

Operating instructions

Solenoid Metering Pump

gamma/ L, GALa

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 instructions

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.

Table of contents

1	Identity code	5
2	About this pump	8
3	Safety chapter	9
4	Storage, transport and unpacking	14
5	Overview of equipment and control elements	15
	5.1 Overview of equipment.....	15
	5.2 Control elements.....	16
	5.2.1 Key functions.....	16
	5.2.2 Stroke length adjustment knob.....	17
	5.2.3 Control elements.....	17
6	Functional description	18
	6.1 Liquid End.....	18
	6.2 Drive Unit.....	18
	6.3 Capacity.....	18
	6.4 Self-Bleeding.....	18
	6.5 Functional description of control.....	18
	6.5.1 Operating modes, functions, options.....	18
	6.5.2 Function and fault indicator.....	20
	6.5.3 Hierarchy of operating modes, functions and fault statuses.....	20
7	Assembly	21
8	Installation, hydraulic	22
	8.1 Install hose lines.....	23
	8.1.1 Installation for metering pumps without bleed valve.....	23
	8.1.2 Installation for metering pumps with bleed valve.....	25
	8.1.3 Installation for metering pumps with self-bleeding (SEK type).....	26
	8.2 Basic installation notes.....	27
9	Installation, electrical	29
	9.1 Supply voltage connector - mains voltage.....	30
	9.2 Supply voltage connector - low voltage.....	31
	9.3 Description of the sockets.....	31
	9.3.1 "External control" terminal.....	31
	9.3.2 "Level Switch" terminal.....	33
	9.3.3 "Dosing monitor" terminal.....	33
	9.3.4 Relay.....	34
10	Set up	37
	10.1 Basic principles of pump adjustment.....	37
	10.2 Checking adjustable values.....	38
	10.3 Changing to adjustment mode.....	38
	10.4 Selecting the operating mode (MODE menu).....	39
	10.5 Operating mode settings (SET menu).....	40
	10.5.1 "Manual" operating mode settings.....	40
	10.5.2 "Analog" operating mode settings (ANALG menu).....	40
	10.5.3 "Contact" operating mode settings (CNTCT menu).....	43
	10.5.4 "Batch" operating mode settings (BATCH menu).....	45
	10.6 Programmable function settings (SET menu).....	45
	10.6.1 "Calibrate" function settings (CALIB menu).....	46
	10.6.2 "Pressure ratings" function settings (PRESS menu).....	47
	10.6.3 "Auxiliary frequency" function settings (AUX menu).....	48
	10.6.4 "Flow" function settings (FLOW menu).....	48
	10.7 Setting the code (CODE menu).....	48

10.8	Deleting the total number of strokes or total litres (CLEAR window).....	49
11	Operation.....	50
11.1	Manual operation.....	50
11.2	Remote operation.....	52
12	Maintenance.....	53
13	Repairs.....	55
13.1	Cleaning valves.....	56
13.2	Replacing the diaphragm.....	57
14	Troubleshooting.....	62
14.1	Faults without a fault alert.....	62
14.2	Faults with error message.....	63
14.2.1	Fault alerts.....	63
14.2.2	Warning Alerts.....	63
14.3	All Other Faults.....	64
15	Decommissioning.....	65
16	Technical data.....	67
16.1	Performance data.....	67
16.2	Accuracy.....	68
16.2.1	Standard Liquid End.....	68
16.2.2	Self-Bleeding Liquid End.....	68
16.3	Viscosity.....	68
16.4	Material specifications.....	69
16.5	Electrical data.....	69
16.6	Temperatures.....	70
16.7	Climate.....	71
16.8	Protection class and Safety Requirements.....	71
16.9	Compatibility.....	71
16.10	Sound pressure level.....	72
16.11	Shipping weight.....	72
17	Dimensional drawings.....	73
18	Exploded Views of Liquid Ends.....	79
19	Ordering Information	112
20	Diagrams for adjusting the capacity.....	114
21	EC Declaration of Conformity.....	117
22	EC Declaration of Conformity.....	118
23	Operating / adjustment overview.....	119
24	Continuous displays.....	121
25	Certification.....	122
26	Index.....	123

1 Identity code

Product range gamma/ L				
GALa	Type	Capacity		
		bar	l/h	
	1000	10	0.74	Solenoid Ø 70 / M70
	1601	16	1.1	
	1602	16	2.1	
	1005	10	4.4	
	0708	7	7.1	
	0413	4	12.3	
	0220	2	19.0	
	1605	16	4.1	Solenoid Ø 85 / M85
	1008	10	6.8	
	0713	7	11.0	
	0420	4	17.1	
	0232	2	32.0	
		Material version		
	PPE	Polypropylene / EPDM		
	PPB	Polypropylene / FPM		
	NPE	Clear acrylic / EPDM		
	NPB	Clear acrylic / FPM		
	PVT	PVDF / PTFE		
	TTT	PTFE/PTFE		
	SST	Stainless steel 1.4571 / PTFE		
		Dosing head design		
	0	without bleed valve, without valve spring only for NP, TT and SS		
	1	without bleed valve, with valve spring only for NP, TT and SS		
	2	with bleed valve, without valve spring only for PP, NP, PV, not for type 0232		
	3	with bleed valve, with valve spring only for PP, NP, PV, not for type 0232		
	4	without bleed valve, with valve spring for more highly viscous media		
	7	self-bleeding without bypass (SER), only PV, not for types 1000, 1601 and 0232		
	9	self-bleeding with bypass (SEK) only for PP, NP, not for types 1000 and 0232		
		Hydraulic connection		
	0	Standard connector in line with technical data		
	5	Connector for 12/6 tube, discharge side only		
	9	Connector for 10/4 tube, discharge side only		
		Version		
	0	with ProMinent logo		
		Power supply		
	U	100 - 230 V, ±10 %, 50/60 Hz		
	M	12 ... 24 V DC (M 70 only)		

Product range gamma/ L	
N	24 V DC (M 85 only)
P	24 V AC
Cable and plug	
A	2 m European
B	2 m Swiss
C	2 m Australian
D	2 m USA
1	2 m open end
Relay	
0	No relay
1	Fault indicating relay, normally energised, 1 x change-over contact 230 V - 2 A
3	Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A
4	as 1 + pacing relay 2 x normally open contacts 24 V - 100 mA
5	as 3 + pacing relay 2 x normally open contacts 24 V - 100 mA
A	Disconnect and warning relay, normally energised 2 x normally open contacts 24 V - 100 m
C	as 1 + 4-20 mA output 1 x normally open contact 24 V - 100 mA
G	Power relay, normally de-energised, 1 x changeover contact 230 V - 8 A
Accessories	
0	No accessories
1	with foot and injection valve, 2 m PVC suction line, 5 m PE metering line, only for PP, PC and NP
2	as 0 + calibration cylinder
3	as 1 + calibration cylinder
Control version	
0	Manual + external 1:1
1	Manual + external with pulse control
2	Manual + external 1:1 + analog current
3	Manual + external with pulse control + analog current
4	as 0 + timer
5	as 3 + timer
P	as 3 + PROFIBUS®
Access code	
0	no access code
1	with access code
Dosing monitor	

Product range gamma/ L												
											0	Input for pulses
											1	Input for continuous contact
												Pause / level
											0	Pause N/C, level N/C

2 About this pump

Pumps in the ProMinent gamma/ L product range are microprocessor-controlled solenoid metering pumps with the following characteristics:

- The capacity can be displayed in l/h or gal/h respectively (in a calibrated state or in strokes/min)
- The stroke length is infinitely adjustable and is shown in the LCD display
- The stroke rate can be set digitally precisely and is shown in the LCD display
- The rated pressure of the gamma/ L can be adapted by pressure ratings to a system
- Two pumps can be actuated differently by means of the same standard signal
- Large illuminated LCD display

The hydraulic parts of the gamma/ L are identical to those of the Beta®.

3 Safety chapter




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 – automatic start-up.
	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 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 for the metering of flammable media without implementing suitable protective measures.
- 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 exterior applications without the implementation of suitable protective measures.
- The pump should only be operated by trained and authorised personnel, see the following "Qualifications" table.
- Observe the information contained in the operating instructions at the different phases of the unit's service life.

Safety notes



WARNING!

Warning about personal and material damage

The pump can start to pump, as soon as it is connected to the mains voltage.

- Install an emergency cut-off switch in the pump power supply line or integrate the pump in the emergency cut-off management of the system.



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.



WARNING!

Warning of dangerous or unknown feed chemical

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

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



WARNING!

Fire danger

When pumping inflammable media the operator must take suitable safety precautions.



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.

**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**

The metering pump can generate a multiple of its rated pressure. Hydraulic parts may burst if a discharge line is blocked.

- Correctly install a relief valve in the discharge line downstream of the metering pump.

**CAUTION!****Only with SER dosing heads: Warning of feed chemical spraying around**

If there is a high pressure acting on the other side of the discharge valve, opening of the bleed valve can result in feed chemical escaping even if the pump is at a standstill.

**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 when selecting the feed chemical - see the ProMinent product catalogue or visit www.prominent.com.

**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.



CAUTION!

Danger from incorrect metering

Should a different liquid end size be fitted, this will change the metering behaviour of the pump.

- Have the pump reprogrammed in the works.



CAUTION!

Warning against illegal operation

Observe the regulations that apply where the device is installed.

Fixed separating protective equipment

- Dosing head
- Housing
- Hood (houses the control elements)

The dosing head may only be removed by the customer in accordance with the "Repair" chapter.

The housing and the hood may only be removed by ProMinent customer service department.

Information in the event of an emergency

In an emergency, either pull out the mains plug, turn the multifunctional switch to "Stop" or press the Emergency Stop switch installed on the customer's side or disconnect the pump from the mains power supply in line with the emergency shut-down management guidelines for your system!

If feed chemical escapes, additionally ensure that the hydraulic system around the pump is at atmospheric pressure. Adhere to the safety data sheet for the feed chemical.

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 ProMaqua to work on the system.

Sound pressure level

Sound pressure level $L_pA < 70$ dB according to EN ISO 20361

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

4 Storage, transport and unpacking

Safety notes



WARNING!

The transporting of pumps which have been used with radioactive feed chemicals is forbidden!

They will also not be accepted by ProMinent!



WARNING!

Only return metering pumps for repair in a cleaned state and with a flushed liquid end - refer to "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.

You can find the "Decontamination Declaration" form under www.prominent.com or on the CD.



CAUTION!

Danger of material damage

The device can be damaged by incorrect or improper storage or transportation!

- The unit should only be stored or transported in a well packaged state - preferably in its original packaging.
- The packaged unit should also only be stored or transported in accordance with the stipulated storage conditions.
- The packaged unit should be protected from moisture and the ingress of chemicals.

Personnel: Technical personnel

Ambient conditions

Ambient conditions - refer to "Technical Data" chapter.

Scope of supply

Compare the delivery note with the scope of supply:

- Metering pump with mains power cable
- Connector kit for hose/pipe connection
- Product-specific operating instructions with EC Declaration of Conformity
- Optional accessories if ordered

5 Overview of equipment and control elements

5.1 Overview of equipment

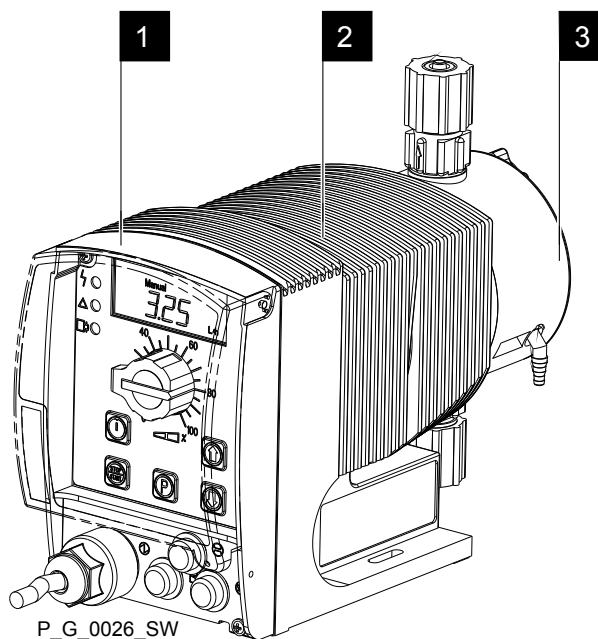


Fig. 2: Overview of equipment, total

- 1 Control unit
- 2 Drive unit
- 3 Liquid end

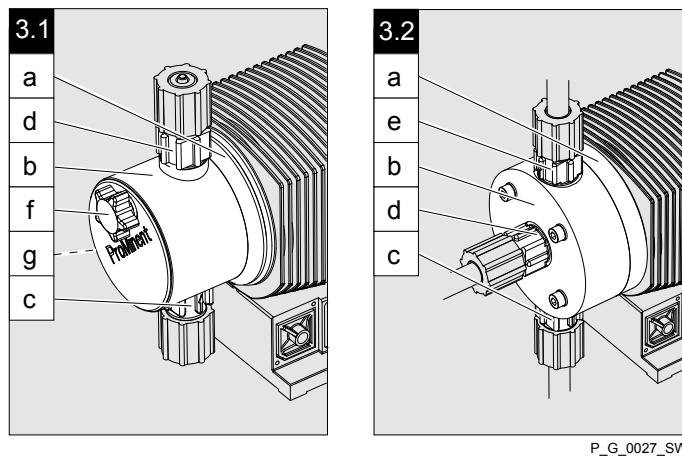
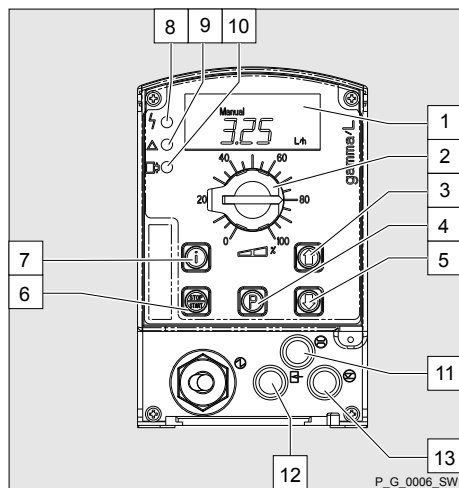


Fig. 3: 3.1 Liquid end with bleed valve, 3.2 Self-bleeding liquid end (SEK)

- a Backplate
- b Dosing head
- g Suction valve
- d Discharge valve
- e Bleed valve, self-bleeding
- f Bleed valve
- g Bypass hose nozzle, concealed

5.2 Control elements

Control elements, overview



- 1 LCD screen
- 2 Stroke length adjustment knob
- 3 [UP]key
- 4 [P]key
- 5 [DOWN]key
- 6 [STOP/START]key
- 7 [i]key
- 8 Fault indicator (red)
- 9 Warning indicator (yellow)
- 10 Operating indicator (green)
- 11 "Dosing monitor" terminal
- 12 "External control" terminal
- 13 "Level Switch" terminal

Fig. 4

5.2.1 Key functions

Key	Application	In continuous displays (operation)	In adjustment mode (set up)
[STOP/START]	Pressed briefly	Stop pump,	Stop pump,
		start pump	start pump
[P]	Pressed briefly	Start batch (only in 'Batch' operating mode), acknowledge fault	Confirm entry - jump to next menu point or to continuous display
	Pressed for 2 s	Change to adjustment mode	-
	Pressed for 3 s	-	Jump to continuous display
	Pressed for 10 s	Display software version	-
	Pressed for 15 s	Load factory settings (calibration)	-
[i]	Pressed 1x	Change between the continuous displays	Change between "Changing individual numbers" and "Changing a number"
	Pressed 2x	-	Under "change individual digits": jump to the first number
[UP], [DOWN]	Individually pressed (until 'Set' identifier appears)	Change directly changeable variables	Select another setting, change individual number or number
	Pressed simultaneously	Priming (in "Stroke rate" continuous display)	-

5.2.2 Stroke length adjustment knob

The stroke length can be adjusted using the stroke length adjustment knob and with it the volume per stroke.

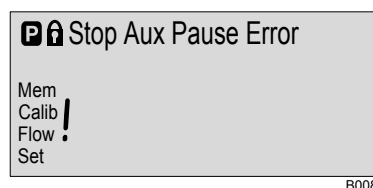
5.2.3 Control elements



Familiarise yourself with the pump control elements using the "Control elements and key functions" overview!

Identifiers

The LCD screen supports the operation and adjustment of the pump with different identifiers:



B0081

Fig. 5

The identifiers have the following meanings:

Identifiers	Meaning
P	The pump is in adjustment mode.
	In the continuous display: Security lock (if a code was set). In adjustment mode: Indicates entry into 'CODE' menu.
'Stop'	The pump was stopped using the [STOP/START] key.
'Aux'	The pump is currently pumping with the auxiliary rate as the stroke rate.
'Pause'	In the 'AUX' menu. The pump is in the 'AUX' menu.
'Error'	The pump was externally stopped by the "Pause" function (externally).
'Mem'	In "Contact" and "Batch" operating modes: The auxiliary function "Memory" has been set. In the 'CNTCT' or 'BATCH' menu (identifier 'Mem' flashes): The auxiliary function "Memory" can be set.
'Calib'	The pump is in the 'CALIB' menu. In the continuous display (identifier 'Calib' flashes): Deviations of the stroke length from the value to the time of calibration by more than 10 scale divisions, that is with a stroke length of 40 %, if this is set at less than 30 % or at greater than 50 %.
'Flow'	The pump is in the 'FLOW' menu.
'Set'	The pump is in the 'SET' menu.
!	The number of strokes achieves is higher than the maximum figures of 99999 that can be displayed in the LCD screen.



The pump only shows the metering volume and the capacity in the calibrated state in l or l/h or in gal or gal/h.

6 Functional description

6.1 Liquid End

The dosing process is performed as follows: The diaphragm is pressed into the dosing head; the pressure in the dosing head closes the suction valve and the feed chemical flows through the discharge valve out of the dosing head. The diaphragm is now drawn out of the dosing head; the discharge valve closes due to the negative pressure in the dosing head and fresh feed chemical flows through the suction valve into the dosing head. One cycle is completed.

6.2 Drive Unit

The diaphragm is driven by an electromagnet, which is controlled by an electronic controller.

6.3 Capacity

The capacity is determined by the stroke length and the stroke rate. The stroke length can be adjusted between 0 and 100 % using the stroke length adjustment knob. A metering volume of between 30 to 100% is reproduced as being technically sensible (SEK type: 50 - 100 %)! The stroke rate can be set using the arrow keys (not in "Analog" operating mode) within a range of 0 - 180 strokes/min.

6.4 Self-Bleeding

Self-bleeding liquid ends (SEK types) are capable of independent priming when a discharge line is connected and diverting existent air pockets via a bypass. During operation they are also capable of conveying away gases which are produced, independently of the operating pressure in the system. It is also possible to dose precisely in a depressurised state due to the integral back pressure valve.

6.5 Functional description of control

6.5.1 Operating modes, functions, options

Operating modes

The operating modes are selected via the *'MODE'* menu (dependent on the identity code, some operating modes may not be present):

***'Analog'* operating mode** (Identity code, control variant: analog). The stroke rate is controlled using an analog current signal via the "External control" terminal. Processing of the current signal can be preselected via the control unit.

***'Manual'* operating mode** The stroke rate is set manually via the control unit. 100 % corresponds to 180 strokes/min.

***'Contact'* operating mode:** This operating mode provides the option of making fine adjustments using small scaling or transfer factors. The metering can be triggered either by a pulse received via the "External control" terminal or through a contact or a semiconductor switching element. A metering quantity (batch) or a number of strokes (scaling or transfer factor 0.01 to 99.99) can be pre-selected via the control unit using the "Pulse Control" option.

'Batch' operating mode: This operating mode provides the option of working with large transfer factors (up to 65535). The metering can be triggered either by pressing the *[P]* key or by a pulse received via the "External control" terminal or through a contact or a semiconductor switching element. It is possible to pre-select a metering quantity (batch) or a number of strokes via the control unit.

'BUS' operating mode (Identity code, control variant: CANopen or PROFIBUS®) This operating mode provides the option of controlling the pump via a BUS (see "Supplementary instructions for ProMinent® gamma/ L and ProMinent Sigma versions with PROFIBUS®").

Functions

The following functions can be selected using the SET menu:

"Calibrate" function: (Identity code, stroke length adjustment: Manual + calibration): The pump can also be operated in the calibrated state in all operating modes. In this case, the corresponding continuous displays can then indicate the metering volume or the capacity directly. Calibration is maintained within a stroke rate range of 0 - 180 strokes/min. The calibration is also maintained when the stroke length is altered by up to $\pm 10\%$ scale divisions.

"Auxiliary frequency" function: Enables a freely selectable and programmable stroke rate to be switched on in the 'SET' menu, which can be controlled via the "External Control" terminal. This auxiliary frequency has priority over the operating mode stroke rate settings.

"Flow" function: Stops the pump when the flow is insufficient, provided a dosing monitor is connected. The number of defective strokes, after which the pump is switched off, can be set in the 'SET' menu.

The following functions are available as standard:

"Level switch" function: Information about the liquid/powder level in the chemical feed container is reported to the pump control. To do so, a two-stage level switch must be fitted; it is connected to the "Level switch" terminal.

"Pause" function: The pump can be remotely stopped via the "External Control" terminal. The "Pause" function only works via the "External Control" terminal.

The following functions are triggered by a key press:

"Stop" function: The pump can be stopped without disconnecting it from the mains/power supply by pressing the *[STOP/START]* key.

"Priming" function: Priming (short-term transport at maximum frequency) can be triggered by simultaneous pressing of the two arrow keys in the "Stroke rate" continuous display.

Relay option

The pump has two connecting options (not with PROFIBUS® or timer):

Option "Fault indicating relay" or "Output relay": In the event of fault signals, warning signals or tripped level switches, the relay connects to complete an electric circuit (for alarm horns etc.). The relay can be retrofitted via a knock-out in the drive unit.

"Fault indicating and pacing relay" option In addition to the fault indicating relay, the pacing relay can be used to make a contact every stroke. The relay can be retrofitted via a knock-out in the drive unit.

6.5.2 Function and fault indicator

The operating and fault statuses are indicated by the three LED indicators and the *'Error'* identifier on the LCD screen, see also the "Troubleshooting" chapter.

LCD screen

If a fault occurs, the identifier *'Error'* appears and an additional error message.

LED displays

Operating indicator (green): The operating indicator illuminates if during pump operation there are no incoming fault or warning messages. It goes out briefly with every stroke.

Warning indicator (yellow): The warning indicator illuminates if the pump electronics detect a condition which may lead to a fault, e.g. "liquid level low 1st stage".

Fault indicator (red): The fault indicator illuminates if a fault occurs e.g. "liquid level low 2nd stage".

6.5.3 Hierarchy of operating modes, functions and fault statuses

The different operating modes, functions and fault statuses have a different effect on if and how the pump reacts.

The following list shows the order:

1. - Priming
2. - Fault, Stop, Pause
3. - Auxiliary frequency (external frequency changeover)
4. - Manual, external contact

Comments:

re 1 - "Priming" can take place in any mode of the pump (providing it is functioning).

re 2 - "Fault", "Stop" and "Pause" stop everything apart from "Priming".

re 3 - The stroke rate of "Auxiliary rate" always has priority over the stroke rate specified by an operating mode or priority 4.

7 Assembly



- Compare the dimensions on the dimensional drawing and pump.

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

If water or other electrically conducting liquids penetrate into the drive housing, in any other manner than via the pump's suction connection, an electric shock may occur.

- Position the pump so that it cannot be flooded.

**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.

**Capacity too low**

The liquid end valves can be disturbed by vibrations.

- Secure the metering pump to ensure that no vibrations can occur.

**Capacity too low**

If the valves of the liquid end do not stand vertically upwards, they cannot close correctly.

- Suction and discharge valves must stand vertically upwards (for self-bleeding liquid end, the bleed valve).

→ Mount the metering pump with the pump foot on a horizontal, level and load-bearing supporting surface.

8 Installation, hydraulic

Safety notes



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 when selecting the feed chemical - see the ProMinent product catalogue or visit www.prominent.com.



CAUTION!

Warning of feed chemical spraying around

Pumps which are not fully installed hydraulically can eject feed chemicals from the outlet openings of the discharge valves as soon as they are connected to the mains.

- The pump must first be hydraulically installed and then electrically.
- In the event that you have failed to do so, press the *[STOP/START]* button or press the emergency-stop switch.



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!

Danger from rupturing hydraulic components

Peak loads during the dosing stroke can cause the maximum permissible operating pressure of the system and pump to be exceeded.

- The discharge lines are to be properly designed.



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!

Warning against illegal operation

Observe the regulations that apply where the device is installed.

8.1 Install hose lines

8.1.1 Installation for metering pumps without bleed valve

Safety notes

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

If the pipes are improperly installed, they can come loose or burst.

- Route all hose lines so they are free from mechanical stresses and kinks.
- Only use original hoses with the specified hose dimensions and wall thicknesses.
- To ensure high durability of the connections, only use clamp rings and hose nozzles that are intended for the hose diameter in question.

**CAUTION!****Danger resulting from rupturing hydraulic components**

Hydraulic components can rupture if the maximum permissible operating pressure is exceeded.

- Always maintain the maximum permissible operating pressure of all hydraulic components - please refer to the product specific operating instructions and system documentation.
- Never allow the metering pump to run against a closed shut-off device.
- Install a relief valve.

**CAUTION!****Hazardous feed chemicals can escape**

Hazardous or extremely aggressive feed chemicals can leak out when using conventional bleeding procedures with metering pumps.

- Install a bleed line with recirculation into the storage tank.

**CAUTION!****Hazardous feed chemicals can escape**

Hazardous or extremely aggressive feed chemicals can leak out in the event that the metering pump is removed from the installation.

- Shut-off valves must be installed on the metering pump's pressure and discharge sides.

**CAUTION!****Uncontrolled flowing feed chemicals**

Feed chemicals can leak through a stopped metering pump in the event of back pressure.

- For this purpose, use an injection valve or vacuum breaker.



CAUTION!

Uncontrolled flowing feed chemicals

Feed chemicals can leak through the metering pump in an uncontrolled manner in the event of excessive priming pressure.

- The maximum priming pressure for the metering pump may not be exceeded - please refer to the product-specific operating instructions.



The pipes are to be aligned in such a way as the metering pump and the liquid end can be removed from the side, if necessary.

Install hose lines - design PP, NP, PV, TT

1. ➤ Cut off the ends of the hoses at right angles.
2. ➤ Pull the union nut (2) and clamp ring (3) over the tube (1) - see figure Fig. 6.
3. ➤ Push the tube end (1) up to the stop over the nozzle (4). Widen it, if necessary.



Ensure that the O-ring and flat seal (5) is properly fitted to the valve (6).



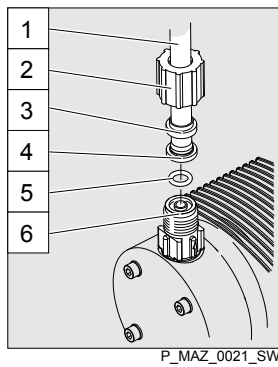
Used PTFE seals may never be re-used. An installation sealed in this way will not be watertight.

The reason for this is that this type of seal is permanently distorted when subjected to pressure.



In order to enable it to be distinguished from the EPDM flat seal, the FPM flat seal design PV has a dot.

4. ➤ Place the tube (1) with the nozzle (4) onto the valve (6).
5. ➤ Clamp the hose connector: Screw the union nut (2) tight while simultaneously pressing on the tube (1).
6. ➤ Re-tighten the hose connector: Pull on the hose (1) briefly, which is fastened to the dosing head, and tighten up the union nut (2) once more.

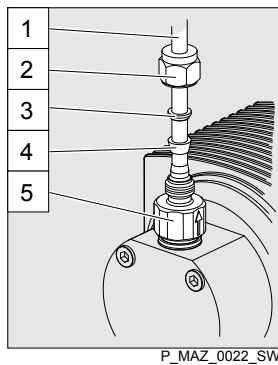


- 1 Tube
- 2 Union nut
- 3 Clamp ring
- 4 Nozzle
- 5 O-ring and flat seal
- 6 Valve

Fig. 6: Designs PP, NP, PV, TT

Installing stainless steel pipe - design SS

1. ➔ Pull the union nut (2) and clamp rings (3, 4) over the pipe (1) with approx. 10 mm overhang - see Fig. 7.
2. ➔ Insert the pipe (1) up to the stop in the valve (5).
3. ➔ Tighten the union nut (2).



- 1 Pipe
- 2 Union nut
- 3 Rear clamp ring
- 4 Front clamp ring
- 5 Valve

Fig. 7: Design SS

Installing hose lines - design SS



CAUTION!

Warning of feed chemical spraying around

Connections can come free in the event that hose lines are installed incorrectly on stainless steel valves.

- Only use PE or PTFE hose lines.
- In addition, insert a stainless steel support insert into the hose line.

8.1.2 Installation for metering pumps with bleed valve

Safety notes



CAUTION!

- All of the installation and safety notes for metering pumps without bleed valves also apply.

Installation of the return line

A return line is connected in addition to the suction and discharge lines.

1. ➔ Fasten the tube line to the return line tube nozzle or to the liquid end bleed valve. PVC tube, soft, 6x4 mm is recommended for this.
2. ➔ Feed the free end of the return line back to the storage tank.

3. ➤ Shorten the return line hose so that it cannot submerge into the feed chemical in the storage tank.

8.1.3 Installation for metering pumps with self-bleeding (SEK type)

Safety notes



CAUTION!

- All of the installation and safety notes for metering pumps without self-bleeding also apply.
- The maximum values for priming lift, priming pressure and the viscosity of the feed chemical may not be exceeded.
- The suction end hose line cross section may not exceed the hose line cross section of the suction valve.



Information about priming pressure

- *The priming pressure on the suction end must be at least equal to the return line pressure.*
- *Priming pressure in the return line restricts the bleeding function.*
- *However, operation with priming pressure in the return line and the suction end at atmospheric pressure is possible.*

Installation of the return line

A return line is connected in addition to the suction and discharge lines.



- *The return line is connected to the vertical valve on the upper side of the liquid end. It is labelled with a red sleeve from factory - see Fig. 8.*
- *The discharge line is connected to the vertical valve.*

1. ➤ Fasten the tube line to the return line tube nozzle or to the liquid end bleed valve. PVC tube, soft, 6x4 mm is recommended for this.
2. ➤ Feed the free end of the return line back to the storage tank.
3. ➤ SEK only: Insert the return line into the anti-kink device on the bleed valve and screw it in place until the anti-kink device engages.



The anti-kink device prevents the return line from kinking, thereby avoiding the risk of self-bleeding system failure.

4. ➤ Shorten the return line hose so that it cannot submerge into the feed chemical in the storage tank.

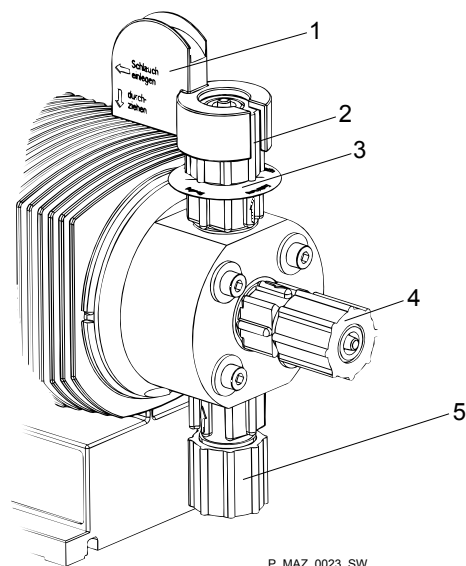


Fig. 8: SEK liquid end

- 1 Anti-kink device
- 2 Bleed valve for the return line in the storage tank, 6/4 mm
- 3 Red sleeve
- 4 Discharge valve for discharge line to injection point, 6/4 - 12/9 mm
- 5 Suction valve for suction line in storage tank, 6/4 - 12/9 mm

8.2 Basic installation notes

Safety notes



CAUTION!

Danger resulting from rupturing hydraulic components

Hydraulic components can rupture if the maximum permissible operating pressure is exceeded.

- Never allow the metering pump to run against a closed shut-off device.
- With metering pumps without integral relief valve: Install a relief valve in the discharge line.



CAUTION!

Hazardous feed chemicals can escape

With hazardous feed chemicals: Hazardous feed chemical can leak out when using conventional bleeding procedures with metering pumps.

- Install a bleed line with a return into the storage tank.

➔ Shorten the return line so that it does not dip into the feed chemical in the storage tank.

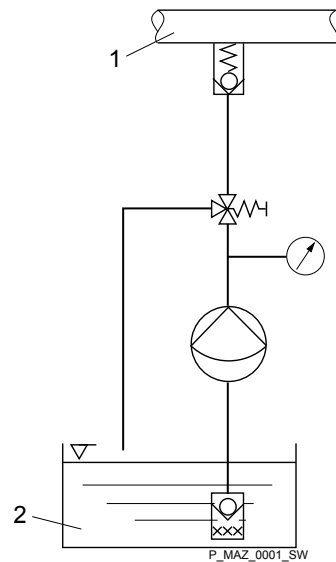


Fig. 9: Standard installation

- 1 Main line
- 2 Storage tank

Legend for hydraulic diagram

Symbol	Explanation	Symbol	Explanation
	Metering pump		Foot valve with filter meshes
	Injection valve		Level switch
	Multifunctional valve		Manometer

9 Installation, electrical

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

A mains voltage may exist inside the device.

- Before any work, disconnect the device's mains cable from the mains.

**WARNING!****Risk of electric shock**

This pump is supplied with a grounding conductor and a grounding-type attachment plug.

- To reduce the risk of electric shock, ensure that it is connected only to a proper grounding-type receptacle.

**WARNING!****Risk of electric shock**

In the event of an electrical accident, the pump must be quickly disconnected from the mains.

- Install an emergency cut-off switch in the pump power supply line or
- Integrate the pump in the emergency cut-off management of the system and inform personnel of the isolating option.

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

Incompletely installed electrical options can allow moisture into the inside of the housing.

- Knock-out openings in the pump housing must be equipped with matching modules or be sealed in a leak-tight manner.

**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.

**WARNING!****Low voltage pump only: Danger of electric shock**

- For safety reasons, the low voltage pumps must be operated using only protective low voltage (SELV in accordance with EN 60335-1).



CAUTION!

Risk of short circuiting caused by moist pins

No moisture must reach the pins of the PROFIBUS® jack.

- A suitable PROFIBUS® plug or protective cap must be screwed onto the PROFIBUS® jack.



CAUTION!

Material damage possible due to power surges

Should the pump be connected to the mains power supply in parallel to inductive consumers (such as solenoid valves, motors), inductive power surges can damage the controller when it is switched off.

- Provide the pump with its own contacts and supply with voltage via a contactor relay or relay.

Personnel: ■ Electrician

➔ Install the pump in line with best working practice and in accordance with the operating instructions and applicable regulations.

9.1 Supply voltage connector - mains voltage



WARNING!

Unexpected startup is possible

As soon as the pump is connected to the mains, the pump may start pumping and consequently feed chemical may escape.

- Prevent dangerous feed chemicals from escaping.
- If you have not successfully prevented this, immediately press the *[STOP/START]* key or disconnect the pump from mains, e.g. via an emergency cu-off switch.



CAUTION!

If the pump is integrated into a system: Design the system so that potential hazardous situations are avoided by pumps starting up automatically subsequent to unintended power interruptions.

Connect the pump to the mains/power supply using the mains cable.

Parallel connection to inductive consumers

Should the pump be connected to the mains in parallel to inductive consumers (e.g. solenoid valves, motor), the pump must be electrically isolated when these consumers are switched off.

- Supply the pumps with voltage via a contactor relay or relay using separate contacts for the pump.
- If this is not possible then connect a varistor (part no. 710912) or an RC member, 0.22 µF / 220 Ω in parallel.

Interference suppression aids

Product	Part no.
Varistor:	710912
RC Gate, 0.22 µF / 220 Ω:	710802

9.2 Supply voltage connector - low voltage



WARNING!

Danger of electric shock

- For safety reasons, the low voltage pumps must be operated using only protective low voltage (SELV in accordance with EN 60335-1).



CAUTION!

Supply voltages that are too high destroy the pump.

- Do not connect the low voltage pump to voltages > 30 V.



CAUTION!

Performance losses are possible.

- The drop in voltage on the supply line for the 12 - 24 V version must remain small enough, even at the moment of the pump stroke, so the pump voltage never drops below 11 V!
- The drop in voltage on the supply line for the 24 V version must remain small enough, even at the moment of the pump stroke, so the pump voltage never drops below 20 V!



CAUTION!

If the pump is integrated into a system: Design the system so that potential hazardous situations are avoided by pumps starting up automatically subsequent to unintended power interruptions.



The direct current pump only works if the polarity is correct.

9.3 Description of the sockets

9.3.1 "External control" terminal

The "external control" socket is a five-pin panel jack. It is compatible with two- and four-conductor cables.

Only use a five-pin cable with the "Auxiliary frequency" and "mA-input" functions.

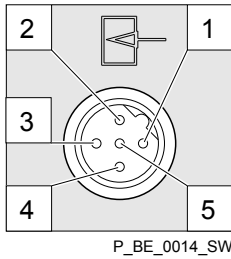


Fig. 10: Pump pin assignments

Electrical interface for pin 1 "Pause" - pin 2 "External contact" - pin 5 "Auxiliary frequency"

Data	Value	Unit
Voltage with open contacts	5	V
Input resistance	10	kΩ
Max. pulse frequency	25	pulse/s
Minimum pulse duration	20	ms

Control via:

- potential-free contact (load: 0.5 mA at 5 V) or
- Semiconductor switch (residual voltage < 0.7 V)

Electrical interface for pin 3 "mA input" (with identity code characteristic "Control variant": 2 and 3)¹

Data	Value	Unit
Input apparent ohmic resistance, approx.	120	Ω

¹ The metering pump makes its first metering stroke at approx. 0.4 mA (4.4 mA) and starts continuous operation at approx. 19.2 mA.

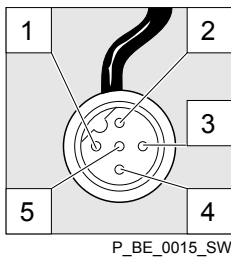


Fig. 11: Cable conductor assignments

Pin	Function	5-conductor cable	2-conductor cable
1	Pause	brown	bridged at pin 4
2	External contact	white	brown
3	mA input*	blue	-
4	Earth / GND	black	white
5	Auxiliary frequency	grey	-

* with identity code characteristic "Control version": 2 and 3



Refer to the functional description for the hierarchy of functions and operating modes.

"Pause" function

The pump does not work if:

- the cable is connected and pin 1 and pin 4 are open.

The pump works if:

- the cable is connected and pin 1 and pin 4 are connected.
- no cable is connected.

"External contact" operating mode

The pump performs one or more strokes if:

- Pin 2 and pin 4 are connected to each other for at least 20 ms. At the same time, pin 1 and pin 4 must also be connected to each other.

"Analog" operating mode

The pump stroke rate can be controlled by a current signal. The current signal is connected between pin 3 and pin 4.

In addition, pin 1 and pin 4 must also be connected.

"Auxiliary frequency" operating mode

The pump works at a pre-set stroke rate if:

- Pin 5 and pin 4 are connected to each other. At the same time, pin 1 and pin 4 must also be connected to each other. The auxiliary frequency is factory-preset to the maximum stroke rate.

9.3.2 "Level Switch" terminal

There is a connecting option for a 2-stage level switch with pre-warning and limit stop.

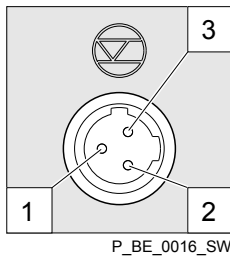


Fig. 12: Pump pin assignments

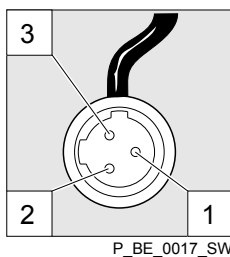


Fig. 13: Cable conductor assignments

Electrical interface

Data	Value	Unit
Voltage with open contacts	5	V
Input resistance	10	kΩ

Control via:

- potential-free contact (load: 0.5 mA at 5 V) or
- Semiconductor switch (residual voltage < 0.7 V)

Pin	Function	3-conductor cable
1	Earth / GND	black
2	Minimum pre-warning	blue
3	Minimum limit stop	brown

9.3.3 "Dosing monitor" terminal

There is a connecting option for a dosing monitor.

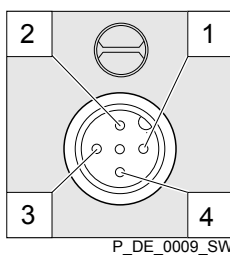


Fig. 14: Pump pin assignments

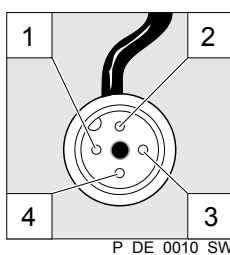


Fig. 15: Cable conductor assignments

Electrical interface

Data	Value	Unit
Voltage with open contacts	5	V
Input resistance	10	kΩ

Control via:

- potential-free contact (load: 0.5 mA at 5 V) or

Pin	Function	4-conductor cable
1	Power supply (5 V)	brown
2	Coding	white
3	Feedback	blue
4	Earth / GND	black

9.3.4 Relay

9.3.4.1 Relay functions

gamma/ L, GALa

Identity code	Description	Type	Maximum voltage	Maximum current	Behaviour of relay type when retrofitting, as standard
0	No relay	-	-	-	-
1	Fault indicating relay	NC changeover contact	230 V	2 A	X
3	Fault indicating relay	NO changeover contact	230 V	2 A	-
4	Fault indicating relay	N/O	24 V	100 mA	X
	Pacing relay	N/O	24 V	100 mA	-
5	Fault indicating relay	N/O	24 V	100 mA	-
	Pacing relay	N/O	24 V	100 mA	-
A	Cut-off relay	N/O	24 V	100 mA	-
	Warning relay	N/O	24 V	100 mA	-
C	Fault indicating relay + 4-20 mA output	N/O	24 V	100 mA	X
F	Power relay	NC changeover contact	230 V	8 A	X
G	Power relay	NO changeover contact	230 V	8 A	-

Relay type switches in the event of...

Relay type	Level Warning	Level low	Dosing monitor Fault	Calibrated stroke length Fault	Processor Fault
Fault indicating relay / Power relay:	X	X	X	X	X
Warning relay:	X	-	-	X	X
Cut-off relay:	-	X	X	-	X

9.3.4.2 "Fault indicating relay" output (identity code 1 + 3)

A fault indicating relay can optionally be ordered. It switches in the event of a fault. An identity code pre-warns whether the relay closes or opens in the event of a fault.

If the fault indicating relay is retrofitted, it closes by default in the event of a fault. The relay board is fully functional once plugged in.

The pump is factory-programmed to "Fault indicating relay". Should another switching function be required, the pump can be reprogrammed in the Heidelberg works.

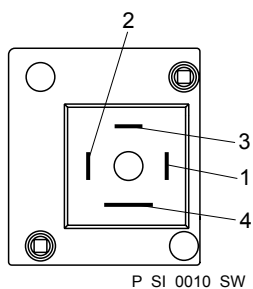


Fig. 16: Pump pin assignments

Identity code 1 + 3

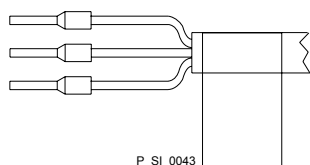


Fig. 17: Cable conductor assignments

Electrical interface

Data	Value	Unit
Maximum contact load at 250 V and 50/60 Hz:	2	A
Minimum mechanical lifespan:	200 000	Switching operations

To pin	VDE cable	Contact	CSA cable
1	white	NO (normally open)	white
2	green	NC (normally closed)	red
4	brown	C (common)	black

9.3.4.3 "Fault indicating and pacing relay" output (identity code 4 + 5)

A fault indicating and a pacing relay can optionally be ordered - refer to ordering information. The pacing output is electrically-isolated by means of an optocoupler with a semiconductor switch. The second switch is a relay, as with the "Fault indicating relay" version.

The fault indicating/pacing relay can be retrofitted.

The pump is factory-programmed to "Fault indicating relay opening" and "Pacing relay closing". Should another switching function be required, the pump can be reprogrammed in the Heidelberg works.

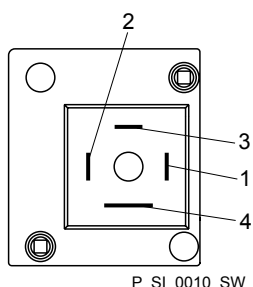


Fig. 18: Pump pin assignments

Electrical interface

for fault indicating relay output:

Data	Value	Unit
Maximum contact load at 24 V and 50/60 Hz:	100	mA
Minimum mechanical lifespan:	20,000,000	Switching operations

for semiconductor switch pacing relay:

Data	Value	Unit
Max. residual voltage when $I_C = 1 \text{ mA}$	0.4	V
Maximum current	100	mA
Maximum voltage	24	VDC
Pacing pulse duration, approx.	100	ms

Identity code 4 + 5

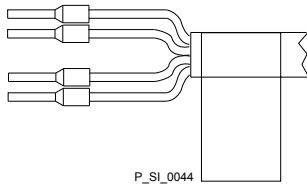


Fig. 19: Cable conductor assignments

To pin	VDE cable	Contact	Relay
1	yellow	NO (normally open)	Fault indicating relay
4	green	C (common)	Fault indicating relay
3	white	NO (normally open)	Pacing relay
2	brown	C (common)	Pacing relay

10 Set up



For supplementary information see "Control elements and key functions" in the chapter "Overview of equipment and control elements" and "Operating/setting overview" in the appendix.



The pump control returns to the continuous display, as soon as no key has been pressed for one minute.

10.1 Basic principles of pump adjustment

= Installation option

= flashes

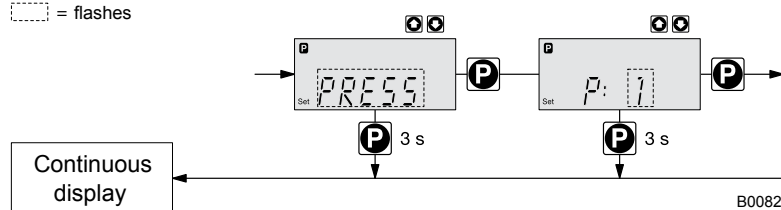


Fig. 20

Confirming an entry

- ➔ Briefly press the $[P]$ key
 - ⇒ The display simultaneously changes to the next menu option or into a continuous display.

Quitting a menu option without confirming it

- ➔ Press and hold the $[P]$ key for 3 seconds
 - ⇒ Entry is cancelled and you jump back to a continuous display.

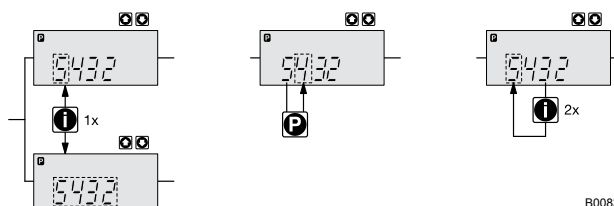


Fig. 21: a) Toggle between changing of individual digits and changing a number; b) Changes the position within the number; c) jump back in the number. More detailed explanations are given in the following text.

Incremental changing of a value

- ➔ Press the $[i]$ key once.

You can toggle between altering the digits of a value ("change individual digits" = standard) and incremental changing of a value ("change a number").

Changing adjustable values

- Press the arrow keys *[UP]* or *[DOWN]*.
 - ⇒ The flashing digit or number counts up or down.

Confirming adjustable values

- Under "change individual digits": confirm each digit by pressing the *[P]* key.
 - ⇒ Upon confirming the last individual digit, the display simultaneously changes to the next menu option or into a continuous display.
- Under "change a number": Press the *[P]* key 1x.
 - ⇒ The display simultaneously changes to the next menu option or into a continuous display.

Correcting incorrectly set digits

- Press the *[i]* key 2x.
 - ⇒ You jump back to the first digit.

10.2 Checking adjustable values

Before you adjust the pump control, you can check the actual settings of the adjustable values:

- Press the *[i]* key ("i" for "Info"), if the LCD screen shows a continuous display (The display does not contain the *[P]* key symbol).
 - ⇒ Each press of the *[i]* key toggles the continuous display output to the screen to another continuous display.

The number of continuous displays depends on the identity code, the selected operating mode and the connected additional devices, see overview "Continuous displays" in the appendix.

10.3 Changing to adjustment mode

1. ➤ In a continuous display press the *[P]* key for at least 2 seconds.
 - ⇒ The pump control changes to adjustment mode.
2. ➤ If 'CODE 1' was set, then after pressing the *[P]* key, the code must first be entered.

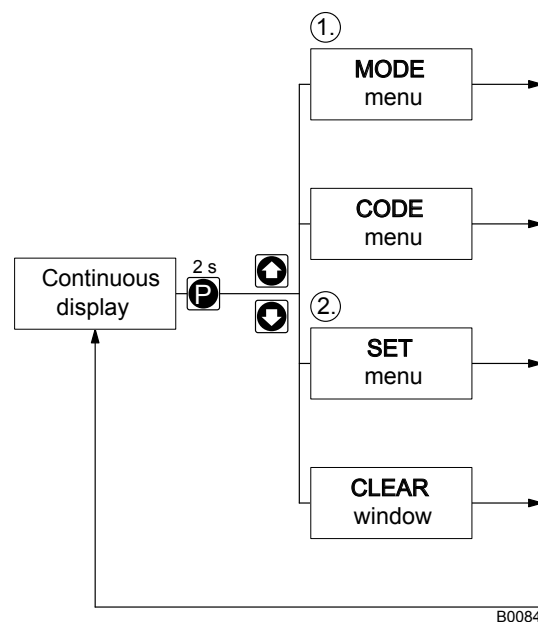
The following menus can initially be chosen in adjustment mode - see also "Operating/setting overview" in the appendix:

- 'MODE' menu
- 'CODE' menu (option)
- 'SET' menu
- 'CLEAR' window



To match the pump to your process requirements, you must observe the following procedure:

1. ➔ In the 'MODE' menu select the operating mode.
2. ➔ If necessary make the settings for this operating mode in the 'SET' menu.



B0084

Fig. 22

Exceptions: Timer and PROFIBUS®.



Note the diagram.

10.4 Selecting the operating mode (MODE menu)

In the 'MODE' menu (dependent on the identity code, some operating modes may not be present):

- 'Manual': for manual operation (identity code control variant: "Manual", available as standard)
- 'Analog': for current control (identity code control variant: "Analog current")
- 'Contact': for contact operation (identity code control variant: "External 1:1" / "External with pulse control")
- 'Batch': for batch operation (identity code control variant: "External with pulse control")

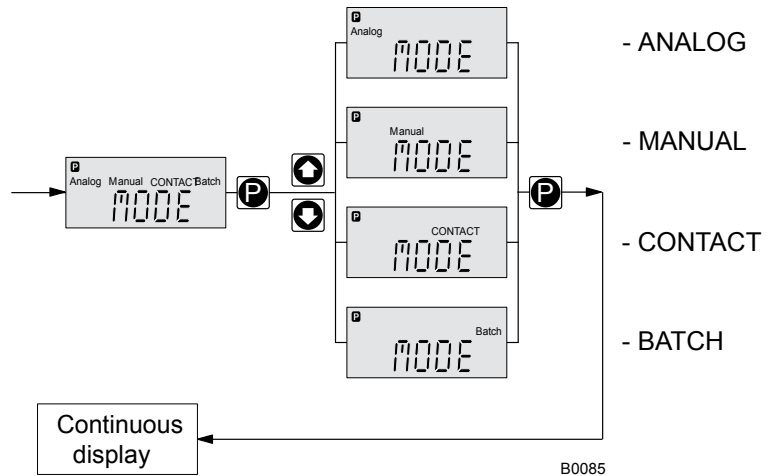


Fig. 23

10.5 Operating mode settings (SET menu)

i First in the 'MODE' menu select the operating mode!
 Exceptions: Timer and PROFIBUS®.

In the 'SET' menu, you can make various settings dependent on the selected operating mode.

Setting menus are available in all operating modes for the following programmable functions:

- Calibrate ('CALIB' menu)
- Auxiliary rate ('AUX' menu)
- Flow ('FLOW' menu; only available if a dosing monitor is connected) - see also the chapter "Programmable function settings (SET menu)".

As to whether or not a further setting menu is available, depends on the selected operating mode.

10.5.1 "Manual" operating mode settings

Other than those described in more detail in the chapter "Programmable function settings (SET menu)" there are no other setting menus available in 'Manual' operating mode via the 'SET' menu.

10.5.2 "Analog" operating mode settings (ANALG menu)

Overview

Alongside those described in more detail in the chapter "Programmable function settings (SET menu)" the 'ANALG' menu is also available in 'Analog' operating mode via the 'SET' menu.

The stroke rate is controlled using an analog current signal via the "External control" terminal

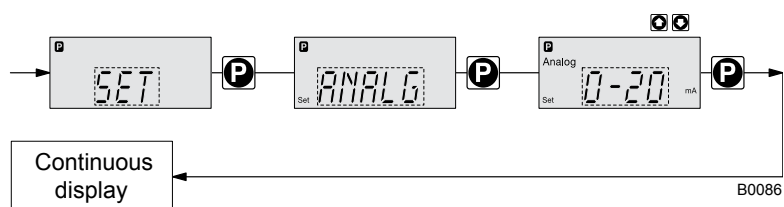


Fig. 24

You can select three types of current signal processing:

- '0 - 20 mA':
 - At 0 mA the pump is stationary.
 - At 20 mA the pump works at the maximum stroke rate.
 - Between these values, the stroke rate is proportional to the current signal.
- '4 - 20 mA':
 - At 4 mA the pump is stationary.
 - At 20 mA the pump works at the maximum stroke rate.
 - Between these values, the stroke rate is proportional to the current signal.
 - For current signals less than 3.8 mA a fault message appears and the pump stops (e.g. if a cable has broken).
- 'Curve': Under the 'Curve' processing type, you can freely program the pump behaviour. There are three options:
 - Linear
 - Lower sideband --___
 - Upper sideband __/--

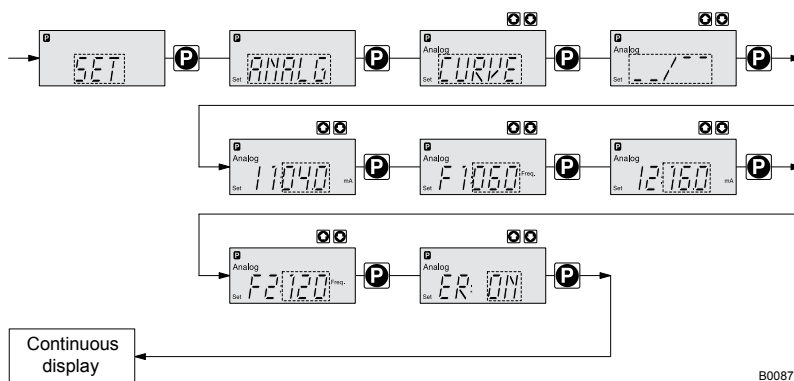


Fig. 25

Linear

The symbol appears on the LCD screen. You can enter any stroke rate- behaviour of the pump proportional to the current signal. For this purpose, enter any two points P1 (I1, F1) and P2 (I2, F2) (F1 is the stroke rate at which the pump is to operate at current I1); this defines a straight line and thus the behaviour is specified:

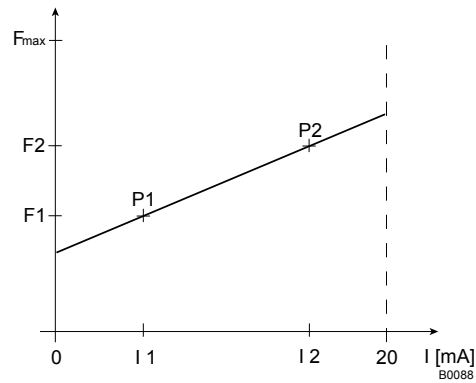



Fig. 26

F₁ Stroke rate at which the pump should operate with current I₁
 F₂ Stroke rate at which the pump should operate with current I₂

 Plot a diagram similar to the one above - with values for (I₁, F₁) and (I₂, F₂) - so that you can set the pump control as required.

Upper/lower sideband

Using these processing types, you can control a metering pump using the current signal as shown in the diagrams below.

Lower sideband:

The symbol $\overline{_ _}$ appears on the LCD screen. Below I₁, the pump works at a rate of F₁ - above I₂ it stops. Between I₁ and I₂ the stroke rate varies between F₁ and F₂ in proportion to the signal current.

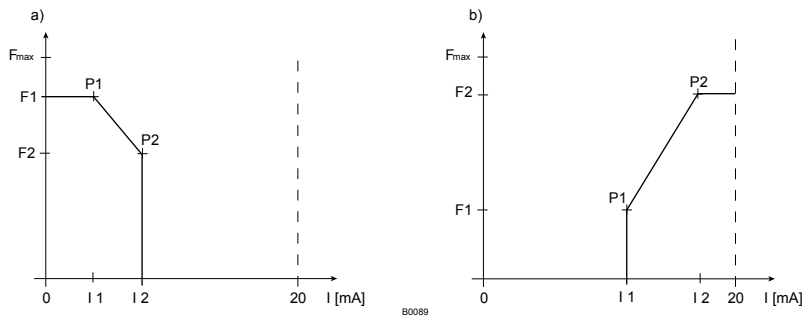


Fig. 27: Lower sideband, e.g. alkali pump

Upper sideband:

The symbol $_ \overline{_}$ appears on the LCD screen. Below I₁, the pump is stationary - above I₂ the pump works at rate F₂. Between I₁ and I₂ the stroke rate varies between F₁ and F₂ in proportion to the signal current.

The smallest processable difference between I₁ and I₂ is 4 mA

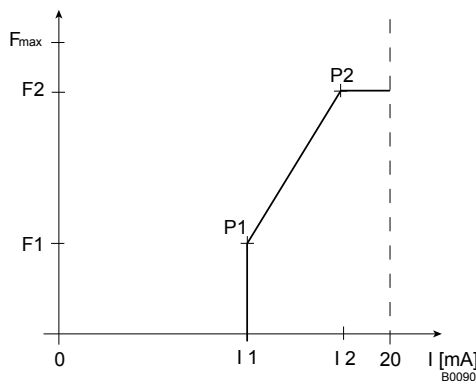


Fig. 28: Upper sideband, e.g. acid pump

Error processing

Under menu option 'ER' (Error) you can activate error processing for the 'Curve' processing type. For current signals below 3.8 mA, an error message appears and the pump stops.

10.5.3 "Contact" operating mode settings (CNTCT menu)

Alongside those described in more detail in the chapter "Programmable function settings (SET menu)" the 'CNTCT' menu is also available in 'Contact' operating mode via the 'SET' menu.

'Contact' operating mode allows you to trigger individual strokes or a stroke series. You can trigger the strokes via a pulse sent via the "external control" terminal. The purpose of this operating mode is to convert the incoming pulses with a reduction (fractions) or small step-up into strokes.

**CAUTION!**

If you change into another operating mode, the factor is reset to "1".

With identity code version "Contact - identity code: External with pulse control", you can enter after how many pulses a stroke should occur. "Contact - identity code: External with pulse control" is intended for small metering quantities.

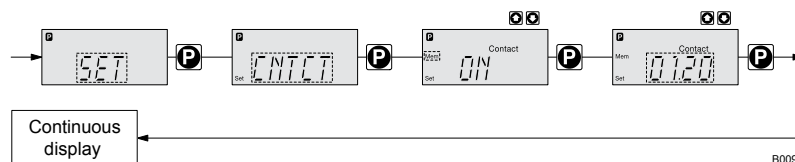


Fig. 29

The number of strokes per pulse depends on the factor which you input. By use of the factor you can multiply incoming pulses by a factor between 1.01 and 99.99 or reduce them by a factor of 0.01 to 0.99:

Number of strokes executed = factor x number of incoming pulses

Example

Example table

	Factor	Pulse (sequence)	Number of strokes (sequence)
Step-up	1	1	1
	2	1	2
	25	1	25
	99.99	1	99.99
	1.50	1	1.50 (1 / 2)
	1.25	1	1.25 (1 / 1 / 1 / 2)
Reduction	1	1	1
	0.50	2	1
	0.10	10	1
	0.01	100	1
	0.25	4	1
	0.40	2.5 (3 / 2)	(1 / 1)
	0.75	1.33 (2 / 1 / 1)	(1 / 1 / 1)

Explanation of step-up

Factor	Pulse and strokes
with a factor 1 ...	1 stroke is executed per pulse
with a factor 2 ...	2 strokes are executed per pulse
with a factor 25 ...	25 strokes are executed per pulse

Explanation of reduction

Factor	Pulse and strokes
with a factor 1 ...	1 stroke is completed after 1 pulse
with a factor 0.5 ...	1 stroke is completed after 2 pulses
with a factor 0.1 ...	1 stroke is completed after 10 pulses
with a factor 0.75 ...	1 stroke is completed after 2 pulses once, then 1 stroke is completed after 1 pulse twice and then (repeating) 1 stroke after 2 pulses, etc...



If a remainder is obtained when dividing by the factor, then the pump software adds the remainders together. As soon as this sum reaches or exceeds "1", the pump executes an additional stroke. Therefore on average during the metering operation, the resultant number of strokes precisely matches the factor.

"Memory" function extension

You can also activate the "Memory" function extension (identifier *'Mem'* appears on the LCD screen; *'Mem'* = memory). When "Memory" is activated, the pump software adds up the remaining strokes, which could not be processed, up to the maximum capacity of the stroke memory of 65,535 strokes. If this maximum capacity is exceeded, the pump goes into fault mode.

You can thus optimally match the pump to the process in question, for example in conjunction with contact water meters.

10.5.4 "Batch" operating mode settings (BATCH menu)

Alongside those described in more detail in the chapter "Programmable function settings (SET menu)" the *'BATCH'* menu is also available in *'Batch'* operating mode via the *'SET'* menu.

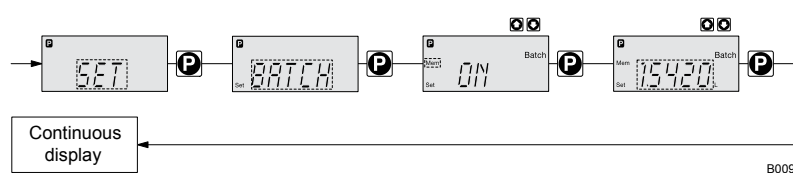


Fig. 30

The operating mode *'Batch'* is a variant of the operating mode *'Contact'* - in the first place see "*'Contact'* operating mode settings". Here also, you can select a number of strokes (no fractions, only integers from 1 to 65535), but also a metering quantity (Batch). To change between the input "Number of strokes" and "Metering quantity" press the *[i]* key 1x under the corresponding menu option (see "Operating / adjustment overview" in the appendix).

'Batch' operating mode is intended for large metering quantities.

The metering can be triggered either by pressing the *[P]* key or by a pulse received via the "External control" terminal.

The number of received pulses, which could not yet be processed, is stored by the pump control in the stroke memory. The stroke memory is limited to the Batch size if "Memory" is not activated, with "Memory" to 65535 strokes.

You can delete it by changing to another operating mode.

"Memory" function extension

You can also activate the "Memory" function extension (identifier *'Mem'* appears on the LCD screen; *'Mem'* = memory). When "Memory" is activated, the pump software adds up the remaining strokes, which could not be processed, up to the maximum capacity of the stroke memory of 65,535 strokes. If this maximum capacity is exceeded, the pump goes into fault mode.

You can thus optimally match the pump to the process in question, for example in conjunction with contact water meters.

10.6 Programmable function settings (SET menu)

Setting menus are available in the SET menu in all operating modes for the following programmable functions:

- Calibrate (*'CALIB'* menu)
- Auxiliary rate (*'AUX'* menu)
- Flow (*'FLOW'* menu; (only available if a dosing monitor is connected)

10.6.1 “Calibrate” function settings (CALIB menu)

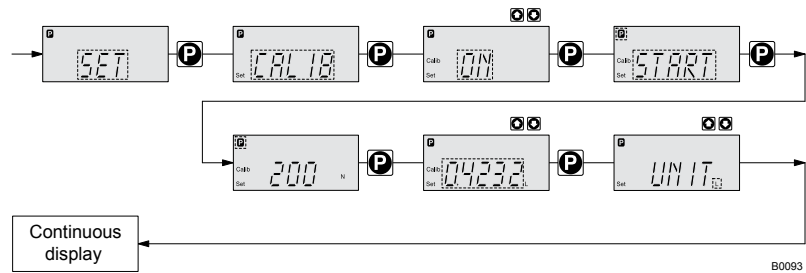


Fig. 31

The pump can also be operated in the calibrated state. In this case, the corresponding continuous displays then indicate the metering volume or the capacity directly. The calibration is maintained when the stroke length is altered by up to ± 10 scale divisions (for a set stroke length of 40 % this corresponds to a range from 30 % ... 50 %). If the stroke length is changed by more than ± 10 scale divisions, the yellow warning light illuminates, the continuous display flashes and the flashing identifier 'Calib' appears.



- Do not allow the stroke length to fall below 30% (SEK type: 50%)! Otherwise the calibration becomes very inaccurate.
- The calibration becomes more accurate, the more strokes the pump makes during calibration. Recommendation: at least 200 strokes.

Calibration

**CAUTION!****Danger with dangerous feed chemicals**

Provided the following handling instructions are followed, contact with the feed chemical is possible.

- If the feed chemical is dangerous, take appropriate safety precautions when carrying out the following handling instructions.
- Observe the feed chemical safety data sheet.

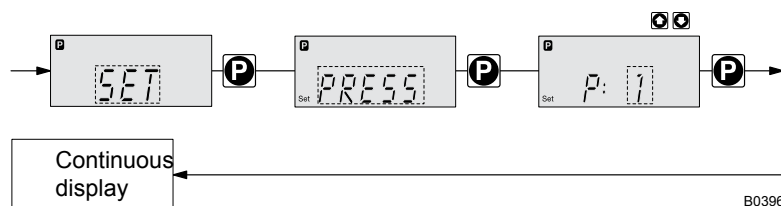
1. Lead the suction hose into a measuring cylinder containing the feed chemical - the discharge hose must be installed in a permanent manner (operating pressure, ...!).
2. Prime the feed chemical (press both arrow keys simultaneously), should the suction hose be empty.
3. Record the level in the measuring cylinder and the stroke length.
4. Select the 'CALIB' menu and press the [P] key to change to the first menu option.
5. With an arrow key select 'ON' and press the [P] key to change to the next menu option.
6. To start the calibration, press the [P] key. The pump starts to pump and indicates the stroke rate - at certain intervals 'STOP' appears. The pump works with the stroke rate set under 'MANUAL'.
7. After a reasonable number of strokes, stop the pump with the [P] key.
8. Determine the required metering volume (difference initial volume - residual volume).
9. Enter this amount under the next menu option and then press the [P] key to change to the next menu option.

10. Under menu option 'UNIT' select the units ('L' or 'gal') using the arrow keys and press the [P] key.
- ⇒ The pump is calibrated.

Consequence:

- The corresponding continuous displays indicate the calibrated values.
- Total number of strokes and total litres are set to "0" by calibrate.
- The pump is in the STOP state.

10.6.2 "Pressure ratings" function settings (PRESS menu)



Using the "Pressure ratings" function, you can reduce the rated pressure of the gamma/ L.



CAUTION!

Select the pump rated pressure so it is as large as necessary and as small as possible!

In doing so you are increasing the safety of your system (reduced risk that lines will burst if blocked)! Moreover this preserves the diaphragm and saves power.



CAUTION!

The rated pressure can be considerably exceeded for stroke lengths less than 100 %. The rated pressure relates to a 100 % stroke length.



CAUTION!

Should a different liquid end size be fitted, then the pump must be reprogrammed in the factory!

The following rated pressures can be selected for these liquid end sizes:

Selectable rated pressure (bar)

Size of liquid end	Pressure rating 1	Pressure rating 2	Pressure rating 3	Pressure rating 4
1601, 1602, 1605	4	7	10	16
1000, 1005, 1008	4	7	10	-
0708, 0713	4	7	-	-



No adjustment is possible for pump types 0413, 0420, 0220, and 0232.

10.6.3 “Auxiliary frequency” function settings (AUX menu)

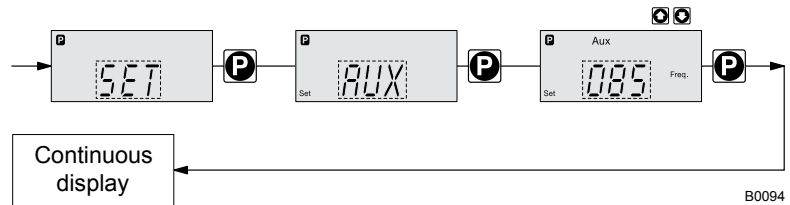


Fig. 32

The programmable function "Auxiliary frequency" facilitates the activating of an auxiliary stroke rate, which can be set in the 'AUX' menu. It can be activated via the "External control" terminal. If the auxiliary frequency is being used, then the identifier 'Aux' appears in the LCD screen.

This auxiliary frequency has priority over the stroke rate, which is specified by the currently selected operating mode.

10.6.4 “Flow” function settings (FLOW menu)

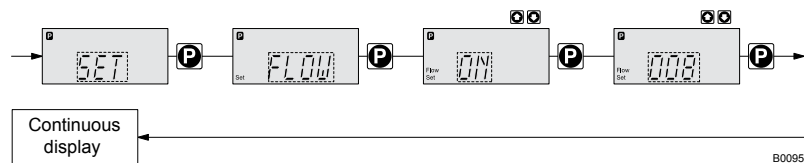


Fig. 33

The 'FLOW' menu only appears if a dosing monitor is connected to the "Dosing monitor" terminal. The metering monitor records the individual metering strokes of the pump at the pressure connector and reports them back to the pump control. If this feedback is sequentially missing for as often as set in the 'FLOW' menu (after a fault or too low metering), the pump is stopped.

10.7 Setting the code (CODE menu)

In the 'CODE' menu, you can enter whether you want to block parts of the adjustment options.

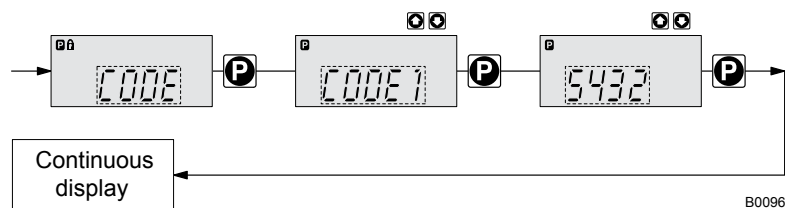


Fig. 34

In the first menu option, you can set either CODE 1 or CODE 2 (both use the same number).

- Select 'CODE 1', to block adjustment mode (① in "Operating / adjustment overview" in the appendix). In the next menu option, enter the number you want to use as the code.
- Select 'CODE 2', to block the option to adjust the directly changeable values in the continuous displays (① in "Operating / adjustment overview" in the appendix). In the next menu option, enter the number you want to use as the code.
- Select 'NONE', to clear a set security lock.

10.8 Deleting the total number of strokes or total litres (CLEAR window)

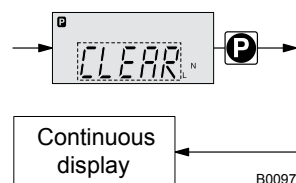


Fig. 35

In the 'CLEAR' window, you can delete the stored total number of strokes and simultaneously the total litres (= reset to "0"). To do this quit the Window by quickly pressing the $[P]$ key.

The values have been counted since pump commissioning or since they were last deleted.

11 Operation



WARNING!

Fire hazard with flammable media

Only with combustible media: These may start to burn when combined with oxygen.

- During filling and draining of the liquid end, an expert must ensure that feed chemical does not come into contact with oxygen.

This chapter describes all the operating options available to you if the pump control is showing a continuous display - then the display does not contain the symbol for the *[P]* key.



- *For supplementary information, please read the overviews "Control elements and key functions" and see the "Operating/setting diagram" at the end of the operating instructions.*
- *Also take note of the overview "Continuous displays". It shows which continuous displays are available in which operating mode and which variables are directly changeable in the relevant continuous display.*

11.1 Manual operation

Adjusting the stroke length

The stroke length can be continuously adjusted using the stroke length adjustment knob in the range 0 ... 100 %. The recommended stroke length range, in which the set metering quantity can, from a technical point of view, be accurately reproduced, is 30 ... 100 %.

(or for the SEK type: 50 ... 100 %)

The following operating options are available via the keys - see the figure on the next page:

Stopping/starting the pump

Stop the pump: Press the *[START/STOP]* key.

Start the pump: Press the *[START/STOP]* key again.

Starting batch

In operating mode *'Batch'*: Briefly press the *[P]* key.

Loading factory settings




*Press the *[P]* key for 15 s, if you want to reload the factory settings prior to calibration!*

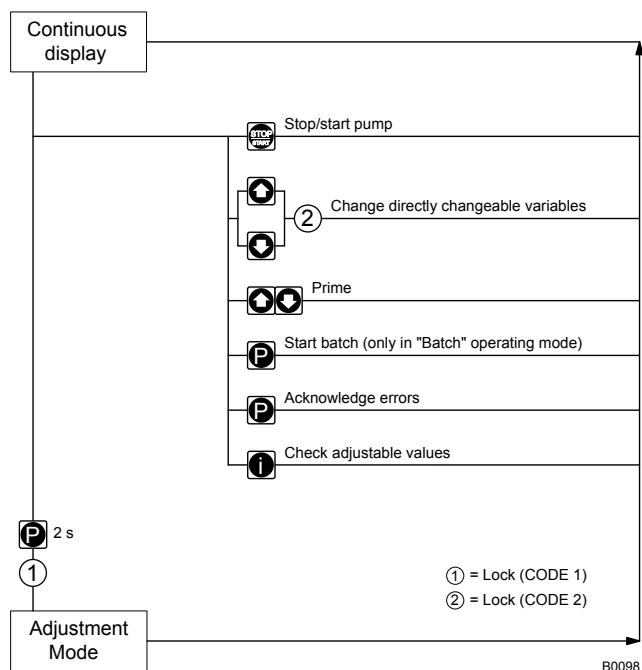
This deletes the current settings.

Changing to adjustment mode

In continuous display if you keep the *[P]* key pressed for 2 s, the pump control switches into adjustment mode - see "Adjustment" chapter.

If *'CODE 1'* was set, then after pressing the *[P]* key, the code must first be entered.

Checking adjustable values	Each press of the <i>[i]</i> key toggles the continuous display output to the screen to another continuous display. The number of continuous displays depends on the identity code, the selected operating mode and the connected additional devices.
Change directly changeable variables	<p>To change a value, see below, directly in the corresponding continuous display, press one of the <i>[arrow keys]</i> until the <i>[Set]</i> identifier appears.</p> <p>(The delay period has been programmed in to prevent unintentional changing of values.)</p> <p>If <i>'CODE 2'</i> was set, then after pressing an <i>[arrow key]</i>, the code must first be entered.</p> <p>The directly changeable variables are in detail:</p>
Stroke rate	<p>In operating modes <i>'Manual'</i>, <i>'Contact'</i> and <i>'Batch'</i>:</p> <p>You can change the stroke rate in the <i>'Stroke rate'</i> continuous display.</p>
Capacity	<p>In operating mode <i>'Manual'</i>:</p> <p>You can change the capacity in the "Capacity" continuous display.</p>
Factor	<p>The factor is the number of strokes which are triggered upon an external pulse or pressing of key <i>[P]</i> (only in <i>'Batch'</i> operating mode).</p> <p>In operating mode <i>'Batch'</i>:</p> <p>You can change the factor from the "Remaining strokes" continuous display. A couple of seconds after your have set the factor, the pump control jumps back to the initial continuous display.</p>
Displaying the program versions	<p>Press the <i>[P]</i> key for 10 s to display the program versions.</p> <p><i>'V1052' + 'X1010'</i></p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;">  i <i>Under 'LOAD3' release the [P] key immediately!</i> </div>
Batch size	<p>In operating mode <i>'Batch'</i>:</p> <p>You can change the batch size from the "Batch size/Remaining litres" continuous display. A couple of seconds after your have set the factor, the pump control jumps back to the initial continuous display.</p>
Priming	Simultaneous pressing of the two <i>[arrow keys]</i> triggers the "Priming" function.
Acknowledging errors	Fault displays are acknowledged by brief pressing of the <i>[P]</i> key.



11.2 Remote operation

There is an option to control the pump remotely via a signal cable, PRO-FIBUS® or CAN bus - see chapter "Settings - selecting the operating mode (MODE menu)" and chapter "Operation", in the "Supplementary instructions for ProMinent® gamma/ L and ProMinent® Sigma versions with PRO-FIBUS®" as well as your system documentation.

12 Maintenance

**WARNING!**

It is mandatory that you read the safety information and specifications in the "Storage, Transport and Unpacking" chapter prior to shipping the pump.

**WARNING!****Fire hazard with flammable media**

Only with combustible media: These may start to burn when combined with oxygen.

- During filling and draining of the liquid end, an expert must ensure that feed chemical does not come into contact with oxygen.

**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.



Third party spare parts for the pumps may lead to problems when pumping.

- Use only original spare parts.
- Use the correct spare parts kits. In the event of doubt, refer to the exploded views and ordering information in the appendix.

Standard liquid ends:

Interval	Maintenance work	Personnel
Quarterly*	<ul style="list-style-type: none"> ■ Check the metering diaphragm for damage** - refer to "Repair". ■ Check that the hydraulic lines are fixed firmly to the liquid end. ■ Check that the suction valve and discharge valve are fitted tightly. ■ Check the tightness of the entire liquid end - particularly around the leakage hole - refer to  'Standard liquid ends:' on page 53 ■ Check that the flow is correct: Allow the pump to prime briefly - turn the multifunctional switch briefly to "Test" ■ Check that the electrical connections are intact. ■ Check the integrity of the housing. ■ Check that the dosing head screws are tight. 	Technical personnel

* Under normal loading (approx. 30 % of continuous operation)

Under heavy loading (e.g. continuous operation): Shorter intervals.

** Check the diaphragm frequently with feed chemicals that put particular pressure on the diaphragm, e.g. those containing abrasive additives.

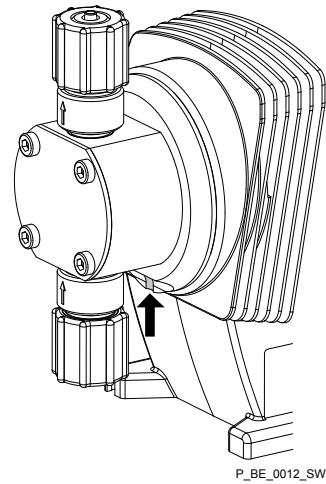


Fig. 36: Leakage hole

Liquid ends with bleed valve:

Interval	Maintenance work
Quarterly*	In addition: <ul style="list-style-type: none"> ■ Check that the bypass line is fixed firmly to the liquid end ■ Check that the bleed valve is tight. ■ Check the discharge and bypass line for kinks ■ Check that the bleed valve is operating correctly.

* Under normal loading (approx. 30 % of continuous operation)

Under heavy loading (e.g. continuous operation): Shorter intervals.

Tightening torque

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

13 Repairs

Safety notes

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

Unauthorised repairs inside the pump can result in an electric shock.

For this reason, repairs inside the pump may only be performed by a ProMinent branch or representative, in particular the following:

- Replacement of damaged mains connection lines
- Replacement of fuses
- Replacement of electronic control

**WARNING!**

It is mandatory that you read the safety information and specifications in the "Storage, Transport and Unpacking" chapter prior to shipping the pump.

**WARNING!****Contact with the feed chemical**

Parts that come into contact with the feed chemical are exposed and touched during repair work.

- Protect yourself against the feed chemical in case it is hazardous. Read the safety data sheet on the feed chemical.

**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.

**WARNING!****Fire hazard with flammable media**

Only with combustible media: These may start to burn when combined with oxygen.

- During filling and draining of the liquid end, an expert must ensure that feed chemical does not come into contact with oxygen.

13.1 Cleaning valves

Personnel: ■ Technical personnel



Warning of faulty operation

Refer to the exploded views in the Appendix when working on the unit.

Cleaning a discharge valve or a suction valve on types (PP, PV, NP) 1000, 1005, 1605, 1601, 1602



Warning of faulty operation

- *Discharge and suction valves differ from each other! Only take them apart one after each other, so that you do not confuse the components!*
- *Only use new components which fit your valve - both in terms of shape and chemical resistance!*
- *Recalibrate the pump after replacing a valve!*
- *Using an Allen key or similar, insert it into the smaller hole of the discharge connector and push the valve inserts out of it.*

A suction valve is constructed in almost the same way as a discharge valve.

Please note, however, that:

- the two valve inserts are identical here
- There is an additional spacer between the valve inserts.
- There is a shaped seal in the dosing head instead of an O-ring.
- The flow direction of the suction connector is the opposite to that of the discharge connector.

Cleaning a discharge valve or a suction valve on types (PP, PV, NP) 0708, 1008, 0220, 0420, 0413, 0713, 0232



Warning of faulty operation

- *Discharge and suction valves differ from each other! Only take them apart one after each other, so that you do not confuse the components!*
- *Only use new components which fit your valve - both in terms of shape and chemical resistance!*
- *Readjust the pump after replacing a valve!*
- *Using an Allen key or similar, insert it into the smaller hole of the discharge connector and push the valve inserts out of it.*

A suction valve is constructed in almost the same way as a discharge valve.

Please note, however, that:

- The shaped seal is laid in the suction connector.
- Only the O-ring, not the shaped seal, is laid in the dosing head.
- The flow direction of the suction connector is the opposite to that of the discharge connector.

13.2 Replacing the diaphragm



WARNING!

A few cubic centimetres of feed chemical may have accumulated behind the metering diaphragm in the backplate following a leak - depending on the design!

- Take this feed chemical into consideration when you are planning a repair - especially if it is hazardous!

Personnel: ■ Technical personnel

- If necessary take protective measures.
 - Adhere to the 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.
 4. ➤ Unscrew the hydraulic connectors on the discharge and suction side.
 5. ➤ With types with bleed valve: Firstly remove the bleed valve (star handle), then lift off the cover of the liquid end with a screwdriver.
 6. ➤ Remove the screws (1).

For pump types 0220, 0232 and 0420 - refer to the following page (there are 4 holes on the diaphragm edge).

Liquid end types with the exception of 0220 , 0232 and 0420

1. ➤ Loosen the dosing head (2) and the backplate (4) from the pump housing (6) - but only loosen!
2. ➤ Hold the pump housing (6) with one hand and clamp the diaphragm (3) with the other hand between the dosing head (2) and the backplate (4).
3. ➤ Loosen the diaphragm (3) from the drive axle with a gentle backwards turn of the dosing head (2), diaphragm (3) and backplate (4) in an anticlockwise direction.
4. ➤ Unscrew the diaphragm (3) completely from the drive axle.
5. ➤ Remove the backplate (4) from the pump housing (6).
6. ➤ Check the condition of the safety diaphragm (5) and replace if necessary.
7. ➤ Push the safety diaphragm (5) onto the drive axle only until it lies flush with the pump housing (6) and no further!
8. ➤ Tentatively screw the new diaphragm (3) onto the drive axle until it can go no further.
 - ⇒ The diaphragm (3) is now sitting at the stop of the thread.
9. ➤ Should this not work, remove dirt or swarf from the threads and screw the diaphragm (3) onto the drive axle correctly this time.



Ensure that the diaphragm is screwed exactly onto the drive axle otherwise the pump will subsequently not meter accurately!

10. ▶ Unscrew the diaphragm (3) again.
11. ▶ Place the backplate (4) onto the pump housing (6).



CAUTION!

Leakage may become apparent at a later stage.

- Make sure that the leakage hole points downwards when the pump is installed later - please refer to [further information on page 59](#)
- Place the backplate (4) immediately in the correct position on the pump housing (6)! Do not twist the backplate on the pump housing to prevent the safety diaphragm (5) becoming warped!

12. ▶ Place the diaphragm (3) into the backplate (4).



CAUTION!

Leakage may become apparent at a later stage.

- Do not over-tighten the diaphragm (3) in the following step!
- Ensure that the backplate (4) remains in its position so that the safety diaphragm does not become warped!

13. ▶ Hold the backplate (4) firmly and screw the diaphragm (3) in a clockwise direction until it is sitting tightly (the twisting resistance of the return spring can be felt).
14. ▶ Set the stroke length to 100 %.
15. ▶ Place the dosing head (2) with the screws (1) onto the diaphragm (3) and the backplate (4) - ensure that the suction connector points downwards when the pump is subsequently fitted.
16. ▶ Gently tighten the screws (1) and then tighten them diagonally. See below for tightening torque.
17. ▶ With types with bleed valve: Allow the cover of the liquid end to rest in the dosing head, then press the knob on the bleed valve (star handle) into the dosing head.



CAUTION!

Leakage possible

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

Tightening torque

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

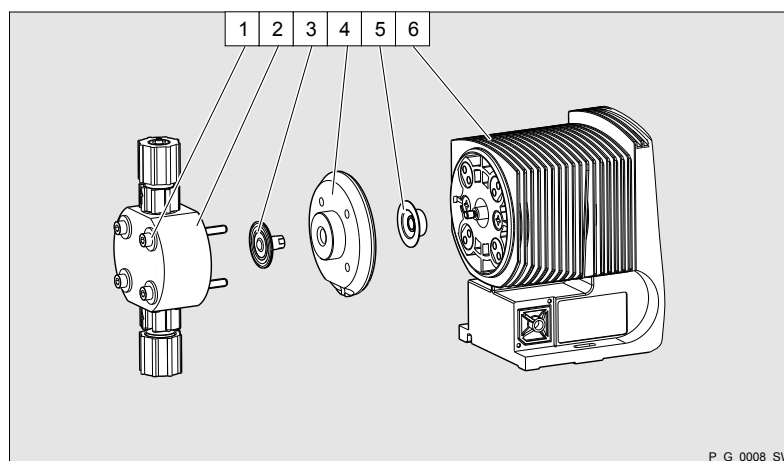


Fig. 37: Partially exploded view of liquid end

Liquid end types 0220 , 0232 and 0420

1. ➤ Remove the dosing head (2) with the screws (1) from the pump.
Only type 0232: Remove the screws of the backplate (4) under the diaphragm (3). Replace the dosing head (2) and screws - the screws (1) should still extend into the holes in the diaphragm (3), but not into the backplate!
2. ➤ Hold the pump housing (6) with one hand and clamp the diaphragm (3) with the other hand between the dosing head (2) and the backplate (4).
3. ➤ Loosen the diaphragm (3) from the drive axle with a gentle backwards turn of the dosing head (2), diaphragm (3) and backplate (4) in an anticlockwise direction.
4. ➤ Pull the dosing head (2) with the screws (1) out of the diaphragm (3) and completely unscrew this from the drive axle.
5. ➤ Remove the backplate (4) from the pump housing (6).
6. ➤ Check the condition of the safety diaphragm (5) and replace if necessary.
7. ➤ Push the safety diaphragm (5) onto the drive axle only until it lies flush with the pump housing (6) and no further!
8. ➤ Tentatively screw the new diaphragm (3) onto the drive axle until it can go no further.
⇒ The diaphragm (3) is now sitting at the stop of the thread.
9. ➤ Should this not work, remove dirt or swarf from the threads and screw the diaphragm (3) onto the drive axle correctly this time.



Ensure that the diaphragm is screwed exactly onto the drive axle otherwise the pump will subsequently not meter accurately!

10. ➤ Unscrew the diaphragm (3) again.
11. ➤ Check whether the diaphragm holes align correctly with the pump housing.
12. ➤ If not, start the pump and adjust the stroke length to 100 %.
13. ➤ With the pump running, slowly turn the diaphragm (3) in the clockwise direction until the 4 diaphragm holes align correctly with the pump housing (6).
14. ➤ Clamp the diaphragm (3) in this position, adjust the stroke length to 0 % and stop the pump.
15. ➤ Unscrew the diaphragm (3) again.

16. ► Place the backplate (4) onto the pump housing (6).



CAUTION!

Leakage may become apparent at a later stage.

- Make sure that the leakage hole points downwards when the pump is installed later - please refer to *Liquid end types 0220, 0232 and 0420* on page 59!
- Place the backplate (4) immediately in the correct position on the pump housing (6)! Do not twist the backplate on the pump housing to prevent the safety diaphragm (5) becoming warped!

17. ► Only type 0232: Screw the backplate (4) on tightly using the screws.

18. ► Place the diaphragm (3) into the backplate (4).



CAUTION!

Leakage may become apparent at a later stage.

- Do not over-tighten the diaphragm (3) in the following step!
- Ensure that the backplate (4) remains in its position so that the safety diaphragm does not become warped!

19. ► Hold the backplate (4) firmly and screw the diaphragm (3) in a clockwise direction until it is sitting tightly (the twisting resistance of the return spring can be felt).

20. ► Place the dosing head (2) with the screws (1) onto the diaphragm (3) and the backplate (4) - ensure that the suction connector points downwards when the pump is subsequently fitted.

21. ► Gently tighten the screws (1) and then tighten them diagonally. Tightening torque - see above.

22. ► With types with bleed valve: Allow the cover of the liquid end to rest in the dosing head, then press the bleed valve (star handle) into the dosing head.



CAUTION!

Leakage possible

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

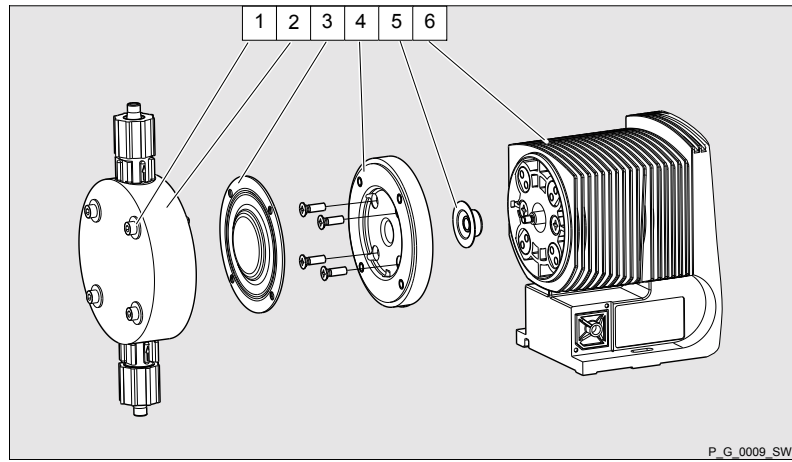


Fig. 38: Partially exploded view of liquid end

14 Troubleshooting

Safety notes



WARNING!

Warning of dangerous or unknown feed chemical

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the 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.



WARNING!

Fire hazard with flammable media

Only with combustible media: These may start to burn when combined with oxygen.

- During filling and draining of the liquid end, an expert must ensure that feed chemical does not come into contact with oxygen.

14.1 Faults without a fault alert

Faults without a fault alert

Fault description	Cause	Remedy	Personnel
Pump does not prime in spite of full stroke motion and bleeding	Minor crystalline deposits on the ball seat due to the valves drying out	Take suction hose out of the storage tank and thoroughly flush out the liquid end	Technical personnel
	Major crystalline deposits on the ball seat due to the valves drying out	Dismantle the valves and clean them - refer to "Repair"	Technical personnel
Fluid is escaping from the backplate	The screws in the dosing head are too loose	Tighten the screws in the dosing head crosswise - refer to "Repair" for tightening torque.	Instructed personnel
	The metering diaphragm is not tight	Replace the metering diaphragm - refer to "Repair".	Technical personnel
Green LED display (operating display) does not light up	The wrong mains voltage or no mains voltage is connected.	The specified mains voltage can be found on the nameplate.	Electrician

14.2 Faults with error message

14.2.1 Fault alerts

Fault description	Cause	Remedy
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'MINIM' flash.	The fluid level in the storage tank has reached "liquid level low 2nd stage".	Fill storage tank.
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'ANALG' flash.	The pump control is in 'Analog' operating mode, a fault behaviour has been programmed in the 'ANALG' menu and the control current has fallen below 3.8 mA.	Clear the cause of the low control current. Switch the programming of the fault behaviour to 'OFF' - see chapter "Adjustment - Operating mode settings (SET menu)".
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'CNTCT' flash.	Pump control is in the operating mode 'Contact' or 'Batch' and the function extension "Memory" has been set. Also a very large factor was set, too many contacts have been received or the key [P] has been pressed too often: Consequently a stroke memory overflow has occurred!	Press the [P] key, the memory content is deleted. Set up the pump again.
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'FLOW' flash.	Dosing monitor not correctly connected.	Connect the dosing monitor correctly. Press the [P] key.
	The dosing monitor reported more defective strokes than was set in the 'FLOW' menu.	Press the [P] key. Investigate and clear the cause.
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'TEMPERATURE' flash.	The temperature inside the pump housing is too high due to too high outside temperature.	Ensure lower outside temperatures. Allow the pump to cool. Press the [P] key (reset function).
	The temperature inside the pump housing is too high due to too high pump power consumption.	Check the installation, change if necessary. Allow the pump to cool. Press the [P] key (reset function).
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'DIAPH' flash.	Metering diaphragm is ruptured.	Replace metering diaphragm according to chapter "Repairs".
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'SYSTEM' flash.	Fault on the control.	Disconnect the pump from the mains/power supply then reconnect. If the error message continues to appear, send the pump to ProMinent.
The red LED indicator illuminates, on the display, the identifiers 'Error' and 'MEM' flash.	Stroke memory overflow has occurred.	Eliminate cause. Press [P] key - bear in mind the consequences for your process.

14.2.2 Warning Alerts

Fault description	Cause	Remedy
Green LED indicator illuminates.	The liquid level in the storage tank has reached "liquid level low 1st stage".	Fill storage tank.

Fault description	Cause	Remedy
Green LED indicator illuminates and the identifier 'Calib' flashes.	The pump is calibrated and the stroke length varies by more than ± 10 scale divisions from the value at the time of the calibration.	Reset the stroke length or recalibrate the pump at the desired stroke length.

14.3 All Other Faults

Please contact the responsible ProMinent branch or representative.

15 Decommissioning

Decommissioning



WARNING!

Danger from chemical residues

There is normally chemical residue in the liquid end and on the housing after operation. This chemical residue could be hazardous to people.

- It is mandatory that the safety notes relating to the "Storage, transport and unpacking" chapter are read before shipping or transporting the unit.
- Thoroughly clean the liquid end and the housing of chemicals and dirt. Adhere to the safety data sheet for the feed chemical.



WARNING!

Warning of dangerous or unknown feed chemical

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

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



WARNING!

Fire hazard with flammable media

Only with combustible media: These may start to burn when combined with oxygen.

- During filling and draining of the liquid end, an expert must ensure that feed chemical does not come into contact with oxygen.



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.



Danger of damage to the device

Take into account the information in the "Storage, Transport and Unpacking" chapter if the system is decommissioned for a temporary period.

1. ➔ Disconnect the pump from the mains power supply.
2. ➔ Drain the liquid end by turning the pump upside down and allowing the feed chemical to run out.

3. → Flush the liquid end with a suitable medium; flush the dosing head thoroughly when using hazardous feed chemicals!

Disposal



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!

Environmental hazard due to electronic waste

There are electronic components in the pump, which can have a toxic effect on the environment.

- Separate the electronic components from the remaining parts.
- Note the pertinent regulations currently applicable in your country!

16 Technical data

16.1 Performance data

gamma/ L operating at 180 strokes/minute
and 100 % stroke length

Type	Minimum pump capacity at maximum back pressure			Minimum pump capacity at medium back pressure			Con- nector size outside Ø x inside Ø	Suction lift*	Priming lift**	Max- imum priming pressure on suc- tion side
	bar	l/h	ml/ stroke	bar	l/h	ml/ stroke				
gamma/ L										
1000	10	0.74	0.069	5.0	0.82	0.076	6x4	6.0	1.8	8
1601	16	1.1	0.10	8.0	1.40	0.13	6x4	6.0	2.0	8
1602	16	2.1	0.190	8.0	2.5	0.24	6x4	6.0	2.5	5.5
1005	10	4.4	0.41	5.0	5.0	0.46	8x5****	5.0	3.0	3
0708	7	7.1	0.66	3.5	8.4	0.78	8x5	4.0	2.0	2
0413	4	12.3	1.14	2.0	14.2	1.31	8x5	3.0	2.5	1.5
0220	2	19.0	1.76	1.0	20.9	1.94	12x9	2.0	2.0	1
1605	16	4.1	0.38	8.0	4.9	0.45	8x5****	4.0	3.0	3
1008	10	6.8	0.63	5.0	8.3	0.76	8x5	3.0	3.0	2
0713	7	11.0	1.02	3.5	13.1	1.21	8x5	3.0	3.0	1.5
0420	4	17.1	1.58	2.0	19.1	1.77	12x9	3.0	3.0	1
0232	2	32.0	2.96	1.0	36.2	3.35	12x9	2.0	2.0	0.8
gamma/ L Metering pumps with self-bleeding dosing head SER/SEK***										
1601	16	0.59	0.055	8.0	0.78	0.072	6x4	-	1.8	0.5
1602	16	1.40	0.13	8.0	1.74	0.16	6x4	-	1.8	0.5
1005	10	3.6	0.33	5.0	4.0	0.37	8x5	-	1.8	0.5
0708	7	6.60	0.61	3.5	7.50	0.69	8x5	-	1.8	0.5
0413	4	10.8	1.0	2.0	12.6	1.17	8x5	-	1.8	0.5
0220	2	16.2	1.5	1.0	18.0	1.67	12x9	-	1.8	0.5
1605	16	3.3	0.31	8.0	3.8	0.35	8x5	-	1.8	0.5
1008	10	6.3	0.58	5.0	7.5	0.69	8x5	-	1.8	0.5
0713	7	10.5	0.97	3.5	12.3	1.14	8x5	-	1.8	0.5
0420	4	15.6	1.44	2.0	17.4	1.61	12x9	-	1.8	0.5

- * - Suction lift with a filled suction line and filled liquid end. With self-bleeding dosing head with air in the suction line.
- ** - Priming lift with clean and moist valves. Priming lift at 100 % stroke length and free outlet or opened bleed valve.
- *** - The given performance data constitutes guaranteed minimum values, calculated using medium water at room temperature. The bypass connection with a self-bleeding dosing head SEK is 6x4 mm.
- **** - The connector width is 6 mm on SST material versions.

gamma/ L metering pumps with dosing heads for higher-viscosity media have a 10-20 % lower metering capacity and are not self-priming. Connection G 3/4-DN 10 with tube nozzle d16-DN10.

16.2 Accuracy

16.2.1 Standard Liquid End

Data	Value	Unit
Capacity range of the series	-5 ... +10	% *
Reproducibility	±2	% **

* - at max. stroke length and max. operating pressure for all material versions

** - at constant conditions and min. 30 % stroke length

16.2.2 Self-Bleeding Liquid End

As the self-bleeding liquid end is used with outgassing media and when operating with air bubbles, no dosing accuracy or reproducibility can be provided.

The recommended minimum stroke length with self-bleeding dosing pumps is 50 %.

16.3 Viscosity

The liquid ends are suitable for the following viscosity ranges:

Version	Range	Unit
Standard	0 ... 200	mPa
With valve springs	200 ... 500	mPa
Self-bleeding (SEK)	0 ... 50	mPa

* Only when the installation is correctly adjusted

16.4 Material specifications

Standard liquid ends

Version	Dosing head	Suction/discharge connector	Seals	Valve balls
PPE	Polypropylene	Polypropylene	EPDM	Ceramic
PPB	Polypropylene	Polypropylene	FPM	Ceramic
NPE	Clear acrylic	PVC	EPDM	Ceramic
NPB	Clear acrylic	PVC	FPM	Ceramic
PVT	PVDF	PVDF	PTFE	Ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	Ceramic
SST	Stainless steel 1.4571	Stainless steel 1.4571	PTFE	Ceramic

Only the self-bleeding design in material version PPE, PPB, NPE and NPB: valve spring made of Hastelloy C, valve insert made of PVDF.

Metering diaphragms with a PTFE coating.

FPM = fluorine rubber.

Pump

Housing parts: polyphenylene ether (PPE with fibreglass)

16.5 Electrical data

Version: 100 - 230 V ± 10 %, 50/60 Hz, gamma/ L GALa

Parameter	M70	M85
Nominal power, approx.	17 W	23 W
Current I _{eff}	0.5 ... 0.2 A	0.8 ... 0.3 A
Peak current	3.6... 1.4 A	6.0 ... 2.8 A
Switch on peak current (within approx. 1 ms)	15 A	15 A
Fuse*	0.8 AT	0.8 AT

* Fuses must have VDE, UL and CSA certification. E.g. [Schurter SPT@] type or [SIBA 179200@] type I [T 800 mA 250V (1.5kA)], order no. 734100

Design: 12 - 24 VDC# -8/+24 %, gamma/ L GALa, Identity code M

Parameter	M70**
Nominal power, approx.	17 W
Nominal current (averaged at 180 H/min)	3.1 ... 1.4 A
Peak current	10.2... 4.3 A
Closed current (no stroke)	128 ... 70 mA
Fuse*	5 AT

SELV in accordance with EN 60335-1

* 5 AT, 5x20 mm, order no. 712028

** M70: 1000, 1601, 1602, 1005, 0708, 0413, 0220



The pump only works if the polarity is correct.

Design: 24 VDC# -15/+24 %, gamma/ L
GALa, Identity code N

Parameter	M85**
Nominal power, approx.	20 W
Nominal current (averaged at 180 H/min)	1.8 A
Peak current	6.0 A
Closed current (no stroke)	70 mA
Fuse*	5 AT

SELV in accordance with EN 60335-1

* 5 AT, 5x20 mm, order no. 712028

** M85: 1605, 1008, 0713, 0420, 0232



The pump only works if the polarity is correct.

Design: 24 VAC# -15/+10 %, gamma/ L
GALa, Identity code P

Parameter	M70**	M85***
Nominal power, approx.	18 W	21 W
Nominal current (averaged at 180 H/min)	2.2 A	2.6 A
Peak current	7.5 A	9.2 A
Closed current (no stroke)	103 mA	103 mA
Fuse*	5 AT	5 AT

SELV in accordance with EN 60335-1

* 5 AT, 5x20 mm, order no. 712028

** M70: 1000, 1601, 1602, 1005, 0708, 0413, 0220

*** M85: 1605, 1008, 0713, 0420, 0232

16.6 Temperatures

Pump, compl.

Data	Value	Unit
Storage and transport temperature	-10 ... +50	°C
Ambient temperature when operating with pumps with _C MET _{US} approval:	-10 ... +40	°C
Ambient temperature in operation (drive and control):	-10 ... +45	°C

Liquid End

Material version	Long term	Temporary *
PP	50 °C	100 °C
NP	45 °C	60 °C

Material version	Long term	Temporary *
PV	45 °C	120 °C
TT	50 °C	120 °C
SS	50 °C	120 °C

* Temp. max., for 15 min at max. 2 bar, dependent on the ambient and feed chemical temperatures

16.7 Climate

Data	Value	Unit
Maximum air humidity *:	95	% relative humidity

* non-condensing

Exposure in a humid and alternating climate:

FW 24 according to DIN 50016

16.8 Protection class and Safety Requirements

Degree of protection

Protection against contact and humidity:

IP 65 in accordance with IEC 529, EN 60529, DIN VDE 0470 Part 1

Safety requirements

Degree of protection:

1 - mains power connection with protective earth conductor

16.9 Compatibility

Some hydraulic parts of the gamma/ L are identical to those of the Beta® product range.

There is substantial compatibility with the following components and accessories with pumps in the product ranges Beta®, CONCEPT, gamma and gamma-Classic:

- Signal cable gamma/Vario 2-, 4- and 5-wire for the "External" function
- Level switch 2-stage (gamma / Vario / Beta®)
- Metering line cross-sections
- Standard gamma connector kit
- gamma wall bracket
- Chemical feed containers and fastening plates
- Overall height (distance between the suction and discharge connector)
- Distance between the connectors and the pump fixing holes
- Identical use of accessories, such as back pressure valves, multifunctional valves, dosing monitor and flushing equipment

16.10 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)

16.11 Shipping weight

Shipping weight of gamma/ L types - in kg

Material	Types			
	1000, 1601, 1602	1005, 0708, 0413, 0220	1605, 1008, 0713	0420, 0232
PP, NP, PV, TT	2.9	3.1	4.5	5.5
SS	3.6	4.5	5.9	8.6

17 Dimensional drawings

i – Compare the dimensions on the dimensional drawing and pump.
 – All dimensions are in mm.

Dimensional drawing gamma/ L, material versions PPE, PPB

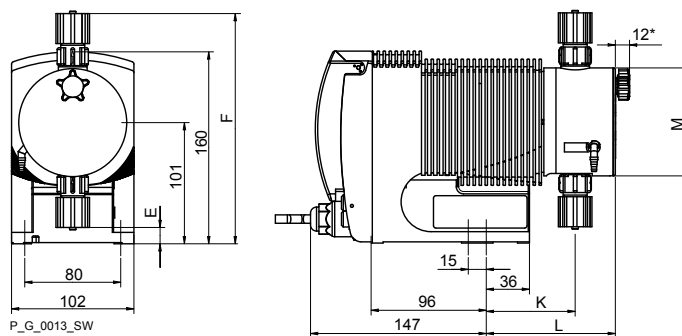


Fig. 39: Dimensional drawing gamma/ L, material version PPE, PPB - dimensions in mm

	gamma/ L M70				gamma/ L M85			
	1000 - 1602	1005	0708 - 0413	220	1605	1008 - 0713	420	232
E	23	13	15	15	13	15	15	5
F	186	193	191	191	193	191	191	197
K	71	71	74	76	71	74	76	76
L	106	105	108	110	105	108	110	91
M	Ø 70	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

Dimensional drawings

Dimensional drawing gamma/ L, material versions NPE, NPB (without bleed valve)

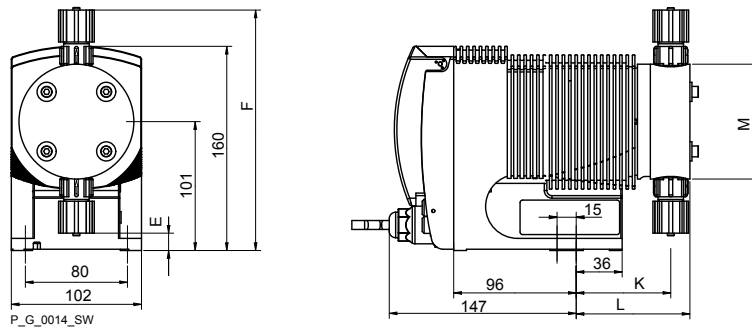


Fig. 40: Dimensional drawing gamma/ L, material versions NPE, NPB (without bleed valve) - dimensions in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	708	0413 - 0220	1605	1008 - 0713	420	232
E	25	23	16	15	15	16	15	15	5
F	177	179	188	189	189	188	189	189	199
K	77	77	74	74	76	74	74	76	76
L	92	92	89	89	91	89	89	91	91
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

Dimensional drawing gamma/ L, material versions NPE, NPB (with bleed valve)

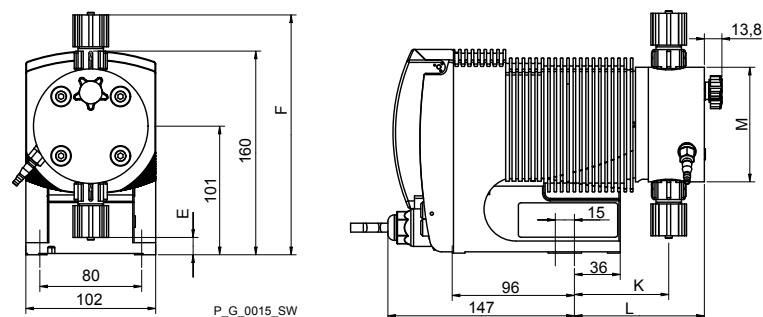


Fig. 41: Dimensional drawing gamma/ L, material versions NPE, NPB (with bleed valve) - dimensions in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	708	0413 - 0220	1605	1008 - 0713	420	232
E	25	23	16	13	15	16	13	15	5
F	177	179	188	189	189	188	189	189	199
K	77	77	74	74	76	74	74	76	76
L	105	105	102	102	104	102	102	104	105
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

Dimensional drawing gamma/ L, material versions PPE, PPB, NPE, NPB SEK

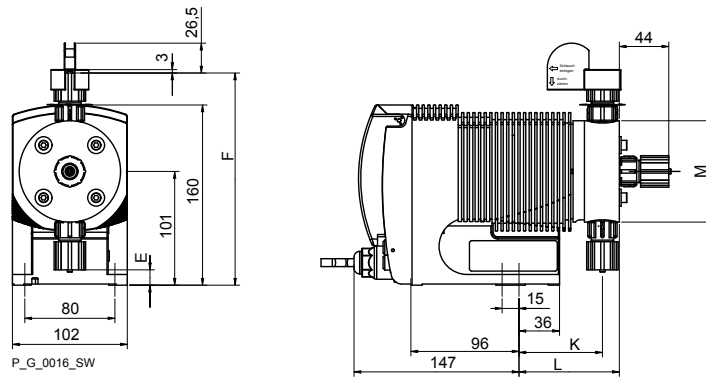


Fig. 42: Dimensional drawing gamma/ L, material version PPE, PPB, NPE, NPB SEK - dimensions in mm

	gamma/ L M70					gamma/ L M85		
	1601	1602	1005	0708	0413 - 0220	1008 - 0713	0420	0232
E	25	23	16	15	15	16	15	15
F	177	179	188	189	189	188	189	189
K	77	77	74	74	76	74	74	76
L	92	92	89	89	91	89	89	91
M	62 (Ø 60)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90

Dimensional drawing gamma/ L, material version PVDF

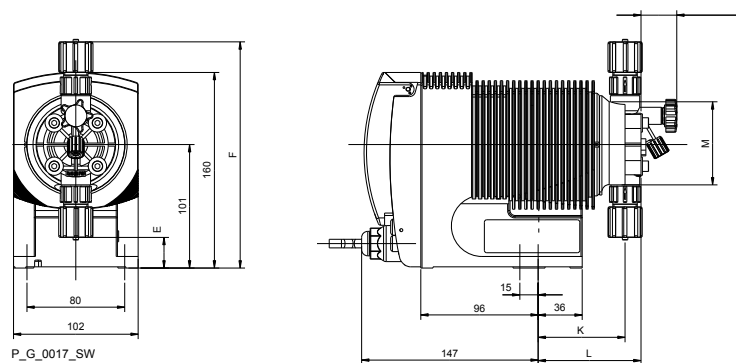


Fig. 43: Dimension drawing gamma/ L, material version PVDF - dimensions in mm

	gamma/ L M70				gamma/ L M85			
	1000 - 1602	1005	0708 - 0413	220	1605	0408 - 0713	420	232
E	25	14	14	14	14	14	14	4
F	185	191	191	191	191	191	191	198
K	71	71	73	75	71	73	75	76
L	84	88	90	92	88	90	92	93
M	Ø 70	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90

Dimensional drawing gamma/ L, material version TTT

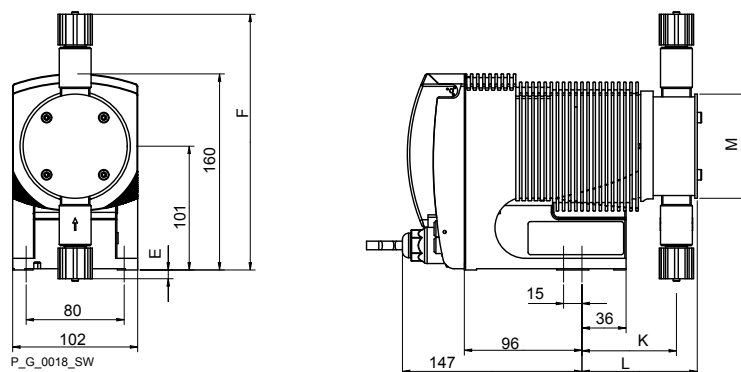


Fig. 44: Dimension drawing gamma/ L, material version TTT - dimensions in mm

	gamma/ L M70				gamma/ L M85		
	1000 - 1601	1602	1005	0708 - 0220	1605	1008 - 0420	232
E	32	25	23	-7	23	-7	-15
F	170	178	179	209	179	209	217
K	78	72	75	77	75	77	78
L	91	87	90	95	90	95	97
M	51 (Ø 60)	66 (Ø 70)	68 (Ø 80)	81 (Ø 85)	68 (Ø 80)	81 (Ø 85)	96 (Ø 100)

Dimensional drawing gamma/ L, material version SST

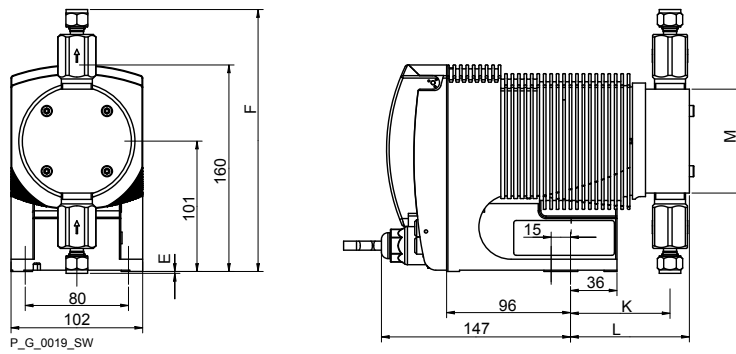
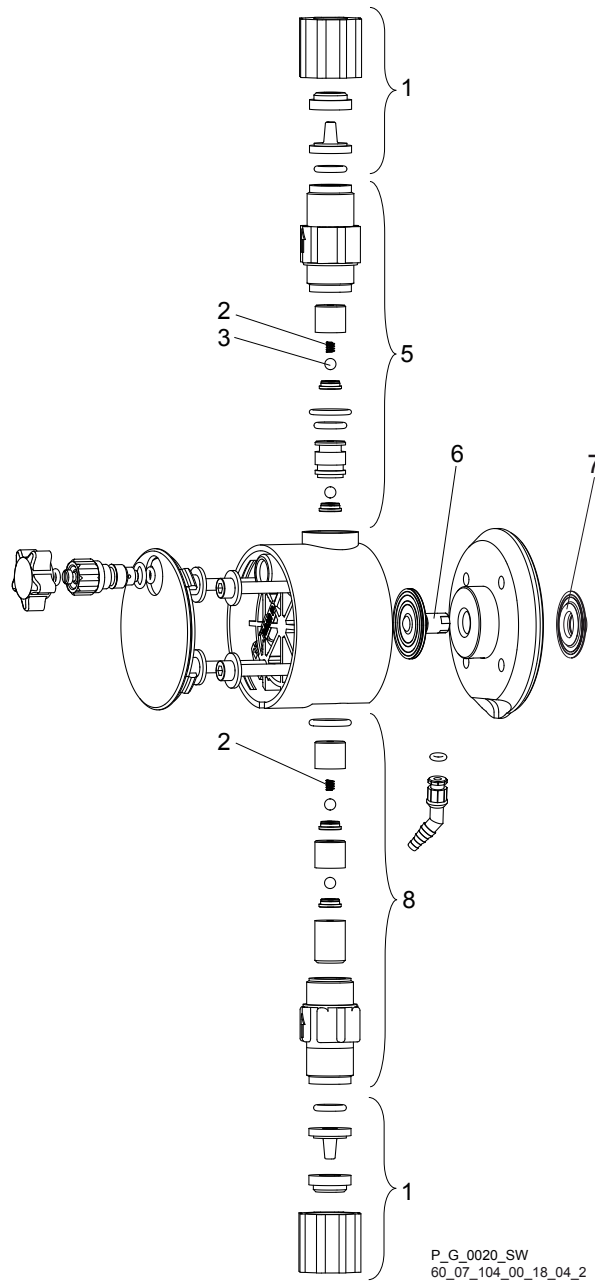


Fig. 45: Dimension drawing gamma/ L, material version SST - dimensions in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	0708 -0413	220	1605	1008 - 0713	420	232
E	40	33	31	-2	-3	31	-2	-3	-10
F	162	170	171	203	204	171	203	204	212
K	78	72	75	77	77	75	77	77	78
L	89	85	88	93	93	88	93	93	95
M	51 (Ø 60)	66 (Ø 70)	68 (Ø 80)	81 (Ø 85)	81 (Ø 85)	81 (Ø 80)	81 (Ø 85)	81 (Ø 85)	96 (Ø 100)

18 Exploded Views of Liquid Ends

Liquid end gamma/ L 1000 - 1005 (1605)
PP with bleed valve



P_G_0020_SW
60_07_104_00_18_04_2

Fig. 46: Liquid end gamma/ L 1000 - 1005 (1605) PP with bleed valve

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
1	Connector kit 6/4 PPE	817150	817150	817150	-
1	Connector kit 8/5 PPE	-	-	-	817153
1	Connector kit 6/4 PPB	817166	817166	817166	-
1	Connector kit 8/5 PPB	-	-	-	817167
3	4 Valve balls	404201	404201	404201	404201
4	Bleed valve	1021662	1021662	1021662	1021662

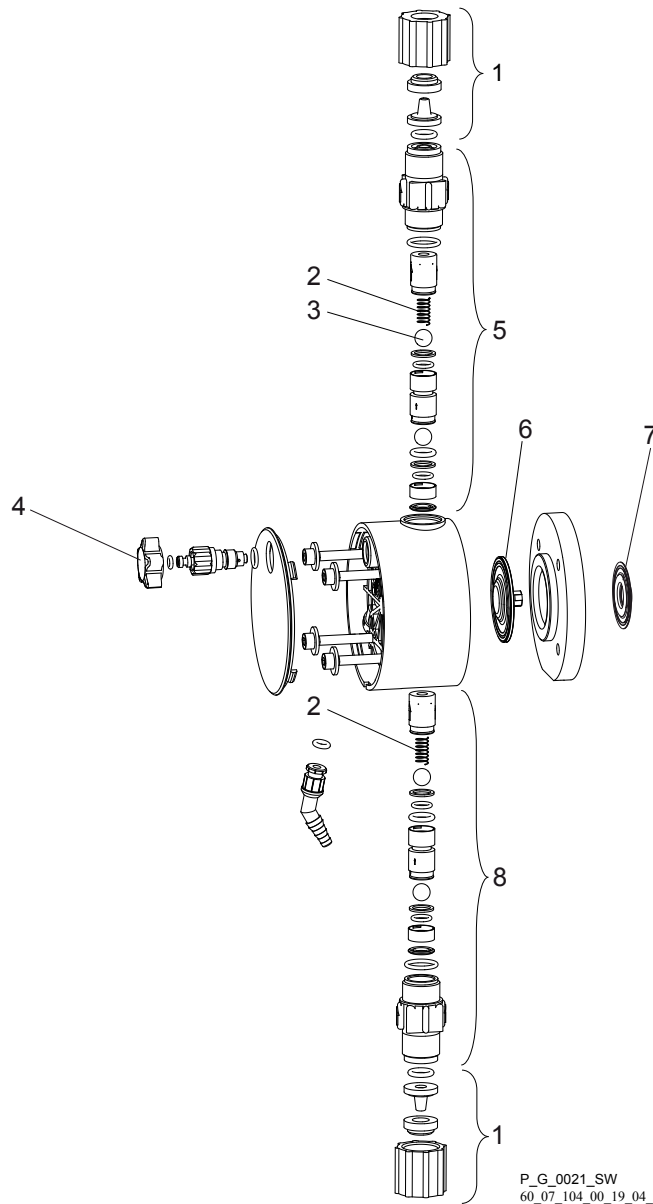
Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Exploded Views of Liquid Ends

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
5	Discharge valve compl. PPE	740350	740350	740350	740350
5	Discharge valve compl. PPB	740351	740351	740351	740351
6	Diaphragm	1000244	1000245	1000246	1000247
7	Safety diaphragm	1027414	1027414	1027414	1027414
8	Suction valve compl. PPE	792644	792644	792644	792644
8	Suction valve compl. PPB	792646	792646	792646	792646

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0708(1008) - 0220 (0420) PP with bleed valve



P_G_0021_SW
60_07_104_00_19_04_2

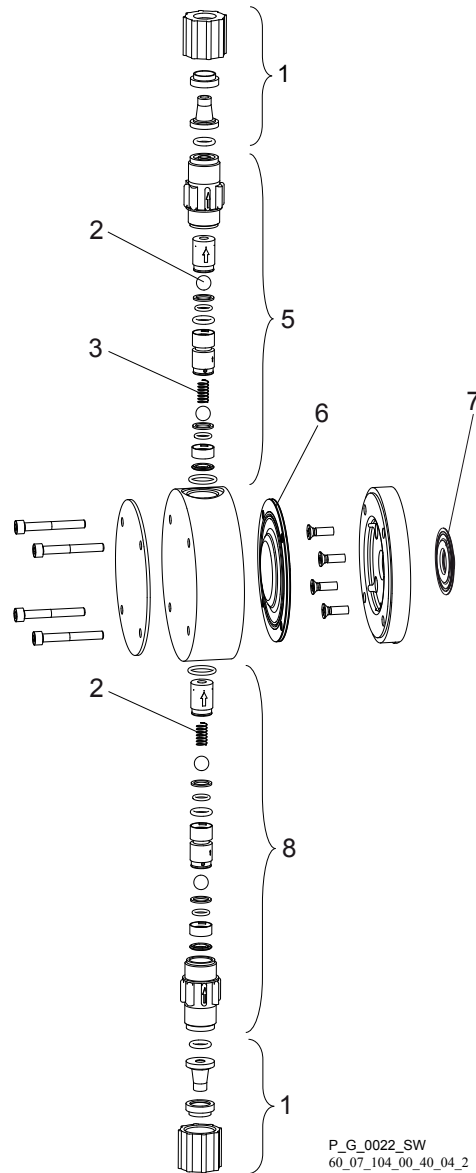
Fig. 47: Liquid end gamma/ L 0708(1008) - 0220 (0420) PP with bleed valve

Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
1	Connector kit 8/5 PPE	817153	817153	-
1	Connector kit 12/9 PPE	-	-	817151
1	Connector kit 8/5 PPB	817167	817167	-
1	Connector kit 12/9 PPB	-	-	817168
3	4 Valve balls	404281	404281	404281
4	Bleed valve	1021662	1021662	1021662
5	Discharge valve compl. PPE	1001441	1001441	1001441
5	Discharge valve compl. PPB	1001440	1001440	1001440
6	Diaphragm	1000248	1000249	1000250
7	Safety diaphragm	1027414	1027414	1027414
8	Suction valve compl. PPE	1001437	1001437	1001437
8	Suction valve compl. PPE	1001436	1001436	1001436

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Exploded Views of Liquid Ends

Liquid end gamma/ L 0232 PP without bleed valve



P_G_0022_SW
60_07_104_00_40_04_2

Fig. 48: Liquid end gamma/ L 0232 PP without bleed valve

Item	Description	Type 0232
1	Connector kit 12/9 PPE	817151
1	Connector kit 12/9 PPB	817168
3	4 Valve balls	404281
5	Discharge valve compl. PPE	1001441
5	Discharge valve compl. PPB	1001440
6	Diaphragm	1000251
7	Safety diaphragm	1027414
8	Suction valve compl. PPE	1001437
8	Suction valve compl. PPB	1001436

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 1000 - 1005 (1605)
NP with and without bleed valve

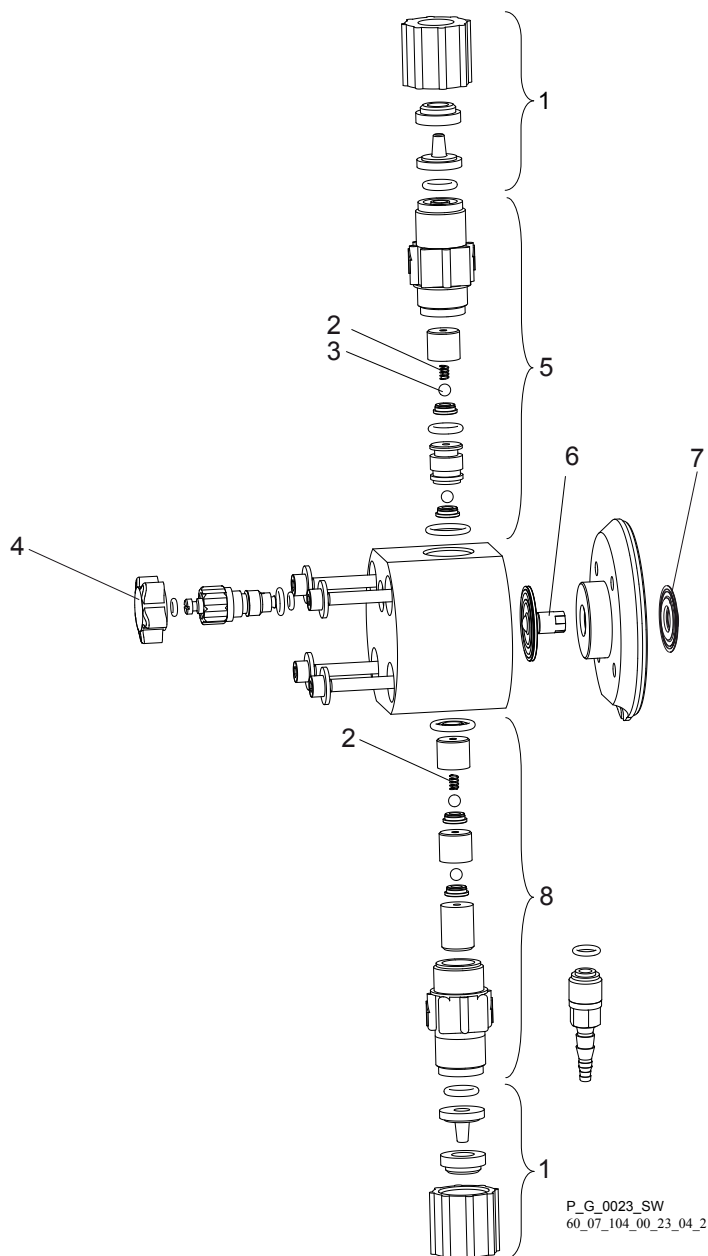


Fig. 49: Liquid end gamma/ L 1000 - 1005 (1605) NP with and without bleed valve

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
1	Connector kit 6/4 PCE	817060	817060	817060	-
1	Connector kit 8/5 PCE	-	-	-	817048
1	Connector kit 6/4 PCB	817050	817050	817050	-
1	Connector kit 8/5 PCB	-	-	-	817053
3	4 Valve balls	404201	404201	404201	404201
4	Bleed valve	1021662	1021662	1021662	1021662
5	Discharge valve compl. PCE	740349	740349	740349	740349
5	Discharge valve compl. PCE	740348	740348	740348	740348

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Exploded Views of Liquid Ends

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
6	Diaphragm	1000244	1000245	1000246	1000247
7	Safety diaphragm	1027414	1027414	1027414	1027414
8	Suction valve compl. PCE	792119	792119	792119	792119
8	Suction valve compl. PCE	792026	792026	792026	792026

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0708 (1008) - 0220 (0420) NP with and without bleed valve

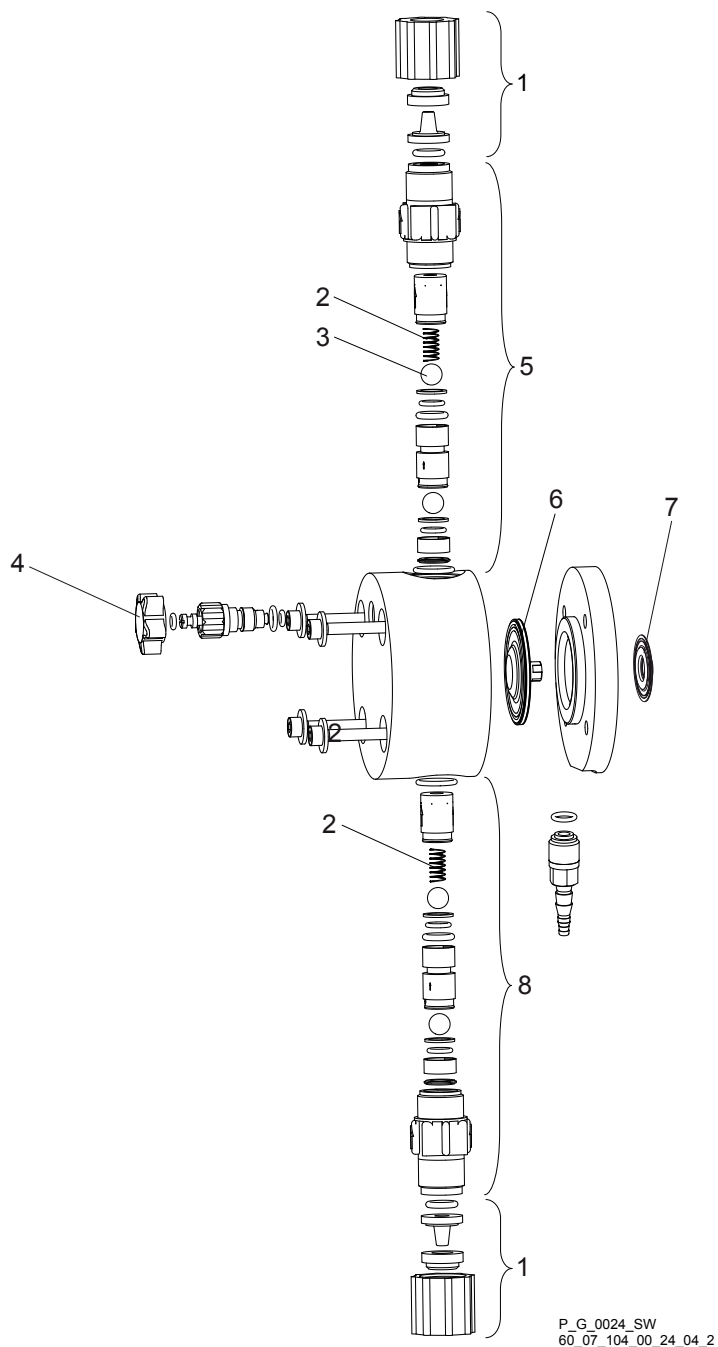


Fig. 50: Liquid end gamma/ L 0708 (1008) - 0220 (0420) NP with and without bleed valve

Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
1	Connector kit 8/5 PCE	817048	817048	-
1	Connector kit 12/9 PCE	-	-	817049
1	Connector kit 8/5 PCB	817053	817053	-
1	Connector kit 12/9 PCB	-	-	817051
3	4 Valve balls	404281	404281	404281
4	Bleed valve	1021662	1021662	1021662

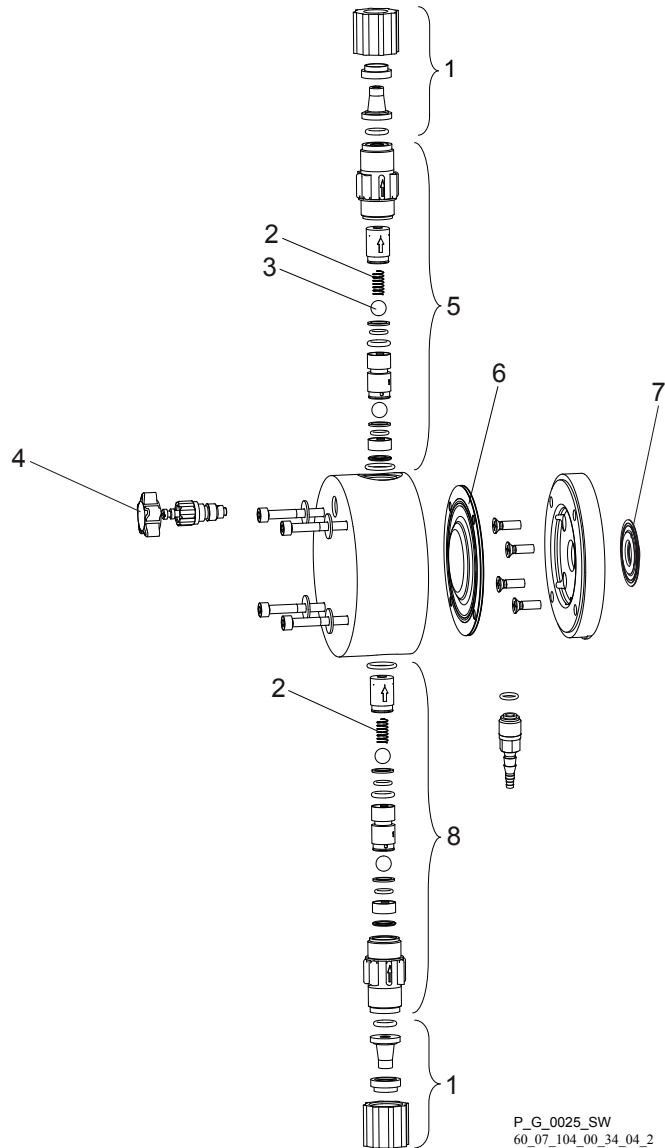
Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Exploded Views of Liquid Ends

Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
5	Discharge valve compl. PCE	1001439	1001439	1001439
5	Discharge valve compl. PCB	1001438	1001438	1001438
6	Diaphragm	1000248	1000249	1000250
7	Safety diaphragm	1027414	1027414	1027414
8	Suction valve compl. PCE	1001435	1001435	1001435
8	Suction valve compl. PCB	1001434	1001434	1001434

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0232 NP with and without bleed valve



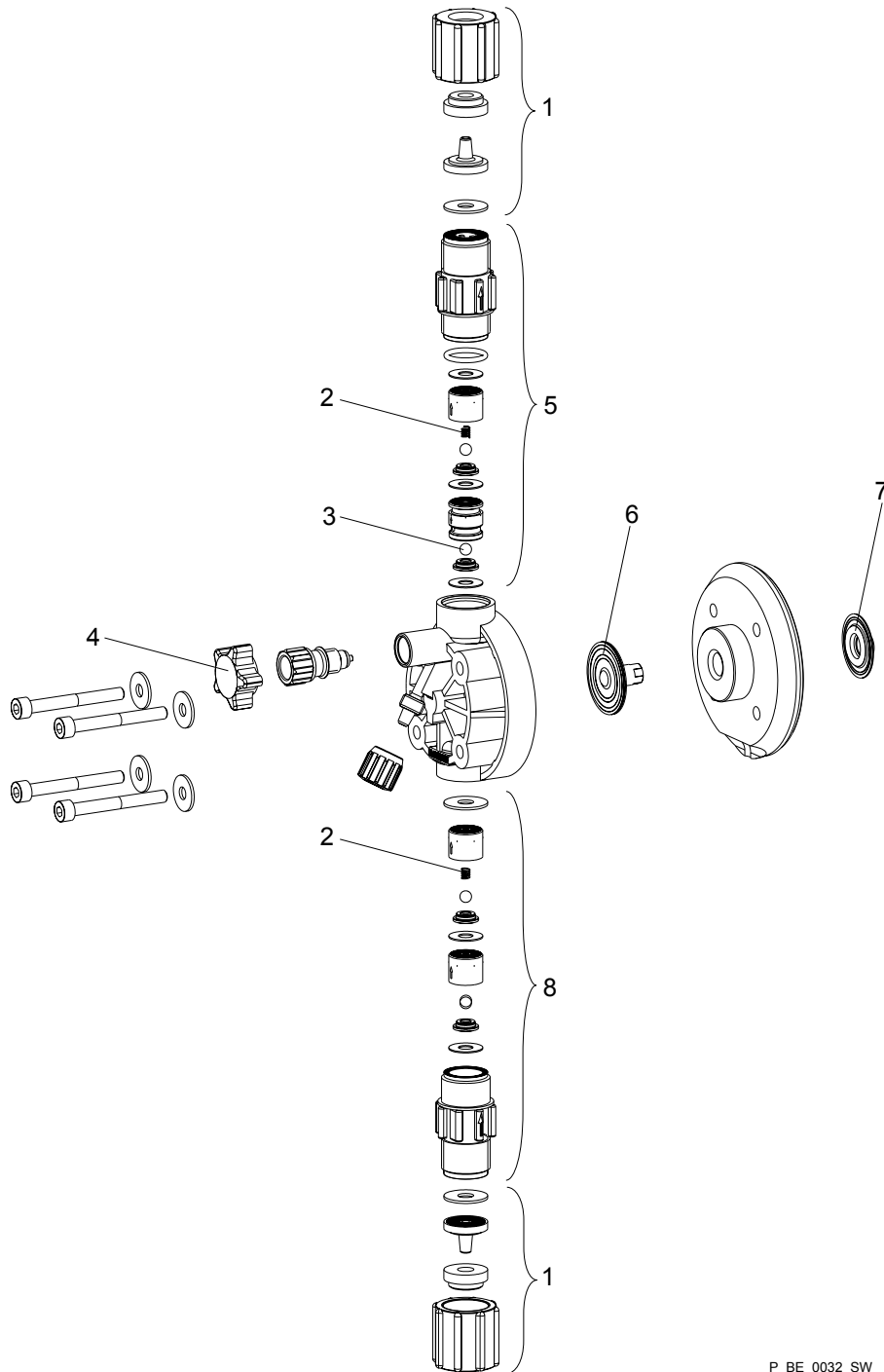
P_G_0025_SW
60_07_104_00_34_04_2

Fig. 51: Liquid end gamma/ L 0232 NP with and without bleed valve

Item	Description	Type 0232
1	Connector kit 12/9 PCE	817049
1	Connector kit 12/9 PCB	817051
3	4 Valve balls	404281
5	Discharge valve compl. PCE	1001439
5	Discharge valve compl. PCE	1001438
6	Diaphragm	1000251
7	Safety diaphragm	1027414
8	Suction valve compl. PCE	1001435
8	Suction valve compl. PCE	1001434

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 1000 - 1005 (1605) PVT with bleed valve



P_BE_0032_SW

Fig. 52: Liquid end gamma/ L 1005 (1605) PVT with bleed valve

Item	Description	Type 1000	Type 1601	Type 1602	Type 1604
1	Connector kit 6/4 PVT	1023246	1023246	1023246	-
1	Connector kit 8/5 PVT	-	-	-	1023247
3	4 Valve balls	404281	404281	404281	404281
4	Bleed valve	1021662	1021662	1021662	1021662

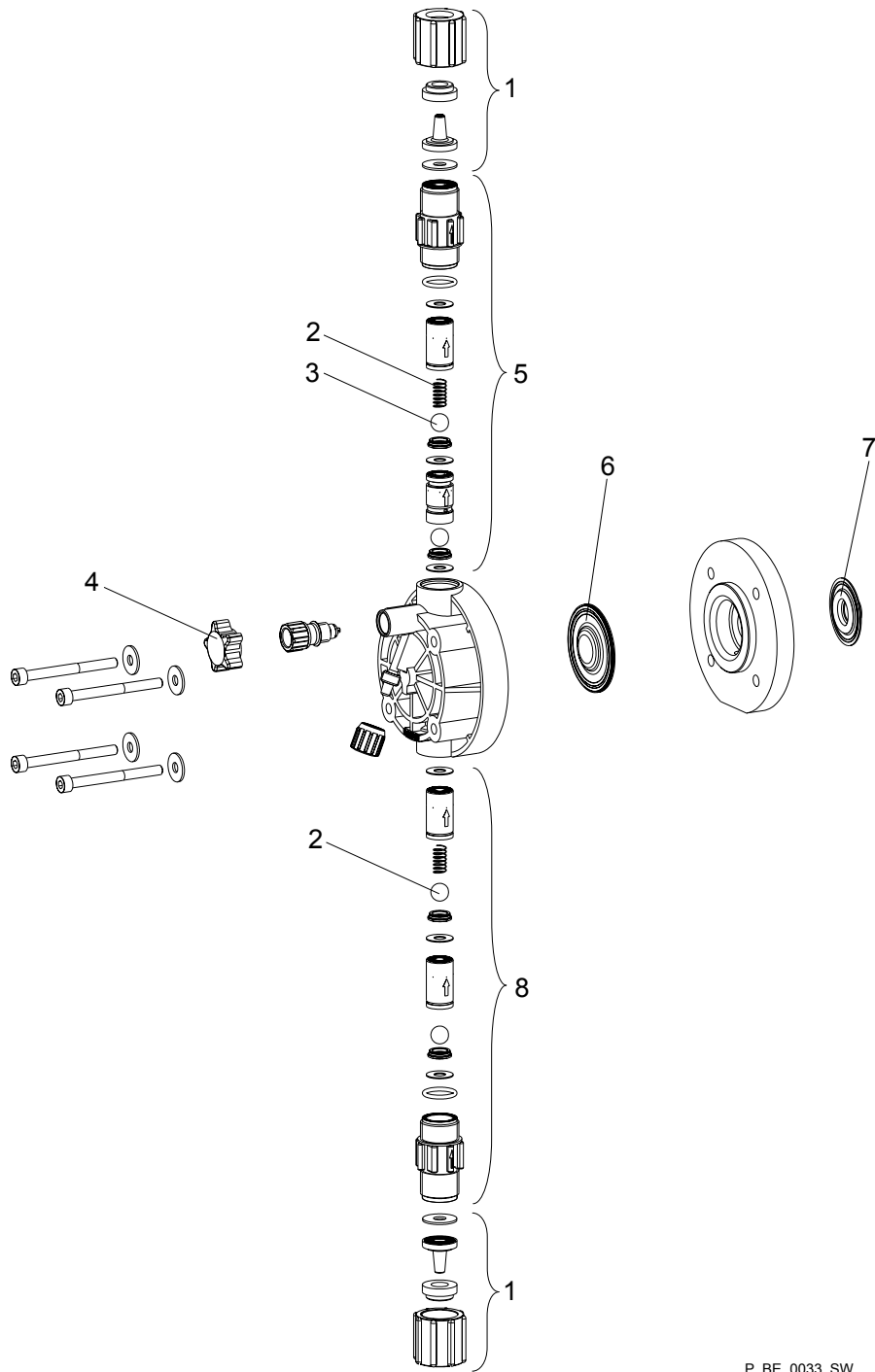
Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 1000	Type 1601	Type 1602	Type 1604
5	Discharge valve, compl. 9.2-2 PVT	1023247	1023247	1023247	1023247
6	Diaphragm	1000244	1000245	1000246	1000247
7	Safety diaphragm	1027414	1027414	1027414	1027414
8	Suction valve, compl. 9.2-2 PVT	1023126	1023126	1023126	1023126

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Exploded Views of Liquid Ends

Liquid end gamma/ L 0708(1008) - 0220
(0420) PV with bleed valve



P_BE_0033_SW

Fig. 53: Liquid end gamma/ L 0708(1008) - 0220 (0420) PV with bleed valve

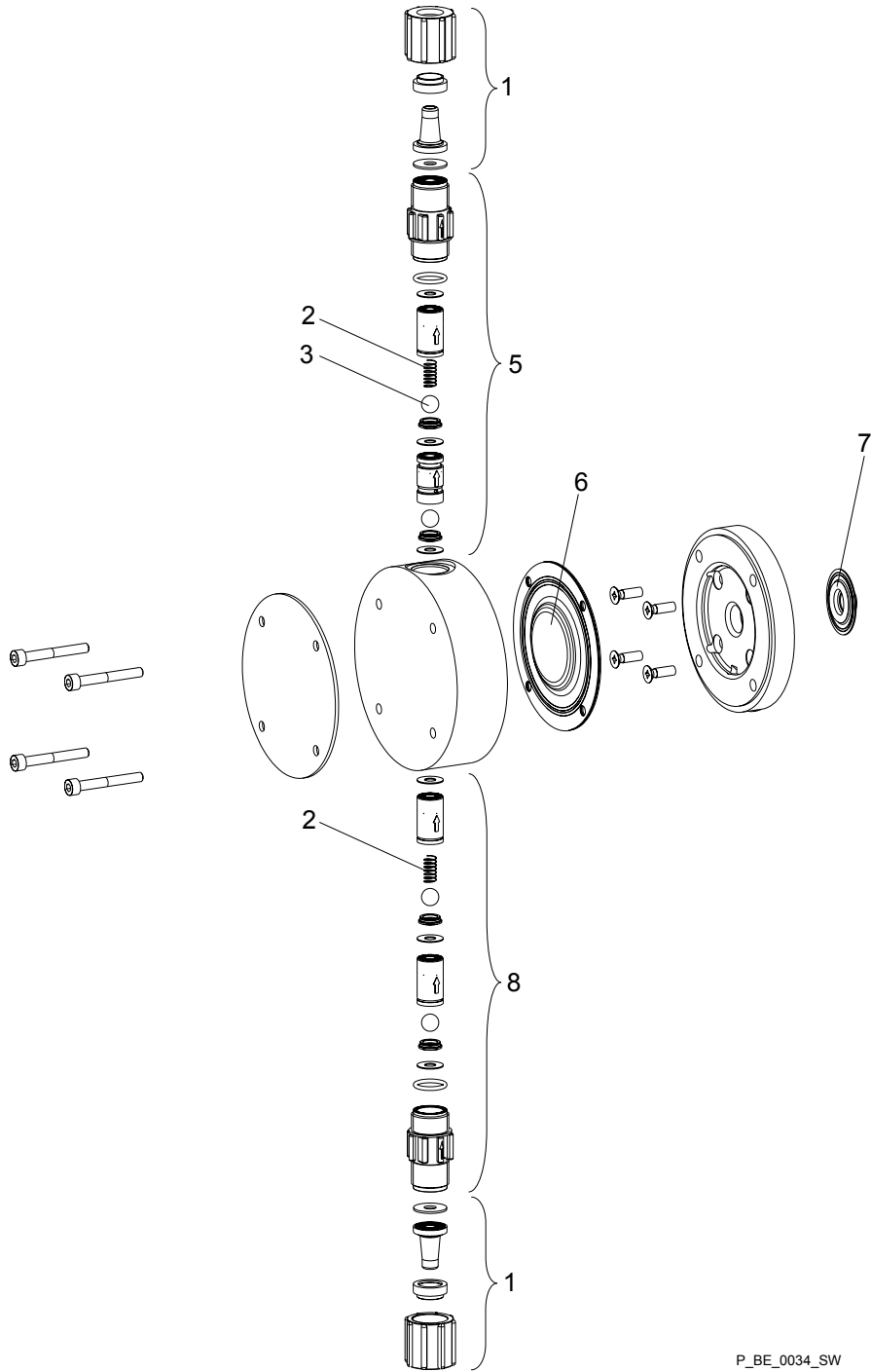
Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
1	Connector kit 8/5 PVT	1023247	1023247	-
1	Connector kit 12/9 PVT	-	-	1023248
3	4 Valve balls	404281	404281	404281
4	Bleed valve	1021662	1021662	1021662

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
5	Discharge valve, compl. 9.2-2 PVT	1023125	1023125	1023125
6	Diaphragm	1000248	1000249	1000250
7	Safety diaphragm	1027414	1027414	1027414
8	Suction valve, compl. 9.2-2 PVT	1023126	1023126	1023126

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0232 PV without bleed valve



P_BE_0034_SW

Fig. 54: Liquid end gamma/ L 0232 PV without bleed valve

Item	Description	Type 0232
1	Connector kit 12/9 PVT	1023248
3	4 Valve balls	404281
5	Discharge valve, compl. 9.2-2 PVT	1023125
6	Diaphragm	1000251

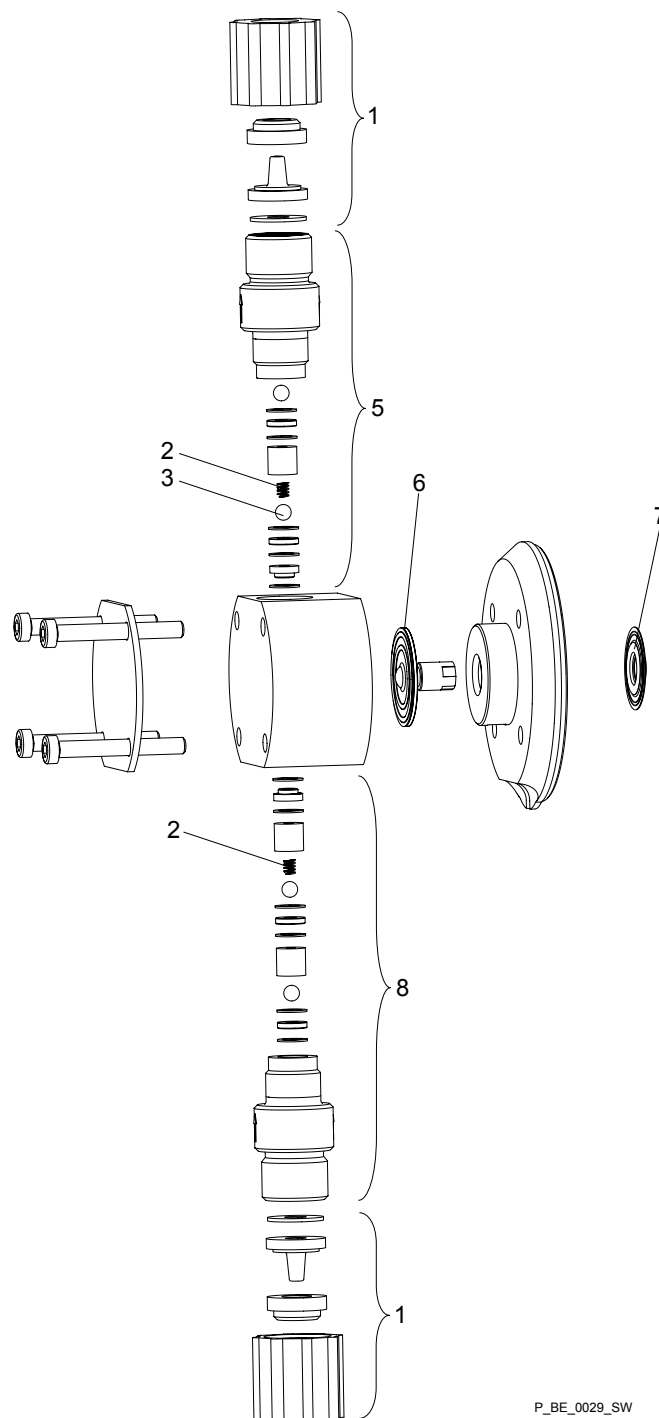
Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 0232
7	Safety diaphragm	1027414
8	Suction valve, compl. 9.2-2 PVT	1023126

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 1000 - 1005 (1605)

TT



P_BE_0029_SW

Fig. 55: Liquid end gamma/ L 1000 - 1005 (1605) TT

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
1	Connector kit 6/4 TTT	817201	817201	817201	-
1	Connector kit 8/5 TTT	-	-	-	817204
3	4 Valve balls	404201	404201	404201	404201
5	Discharge valve compl. TTT	809406	809406	809406	809406

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
6	Diaphragm	1000244	1000245	1000246	1000247
7	Safety diaphragm	1027414	1027414	1027414	1027414
8	Suction valve compl. TTT	809407	809407	809407	809407

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0708 (1008) - 0220 (0420) TT

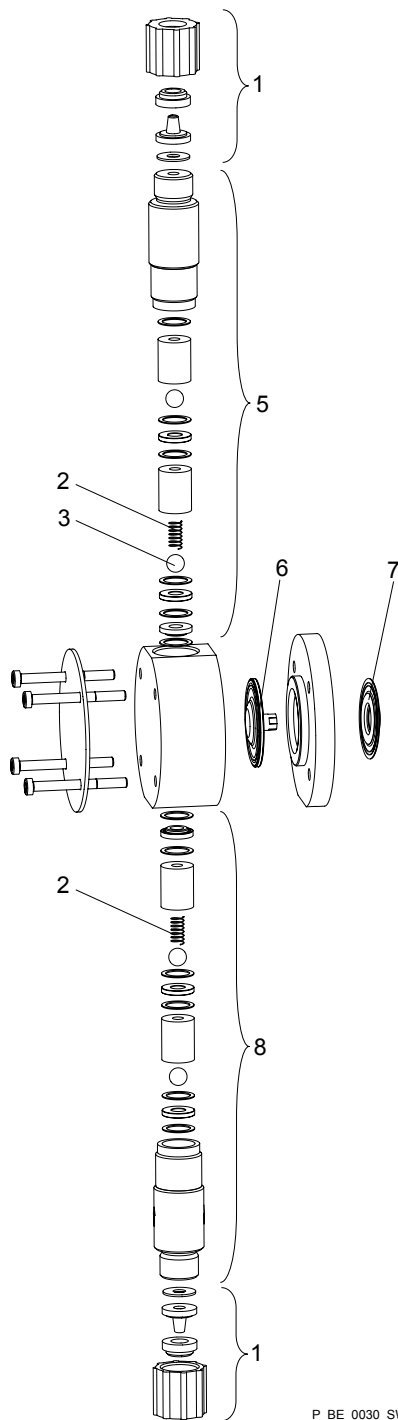


Fig. 56: Liquid end gamma/ L 0708 (1008) - 0220 (0420) TT

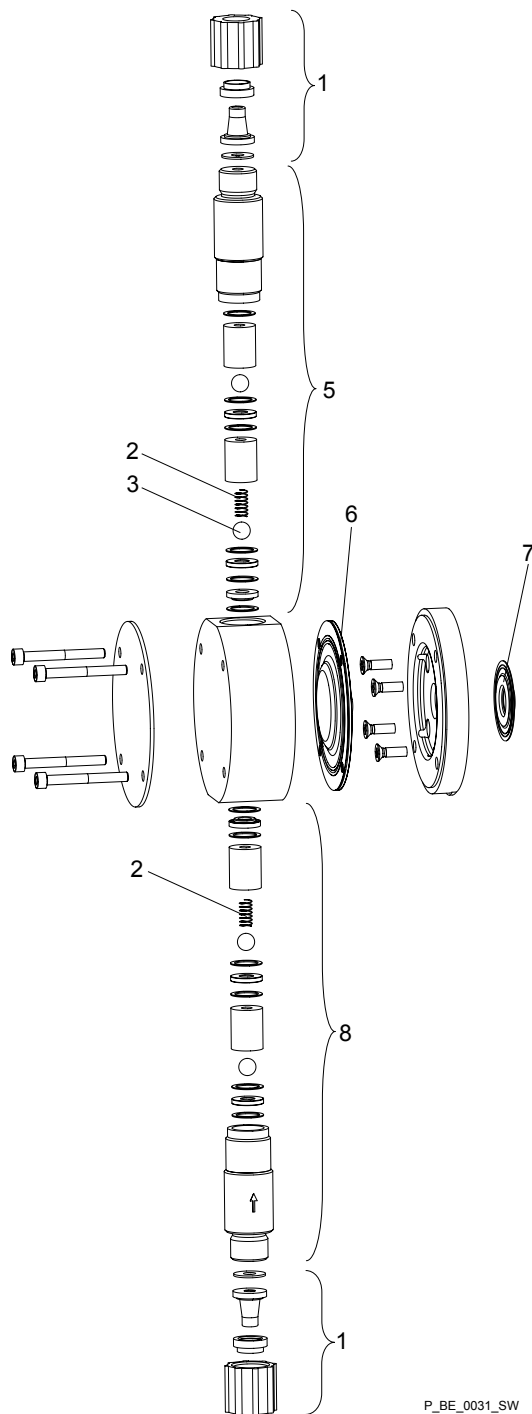
Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
1	Connector kit 8/5 TTT	817204	817204	-
1	Connector kit 12/9 TTT	-	-	817202
3	4 Valve balls	404281	404281	404281
5	Discharge valve compl. TTT	809444	809444	809444

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
6	Diaphragm	1000248	1000249	1000250
7	Safety diaphragm	1027414	1027414	1027414
8	Suction valve compl. TTT	809445	809445	809445

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0232 TT



P_BE_0031_SW

Fig. 57: Liquid end gamma/ L 0232 TT

Item	Description	Type 0232
1	Connector kit 12/9 TTT	817202
3	4 Valve balls	404281
5	Discharge valve compl. TTT	809444
6	Diaphragm	1000251

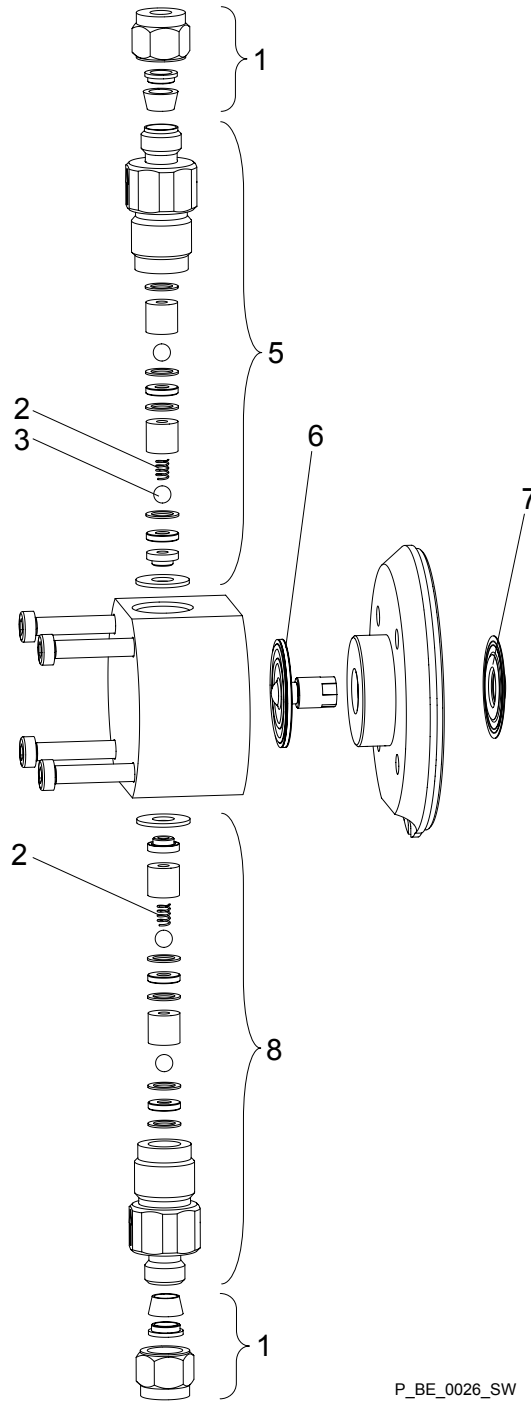
Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 0232
7	Safety diaphragm	1027414
8	Suction valve compl. TTT	809445

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Exploded Views of Liquid Ends

Liquid end gamma/ L 1000 - 1005 (1605)
SS



P_BE_0026_SW

Fig. 58: Liquid end gamma/ L 1000 - 1005 (1605) SS

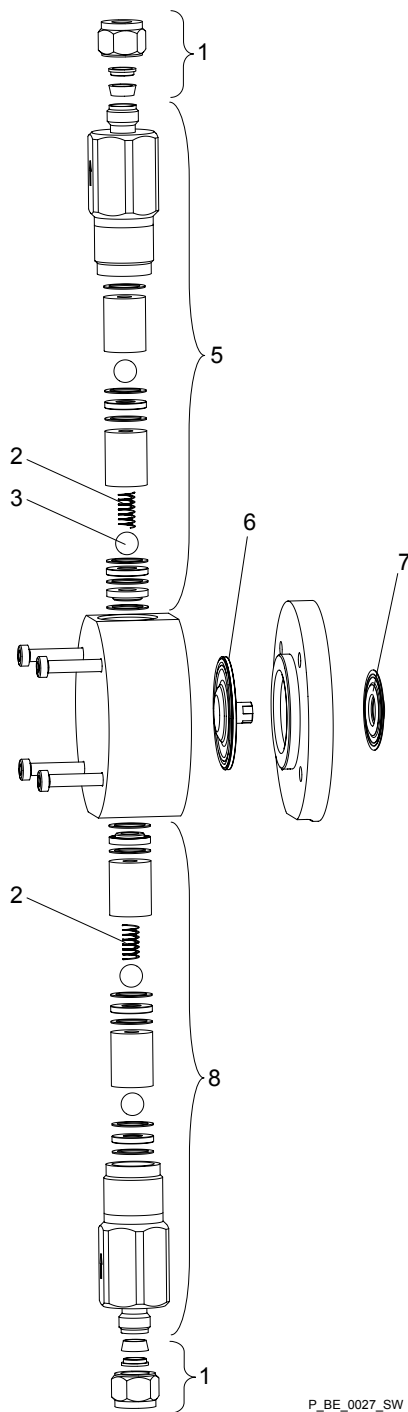
Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
1	Connector kit 6 mm SS	104233	104233	104233	104233
3	4 Valve balls	404201	404201	404201	404201
5	Discharge valve compl. 6 mm SST	809418	809418	809418	809418
6	Diaphragm	1000244	1000245	1000246	1000247

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 1000	Type 1601	Type 1602	Type 1005
7	Safety diaphragm	1027414	1027414	1027414	1027414
8	Suction valve compl. 6 mm SST	809419	809419	809419	809419

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0708 (1008) - 0220 (0420) SS



P_BE_0027_SW

Fig. 59: Liquid end gamma/ L 0708 (1008) - 0220 (0420) SS

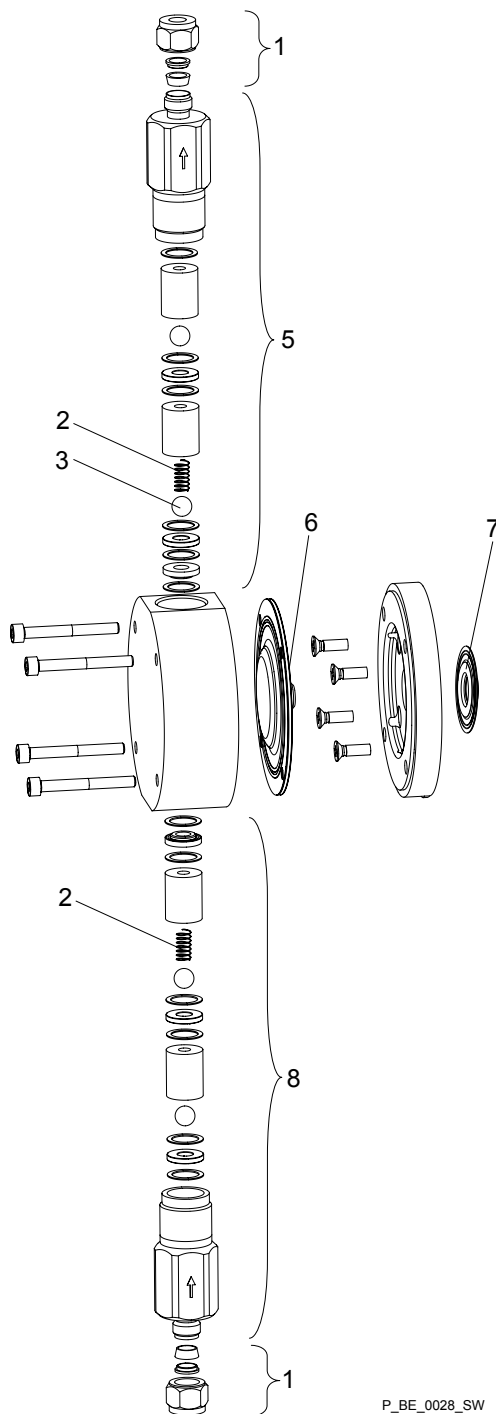
Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
1	Connector kit 8 mm SS	104237	104237	-
1	Connector kit 12 mm SS	-	-	104245
3	4 Valve balls	404281	404281	404281
5	Discharge valve compl. 8 mm SST	809494	809494	-

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 0708 (1008)	Type 0413 (0713)	Type 0220 (0420)
5	Discharge valve compl. 12 mm SST	-	-	809446
6	Diaphragm	1000248	1000249	1000250
7	Safety diaphragm	1027414	1027414	1027414
8	Suction valve compl. 8 mm SST	809495	809495	-
8	Suction valve compl. 12 mm SST	-	-	809447

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 0232 SS



P_BE_0028_SW

Fig. 60: Liquid end gamma/ L 0232 SS

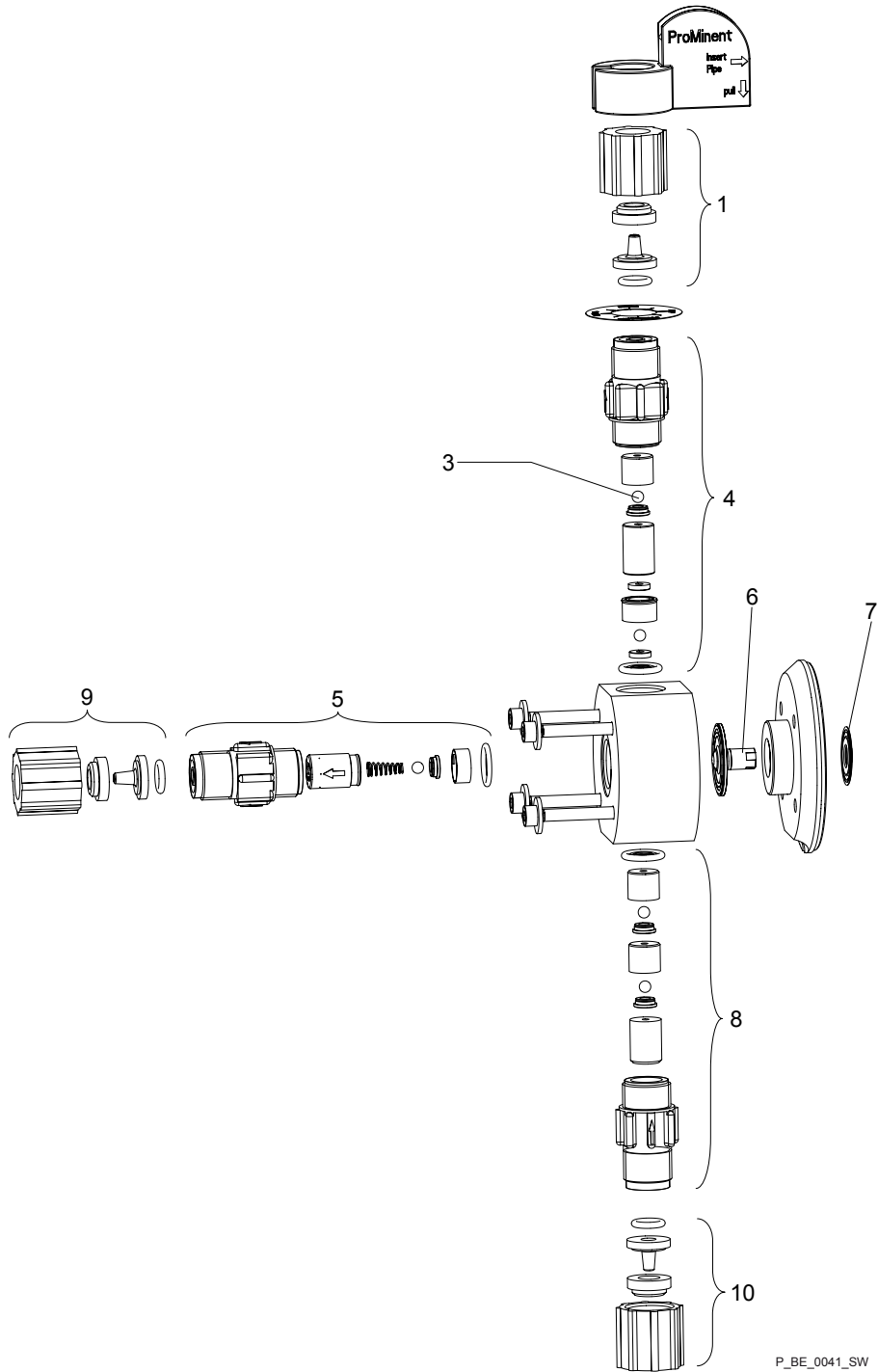
Item	Description	Type 0232
1	Connector kit 12 mm SS	104245
3	4 Valve balls	404281
5	Discharge valve compl. 12 mm SST	809446
6	Diaphragm	1000251

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Item	Description	Type 0232
7	Safety diaphragm	1027414
8	Suction valve compl. 12 mm SST	809447

Spring (item 2) is a special accessory. The positions listed are included in the spare parts kit. Technical changes reserved.

Liquid end gamma/ L 1601 - 1005 (1605)
 PP / NP SEK, self-bleeding



P_BE_0041_SW

Fig. 61: Liquid end gamma/ L 1601 - 1604 PP / NP SEK, self-bleeding

Item	Part	Material version	Part no.
1, 9, 10	Connector kit 6/4	PPE	817160
1, 9, 10	Connector kit 6/4	PPB	817173
1, 9, 10	Connector kit 6/4	PCE	791161
1, 9, 10	Connector kit 6/4	PCB	817165
9, 10	Connector kit 8/5	PPE	817161
9, 10	Connector kit 8/5	PPB	817174

Item	Part	Material version	Part no.
9, 10	Connector kit 8/5	PCE	792058
9, 10	Connector kit 8/5	PCB	817066
3	4 Valve balls		404201
4	Bleed valve	PPE	1001063
4	Bleed valve	PPB	1001062
4	Bleed valve	PCE	1001061
4	Bleed valve	PCB	1001060
5	Discharge valve compl.	PPE	1001067
5	Discharge valve compl.	PPB	1001066
5	Discharge valve compl.	PCE	1001065
5	Discharge valve compl.	PCB	1001064
6	Diaphragm 1601		1000245
6	Diaphragm 1602		1000246
6	Diaphragm 1604		1000247
7	Safety diaphragm		1027414
8	Suction valve compl.	PPE	792644
8	Suction valve compl.	PPB	792646
8	Suction valve compl.	PCE	792119
8	Suction valve compl.	PCB	792026

Spare parts kits for type:	Material version	Part no.
1601	PPE	1001756
1602	PPE	1001757
1005 (1605)	PPE	1001758
1601	PPB	1001762
1602	PPB	1001763
1005 (1605)	PPB	1001764
1601	NPE	1001660
1602	NPE	1001661
1005 (1605)	NPE	1001662
1601	NPB	1001666
1602	NPB	1001667
1005 (1605)	NPB	1001668

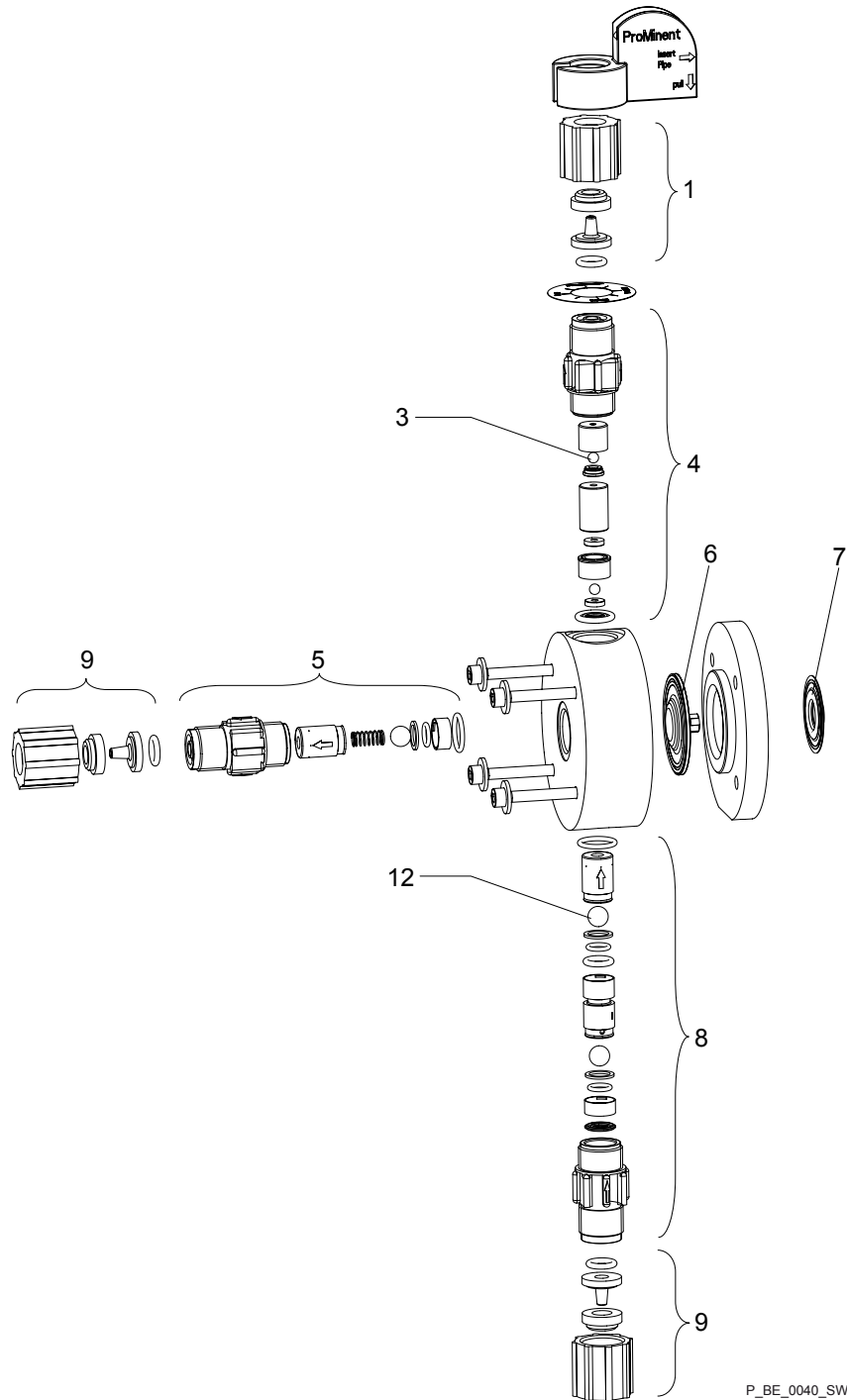
Exploded Views of Liquid Ends

Sealing sets	Material	Part no.
1 Sealing set	EPDM	1001674
1 Sealing set	FPM	1001672

The positions listed are included in the spare parts kit.

Technical changes reserved.

Liquid end gamma/ L 0708 (1008) - 0220
 (0420) PP / NP SEK, self-bleeding



P_BE_0040_SW

Fig. 62: Liquid end gamma/ L 0708 (1008) - 0220 (0420) PP / NP SEK, self-bleeding

Item	Part	Material version	Part no.
1	Connector kit 6/4	PPE	817160
1	Connector kit 6/4	PPB	817173
1	Connector kit 6/4	PCE	791161
1	Connector kit 6/4	PCB	817165
9	Connector kit 8/5	PPE	817161
9	Connector kit 8/5	PPB	817174

Item	Part	Material version	Part no.
9	Connector kit 8/5	PCE	792058
9	Connector kit 8/5	PCB	817066
9	Connector kit 12/9	PPE	817162
9	Connector kit 12/9	PPB	817175
9	Connector kit 12/9	PCE	790577
9	Connector kit 12/9	PCB	817067
3	4 Valve balls		404201
4	Bleed valve	PPE	1001063
4	Bleed valve	PPB	1001062
4	Bleed valve	PCE	1001061
4	Bleed valve	PCB	1001060
5	Discharge valve compl.	PPE	1001071
5	Discharge valve compl.	PPB	1001070
5	Discharge valve compl.	PCE	1001069
5	Discharge valve compl.	PCB	1001068
6	Diaphragm 0708		1000248
6	Diaphragm 0413		1000249
6	Diaphragm 0220		1000250
7	Safety diaphragm		1027414
8	Suction valve compl.	PPE	1001437
8	Suction valve compl.	PPB	1001436
8	Suction valve compl.	PCE	1001435
8	Suction valve compl.	PCB	1001434

Spare parts kits for type:	Material version	Part no.
0708 (1008)	PPE	1001759
0413 (0713)	PPE	1001760
0220 (0420)	PPE	1001761
0708 (1008)	PPB	1001765
0413 (0713)	PPB	1001766
0220 (0420)	PPB	1001767
0708 (1008)	NPE	1001663
0413 (0713)	NPE	1001664
0220 (0420)	NPE	1001665
0708 (1008)	NPB	1001669
0413 (0713)	NPB	1001670
0220 (0420)	NPB	1001671

Sealing sets	Material	Part no.
1 Sealing set	EPDM	1001674
1 Sealing set	FPM	1001672

The positions listed are included in the spare parts kit.

Technical changes reserved.

19 Ordering Information

Spare parts kits for SEK types (with bypass)

The information is given in the corresponding exploded views.

Spare parts kits for SER types (without bypass)

Type	PVT7
1602	1047830
1005 (1605)	1047831
0708 (1008)	1047832
0413 (0713)	1047833
0220 (0420)	1047837

Spare parts kits for other types

Type	PPE	PPB	PCE / NPE	PCB / NPB	TT	SS
1000	1001644	1001652	1001713	1001721	1001737	1001729
1601	1001645	1001653	1001714	1001722	1001738	1001730
1602	1001646	1001654	1001715	1001723	1001739	1001731
1005 (1605)	1001647	1001655	1001716	1001724	1001740	1035332
0708 (1008)	1001648	1001656	1001716	1001725	1001741	1001733
0413 (0713)	1001649	1001657	1001717	1001726	1001742	1001734
0220 (0420)	1001650	1001658	1001718	1001727	1001754	1001735
0232	1001651	1001659	1001719	1001728	1001755	1001736

Sealing sets for SEK types (with bypass)

The information is given in the corresponding exploded views.

Sealing sets for other types

Type	PPE	PPB	NPE	NPB	PVT	TT, SS
1000, 1601, 1602, 1005 (1605)	1001775	1001773	1001775	1001773	1023130	483907 *
0708 (1008) 0413 (0713) 0220 (0420)	1001776	1001774	1001776	1001774	1023130	483975
0232	1001651	1001659	1001776	1001774	1023129	483975

* 11-part

Relay

Product	Part no.
Fault indicating relay Beta ® b:	1002526
Fault indicating / pacing relay option:	1002528

Interference suppression aids

Product	Part no.
Varistor:	710912
RC member, 0.22 μ F / 220 Ω :	710802

Further sources of information

Further information on spare parts, accessories and options can be found in:

- the exploded drawings
- the identity code
- at www.prominent.com
- the ProMinent product catalogue

20 Diagrams for adjusting the capacity

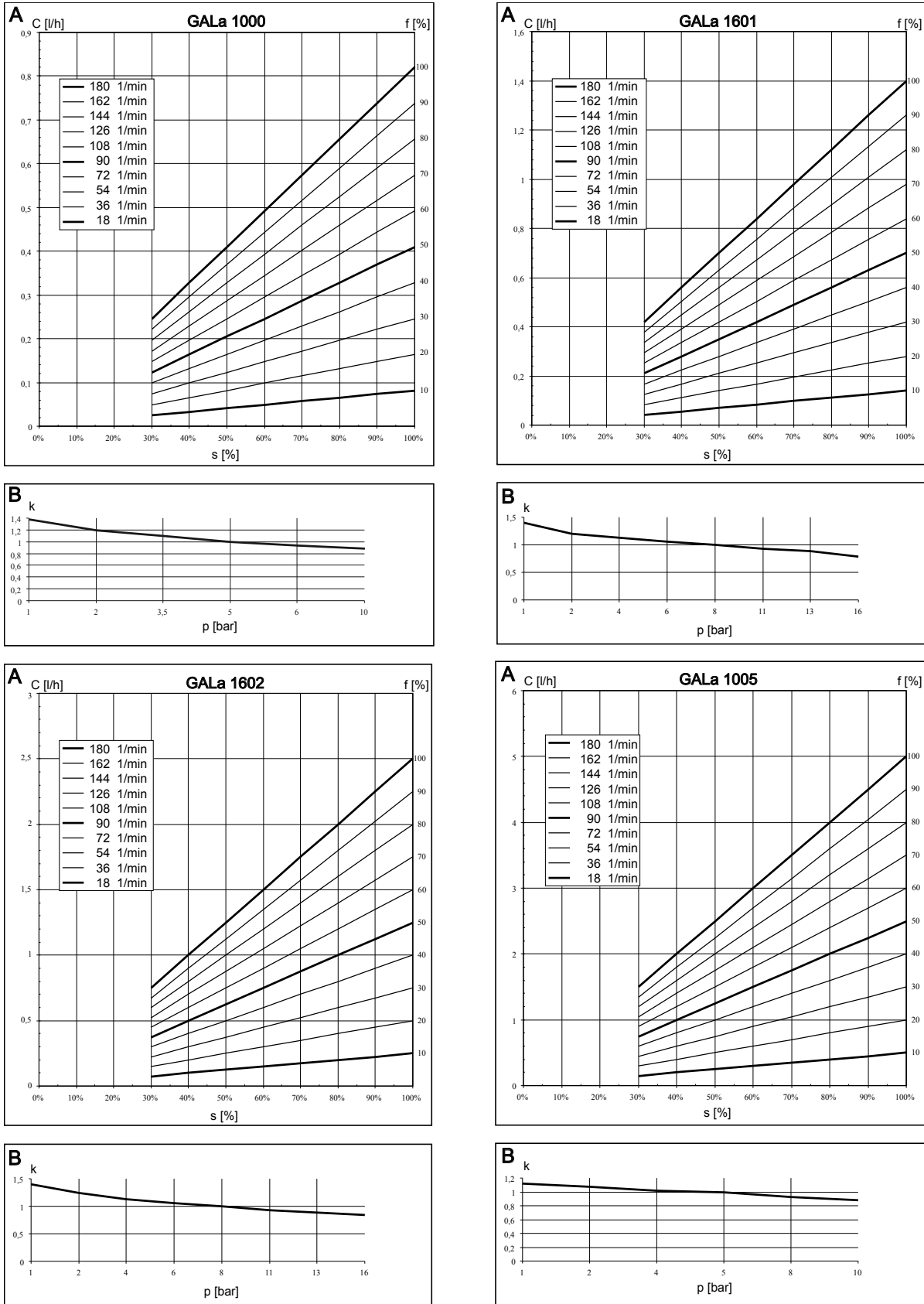


Fig. 63: A) Capacity C for medium back pressure dependent on the stroke length s for different stroke rates f. B) Corresponding correction factors k dependent on back pressure p.

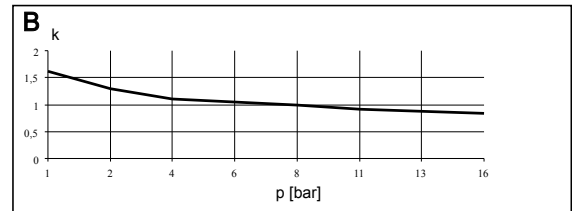
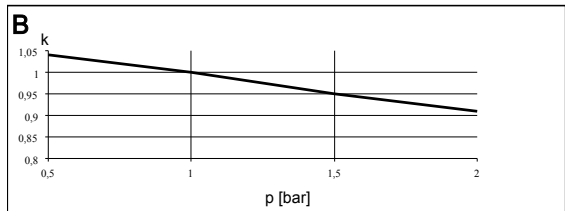
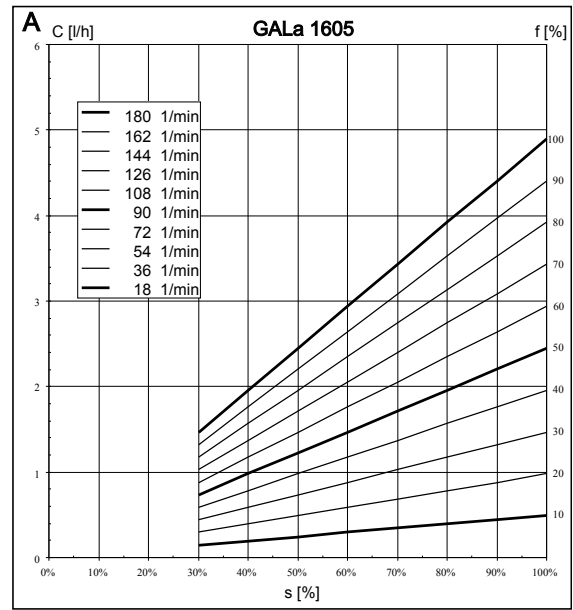
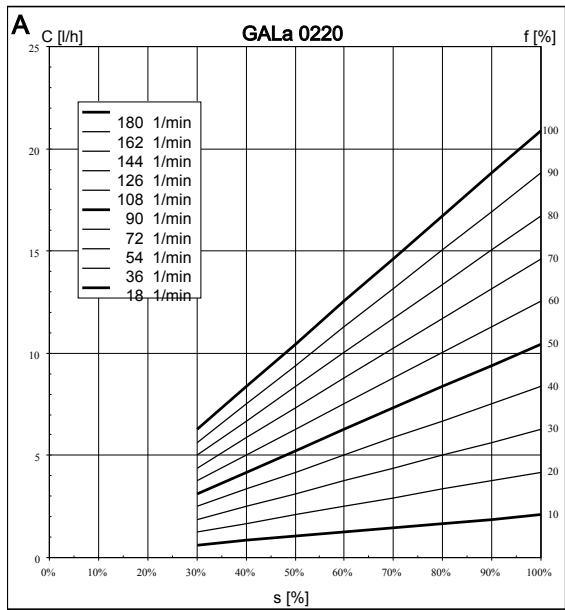
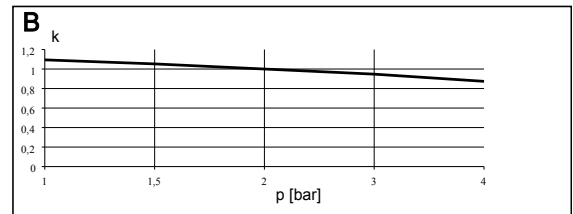
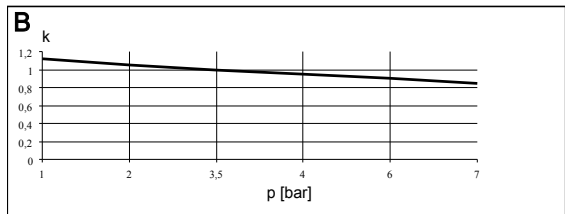
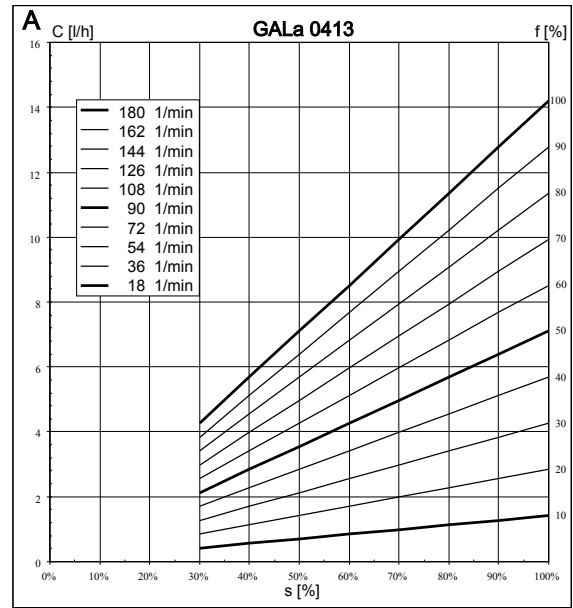
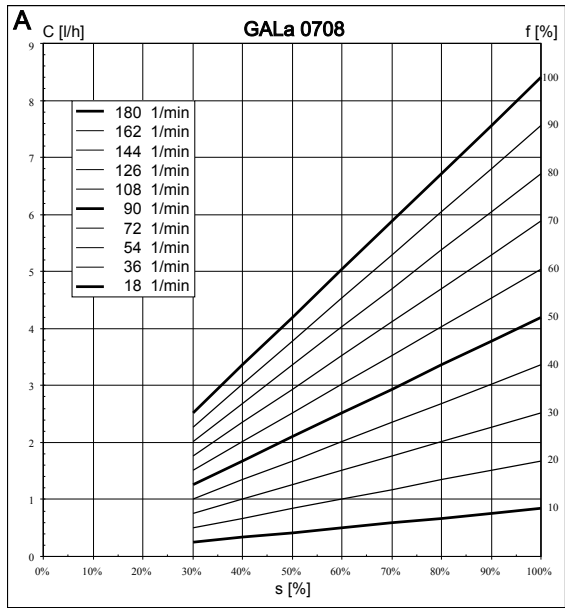


Fig. 64: A) Capacity C for medium back pressure dependent on the stroke length s for different stroke rates f . B) Corresponding correction factors k dependent on back pressure p .

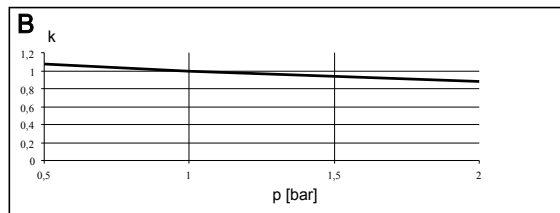
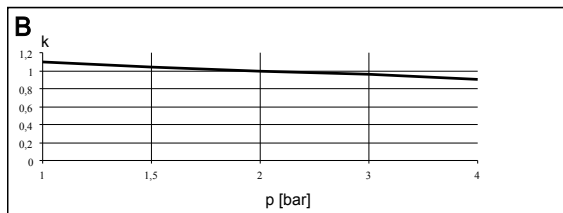
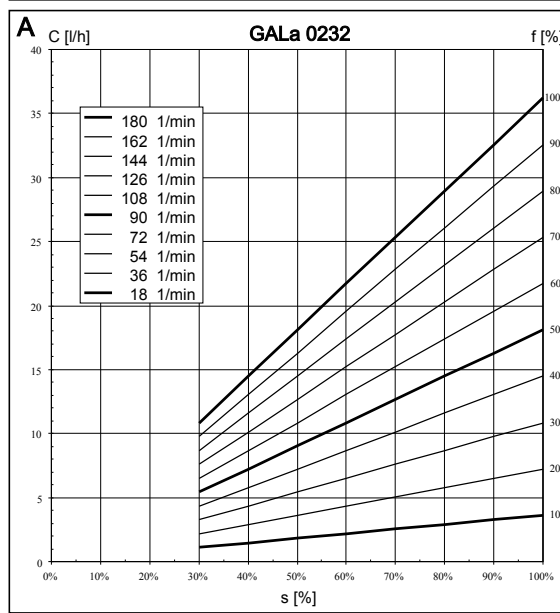
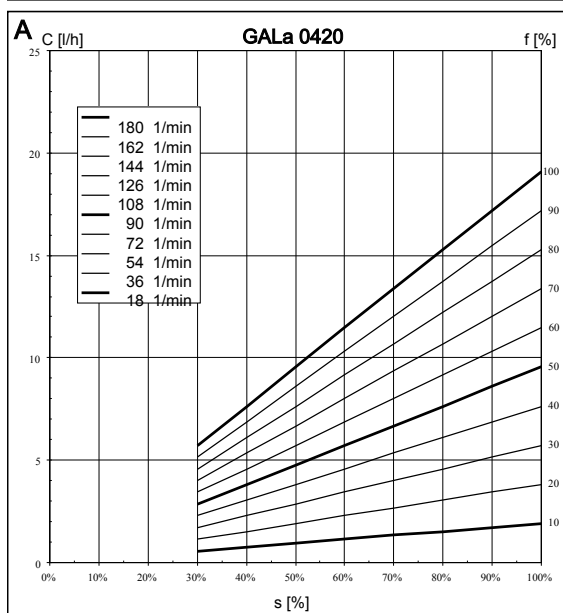
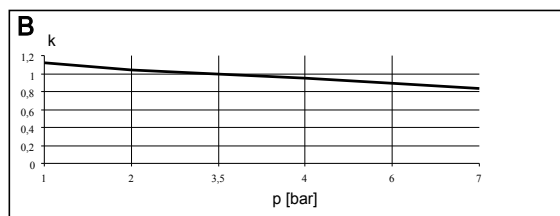
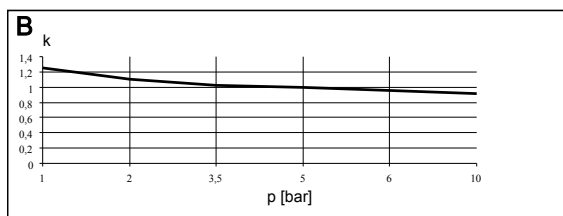
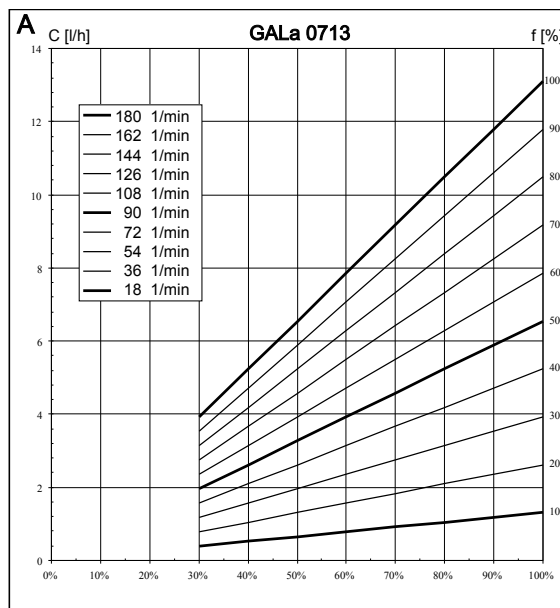
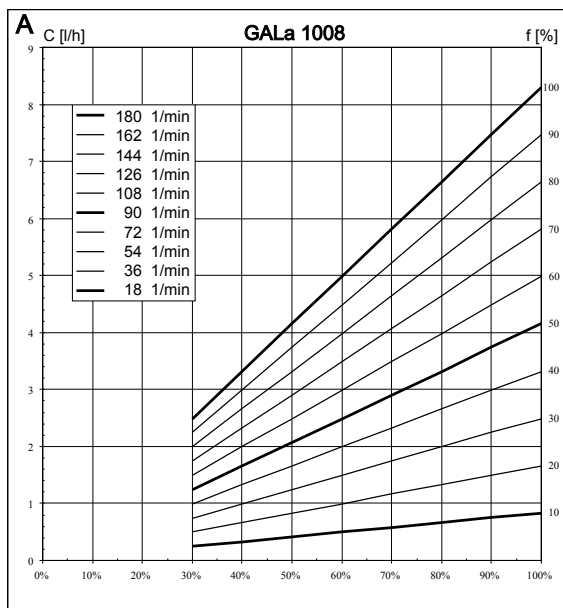


Fig. 65: A) Capacity C for medium back pressure dependent on the stroke length s for different stroke rates f. B) Corresponding correction factors k dependent on back pressure p.

21 EC Declaration of Conformity

For mains voltage pumps:

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 Dosiertechnik GmbH
- Im Schuhmachergewann 5 - 11
- D - 69123 Heidelberg,

hereby declares 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. This declaration loses its validity in the event of a modification to the product not agreed upon with us.

Extract from the EC Declaration of Conformity

Designation of the product:	Metering pump, Gamma L product range
Product type:	GALa _____ U _____
Serial number:	refer to nameplate on the device
Relevant EC directives:	EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC) Compliance with the protection targets of the Low Voltage Directive (2006/95/EC) according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC
Harmonised standards applied, in particular:	EN ISO 12100, EN 809, EN 61010-1 EN 61000-6-2/3
Date:	20/09/2013

You can find the EC Declaration of Conformity as a download under www.prominent.com

22 EC Declaration of Conformity

For low voltage pumps:

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 Dosiertechnik GmbH
- Im Schuhmachergewann 5 - 11
- D - 69123 Heidelberg,

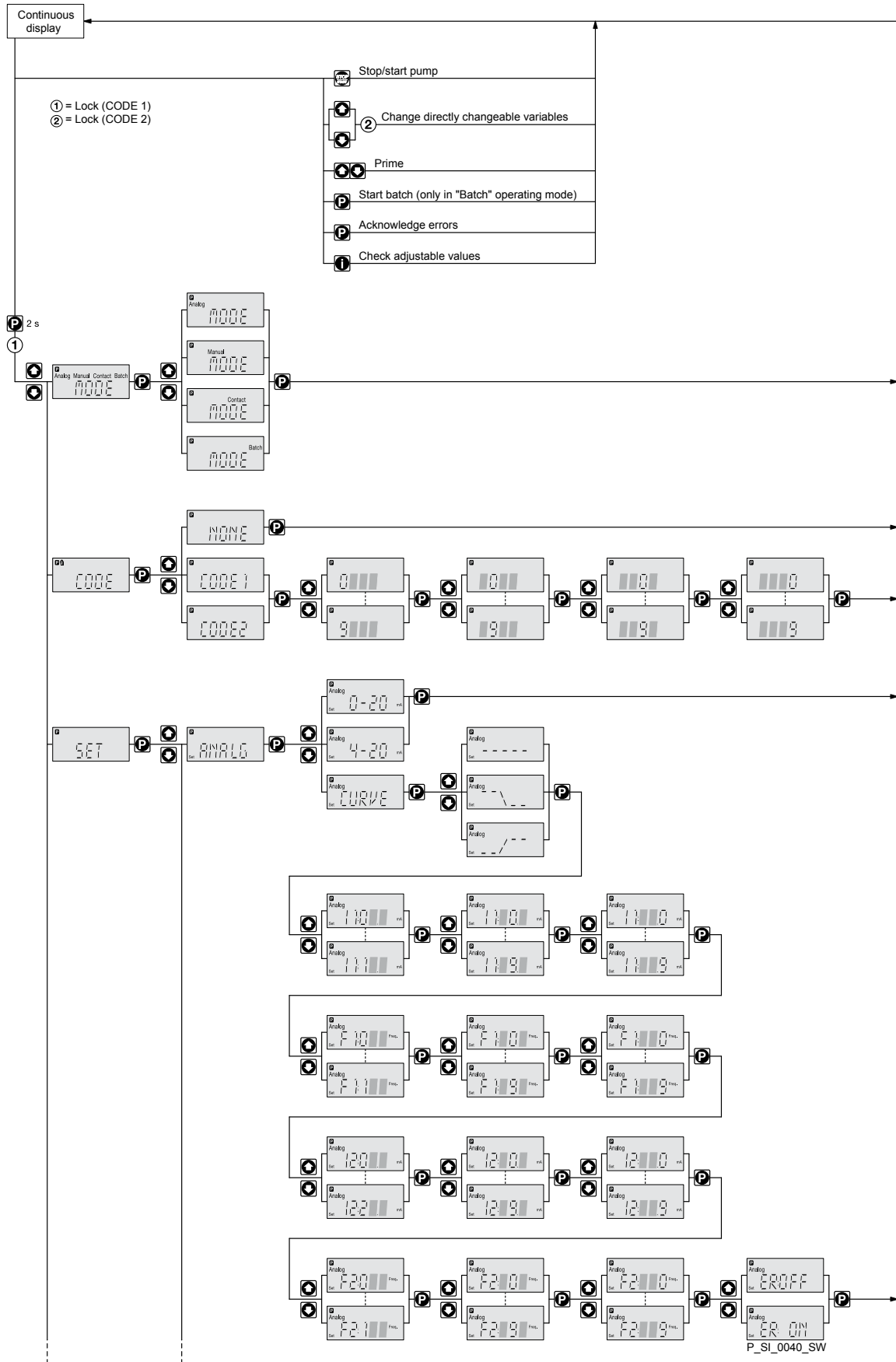
hereby declares that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. This declaration loses its validity in the event of a modification to the product not agreed upon with us.

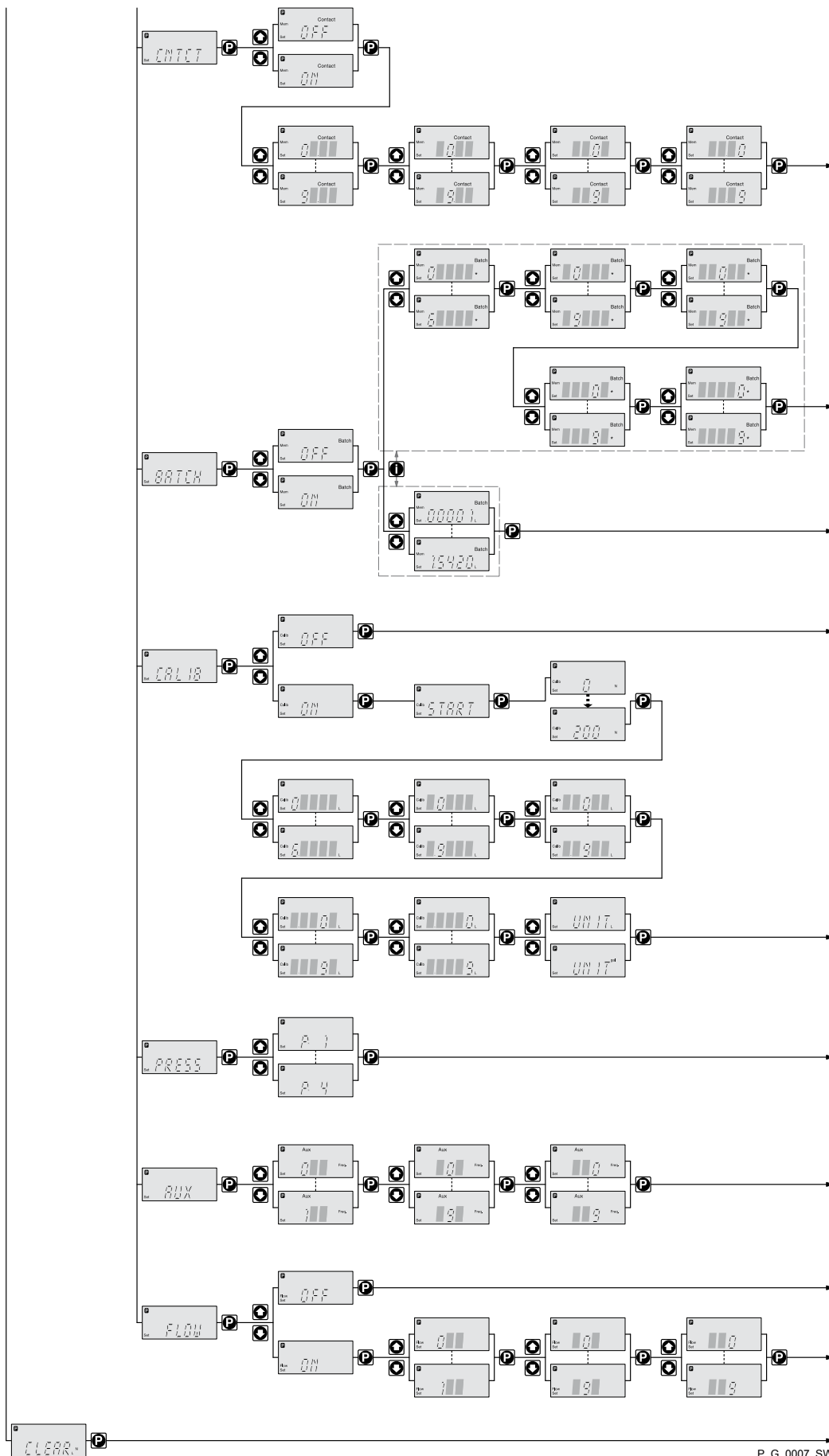
Extract from the EC Declaration of Conformity

Designation of the product:	Metering pump, Gamma L product range
Product type:	GALa _____ M _____ GALa _____ N _____ GALa _____ P _____
Serial number:	refer to nameplate on the device
Relevant EC directives:	EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC)
Harmonised standards applied, in particular:	EN ISO 12100, EN 809, EN 61000-6-2/3
Date:	20/09/2013

You can find the EC Declaration of Conformity as a download under www.prominent.com

23 Operating / adjustment overview





P_G_0007_SW

24 Continuous displays

Continuous displays

Continuous display	Operating mode "Analog" 0...20 mA	"Manual" operating mode	Operating mode "Contact" with memory and transfer factor 5	"Batch" operating mode with memory
Stroke rate				
Capacity				
Total number of strokes				
Total litres (metering quantity)				
"External" display				
Signal current				
Remaining strokes				
Batch size / Remaining litres				
Factor				
Stroke length				
= values which can be changed directly using the UP or DOWN arrow keys		Identifier "Mem" only in the event that function extension "Memory" is activated		

25 Certification

c MET US

The pump is approved as per c MET US with the following qualification:

- Ambient temperature during operation: -10 °C ... +40 °C.

26 Index

1, 2, 3 ...

"Analog" operating mode settings	40
"Batch" operating mode settings	45
"Contact" operating mode settings	43
"External control" terminal	31
"Manual" operating mode settings	40
"Auxiliary rate" function settings	48
"Calibrate" function settings	46
"Flow" function settings	48
"Pressure ratings" function settings	47
4 - 20 mA	40

A

Accuracy	68
Adjustment mode	38
Analog	18, 32, 40
Analog input	32
Anti-kink device	27
Applied harmonised standards	117, 118
Assembly	21
AUX menu	48
Auxiliary frequency	19, 32, 33, 48
Auxiliary rate	20

B

Basic principles of pump adjustment	37
Batch	19, 45
Bleed valve	27
Bleeding	25, 26
BUS	19

C

CALIB menu	46
Calibration	19, 46
Capacity	114
Certification	122
Changing a number	37
Changing individual numbers	37
Changing to adjustment mode	38
check	38
Checking adjustable values	38
Cleaning valves	56
CLEAR window	49
Code setting	48
Compatibility	71
Confirming an entry	37
Connector size	67
CONTACT	18, 43
Contact relay	30
Control elements	15
Correct	38
Curve	40

D

Decommissioning	65
Degree of protection	71
Delete	45, 49
Deleting the total number of strokes or total litres	49
Designation of the product	117, 118
Diagrams for adjusting the capacity	114
Dimensional drawings	73
Discharge valve	27
Disposal	66
Dosing monitor	33, 48
Draining the liquid end	65

E

Electrical data	69
-----------------	----

Emergency	12
Error processing	43
External contact	20, 32
External frequency changeover	20

F

Factor	43
Fault	20
Fault indicating relay	20, 34, 35
Fault indicator	16, 20
Fault statuses	20
Flow	19
FLOW menu	48
Function	46, 47, 48
Function display	20
Functions	18, 20, 45

H

Hierarchy of operating modes	20
------------------------------	----

I

Identification of safety notes	9
Identity code	5
Incorrectly set digits	38
Incremental changing of a value	37
Inductive consumers	30
Information in the event of an emergency	12
Install hose lines	23
Installation, electrical	29
Installation, hydraulic	22
Intended use	9
IP	71

K

Keys	16
------	----

L

LCD screen	16
Leakage hole	53
Level switch	19, 33, 34
Linear	41
Lock	48
Lower sideband	41, 42

M

mA input	32
Mains cable	30
Maintenance	53
Manual	18, 20, 40
Material specifications	69
Memory	45
Metering pumps with bleed valve	25
Metering pumps with self-bleeding	26
Metering pumps without integral relief valve	27
Metering pumps without self-bleeding	23
Minimum Stroke Length	68
Mode	40, 43, 45
MODE menu	18, 39

O

Operating indicator	16, 20
Operating mode selection	39
Operating mode settings	40
Operating modes	18, 20
Options	18
Ordering Information	112
Output relay	20
Overview of equipment	15

P	
Pacing relay	20, 35
Parallel connection	30
Pause	19, 20, 32
Performance data	67
Power consumption	69
PRESS menu	47
Pressure ratings	47
Priming	19, 20
Priming pressure	26
Programmable function settings	45
Protect	48
Protection against contact and humidity	71
Protection class	71
Q	
Qualification of personnel	12
Quitting a menu option without confirming it	37
R	
Radioactive	14
RC member	30
Reduction	44
Relay	34
Relevant EC directives	117, 118
Repairs	55
Replacing the diaphragm	57
Reproducibility	68
Return line	23, 25, 26, 27
S	
Safety chapter	9
Safety declaration form	14
Safety requirements	71
Scope of supply	14
SEK	26
SEK types	18
Self-Bleeding	18
Semiconductor switch	35
Serial number	117, 118
SET menu	40, 45
Set up	37
Shipping weight	72
Sleeve	27
Sockets	16
Sound pressure level	13, 72
Standard installation	28
Step-up	44
Stop	19, 20
Storage	14
Stroke length adjustment knob	16
Supply voltage	30
Symbols	28
T	
Technical data	67
Total litres	49
Transport	14
U	
Unpacking	14
Upper sideband	41, 42
V	
Varistor	30
Viscosity	68
W	
Warning alert	34
Warning indicator	16, 20
Warning sign	9



ProMinent GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg
Germany
Telephone: +49 6221 842-0
Fax: +49 6221 842-612
Email: info@prominent.com
Internet: www.prominent.com

987604, 5, en_GB