

Product Information

TrueDos® D

The digital diaphragm dosing pump



TrueDos® D – direct input in l/h

No stroke adjustment knob or mathematic calculations are needed

TrueDos® D is as precise as no other

The linearity deviation is only $\pm 1.5\%$ within the entire adjustment range

TrueDos® D doses very small capacities down to 0.005 l/h

With the integrated calibration system the dosing flow can be adjusted precisely; evidence can be provided at any time while the pump is running

TrueDos® D draws in the liquid very smoothly

A constant stroke volume level provides an optimum draw-in also in low flows

TrueDos® D doses virtually continuously

Modern drive technology and a powerful microcontroller provide optimum speed profiles and a dosing characteristic unrivalled on the market

TrueDos® D doses viscous liquids reliably

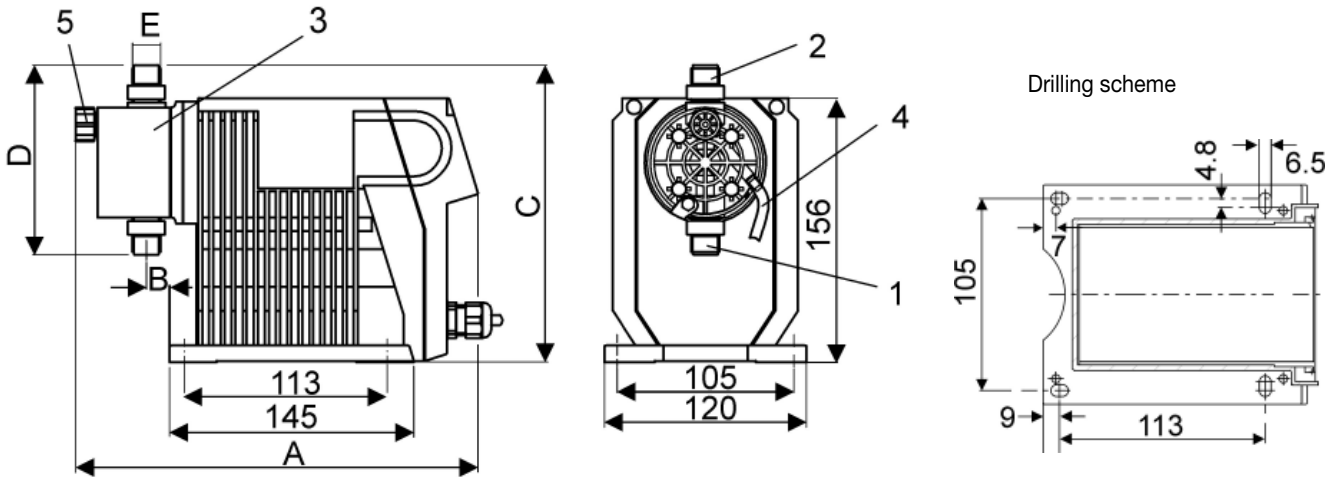
The Slow-Mode decelerates the suction stroke

ALLDOS

A Grundfos company

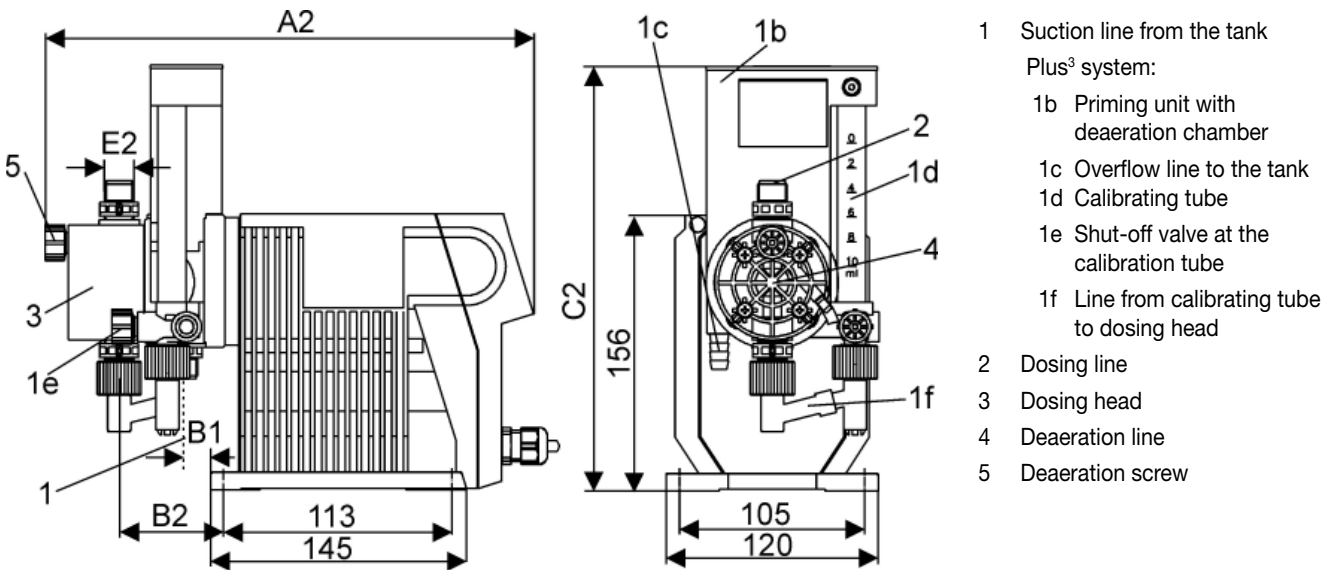
Measurement

• TrueDos® D with manual deaeration



Measurements in mm

* TrueDos® D with Plus³ system



- 1 Suction line from the tank
Plus³ system:
- 1b Priming unit with deaeration chamber
- 1c Overflow line to the tank
- 1d Calibrating tube
- 1e Shut-off valve at the calibration tube
- 1f Line from calibrating tube to dosing head
- 2 Dosing line
- 3 Dosing head
- 4 Deaeration line
- 5 Deaeration screw

Pump types	•	*	•	*	*	•	*	•	•	*
	A	A2	B	B1	B2	C	C2	D	E	E2
209-0.4D	239	276	23	25	61	176	240	108	G 3/8"	G 3/8"
209-2.2D	239	276	23	25	61	176	240	108	G 3/8"	G 3/8"
209-2.5D	239	276	23	25	61	176	240	108	G 3/8"	G 3/8"
209-5.5D	239	276	23	25	61	176	240	108	G 3/8"	G 3/8"
209-13.8D	240	-	29	-	-	185	-	133	G 5/8"	-
209-20D	240	-	29	-	-	185	-	133	G 5/8"	-

Pump types

- incl. connections, deaeration line, cable and European plug
- strokes per minute: max. 180 in normal operation, max. 120 in slow mode

Normal operation				Slow mode				V _{Hub} [ml] (p = 3 bar)	Order number
Q [l/h]	p _{max} [bar]	Q [USg/h]	p _{max} [psi]	Q [l/h]	p _{max} [bar]	Q [USg/h]	p _{max} [psi]		
0.004 - 0.4 *	10	0.001 - 0.11	145	0.004 - 0.26	10	0.001 - 0.071	145	0.069	209-0.4D
0.025 - 2.2	16	0.007 - 0.58	232	0.025 - 1.5	16	0.007 - 0.39	232	0.276	209-2.2D
0.025 - 2.5	10	0.007 - 0.66	145	0.025 - 1.7	10	0.007 - 0.45	145	0.276	209-2.5D
0.055 - 5.5	10	0.015 - 1.45	145	0.055 - 3.7	10	0.015 - 0.97	145	0.587	209-5.5D
0.138 - 13.8	4	0.036 - 3.64	58	0.138 - 9.2	4	0.036 - 2.38	58	1.36	209-13.8D
0.200 - 20	3	0.053 - 5.28	43.5	0.200 - 13.3	3	0.053 - 3.43	43.5	1.95	209-20D

Pumps with Plus³ system

0.004 - 0.4 *	10	0.001 - 0.105	145	0.003 - 0.27	10	0.001 - 0.071	145	0.069	209-0.4D Plus ³
0.025 - 1.9	16	0.007 - 0.50	232	0.025 - 1.3	16	0.007 - 0.32	232	0.276	209-2.2D Plus ³
0.025 - 2.2	10	0.007 - 0.58	145	0.025 - 1.4	10	0.007 - 0.37	145	0.276	209-2.5D Plus ³
0.055 - 4.9	10	0.015 - 1.29	145	0.055 - 3.2	10	0.015 - 0.84	145	0.587	209-5.5D Plus ³

*) If the backpressure is less than 10 bars, the maximum dosing capacity of TrueDos® 209-0.4D increases up to 1.0 l/h.

Technical Data

Connections	209-2.2D (16 bar)	<ul style="list-style-type: none"> Suction side PVC (PE) hose 4/6, PVDF hose 4/6, steel pipe 4/6 Pressure side PVC hose 6/12, PP or PVDF pipe 12/16, steel pipe 1/4" 	
	209-0.4D/-2.5D /-5.5D	<ul style="list-style-type: none"> Suction side PVC (PE) hose 4/6, PVDF hose 4/6, steel pipe 4/6 Pressure side PVC hose 6/12, PP or PVDF pipe 12/16, steel pipe 4/6 	
	209-13.8D/-20D	<ul style="list-style-type: none"> PVC hose 4/6, PP or PVDF pipe 12/16, steel pipe 1/4" 	
Accuracy	Dosing flow variation < ± 1.5%, linearity deviation < ± 1.5 %		
Noise level	± 55 dB (A), tested according to DIN 45635-01-KL3		
Max. suction height <i>liquids with viscosity similar to water</i>	209-0.4D 209-2.2D/-2.5D/-5.5D 209-13.8D/-20D	Normal operation Flooded suct., Plus ³ : 1,5 m WC 4 m WC; with Plus ³ : 1,5 m WC 3 m WC	Slow mode Flooded suct., Plus ³ : 1,5 m WC 6 m WC; with Plus ³ : 1,5 m WC 3 m WC
Max. viscosity <i>at operating temperature</i>	209-0.4D/-5.5D 209-13.8D/-20D 209-0.4D Plus ³ /-2.5D Plus ³ 209-5.5D Plus ³	Normal operation 200 mPa s 150 mPa s 100 mPa s 50 mPa s	Slow mode 300 mPa s 200 mPa s 200 mPa s 100 mPa s
Max. admission pressure	2 bar on the suction side (with Plus ³ system: only suction)		
Min. backpressure	1 bar on the pressure side (at the pressure joint of the pump)		
Max. temperature	<ul style="list-style-type: none"> max. ambient and operating temperature + 40° C storage temperature - 10° C bis + 50° C 		
Max. relative air humidity	80%, no condensation		
Motor / voltage	Dynamic stepping motor with gear, long range 110 V - 240 V, 50/60 Hz, option 24 V DC Power consumption 20 VA		
Enclosure, protection	Pump and electronics, material of enclosure: s PS FR GF 22; Pump protection: IP 65		
Weight	Up to max. 3.6 kg		
Plus ³ system	<ul style="list-style-type: none"> Suitable for moderately degassing, crystallizing and/or concentrated liquids as well as very small quantities; Examples: sodium hypochlorite, flocculents, hydrochloric acid For H₂O₂ or peracetic acid please contact us! 		

Options: voltage, display, Profibus

- **Voltage:** 110 - 240 V or 24 V DC
- **Display:** horizontal or at an angle
- **Profibus:** with or without Profibus® DP - VO incl. GSD file and address decoder document

Accessories for electronics and Profibus

Signal transmission cable incl. circular connector	Order number	
	cable length 2 m	cable length 5 m
For inputs: control contact or remote On/Off or 0/4-20 mA current input, 4-wire cable	321-205	321-207
For outputs: empty pre-alert or individual stroke signal or error signal, 4-wire cable	321-206	321-208
For output: current signal, 5-wire cable	321-215	
Dosing controller (installation on suction side)	on request	
Accessories for Profibus DP	Order number	
T-splitter with M 12 connection technology <i>Necessary for every pump!</i>	321-225	
Terminating resistor M 12 <i>Necessary for every pump connected at the first and/or the last position of the bus system !</i>	321-224	

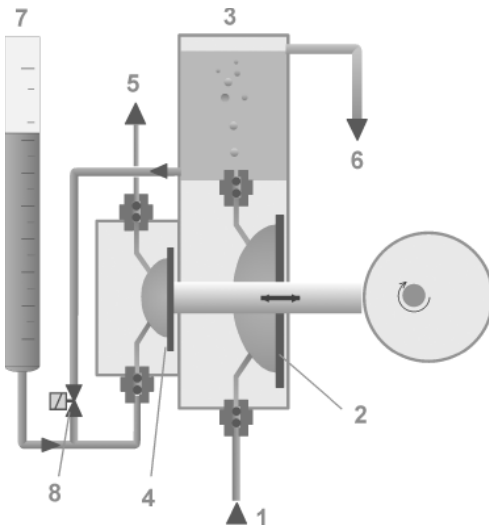
Electronics and electronic data

- Continuous operation: start/stop, function check, dosing head deaeration
- Memory function saves up to 65 000 pulses
- Empty tank signal: Reed contact for empty signal/ pre-alert
- Dosing controller
- Diaphragm breakage indication, dosing head with optical sensor, option
- Stroke signal (standard) or empty pre-alert (adjustable)
- Code protection against unauthorized access
- Calibrating function
- Dosing quantity counter, with reset to 0
- Tamper-proof service hours counter
- Remote On/Off
- Profibus DP interface (option)

Operating modes	Input / Display																								
Manual operation	input / display of dosing capacity in l/h or gal/h																								
Contact signal control	<table border="1"> <thead> <tr> <th>input / display of dosing capacity in ml/contact</th> <th>Pump type</th> <th>V_{min} (ml)</th> <th>V_{max} (ml)</th> </tr> </thead> <tbody> <tr> <td></td> <td>209-0.4D</td> <td>0.001</td> <td>0.07</td> </tr> <tr> <td></td> <td>209-2.2D / -2.5D</td> <td>0.004</td> <td>0.88</td> </tr> <tr> <td></td> <td>209-5.5D</td> <td>0.011</td> <td>2.20</td> </tr> <tr> <td></td> <td>209-13.8D</td> <td>0.024</td> <td>4.96</td> </tr> <tr> <td></td> <td>209-20D</td> <td>0.038</td> <td>7.86</td> </tr> </tbody> </table>	input / display of dosing capacity in ml/contact	Pump type	V _{min} (ml)	V _{max} (ml)		209-0.4D	0.001	0.07		209-2.2D / -2.5D	0.004	0.88		209-5.5D	0.011	2.20		209-13.8D	0.024	4.96		209-20D	0.038	7.86
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Current signal 0(4)-20 mA with manual weighting function <i>(weighting function for the assignment between the current value and flow rate)</i>	display of dosing capacity in l/h or gal/h, volumetric flow in proportion to the current signal																								
Batch dosing (contact signal/manual)	input / display of dosing flow in ml or l and dosing capacity in l/h or gal/h																								
Batch dosing with timer function	<ul style="list-style-type: none"> > input / display of dosing flow (ml or l) > input / display of dosing capacity (l/h or gal/h) per batch > input starting time of first batch: t₁ = 1 min. to max. 24 h (0.0 to 999. ml) > input starting time of subsequent batches: t₂ = 1 min. to max. 240 h (1.00 to 99.99 l) 																								
slow mode (longer suction stroke): to avoid cavitation or for dosing viscous liquids																									

Inputs and outputs	Standard adjustment	with software adjustable to	Technical data	
Input	contact signal	-	-	load < 12 V, 5 mA
	current signal 0(4) - 20 mA	-	-	load < 22 Ohm
	remote On/Off	N.O.	N.C.	load < 12 V, 5 mA
	tank empty signal	N.O.	N.C.	load < 12 V, 5 mA
	dosing controller	-	-	-
	diaphragm breakage indication	-	-	-
Out-put	current signal 0(4) - 20 mA	-	-	load < 350 Ohm
	error signal	N.O.	N.C. / empty pre-alert	ohm load < 50V DC/75 V AC, 0.5 A
	stroke signal	N.O.	N.C. / stroke signal	contact time 200 ms / stroke
	empty pre-alert	-	-	ohm load < 50V DC/75 V AC, 0.5 A

Functional diagram of Plus³ system



- The conveying diaphragm (2) takes a large volume of liquid out of the dosing station (tank) (1) and transfers it into the priming (deaeration) chamber (3). No problem when drawing in very small amounts.
- Any gas bubbles in the liquid are vented to the atmosphere in the priming chamber.
- The separate working diaphragm (laid out for the required liter capacity) (4) doses the liquid into the process line (5).
- Any excess liquid is returned to the tanks via the deaeration bypass (6).
- The integrated calibration system comprising a graded calibration tube (7) and a calibration valve (8) allows precise calibration of the dosing flow while the pump is running.
- **Additional advantage:** Chemical storage tanks can be exchanged without stopping the system.

Dosing head and valve materials

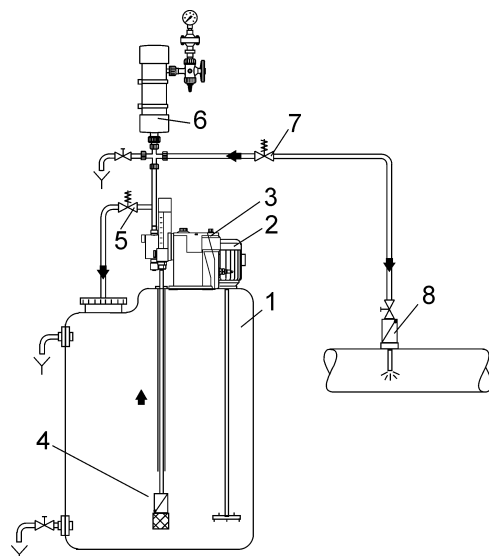
Dosing head	Valve	Materials				Dosing heads available with	
		Gaskets	Seat	Ball ¹⁾		diaphragm break. indication	Plus ³ system
				4/6	6/12 + 12/16		
PVC	PVC	Viton	Viton	Glass	Glass	✓	–
PVC	PVC	Viton	Viton	Ceramics	–	–	✓
PVC	PVC	EPDM	EPDM	Ceramics	PTFE	✓	✓
PVC	PVC	PTFE	PTFE	Ceramics	Ceramics	–	–
PP	PP	Viton	Viton	Glass	Glass	✓	–
PP	PP	Viton	Viton	Ceramics	–	–	✓
PP	PP	EPDM	EPDM	Ceramics	PTFE	✓	✓
PVDF	PVDF	PTFE	PTFE	Ceramics	PTFE	✓	–
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	✓	–

1) Material depending on the connection size; connections 6/12 and 12/16 not suitable for Plus³ system

Accessories and fittings

Flow scheme of a complete dosing installation

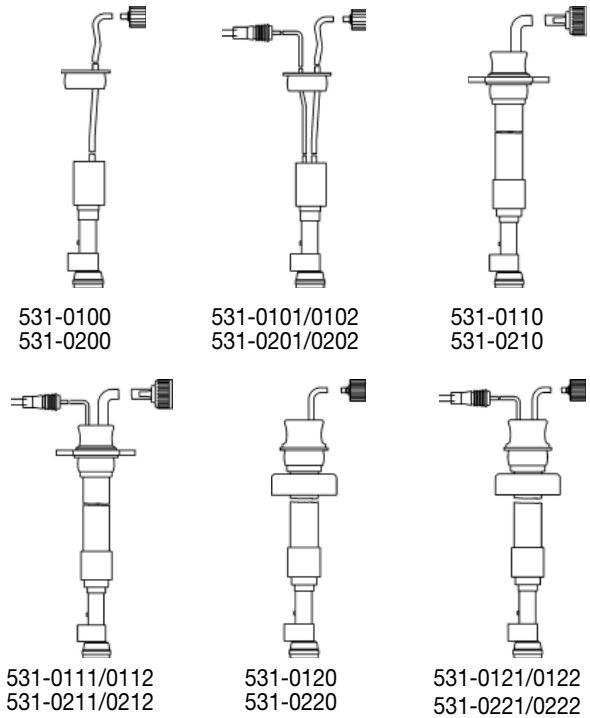
- 1 Dosing tank 502 (see Product Information 502/509)
- 2 Electric agitator 509 (see Product Information 502/509)
- 3 Pump TrueDos® D
- 4 Suction line 531 with empty signal
- 5 Pressure relief valve 525
- 6 Pulsation damper 517 (see Product Information 516/517)
- 7 Pressure loading valve 525
- 8 Injection unit 522



Suction line systems 531

- **Flexible lines:** PE plug ø 44 mm for tank, ceramic weighing stone
- **Rigid lines for tanks:** PE plug ø 44 mm for tank, PVC protective tube for ALLDOS tanks 75 l (502-0075.1) without agitator
- **Rigid lines for containers:** PVC protective tube, container cover according to DIN 6131, for tank 5-12 l
- **Lines with empty indication (pre-alert) for electronic pumps:** with foot valve, N.O. contact.

Different materials, line and cable lengths on request !



Suction lines for ALLDOS tanks

- **Please indicate the tank size!**
When ordering together with an ALLDOS dosing tank, the length of the suction line is adapted.
- **Please indicate, whether you use a tank with or without agitator!**
For tanks with agitators, the suction line is equipped with a knurled nut.

Description	Order number					
	flexible		rigid for tanks		rigid for containers	
	4/6	6/12	4/6	6/12	4/6	6/12
without empty signal	531-0100	531-0200	531-0110	531-0210	531-0120	531-0220
with empty signal	531-0101	531-0201	531-0111	531-0211	531-0121	531-0221
with empty signal and pre-alert	531-0102	531-0202	531-0112	531-0212	531-0122	531-0222

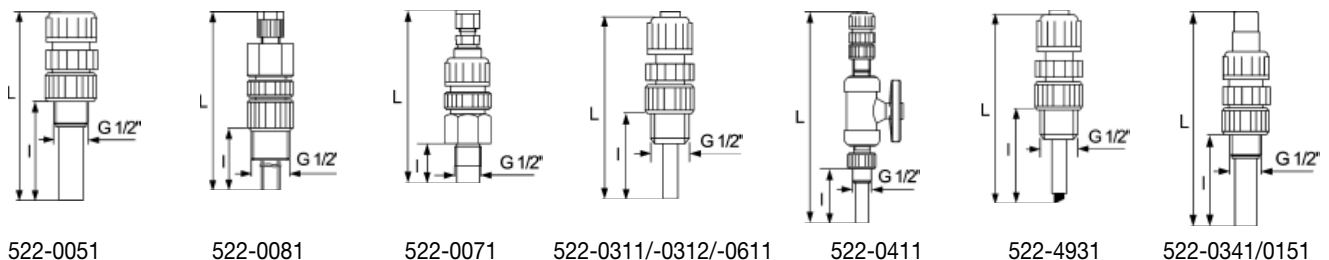
Injection units 522

Note: bushing thread G 1/2" provided by customer is necessary!

- ball check valve, spring Hastelloy C, incl. connections
- Threaded piece with integrated injection tube for installation into the threaded sleeve of the process line

Materials	Order number	I [mm]	L [mm]	T _{max} [°C]	PN [bar]	Connections
PP/Viton/Glas	522-0051	62	121	40°	10	Hose 4/6
PVDF/PTFE/Ceramics	522-0081	62	130	50°	16	Pipe 4/6
Stainless steel/Viton/Stainless steel	522-0071	27	118	70°	25	Pipe 4/6
PVC/Viton/Glass	522-0311	62	118	40° to 10 bar 20° to 16 bar	16	Hose 6/12 or 4/6, Pipe 10/12
PVC/EPDM/Stainless steel	522-0312	62	118			
PVC/Viton/Glass + with ball valve	522-0411	62	257			
PVC/Viton/Glass + threaded piece stainl. steel	522-0611	62	118			
PVC/Viton/Glass + with lip valve *	522-4931	55	114			
Stainless steel/Viton/Stainless steel	522-0911	27	92	70°	16	1/4"
PP/Viton/Glass	522-0341	62	118	40°	10	Pipe 12/16
PVDF/PTFE/PTFE	522-0151	62	118	50°	16	Pipe 14/16

*) especially for crystallizing liquids, such as sodium hypochlorite



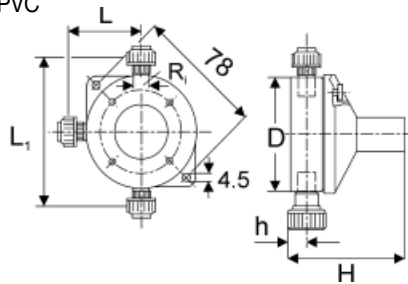
Pressure relief valves 525

protect the line system on the discharge side against too high pressures.

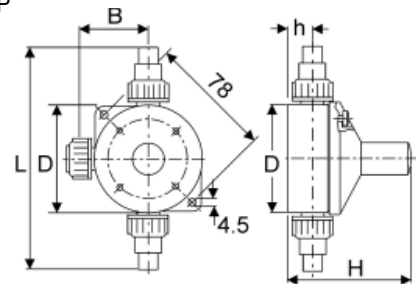
- 3-way valves, incl. connections, overflow function by a diaphragm spring system, diaphragm PTFE
- Opening pressure adjustable, at factory approximately 11 bar

Materials	Connections	B [mm]	L [mm]	H [mm]	h [mm]	ø D [mm]	Order number
PVC/Viton	Hose 4/6 or 6/12, Pipe 10/12	48	96	90	21	68	525-0584.1
PP/Viton	Hose 4/6	48	96	90	21	68	525-0582
PP/EPDM	Hose 4/6	48	96	90	21	68	525-0582.1
PVDF/PTFE	Pipe 4/6	60	120	90	21	68	525-0580.1
St. steel/Viton	Pipe 4/6	54	108	82	11	68	525-0581
PVC/Viton or EPDM/PTFE	Hose 6/12, Pipe 10/12 Opening pressure 17 bar	49	140	90	21	68	525-1584.1
PP/Viton	Pipe 12/16	50	140	90	21	68	525-0583
PP/EPDM	Pipe 12/16	50	140	90	21	68	525-0583.1
PVDF/PTFE	welded nipple/sleeve for Pipe 14/16	50	140	90	21	68	525-0585.1
St. steel/Viton	female thread G 1/4"	-	-	82	11	68	525-0586

Pressure relief valve PVC



Pressure relief valve PP



Pressure loading valves 525

necessary, if the dosing system has no backpressure, if the backpressure varies or if the injection point is situated below the pump.

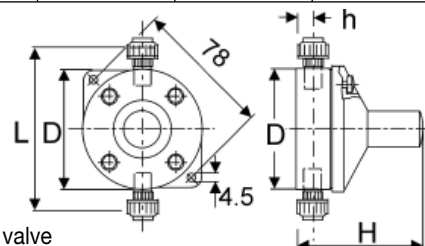
- Adjustable by a spring-loaded screw, adjusted by the factory approx. 2 to 3 bars, incl. connections

Materials	Connection	L [mm]	H [mm]	h [mm]	ø D [mm]	Order number
PVC/Viton or PVC/EPDM	Hose 4/6 or 6/12, Pipe 10/12	96	90	21	68	525-0567.1
PP/Viton	Hose 4/6	96	90	21	68	525-0565
PP/EPDM	Hose 4/6	96	90	21	68	525-0565.1
PVDF/PTFE	Pipe 4/6	120	90	21	68	525-0566.1
Stainless steel/Viton	Pipe 4/6	108	82	11	68	525-0570
PP/Viton	Pipe 12/16	140	90	21	68	525-0568
PP/EPDM	Pipe 12/16	140	90	21	68	525-0568.1
PVDF/PTFE	welded nipple/sleeve for Pipe 14/16	140	90	21	68	525-0569.1
Stainless steel/Viton	female thread G 1/4"	-	82	11	68	525-0571

Adapters

for the installation of pressure relief and loading valves directly on pumps.

Materials	Order number
PVC	529-454
PP	529-455



Pressure loading valve

Installation sets

- suction line with foot valve and filter; including injection unit
- deaeration and suction hose 1.5 m, pressure hose 5 m

Description	Materials	Order number	
		with injection unit G 1/4"	with injection unit G 1/2"
Pumps without electronics	PVC	553-048	553-1012 *
Suction line without empty signal	PP	553-063	553-1014
Pumps with electronics	PVC	553-049	553-1013 *
Suction line with empty signal	PP	553-064	553-1015

*) for pumps up to max. 16 bar, the other sets up to max. 10 bar.

Spare parts sets

for dosing head with manual deaeration valve

- 2 suction/pressure valve
- gaskets for dosing head and valves
- 1 deaeration cartridge
- 1 dosing diaphragm
- 1 sealing diaphragm
- screws for the dosing head

Materials	Order number for 209...		
	-0.4D	-2.2D to -5.5D	-13.8D/-20D
PVC/Viton/Glass	553-1395	553-1403	553-1419
PVC/EPDM/Ceramics	553-1399	553-1407	553-1423
PP/Viton/Glass	553-1396	553-1404	553-1420
PP/EPDM/Ceramics	553-1400	553-1408	553-1424
PVDF/PTFE/Ceramics	553-1401	553-1409	553-1425
St. steel/PTFE/St. steel	553-1402	553-1410	553-1426

for dosing head with Plus³ system

- 4 suction/pressure valve
- gaskets for dosing head and valves
- 1 deaeration cartridge
- 1 dosing diaphragm
- screws for the dosing head

Materials	Order number for 209...	
	-0.4D	-2.2D to -5.5D
PVC/Viton/Ceramics	553-1487	553-1486
PVC/EPDM/Ceramics	553-1492	553-1495
PP/Viton/Ceramics	553-1493	553-1496
PP/EPDM/Ceramics	553-1494	553-1497

Transparent cover

- for dirt protection: optional for pumps with horizontal display
- material: Makrolon

Wall console

- with fastening material

Description	Order number
PE black	539-006



Presented by: