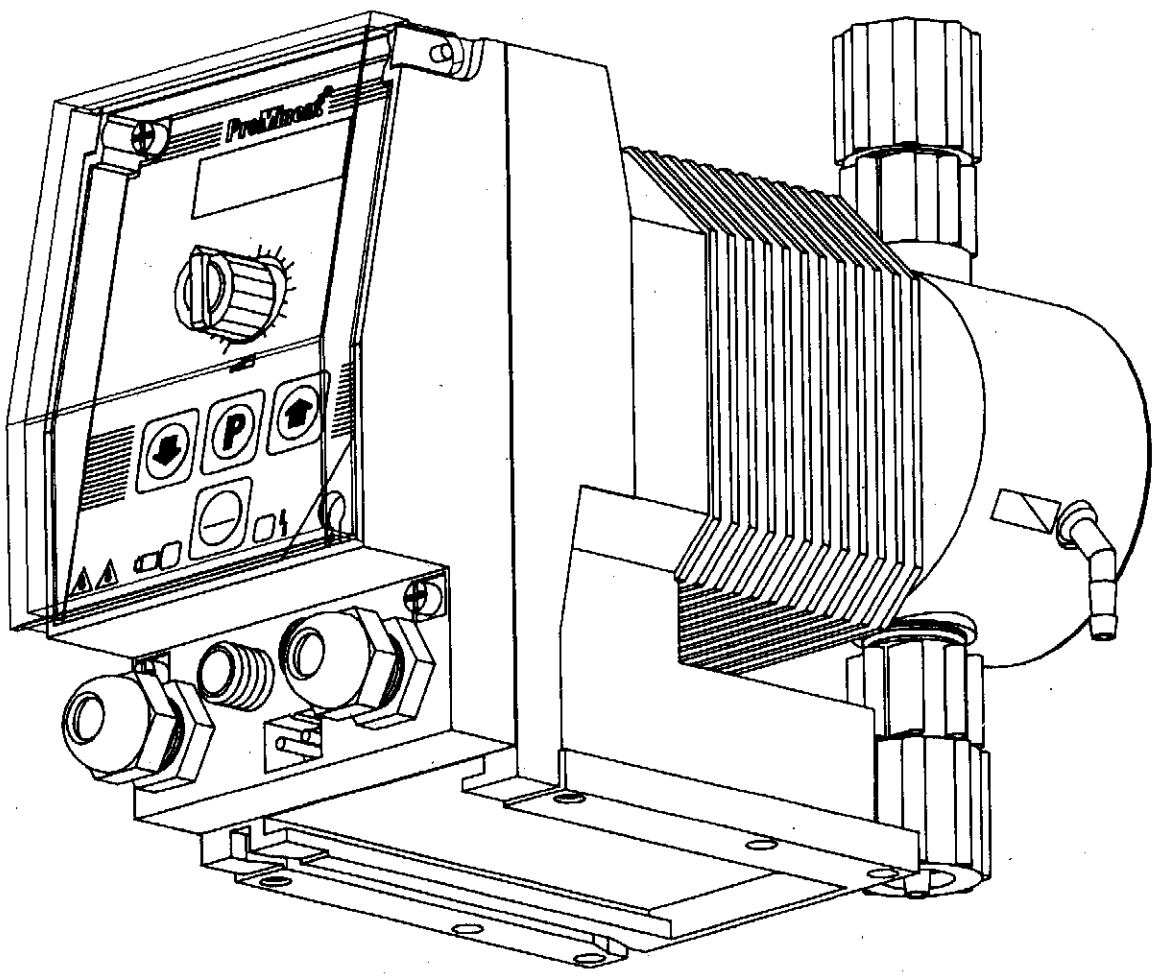
ProMinent®
gamma/ 4-I/W (RS)

Instruction Manual

T.Nr. 985960.3 e



ProMinent Dosiertechnik GmbH · D-69123 Heidelberg · Germany BA G4 002 7/94 GB

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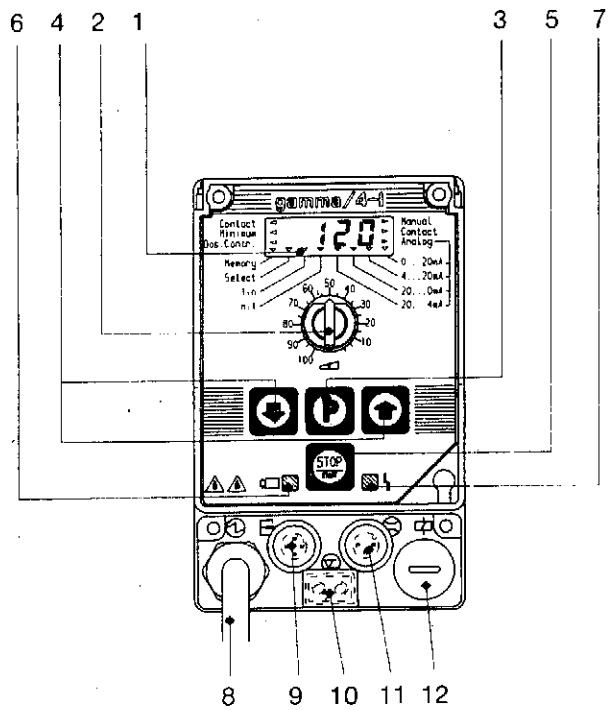
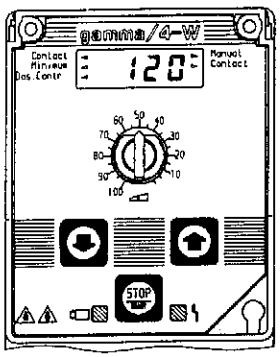
In case of doubt refer to the manufacturer or to one of the affiliate companies listed on the back cover.

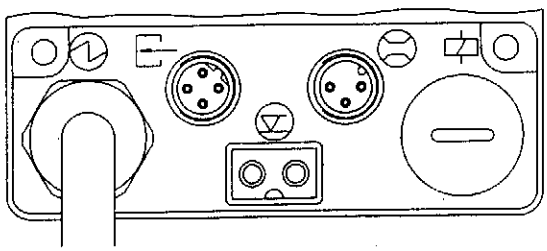
View of operator panel, gamma/ 4-I

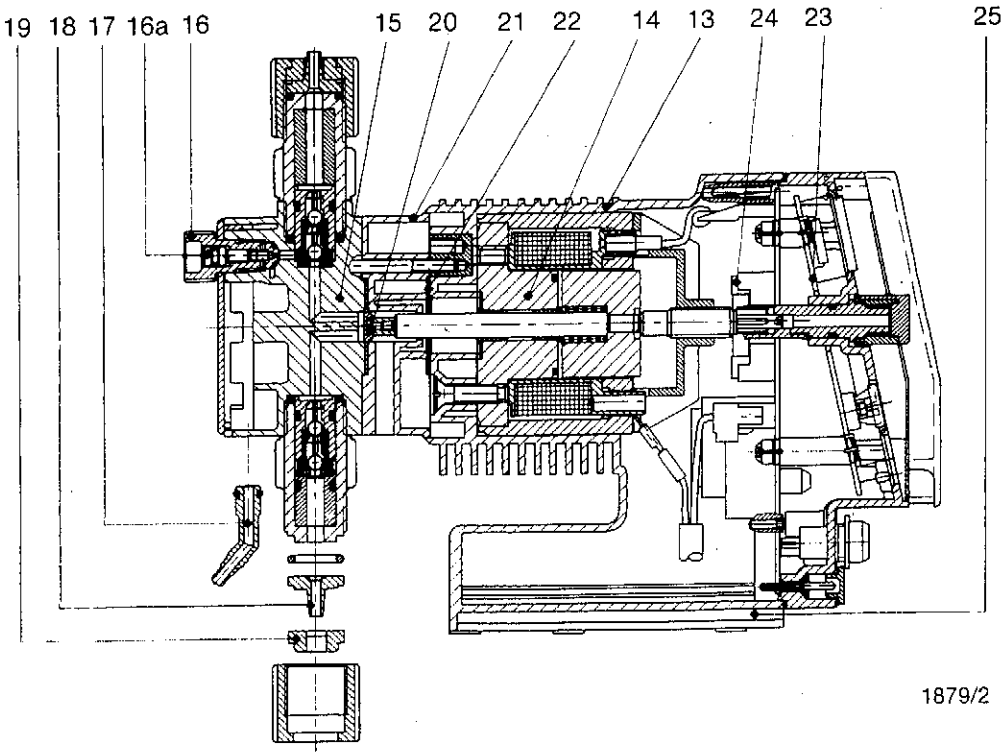


View of operator panel, gamma/ 4-W



Cable connectors





Sectional drawing and legend

1 LCD readout

2 Stroke length adjusting knob

3 Program selector key

4 Up/Down keys

5 Stop/Start key

6 Stroke indicating light

7 Fault/Lack-of-chemical indication

8 Power supply

9 Connector for external control cable

10 Float switch connector

11 Connector for flow monitor

12 Cable gland thread (Pg 9) for relay output

13 Power end housing

14 Short-stroke solenoid drive

15 Liquid end with suction and discharge connectors

16 Bleed valve, coarse adjustment

16a Bleed valve, fine adjustment

17 Hose nozzle, bleed valve

18 Hose nozzle, suction connector

19 Grip ring

20 Pump diaphragm with steel core and PTFE facing

21 Intermediate disk with safety leak hole

22 Gasket

23 Electronic circuit board with microprocessor

24 Fuse

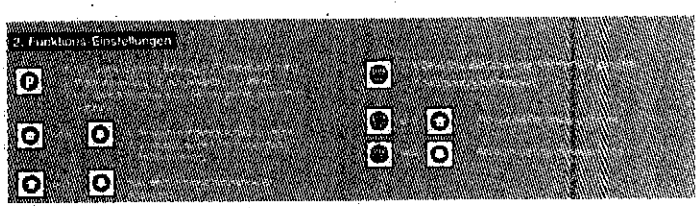
25 Folding card with summary operating instructions

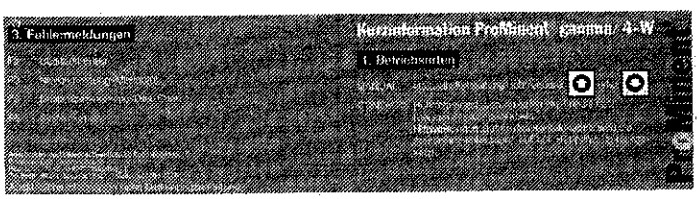
Legend of symbols on operator panel

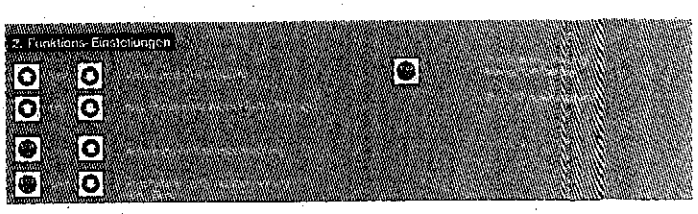
- Stroke length adjustment
- Level of enclosure IP 65
- Pilot and stroke indicating light
- Fault indication
- Power supply
- Connector for external control cable
- Float switch connector
- Connector for flow monitor
- Relay output for peripheral systems

Summary instructions, gamma/ 4

A folding card with summary operating instructions as illustrated below will be supplied with every pump, inserted into the pump base.







General description

ProMinent® gamma/ 4 solenoid-driven diaphragm-type metering pumps for liquid media consist of the following main components:

– **Power end**

– Housing (13)
– Solenoid (14)
– Electronic circuit board with microprocessor (23)

and

– **Liquid end**

– Pump head with suction and discharge connectors (15)
– Pump diaphragm (20)
– Intermediate disk (21)

The pump output has a pulsating flow profile. Every pulse generated by the electronic circuit excites the solenoid, which in turn attracts the movably supported armature. The pump diaphragm connected to the armature displaces the media in the liquid end, expelling it through the discharge valve and closing the balls of the suction valve. The maximum stroke length is 1.25 mm (with Model gamma/ 4 1000 only 0.63 mm). When the pulse decays, the solenoid becomes de-energized and the armature with the pump diaphragm is spring-returned into its original position. This causes the suction stroke to be performed, new media is drawn into the liquid end, the balls of the discharge valve close.

By means of the stroke length adjusting knob the flow output per stroke can be infinitely varied between 100 and 10%. This adjustment should be made only while the pump is operating, when the adjustment bolt is temporarily relieved.

In the internally controlled, or manual, mode the stroking rate can be varied by means of the two keys (4) from 1 to 120 strokes per minute in steps of one. The settings are repeatable with quartz-like accuracy. The output flow is proportional to the stroking rate.

Commissioning

First of all, by means of the shipping note, check pump, name plate and accessories for conformity.

Mount metering pump on a tank or bracket by means of screws and washers, 5 mm dia. To ensure their good function , the valves of the liquid end must be in a vertical position.

Fix suction line to the suction connector pointing downwards as follows:

– if flexible tubing is used, slide union nut over tubing behind the grip ring and push the sqarely cut end of the tubing over the hose nozzle to a stop. Remove plug from suction connector, if any
Note: To ensure a secure connection, only use grip rings and hose nozzles fitting the hose diameter.

Now, tighten union nut to obtain secure fastening. To improve the stability of the joint, especially when using 12 mm dia. hose, give the fastened line a short pull and tighten the union nut once more.

When stainless steel connectors and pipes are used, pass pipe through union nut, slide grip ring over the pipe end to a stop, and tighten union nut.

When joining PE or PTFE tubing to stainless steel connectors, place a stainless steel ferrule into end of tubing.

Shorten the suction line so that the foot valve subsequently to be fitted just clears the tank bottom. Allow for a clearance of at least 50 mm if media contains matter tending to settle to the bottom.

The Models gamma/ 4 1000...0408 N and PP are equipped with a bypass-type bleed valve (16). Fasten a 4 mm i.d. (max. 6 mm i.d.) hose to the bypass hose nozzle (17) and run it back into the chemical tank. Use the occasion and connect the discharge line to discharge connector and injection valve. Open bleed valve by giving the protruding part about two turns in an anticlockwise direction. This opens the coarse passage of the bleed valve for the purpose of priming.

In case of liquid ends without bleed valve, connect discharge line to discharge connector only, not to injection valve.

Plug power cord into mains socket and set stroke volume to 100%. Press Stop key (5) to avoid uncontrolled pumping. Start automatic quick priming by pressing the Up and Down keys (4) simultaneously. Keep keys pressed until media fills the liquid end completely and comes out of the liquid end with every pump stroke. Close bleed valve or connect discharge line to injection valve, respectively.

With media tending to emit fumes and vapors, fine bleeding can be employed continuously if the liquid end is equipped with a bleed valve. Loosen screw (16a) inside the bleed valve by giving it about 1 turn in an anticlockwise direction. This causes a constant slip-stream to be returned into the chemical tank. The slip-stream should have a flow rate of about 20% of the total output flow. If the return line to the tank is made to end above the liquid level, the bleed valve acts also as a vacuum breaker that prevents the chemical tank from being drawn empty should a vacuum occur in the discharge line.

Connect, if any, float switch, external control cable or cable of flow monitor after having removed the protective caps.

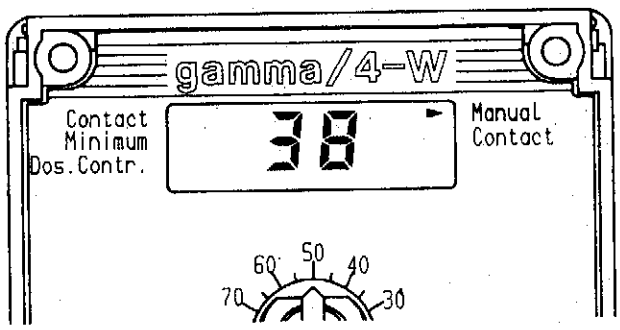
Set desired flow output, using the respective nomograph (see technical data). Select desired electronic function as per the following description:

Operating instructions, gamma/ 4-W

Modes of operation:

"Manual" or internal control

The pump operates at a constant stroking rate, which can be set to 1...120 strokes per minute by means of the Up and Down keys. When set to 0 strokes per minute, the pump will be inoperative. The actual stroking rate in strokes per minute will be displayed on the LCD readout.



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The pump can be stopped by pressing the "Start/Stop" key, when the readout will display the letters "SP". Press "Stop/Start" key to restart the pump at the stroking rate last employed.

"Contact" or external control

The pump is capable of being controlled by external pulse signals from mechanical contact closure or semiconductor or open collector circuits having a residual voltage of less than 350 mV. The minimum pulse duration required is 20 milliseconds. Every pulse received causes only one stroke to be performed.

On continuous contact (contact closed) only one stroke will be performed. A second stroke requires the contact to be opened first and then to be reclosed. Every pulse received will flash the arrow symbol next to "Contact" on the left-hand side of the readout.

The system switches automatically into the external control mode and the LCD readout displays the letter "E", as soon as the 4-pole connector of the control cable is introduced into the socket.

Connecting the external control cable

Raise perspex cover and pull float-switch connector, if any. Plug control cable connector lightly into the left-hand socket so that the guide ledge fits into the groove. Screw down coupling sleeve without edging it.

To air-bleed the pump or to check its proper functioning press "Up" and "Down" keys simultaneously for at least 3 seconds. The pump will operate at the maximum stroking rate as long as the keys are pressed. To switch into the manual mode, that is, operation at a constant, internally controlled stroking rate, remove the external control cable (mandatory) and, by pressing the "Up" key, change stroking rate from 0 to the desired value.

"Dos. Control" - Flow monitor (optional)

Install the flow sensor of the flow monitor onto the discharge connector and plug cable into the respective socket.

Adding the flow monitor ("Dos. Control") function

Press "Stop/Start" key and then the "Up" key simultaneously. An arrow pointing to "Dos.Control" shows that the flow monitor is activated. Then, if flow fails for 8 strokes in succession, the pump will be stopped, the red fault indicating lamp will light up and the readout will flash error "F 5". Press the "Stop/Start" key twice to reset fault annunciation and resume operation.

Dropping the flow monitor ("Dos. Control" function

Press "Stop/Start" key and then the "Down" key simultaneously. The arrow pointing to "Dos. Control" disappears and the pump continues to operated without flow monitor.

Possible readings of the LCD readout (Model gamma/ 4-W)

"120...0" - Manual mode. Arrow points to "Manual". Reading indicates stroking rate in strokes per minute. Yellow LED goes out while a stroke is performed.

"E" - (Not with Model gamma/ 4-I)

External mode. External control cable is plugged in. Arrow points to "Contact". Yellow LED goes out while a stroke is performed.

"SP"

Pump is switched off. Re-start by means of "Stop/Start" key.

Fault annunciations and fault reset

"F 2" Overtemperature

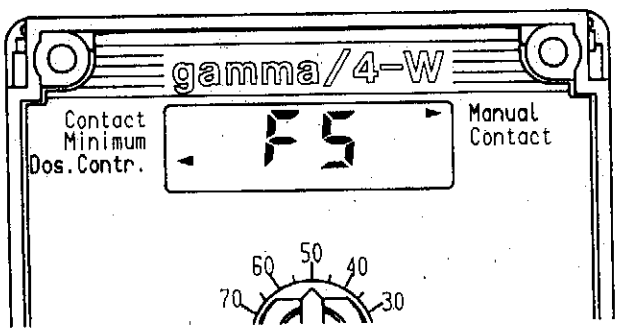
Temperature sensor (optional) stops pump on account of excessive solenoid temperature. After solenoid has cooled down to admissible working temperature, re-start by pressing the "Stop/Start" key.

"F 3" Lack of chemical

Make up chemical tank. Fault annunciation and fault reset are delayed by about 3 seconds.

"F 5" Flow failure (optional)

The flow monitor has registered no, or insufficient, flow for 8 consecutive strokes. Remedy defect. Press "Stop/Start" key.



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Operating instructions, gamma/ 4-I

The operator panel of Model gamma/4-I has 4 keys for selecting the different modes and functions:

"Stop/Start" key (STOP START): For starting and stopping the pump. When the pump is stopped the readout diplays "SP"

"Up" and "Down" keys (▲ ▼): For changing stroking rate or functions

"P" key (P): Programming key, for going into the selection mode (press for 3 seconds until indicating arrow flashes) and for entering the selected function.

The following functions, which are identified on the readout by 14 indicating arrows, can be selected:

"Manual"	Manual setting of stroking rate between 1 and 120 strokes per minute. When set to 0 strokes per minute, the pump will be inoperative. The actual stroking rate in strokes per minute will be displayed on the LCD readout.
"Contact"	External pacing by voltage-free contacts, semiconductor contacts or open-collector circuits having a residual voltage of <350 mV. Contact duration at least 40 msec., contact rating about 12 mA. Maximum pulse rate 10 pulses per second.
"Analog"	Stroking rate control by standard process signals. The stroking rate will be displayed on the LCD readout in strokes per minute.
"0...20 mA"	Analog signal of 0...20 mA relates to 0...120 strokes per minute.
"4...20 mA"	Analog signal of 4...20 mA relates to 0...120 strokes per minute. An alarm will be given if signal drops below 4 mA. LED readout displays error "F 4".
"20...0 mA"	Analog signal of 20...0 mA relates to 0...120 strokes per minute.
"20...4 mA"	Analog signal of 20...4 mA relates to 0...120 strokes per minute. An alarm will be given if signal drops below 4 mA. LED readout displays error "F 4".
"1:n"	Pulse step-up: 1 pulse received generates 1...1999 pump strokes. "n" is constantly displayed on the LCD readout.
"n:1"	Pulse step-down: 1...1999 pulses received generate 1 pump stroke. "n" is constantly displayed on the LCD readout.
"Select"	Predetermining counter for 1...1999 strokes. The LCD readout displays the number of pump strokes yet to be performed.
"Memory"	Buffer memory for pulses received in excess of maximum stroking rate. In the "Contact" mode the buffer memory function can be added to the step-up "1:n", step-down "n:1" and "Select" functions.
"Dos. Control"	Activates flow monitor (if optional flow sensor is used). Can be added to all functions.
"Minimum"	Tank level monitor (if optional float switch is used).
"Contact"	Indication of pulses received.

Programming functions:

The factory setting of gamma/4 will be for "Manual" operation at an internally controlled maximum stroking rate of 120 strokes per minute.

A more rapid variation of the stroking rate setting can be obtained by constantly pressing the "Up" or "Down" key. The maximum stroking rate of 120 strokes per minute cannot be exceeded irrespective of function selected. The metering monitor "Dos. Control" can be added and dropped with any function.

Conversion to "Contact" - External pacing by pulses stepped up 1:1; without buffer memory. 1 pulse received generates 1 pump stroke.

Note: The maximum stroking rate in the "Contact" mode is the stroking rate last selected. If required, first change setting in the "Manual" mode to desired maximum stroking rate.

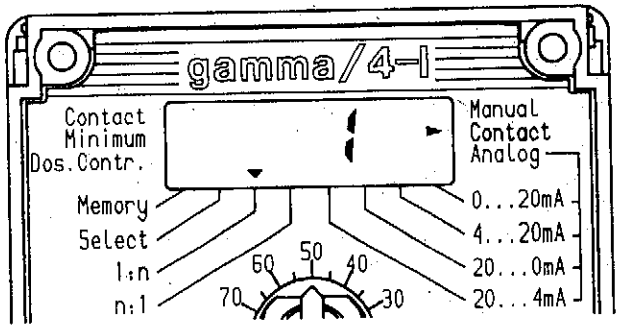
Press "P" key for about 3 seconds until the arrow pointing to "Manual" flashes. Shift arrow to "Contact" by means of the "Down" key.

Press "P" key once more. One or two arrows appear, pointing to "1:n", "n:1", "Select" or "Memory".

Press "Up" or "Down" key several times until there is only one arrow left, pointing to "1:n".

Press "P" key to enter function.

Press "Up" key. The readout displays the figure 1 (see Fig. 1919/3-3).



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If the readout displays a figure greater than 1 (resulting from an earlier setting), correct it to 1, using the "Down key". If a different step-up ratio is desired, e.g. 1:4 (1 pulse received generates 4 pump strokes), set figure 4 by means of the "Up" key.

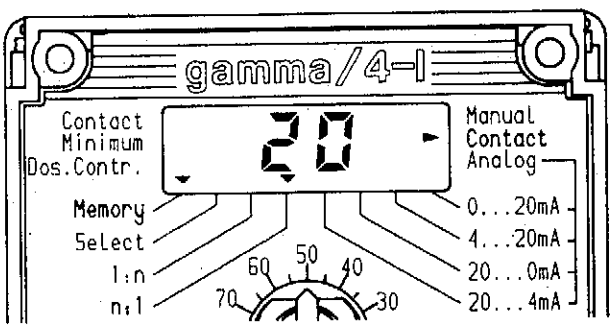
If the buffer memory function "Memory" is to be added, press the "Stop/Start" key and the "Up" key simultaneously. An additional arrow appears, pointing to "Memory".

Then, pulses received in excess will be stored and worked off at the maximum stroking rate set last in the "Manual" mode. The step-up ratio, in this example figure 4, will be displayed all the time.

The "Memory" function can be dropped if the "Stop/Start" key and the "Down" key are pressed simultaneously. The arrow pointing to "Memory" will disappear.

If pulses are to be stepped down in the ratio of "n:1", e.g. 20:1 - 20 pulses received generate 1 pump stroke - press "P" key until arrow pointing to "Contact" flashes. Press "P" key once more until arrows pointing to "n:1", "1:n", "Select" or "Memory" appear.

Press "Up" or "Down" key several times until there is only one arrow left, pointing to "n:1". Press "P" key to enter function. Set figure 20 by means of the "Up" key. The step-down ratio, in this example figure 20, will be displayed all the time. To add the "Memory" function proceed as described above.



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"Select" - Predetermining counter mode: Step-up function with a display of number of pump strokes yet to be performed.

Example: 150 pump strokes per pulse received or per manual starting pulse:

Press "P" key until the arrow pointing to "Contact" flashes. Press "P" key once more. One or two arrows appear, pointing to "1:n", "n:1", Select" or "Memory".

Press "Up" or "Down" key several times until there is only one arrow left, pointing to "Select". Press "P" key to enter function. Set figure 150 by means of "Up" key. The 150 pump strokes can be started by an external pulse or by means of the "P" key. When the pump is idle, the readout displays the number of pump strokes selected, if it is working, the number of pump strokes yet to be performed. To add "Memory" function proceed as described above.

How to delete stored data in the "Select" mode plus "Memory" function: If the pulses stored in the buffer memory are no longer required to be worked off, delete stored data by going into the "Manual" mode or by pulling the power plug for a short moment.

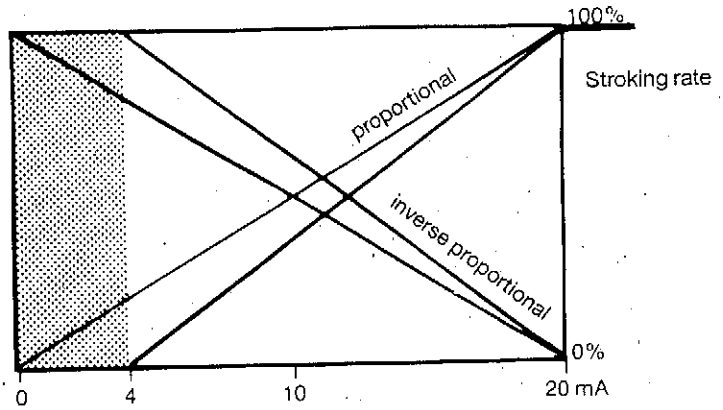
"Analog" - Stroking rate is directly or inversely proportional to a 0...20 or 4...20 mA standard process signal.

Example: 4...20 mA: Press "P" key until indicating arrow flashes. Shift indicating arrow to "Analog" by means of "Up" or "Down" key. Press "P" key once more. Another arrow will appear within the area ranging from 0...20 mA to 20...4 mA. Set arrow to "4...20 mA". Enter by pressing "P" key.

Note:
If no signal source is connected to the external control cable, or the signal is lower than 4 mA, error "F 4" will be annunciated at once.

Connect signal source, start pump by pressing "Stop/Start" key. The stroking rate will now be proportional to the analog signal, 4...20 mA corresponding to 1...120 strokes per minute.

Any new setting must be entered by means of the "P" key. The pump will return into the original mode unless the new setting is entered within 25 seconds.



Fault annunciations and fault reset

In case of a fault one of the following fault annunciations will be displayed flashing on the LCD readout, the pump will be switched off, the red LED will light up and the (optional) alarm relay pull in:

"F 1" Overflow of buffer memory "Memory".
The storage capacity of 65,535 pulses has been exceeded and the data have been deleted. Re-start by means of "Stop/Start" key.

"F 2" Overtemperature
The temperature sensor (optional) has stopped pump on account of excessive solenoid temperature. After solenoid has cooled down to admissible working temperature, re-start by pressing the "Stop/Start" key. If the ambient temperature is too high, reduce maximum stroking rate (see "Operating conditions").

"F 3" Lack of chemical
Make up chemical tank or, to bridge gap until then, pull float switch connector from pump. Level of liquid left before air is drawn: About 15 mm. Fault annunciation and fault reset are delayed by about 3 seconds.

"F 4" Signal current in the analog mode (4...20 mA, 20...4 mA) is less than 4 mA
Remove cause, e.g. defective cable, defective signal source.
Re-start by means of "Stop/Start" key.

"F 5" Flow failure The flow sensor (optional) has registered no, or insufficient, flow for 8 consecutive strokes. Remedy cause.

Possible causes:
Entrapped air or gas in the liquid end (bleed liquid end, see page 5).

Lack of chemical (if no float switch is used) (make up tank and bleed suction line and liquid end, see page 16).

Blockage of foot, suction, discharge or injection valve (clean, see page 16).

Pump diaphragm is defective (replace, see page 17).
Three-pole cable from flow sensor is not properly connected (check and remedy).

Making flow monitor inactive:
First press "Stop/Start" key, then simultaneously "Down" key.

Activating flow monitor:
Press "Stop/Start" key and "Up" key simultaneously.

Re-start by pressing "Stop/Start" key.

"F 6" System fault (microprocessor)
The electronic control circuit is self-monitoring. If there is a fault, the system will be switched off.

Return pump or complete electronic circuit to supplier for repair or replacement.

Irregular stroking
Stroking rate and solenoid operation are quartz-controlled. Synchronization is effected when the mains voltage passes through zero. This may occasionally cause audible irregular stroking as the strokes fall in step.

Operating conditions

The maximum admissible ambient temperature ranges from –10 °C to +45 °C. In case of higher temperatures reduce the maximum stroking rate by about 3 strokes per minute per 1 °C. At ambient temperatures of up to 50 °C the pump can be operated at maximum stroking rate for periods of up to 1 hour.

Relative humidity: 10...95%, not condensing.

Electric connection

The pump is connected to the mains power supply by means of the attached power cord and plug. The design range of the power supply is 210...250 V, 50...60 Hz, the tolerable range 195...265 V, 48...62 Hz.

After having been disconnected from the mains power supply, the pump, when switched on again, "awakes" in the mode last selected, even if it has been idle for years.

Caution: A changement in the pump's programme (adjustment/operation mode) is only in the memory after 5 seconds. If the power supply is disconnected within 5 seconds after a re-adjustment, the adjustment just made is lost, and the pump remains adjusted as before.

If, in the manual mode, the pump is to be switched on and off frequently, it is recommended that the pump be operated by voltage-free, remote on/off control while remaining connected to the mains power supply (Option "Remote on/off contol", Part No. 91.22.92.0). Remote control is obtained via a 4-pole control cable (see Wiring Diagram, page 35).

If the pump is connected in parallel with an inductive consumer, such as a solenoid valve, motor, etc., the metering pump must be switched of while electrically isolated from the other consumer. Therefor, the pump must be connected to the mains power supply via an auxiliary contactor or a relay. If this is not possible, a varistor (Part No. 71.09.07.7) or an RC-combination (0.22 μF, 470 Ohm) should be connected in parallel in order to dampen the induced voltage (see Section "Connection in parallel with other consumers", page 15).

Suction lift

Depending on the pump type, the maximum suction lift of the ProMinent® gamma/ 4 with the liquid end filled with media is 1.5...5 m W.G. (see "Technical data"). The suction lift with the liquid end empty depends on the stroke volume and is lower when the stroke volume is small. The pump cannot prime against a head.

If the pump feeds into a pressurized system and has accidentally drawn some air, the air will be just compressed within the liquid end and no media will be discharged. In this case disconnect the discharge line from the injection valve and quick-prime the pump by pressing the "Up" and "Down" keys simultaneously until the suction line and the liquid end are completely filled and free of bubbles. Models gamma/ 4 1000, 2001, 1201, 0803, 1002 N and 0408 PP are equipped with a bleed valve. Air bleeding can be accomplished without disconnecting the discharge line by giving the bleed valve on the liquid end one turn maximum and causing the pump to quick-prime until the suction line and the liquid end are completely filled.

If a float switch is used, the pump will be switched off to keep it from drawing air as soon as the minimum tank level is reached.

Metering accuracy

All data given are the result of flow measurements with water of a temperature of 20 °C. When conditions remain unchanged and a stroke length setting of not less than 30% is employed, the flow repeatability is $\leq \pm$ 2% of rated capacity.

Accurate metering is not possible unless the discharge pressure is constant to some extent and not lower than 1 bar.

If the media is to be discharged against atmospheric pressure (open-ended discharge line), a loading or back-pressure valve should be fitted to the discharge valve in order to create an artificial back pressure of about 1.5 bar.

If the fluid level in the chemical tank is located above the metering pump (flooded suction), the back pressure should be so high that a differential pressure of at least about 1.5 bar exists. Otherwise a back-pressure valve or a spring-loaded injection valve with an appropriate opening pressure should be used.

Note: A back-pressure or antisiphoning valve cannot be considered as being a tightly closing isolating valve. If required, install an isolating valve, which is closed when the pump is idle, in the suction line.

The suction line should be as short as possible and be routed with a continuously rising slope to prevent air bubbles from collecting.

An output flow, once set and possibly confirmed by calibration, can be reproduced exactly by setting the stroking rate to the original value since the stroking rate is strictly linear and exactly repeatable. Thus, an excellent flow repeatability is ensured.

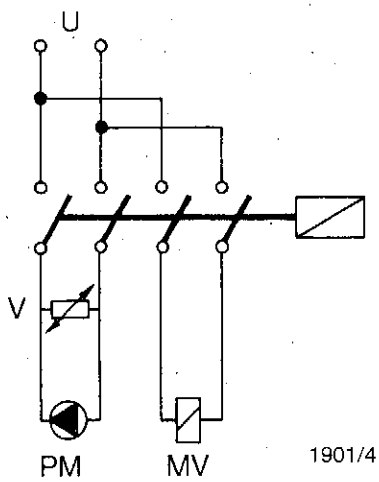
Connecting metering pump in parallel with inductive loads

If the pump is to be connected in parallel with an inductive load, such as a solenoid valve or an electric motor, the electronic circuit of the pump is liable to be damaged by transient peak voltages when the parallel load is switched off. For this reason the pump and the parallel load must be isolated from each other at the moment of switching. Therefore, the pump must have its own separate switch contacts.

Isolation by means of a multi-pole contactor or switch

(If the inductive load P_{MV} is $\leq$ 20 W the pump PM and the load MV could have a common control contact)

Isolation by means of an auxiliary contactor



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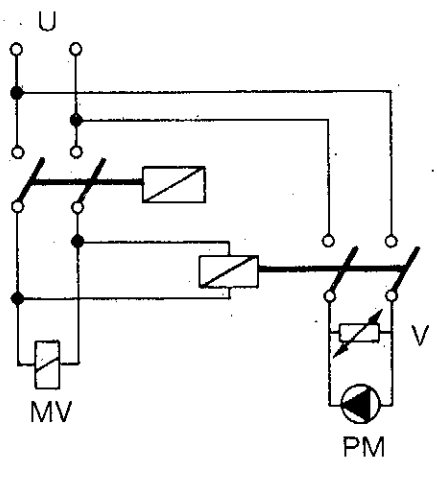


1902/4

U = Supply voltage

MV = Solenoid valve, motor or similar load

PM = ProMinent® metering pump

V = Varistor (The varistor is standard equipment of the metering pump. If necessary, an additional varistor (Part No. 71.09.07.7) could be connected externally in parallel with the pump.

Minor faults, causes and remedies

Pump does not prime in spite of full stroke length and proper air bleeding:

Crystalline deposits due to dry valves: Lift suction hose temporarily and flush liquid end well. If unsuccessful, disassemble and clean valves. The valve insert can be driven out by means of a 3 mm punch.

Pump does not work, yellow LED is extinct, no fault annunciation on the LCD readout:

Check mains voltage. Have fuse checked by authorized service personnel, and replaced if blown.

Caution: Use sizes shown on lable only

210-250 V	0.25 A super slow	Part No. 71.20.35.5
100-127 V	0.5 A super slow	Part No. 71.20.37.1
42- 48 V	1.25 A super slow	Part No. 71.20.38.9
23- 25 V	2.25 A super slow	Part No. 71.20.39.7

If fault cannot be remedied by replacing the fuse, have electronic circuit or whole pump checked in the factory.

No flow output, although the yellow indicating light is flashing

The stroke length is set to zero, or too short. Increase stroke length by means of stroke adjusting knob (2). Air might possibly be entrapped in the liquid end. Bleed as described in Section "Installation and commissioning".

Red fault indicating light goes on

Take note of fault annunciation on the LCD readout.

More information on remedying electronic faults will be given on page ??.

Float switch does not stop the pump although tank is empty

Float is blocked. Remove deposits and clean float.

Media leaks from intermediate disk

Diaphragm leaks. Tighten bolts of liquid end crosswise and continue operation. If this proves unsuccessful, the diaphragm is ruptured and must be replaced.

Replacing the pump diaphragm

Set stroke length to zero while pump is working. Flush liquid end thoroughly if hazardous media was handled. Squirt water or a detergent into the suction connector by means of a squeeze bottle. If necessary, turn pump upside down to bring suction connector to the top.

Loosen screws of liquid end, pull them out for about 5 mm, but still leave them in the liquid end. Unscrew diaphragm from armature by turning the complete liquid end anticlockwise with a slight jerk.

Place new diaphragm into the intermediate disk and replace liquid end so that the suction connector is next to the drain hole in the intermediate disk. Stick fastening screws through and turn the whole assembly clockwise until the diaphragm is securely fixed. Let the pump work, set stroke length to 100% and turn the whole assembly clockwise until the suction connector points right down. With pump still working, tighten screws crosswise. With liquid end versions N and PP, except Model 0216, the bleed valve is located near the top next to the discharge valve, and the bypass nozzle laterally near the bottom next to the suction valve.

To enable you to remedy smaller faults at any time we recommend you to have a spare parts kit available.

Safety instructions

Warning:

Metering pumps and their peripheral equipment may only be serviced by correctly trained authorised persons!

Caution: Wear protective clothing, goggles and when working on a liquid end handling dangerous or unknown fluids. Always relieve discharge line from pressure. Drain and flush liquid end. Observe codes or practice and information cards concerning hazardous substances. Disconnect pump from mains power supply before opening it.

Please clean pumps and flush liquid ends thoroughly before sending them to the factory for repair. If possible, briefly state kind of defect and operating conditions.

Disposal of Old Parts

Warning:

Never throw the device or part into the bin (domestic refuse)!
The electrolyte contained in the plastic shaft can damage your health!
Plastics, electrolyte and electronic parts are classified as special refuse and can be recycled!

Old parts should be disposed of on an environmentally friendly way or (if possible) recycled.
If this is not possible
the ProMinent subsidiary or representative responsible for you
will take back your old parts for a small fee!
(Addresses can be found at the back/last page of this instruction manual.)

Pump selection guide

ProMinent® gamma/4	Capacity at max. back pressure			Capacity at average back pressure			Max. stroking rate strokes minute	Average power consumption (W)	Peak power consumption (W)	Suction line o.d.x i.d.	Discharge line o.d.x i.d.	Materials			gamma/4 ....-W Part. No.	gamma/4 ....-I Part. No.
Pump type	bar (psi)	l/h	ml/ stroke	bar (psi)	l/h	ml/ stroke						Liquid end/ connectors	Valve balls	Seals		
1000 PP N T S S-K	10 (145)	0,20	0,028	5 (72,5)	0,26	0,036	7200	12	155	6x4 6x4 6x4 6x5 1/16"	6x4 6x4 6x4 6x5 1/8"	PP Plexi/PVC PTFE S/s 4571 S/s 4571	Ceramic Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE PTFE	91.21.31.0 91.21.30.2 91.21.32.8 91.21.33.6 91.21.92.2	91.21.02.1 91.21.01.3 91.21.03.9 91.21.04.7 91.21.88.0
2001 PP N T S S-K	16 (232)	0,69	0,096	10 (145)	0,95	0,132	7200	12	155	6x4 6x4 6x4 6x5 1/16"	6x4 6x4 6x4 6x5 1/8"	PP Plexi/PVC PTFE S/s 4571 S/s 4571	Ceramic Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE PTFE	91.21.35.1 91.21.34.4 91.21.36.9 91.21.37.7 91.21.93.0	91.21.06.2 91.21.05.4 91.21.07.0 91.21.08.8 91.21.89.8
1201 PP N T S S-K	12 (174)	1,60	0,22	6 (87)	1,79	0,248	7200	12	155	6x4 6x4 6x4 6x5 1/16"	6x4 6x4 6x4 6x5 1/8"	PP Plexi/PVC PTFE S/s 4571 S/s 4571	Ceramic Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE PTFE	91.21.39.3 91.21.38.3 91.21.40.1 91.21.41.9 91.21.94.8	91.21.10.4 91.21.09.6 91.21.11.2 91.21.12.0 91.21.90.6
0803 PP N T S S-K	8 (116)	3,10	0,43	4 (58)	3,55	0,493	7200	12	155	6x4 6x4 6x4 6x5 1/16"	6x4 6x4 6x4 6x5 1/8"	PP Plexi/PVC PTFE S/s 4571 S/s 4571	Ceramic Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE PTFE	91.21.43.5 91.21.42.7 91.21.44.3 91.21.45.0 91.21.95.5	91.21.14.6 91.21.13.8 91.21.15.3 91.21.16.1 91.21.91.4
1002 PP N T S	10 (145)	2,17	0,30	5 (72,5)	2,61	0,362	7200	12	155	8x5 8x5 8x5 8x7	8x5 8x5 8x5 8x7	PP Plexi/PVC PTFE S/s 4571	Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE	91.21.47.6 91.21.46.8 91.21.48.4 91.21.49.2	91.21.18.7 91.21.17.9 91.21.19.5 91.21.20.3
0408 PP N T S	3,5 (50,8)	7,74	1,075	2 (29)	8,60	1,195	7200	12	155	8x5 8x5 8x5 8x7	8x5 8x5 8x5 8x7	PP Plexi/PVC PTFE S/s 4571	Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE	91.21.51.8 91.21.50.0 91.21.52.6 91.21.58.4	91.21.22.9 91.21.21.1 91.21.23.7 91.21.24.5
0216 PP N T S	1.5 (22)	16,0	2,22	1 (14,5)	20,0	2,775	7200	12	155	12x9 12x9 12x9 12x10	12x9 12x9 12x9 12x10	PP Plexi/PVC PTFE S/s 4571	Ceramic Ceramic Ceramic Ceramic	EPDM Viton PTFE PTFE	91.21.55.9 91.21.54.2 91.21.56.7 91.21.57.5	91.21.26.0 91.21.25.2 91.21.27.8 91.21.28.6

Adjusting flow output

Determine the correction coefficient KF relating to the actual back pressure in the discharge line, using the respective diagram on one of the following pages.

Divide desired output flow by correction coefficient KF to find corrected output flow.

Enter corrected output flow on centér scale "Flow rate" in l/h or ml/min. Place a straight edge through value entered on flow rate scale. In order to obtain reasonable stroke length and stroking rate settings, the straight edge should run more or less horizontally. Select the next highest round figure on the stroke length scale, connect with value on flow rate scale and project to cut stroking rate scale. Read off stroking rate at intersection on stroking rate scale.

For high viscosity media and media tending to emit vapors and fumes select a larger stroke length with a correspondingly lower stroking rate. For a good mixing effect choose a shorter stroke length with a correspondingly higher stroking rate.

Set metering pump accordingly. Adjust stroke length only when the pump is working.

If the output flow is to meet higher demands of accuracy, measure the actual output flow and correct the settings accordingly.

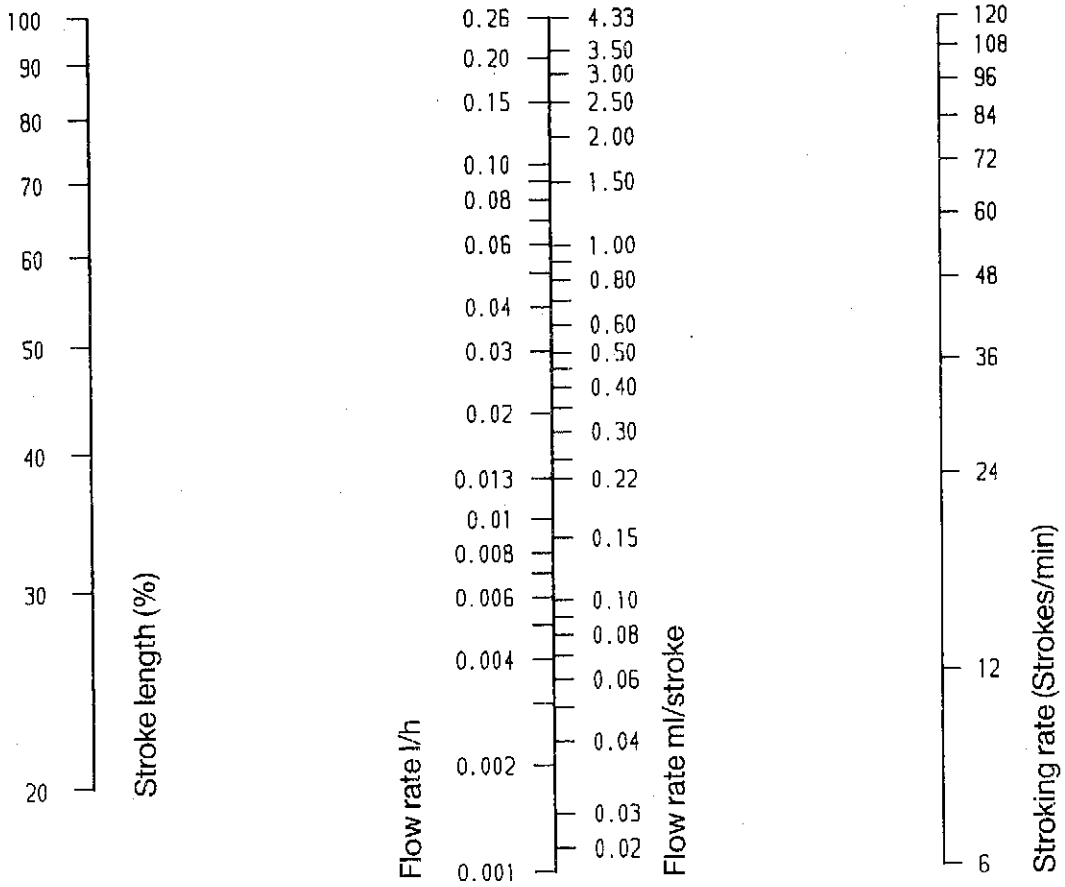
Capacity and technical data of Model gamma/ 4 1000 metering pump

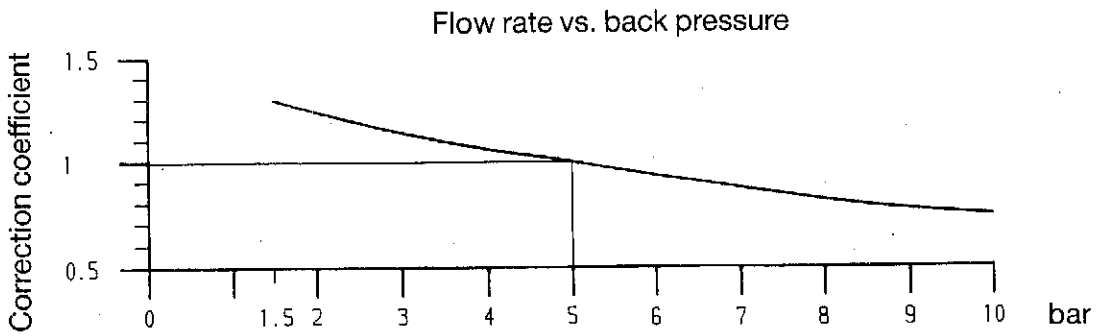
Nomograph for determining flow output of Model gamma/4 1000 and diagram for determining correction coefficient for flow output relative to back pressure

Maximum capacity against 5 bar	0.26 l/h = 0.036 ml/stroke
Maximum capacity against 10 bar	0.20 l/h = 0.028 ml/stroke

gamma/4 1000

Max. capacity against	10 bar	0.20 l/h; 0.028 ml/stroke
Max. back pressure		10 bar
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range		10...100%
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Discharge line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.5/2.7 kg
Weight, S version		plus 0.5 kg
Maximum suction lift		about 1.5 m W.G.


100
90
80
70
60
50
40
30
20
Stroke length (%)
0.26
0.20
0.15
0.10
0.08
0.06
0.04
0.03
0.02
0.013
0.01
0.008
0.006
0.004
0.002
0.001
Flow rate l/h
4.33
3.50
3.00
2.50
2.00
1.50
1.00
0.80
0.60
0.50
0.40
0.30
0.22
0.15
0.10
0.08
0.06
0.04
0.03
0.02
Flow rate ml/stroke
120
108
96
84
72
60
48
36
24
12
6
Stroking rate (Strokes/min)


Flow rate vs. back pressure
Correction coefficient
1.5
1
0.5
0
1.5
2
3
4
5
6
7
8
9
10
bar

1910/4

Capacity and technical data of Model gamma/ 4 2001 metering pump

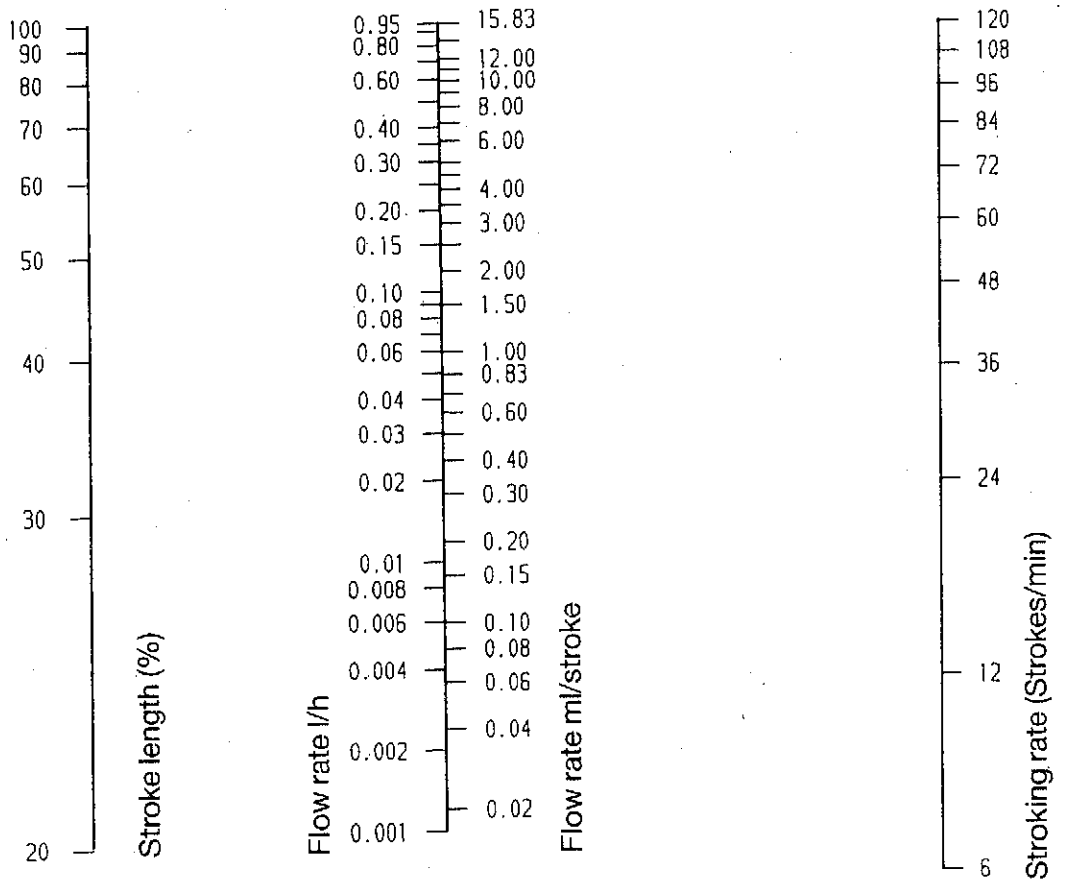
Nomograph for determining flow output of Model gamma/4 2001 and diagram for determining correction coefficient for flow output relative to back pressure

Maximum capacity against 10 bar	0.95 l/h = 0.132 ml/stroke
Maximum capacity against 16 bar	0.69 l/h = 0.096 ml/stroke

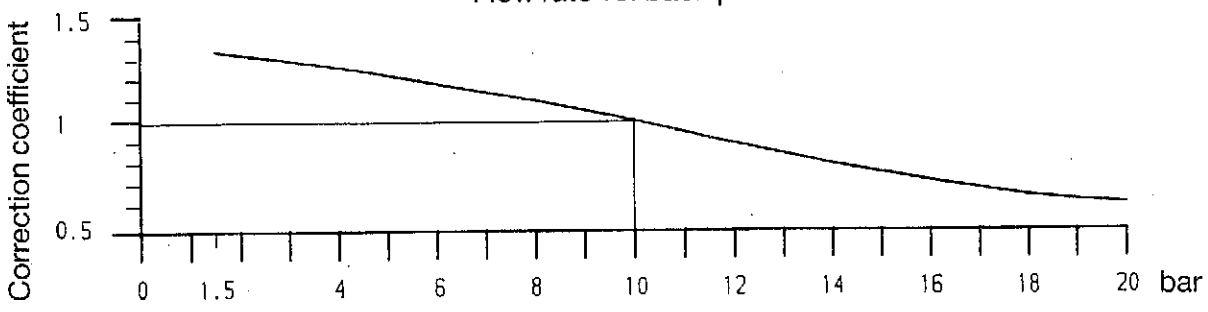
gamma/ 4 2001

Max. capacity against	16 bar	0.69 l/h; 0.096 ml/stroke
Max. back pressure		16 bar
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range		10...100%
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Discharge line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.5/2.7 kg
Weight, S version		plus 0.5 kg
Maximum suction lift		about 3 m W.G.

ProMinent® gamma/ 4 type 2001



Flow rate vs. back pressure



1911/4

Capacity and technical data of Model gamma/ 4 1201 metering pump

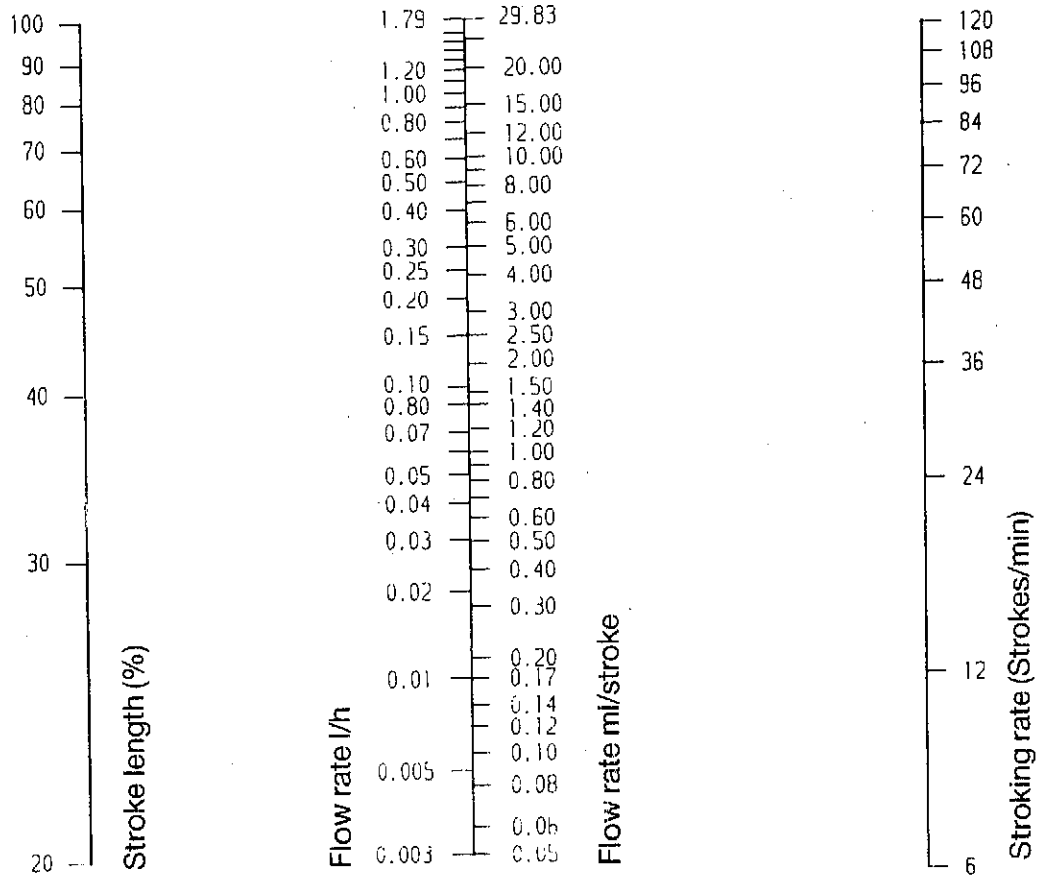
Nomograph for determining flow output of Model gamma/4 1201 and diagram for determining correction coefficient for flow output relative to back pressure

Maximum capacity against 6 bar	1.79 l/h = 0.248 ml/stroke
Maximum capacity against 12 bar	1.60 l/h = 0.220 ml/stroke

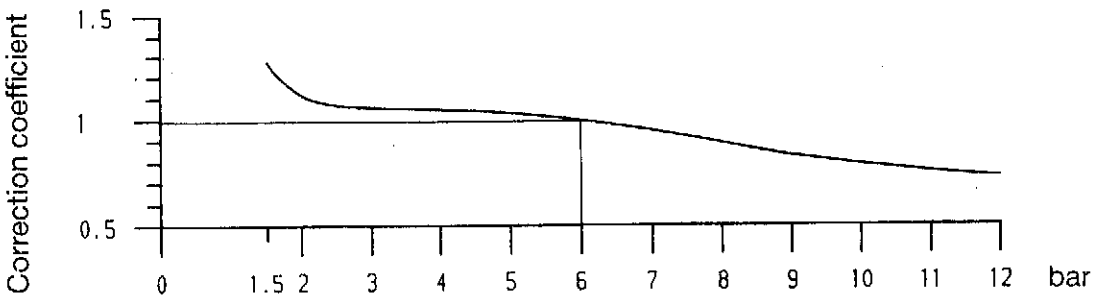
gamma/ 4 1201

Max. capacity against	12 bar	1.60 l/h; 0.22 ml/stroke
Max. back pressure	12 bar	
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range	10...100%	
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Discharge line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.5/2.7 kg
Weight, S version		plus 0.5 kg
Maximum suction lift		about 4 m W.G.

ProMinent® gamma/ 4 type 1201



Flow rate vs. back pressure



1912/4

Capacity and technical data of Model gamma/ 4 0803 metering pump

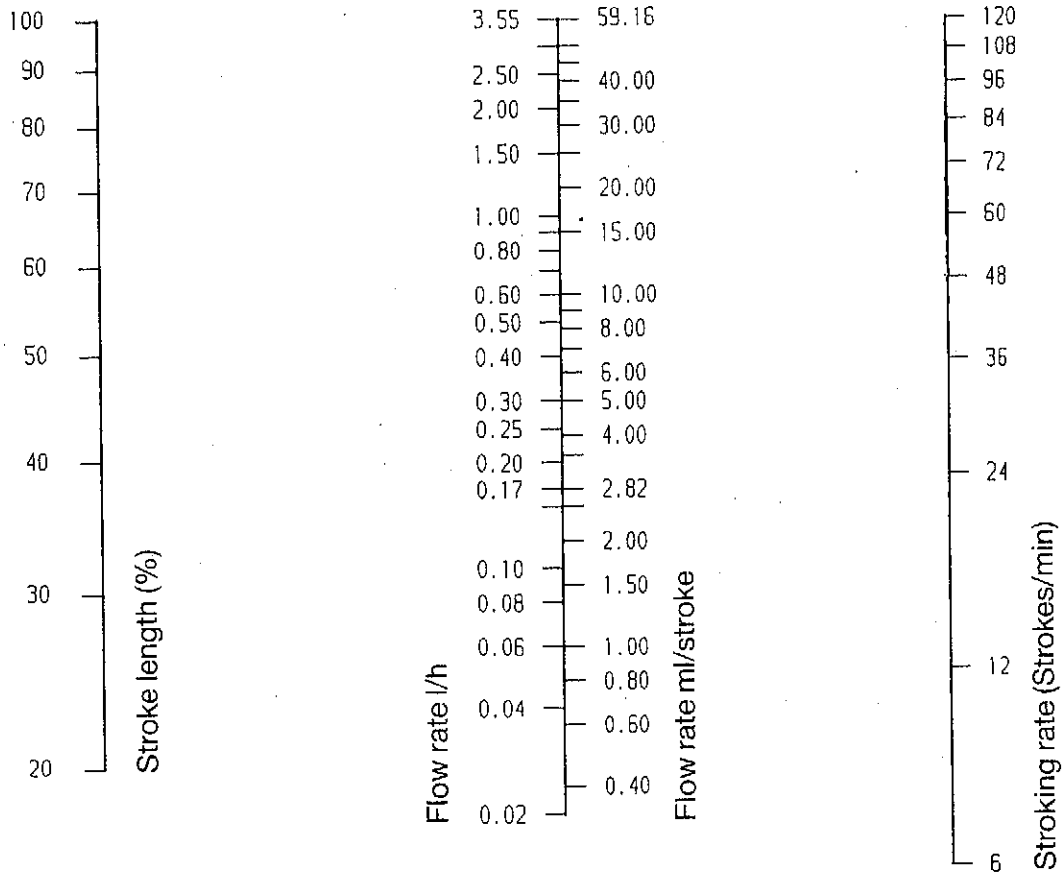
Nomograph for determining flow output of Model gamma/4 0803 and diagram for determining correction coefficient for flow output relative to back pressure

Maximum capacity against 4 bar	3.55 l/h = 0.493 ml/stroke
Maximum capacity against 8 bar	3.10 l/h = 0.430 ml/stroke

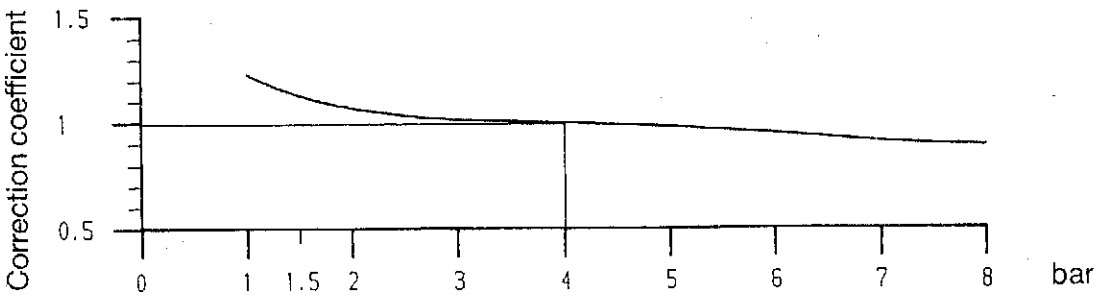
gamma/ 4 0803

Max. capacity against	8 bar	3.10 l/h; 0.43 ml/stroke
Max. back pressure		8 bar
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range		10...100%
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Discharge line	PP, N, T versions	Hose 6 mm o.d. x 4 mm i.d.
	S version	Pipe 6 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.5/2.7 kg
Weight, S version		plus 0.5 kg
Maximum suction lift		about 5 m W.G.

ProMinent® gamma/ 4 type 0803



Flow rate vs. back pressure



1913/4

Capacity and technical data of Model gamma/ 4 1002 metering pump

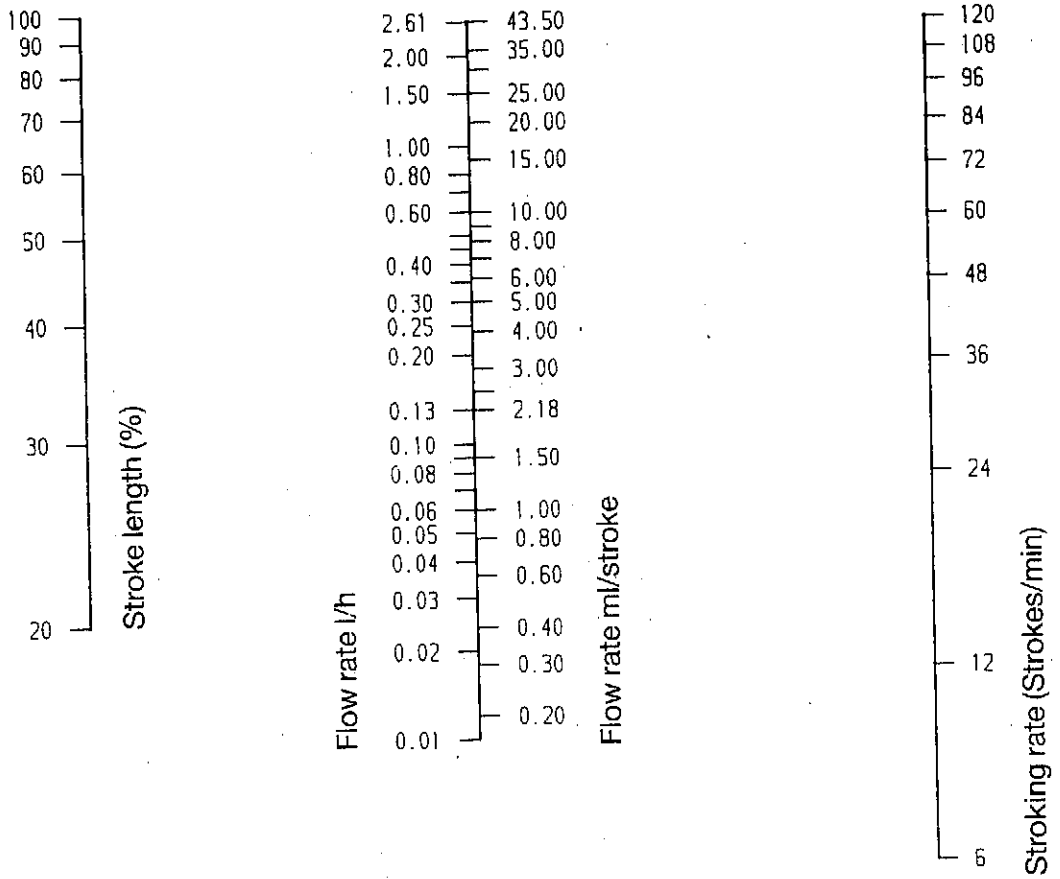
Nomograph for determining flow output of Model gamma/4 1002 and diagram for determining correction coefficient for flow output relative to back pressure

Maximum capacity against 5 bar	2.61 l/h = 0.362 ml/stroke
Maximum capacity against 10 bar	2.17 l/h = 0.300 ml/stroke

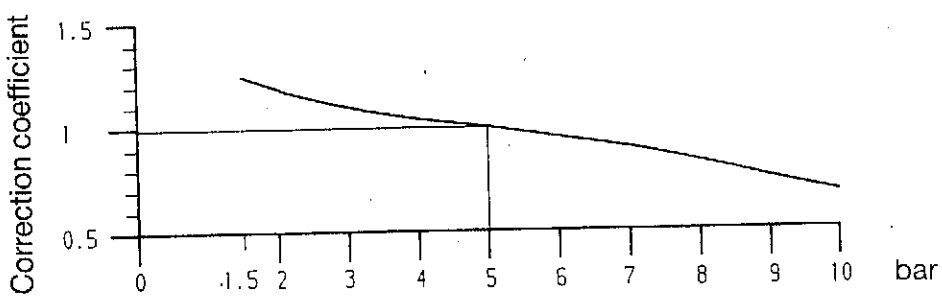
gamma/ 4 1002

Max. capacity against	10 bar	2.17 l/h; 0.30 ml/stroke
Max. back pressure		10 bar
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range		10...100%
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 8 mm o.d. x 5 mm i.d.
	S version	Pipe 8 mm o.d.
Discharge line	PP, N, T versions	Hose 8 mm o.d. x 5 mm i.d.
	S version	Pipe 8 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.6/2.8 kg
Weight, S version		plus 0.8 kg
Maximum suction lift		about 5 m W.G.

ProMinent® gamma/ 4 type 1002



Flow rate vs. back pressure



1914/4

Capacity and technical data of Model gamma/ 4 0408 metering pump

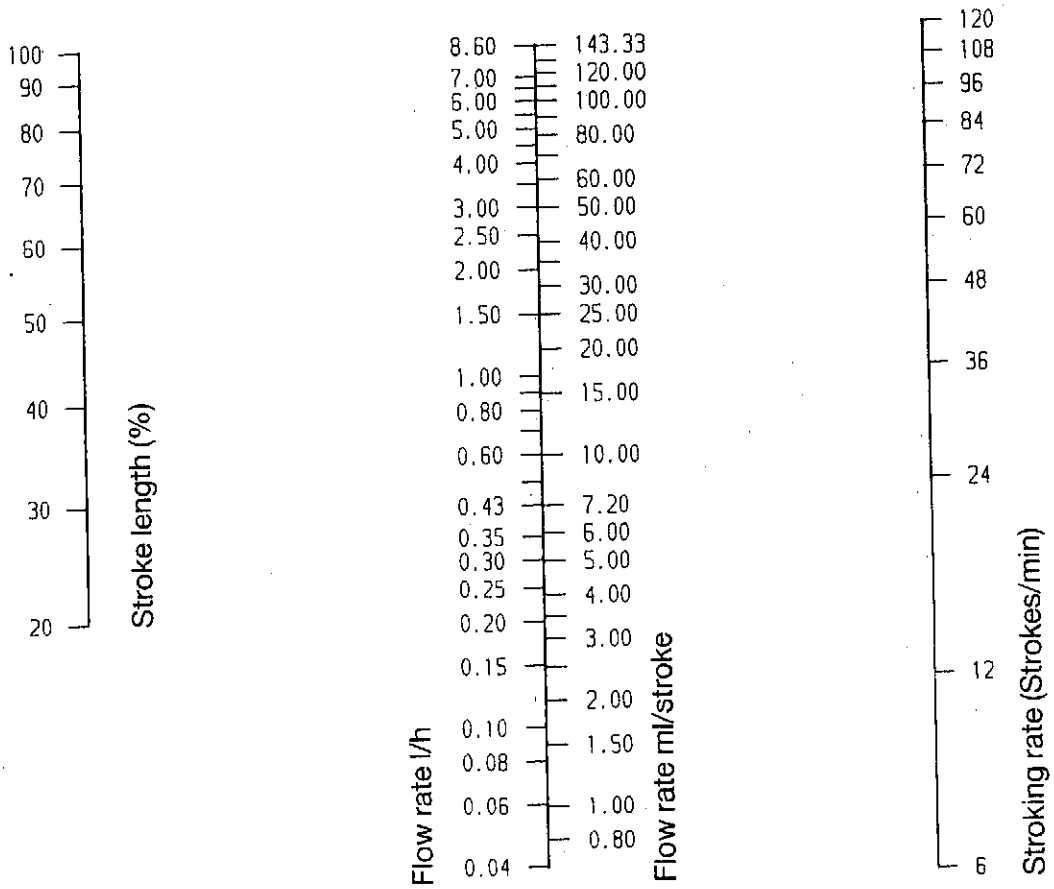
Nomograph for determining flow output of Model gamma/4 0408 and diagram for determining correction coefficient for flow output relative to back pressure

Maximum capacity against 2 bar	8.60 l/h = 1.195 ml/stroke
Maximum capacity against 3.5 bar	7.74 l/h = 1.075 ml/stroke

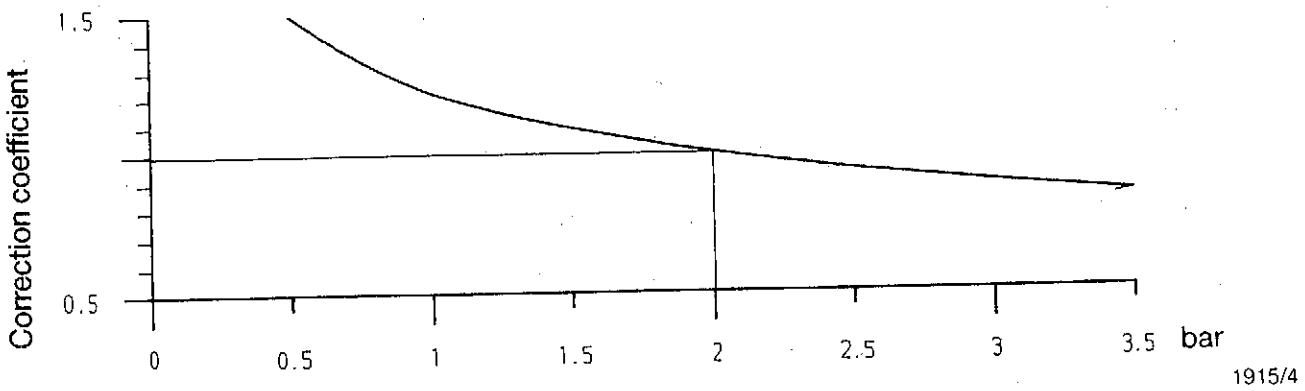
gamma/ 4 0408

Max. capacity against	3.5 bar	7.74 l/h; 1.075 ml/stroke
Max. back pressure		3.5 bar
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range		10...100%
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 8 mm o.d. x 5 mm i.d.
	S version	Pipe 8 mm o.d.
Discharge line	PP, N, T versions	Hose 8 mm o.d. x 5 mm i.d.
	S version	Pipe 8 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.6/2.8 kg
Weight, S version		plus 0.8 kg
Maximum suction lift		about 2.5 m W.G.

ProMinent® gamma/ 4 type 0408



Flow rate vs. back pressure



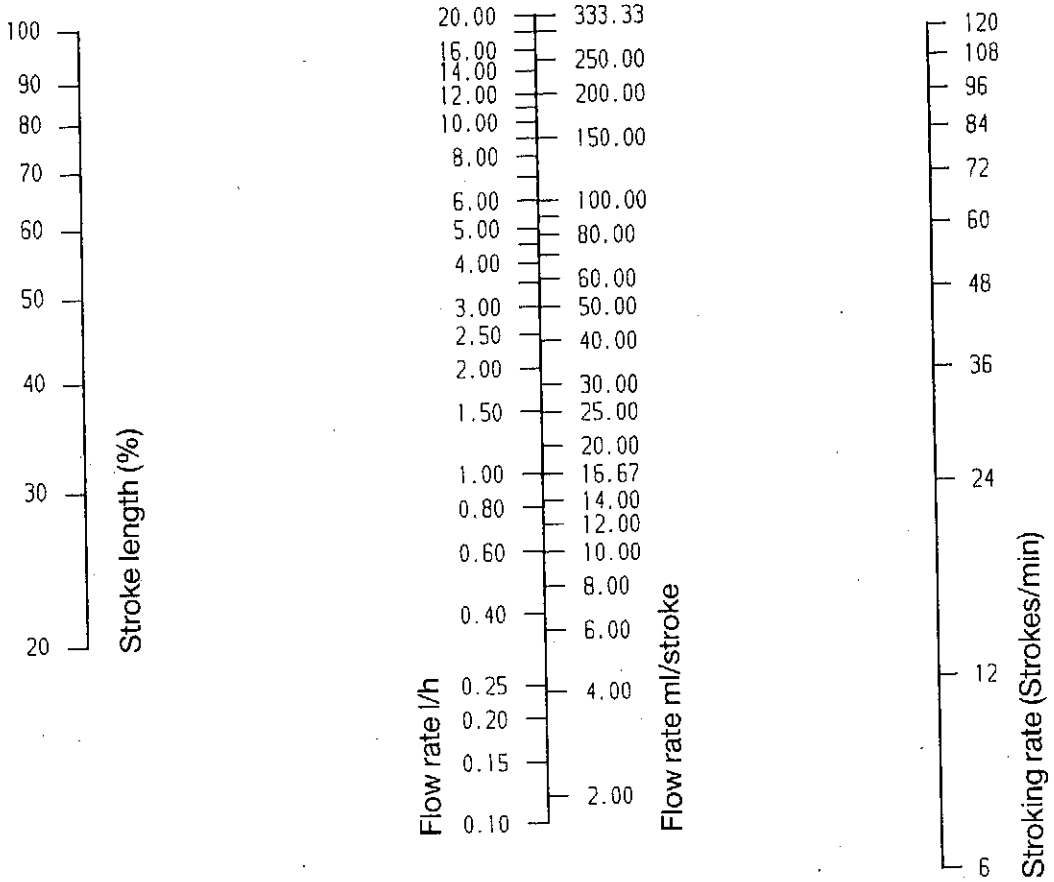
Capacity and technical data of Model gamma/ 4 0216 metering pump

Nomograph for determining flow output of Model gamma/4 0216 and diagram for determining correction coefficient for flow output relative to back pressure

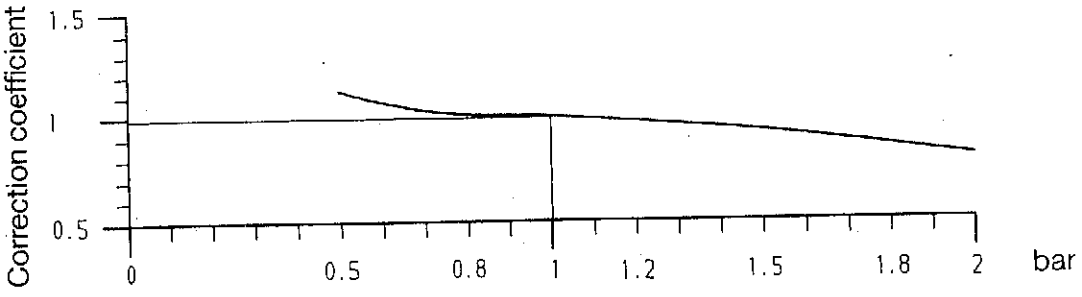
Maximum capacity against 1 bar	20.0 l/h = 2.775 ml/stroke
Maximum capacity against 1.5 bar	16.0 l/h = 2.220 ml/stroke

gamma/ 4 0216

Max. capacity against	1.5 bar	16.0 l/h; 2.22 ml/stroke
Max. back pressure		1.5 bar
Max. stroking rate		7200 sph; 120 spm
Min. stroking rate (Internal control)		60 sph; 1 spm
Stroke length adjusting range		10...100%
Power supply		210...250 V, 50...60 Hz
Average power consumption		12 W
Control voltage		5 V
Minimum duration of pacing pulses (External control)		20 ms
Contact load		12 mA
Level of enclosure		IP 65
Suction line	PP, N, T versions	Hose 12 mm o.d. x 9 mm i.d.
	S version	Pipe 12 mm o.d.
Discharge line	PP, N, T versions	Hose 12 mm o.d. x 9 mm i.d.
	S version	Pipe 12 mm o.d.
Dimensions		247 x 90 x 186 mm l x w x h
Net/Gross weight		2.8/3.0 kg
Weight, S version	plus 2 kg	
Maximum suction lift		about 2 m W.G.



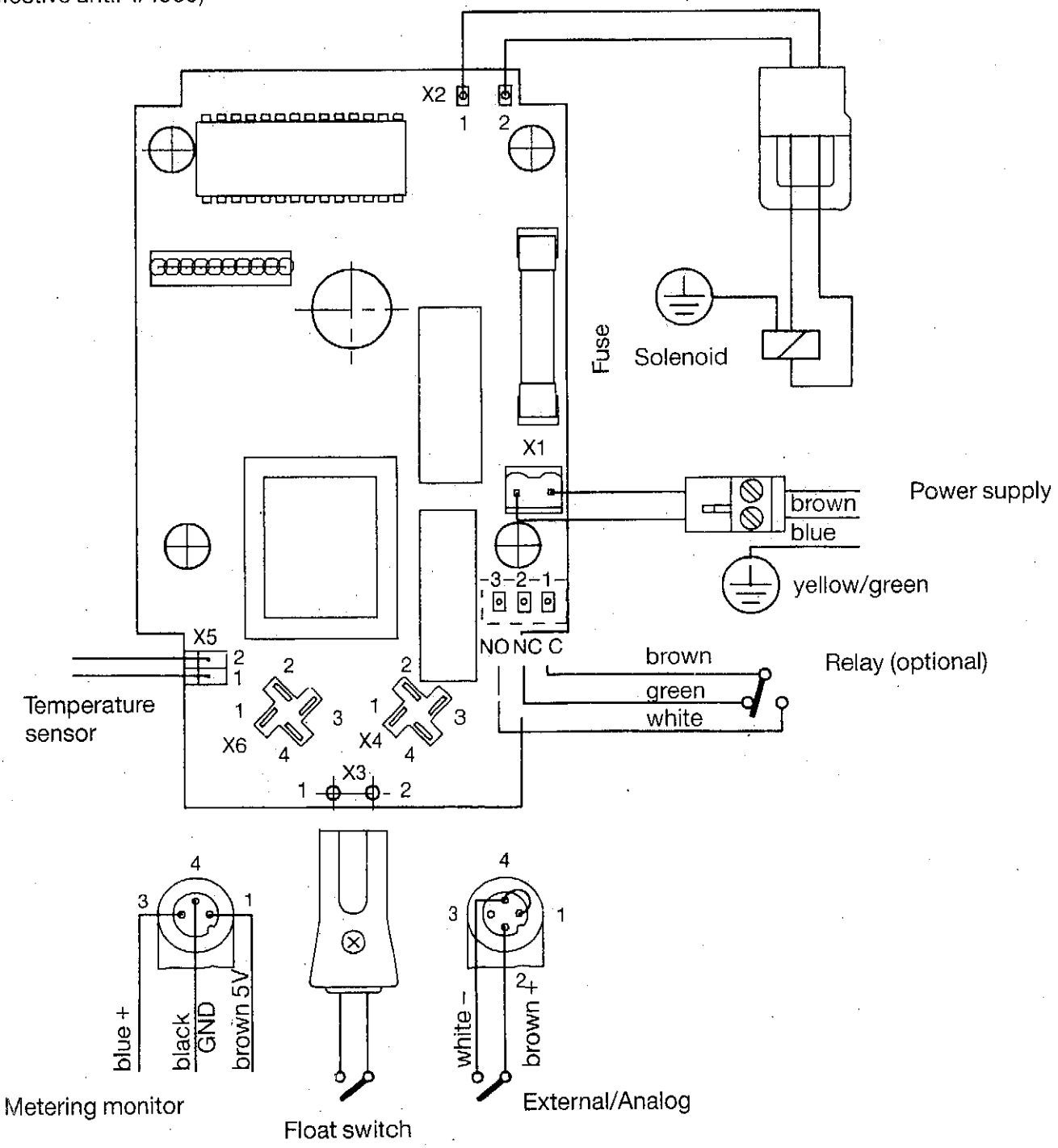
Flow rate vs. back pressure



1916/4

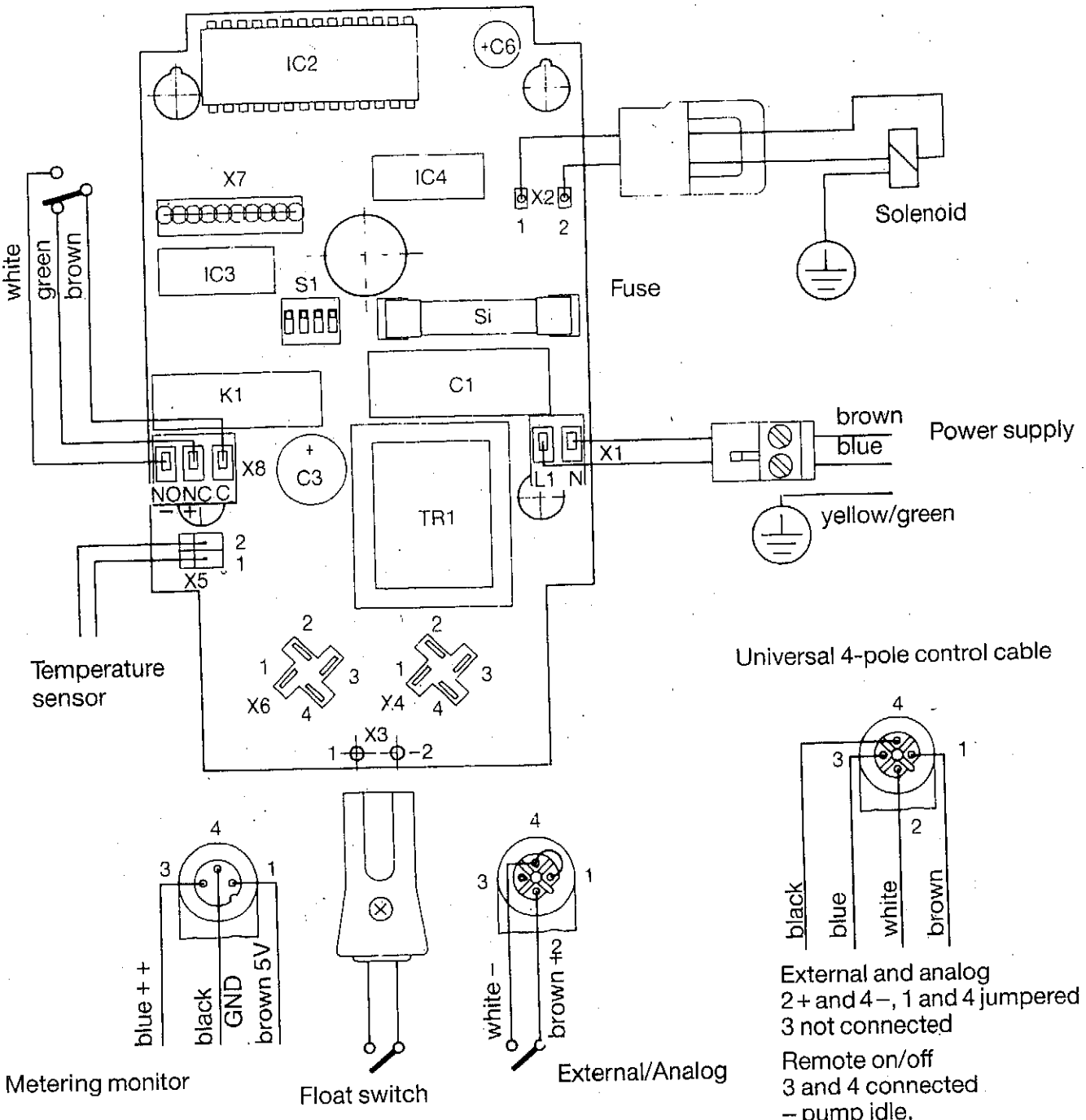
Terminal plan ProMinent® gamma/ 4

(effective until 4/1989)



Terminal plan ProMinent® gamma/ 4

(effective as from 4/1989)



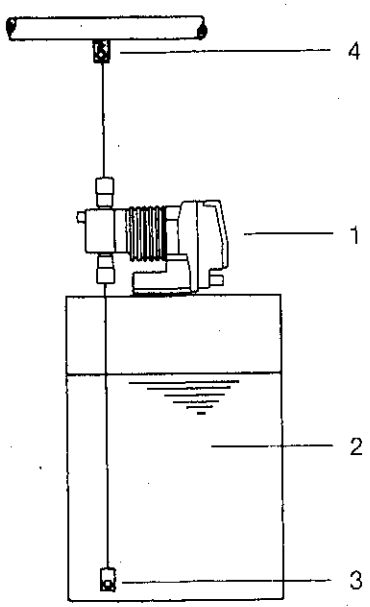
Spares

Description	Part No.			
	210...250 V	100...127 V	42...48 V	23...25 V
Control circuit gamma/ 4-I	81.90.84.5	81.90.87.8	81.90.90.2	81.90.93.6
Control circuit gamma/ 4-W	81.90.85.2	81.90.88.6	81.90.91.0	81.90.94.4
Fuse 6.3 x 32 mm	71.20.35.5	71.20.37.1	71.20.38.9	71.20.39.7

Typical installations

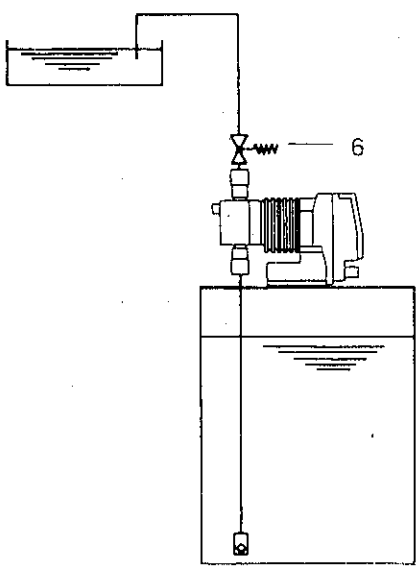
1 Metering pump
2 Chemical tank
3 Foot valve with strainer and check valve
4 Injection valve, spring-loaded
5 Injection valve, enhanced spring load
6 Back-pressure valve, pump-mounted
7 Back-pressure valve, installed in line
8 Back-pressure valve, adjustable
9 Pulsation dampener
10 Solenoid valve
11 Drain valve
12 Bleed valve
13 Isolating valve

1) Standard installation



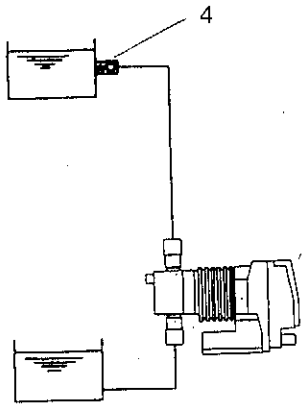
1881/4

2) Atmospheric discharge, low head



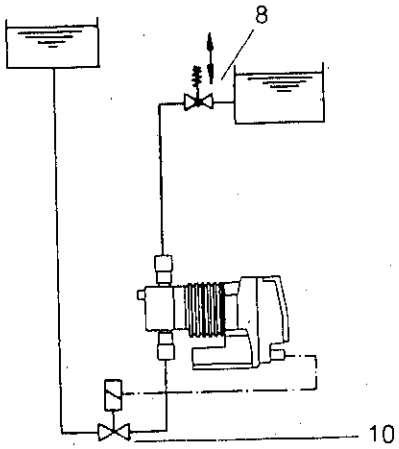
1882/4

2b) Atmospheric discharge,
large head, without back-pressure valve



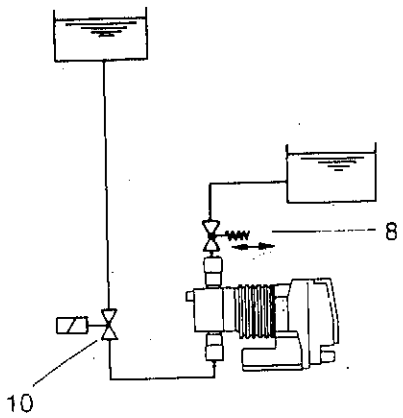
1883/4

3a) Flooded suction,
large discharge head



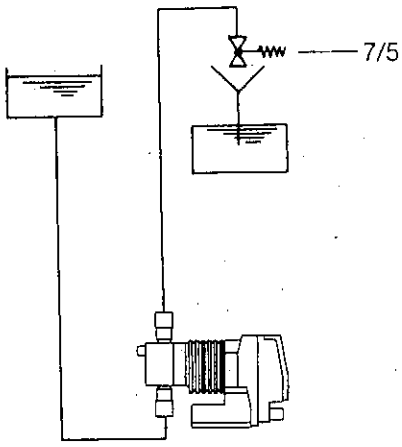
1884/4

3b) Flooded suction,
low discharge head



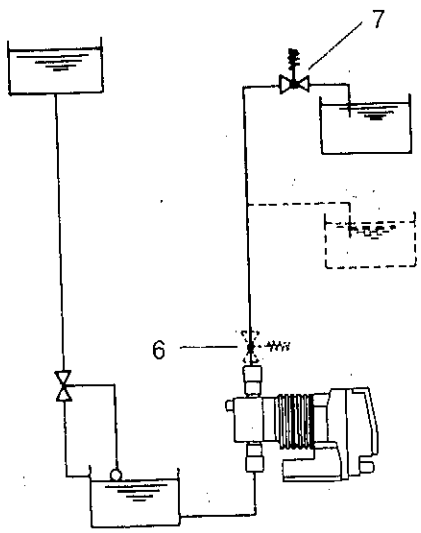
1885/4

4a) Installation to prevent siphoning
of hazardous media



1886/4

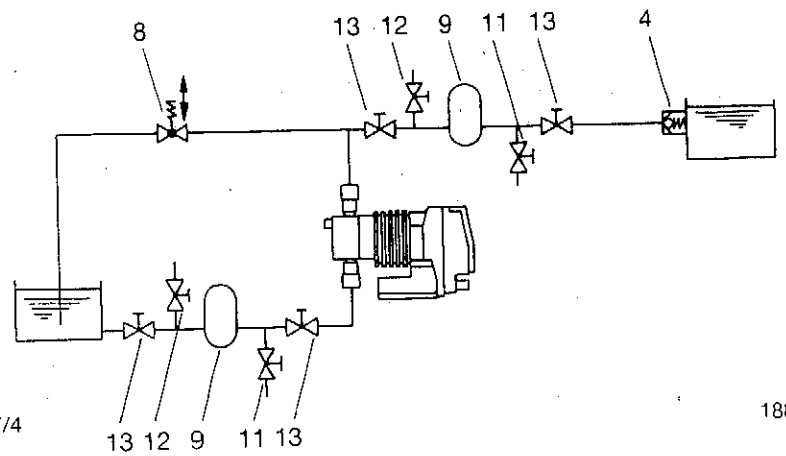
4b) Installation to prevent siphoning
of hazardous media



1887/4

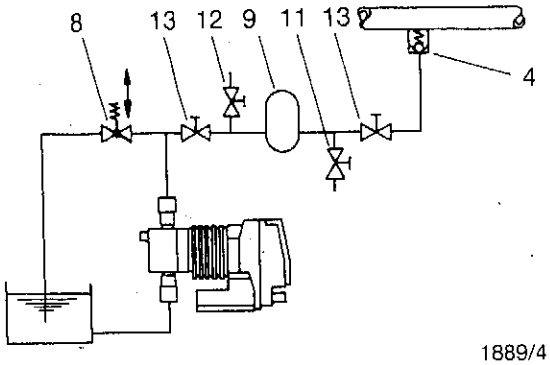
5) With long suction and discharge pipes

10 Solenoid valve (closed when pump is idle)



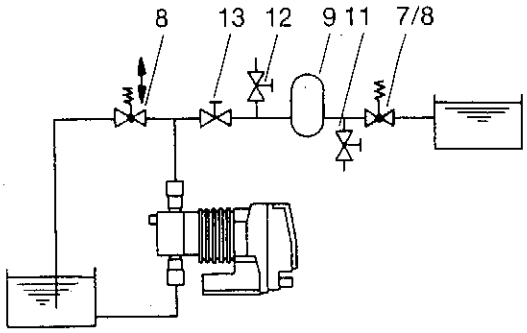
1888/4

6a) Pulsation-free discharge into a pressurized system



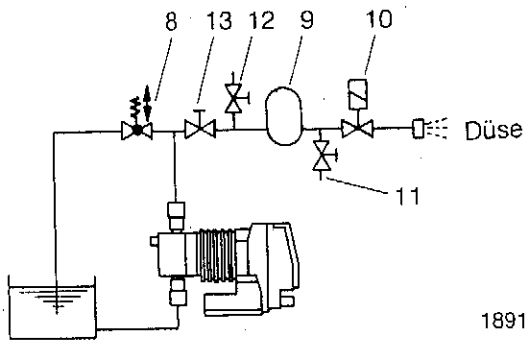
1889/4

6b) Pulsation-free discharge into an atmospheric system



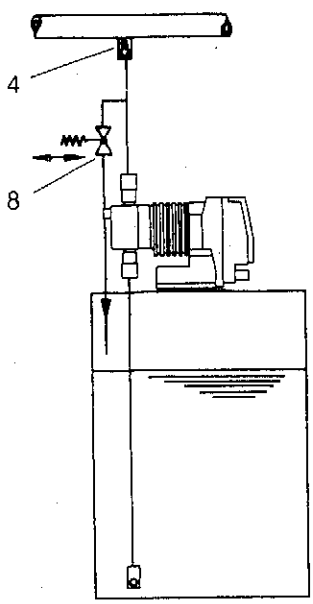
1890/4

6c) Pulsation-free discharge without overfeeding



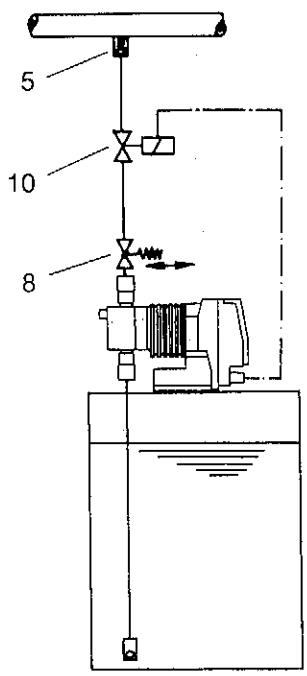
1891/4

7) Protection against excess pressure



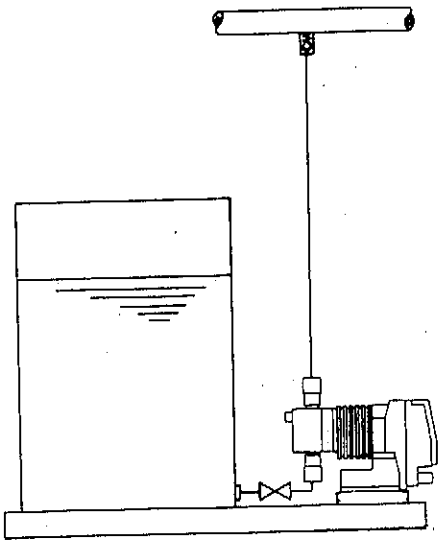
1892/4

8) Discharge into a vacuum



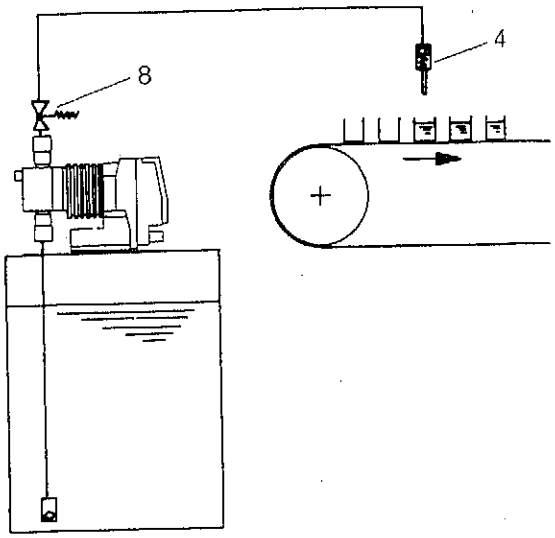
1893/4

9) With media tending to emit fumes and vapors



1894/4

10) Multiple batching



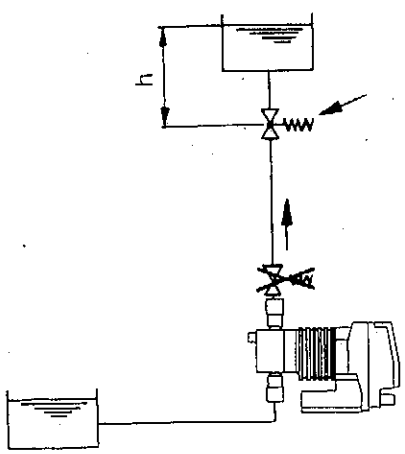
1895/4

Formula for determining maximum head of liquid on top of back-pressure valve

$$h_{max} \leq \frac{P \times 14.3}{\varrho \times g} \text{ (m)}$$

where h_{max}: Max. head (m)
P: Pressure setting of back-pressure valve (bar)
g: Gravity constant (10 m/s^2)
ϱ: Density of media (kg/dm^3)

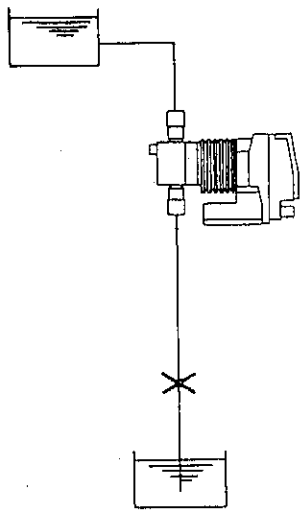
11) Correct installation of back-pressure valve



1900/4

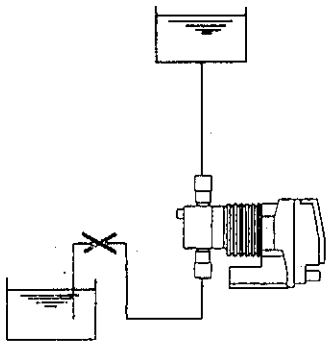
Faulty installations:

12) Suction lift too high



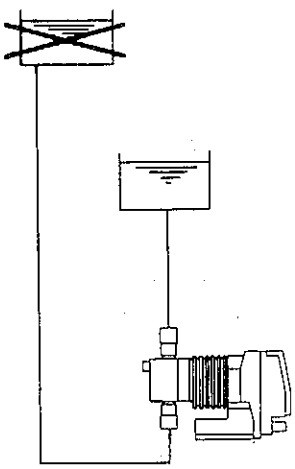
1896/4

13) Suction line cannot be air-bled



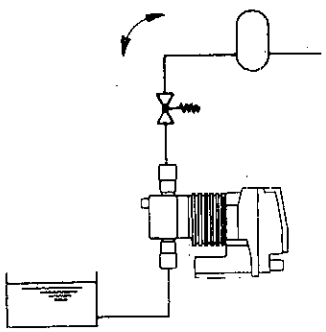
1897/4

14) Media will be gravity-fed through pump



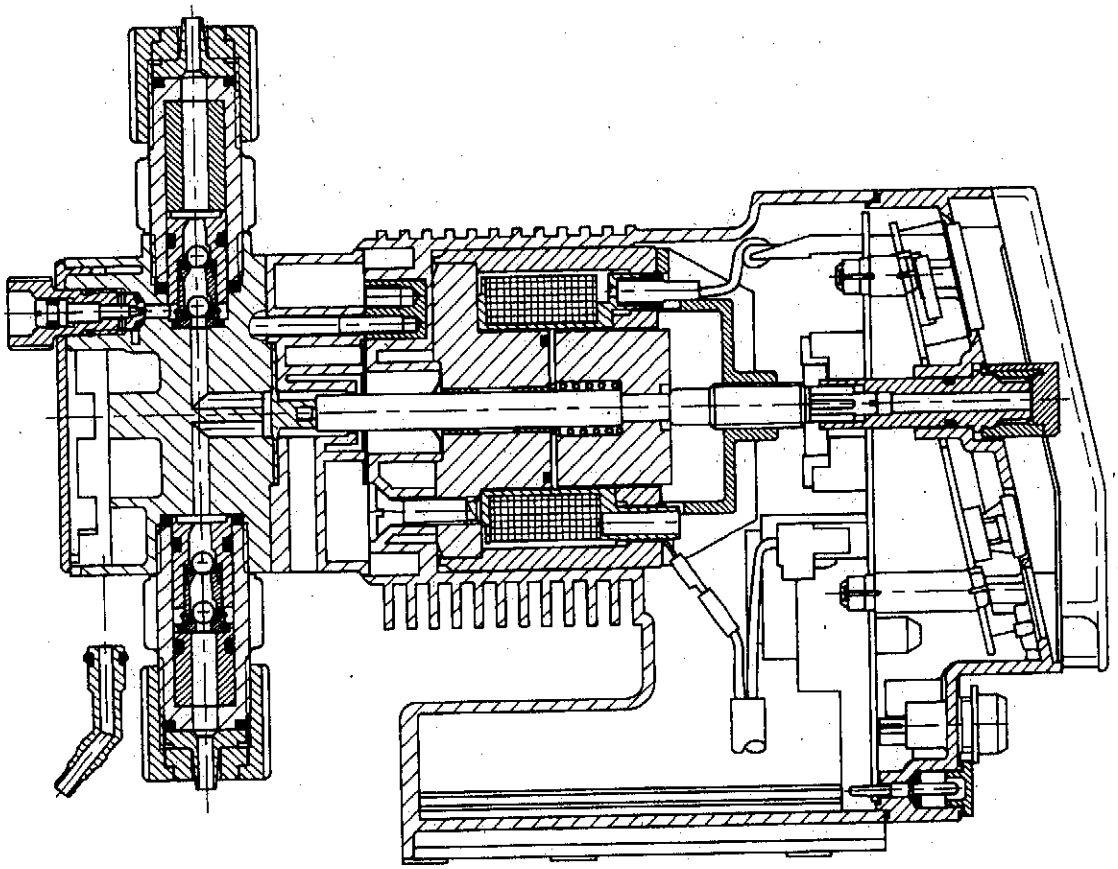
1898/4

15) Pulsation dampener ineffective



1899/4

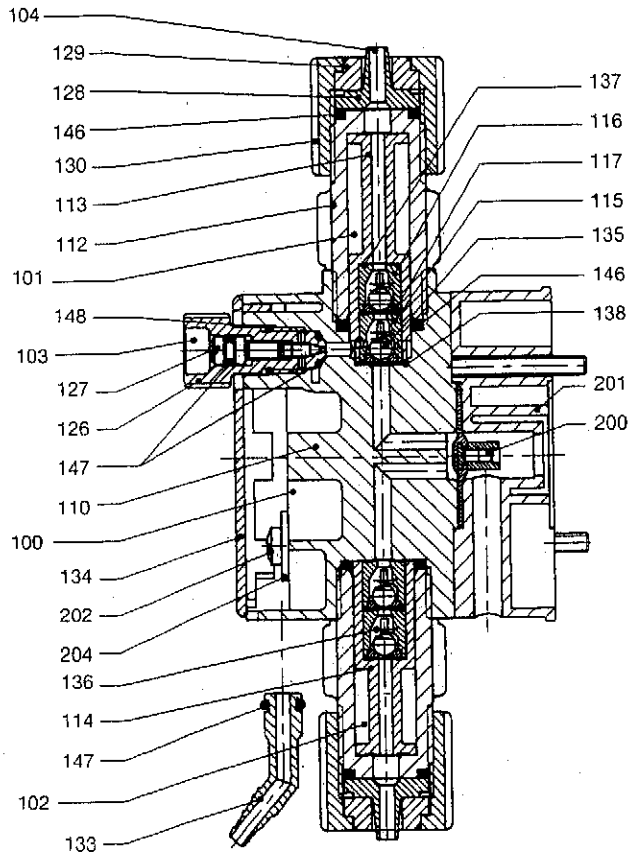
Spare Parts List Liquid Ends



1991/3

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

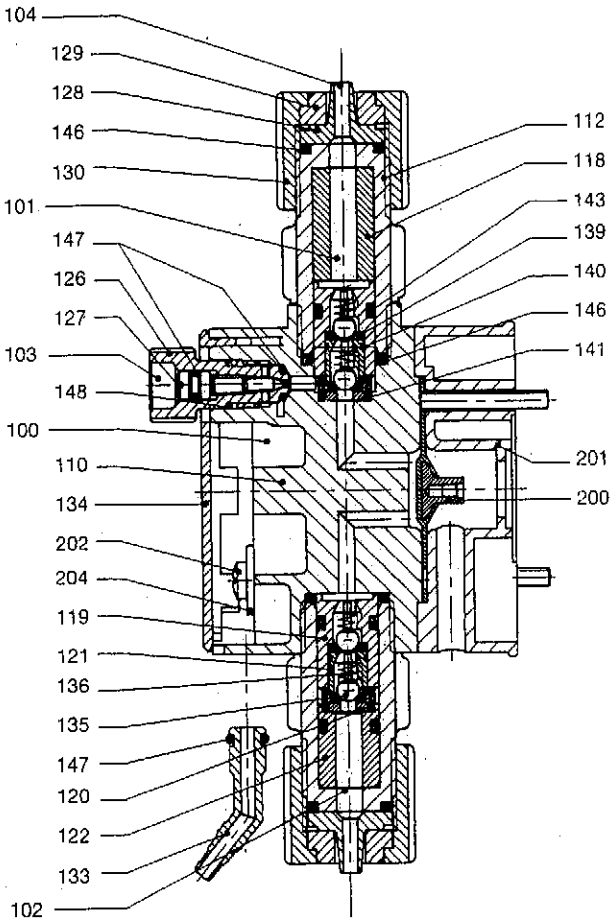
1000 PP



1930/4

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

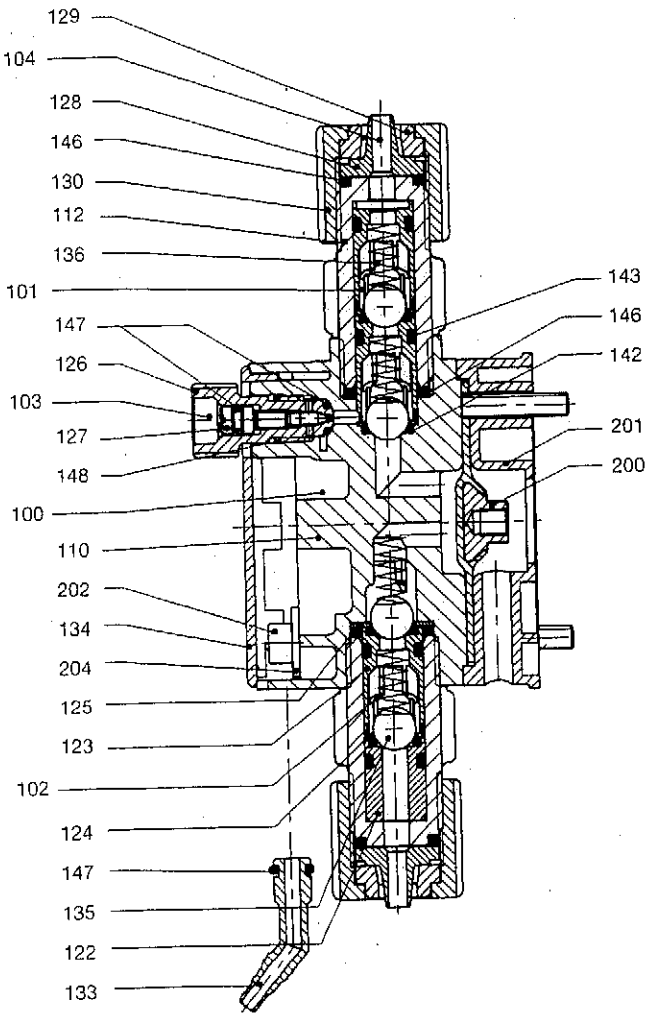
2001 - 1201 - 0803 PP



1932/4

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

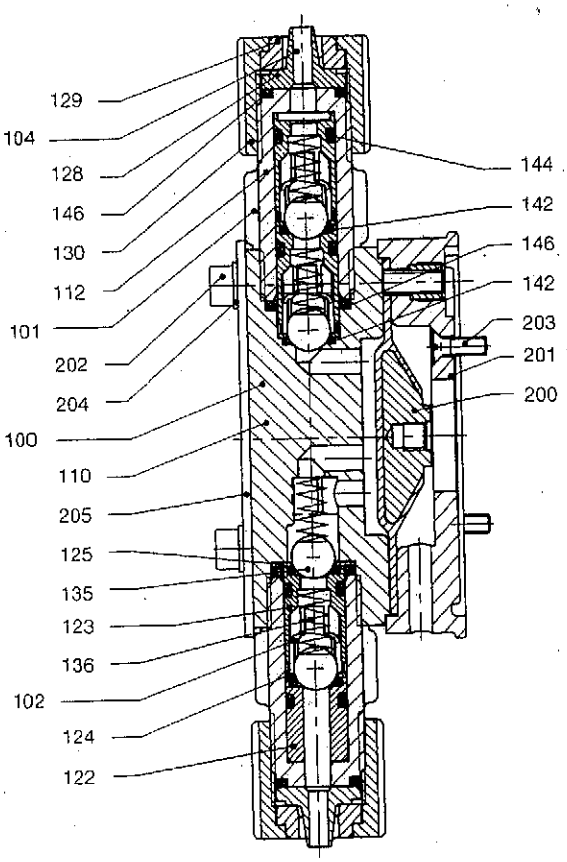
1002 - 0408 PP



1933/4

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

0216 PP



1934/4

Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Fördereinheiten PP	**gamma/4 Liquid End Assemblies PP**	98.52.46.8
1 A	1	Förderteil gamma/4 1000 PP 6x4	Liquid end gamma/4 1000 PP 6x4	91.22.02.9
2 B	1	Förderteil gamma/4 2001 PP 6x4	Liquid end gamma/4 2001 PP 6x4	91.22.07.8
3 C	1	Förderteil gamma/4 1201 PP 6x4	Liquid end gamma/4 1201 PP 6x4	91.22.12.8
4 D	1	Förderteil gamma/4 0803 PP 6x4	Liquid end gamma/4 0803 PP 6x4	91.22.17.7
5 E	1	Förderteil gamma/4 1002 PP 8x5	Liquid end gamma/4 1002 PP 8x5	91.22.22.7
6 F	1	Förderteil gamma/4 0408 PP 8x5	Liquid end gamma/4 0408 PP 8x5	91.22.27.6
7 G	1	Förderteil gamma/4 0216 PP 8x5	Liquid end gamma/4 0216 PP 8x5	91.22.32.6
100 A	1	Dos.Kopf kpl.70x10 LK38 PP EPDM	Dos.head cpl.70x10 LK38 PP EPDM	81.71.01.9
100 B	1	Dos.Kopf kpl.70x12,5LK38 PP EPDM	Dos.head cpl.70x12,5LK38 PP EPDM	81.71.02.7
100 C	1	Dos.Kopf kpl.70x16 LK38 PP EPDM	Dos.head cpl.70x16 LK38 PP EPDM	81.71.03.5
100 D	1	Dos.Kopf kpl.70x22 LK38 PP EPDM	Dos.head cpl.70x22 LK38 PP EPDM	81.71.04.3
100 E	1	Dos.Kopf kpl.70x22 LK50 PP EPDM	Dos.head cpl.70x22 LK50 PP EPDM	81.71.05.0
100 F	1	Dos.Kopf kpl.70x34 LK50 PP EPDM	Dos.head cpl.70x34 LK50 PP EPDM	81.71.06.8
100 G	1	Dos.Kopf kpl.85x42 LK66 PP EPDM	Dos.head cpl.85x42 LK66 PP EPDM	81.71.11.8
101 A	1	Druckventil kpl.4.7-1000 EPDM PP	Discharge valve 4.7-1000 EPDM PP	80.94.28.6
101 B-D	1	Druckventil kpl.4.7 EPDM PP	Discharge valve cpl.4.7 EPDM PP	80.94.30.2
101 E-G	1	Druckventil kpl.9.2 EPDM PP	Discharge valve cpl.9.2 EPDM PP	80.94.32.8
102 A	1	Saugventil kpl.4.7-1000 EPDM PP	Suction valve 4.7-1000 EPDM PP	80.94.29.4
102 B-D	1	Saugventil kpl.4.7 EPDM PP	Suction valve cpl. 4.7 EPDM PP	80.94.31.0
102 E-G	1	Saugventil kpl.9.2 EPDM PP	Suction valve cpl.9.2 EPDM PP	80.94.33.6
103 A-F	1	Entlüftungsventil kpl. PVDF/EPDM	Vent valve cpl. PVDF/EPDM	80.94.90.6
104 A-D	1	Anschlußset 6x4 EPDM PP	Connection set 6x4 EPDM PP	81.71.50.6
104 A-G **	1	Anschlußset 12x9 EPDM PP	Connection set 12x9 EPDM PP	81.71.51.4
104 A-G **	1	Anschlußset 12x6 EPDM PP	Connection set 12x6 EPDM PP	81.71.52.2
104 E-G	1	Anschlußset 8x5 EPDM PP	Connection set 8x5 EPDM PP	81.71.53.0
104 A-G **	1	Anschluss-Set 12x9 USA EPDM PP	Connection set 12x9 USA EPDM PP	81.71.55.5
105 A-G **/*	1	Adapterset M20x1,5 R 5/8 EPDM PP	Adapterset M20x1,5 R 5/8 EPDM PP	81.71.54.8
110 F	1	Dosierkopf d70x34 LK50-BF PP	Dosing head d70x34 LK50-BF PP	14.55.30.2
110 E	1	Dosierkopf d70x22 LK50-BF PP	Dosing headd70x22 LK50-BF PP	14.55.31.0
110 D	1	Dosierkopf d70x22 LK38-BF PP	Dosing headd 70x22 LK38-BF PP	14.55.40.1
110 C	1	Dosierkopf d70x16 LK38-BF PP	Dosing head d70x16 LK38-BF PP	14.55.41.9
110 B	1	Dosierkopf d70x12,5 LK38-BF PP	Dosing head d70x12,5 LK38-BF PP	14.55.42.7
110 A	1	Dosierkopf d70x10 LK38-BF PP	Dosing head d70x10 LK38-BF PP	14.55.43.5
110 G	1	Dosierkopf 85x42x30 LK66 g/4 PP	Dosing head 85x42x30 LK66 g/4 PP	81.08.75.5
111 A-F *	1	Stopfen f.Dosierkopf gespr. PE	Stopper f.dosing head PE	14.04.01.1
112 A-G	2	Ventilkörper M20x1,5x45 PP	Valve body M20x1,5x45 PP	80.06.16.5
113 A	1	Ventilbüchse 4.7 Druckseite PP	Valve bushing 4,7disch.side PP	80.06.29.8
114 A	1	Ventilbüchse 4.7 Saugseite PP	Valve bushing 4,7snct.side PP	80.06.32.2
115 A	1	Ventileinsatz d4.7-1000-1 PP	Valve insert d4.7-1000-1 PP	80.06.30.6
116 A	3	Ventileinsatz d4.7-1000-2 PP	Valve insert.d4.7-1000-2 PP	80.06.31.4
117 A	4	Kugelsitzscheibe d.7,2x3 Keramik	Ball seat washer d.7,2x3 ceramic	40.40.13.5
118 B-D	1	Distanzhülse 4,7 d13x24 PP	Spacing slide 4,7 d13x24 PP	80.06.20.7
119 B-D	2	Clipbuchse 4,7 d13x23 PP	Clip busk 4,7 d13x23 PP	80.06.24.9
120 B-D	2	Clipscheibe 4,7 PP	Clipplate 4,7 PP	80.06.25.6
121 B-D	2	Ventileinsatz 4,7x11 PP	Valve inerset 4,7x11 PP	80.06.22.3
122 B-G	1	Distanzhülse 4,7 d18x18 PP	Spacing slide 4,7 d18x18 PP	80.06.21.5
123 E-G	3	Ventileinsatz 9,2x23 PP	Valve inerset 9,2x23 PP	80.06.23.1
124 E-G	3	Kugelsitzscheibe 13x9,5x1 PP	Ball seat washer 13x9,5x1 PP	14.07.54.3
125 E-G	1	Kugelsitzscheibe 9,5 PP	Ball seat washer 9,5 PP	81.15.33.9
126 A-F	1	Ventilkörper Entlüftung DK. PVDF	Valve body PVDF	14.12.05.5
127 A-F	1	Ventilnadel Entlüftung DK. PVDF	Valve needle PVDF	14.12.06.3
128 A-D	2	Schlauchtülle 6x4 PP	Tube nozzle 6x4 PP	80.06.09.0
128 E-G	2	Schlauchtülle 8x5 PP	Tube nozzle 8x5 PP	80.06.10.8
128 A-G **	2	Schlauchtülle 12x6 PP	Tube nozzle 12x6 PP	80.06.11.6
128 A-G **	2	Schlauchtülle 12x9 PP	Tube nozzle 12x9 PP	80.06.12.4
128 A-G **	2	Schlauchtülle d12x9 USA PP	Tube nozzle d12x9 USA PP	80.06.27.2
129 A-D	2	Quetschring d6 PP	Clamp-ring d6 PP	80.06.17.3
129 E-G	2	Quetschring d8 PP	Clamp-ring d8 PP	80.06.18.1
129 A-G **	2	Quetschring d12 PP	Clamp ring d12 PP	80.06.19.9
129 A-G **	2	Quetschring d12 USA Ryton	Clamp-ring d12 USA Ryton	80.06.28.0
130 A-G	2	Überwurfmutter M20x1,5x25 PP	Union nut M20x1,5x25 PP	80.06.08.2
131 A-G **/*	2	Adapter M20x1,5-R5/8" PP	Adapter M20x1,5-R5/8" PP	80.06.14.0
133 A-F	1	Schlauchtülle-Bypass d5,5 PP	Tube nozzle-bypass d5,5 PP	80.06.13.2
134 A-F	1	Abdeckblende d70 Dosk.gespr. PP	Cover d70 Dosk.gespr. PP	80.06.26.4
135 A-D	4	Ventilkugel 4,8mm Keramik	Valve ball 4,8mm ceramic	40.42.01.6
135 E-G	4	Ventilkugel 9,2mm Duran 50	Valve ball 9,2mm Duran 50	40.42.10.7
136 E-G **	4	Ventilfeder 8+12 1.4571	Valve spring 8+12 st.st	46.94.03.0
136 A-D **	4	Ventilfeder D0,3/DA3,9 1.4571	Valve spring 3,9x0,3x4,5 st.st	46.94.06.3
137 A	7	Flachdichtg. D9,d5,S0,5 EPDM	Flat packing D9,d5,S0,5 EPDM	48.39.55.1
138 A	1	Flachdichtg. D11,d5,S0,5 EPDM	Flat packing D11,d5,S0,5 EPDM	48.39.56.9
139 B-D	4	O-Ring 3,68-1,78/E893-80EPDMviol	O-Ring 3,68-1,78/E893-80EPDMviol	48.04.03.5
140 B-D	2	O-Ring 6-1 E893-80EPDM viol	O-Ring 6-1 E893-80EPDM viol	48.04.06.8
141 B-D	2	O-Ring 7,65-1,78/E893-80EPDMviol	O-ring 7,65-1,78/E893-80EPDMviol	48.04.08.4
142 E-G	4	O-Ring 7,65-1,78/E893-80EPDMviol	O-ring 7,65-1,78/E893-80EPDMviol	48.04.08.4
143 B-D	3	O-Ring 8,3-2,4/E893-80EPDM viol	O-Ring 8,3-2,4/E893-80EPDM viol	48.04.09.2
144 E-G	4	O-Ring 8,3-2,4/E893-80EPDM viol	O-Ring 8,3-2,4/E893-80EPDM viol	48.04.09.2

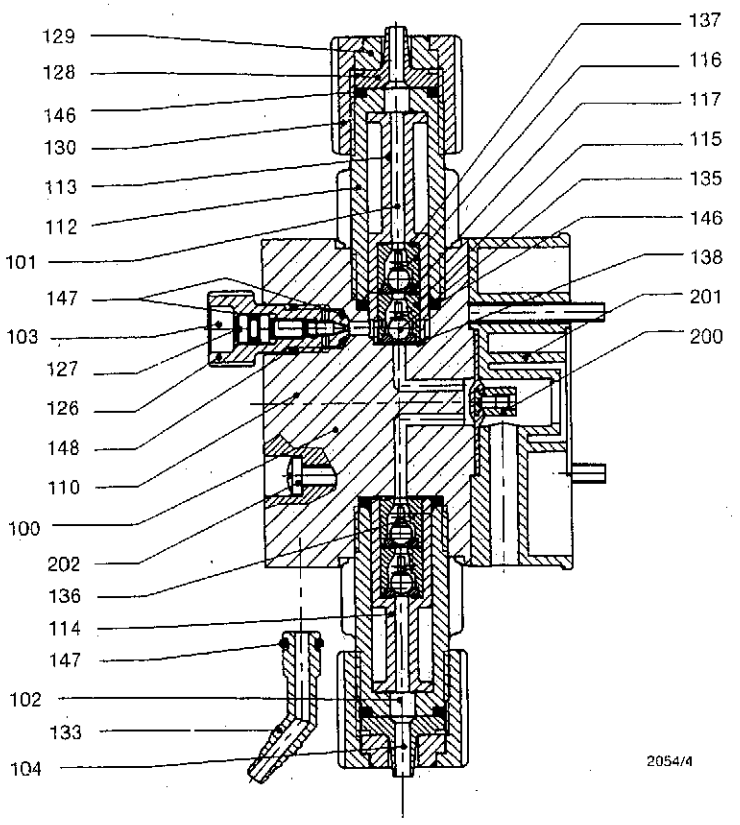
Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Fördereinheiten PP	**gamma/4 Liquid End Assemblies PP**	98.52.46.8
145 A–G **/*	2	O-Ring 12,37-2,62/E893-80EPDM v.	O-ring 12,37-2,62/E893-80EPDM v.	48.04.15.9
146 A–G	4	O-Ring 13-2,5/E893-80EPDM viol	O-Ring 13-2,5/E893-80EPDM viol	48.04.17.5
147 A–F	3	O-Ring 3,68-1,78/E893-80EPDMviol	O-Ring 3,68-1,78/E893-80EPDMviol	48.04.03.5
148 A–F	1	O-Ring 7,65-1,78/E893-80EPDMviol	O-ring 7,65-1,78/E893-80EPDMviol	48.04.08.4
200 A	1	Developan-Membran 9.20 31x6 T	Developan-diaphg. 9.20 31x6 T	81.14.52.2
200 B	1	Developan-Membran 9.21 48x9,5 T	Developan-diaphg. 9.21 48x9,5 T	81.14.53.0
200 C	1	Developan-Membran 9.22 48x12,5 T	Developan-diaphg. 9.22 48x12,5 T	81.14.54.8
200 D	1	Developan-Membran 9.23 48x18,5 T	Developan-diaphg. 9.23 48x18,5 T	81.14.55.5
200 E	1	Developan-Membran 9.33 60x17 T	Developan-diaphg. 9.33 60x17 T	81.14.56.3
200 F	1	Developan-Membran 9.44 60x28 T	Developan-diaphg. 9.44 60x28 T	81.14.57.1
200 G	1	Developan-Membran 9.46 76x37 T	Developan-diaphg. 9.46 76x37 T	81.14.58.9
201 E	1	Kopfscheibe 70x22 HKS 41 Noryl	Head washer 70x22 HKS 41 Noryl	14.11.28.9
201 F	1	Kopfscheibe 70x41 HKS 41 Noryl	Head washer 70x41 HKS 41 Noryl	14.11.29.7
201 A	1	Kopfscheibe d70x10 LK38 g/4 GFN2	Back plate d70x10 LK38 g/4 GFN2	80.07.01.5
201 B	1	Kopfscheibe d70x13,4LK38 g4 GFN2	Back plate d79x13,4 LK38 g4 GFN2	80.07.02.3
201 C	1	Kopfscheibe d70x17 LK38 g/4 GFN2	Back plate d79x17 LK38 g/4 GFN2	80.07.03.1
201 D	1	Kopfscheibe d70x23,2LK38 g4 GFN2	Back plate d70x23,2 LK38 g4 GFN2	80.07.04.9
201 G	1	Kopfscheibe d85x47 LK38/66 GFN2	Back plate d85x47 LK38/66 GFN2	81.17.07.9
202 G	4	IS-Schraube M5x45 A4 DIN 912	Socket cp.scr.M5x45 A4 DIN 912	46.80.74.0
202 E,F	4	IS-Schraube M5x60 A4 DIN 912	Socket cp.scr.M5x60 A4 DIN 912	46.80.77.3
202 A–D	4	Liko-Schraube M4x65 A2 DIN 7985	Cntrsunk screw M4x65 A2 DIN 7985	46.86.40.8
203 G	4	Senkschraube M4x12 verz.DIN 965	Cntrsunk screw M4x12 DIN 965	46.87.11.7
204 A–F	4	U-Scheibe 5,3 A2 DIN 9021	Washer 5,3 A2 DIN 9021	46.22.28.8
205 G	1	Panz.sch. d85mm RAL5003 1.4301	Reinforce.plate d85mm RAL 1.4301	80.70.50.0

* Ohne Abbildung/Not Shown

** Sonderzubehör/Special Accessories

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

1000 N



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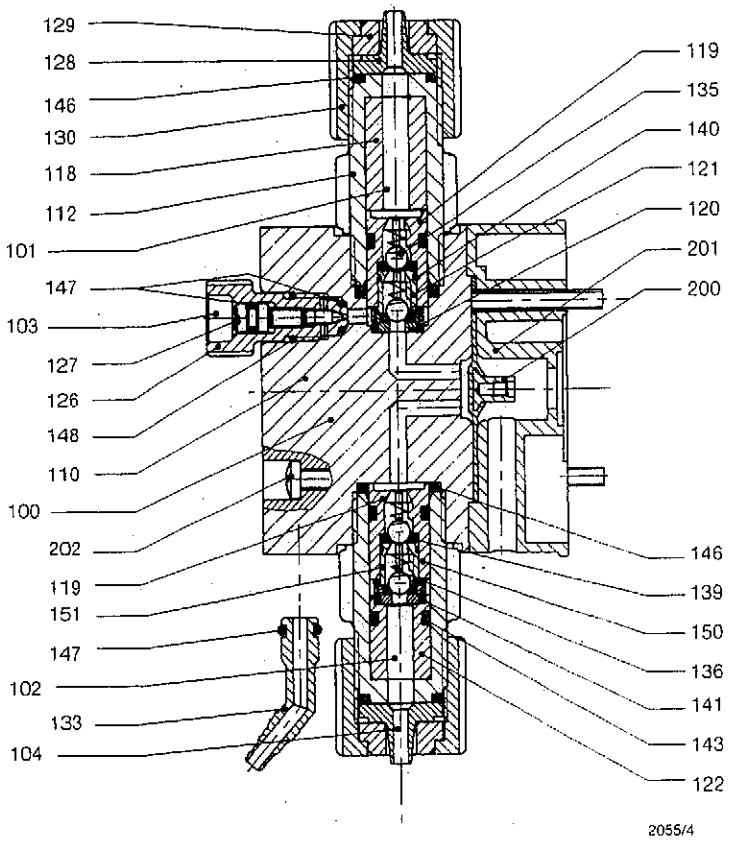
2001 - 0803 N



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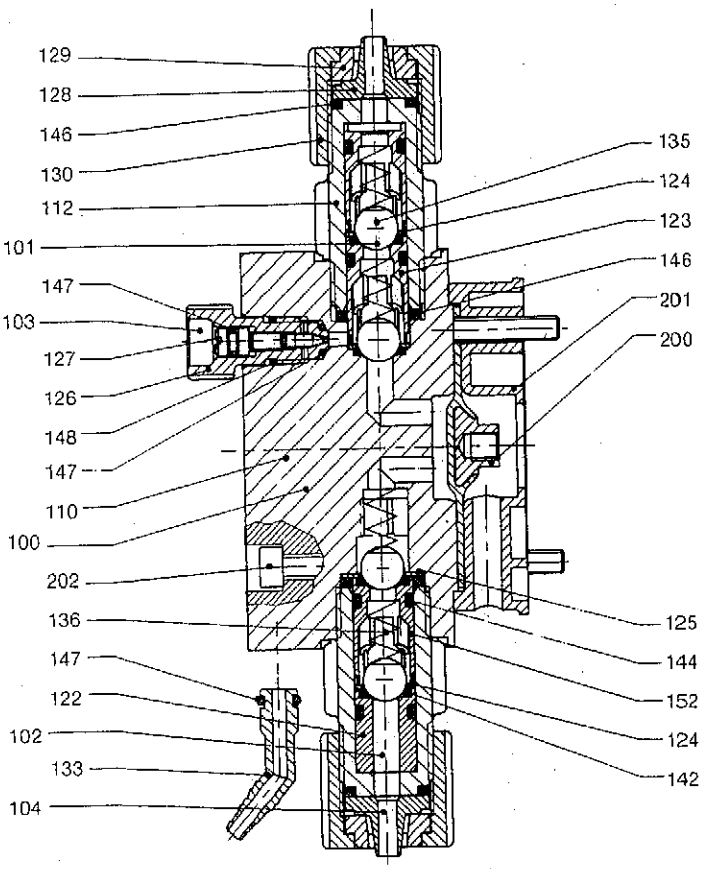
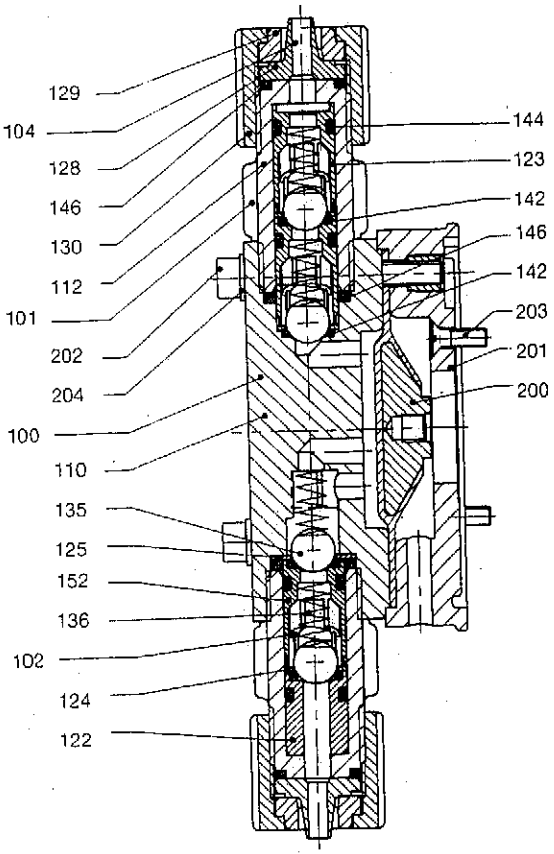
1002 - 0408 N



2063/4

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

0216 N



2064/4

Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Fördereinheiten kpl.	**gamma/4 Liquid End Assemblies cpl.**	98.52.51.8
1 A	1	Förderteil gamma/4 1000 N 6x4	Liquid end gamma/4 1000 N 6x4	91.22.01.1
2 B	1	Förderteil gamma/4 2001 N 6x4	Liquid end gamma/4 2001 N 6x4	91.22.06.0
3 C	1	Förderteil gamma/4 1201 N 6x4	Liquid end gamma/4 1201 N 6x4	91.22.11.0
4 D	1	Förderteil gamma/4 0803 N 6x4	Liquid end gamma/4 0803 N 6x4	91.22.16.9
5 E	1	Förderteil gamma/4 1002 N 8x5	Liquid end gamma/4 1002 N 8x5	91.22.21.9
6 F	1	Förderteil gamma/4 0408 N 8x5	Liquid end gamma/4 0408 N 8x5	91.22.26.8
7 G	1	Förderteil gamma/4 0216 N 8x5	Liquid end gamma/4 0216 N 8x5	91.22.31.8
100 A	1	Dosierkopf kpl. d70x10 LK38 N	Dosing head cpl.d70x10 LK38 N	81.70.01.1
100 B	1	Dosierkopf kpl. d70x12,5LK38 N	Dosing head cpl.70x12,5 LK38 N	81.70.02.9
100 C	1	Dosierkopf kpl. d70x16 LK38 N	Dosing head cpl.d70x16 LK38 N	81.70.03.7
100 D	1	Dosierkopf kpl. d70x22 LK38 N	Dosing head cpl.d70x22 LK38 N	81.70.04.5
100 E	1	Dosierkopf kpl. d70x22 LK 50 N	Dosing head cpl.d70x22 LK 50 N	81.70.05.2
100 F	1	Dosierkopf kpl. d70x34 LK50 N	Dosing head cpl.d70x34 LK50 N	81.70.06.0
100 G	1	Dosierkopf kpl. d85x42 LK66 N	Dosing head cpl.d85x42 LK66 N	81.70.07.8
101 A	1	Druckventil kpl. 4.7-1000 N/P	Discharge valve cpl. 4.7-1000N/P	80.94.08.8
101 B-D	1	Druckventil kpl. 4.7 N/P	Discharge valve cpl. 4.7 N/P	80.94.10.4
101 E-G	1	Druckventil kpl. 9.2 N/P	Discharge valve cpl. 9.2 N/P	80.94.12.0
102 A	1	Saugventil kpl.4.7-1000 N/P	Suction valve cpl.4.7-1000 N/P	80.94.09.6
102 B-D	1	Saugventil kpl. 4.7 PVC	Suction valve cpl. 4.7 PVC	80.94.11.2
102 E-G	1	Saugventil kpl. 9.2 PVC	Suction valve cpl. 9.2 PVC	80.94.13.8
103 A-F	1	Entlüft.ventil kpl. PVDF/FKM	Vent valve cpl. PVDF/FKM	80.94.91.4
104 A-D	1	Anschlußset 6x4 PVC	Connection set 6x4 PVC	81.70.50.8
104 A-G **	1	Anschlußset 12x9 PVC	Connection set 12x9 PVC	81.70.51.6
104 A-G **	1	Anschlußset 12x6 PVC	Connection set 12x6 PVC	81.70.52.4
104 E-G	1	Anschlußset 8x5 PVC	Connection set 8x5 PVC	81.70.53.2
104 A-G **	1	Anschluss-Set 12x9 USA PVC	Connection set 12x9 USA PVC	81.70.55.7
105 A-G **/*	1	Adapterset M20x1,5 R5/8 PVC	Adapterset M20x1,5 R5/8 PVC	81.70.54.0
110 A	1	Dosierk.70x10 LK38 g/4 1000 N	Dos.head 70x10 LK38 g/4 1000 N	81.07.51.8
110 B	1	Dosierk.70x12,5 LK38 g/4-2001 N	Dos.head70x12,5 LK38 g/4-2001 N	81.07.52.6
110 C	1	Dosierk.70x16 LK38 g/4-1201 N	Dos.head70x16 LK38 g/4-1201 N	81.07.53.4
110 D	1	Dosierk.70x22 LK38 g/4 0803 N	Dos.head70x22 LK38 g/4 0803 N	81.07.54.2
110 E	1	Dosierk.85x22 LK50 g/4-1002 N	Dos.head85x22 LK50 g/4-1002 N	81.07.55.9
110 F	1	Dosierk.85x34 LK50 g/4-0408 N	Dos.head85x44 LK50 g/4-0408 N	81.07.56.7
110 G	1	Dosierk.85x42 LK66 g/4-0216 N	Dos.head85x42 LK66 g/4-0216 N	81.07.57.5
112 A-G	2	Ventilkörper M20x1,5x45 PVC	Valve body M20y1,5x45 PVC	80.05.25.8
113 A	1	Ventilbüchse 4.7 Druckseite N	Valve bushing 4,7 disch.side N	80.04.05.3
114 A	1	Ventilbüchse 4.7 Saugseite N	Valve bushing 4.7 snct.side N	80.04.06.1
115 A	1	Ventileinsatz d4.7-1000-1 N	Valve insert d4.7-1000-1 N	80.04.07.9
116 A	3	Ventileinsatz d4.7-1000-2 N	Valve insert d4.7-1000-2 N	80.04.08.7
117 A	4	Kugelsitzscheibe d.7,2x3 Keramik	Ball seat washer d.7,2x3 ceramic	40.40.13.5
118 B-D	1	Distanzhülse 4,7 x 24 PVC	Spacing slide 4,7 x 24 PVC	80.05.16.7
119 B-D	1	Clipbuchse 4.7 d13x23 N	Clip bush 4.7 d13x23 N	80.04.11.1
120 B-D	2	Clipscheibe 4,7 PVC	Clipplate 4,7 PVC	80.05.15.9
121 B-D	1	Ventileinsatz 4.7x11 N	Valve insert 4.7x11 N	80.04.10.3
122 B-G	1	Distanzhülse 4,7 d18 x 18 PVC	Spacing slide 4,7 d18 x 18 PVC	80.05.17.5
123 E-G	2	Ventileinsatz 9.2x23 N	Valve insert 9.2x23 N	80.04.09.5
124 E-G	3	Scheibe 13x9,5x1 PVC	Disc 13x9,5x1 PVC	14.05.54.7
125 E-G	1	Kugelsitzscheibe 18x9,5x1 PVC	Ball seated disc 18x9,5x1 PVC	81.15.25.5
126 A-F	1	Ventilkörper Entlüftung DK. PVDF	Valve body PVDF	14.12.05.5
127 A-F	1	Ventilnadel Entlüftung DK. PVDF	Valve needle PVDF	14.12.06.3
128 A-D	2	Schlauchtülle 6 x 4 PVC	Tube nozzle 6 x 4 PVC	80.05.20.9
128 E-G	2	Schlauchtülle 8 x 5 PVC	Tube nozzle 8 x 5 PVC	80.05.21.7
128 A-G **	2	Schlauchtülle 12 x 6 PVC	Tube nozzle 12 x 6 PVC	80.05.22.5
128 A-G **	2	Schlauchtülle 12 x 9 PVC	Tube nozzle 12 x 9 PVC	80.05.23.3
128 A-G **	2	Schlauchtülle d12x9 USA PVC	Tube nozzle d12x9 USA PVC	80.05.30.8
129 A-D	2	Quetschring d6 PVC	Clamp ring d6 PVC	80.05.10.0
129 E-G	2	Quetschring d8 PVC	Clamp ring d8 PVC	80.05.11.8
129 A-G **	2	Quetschring d12 PVC	Clamp ring d12 PVC	80.05.12.6
129 A-G **	2	Quetschring d12 USA PVC	Clamp-ring d12 USA PVC	80.05.31.6
130 A-G	2	Überwurfmutter M20x1,5x25 PVC	Union nut M20x1,5x25 PVC	80.05.18.3
131 A-G **/*	2	Adapter M20x1,5 - R5/8 PVC	Adapter M20x1,5 - R5/8 PVC	80.05.24.1
133 A-F	1	Schlauchtülle - Bypass d5,5 PVC	Tube nozzle - bypass d5,5 PVC	80.05.19.1
135 A-D	4	Ventilkugel 4,8mm Keramik	Valve ball 4,8mm ceramic	40.42.01.6
135 E-G	4	Ventilkugel 9,2mm Duran 50	Valve ball 9,2mm Duran 50	40.42.10.7
136 E-G **	4	Ventilfeder 8+12 1.4571	Valve spring 8+12 st.st	46.94.03.0
136 A-D **	4	Ventilfeder D0,3/DA3,9 1.4571	Valve spring 3,9x0,3x4,5 st.st	46.94.06.3
137 A	7	Flachd. D=9-0,2 d=5,5+-0,2 Viton	Flat packing D9 d5,5 Viton A	48.39.48.6
138 A	1	Flachd. D=11 d=5 S=0,5 Viton A	Flat packing D11 d5 Viton A	48.39.49.4
139 B-D	4	O-Ring 3,68-1,78 83FKM575	O-ring 3,68-1,78 83FKM575	48.10.03.2
140 B-D	2	O-Ring 6-1 67FKM581	O-ring 6-1 67FKM581	48.10.06.5
141 B-D	2	O-Ring 7,65-1,78 83FKM575	O-ring 7,65-1,78 83FKM575	48.10.07.3
142 E-G	4	O-Ring 7,65-1,78 83FKM575	O-ring 7,65-1,78 83FKM575	48.10.07.3
143 B-D	3	O-Ring 8,3x2,4 67FKM581	O-ring 8,3x2,4 67FKM581	48.10.08.1
144 E-G	4	O-Ring 8,3x2,4 67FKM581	O-ring 8,3x2,4 67FKM581	48.10.08.1
145 A-G **/*	2	O-Ring 12,37-2,62/E893-80EPDM v.	O-ring 12,37-2,62/E893-80EPDM v.	48.04.15.9
146 A-G	4	O-Ring 13-2,5 67FKM581	O-ring 13-2,5 67FKM581	48.10.13.1

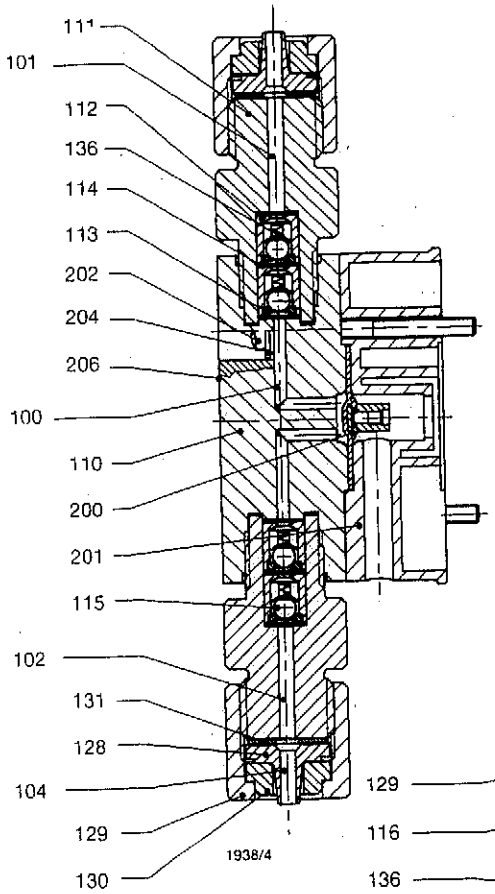
Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Fördereinheiten kpl.	gamma/4 Liquid End Assemblies cpl.	98.52.51.8
147 A-F	3	O-Ring 3,68-1,78 83FKM575	O-ring 3,68-1,78 83FKM575	48.10.03.2
148 A-F	1	O-Ring 7,65-1,78 83FKM575	O-ring 7,65-1,78 83FKM575	48.10.07.3
150 B-D	1	Clipbuchse 4,7 d13 x 23 PVC	Clip bush 4,7 d13 x 23 PVC	80.05.14.2
151 B-D	1	Ventileinsatz 4,7 x 11 PVC	Valve insert 4,7 x 11 PVC	80.05.26.6
152 E-G	1	Ventileinsatz 9,2 x 23 PVC	Valve insert 9,2 x 23 PVC	80.05.27.4
200 A	1	Developan-Membran 9.20 31x6 T	Developan-diaphg. 9.20 31x6 T	81.14.52.2
200 B	1	Developan-Membran 9.21 48x9,5 T	Developan-diaphg. 9.21 48x9,5 T	81.14.53.0
200 C	1	Developan-Membran 9.22 48x12,5 T	Developan-diaphg. 9.22 48x12,5 T	81.14.54.8
200 D	1	Developan-Membran 9.23 48x18,5 T	Developan-diaphg. 9.23 48x18,5 T	81.14.55.5
200 E	1	Developan-Membran 9.33 60x17 T	Developan-diaphg. 9.33 60x17 T	81.14.56.3
200 F	1	Developan-Membran 9.44 60x28 T	Developan-diaphg. 9.44 60x28 T	81.14.57.1
200 G	1	Developan-Membran 9.46 76x37 T	Developan-diaphg. 9.46 76x37 T	81.14.58.9
201 E	1	Kopfscheibe 70x22 HKS 41 Noryl	Head washer 70x22 HKS 41 Noryl	14.11.28.9
201 F	1	Kopfscheibe 70x41 HKS 41 Noryl	Head washer 70x41 HKS 41 Noryl	14.11.29.7
201 A	1	Kopfscheibe d70x10 LK38 g/4 GFN2	Back plate d70x10 LK38 g/4 GFN2	80.07.01.5
201 B	1	Kopfscheibe d70x13,4LK38 g4 GFN2	Back plate d79x13,4 LK38 g4 GFN2	80.07.02.3
201 C	1	Kopfscheibe d70x17 LK38 g/4 GFN2	Back plate d79x17 LK38 g/4 GFN2	80.07.03.1
201 D	1	Kopfscheibe d70x23,2LK38 g4 GFN2	Back plate d70x23,2 LK38 g4 GFN2	80.07.04.9
201 G	1	Kopfscheibe d85x47 LK38/66 GFN2	Back plate d85x47 LK38/66 GFN2	81.17.07.9
202 G	4	IS-Schraube M5x45 A4 DIN 912	Socket cp.scr.M5x45 A4 DIN 912	46.80.74.0
202 E,F	4	IS-Schraube M5x60 A4 DIN 912	Socket cp.scr.M5x60 A4 DIN 912	46.80.77.3
202 A-D	4	Linsenschraube M4x65 A2 DIN 7985	Cntrsunk screw M4x65 A2 DIN 7985	46.86.40.8
203 G	4	Senkschraube M4x12 verz.DIN 965	Cntrsunk screw M4x12 DIN 965	46.87.11.7
204 G	4	U-Scheibe 5,3 A2 DIN 9021	Washer 5,3 A2 DIN 9021	46.22.28.8

* Ohne Abbildung/Not Shown

** Sonderzubehör/Special Accessories

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

1000 - 0803 T



1938/4

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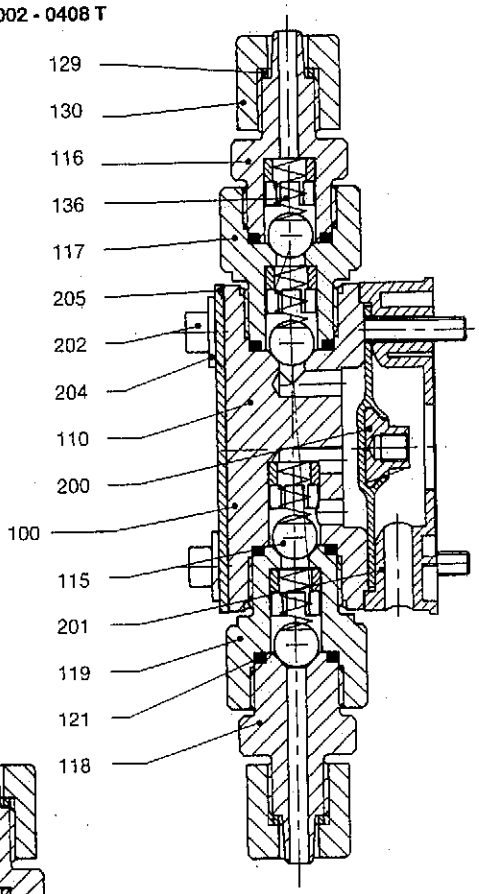
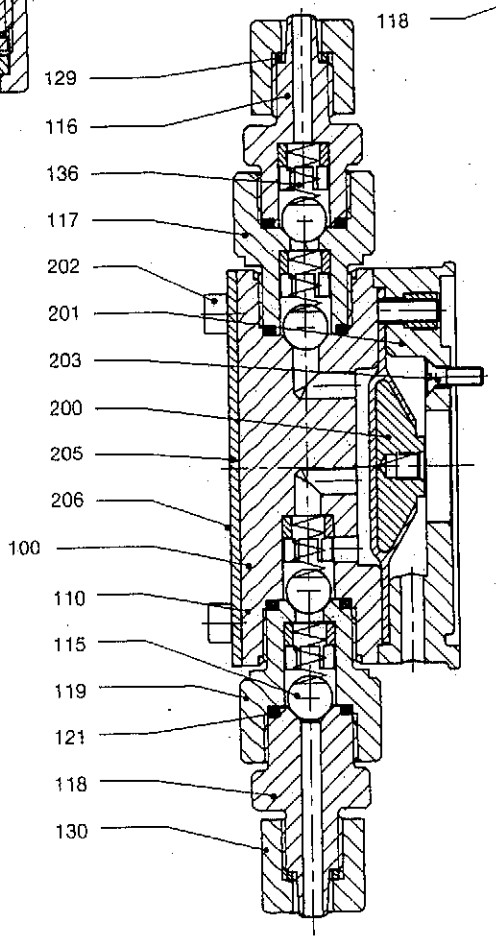


1939/4

gamma/ 4 Fördereinheit kpl./
Liquid End cplt.

0216 T



1940

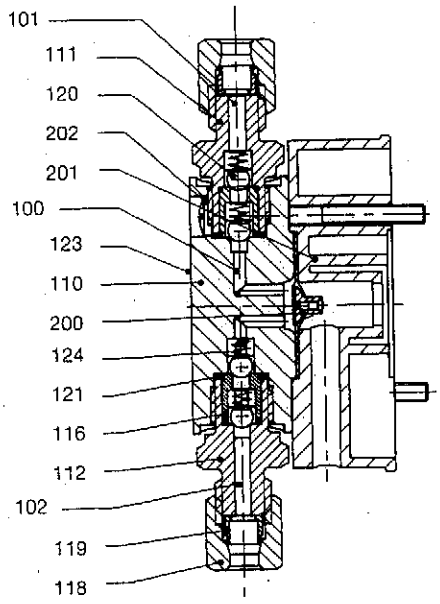
Pos. Typ Pos. Type	Anz. No. of	Artikel		Description		Best. Nr. Code No.
		gamma/4 Fördereinheiten T		**gamma/4 Liquid End Assemblies T**		98.52.47.6
1 A	1	Förderteil gamma/4 1000 T 6x4		Liquid end gamma/4 1000 T 6x4		91.22.03.7
2 B	1	Förderteil gamma/4 2001 T 6x4		Liquid end gamma/4 2001 T 6x4		91.22.08.6
3 C	1	Förderteil gamma/4 1201 T 6x4		Liquid end gamma/4 1201 T 6x4		91.22.13.6
4 D	1	Förderteil gamma/4 0803 T 6x4		Liquid end gamma/4 0803 T 6x4		91.22.18.5
5 E	1	Förderteil gamma/4 1002 T 8x5		Liquid end gamma/4 1002 T 8x5		91.22.23.5
6 F	1	Förderteil gamma/4 0408 T 8x5		Liquid end gamma/4 0408 T 8x5		91.22.28.4
7 G	1	Förderteil gamma/4 0216 T 8x5		Liquid end gamma/4 0216 T 8x5		91.22.33.4
100 G	1	Dosierkopf kpl. 85x42 LK66	T	Dosing head cpl. 85X42 LK66	T	81.99.06.9
100 A	1	Dosierk.kpl.d70x10 LK38	T	Dos.head c.d70x10 LK38	T	81.99.11.9
100 B	1	Dosierk.kpl.d70x12,5 LK38	T	Dos.head c.d70x12,5 LK38	T	81.99.12.7
100 C	1	Dosierk.kpl.d70x16 LK38	T	Dos.head c.d70x16 LK38	T	81.99.13.5
100 D	1	Dosierk.kpl.d70x22 LK38	T	Dos.head c.d70x22 LK38	T	81.99.14.3
100 E	1	Dosierkopf kpl. 70x22 LK50	T	Dosing head cpl. 70X22 LK50	T	81.99.34.1
100 F	1	Dosierkopf kpl. 70x34 LK50	T	Dosing head cpl. 70X34 LK50	T	81.99.35.8
101 A-D	1	Druckventil kpl. d6	T	Discharge valve cpl. d6	T	80.94.40.1
102 A-D	1	Saugventil kpl. d6	T	Suction valve kpl. d6	T	80.94.41.9
104 A-D	1	Anschluss-Set 6x4	T	Connection set 6x4	T	81.72.01.7
104 A-D **	1	Anschluss-Set 12x9	T	Connection set 12x9	T	81.72.02.5
104 A-D **	1	Anschluss-Set 12x6	T	Connection set 12x6	T	81.72.03.3
104 E-G	1	Anschluss-Set 8x5	T	Connection set 8x5	T	81.72.04.1
110 A	1	Dosierk. d70x10x27 LK 38	T	Dosing hd. d70x10x27 LK38	T	81.09.26.6
110 B	1	Dosierk. d70x12,5x27 LK38	T	Dosing hd. d70x12,5x27 LK38	T	81.09.27.4
110 C	1	Dosierk. d70x16x27 LK38	T	Dosing hd. d70x16x27 LK38	T	81.09.28.2
110 D	1	Dosierk. d70x22x27 LK38	T	Dosing hd. d70x22x27 LK38	T	81.09.29.0
110 G	1	Dosierkopf 85x42 m.SB.	T	Dosing head 85x42 m.SB.	T	81.10.52.0
110 E	1	Dosierkopf 70x22 m.SB.	T	Dosing head 70x22 m.SB.	T	81.10.53.8
110 F	1	Dosierkopf 70x34 m.SB.	T	Dosing head 70x34 m.SB.	T	81.10.54.6
111 A-D	2	Ventilkörper 6 M20xR3/8"x48	T	Valve body 6 M20xR3/8"x48	T	81.18.01.0
112 A-D	4	Ventileinsatz	T	Valve insert	T	81.14.49.8
113 A-D	4	Kugelsitzscheibe d7,2 ZrO2 Keram		Ball seat washer d7,2 ZrO2 ceram		40.40.23.4
114 A-D	6	Fl.dichtg.D8,5xd4x0,5 PTFE nat		Gasket 8,5x4,0x0,5mm PTFE		48.39.15.5
115 A-D	4	Ventilkugel 4,8mm Keramik		Valve ball 4,8mm ceramic		40.42.01.6
115 E-G	4	Ventilkugel 9,5mm Duran 50		Valve ball 9,5mm Duran 50		40.42.09.9
116 E-G	1	Druckanschluss m.SB.8	T	Discharge conn. m.SB.8	T	81.10.61.1
117 E-G	1	Zwst.Druckanschl. m.SB.8/12	T	Inter.disch.conn. m.SB.8/12	T	81.10.59.5
118 E-G	1	Sauganschluss 8mm	T	Suction conn. 8mm	T	81.14.02.7
119 E-G	1	Zwst.Sauganschl. m.SB.8/12	T	Interm.suct.conn. m.SB.8/12	T	81.10.58.7
121 E-G	4	O-Ring 13-2,5	T	O-ring 13-2,5	T	48.11.13.9
128 A-D	2	Schlauchtülle 6x4	T	Tube socket 6x4	T	81.18.03.6
128 A-D **	2	Schlauchtülle 12x9	T	Tube socket 12x9	T	81.18.04.4
128 A-D **	2	Schlauchtülle 12x6	T	Tube socket 12x6	T	81.18.05.1
128 A-D	2	Schlauchtülle 8x5	T	Tube socket 8x5	T	81.18.06.9
129 A-D	2	Quetschring d6	PP	Clamp-ring d6	PP	80.06.17.3
129 A-D **	2	Quetschring d8	PP	Clamp-ring d8	PP	80.06.18.1
129 A-D **	2	Quetschring d12	PP	Clamp ring d12	PP	80.06.19.9
129 E-G	2	Quetschring d8 4571	S	Clamp-ring d8 4571	S	81.05.70.2
130 E-G	2	Überwurfmutter d8mm	T	Cap nut d8mm	T	81.14.38.1
130 A-D	2	Überwurfmutter M20x1,5x25	T	Union nut M20x1,5x25	T	81.18.02.8
131 A-D	2	Flachdichtung D17x4,7x1mm	T	Gasket D17x4,7x1mm	T	48.39.11.4
136 E-G **	4	Ventilfeder 8+12 1.4571		Valve spring 8+12 st.st		46.94.03.0
136 A-D **	4	Ventilfeder D0,3/D43,9 1.4571		Valve spring 3,9x0,3x4,5 st.st		46.94.06.3
200 A	1	Developan-Membran 9.20 31x6	T	Developan-diaphg. 9.20 31x6	T	81.14.52.2
200 B	1	Developan-Membran 9.21 48x9,5	T	Developan-diaphg. 9.21 48x9,5	T	81.14.53.0
200 C	1	Developan-Membran 9.22 48x12,5	T	Developan-diaphg. 9.22 48x12,5	T	81.14.54.8
200 D	1	Developan-Membran 9.23 48x18,5	T	Developan-diaphg. 9.23 48x18,5	T	81.14.55.5
200 E	1	Developan-Membran 9.33 60x17	T	Developan-diaphg. 9.33 60x17	T	81.14.56.3
200 F	1	Developan-Membran 9.44 60x28	T	Developan-diaphg. 9.44 60x28	T	81.14.57.1
200 G	1	Developan-Membran 9.46 76x37	T	Developan-diaphg. 9.46 76x37	T	81.14.58.9
201 E	1	Kopfscheibe 70x22 HKS 41 Noryl		Head washer 70x22 HKS 41 Noryl		14.11.28.9
201 F	1	Kopfscheibe 70x41 HKS 41 Noryl		Head washer 70x41 HKS 41 Noryl		14.11.29.7
201 A	1	Kopfscheibe d70x10 LK38 g/4 GFN2		Back plate d70x10 LK38 g/4 GFN2		80.07.01.5
201 B	1	Kopfscheibe d70x13,4LK38 g4 GFN2		Back plate d79x13,4 LK38 g4 GFN2		80.07.02.3
201 C	1	Kopfscheibe d70x17 LK38 g/4 GFN2		Back plate d79x17 LK38 g/4 GFN2		80.07.03.1
201 D	1	Kopfscheibe d70x23,2LK38 g4 GFN2		Back plate d70x23,2 LK38 g4 GFN2		80.07.04.9
201 G	1	Kopfscheibe d85x47 LK38/66 GFN2		Back plate d85x47 LK38/66 GFN2		81.17.07.9
202 G	4	IS-Schraube M5x45 A4 DIN 912		Socket cp.scr.M5x45 A4 DIN 912		46.80.74.0
202 E,F	4	IS-Schraube M5x55 A4 DIN 912		Socket cp.scr.M5x55 A4 DIN 912		46.80.76.5
202 A-D	4	Liko-Schraube M4x45 A2 DIN 7985		Screw M4x45 A2 DIN 7985		46.86.22.6
203 G	4	Senkschraube M4x12 verz.DIN 965		Cntrsunk screw M4x12 DIN 965		46.87.11.7
204 A-D	4	U-Scheibe 4,3 A2 DIN 9021		Washer 4,3 A2 DIN 9021		46.22.27.0
204 E,F	4	U-Scheibe 5,3 A2 DIN 9021		Washer 5,3 A2 DIN 9021		46.22.28.8
205 E,F	1	Panz.sch. d85mm RAL5003 1.4301		Rainforce.plate d85mm RAL 1.4301		80.70.50.0
205 G	1	Panzerscheibe d70 blau 5003		Reinforcement plate d70 5003		81.02.10.5
206 A-G	1	Selbstklebeetikett roter Pfeil		Label red arrow		60.96.15.0

* Ohne Abbildung/Not Shown

** Sonderzubehör/Special Accessories

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

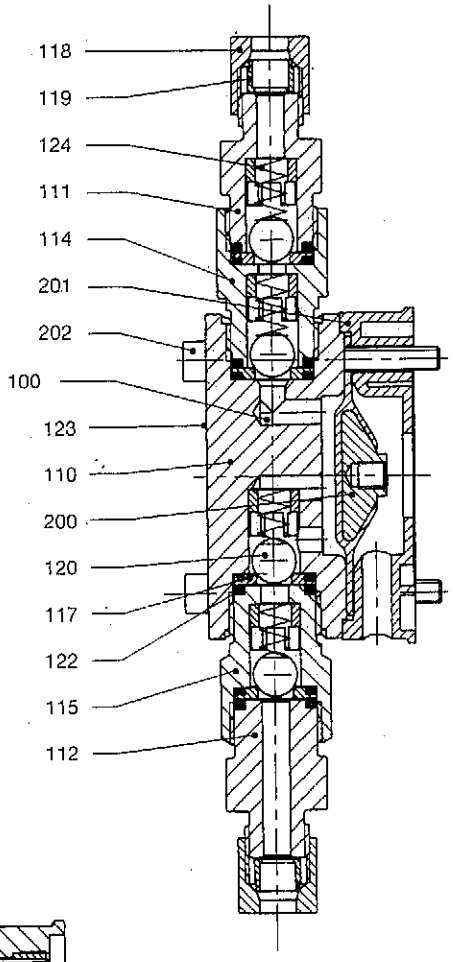
1000 - 0803 S



1941/4

gamma/ 4 Fördereinheit kpl./Liquid End cplt.

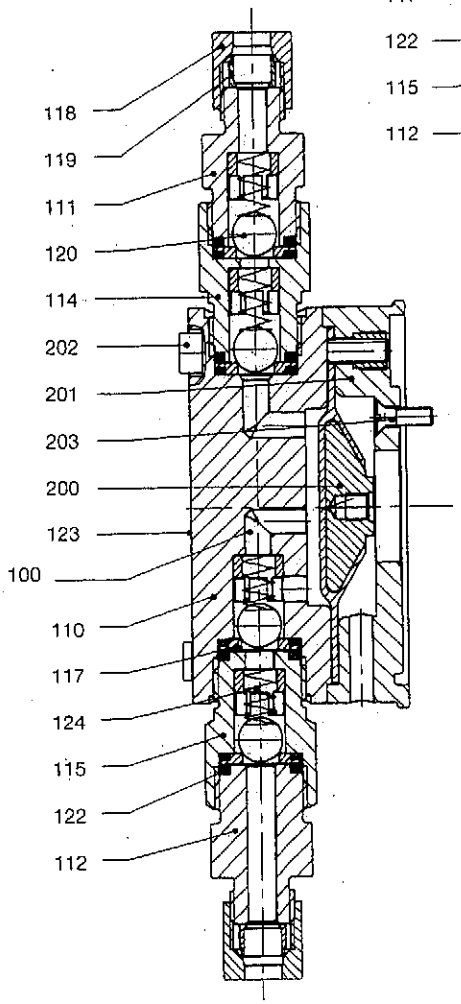
1002 - 0408 S



1942/4

gamma/ 4 Fördereinheit kpl./ Liquid End cplt.

0216 S



1943/4

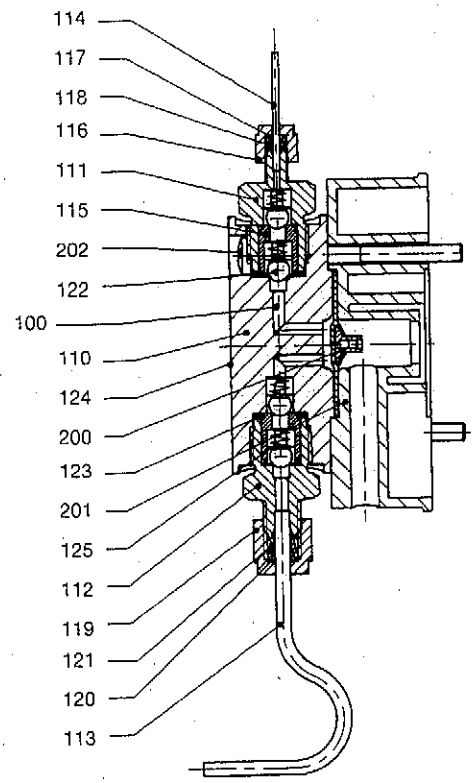
Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Fördereinheiten S	**gamma/4 Liquid End Assemblies S**	98.52.48.4
1 A	1	Förderteil gamma/4 1000 S 6	Liquid end gamma/4 1000 S 6	91.22.04.5
2 B	1	Förderteil gamma/4 2001 S 6	Liquid end gamma/4 2001 S 6	91.22.09.4
3 C	1	Förderteil gamma/4 1201 S 6	Liquid end gamma/4 1201 S 6	91.22.14.4
4 D	1	Förderteil gamma/4 0803 S 6	Liquid end gamma/4 0803 S 6	91.22.19.3
5 E	1	Förderteil gamma/4 1002 S 8	Liquid end gamma/4 1002 S 8	91.22.24.3
6 F	1	Förderteil gamma/4 0408 S 8	Liquid end gamma/4 0408 S 8	91.22.29.2
7 G	1	Förderteil gamma/4 0216 S 8	Liquid end gamma/4 0216 S 8	91.22.34.2
100 G	1	Dosierkopf kpl. 85x42 D8 S	Dosing head cpl.85X42 D8 S	81.89.06.0
100 E	1	Dosierkopf kpl. 70x22 D8 S	Dosing head cpl.70x22 D8 S	81.89.34.2
100 F	1	Dosierkopf kpl. 70x34 D8 S	Dosing head cpl.70x34 D8 S	81.89.35.9
100 A	1	Dosierkopf kpl.d55x10 LK 38 S	Dosing head cp.d55x10 LK 38 S	81.89.84.7
100 B	1	Dosierkopf kpl.d55x12,5 LK 38 S	Dosing head cp.d55x12,5 LK 38 S	81.89.85.4
100 C	1	Dosierkopf kpl.d55x16 LK 38 S	Dosing head cp.d55x16 LK 38 S	81.89.86.2
100 D	1	Dosierkopf kpl.d55x22 LK 38 S	Dosing head cp.d55x22 LK 38 S	81.89.87.0
101 A-D	1	Druckventil kpl.6 S	Discharge valve cpl.6 S	80.94.42.7
102 A-D	1	Saugventil kpl. 6 S	Suction valve cpl. 6 S	80.94.43.5
110 A	1	Dosierkopf d55xd10x22 LK 38 S	Dosing hd. d55xd10x22 LK 38 S	81.06.90.8
110 B	1	Dosierkopf d55xd12,5x22 LK 38 S	Dosing hd. d55xd12,5x22 LK 38 S	81.06.91.6
110 C	1	Dosierkopf d55xd16x22 LK 38 S	Dosing hd. d55xd16x22 LK 38 S	81.06.92.4
110 D	1	Dosierkopf d55xd22x22 LK 38 S	Dosing hd. d55xd22x22 LK 38 S	81.06.93.2
110 E	1	Dosierkopf 70x22 m.SB. S	Dosing head70x22 M.SB. S	81.10.01.7
110 F	1	Dosierkopf 70x34 M.SB. S	Dosing head70x34 M.SB. S	81.10.05.8
110 G	1	Dosierkopf 85x42 M.SB. S	Dosing head85x42 M.SB. S	81.10.07.4
111 A-D	1	Druckanschluss 6 WST 4571 S	Discharge joint 6 S	40.20.42.6
111 E-G	1	Druckanschluss M.SB.8 S	Discharge conn. M.SB.8 S	81.10.04.1
112 A-D	1	Sauganschluss 6 WST 4571 S	Suction joint 6 WST 4571 S	40.20.41.8
112 E-G	1	Sauganschluss 8 S	Suction valve 8 S	81.05.75.1
114 E-G	1	Zwst.Druckanschl. M.SB.12 S	Inter.dischg.conn. M.SB.12 S	81.10.03.3
115 E-G	1	Zwst.Sauganschl. m.SB.12 S	Interm.suct.conn. m.SB.12 S	81.10.02.5
116 A-D	2	Ventileinsatz 6 S	Valve insert 6 S	40.20.40.0
117 E-G	4	Kugelsitzscheibe 9,55 S	Ball seating disc.9,55 S	81.05.12.4
118 E-G	2	Anschlussmutter #16374-8 S	Terminal nut #16374-8 S	35.93.60.5
118 A-D	2	Anschlussmutter 6 WST 4571 S	Clamping nut 6 S	40.20.43.4
119 E-G	2	Klemmring 8 #16372-8 S	Clamping sleeve 8 #16372-8 S	35.93.55.5
119 A-D	2	Klemmring 6 #16372-6 S	Clamping sleeve 6 #16372-6 S	35.93.57.1
120 A-D	4	Ventilkugel 4,8mm WST 1.4401	Valve ball 4,8mm st.st	40.42.33.9
120 E-G	4	Ventilkugel 9,5mm WST 1.4401	Valve ball 9,5mm st.st	40.42.40.4
121 A-D	2	O-Ring 7,2-1,6 T	O-ring 7,2-1,6 T	48.11.07.1
122 E-G	8	O-Ring 13-2,5 T	O-ring 13-2,5 T	48.11.13.9
123 A-G	1	Etikett Rostfrei	Label "Rostfrei"	60.96.16.8
124 E-G **	4	Ventilfeder 8+12 1.4571	Valve spring 8+12 st.st	46.94.03.0
124 A-D **	4	Ventilfeder D0,3/DA3,9 1.4571	Valve spring 3,9x0,3x4,5 st.st	46.94.06.3
200 A	1	Developan-Membran 9.20 31x6 T	Developan-diaphg. 9.20 31x6 T	81.14.52.2
200 B	1	Developan-Membran 9.21 48x9,5 T	Developan-diaphg. 9.21 48x9,5 T	81.14.53.0
200 C	1	Developan-Membran 9.22 48x12,5 T	Developan-diaphg. 9.22 48x12,5 T	81.14.54.8
200 D	1	Developan-Membran 9.23 48x18,5 T	Developan-diaphg. 9.23 48x18,5 T	81.14.55.5
200 E	1	Developan-Membran 9.33 60x17 T	Developan-diaphg. 9.33 60x17 T	81.14.56.3
200 F	1	Developan-Membran 9.44 60x28 T	Developan-diaphg. 9.44 60x28 T	81.14.57.1
200 G	1	Developan-Membran 9.46 76x37 T	Developan-diaphg. 9.46 76x37 T	81.14.58.9
201 E	1	Kopfscheibe 70x22 HKS 41 Noryl	Head washer 70x22 HKS 41 Noryl	14.11.28.9
201 F	1	Kopfscheibe 70x41 HKS 41 Noryl	Head washer 70x41 HKS 41 Noryl	14.11.29.7
201 A	1	Kopfscheibe d70x10 LK38 g/4 GFN2	Back plate d70x10 LK38 g/4 GFN2	80.07.01.5
201 B	1	Kopfscheibe d70x13,4LK38 g4 GFN2	Back plate d79x13,4 LK38 g4 GFN2	80.07.02.3
201 C	1	Kopfscheibe d70x17 LK38 g/4 GFN2	Back plate d79x17 LK38 g/4 GFN2	80.07.03.1
201 D	1	Kopfscheibe d70x23,2LK38 g4 GFN2	Back plate d70x23,2 LK38 g4 GFN2	80.07.04.9
201 G	1	Kopfscheibe d85x47 LK38/66 GFN2	Back plate d85x47 LK38/66 GFN2	81.17.07.9
202 G	4	IS-Schraube M5x40 A4 DIN 912	Socket cp.scr.M5x40 A4 DIN 912	46.80.73.2
202 E,F	4	IS-Schraube M5x50 A4 DIN 912	Socket cp.scr.M5x50 A4 DIN 912	46.80.75.7
202 A-D	4	Like-Schraube M4x45 A2 DIN 7985	Screw M4x45 A2 DIN 7985	46.86.22.6
203 G	4	Senkschraube M4x12 verz.DIN 965	Cntrsunk screw M4x12 DIN 965	46.87.11.7

* Ohne Abbildung/Not Shown

** Sonderzubehör/Special Accessories

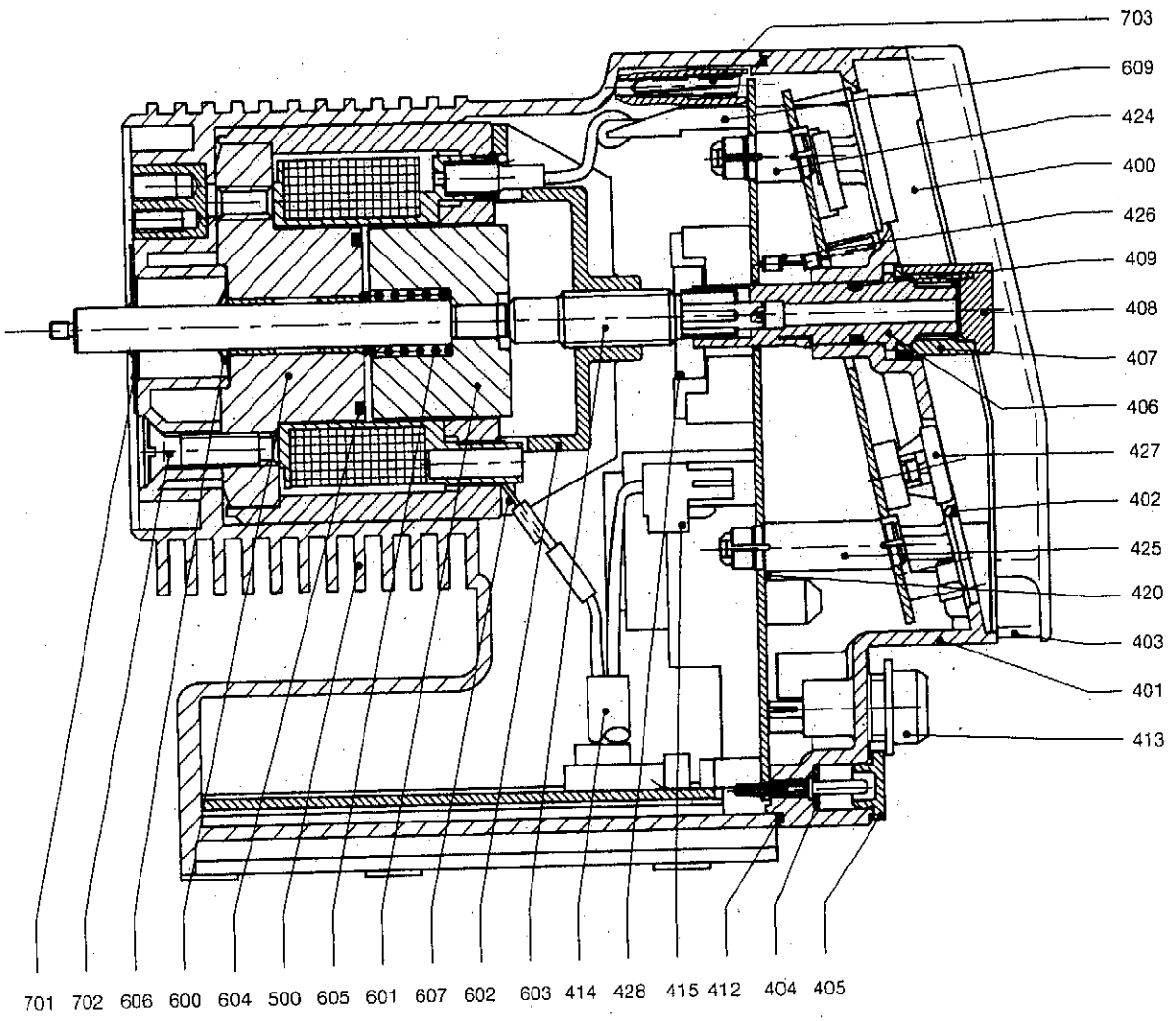
gamma/ 4 Fördereinheit kpl./
Liquid End cplt.

1000 - 0803 SK



Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/ 4 Fördereinheiten SK	**gamma/ 4 Liquid End Assemblies SK**	98.52.49.2
1 A	1	Förderteil gamma/4 1000 SK	Liquid end gamma/4 1000 SK	91.22.05.2
2 B	1	Förderteil gamma/4 2001 SK	Liquid end gamma/4 2001 SK	91.22.10.2
3 C	1	Förderteil gamma/4 1201 SK	Liquid end gamma/4 1201 SK	91.22.15.1
4 D	1	Förderteil gamma/4 0803 SK	Liquid end gamma/4 0803 SK	91.22.20.1
100 A	1	Dosierkopf kpl.d55x10 LK38 S-K	Dosing head cp.d55x10 LK38 S-K	81.89.80.5
100 B	1	Dosierkopf kpl.d55x12,5 LK38 S-K	Dosing head cp.d55x12,5 LK38 S-K	81.89.81.3
100 C	1	Dosierkopf kpl.d55x16 LK38 S-K	Dosing head cp.d55x16 LK38 S-K	81.89.82.1
100 D	1	Dosierkopf kpl.d55x22 LK38 S-K	Dosing head cp.d55x22 LK38 S-K	81.89.83.9
101	1	Druckanschluss kpl. Kap 1/16"	Dischg. conn.	81.94.80.5
102	1	Sauganschluss kpl. Kap. 1/8"	Suct. conn.	81.94.81.3
110 A	1	Dosierkopf d55xd10x22 LK 38 S	Dosing hd. d55xd10x22 LK 38 S	81.06.90.8
110 B	1	Dosierkopf d55xd12,5x22 LK 38 S	Dosing hd. d55xd12,5x22 LK 38 S	81.06.91.6
110 C	1	Dosierkopf d55xd16x22 LK 38 S	Dosing hd. d55xd16x22 LK 38 S	81.06.92.4
110 D	1	Dosierkopf d55xd22x22 LK 38 S	Dosing hd. d55xd22x22 LK 38 S	81.06.93.2
111	1	Druckanschluss Duramat 80 S	Discharge valve Duramat 80 S	81.40.47.7
112	1	Sauganschluss Duramat 80 S	Suction valve Duromat 80 S	81.40.46.9
113	1	Saugrohr Duramat WST 1.4571	Suction pipe duramat st.st	40.23.08.1
114	1	Nippel d.1,5/0,9x25mm WST 1.4571	Nipple d.1,5/0,9x25mm WST 1.4571	40.23.15.6
115	2	Ventileinsatz 6 S	Valve insert 6 S	40.20.40.0
116	1	Anschlussmutter Nut 1/16" Edelst	Nut 1/16" st.st	35.95.45.1
117	1	Druckring 1/16" Edelstahl	Press.ring 1/16" st.st	35.95.44.4
118	1	Verspannring 1/16" Edelstahl	Bracing ring 1/16" st.st	35.95.43.6
119	1	Anschlussmutter Nut*1/8" Edelst.	Nut 1/8" st.st	35.95.34.5
120	1	Druckring 1/8" Edelstahl	Press.ring 1/8" st.st	35.95.32.9
121	1	Verspannring 1/8 " Edelstahl	Bracing ring 1/8" st.st	35.95.33.7
122	4	Ventilkugel 4,8mm WST 1.4401	Valve ball 4,8mm st.st	40.42.33.9
123	2	O-Ring 7,2-1,6 T	O-ring 7,2-1,6 T	48.11.07.1
124	1	Etikett Rostfrei	Label "Rostfrei"	60.96.16.8
125 **	4	Ventilfeder D0,3/DA3,9 1.4571	Valve spring 3,9x0,3x4,5 st.st	46.94.06.3
200 A	1	Developan-Membran 9.20 31x6 T	Developan-diaphg. 9.20 31x6 T	81.14.52.2
200 B	1	Developan-Membran 9.21 48x9,5 T	Developan-diaphg. 9.21 48x9,5 T	81.14.53.0
200 C	1	Developan-Membran 9.22 48x12,5 T	Developan-diaphg. 9.22 48x12,5 T	81.14.54.8
200 D	1	Developan-Membran 9.23 48x18,5 T	Developan-diaphg. 9.23 48x18,5 T	81.14.55.5
201 A	1	Kopfscheibe d70x10 LK38 g/4 GFN2	Back plate d70x10 LK38 g/4 GFN2	80.07.01.5
201 B	1	Kopfscheibe d70x13,4LK38 g4 GFN2	Back plate d79x13,4 LK38 g4 GFN2	80.07.02.3
201 C	1	Kopfscheibe d70x17 LK38 g/4 GFN2	Back plate d79x17 LK38 g/4 GFN2	80.07.03.1
201 D	1	Kopfscheibe d70x23,2LK38 g4 GFN2	Back plate d70x23,2 LK38 g4 GFN2	80.07.04.9
202	4	Liko-Schraube M4x45 A2 DIN 7985	Screw M4x45 A2 DIN 7985	46.86.22.6

Spare Parts List Drive Units



Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Antrieb kpl.	**gamma/4 Drive Unit cpl.**	98.52.50.0
1 A	1	Pumpe gamma /4 1000	Pump gamma /4 1000	
2 B	1	Pumpe gamma /4 2001	Pump gamma /4 2001	
3 C	1	Pumpe gamma /4 1201	Pump gamma /4 1201	
4 D	1	Pumpe gamma /4 0803	Pump gamma /4 0803	
5 E	1	Pumpe gamma /4 1002	Pump gamma /4 1002	
6 F	1	Pumpe gamma /4 0408	Pump gamma /4 0408	
7 G	1	Pumpe gamma /4 0216	Pump gamma /4 0216	
400	1	Haube kpl. g/4 I 220/240V ET	Hood cpl. g/4 I 220/240V ET	80.80.01.2
400	1	Haube kpl. g/4 I 100/115V ET	Hood cpl. g/4 I 100/115V ET	80.80.02.0
400	1	Haube kpl. g/4 I 42 V ET	Hood cpl. g/4 I 42 V ET	80.80.03.8
400	1	Haube kpl. g/4 I 24V ET	Hood cpl. g/4 I 24V ET	80.80.04.6
400	1	Haube kpl. g/4 W 220/240V ET	Hood cpl. g/4 W 220/240V ET	80.80.05.3
400	1	Haube kpl. g/4 W 100/115V ET	Hood cpl. g/4 W 100/115V ET	80.80.06.1
400	1	Haube kpl. g/4 W 42V ET	Hood cpl. g/4 W 42V ET	80.80.07.9
400	1	Haube kpl. g/4 W 24V ET	Hood cpl. g/4 W 24V ET	80.80.08.7
400	1	Haube kpl. g/4-RS 220/240V ET	Hood cpl. g/4-RS 220/240V ET	80.80.09.5
400	1	Haube kpl. g/4-RS 100-115V ET	Hood cpl. g/4-RS 100-115V ET	80.80.10.3
400	1	Haube kpl. g/4-RS 42V ET	Hood cpl. g/4-RS 42V ET	80.80.11.1
400	1	Haube kpl. g/4-RS 24V ET	Hood cpl. g/4-RS 24V ET	80.80.12.9
401	1	Haube g/4 mont. RAL2003 orange	Cover g/4 mont. Ral2003 orange	14.51.71.5
402	1	Designfolie gamma/4 "I" Polyest.	Design foil gamma/4 "I" Polyest.	60.62.97.0
402	1	Designfolie gamma/4 "W" Polyest.	Design foil gamma/4 "W" Polyest.	60.62.98.8
402	1	Designfolie Gamma/4 "RS"	Design foil Gamma/4 "RS"	60.62.99.6
403 **	1	Klarsichtdeckel g/4 Schloß+Druck	Cover transp. gamma/4 Lock	14.51.72.3
403	1	Klarsichtdeckel g/4 m.Druck	PM-cover transp. gamma/4	14.51.73.1
404	1	Flachdichtung Niveau 13,5x8x1GU	Gasket f. levelswitch 13,5x8x1GU	48.26.06.1
405	1	Stopfen Niveau. 13,6x8,1 PE	Plug level socket 13,6x8,1 PE	14.51.26.9
406	1	Hubverstellwelle g/4 Host.C	Stroke shaft g/4 Host.C	80.08.03.9
407	1	Stellknopf g/4 Host.C	Knob g/4 Host.C	80.08.04.7
408 B-G	1	Drehknopf Zeiger g/4 Host.C	Knob arrow g/4 Host.C	80.08.05.4
408 A	1	Drehknopf Zeiger g/4 1000 rot	Knob arrow red g/4 1000 red	80.08.07.0
409	1	O-Ring 7,0-2,0 70 NBR	O-ring 7,0-2,0 70 NBR	48.03.07.8
410 *	1	Skintop-Verschrb. PG 9 schwarz	Skintop fitting PG 9 black	70.38.85.4
411 *	1	Blindstopfen m.Schlitz PG 9 KST	Blind plug PG 9 KST	70.38.71.4
412	1	Rundschnurring 128x1,41 Latex	O-ring 128x1,41 latex	48.13.40.8
413	2	Parallelstopfen d 11,5	Stopper d 11,5	14.04.65.6
414	1	Netzkabel m.Stecker gebunden E,F	Power cable with plug E,F	91.84.47.5
415	1	Steck-Klemmleiste 2-polig	Terminal-strip 2-phase	71.39.52.0
420	1	Steuerung kpl. g/4 I 220-240V	El.control cpl. g/4 I 220-240V	81.90.84.5
420	1	Steuerung kpl. g/4 W 220/240V	El.Control cpl. g/4 W 220/240V	81.90.85.2
420	1	Steuerung kpl. g/4RS232 220-240V	El.control cpl.g/4RS232 220-240V	81.90.86.0
420	1	Steuerung kpl. g/4 I 100/115V	El.control cpl. g/4 I 100-115V	81.90.87.8
420	1	Steuerung kpl. g/4 W 110-115V	El.control cpl. g/4 W 110-115V	81.90.88.6
420	1	Steuerung kpl. g/4 RS232 115V	El.control cpl. g/4 RS232 115V	81.90.89.4
420	1	Steuerung kpl. g/4 I 42V	El.control cpl. g/4 I 42V	81.90.90.2
420	1	Steuerung kpl. g/4 W 42V	El.control cpl. g/4 W 42V	81.90.91.0
420	1	Steuerung kpl. g/4 RS232 42V	El.control cpl. g/4 RS232 42V	81.90.92.8
420	1	Steuerung kpl. g/4 I 24V	El.control cpl. g/4 I 24V	81.90.93.6
420	1	Steuerung kpl. g/4 W 24V	El.control cpl. g/4 W 24V	81.90.94.4
420	1	Steuerung kpl. g/4 RS232 24V	El.control cpl. g/4 RS232 24V	81.90.95.1
424	2	Platinenhülse kurz g/4 GFN2	Sleeve f.pc-board short g/4 GFN2	80.07.07.2
425	2	Platinenhülse lang g/4 GFN2	Sleeve f.pc-board long g/4 GfN2	80.07.08.0
426	1	Stiftleiste 10-pol. MSD10/12 Lum	Pin ther.block 10-pol.MSD10/12	71.40.64.3
427	4	Tastkappe g/4 Host.C	Taste-cap g/4 Host.C	80.08.06.2
428	1	Sicherung 6,3x32 L.Fuse 0,25 ATT	Fuse 6,3x32 L.Fuse 0,25 ATT	71.20.35.5
428	1	Sicherung 6,3x32 L.Fuse 0,5 ATT	Fuse 6,3x32 L.Fuse 0,5 ATT	71.20.37.1
428	1	Sicherung 6,3x32 L.Fuse 1,25 ATT	Fuse 6,3x32 L.Fuse 1,25 ATT	71.20.38.9
428	1	Sicherung 6,3x32 L.Fuse 2,25 ATT	Fuse 6,3x32 L.Fuse 2,25 ATT	71.20.39.7
500	1	Gehäuse g/4 HSK41 blau	Housing g/4 HSK41 blue	14.51.70.7
600 A	1	Magnet kpl.g/4 1000 70M3 220-240	Solenoid cpl.g/4 1000 70M3	81.78.51.9
600 A	1	Magnet kpl.g/4 1000 70M3 100-115	Solenoid cpl.g/41000 70M3100-115	81.78.52.7
600 A	1	Magnet kpl.g/4 1000 70M3 42V	Solenoid cpl.g/4 1000 70M3 42V	81.78.53.5
600 A	1	Magnet kpl.g/4 1000 70M3 24V	Solenoid cpl.g/4 1000 70M3 24V	81.78.54.3
600 B-D	1	Magnet kpl.g/4 70M3 220-240V	Solenoid cpl.g/4 70M3 220-240V	81.78.55.0
600 B-D	1	Magnet kpl.g/4 70M3 100-115V	Solenoid cpl.g/4 70M3 100-115V	81.78.56.8
600 B-D	1	Magnet kpl.g/4 70M3 42V	Solenoid cpl.g/4 70M3 42V	81.78.57.6
600 B-D	1	Magnet kpl.g/4 70M3 24V	Solenoid cpl.g/4 70M3 24V	81.78.58.4
600 E-G	1	Magnet kpl.g/4 70M6 220-240V	Solenoid cpl.g/4 70M6 220-240V	81.78.59.2
600 E-G	1	Magnet kpl.g/4 70M6 100-115V	Solenoid cpl.g/4 70M6 100-115V	81.78.60.0
600 E-G	1	Magnet kpl.g/4 70M6 42V	Solenoid cpl.g/4 70M6 42V	81.78.61.8
600 E-G	1	Magnet kpl.g/4 70M6 24V	Solenoid cpl.g/4 70M6 24V	81.78.62.6
601 A-D	1	Druckstück kpl. 70M3 Sint	Press.piece cpl. 70M3 Sint	81.96.86.7
601 E-G	1	Druckstück kpl. 70M6 Sint	Press.piece cpl. 70M6 Sint	81.96.88.3

Pos. Typ Pos. Type	Anz. No. of	Artikel	Description	Best. Nr. Code No.
		gamma/4 Antrieb kpl.	**gamma/4 Drive Unit cpl.**	98.52.50.0
602 B-G	1	Hubdeckel d70 M10x1,5 g/4 GFN2	Stroke lid d70 M10x1,5 g/4 GFN2	80.07.05.6
602 A	1	Hubdeckel d70 M10x0,75 g/4 GFN2	Stoke lid d70 M10x0,75 g/4 GFN2	80.07.06.4
603 B-G	1	Hubverst.bolz.M10x1,5x46 g/4 POM	Stroke bolt M10x1,5x46 g/4 POM	80.08.01.3
603 A	1	Hubverst.bolzen M10x0,75x46 POM	Stroke bolt M10x0,75x46 POM	80.08.02.1
604	1	O-Ring 28-2 BL-EP EPDM 70 Shore	O-ring 28-2 BL-EP EPDM 70 shore	48.04.35.7
605 A-D	1	Druckfeder d=1,3 Dm=10 1.4310	Compr.spring d=1,3 Dm=10 1.4310	46.94.58.4
605 E-G	1	Druckfeder d=2,9 Dm=38,5 1.2000C	Compr.spring 2,9/Dm=38,5 1.2000C	46.94.73.3
606	1	Wellensicherung SFO 5786/D8 verz	Snap ring SFO 5786/D8 verz	46.72.01.0
607	1	Flachstecker 6,3x0,8 MS0140814-1	Plug 6,3x0,8 MS0140814-1	71.06.20.6
608 *	3	Kombischr.M4x10 4.8verz. DIN7985	Comb. Screw M4x10 DIN7985	46.86.09.3
609	1	Magnetkabel F kpl.	Solenoid-cable F cpl.	81.83.76.6
701	1	Dichtungsscheibe d.30x7/0,5 EPDM	Gask.washer d.30x7/0,5 EPDM 75SH	48.35.47.6
702	2	Senkschraube M6x20 verz.DIN 965	Cntrsunk screw M6x20 DIN 965	46.87.34.9
703	2	Schneidschr.f.K.St. d3,5x40 A2	Self-tapping screw d3,5x40 A2	46.84.43.7
704 *	2	Schneidschr.f.K.St. d3,5x25 A2	Self-tapping screw d3,5x25 A2	46.84.40.3
705 *	1	Etikett "vor Öffnen...geprüft"	Label "before opening..approved"	60.96.14.3

* Ohne Abbildung/Not Shown

** Sonderzubehör/Special Accessories

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