ENGINEERING
TOMORROW

Installation Guide

Proportional Valve Group
PVG-EX

The Danfoss PVG-EX program is an explosion-proof PVG designed to be used in Ex hazardous areas like mining and oil and gas industries.

The PVG-EX is developed according to and in compliance with:

EU Directive 2014/34/EU Equipment for explosive atmosphere - ATEX

- EN 60079-0:2018 Electrical apparatus for explosive gas atmospheres-part 0
- EN 80079-36:2016 Non-electrical equipment for explosive atmospheres – Basic method and requirements
- EN 80079-37:2016 Non-electrical equipment for explosive atmospheres – Non-electrical type of protection constructional safety “c”, control of ignition sources “b”, liquid immersion “k”
- EN 80079-38:2016 Equipment and components in explosive atmospheres in underground mines

Warning

All brands and all types of directional control or proportional valves, which are used in many different operation conditions and applications, can fail and cause serious damage.

Analyze all aspects of the application. The machine builder/system integrator alone is responsible for making the final selection of the products and assuring that all performance, safety and warning requirements of the application are met.

The process of choosing the control system and safety levels is governed by Machinery Directive 2006-42-EC, and harmonized standard EN 13849 (Safety related requirements for control systems).

Warning

All national safety regulations must be fulfilled in connection with installation, start-up and operation of Danfoss PVG-EX.

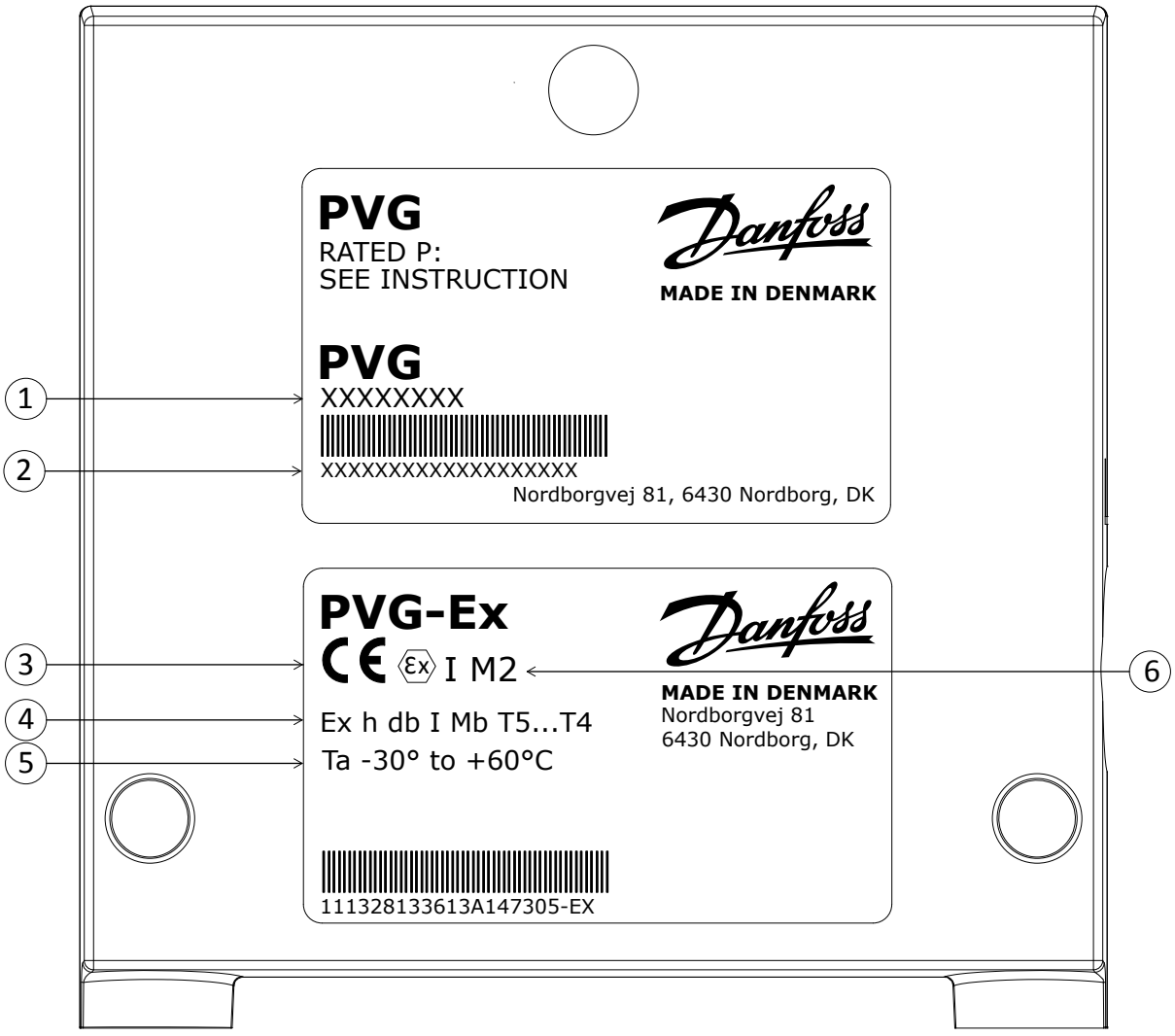
Furthermore, the requirements of the Declaration of Conformity and national regulations for installations in potentially explosive atmospheres applies as well. Disregarding such regulations involves a risk of serious personal injury or extensive material damage.

Warning

Work in connection with the valve group must be performed only by professionals and qualified persons.

Warning

PVG with non-conductive coating must have preventive protection against electrostatic charge by an earthed metal connection.



Nameplate key

Nameplate legend

Number	Description	
1	PVG Valve Group code number	
2	Code number, production date, and serial number	*Example:* 42 12 C xxxxxx Week: 42, Year: 2012, Day: C=Wednesday (A=Monday), Serial number
3	CE Conformity marking	
4	EU marking (per 80079) - Standard part	
5	Ambient temperature range	
6	EU marking (per 2014/34/EU) - Directive part	

T-category with ambient temperature at 65°C [149°F]

Oil inlet temperature	T-category
≤ 79°C [174°F]	T5
79 - 90°C [174 - 194°F]	T4

Ex marking (EN 80079-36 standard part)

Description	EU Marking
Protection principle	h
Explosion protection marking	
Equipment group	I / II
Equipment protection level (EPL)	Mb / Gb
T-class	T5...T4

Ex marking (EU Directive part)

Description	EU Marking
CE conformity marking	CE
Explosion protection marking	
Equipment Group	I / II
Equipment Category	M2 / 2G

EPL/Equipment category

Definition	Level of protection	Typical zone of application	IEC		EU	
			EPL	Group	Category	Group
Mines	Very high	N/A	Ma	I	M1	I
	High		Mb		M2	
Gas atmosphere	Very high	0	Ga	II	1G	II
	High	1	Gb		2G	
	Enhanced	2	Gc		3G	

Technical data

Maximum rated pressure	P-port continuous	350 bar [5075 psi]
	P-port intermittent	400 bar [5800 psi]
	T-port static/dynamic	25/40 bar [365/580 psi
	A/B-port continuous	350 bar [5075 psi]
	A/B-port intermittent	420 bar [5800 psi]
Maximum rated flow	P-port	140 l/min [37 US gal/min]
	Port A/B	125 l/min [33 US gal/min]
Oil temperature	Recommended	30 to 60°C [86 to 140°F]
	Minimum	-30°C [-22°F]
	Maximum	90°C [194°F]
Ambient temperature	Recommended	-30 to 60°C [-22 to 140°F]
Oil viscosity	Operating range	12 to 75 cSt [65 to 347 SUS]
	Minimum	4 cSt [39 SUS]
	Maximum	460 cSt [2128 SUS]
Oil cleanliness	Minimum	23/19/16 (according to ISO 4406)

Standard hydraulic oil has a flash point (COC) ignition temperature of 230°C [446°F] and auto ignition temperature 343°C [649°F]. Hydraulic fluid used must fulfill requirements for Auto Ignition temperature for the designated area.

Recommended:

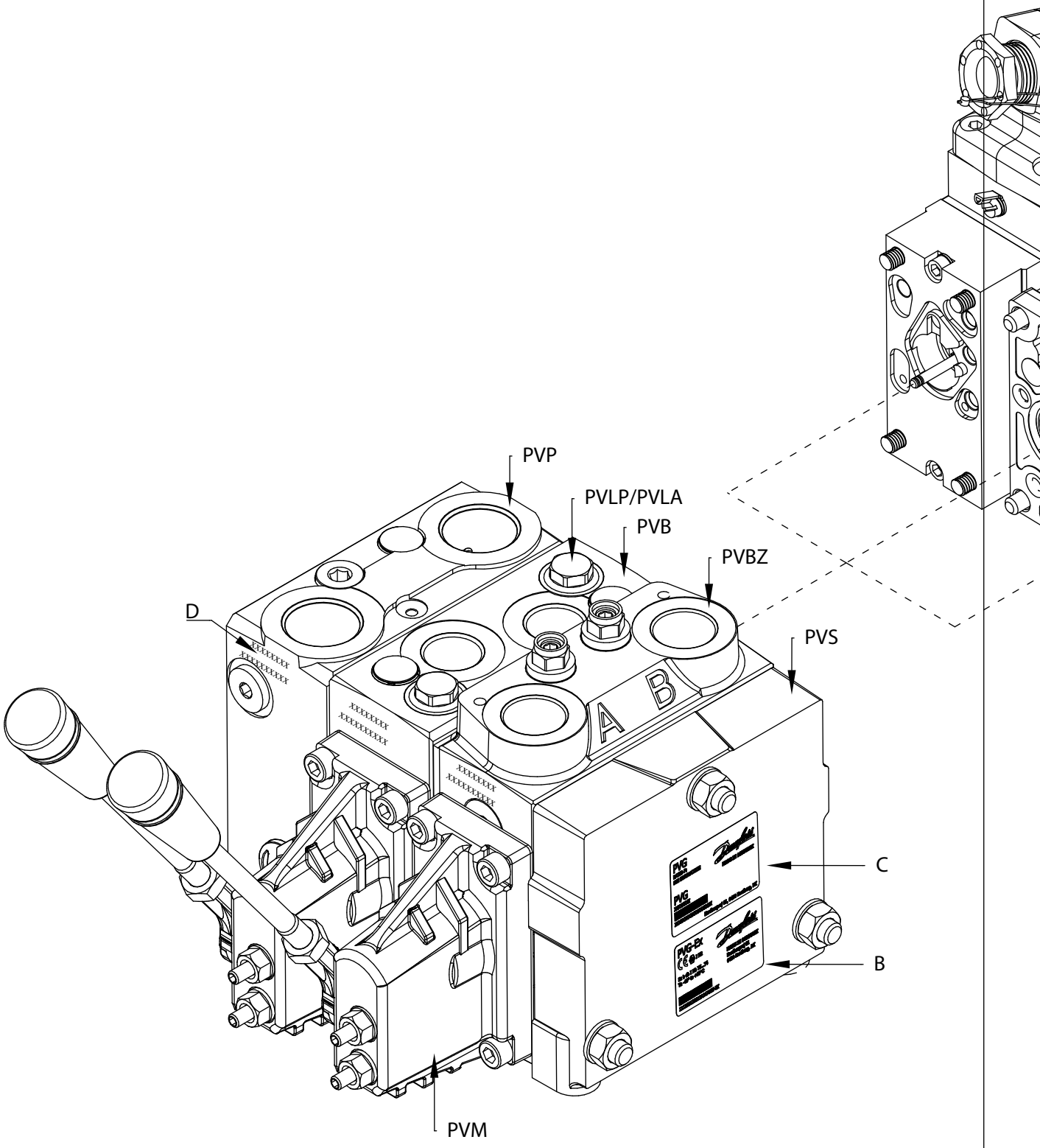
ISO VG 68

ISO VG 46

ISO VG 32

- DIN 51524-2: Mineral oil hydraulic fluids of category HLP
- DIN 51524-3: Mineral oil hydraulic fluids of category HVLP
- ISO 11158: Mineral oil hydraulic fluids of category HM
- ISO 11158: Mineral oil hydraulic fluids of category HV

Identification



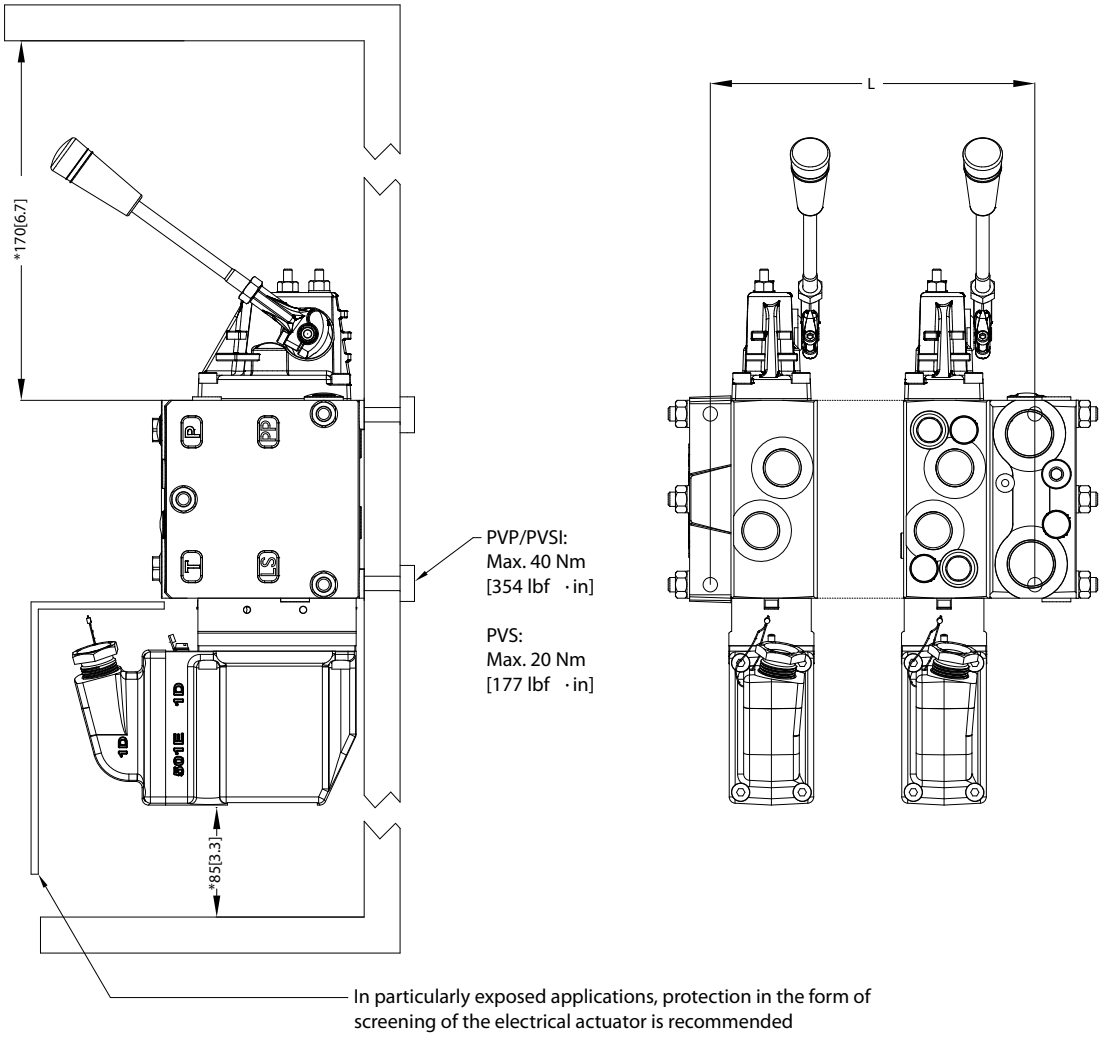
B PVG-EX label

C PVG number, week and year of installation, series number and PVP-pressure setting

D Engraved part number on PVP and PVB

Installation and plug orientation

PVB	1	2	3	4	5	6	7	8	9	10
L (mm)	82	130	178	226	274	322	370	418	466	514
L (in)	3.23	5.12	7.01	8.90	10.79	12.68	14.57	16.46	18.35	20.24

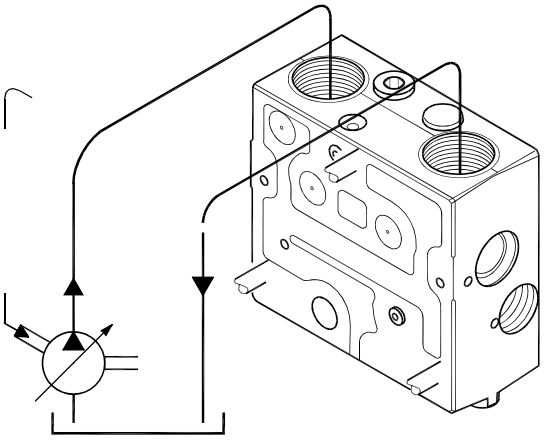


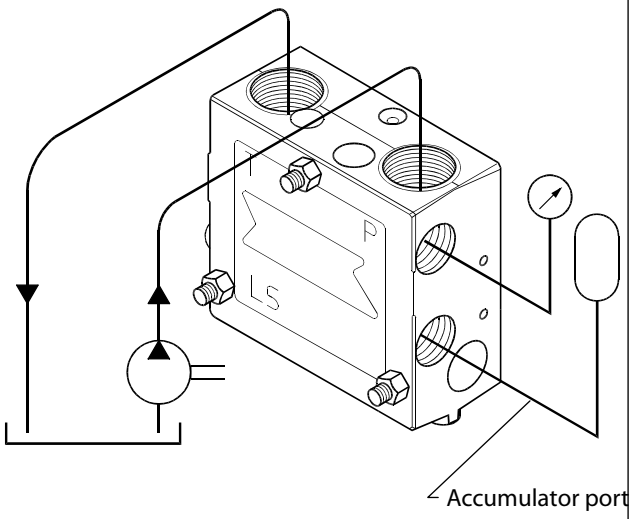
* Room for dismantling

Warning

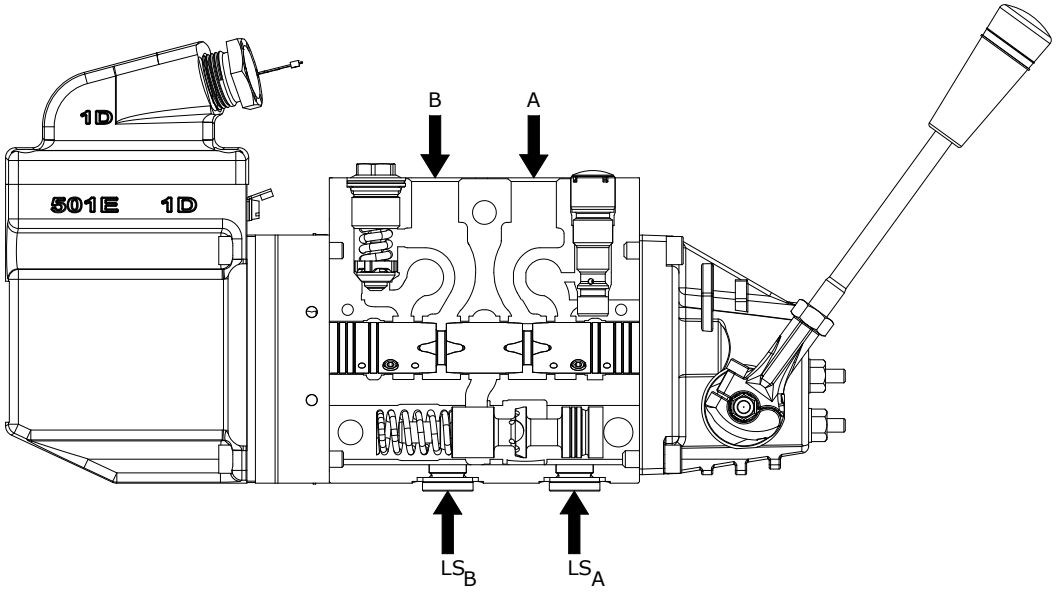
It is important to keep the moving parts of the PVG clean and free of dust at all times. PVM lever with plastic knob must have sufficient space for free movement.

Connection - PVP, pump side module





PVB, basic module



Connection threads type G (ISO 228-1)

Max. tightening torques

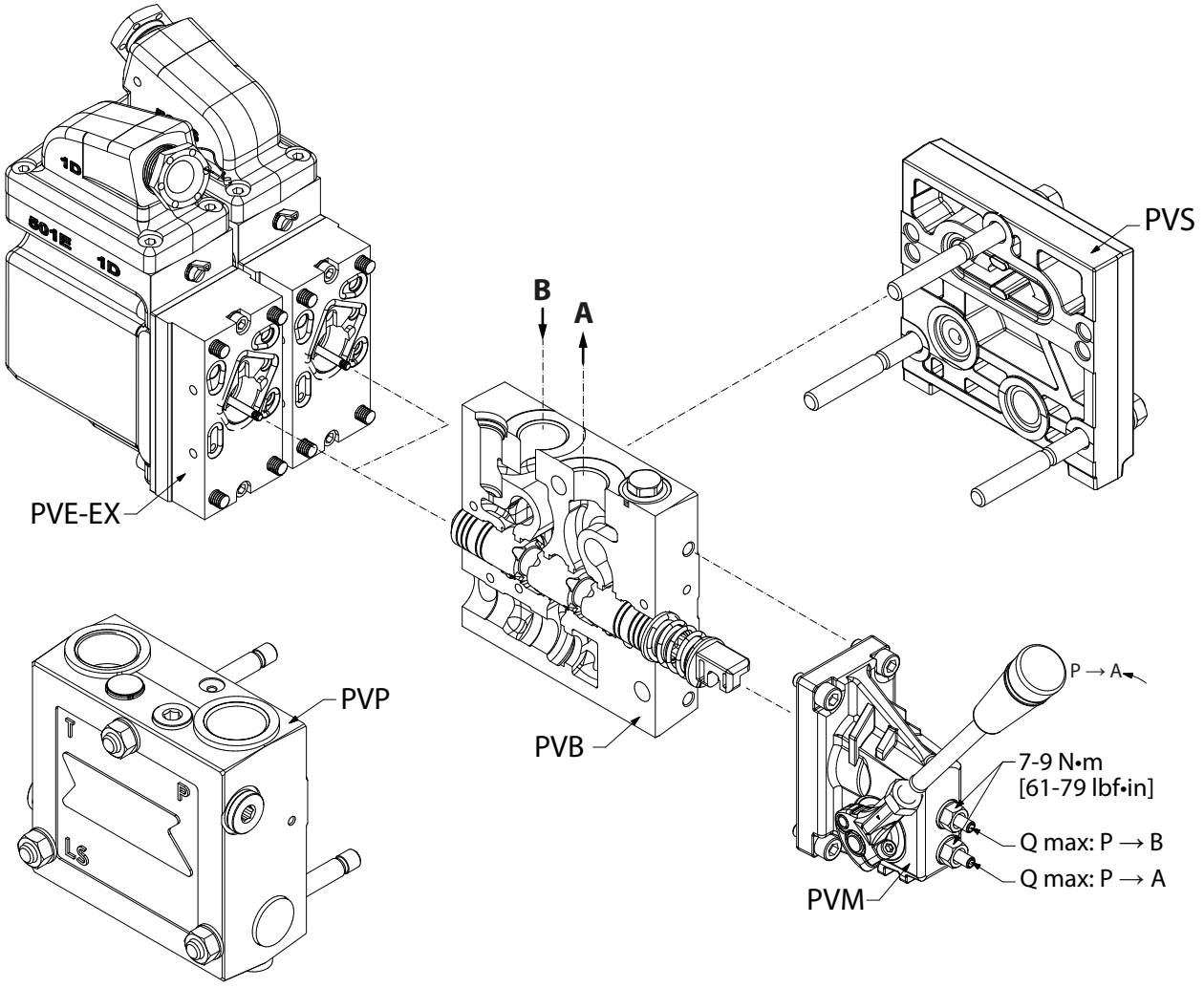
Connection	**P**		**A/B**	**T**	**LS,M, LSA, LSB, PVH, Accu**	**LX, PVS, PVSI**	
Sealing \ Thread	**G 1/2**	**G 3/4**	**G 1/2**	**G 3/4**	**G 1/4**	**G 1/8**	**G 1/4**
With steel washer	130 N•m [1150 lbf•in]	210 N•m [1850 lbf•in]	130 N•m [1150 lbf•in]	210 N•m [1850 lbf•in]	40 N•m [350 lbf•in]	17 N•m [150 lbf•in]	40 N•m [350 lbf•in]
With copper washer	30 N•m [270 lbf•in]	50 N•m [445 lbf•in]	30 N•m [270 lbf•in]	50 N•m [445 lbf•in]	20 N•m [180 lbf•in]	15 N•m [135 lbf•in]	20 N•m [180 lbf•in]
With aluminum washer	70 N•m [620 lbf•in]	110 N•m [970 lbf•in]	70 N•m [620 lbf•in]	110 N•m [970 lbf•in]	30 N•m [270 lbf•in]	15 N•m [135 lbf•in]	30 N•m [270 lbf•in]
With cutting edge	130 N•m [1150 lbf•in]	210 N•m [1850 lbf•in]	130 N•m [1150 lbf•in]	210 N•m [1850 lbf•in]	40 N•m [350 lbf•in]	17 N•m [150 lbf•in]	40 N•m [350 lbf•in]

UN and UNF connection threads - O-ring boss port

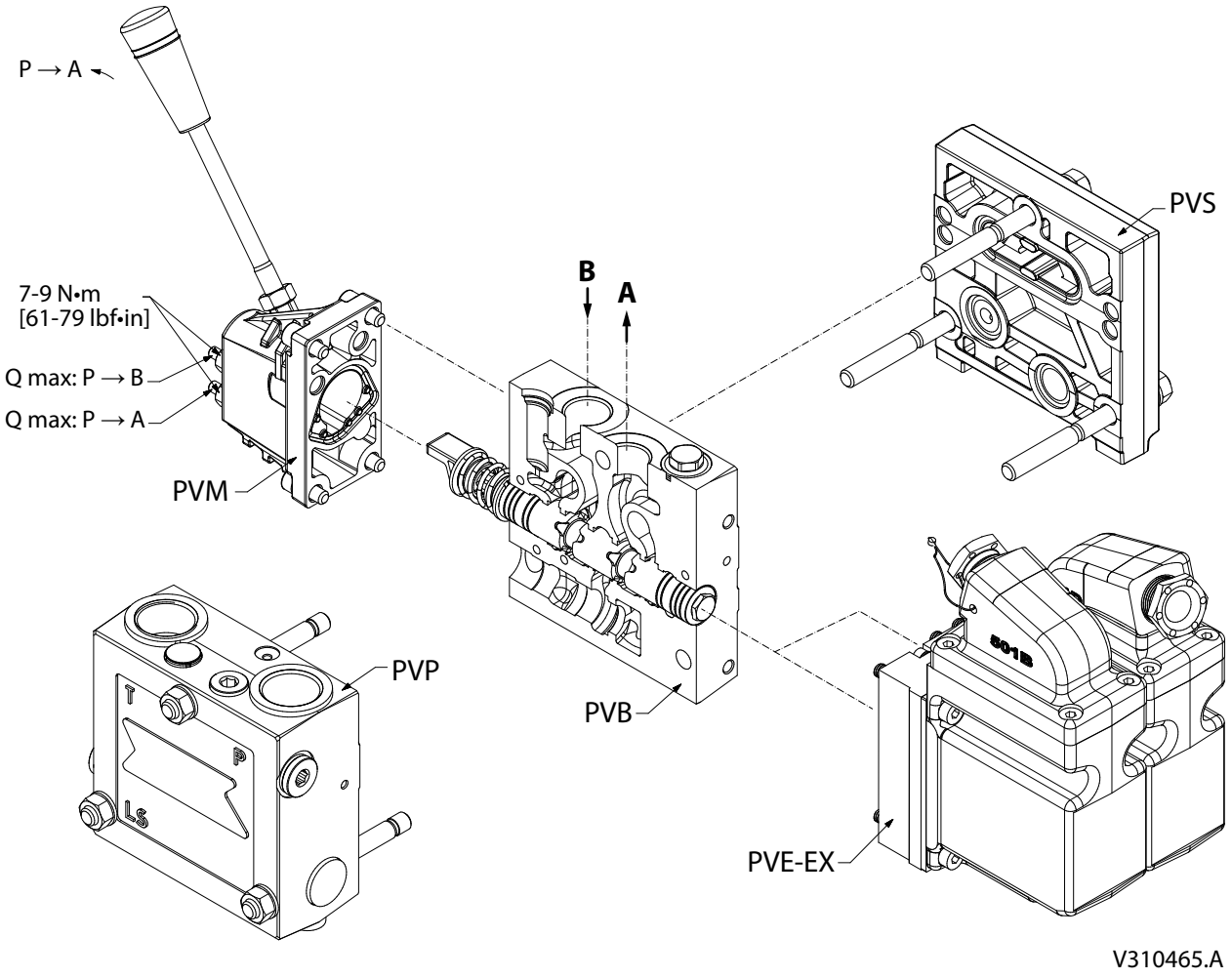
Max. tightening torques

Connection	**P**		**A/B**	**T**	**LS, M, LSA, LSB, PVH, Accu**	**LX, PVS, PVSI**	
Screwed connection \ UNF	7/8 in - 14	1 1/16 in - 12	7/8 in - 14	1 1/16 in - 12	1/2 in - 20	3/8 in - 24	1/2 in - 20
O-ring	90 N•m [800 lbf•in]	120 N•m [1060 lbf•in]	90 N•m [800 lbf•in]	120 N•m [1060 lbf•in]	30 N•m [270 lbf•in]	10 N•m [90 lbf•in]	30 N•m [270 lbf•in]

Mounting of PVE



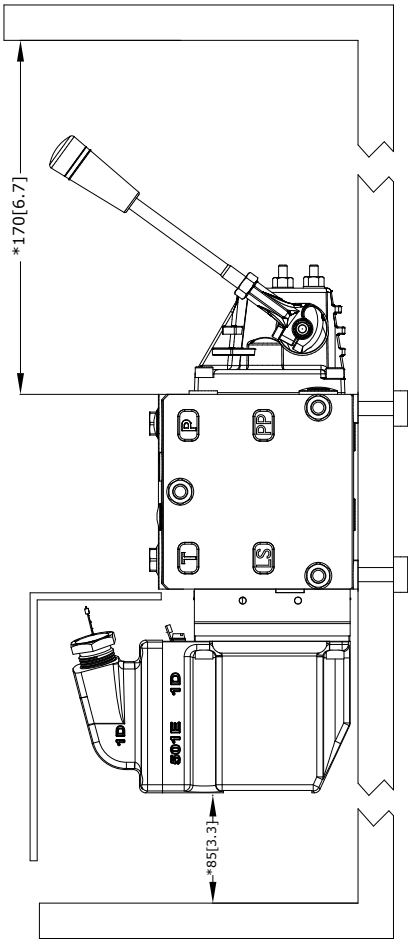
Standard assembly



Optional assembly

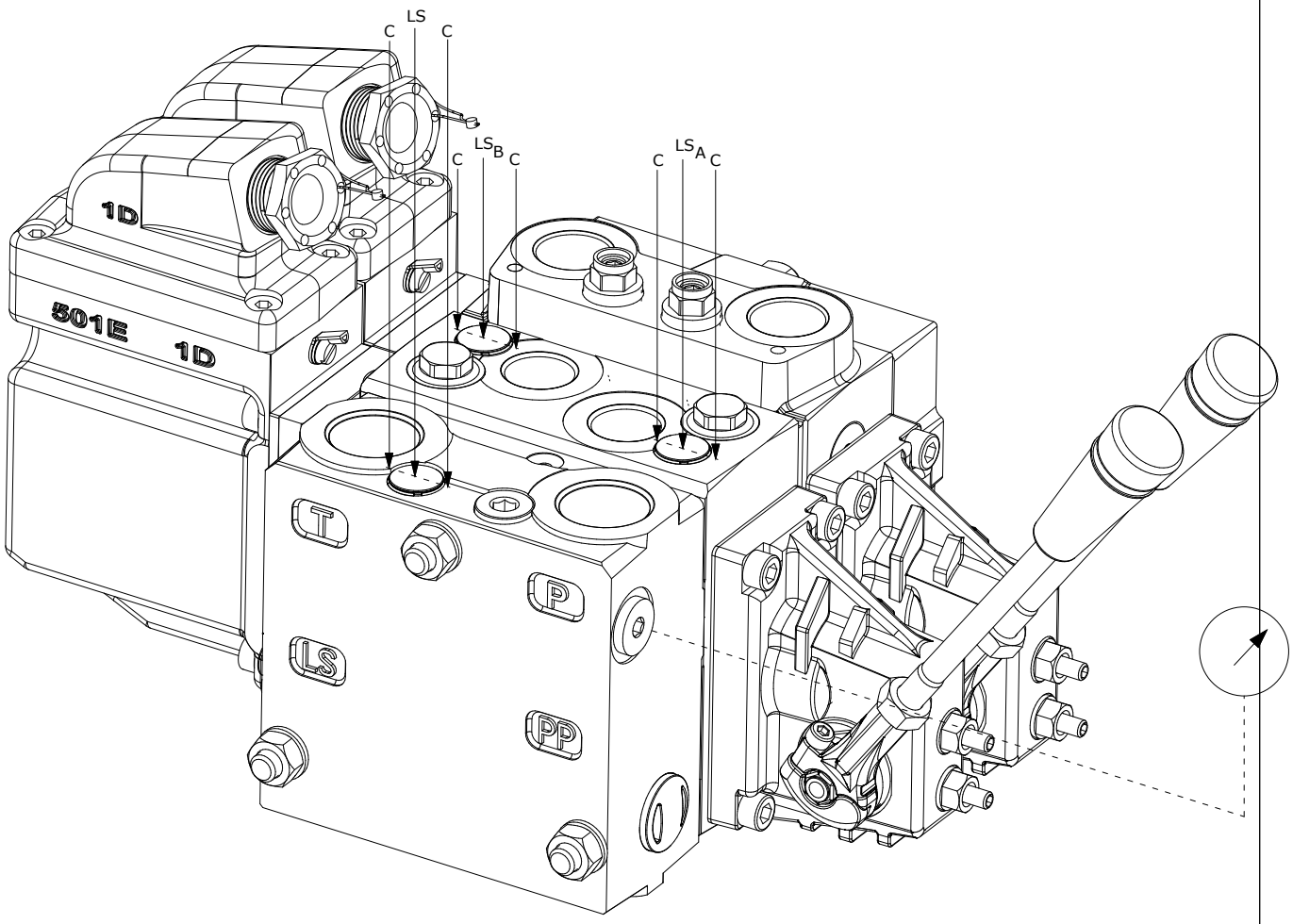
PVG - Bleeding

If the group is installed vertically, it is recommended to bleed it at the adjusting screws.



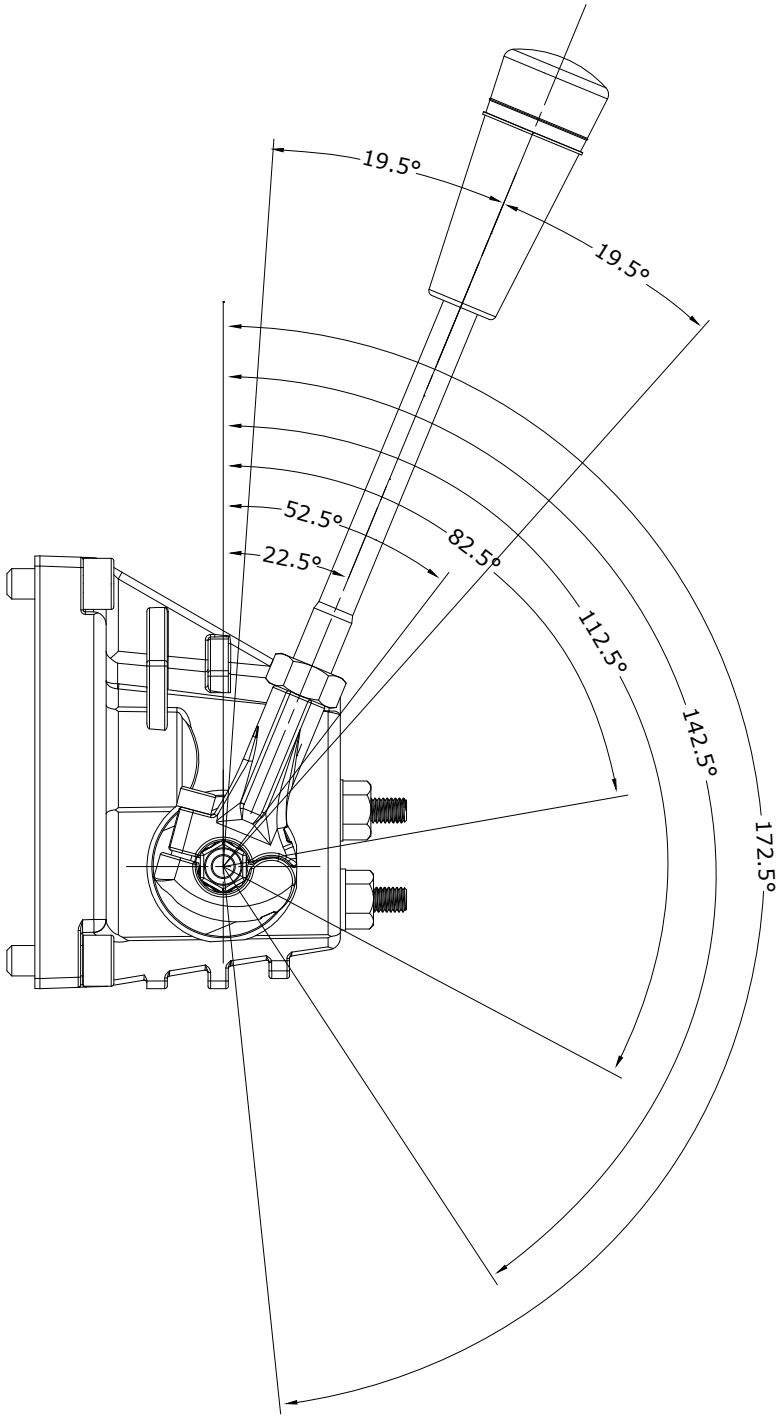
Because of the hydraulic build-up of PVEA, it may be necessary to bleed it.

PVG - Pressure setting - PVP, LS_A, LS_B



PVM - Installation of lever

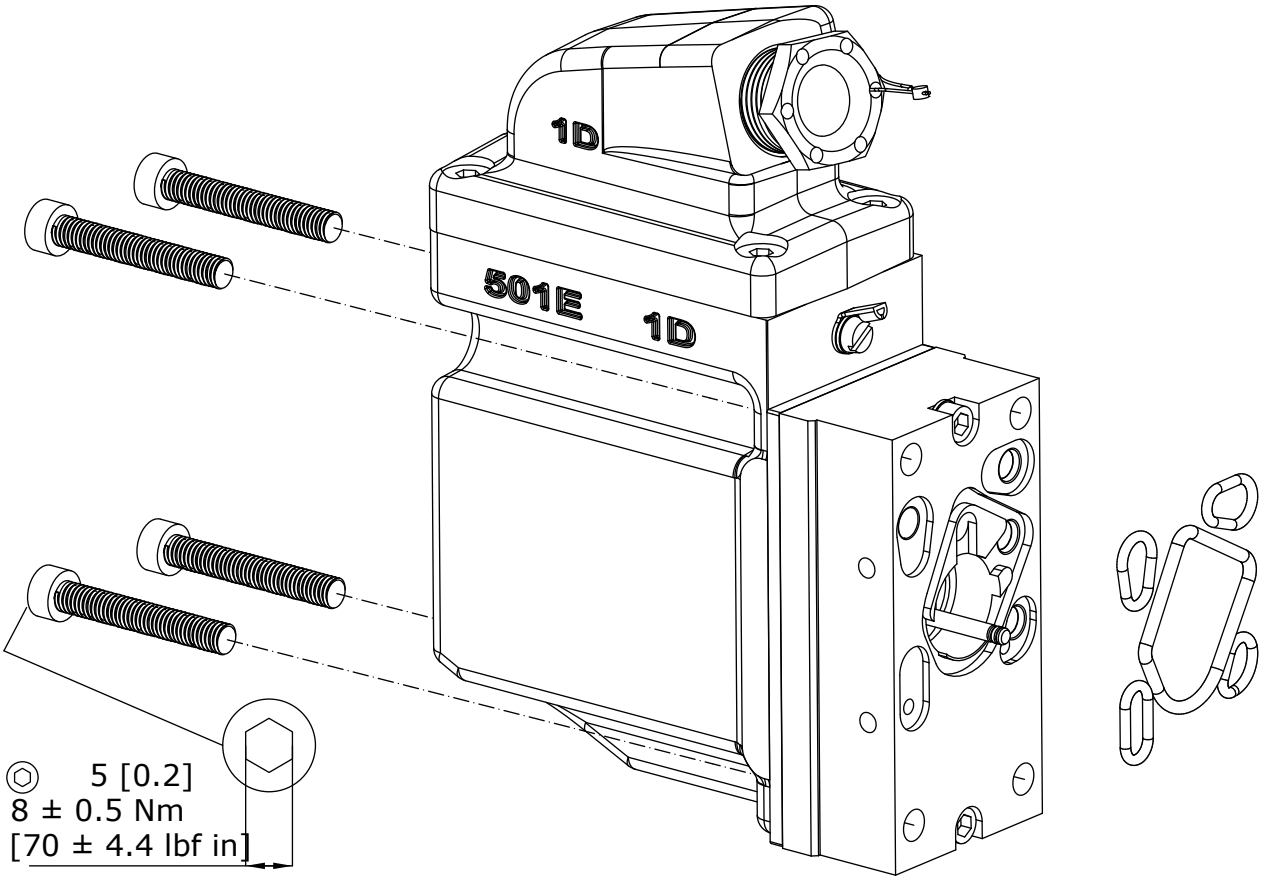
Screw the lever completely home



Warning

PVG must only be used with the Danfoss certified manual lever with plastic knob. Lever must have sufficient space for free movement to prevent impact with solid objects that are not part of the PVG.

PVE - Installation



PVE-EX Standard

For installation, mounting, and technical data of the PVE-EX, please see *PVE-EX Installation Guides* document number:

- AN212686484914 for eb mb version
- AN216686485434 for db version
- AN249186480855 for UL version

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EU DECLARATION OF CONFORMITY

Danfoss A/S
Danfoss Power Solutions / SVS

declare under our sole responsibility that the following product(s) / component(s)

Product category PVG32-128-256-Ex, PVE Ex

Type designation(s) PVG Load Independent Proportional Valve

Covered by this declaration is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

Description:
PVG Load Independent Proportional Valve

PVG is based on a modular system assembled from a defined range of modules consisting of PVE-EX which are ATEX equipment in its own right and non-electrical items that have been assessed separately by Danfoss to form a compliant assembly.

Variant(s):
Group I: PVEO-EX-12V, PVEO-EX-24V, PVEO-DI-EX-24V, PVEH-DI-EX, PVEH120-DI-EX, PVEO120-DI-EX-12V

Group IIB: PVEO-EX-24V, PVEH-EX, PVEH-U-EX, PVES-EX, PVES-U-EX, PVEO120-EX-24V, PVEH120-EX, PVES120-EX, PVES120-U-EX, PVEO256-EX-24V, PVES256-EX, PVES256-U-EX

Group I / IIB: PVG32-EX, PVG128-EX, PVG256-EX

Date	Issued by	Date	Approved by
2022.08.22	**Per Bloch Simonsen**	2022.08.22	**Lars Otten**
Mechanical Engineer		**Senior Director SVS Global R&D**	

Danfoss only vouches for the correctness of the English version of this declaration. In the event of the declaration being translated into any other language, the translator concerned shall be liable for the correctness of the translation

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EU declaration of conformity, page 1

ENGINEERING TOMORROW

Variant	Part number	Marking	EU Type Examination Certificate		Directive 2014/34/EU Standard / reference number							Directive 2014/30/EU Standard / reference		Inspection
					EN 60079-0:2018	EN 60079-1:2014	EN 60079-7:2015	EN 60079-18:2015	EN 80079-36:2016	EN 80079-37:2016	EN 80079-38:2016/A1:2018	EN 61000-6-4:2007/A1:2011	EN 61000-6-2:2005	Notified Body PQAN
PVEO-EX-24V	11123165	Ex I M2 / Ex db I Mb	Presafe 14 ATEX 5153X	DNV Product Assurance AS Veritasveien 3, 1363 Høvik, Norway, Notified body number 2460	X	X						X	X	Nemko, Gaustad alléen 30, 0314 Oslo, Norway, Notified Body number 0470
PVEH-EX-ACT	11127696				X	X						X	X	
PVEO-DI-EX-24V	11156461				X	X						X	X	
PVEO-EX-12V	11156462				X	X						X	X	
PVEH120-EX-ACT	11166357				X	X						X	X	
PVEO120-EX-12V	11170401				X	X						X	X	
PVEH-32-EX-ACT	11156465	Ex II 2G / Ex db IIB T5 Gb			X	X						X	X	
PVES32-EX-ACT	11156466				X	X						X	X	
PVEO32-EX-24V	11156467				X	X						X	X	
PVEO120-EX-24V	11156468				X	X						X	X	
PVES120-EX-PAS	11156567				X	X						X	X	
PVES120-EX-ACT	11156568				X	X						X	X	
PVEH120-EX-PAS	11161000				X	X						X	X	
PVEH32-EX-PAS	11156463				X	X						X	X	
PVES32-EX-PAS	11156464				X	X						X	X	
PVEO256-EX-24V	11194404				X	X						X	X	
PVES256-EX	11194415				X	X						X	X	
PVEO32-EX-24V	11123166	Ex II 2G / Ex eb mb IIB T4 Gb	Presafe 16 ATEX 8699X		X		X	X				X	X	
PVEH32-EX-PAS	11156608				X		X	X				X	X	
PVES32-EX-PAS	11156609				X		X	X				X	X	
PVEH32-U-EX-ACT	11156610				X		X	X				X	X	
PVES32-U-EX-ACT	11156569				X		X	X				X	X	
PVES120-U-EX-ACT	11156613				X		X	X				X	X	
PVEO120-EX-24V	11156571				X		X	X				X	X	
PVES120-EX-PAS	11156612				X		X	X				X	X	
PVEO256-EX-24V	11241525				X		X	X				X	X	
PVES256-U-EX	11241590				X		X	X				X	X	
PVES256-EX	11241519				X		X	X				X	X	
PVEH120-EX-PAS	11161001				X		X	X				X	X	

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EU declaration of conformity, page 2

ENGINEERING TOMORROW

Variant	Part number	Marking	Technical File	Directive 2014/34/EU Standard / reference number							Directive 2014/30/EU Standard / reference number		Inspection
				EN 60079-0:2018	EN 60079-1:2014	EN 60079-7:2015	EN 60079-18:2015	EN 80079-36:2016	EN 80079-37:2016	EN 80079-38:2016 /A1:2018	EN 61000-6-4:2007 /A1:2011	EN 61000-6-2:2005	Internal
PVG32-128-256-EX	Customer specific part number	Ex I M2 / Ex h I Mb Ex II 2G / Ex h IIB T5...T4 Gb	Acknowledgement of Receipt, DNV: C536023	X				X	X	X			Internal production control in accordance with Directive 2014/34/EU Annex VIII Module A.
non-electrical items that can be selected to form a compliant PVG assembly													
PVP/PVPV/ PVPM/PVPVM	Part number must be selected from PVG-Ex Technical Information no. BC290860493426	N/A	Acknowledgement of Receipt , DNV: C536023	X				X	X	X			
PVB/PVBZ				X				X	X	X			
PVBS				X				X	X	X			
PVM				X				X	X	X			
PVH				X				X	X	X			
PVSK/PVSKM				X				X	X	X			
PVSP/PVSPM				X				X	X	X			
PVSI				X				X	X	X			
PVAS				X				X	X	X			
PVLP/A				X				X	X	X			
PVGI				X				X	X	X			

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EU declaration of conformity, page 3

Marking combination for PVG valve group assemblies:

Variant	Part number	Marking			
		PVE-EX	PVG-EX Non-electrical parts	Combination	Sample: marking for PVG valve group assemblies
PVEO-EX-24V	11123165	Ex I M2 / Ex db I Mb	Ex I M2 / Ex h I Mb Ex II 2G / Ex h IIB T5...T4 Gb	Ex I M2 Ex h db I T5...T4 Mb	
PVEH-EX-ACT	11127696				
PVEO-DI-EX-24V	11156461				
PVEO-EX-12V	11156462				
PVEH120-EX-ACT	11166357				
PVEO120-EX-12V	11170401				
PVEH-32-EX-ACT	11156465	Ex II 2G / Ex db IIB T5 Gb		Ex II 2G Ex h db IIB T5...T4 Gb	
PVES32-EX-ACT	11156466				
PVEO32-EX-24V	11156467				
PVEO120-EX-24V	11156468				
PVES120-EX-PAS	11156567				
PVES120-EX-ACT	11156568				
PVEH120-EX-PAS	11161000				
PVEH32-EX-PAS	11156463				
PVES32-EX-PAS	11156464				
PVEO256-EX-24V	11194404				
PVES256-EX	11194415				
PVEO32-EX-24V	11123166	Ex II 2G / Ex eb mb IIB T4 Gb		Ex II 2G Ex h eb mb IIB T4 Gb	
PVEH32-EX-PAS	11156608				
PVES32-EX-PAS	11156609				
PVEH32-U-EX-ACT	11156610				
PVES32-U-EX-ACT	11156569				
PVES120-U-EX-ACT	11156613				
PVEO120-EX-24V	11156571				
PVS120-EX-PAS	11156612				
PVEH120-EX-PAS	11161001				
PVEO256-EX-24V	11241525				
PVES256-U-EX	11241590				
PVES256-EX	11241519				

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Variant	Part number	Marking			
		PVE-EX	PVG-EX Non-electrical parts	Combination	Sample: marking for PVG valve group assemblies
Without PVE-EX	N/A	N/A	Ex I M2 / Ex h I Mb Ex II 2G / Ex h IIB T5...T4 Gb	N/A	PVG-Ex CE Ex I Mb / II 2G Ex h I Mb Ex h IIB T5...T4 Gb Ta -30° to +60°C 111328133613A147305-EX

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EU declaration of conformity, page 5

DNV

ACKNOWLEDGEMENT OF RECEIPT - EU

Acknowledgement Number: C536023 Issue 0

This Acknowledgement consists of 2 pages

This is to confirm that the Technical File for the following product(s):

PVG Load Independent Proportional Valve

With the type designation(s): See page 2

Manufactured by: Danfoss Power Solution Aps
Nordborgvej 81
6430 Nordborg
Denmark

has been received and stored according to the conformity assessment procedure described in Article 13, 1.(b).(ii), the Council Directive 2014/34/EU of 26 February 2014, category 2 non -electrical equipment.

Further details are given overleaf.

Jurisdiction:
DNV Product Assurance AS is appointed by the Norwegian Directorate for Civil Protection as Notified Body (No. 2460) under the terms of Article 21 of the Council Directive 2014/34/EU of 26 February 2014.

Date of issue:
2022 -04 -20

Validity end date:
2030 -11 -20

Asle Kaastad
For DNV Product Assurance AS
The document has been digitally signed.
See www.dnv.com/digitalsignatures for info

EU acknowledgement of receipt, page 1

DNV

Acknowledgement Number C536023 Issue 0

Product description
The following types are covered by the Acknowledgement:

Product Description	Type Designations	Category	Product Group
PVG Load Independent Proportional Valve	PVG-EX 32/128/256	M2 and 2	Non -electrical Ex equipment

Technical documentation:

The following documentation has been received and stored:

Document No	Document Name
DOC00004829 -A	Technical file for Presafe PVG32
DOC000013912	Technical file for Presafe PVG -Ex
DOC00022923 rev. A.2	Technical file for presafe PVG32 -128 -256 -EX

Terms and conditions
The product liability rests with the manufacturer, his representative or, in the absence of a representative, the importer, in accordance with the General Product Safety Directive 2001/95/E C
The following conditions may render this acknowledgement invalid:

- Changes in the design or construction of the product.
- Changes or amendments to the referenced directive(s).
- Changes or amendments in the standards which form the basis for documenting comp liance with the essential requirements of the directive(s).

Conformity declaration and marking of product
In order to fully meet with the requirements of the Directive and legally affix the CE mark, the manufacturer must take all measures necessary to ensure that the manufactured product comply with the technical documentation and with the requirements of the Directive and finally draw up an EU D eclaration of C onformity.

Acknowledgement History:

Issue	Description	Issue date
0	Original acknowledgement	2020 -11 -20
1	Updated technical file	2021 -03 -10
0	Updated technical file , C536023 replace 11696 -PA -NA -NOR .	2022 -04 -20

END OF ACKNOWLEDGEMENT

EU acknowledgement of receipt, page 2