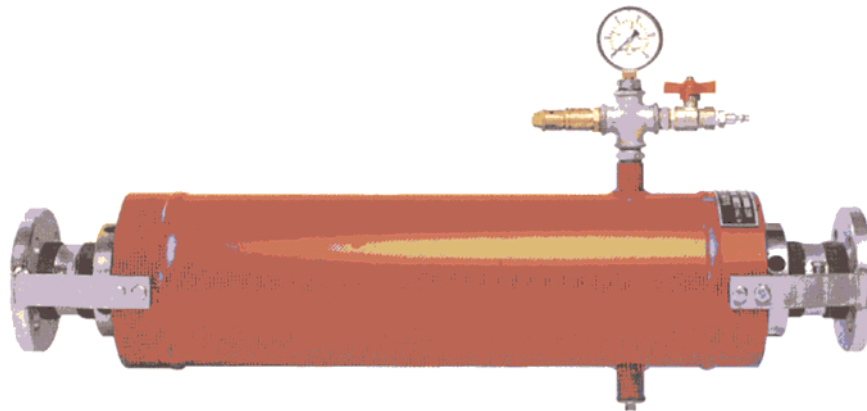


Pulsation-Dampener series

PD/40; PD/65; and PD/100

Installation and Maintenance Manual



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1 PREFACE

1.1 Installation and maintenance instructions

These installation and maintenance instructions are intended to serve as a manual for professional, skilled, and authorized users, in order to be able to safely install, perform periodic maintenance (cleaning), and remedy any malfunctions to the pulsation-dampers indicated on the front page of this document.




1.2 Pictograms and symbols

In these installation and maintenance instructions, the following pictograms are used:



	WARNING
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	Danger of electric voltage.
--	-----------------------------

	<p>WARNING Procedures, which, if not carried out with the necessary care, may result in serious damage to the pulsation damper or in serious bodily harm.</p>
	<p>CAUTION Procedures, which, if not carried out with the necessary care, may result in serious damage to the pulsation damper, the surrounding area or the environment.</p>
	<p>Remarks, suggestions and advice.</p>

1.3 Available documentation

Parts list: You can easily find the order number for each part of the pulsation damper.

1.4 Included supplier documentation

Technical documentation is included for the pressure-relief valve.

1.5 Service and technical support

For information with respect to specific adjustments and maintenance or repair jobs that fall beyond the scope of this manual, contact your Bredel representative. Make sure you have the following information at hand:

- Serial number of the pulsation damper
- Type number of the pulsation damper

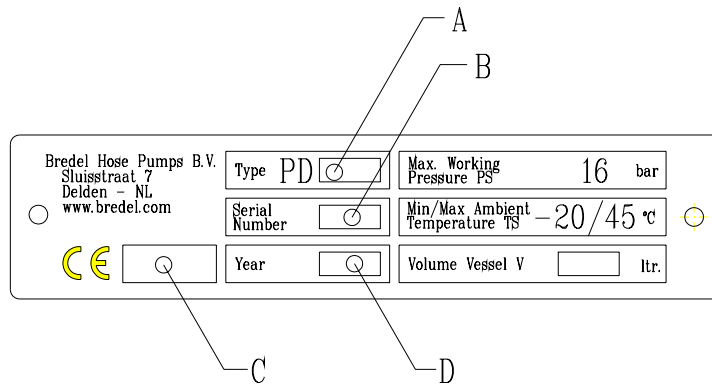
This information is provided on the identification plate of the pulsation damper (see: "Identification of the product").

2 IDENTIFICATION OF THE PRODUCT

The pulsation damper and hose may be identified by way of the identification plate on the damper housing and the hose label.

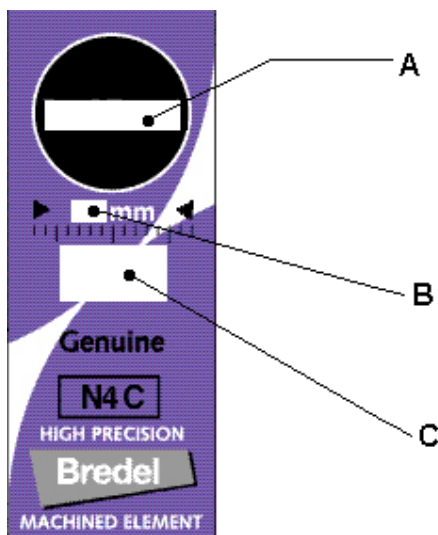
The identification plate of the pulsation damper contains the following information:

- A. Type
- B. Serial number
- C. Identification number inspection body (PD65 and PD100 only)
- D. Year of manufacture



Identification of the hose:

- A. Order number
- B. Internal diameter
- C. Type of material of inner diameter




3 WARRANTIES

1. Commissionee guarantees correct performance as agreed, for a period of two years after delivery.
2. If it is demonstrated that the construction supplied, and the materials used, are not sound, commissionee will correct or replace these. Those parts that are to be corrected or replaced by commissionee, are to be sent to the commissionee carriage paid. Assembly and disassembly of these parts, and any accommodation and traveling expenses are for the account of the client.
3. If the performance agreed upon concerns the delivery of a good, commissionee will guarantee the soundness of the good delivered, for the period specified in Article 1. If it turns out that the delivery was not sound, the good should be returned to the commissionee, carriage paid. Commissionee will then decide to:
 - Repair the good himself;
 - Replace the good;
 - Credit the client for the appropriate part of the invoice.
4. All parts, for which client and commissionee have explicitly agreed such in writing, are subject to a manufacturer's warranty. If client has been given the opportunity to acquaint himself with the manufacturer's warranty, it will, on the grounds of this Article, replace the normal warranty.
5. Client should, at all times, give commissionee the opportunity to mend any fault or to carry out the action again.
6. Client may not invoke the warranty until after he has fulfilled all obligations towards commissionee.
7. No warranty is given for faults resulting from normal wear and tear of consumer items, such as pulsation-damper hoses, hose clamps, and seals.
8. Damaged parts, which are covered by the applicable warranty conditions, can be returned to the manufacturer. The parts must be accompanied by a fully filled in and signed safety form, as included at the back of this manual. The safety form must be applied to the outside of the shipping carton. Parts which have been contaminated or which have been corroded by chemicals or other substances, which can pose a health risk, must be cleaned before they are returned to the manufacturer. Furthermore, it should be indicated on the safety form, which specific cleaning procedure has been followed, and it should be indicated that the equipment has been decontaminated. The safety form is required at all items, even if the parts have not been used.
9. Warranties purporting to be on behalf of Bredel Hose Pumps BV made by any person, including representatives of Bredel Hose Pumps BV, its subsidiaries, or its distributors, which do not accord with the terms of this warranty shall not be binding upon Bredel Hose Pumps BV unless expressly approved in writing by a Director or Manager of Bredel Hose Pumps BV.

4 SAFETY REGULATIONS AND DANGER WARNINGS

4.1 General

The manufacturer does not accept any liability for damage or harm caused by not (strictly) observing the safety regulations and instructions in this manual and the manual of the pressure-relief valve used, or by negligence during installation, use, maintenance and repair of the pulsation dampers indicated on the front cover. Depending on the specific working conditions, additional safety instructions can be required. Immediately contact your Bredel representative, if you noticed a potential danger while using your pulsation damper.

	<p>WARNING The user of the pulsation damper is, at all times, fully responsible for observing the local valid safety regulations and directives. Observe these safety regulations and directives when using the pulsation damper.</p>
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4.2 Installation and maintenance instructions

- Anyone who will work with the pulsation damper must know the content of these installation and maintenance instructions and observe the instructions with great care.
- Never change the order of the actions to be carried out.
- Always store the installation and maintenance instructions near the pulsation damper.
- Also observe the three points above for the manual for the pressure-relief valve used.

4.3 Users

Use of the pulsation damper, i.e. the installation and maintenance, is only reserved to well-trained and qualified users. Temporary staff and persons in training may only use the pulsation damper under the supervision and responsibility of well-trained and qualified users.

4.4 Technical specifications

All specifications stated in this manual are not to be changed.

4.5 Modifications

Modification to (parts of) the pulsation damper is not permitted.

4.6 Intended use

The pulsation damper was specifically designed for the damping of pulses on the discharge side of a Bredel hose pump. After consultation with your Bredel representative, and only on certain conditions, the pulsation damper may be used as a so-called “overflow valve”. Any other or further use is not in conformance with the intended use. The manufacturer cannot be held liable for any damage or harm resulting from this.

5 USED PRODUCTS AND THE ENVIRONMENT



The timber and cardboard used for transportation and protection of the product may be reused. Therefore, do not deposit the packaging with the industrial waste, but ask your local authorities where this material can be taken.

Always observe the local rules and regulations with respect to processing (worn) parts of the pulsation damper.

6 GENERAL DESCRIPTION AND OPERATION

The pulsation damper (PD40, PD65, and PD100) meets the European Directive PED 97/23/EG.

The pulses on the discharge side of a Bredel hose pump are eliminated for up to approx. 90% by the pulsation damper. This is achieved by means of a thick-walled, flexible rubber hose, which is mounted in a steel cylinder (pressure vessel), surrounded by an air volume (compressed air).

It has to:

- Be mounted as closely as possible to the discharge side of the pump.
- Be in line with the discharge direction of the pump.

The pulsation damper protects pump and pipes against excessive vibrations.

The pulsation damper increases the pump installation's efficiency.

The pulsation damper is easy to clean.

The pulsation damper may be provided with flange connections in accordance with DIN, ASA or JIS.

The hose and insert material of the pulsation damper must match the product to be pumped, i.e. the same hose and insert material as is used in the hose pump.

Because a thick-walled hose is used, the pulsation damper will not create much effect when used with a pressure of less than 2 bars. (30 psi)

The pressure within the space in-between the hose and the steel cylinder (pressure vessel) must be approximately equal to the minimum operating pressure of the hose pump.

The best damping results are achieved by means of fine-tuning during normal operation of the pump.

The pulsation dampers are equipped with a pressure-relief valve, which will be opened if the pressure exceeds 16 bars. (232 psi)

7 INSTALLATION

Before starting to unpack, install, and commission the pulsation damper, carefully read this manual first. In view of everyone's safety, the user must be authorized to commission and maintain this product. In addition, the user must be familiar with the general safety regulations. (see 'Safety regulations and danger warnings')

7.1 Unpacking


Check the product for completeness and any transport damage (see also: "Identification of the product"). Report any damage immediately to your Bredel representative.

7.2 Ambient conditions

Make sure the ambient temperature, during normal operation of the pulsation damper, does not fall to below -20°C (-4°F), and does not exceed $+45^{\circ}\text{C}$ (-113°F).

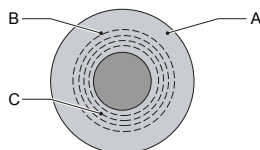
7.3 Lifting and positioning the pulsation damper

To lift, move and position the pulsation damper, suitable hoisting belts must be used. The best place to attach the hoisting belts is immediately behind both flanges of the pulsation damper. Keep in mind the pulsation-damper's weight. For weights, see: "Specifications".

	<p>WARNING If the pulsation damper is to be lifted, ensure that all safety regulations for lifting movements are adhered to and that the lifting is carried out by qualified personnel only.</p>
---	---

7.4 The pulsation-damper hose

The pulsation-damper hose liner material should be chemically resistant to the product to be pumped. Dependent on the specific requirements of your application, a matching hose should be selected.





- A. Outer extruded layer made of natural rubber
- B. Four nylon reinforcement layers
- C. Inner extruded liner

2.3.1

For each pulsation damper, various hose types are available. The material of the inner liner of the hose determines the hose type. Each hose type is marked by a unique color code

Hose type	Material	Color code	Article number:		
			PD40	PD65	PD100
NR	Natural rubber	Purple	P040020	P065020	P100020
NBR	Buna-N	Yellow	P040040	P065040	P100040
EPDM	EPDM	Red	P040075	P065075	P100075


	Consult your Bredel representative for more detailed information about the chemical and temperature resistance of pulsation-damper hoses.
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	Store the pulsation-damper hose in a cool, dry place and do not subject it to sunlight.
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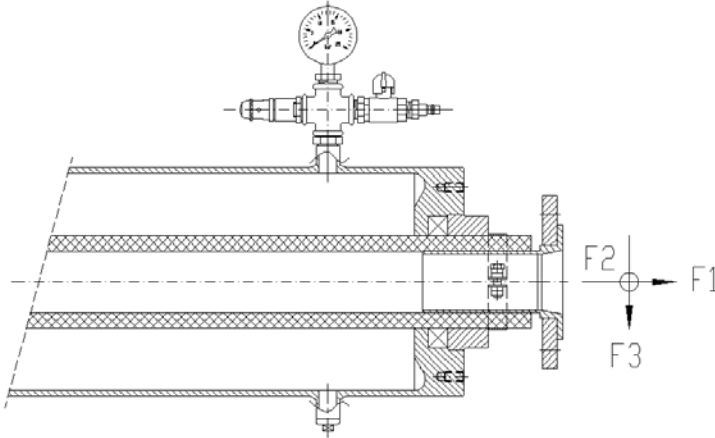
7.5 Connecting the pipework to the pulsation damper

When connecting the pipework to the pulsation damper, consider the following points:

- The bore size of the discharge lines must not be bigger than the bore size of the pulsation-damper hose. (see also “pump range”). For more information consult your Bredel Hose Pumps representative.
- Limit the presence of sharp bends. Make sure that the radius of the bent discharge line is as large as possible. It is recommended to use Y-connections instead of T-connections.
- The pulsation damper will be most effective if it is directly mounted onto the hose pump. Minimize the distance between pump and pulsation damper.
- Avoid, at all times, a pressure higher than the maximum operating pressure.
- Avoid heavy loads on the flanges. (see table below).

	CAUTION Consider the maximum operating pressure. Exceeding the maximum operating pressure may lead to serious injuries or damage to the pump and the environment.
---	---

7.6 Maximum load on the flange of the pulsation damper




Maximum flange loads in [LB]			
Force	PD40	PD65	PD100
F1	225	315	450
F2	112	157	225
F3	45	67	90


7.7 Selection table pulsation damper and matching pump:


Selection table pump and pulsation damper	
Pulsation damper type:	Bredel Pump type:
PD 40	SP(X)25, SP(X)32, SP(X)40
PD 65	SP(X)50, SP(X)65
PD 100	SP(X)80, SP(X)100


i If in doubt concerning the correct installation of your pulsation damper, contact your Bredel Hose Pumps representative for assistance. He will advise about the installation layout, pipe diameters, etc, to ensure optimum performance of your Bredel pulsation damper.

7.8 Pressurizing the system

	<p>CAUTION Do not pressurize the pulsation damper if it is not installed into the pipe system.</p> <p>Consider the maximum operating pressure. Exceeding the maximum operating pressure may lead to serious injuries or damage to the pump and the environment.</p>
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	<p>CAUTION Consider the filling medium for the pulsation-damper housing – in this case compressed air or nitrogen.</p>
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	<p>CAUTION The filling medium must be connected to the filling nipple. (see pos. 18)</p>
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	<p>If in doubt concerning the correct filling medium for your pulsation damper, contact your Bredel Hose Pumps representative for assistance.</p>
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8 MAINTENANCE

During the development of the pulsation damper, Bredel Hose Pumps has once more applied its reputation in the area of simplicity, reliability, and maintenance-friendliness. However, careful maintenance and, in particular, scrupulous cleaning are essential conditions for problem-free operation of the pulsation damper.

- Before carrying out any maintenance to the pulsation damper, please thoroughly acquaint yourself first with the directives as pointed out in the section “Safety regulations and danger warnings”.
- Any repair to the pulsation damper is to be carried out by properly skilled and authorized users only.
- After cleaning and maintenance work, do not use the pulsation damper until all parts that have been removed, are reinstalled correctly.



WARNING

Make sure to remove all electric voltage from the pump motor concerned, before embarking upon any maintenance work to the corresponding pulsation damper.



WARNING

Release the pressure from the pulsation damper by means of the ball valve near the pressure-relief valve, before starting on any work to the pulsation damper.



WARNING

Protect your hands and face from any dangerous substances when handling or examining the pulsation-damper hose.



CAUTION

After maintenance has been carried out, and before switching the pump back on, ensure that all valves present in the pipework are opened.

8.1 Cleaning the pulsation-damper hose internally


Flushing the pump and pulsation-damper with clean water easily cleans the inside of the pulsation-damper hose. If a cleaning fluid is added to the water, it must be checked that the hose liner material is resistant to that fluid.



With many products to be pumped, it is necessary to clean the pulsation-damper hose immediately once the pump is stopped, to avoid solidification and hardening of the product within the hose.

8.2 Removing / replacing the pulsation-damper hose


1. Disconnect the electric voltage from the corresponding pump and close any valves to minimize product loss.
2. Position a tray under the pulsation damper. This tray must be sufficiently large to collect all liquid inside the pulsation damper.
3. Release the pressure from the pulsation damper using the filler valve near the pressure gauge.


	<p>WARNING If the pulsation-damper hose is cracked or worn, liquid product to be pumped may escape via the filler valve. Therefore, take the necessary safety precautions.</p>
---	---

4. Support the pulsation damper in such a way that it cannot fall during disassembly.
5. Remove the mounting bolts from both flanges. Place the pulsation damper on a suitable workbench.
6. Loosen the hose clamps (pos. 8) from both ends.
7. Unscrew the bolts (pos. 11 and 12) from both flanges (pos. 9).
8. Unscrew the locknut (pos. 7) on both sides, remove the locking plates and remove the washer (pos. 6) and the neck ring (pos. 3) behind.
9. Remove both inserts (pos. 10) from the pulsation-damper hose.
10. Remove the mounting bolts from both flange supports (pos. 9) together with the inserts (pos. 10).
11. Remove the pulsation-damper hose from the housing.

8.3 Mounting the (new) pulsation-damper hose

After the pulsation-damper hose has been removed, as described in "Removing / replacing the pulsation-damper hose", the (new) hose can be mounted in the pulsation damper.

	<p>CAUTION If you are mounting a new pulsation-damper hose, and you wish to continue pumping the same product, ensure that the color code of the new hose matches the color code of the old, used hose.</p>
---	--

	<p>CAUTION If you are mounting a new pulsation-damper hose, and you wish to continue pumping the same product, ensure that the color code of the new hose matches the color code of the old, used hose.</p>
---	--

1. Collect all parts to be mounted and check for damage.
2. Install one of the neck rings (pos. 3) in the damper housing. Install the pulsation-damper hose (pos. 2). Install the second neck ring (pos. 3).
3. Grease both O rings (pos. 4) with Molykote 55M and slide these at both ends over the pulsation-damper hose.
4. Place both washers (pos. 6 incl. O rings pos. 5) and hand-tighten both nuts (pos. 7).
5. Loosely replace the hose clamps (pos. 8) at both ends.
6. Loosely replace the flanges on both sides (pos. 9). Replace the inserts. (pos. 10)
7. Tighten the nuts (pos. 7) (see “Torque values”).
8. Tighten both flanges (pos. 9) using the corresponding bolts and spring washers. (pos. 11 and 12)
9. Connect the pressure system up to the appropriate filling nipple (pos. 18). Take the necessary safety precautions and pressurize the pulsation-damper housing to 16 bar (232 psi). Also see: Pressurizing the system.
10. Next, release the pressure down to 14 bar (203 psi), using the filler valve (pos. 17).
11. Tighten both hose clamps (pos. 8); see “Torque values”, table 8.

9 TROUBLE SHOOTING

If the pulsation damper does not function (correctly), consult the following checklist to see if you can remedy the problem yourself. If you cannot, please contact your Bredel representative.

Problem	Possible cause	Solution
Product leakage at connecting insert	Hose clamp (pos. 8) incorrectly mounted.	Tighten to the specified torque settings (see "Torque values")
Pressure loss at pulsation-damper housing	Damaged O ring (pos. 4 or 5)	Replace the O ring concerned
	Nut (pos. 7) incorrectly mounted	Tighten to the specified torque settings (see "Torque values")
Short pulsation-damper hose life	Chemical corrosion of the hose	Check the compatibility of the hose material with the product to be pumped. Consult your Bredel representative for correct hose selection.
	High discharge pressures	Maximum operating pressure is 16 bar (232 psi). Check whether the discharge line is blocked. Make sure the shut-off valves are fully opened and the pressure-relief valve (if present) in the discharge line is functioning properly.
	High product temperature	Consult your Bredel representative for correct pulsation-damper hose selection.
	High pulsations	Restructure the discharge and inlet conditions.

10 TECHNICAL SPECIFICATIONS

10.1 General information

Description	Value
Max. operating pressure for pulsation damper	16 bar (232 psi)
Ambient temperature of the pulsation damper	-20°C to 45°C (-4°F to 113°F)
Product temperature for pulsation damper	-10°C to 80°C (14°F to 176°F)
Storage temperature of the pulsation damper	-40°C to 70°C (-40°F to 158°F)
PED directive	97/23/EC
Max. volume	See type plate

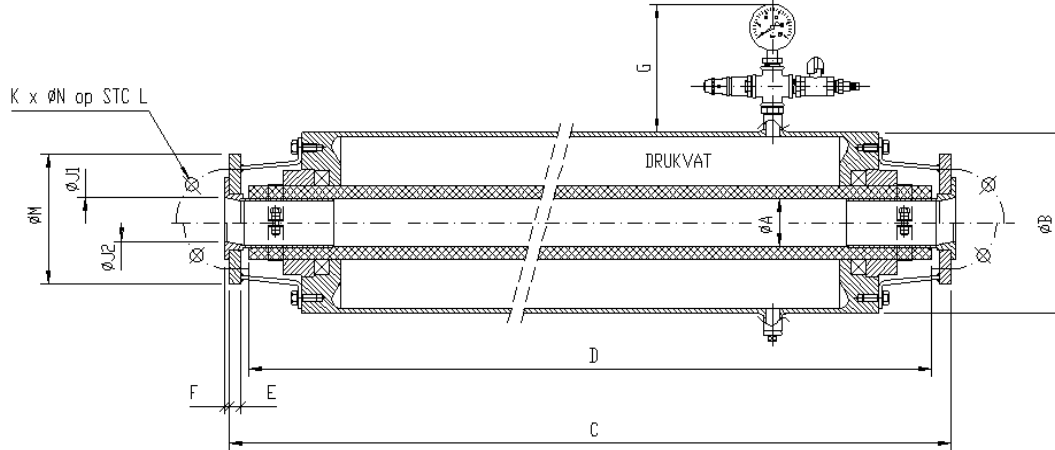
10.2 Torque values

Description	PD/40	PD/65	PD/100
Nut (pos. 7)			
Thread	M115 x 2	M145 x 2	M185 x 3
Torque value [lb-ft]	N/A	N/A	N/A
Key width [mm]	Ø16	Ø16	Ø16
Hose clamp (pos. 8)			
Thread	M8	M8	M10
Torque value [lb-ft]	8.85	8.85	8.85
Key width [mm]	13	13	13
Connecting flange (pos. 11)			
Thread	M8	M10	M12
Torque value [lb-ft]	18.44	36.88	62.7
Key width [mm]	13	17	19

10.3 Weights table

	PD/40	PD/65	PD/100
Pulsation damper, complete [lb]	70	165	297
Hose [lb]	4.9	10.8	24

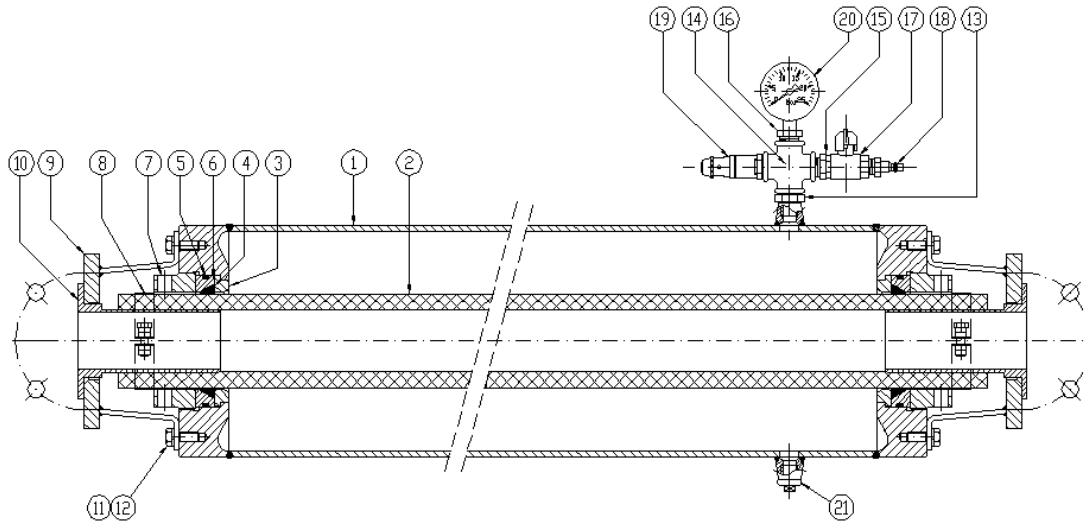
10.4 Dimensions



Pulsation Damper Type	Pump Type	A	B	C	D	E	F			G	J1	J2	K	L	M	N
							Steel	SS	Plastic							
PD/40	SP(X)25	1.57	6.61	31.5	28.94	0.63	-	0.16	0.79	6.89	-	1	0.16	3.35	4.53	0.55
	SP(X)32						0.16	-			1.25	3.94		5.51		
	SP(X)40						0.09	1.57			-	4.33		5.9		
PD/65	SP(X)50	2.56	9.65	41.33	38.39	0.63	-	0.25	0.79	6.89	-	2	0.16	4.92	6.5	0.71
	SP(X)65						0.25	0.12			2.56	-		5.71	7.28	
PD/100	SP(X)80	3.94	12.75	53.39	50.98	0.71	0.31	0.31	1.89	6.89	-	3.15	0.31	6.3	7.87	0.71
	SP(X)100							0.12			3.94	-		7.09	8.66	

Dimensions are in inches

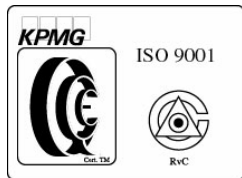
10.5 Spare-parts list



Pos.	Qty.	Description	PD/40	PD/65	PD/100
1	1	Housing	540201000	565201000	510201000
2	1	Hose NR	P040020	P065020	P100020
	1	Hose NBR	P040040	P065040	P100040
	1	Hose EPDM	P040075	P065075	P100075
3	2	Collar-Brush	540204000	565204000	510204000
4	2	O ring NBR	540205SET	565205SET	510205SET
5	2	O ring NBR	540205SET	565205SET	510205SET
6	2	Washer	540205SET	565205SET	510205SET
7	2	Nut	540207000	565207000	510207000
8	2	Hose clamp	540208000	565208000	510208000
9	2	Flange, steel, ASA	540213000	550213000	580213000
10	2	Insert, SS PD40-25	525215000		
	2	Insert, PVC PD40-25	525216000		
	2	Insert, PP PD40-25	525290000		
	2	Insert, PVDF 40-25	525280000		
	2	Insert, SS PD 40-32/40	540211000		
	2	Insert, PVC PD 40-32/40	540212000		
	2	Insert, PP PD 40-32/40	540292000		
	2	Insert, PVDF 40-32/40	540282000		
	2	Insert, SS PD 65-50		550215000	
	2	Insert, PVC PD 65-50		550216000	
	2	Insert, PP PD 65-50		550290000	
	2	Insert, PVDF 65-50		550280000	
	2	Insert, SS PD 65-65		565211000	
	2	Insert, PVC PD 65-65		565212000	
	2	Insert, PP PD 65-65		565292000	
	2	Insert, PVDF 65-65		565282000	
	2	Insert, SS PD 100-80			580215000
	2	Insert, PVC PD 100-80			580216000
	2	Insert, PP PD 100-80			580290000
	2	Insert, PVDF 100-80			580280000
2	Insert, SS PD 100-100			510211000	
2	Insert, PVC PD 100-100			510212000	
2	Insert, PP PD 100-100			510292000	
2	Insert, PVDF 100-100			510282000	
11	8	Bolt	540217SET	565217SET	510217SET
12	8	Washer, Spring Lock	540217SET	565217SET	510217SET
13	1	Nipple G1/2"	540219SET	565219SET	510219SET
14	1	Cross piece G1/2"	540219SET	565219SET	510219SET
15	1	Reducing ring G1/2"x 3/8"	540219SET	565219SET	510219SET
16	1	Reducing ring G1/2"x 1/4"	540219SET	565219SET	510219SET
17	1	Ball valve G3/8"	540223000	540223000	540223000
18	1	Nipple G3/8"	540224000	540224000	540224000
19	1	Safety valve G1/4"	540225000	540225000	540225000
20	1	Pressure gauge 0-25 bar	540226000	540226000	540226000
21	1	Stop G1/2"	540219SET	565219SET	510219SET

10.6 Paint specification - standard

- Primer - two pack epoxy primer dry thickness 30 microns
- Top coat - two pack polyurethane dry thickness 30 microns
- Gloss finish 100%.



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TS03-060-0

29210391

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