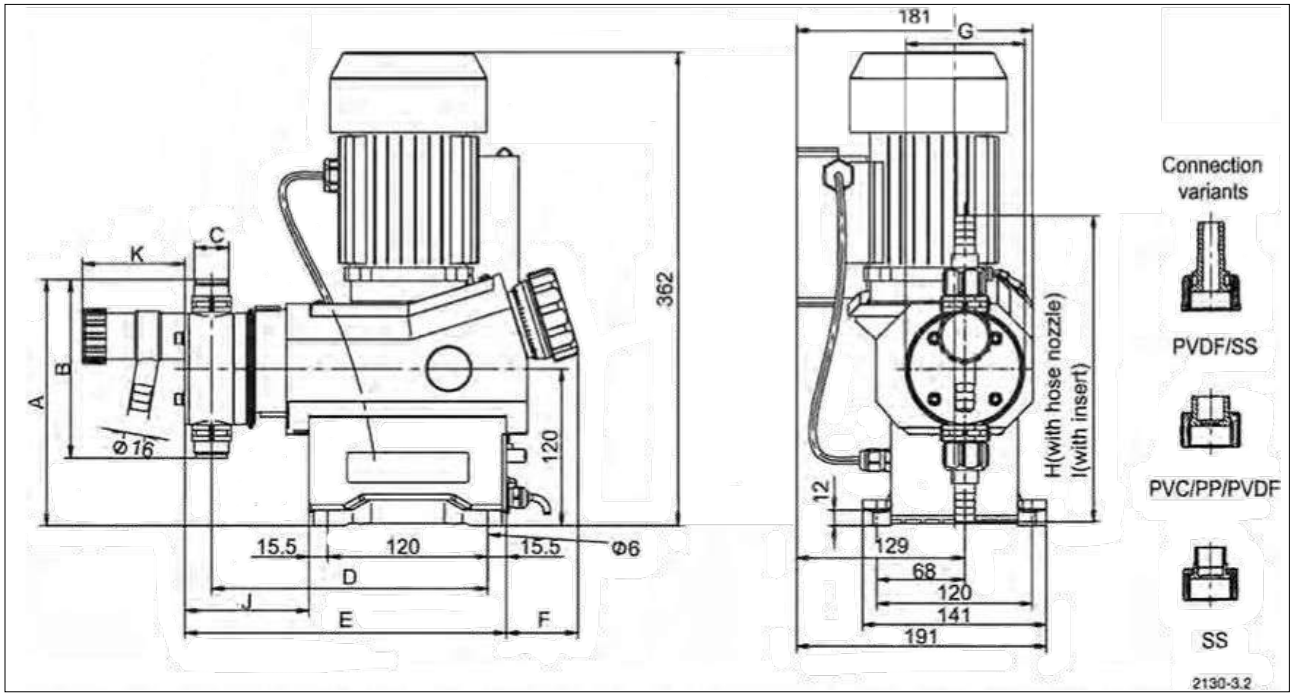


Fig. 2: Dimensional drawing of Vario d

Tab. 5: Dimensions of Vario d

Material version	A	B	C	D	E	F	G	J	K
042 PVT	191	142	G3/4A-DN10	208	246 (251*)	65	85	95 (100*)	74*
042 SST	190	120	G3/4A-DN10	208	241	65	85	90	-
063 PVT	191	142	G3/4A-DN10	208	246 (251*)	65	85	95 (100*)	74*
063 SST	190	140	G3/4A-DN10	208	241	65	85	90	-
120 PVT	218	195	G1A-DN15	210	256 (263*)	65	135	105 (112*)	69*
120 SST	218	195	G1A-DN15	210	249	65	135	98	-
* PVT with vent valve									

6 Diagrams for adjusting the dosing rate

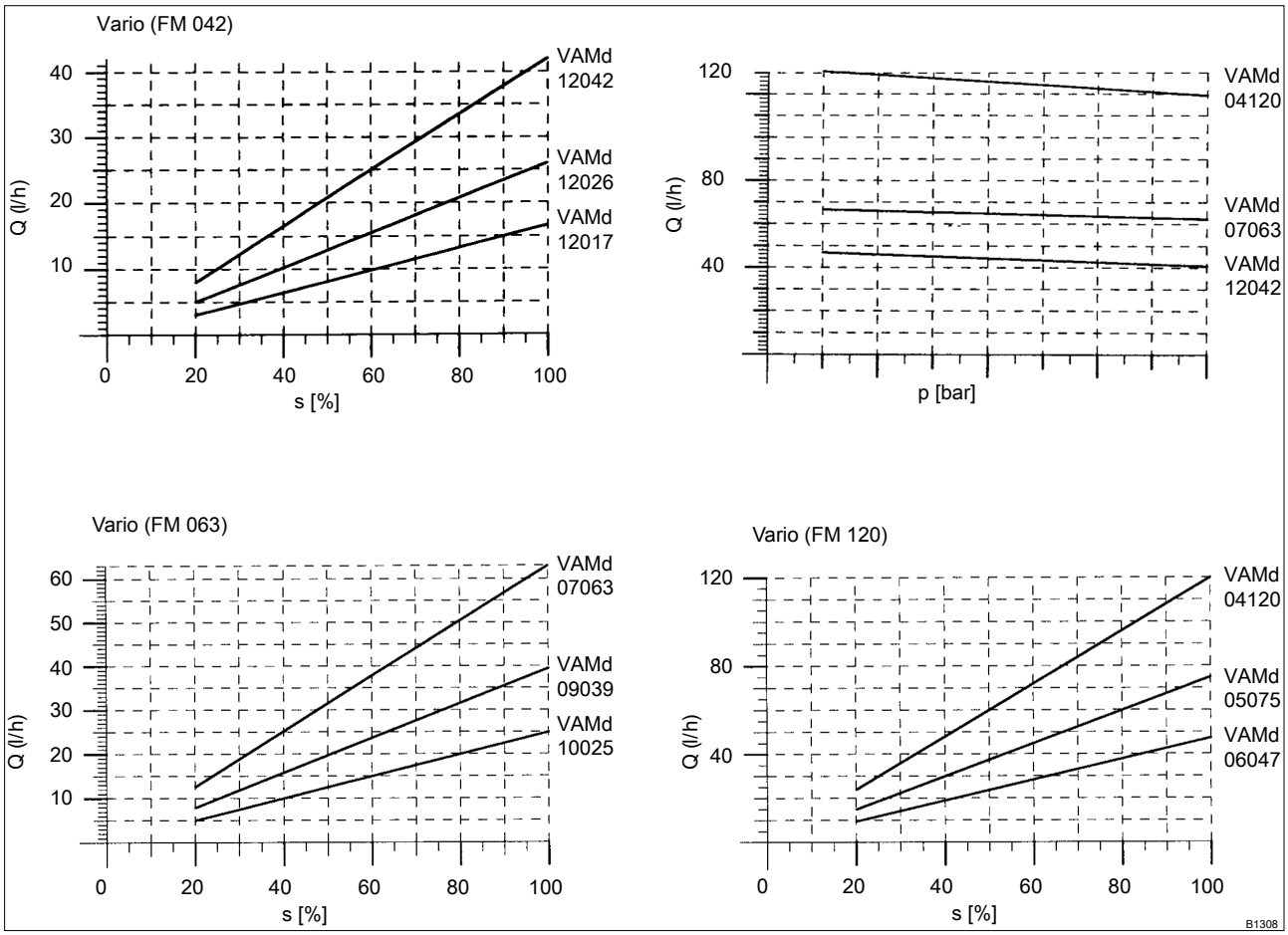


Fig. 3: Dosing rate Q at minimum back pressure depending on the stroke length s, and dosing rate Q depending on the back pressure p.

7 Wear parts for Vario d, VAMd

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

7.1 Spare parts kits

Scope of delivery of PVT:

1 metering diaphragm
1 suction valve assembly
1 discharge valve assembly
2 valve balls
1 sealing set, complete (cover rings, ball seat housings)

Scope of delivery of SST:

1 metering diaphragm
2 valve balls
1 sealing set, complete (cover rings, flat seals, ball seat)

Scope of delivery of PP1:

1 metering diaphragm
1 suction valve assembly
1 discharge valve assembly
2 valve balls
1 sealing set, complete (O-ring, ball seat housings)

Tab. 6: Types 12017, 12026, 12042

Liquid end	Material version	Order no.
FM 042 - DN 10	PVT	1003641
FM 042 - DN 10	SST	910751
FM 042 - DN 10	SST (with 2 valves)	910750
FM 042 - DN 10	PP1	910753

Tab. 7: Types 10025, 09039, 07063

Liquid end	Material version	Order no.
FM 063 - DN 10	PVT	1003642
FM 063 - DN 10	SST	910756
FM 063 - DN 10	SST (with 2 valves)	910755
FM 063 - DN 10	PP1	910758

Tab. 8: Types 06047, 05075, 04120

Liquid end	Material version	Order no.
FM 120 - DN 15	PVT	1003643
FM 120 - DN 15	SST	910761
FM 120 - DN 15	SST (with 2 valves)	910760
FM 120 - DN 15	PP1	910763

7.2 Diaphragms

Tab. 9: Diaphragms for ...

Liquid end	Order no.
FM 042, types 12017, 12026, 12042	811458
FM 063, types 10025, 09039, 07063	811459
FM 120, types 06047, 05075, 04120	811460

8 Declaration of Conformity for Machinery

In accordance with the Machinery Directive 2006/42/EC

Tab. 10: Extract from the Declaration of Conformity

Certificate number:	IN-DL-5805-20033M
Licensee:	ProMinent Fluid Controls (Dalian) Co., Ltd.
Address:	No. 14 Road Liaohexisan Dalian Economic & Technical Development Zone, P. R. China
Manufacturer:	ProMinent Fluid Controls (Dalian) Co., Ltd.
Address:	No. 14 Road Liaohexisan Dalian Economic & Technical Development Zone, P. R. China
Description of the machine:	Metering pump
Type identification:	VAMD04120PP1000B3B102EN
Machine parameters:	AC 230 V 1-phase, 50 Hz
Technical documentation reference number:	IN-DL-5805-20033M
Applied standards:	EN ISO 12100:2010 EN 60204-1:2018 EN 809:1009 + A1:2009
Place, Date:	Dalian, 26.03.2021

Declaration: In the view of SGS - STANDARDS TECHNICAL SERVICES CO.,LTD, 16/F, Century YuHui Mansion, No. 73, Fucheng Road, Beijing, China - this technical documentation IN-DL-5805-20033M complies with the requirements of the Machinery Directive 2006/42/EG, Appendix VII.

You will find the Declaration of Conformity to download on our homepage.

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