

Technical Information

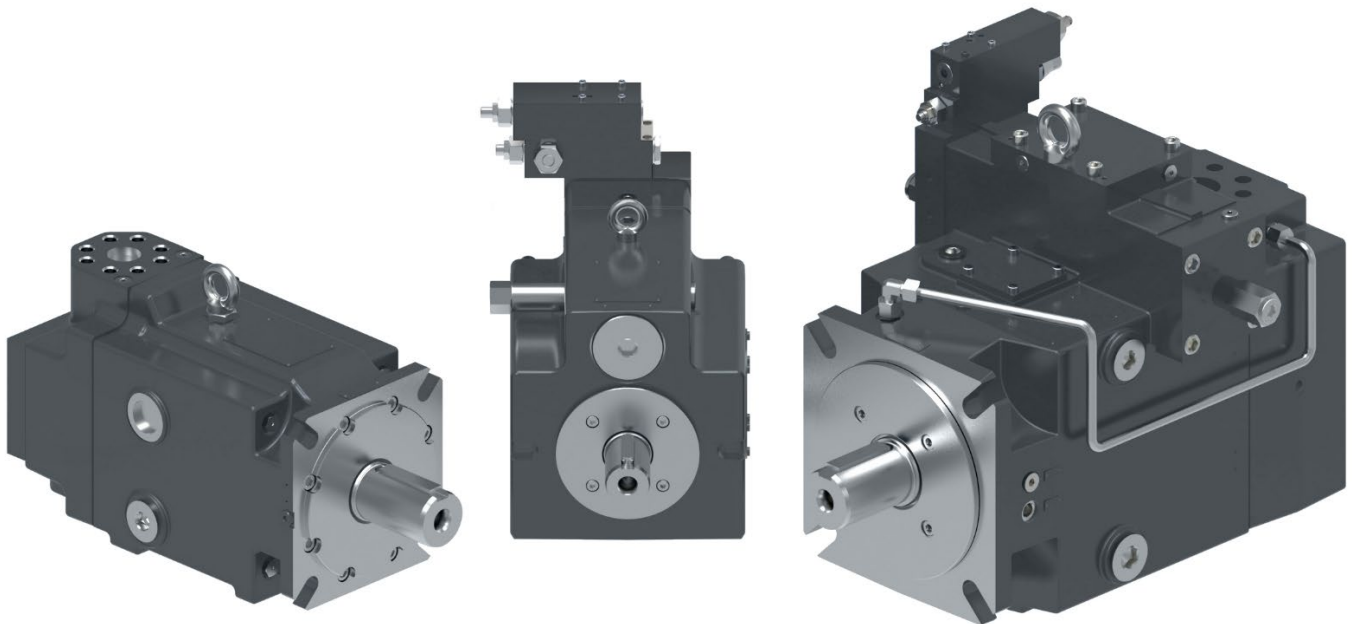
Vickers® by Danfoss

Hydrokraft Piston Pumps and Motors ATEX

Technical Information

ATEX / UKEX Certified

Hydrokraft Open Loop, Closed Loop 66 – 750 cc



ATEX Directive 2014/34/EU

CE  II 2G Ex h IIC T4-T1 Gb X

UKEX SI 2016 No. 1107

UK  II 2G Ex h IIC T4-T1 Gb X





Revision History

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Date	Changed	Rev
Jul 2024	First edition	0101

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General Information

ATEX / UKEX Introduction

The ATEX Directive 2014/34/EU specifies the minimum safety requirements for equipment intended for use in potentially explosive atmospheres in European Union member states. ATEX is derived from the French term **AT**mosphères **EX**plosives.

The Statutory Instruments (abbr. "SI") 2016 No. 1107 are the equivalent health and safety regulations which were transposed by the UK from European ATEX Directive 2014/34/EU after leaving the European Union. They extend to England, Wales and Scotland. Hereafter they will be referred to as "**UKEX**".

Hydrokraft hydraulic pumps and motors are designed for industrial applications. Some pumps are used in related applications, where locations are classified as hazardous areas.

The equipment intended for use in hazardous areas are divided into two groups:

Group I: Equipment intended for use in underground parts of mines (mining equipment).

Group II: Equipment intended for use in other places than mines (non-mining equipment).

Vickers by Danfoss hydraulic pumps and motors, type Hydrokraft are intended for use in Group II applications.

Explosion Triangle

A "hazardous area" is defined as an area in which the atmosphere contains, or may contain in sufficient quantities, flammable or explosive gases, dusts or vapors. In such an atmosphere a fire or explosion is possible when three basic conditions are met. This is often referred to as the "hazardous area" or "explosion" triangle.

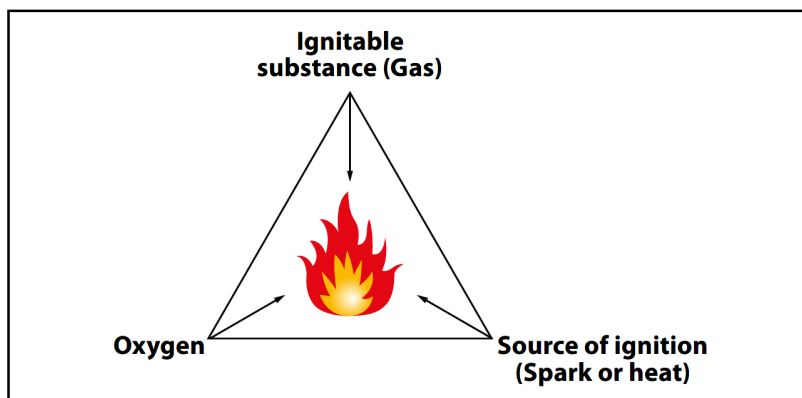


Figure 1: Explosion Triangle

An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a potentially explosive atmosphere. Products covered by directive 2014/34/EU and SI 2016 No. 1107 are defined as intended for use in potentially explosive atmospheres. Removing one of the elements eliminates all risk of explosion.

General Zone Classification

Directive 99/92/EC and SI 2002 No. 2776 (DSEAR) divide the Hazardous areas into zones and defines criteria by which products are categorized within these zones; Zone 0 / 20 is the most restrictive and Zones 1 / 21 and 2 / 22 are less restrictive. The following table describes the zones in an installation where there is a potential for explosive atmospheres. The owner of the installation must analyze and assess the area in which the explosive gas/dust mixture may occur, and if necessary must divide it into zones. This process of zoning then allows the correct plant and equipment to be selected for use in the area.

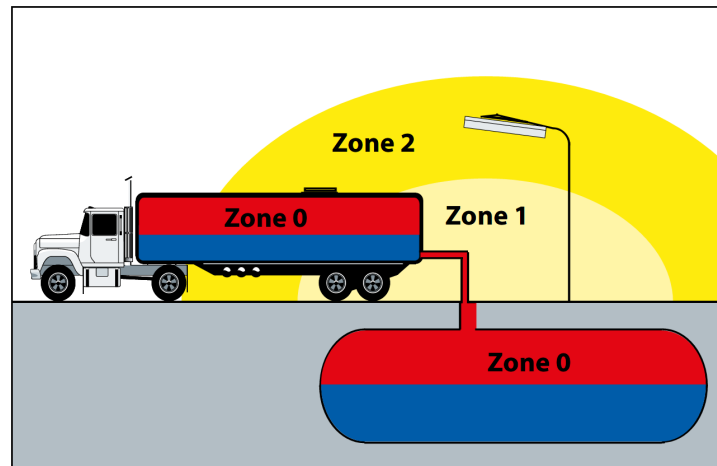


Figure 2: ATEX / UKEX Zones Example

Table 1: Classification of Explosive Atmospheres

Zones		Presence of potentially explosive atmosphere	Type of Risk
Gas (G)	Dust (D)		
0	20	Present continuously or for long periods	Permanent
1	21	Likely to occur in normal operation occasionally	Potential
2	22	Not likely to occur in normal operation but if it does occur will persist for a short period of time	Minimal

Equipment Category and Zones

Mechanical components with potential ignition sources e.g. components containing non-conductive materials or layers or components with hot surface are covered by the ATEX-directive / UKEX SI.

Non-mining equipment for potentially explosive atmosphere is classified as:

Equipment Group II – this group comprises three categories according to the level of safety provided:

- Category 1
- Category 2
- Category 3

Category 1 equipment has the highest degree of protection – see the following below.

Table 2: Equipment Categories

Degree of Protection	Protection	Category
Very high	Two independent protection measures or safe if two errors occur independently	Category 1
High	Safe in normal operation and in anticipated case of commonly occurring errors	Category 2
Normal	Safe in normal operation	Category 3

These products have to fulfill all requirements in the ATEX directive / UKEX SI, and have to be marked with the required “Ex” marking.

Equipment located in zone specified areas must fulfil the following requirements (see also the following figure):

- Category 3 – approved equipment can be installed in hazardous areas zone 2 / 22 and outside zone categorized areas.
- Category 2 – approved equipment can be installed in hazardous areas zone 1 / 21, zone 2 / 22 and outside zone categorized areas.
- Category 1 – approved equipment can be installed in hazardous areas zone 0 / 20, zone 1 / 21, zone 2 / 22 and outside zone categorized areas.

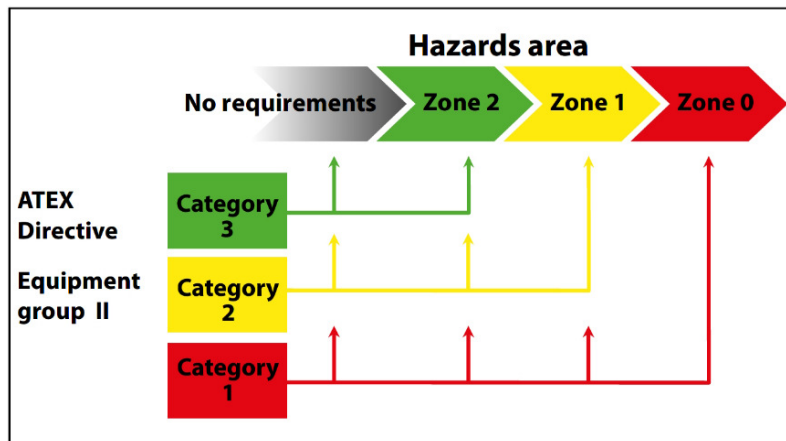


Figure 3: Group II, Category 1, 2, 3: Permissible Hazard Area Zones

Contents of Marking

The rules for the marking of systems, equipment and components are uniformly defined in the standards relating to the general technical requirements – (BS) EN ISO 80079-36:2016 for non-electrical equipment.

A priority for all Ex equipment and protective systems is that the marking should show the areas of their designated use. Components covered within the scope of the ATEX directive have to be CE-marked, and marked with the specific "Ex"-sign. Respectively, components covered within the scope of UKEX SI have to be marked with the UK marking (UKCA-Logo)

Principle

The marking must indicate the following:

- The manufacturer who has put the item of equipment on the market
- Manufacturer's type identification
- A serial number
- Symbol Ex, Letter "h" (non-electrical Equipment)

And further the ignition protection marking

- Symbol of the equipment group and category (M1 or M2 for group I mining equipment, or 1 or 2 or 3 for Group II non-mining equipment).

Additionally for Group II equipment only:

1. The letter "G" where explosive atmospheres caused by gases, vapors or mists are concerned; and/or
 2. The letter "D" where explosive atmospheres caused by dusts are concerned.
- Where appropriate, symbol of explosion group of the equipment.
 - EPL (Equipment Protection Level) "Ma", "Mb", "Ga", "Gb", "Gc", "Da", "Db" or "Dc"
 - For Group II equipment, the symbol indicating the temperature class or the maximum surface temperature in °C, or both.
 - Where appropriate, special conditions "X"

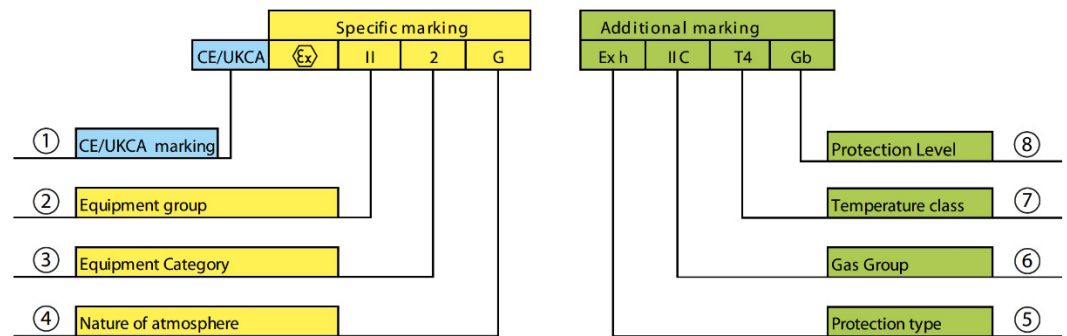


Figure 4: Explanation of ATEX / UKEX Marking, see table below for descriptions

Callout	Description	
1	Marking	CE
		UKCA
Specific Marking		
2	Equipment group	I – Mining
		II – Non-mining
3	Equipment category	1 (zone 0/20)
		2 (zone 1/21)
		3 (zone 2/22)
4	Nature of atmosphere	G – Gas
		D – Dust
Additional Marking		
5	Protection type	Ex h – Protection by constructional safety
		Ex h – Protection by control of ignition source
		Ex h – Protection by liquid immersion
		Ex h – Protection by enclosure (Dusts)
		Ex h – Flame-proof enclosure
		fr – Protection by flow restricting enclosure
6	Gas group	IIA (e.g. Hydrogen, Acetylene)
		IIB (e.g. Town Gas, Ethylene)
		IIC (e.g. Ammonia, Methane, Propane)
7	Temperature class	T1 to T6 (Gas)
		T*** °C (Dust)
		Where the maximum Surface Temperature depends not on the equipment itself, but mainly on operating conditions (like heated fluid) the relevant information shall be given in the instruction for use in order to inform the user about this special situation. An “X” should be added to the end of the marking.
8	Equipment Protection Level (EPL)	Ga (Gas) / Da (Dust)
		Gb (Gas) / Db (Dust)
		Gc (Gas) / Dc (Dust)
		Ma / Mb (Methane, Carbon dust)
Add.	Ambient Temperature	Example: -30≤Ta≤60°C
Add.	Specific conditions	X – Special Conditions of use acc. to equipment instructions (User Manual)
		U – Uncompleted component certificate (conformity is certified when used in an overall equipment)

Marking of Vickers® by Danfoss Hydrokraft Units

The Vickers® by Danfoss Hydrokraft units are marked as equipment for Group II, category 2 for gas environment and with ignition protection **constructional safety** and **liquid immersion**.

Temperature class/ Maximum surface temperature depends on the operating conditions (ambient and fluid temperature). The operating conditions to which each temperature class applies must be always upheld.

Table 3: ATEX/UKEX Marking Options

Marking	For model code option
Ex II 2G Ex h IIC T4-T1 Gb X	EX (see Table 5 on page 9 for requirements)

See *"How to Order ATEX / UKEX Units by Special Feature"* for position of order letter and additional options information.

See *"Fluid Viscosity and Temperature for ATEX / UKEX Hydrokraft Units"* on page 9 for more information about temperature classes. For detailed information on selecting the appropriate class and application requirements, please see Table 5, page 9 and *Hydrokraft ATEX / UKEX User Manual BC482851121479en*.

Production Place and Date of Pump

The production location and date are shown on the unit label as pictured below.

The ATEX certification of the units are done under the scope of:

"Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres."

And UKEX Statutory Instruments:

"2016 No. 1107 HEALTH AND SAFETY The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016"

With following parameters:

- Equipment group: II, non-mining equipment
- Equipment Category: 2G
- Temperature class: T4...T1
- Gas Group: IIC
- Equipment protection level (EPL): Gb
- Resulting Zone: 1 (Gas Environment)

The Conformity Assessment Procedure must be executed according to:

- /1/ Directive 2014/34/EU, annex VIII, Modul A: Internal Production Control (see article 13, section 1 (b)(ii))
- /2/ UKEX SI 2016 No. 1107 Schedule 3A, Part 6: Internal Production control (see Part 3, article 39 (1)(b)(ii))

The EU declaration of conformity has to be prepared and issued with regard to annex X of /1/. The "Essential Health and Safety Requirements" defined by /1/, annex II, have to be considered.

The UK declaration of conformity has to be prepared and issued with regard to schedule 6 of /2/. The "Essential Health and Safety Requirements" defined by /2/, schedule 1, have to be considered.

Maximum Surface Temperature

Fluid Viscosity and Temperature for ATEX / UKEX Hydrokraft Units

Table 4: Fluid Viscosity and Temperature Rating of Hydrokraft ATEX / UKEX Units

Features		Data
Viscosity	Minimum Intermittent ¹⁾	10 mm ² /s [59 SUS]
	Continuous Operation Range	10 – 75 mm ² /s [59 – 348 SUS]
	Maximum (Cold Start) ²⁾	1000 mm ² /s [4550 SUS]
Inlet Temperature ⁴⁾	Minimum (Cold Start) ²⁾	-25 °C [-13 °F]
	Maximum Rated	80 °C [176 °F]
	Maximum Intermittent ¹⁾	90 °C [219 °F]
Case Drain Temperature ⁴⁾	Maximum Rated	100 °C [212 °F] ³⁾
	Maximum Intermittent ¹⁾	110 °C [230 °F] ³⁾

¹⁾ Intermittent = Short term $t < 3$ min per incident.

²⁾ Cold start = Short term $t < 3$ min; $p \geq 50$ bar; $n \leq 1000$ min⁻¹ (rpm); please contact Danfoss Power Solutions especially when the temperature is below -25 °C [-13 °F].

³⁾ Must not be exceeded locally either (e.g. in the bearing area). The temperature in the bearing area is (depending on pressure and speed) up to 5 °C [9 °F] higher than the average case drain temperature.

⁴⁾ Applicable to FKM shaft seal. Can be lower if different shaft seal is used. E.g. max. rated case drain temperature for NBR = 80 °C

Below maximum surface temperatures are without any deposited dust on the product. The possible insulation effect of a dust layer on the surface has to be taken into account by the safety margin to the minimum ignition temperature of the dust concerned. For up to 5 mm [1.97 in] layer thickness the safety margin is 75 °C [167 °F]. For further information please see IEC 60079-14.

Warning

The required operating temperatures (ambient and oil) of the unit must be guaranteed by the end user at all times. See [Table 5](#) for limitations corresponding to selected temperature classes.

Warning

It is compulsory to use oils whose inflammable degree is at least 50K above the maximum surface temperature of the pump. See also [Oil Types / Operating Fluids](#) on page 10.

Table 5: Temperature Classes for Maximum Case Drain Temperatures

Maximum Case Drain Temperature (measured max. 30 cm after housing drain port) ⁴⁾	Max. Ambient Temperature			
	≤ 30 °C ≤ 86 °F	≤ 40 °C ≤ 104 °F	≤ 50 °C ≤ 122 °F	≤ 60 °C ≤ 140 °F
≤ 80 °C [176 °F]	T4	T4	T4	T3
≤ 90 °C [194 °F]	T4	T4	T3	T3
≤ 100 °C [212 °F]	T4	T3	T3	T3
≤ 110 °C [230 °F]	T3	T3	T3	–

⁴⁾ Applicable to FKM shaft seal. Can be lower if different shaft seal is used. E.g. max. rated case drain temperature for NBR = 80 °C

Table 6: T-Codes with respective Maximum Surface Temperature

T-Code / Temperature Class	Maximum Surface Temperature	
	°C	°F
T3	200	392
T4	135	275

Technical Specifications

Ambient Temperature

Maximum ambient temperature depends on the requested temperature class needed. Refer to [Fluid Viscosity and Temperature for ATEX/UKEX Hydrokraft Units](#) on page 9 and ATEX/UKEX User Manual [BC482851121479en](#).

In general, the ambient temperature should lie between -25° C [-13° F] and +60° C [140 °F] to ensure that the shaft seal retains its sealing capacity.

Oil Types / Operating Fluids

In a hydraulic system the most important task of the oil is to transfer energy. At the same time the oil must lubricate moving parts in hydraulic components, protect them from corrosion, and transport dirt particles and heat out of the system. To ensure that hydraulic components operate without problems and have long operating life it is therefore vital to select the correct oil type with the necessary additives.

Ratings and performance data are based on operating with hydraulic fluids containing oxidation, rust and foam inhibitors. These fluids must possess good thermal and hydrolytic stability to prevent wear, erosion and corrosion of pump components.

Mineral Oils

For systems containing Vickers by Danfoss hydraulic pumps, type Hydrokraft, mineral hydraulic oil with anti-wear additives, type HLP [DIN 51524] or HM (ISO 11158) shall be used.

Information on operation with fire resistant or environmentally friendly fluids (e.g. Water Glycol HFC, HFDR, HEES etc.) can be found in the pump or motor standard catalogs. For further information or operation on other alternative, please contact your Danfoss representative.



It is compulsory to use oils whose inflammable degree is at least 50K above the maximum surface temperature of the unit. See [Table 6](#) on page 9.

Oil Temperature

Maximum oil temperature depends on the requested ATEX class needed. See Table 5 on page 9 and ATEX/ UKEX User Manual [BC482851121479en](#) for limitations.

Under normal operating conditions it is recommended to keep the temperature in the range of 30 °C [86 °F] and 60 °C [140 °F].

Fluid temperature affects the viscosity of the fluid and resulting lubricity and film thickness. High temperatures can also limit seal life, at most non-metallic materials are adversely affected by use at elevated temperatures.

Fluids may break down or oxidize at high temperature, reducing their lubricity and resulting in reduced life of the unit. Oil life is greatly reduced if its temperature exceeds +60 °C [+140 °F]. As a general rule, oil life is halved for each 8 °C [46 °F] its temperature exceeds +60 °C [+140 °F].

Viscosity

Maintain fluid viscosity within the recommended range for maximum efficiency and bearing life. Minimum viscosity should only occur during brief occasions of maximum ambient temperature and severe duty cycle operation. Maximum viscosity should only occur at cold start. Limit speeds until the system warms up.

See page 9 for viscosity rating and limitations. We recommend the use of an oil type having a viscosity of 16 – 40 mm²/s [83 – 187 SUS] at the actual operating temperature.

Case Pressure

The maximum permissible leakage pressure (case pressure) stated below must always be adhered to. Case/leakage pressure measurements are to be taken in close proximity to the unit housing as to avoid inaccurate readings due to pressure losses within hoses and tubing. For applications exceeding the general speed ratings please refer to a Danfoss application engineer for maximum case pressure rating.

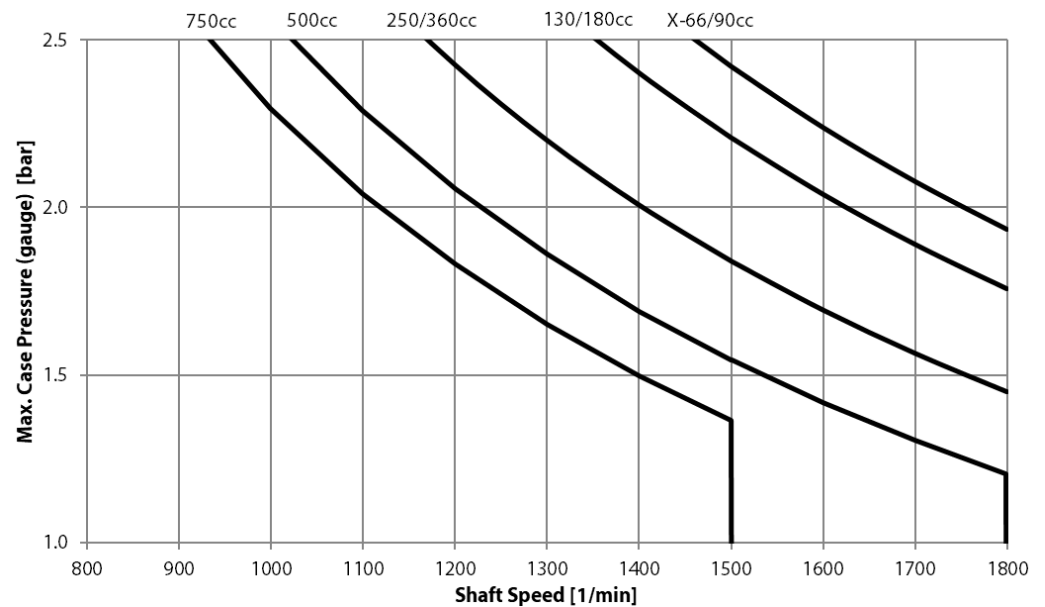


Figure 5: Maximum case gauge pressure depending on speed

Case pressure at drain port (gauge)		Definition
Max. pressure continuous	2.5 bar	Generally max. permissible leakage pressure. Is reduced depending on rotational speed of the unit (see Figure 5). Max. pressure delta between inlet and case must also be adhered to (see application guidelines).
Pressure Peaks	5 bar	$t < 0.1 \text{ s}$



Hydrokraft ATEX / UKEX Pumps & Motors

How to Order ATEX / UKEX Units by Special Feature

To order a Vickers® by Danfoss Hydrokraft unit with ATEX or UKEX certification, please first define a modelcode by using the following chapters. The options include some limitations only applying to ATEX units.

When ordering, specify your ATEX or UKEX requirements and relevant application conditions in the order text as **special feature**, for example:

*"With ATEX / UKEX certification for zone 2 IIB T3, Application Max. Ambient Temp.: +40 °C
No paint, only rust inhibitor (will be painted by customer)"*

A Danfoss-defined number will be added to the modelcode at the respective position (see following modelcode chapters). The next page 13, the "Order Form Page" can be printed or copied to be used as an order template. This will ensure that each number is entered in the correct box.

For combination (tandem) units, you may need to provide an additional model code. In such a case, each single pump section must be specified separately using this or the standard catalog order form to complete the modelcode.

Order Form Page

PVW / PFW

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
P		W		-				M							1				S						
Basic Pump Modelcode																									
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48		
Control Options															Customer Adjustment Spec.					Special Features				Design No.	

TVW

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
T	V	W		-				M								1	R			S								
Basic Pump Modelcode																												
29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55		
Control Options																		Customer Adjustment					Special Features				DesignNo	

MVW / MFW

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
M		W		-				M				B			1	R			S	V		
Basic Pump Modelcode																						
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42			
Control Options												Customer Adjustment Spec.				Special Features				DesignNo		

PVX / PFX

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
P		X		-				M							1				S						
Basic Pump Modelcode																									
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48		
Control Options															Customer Adjustment Spec.					Special Features				Design No.	

MFV

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
M		W		-				M				B			1	R			S	V		
Basic Pump Modelcode																						
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42			
Control Options												Customer Adjustment Spec.				Special Features				DesignNo		

SPECIFY NON-STANDARD ADJUSTMENT BELOW

SPECIFY SPECIAL FEATURE BELOW

With ATEX / UKEX Certification for

PVW / PFW Open Loop Pumps 130 – 750 cc

The below illustration and the following sections describe how to identify parts of the model code and availability of certain part options based on frame size. The limitations to the standard catalog are a result of the performed ignition risk analysis. The limitations largely concern the control options (24-48) which can only supplied in non-electric versions. To add ATEX electronic flow control valves (not supplied with unit), standard valve interface and separate special ATEX yoke position sensor can be supplied on request.

For pump technical specifications, see standard PVW catalog BC442364653254en.

P * W * - * * * M * * * * * 1 R * * S * * A #

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 - 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

Pump Size						Pump Size					
130 180 250 360 500 750						130 180 250 360 500 750					
1 Pump						Maximum Displacement Screws (cont.)					
P – Open loop pump						6 – Fixed mech. stop ring sides A & B					
2 Displacement						Note: Customer adjustment required					
F – Fixed						4 used as max. volume adjustment side A					
V – Variable						5 used as min. volume stop side A					
3 Pump Series						14 15 Thru-Drive Options					
W – “W” series (ex-30 design)						00 – None					
4 Configuration						0A – SAE A					
S – Single unit						0B – SAE B					
F – Front unit						0C – SAE C					
M – Middleunit						0P – Pilot pump (8 cm ³ /rev)					
R – Rear unit						0* – * assigned by Engineering					
5 Separator						16 Main Ports					
6 7 8 Displacement cm³/rev (in³/rev)						1 – SAE ports - Metric bolts					
130 – 130 cm ³ /rev (8 in ³ /rev)						17 Main Port Orientation					
180 – 180 cm ³ /rev (11 in ³ /rev)						R – Radial (side ports)					
250 – 250 cm ³ /rev (15.3 in ³ /rev)						A – Axial (rear ports)					
360 – 360 cm ³ /rev (22.0 in ³ /rev)						18 19 Main Drive Shaft End					
500 – 500 cm ³ /rev (30.5 in ³ /rev)						01 – ISO straight key					
750 – 750 cm ³ /rev (45.8 in ³ /rev)						02 – ISO splines					
*** – Non-standard (PFW only) ◇						05 – ISO special splines					
◇ Non-standard displacements (cm ³ /rev):						D1 – SAE D keyed 1 3/4"					
250 220/200						D2 – SAE D splined 8/1613T					
360 310						E1 – SAE E keyed 1 3/4"					
500 465/365						E2 – SAE E splined 8/16 13T					
750 710						F1 – SAE F keyed 2"					
9 Basic Standard						F2 – SAE F splines 8/16 15T					
M – Metric						20 Drive Shaft Seal Configuration					
10 11 Mounting Flange						S – Single shaft seal					
05 – ISO 3019/2-160B4HW						21 Seal Material					
07 – ISO 3019/2-200B4HW						V – FKM					
08 – ISO 3019/2 8 bolt metric						C – Special shaft seal, for HFC fluids					
09 – Special 8-bolt flange						F – FKM + front bearing flushing prepared					
0D – SAE D 4-hole flange						K – FKM with HP lubrication					
0E – SAE E 4-hole flange						22 Yoke Position Indicator					
0F – SAE F 4-hole flange						0 – No position indicator					
12 Rotation						V – Visual indicator					
R – Clockwise						ATEX Sensor version on request, sold separately					
L – Counter-clockwise						23 Surface Coating					
13 Maximum Displacement Screws						A – Painted black					
0 – Displacement adjusting screw W						Other finishes on request.					
ith control DF/LR						24 - 48 Control Model Code					
W ith control DP/SP/PQ						DF Pressure Compensator (+LS) (+Remote)					
W ith control DP or SP + DF						LR Power Limiter Control (+DF)					
W ith control DP or SP (+ DF) + LR/ES						SP* Electrical Flow Control (Neutral at Min.)					
4 – Fixed mechanical stop ring side A						ST* Electrical Flow Control (Neutral at Max.)					
5 – Fixed mechanical stop ring side B						DP Hydraulic Flow Control					
Continued next column						PQ* Electrical Multifunctional PpQ Control					
Pump Size						ES Electric Motor Flow Control					
130 180 250 360 500 750						00 No Control - For PFW Fixed Units only					
						* Only valve interface, no electronic valves added.					
						ATEX yoke sensor can be ordered separately					

Modelcode PVW

DF-Control

D F 0 0 0 A * * 0 0 0 0 * 0 0 * * * * * * * * *
 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

		Pump Size	130	180	250	360	500	750
24 25	Control Type							
DF	– Pressure compensator		●	●	●	●	●	●
26	Displacement Adjustment Options							
0	– Not applicable							
27 28	Electronic Controls							
0	– Not applicable							
29	Yoke Displacement Zone							
A	– Single side of centre “A”		●	●	●	●	●	●
30	Additional Functions							
0	– None		●	●	●	●	●	●
1	– Load sensing (standard $\Delta p = 15$ bar)		●	●	●	●	●	●
A	– 2-level pressure compensator, 4/2 solenoid valve ▲		X	X	X	X	X	X
B	– 2-level pressure compensator, 4/3 solenoid valve ▲		X	X	X	X	X	X
31	Pressure Control Options							
0	– None i.e. pilot operated with remote port (standard arrangement)		●	●	●	●	●	●
F	– Remote port without pilot valve		○	○	○	○	○	○
K	– Electro-proportional relief valve, complete with electronic card		X	X	X	X	X	X
S	– Slow upstroke screw adjustment		○	○	○	○	○	○
32 33 34	Power Control							
000	– Not applicable							
35	Pilot Oil Filter							
0	– Not applicable							
36	Venting Valve							
0 1	– None		●	●	●	●	●	●
	– Solenoid valve ▲		X	X	X	X	X	X
37	Position Monitoring							
0	– None							
38	Electric MotorType							
0	– None							
		Pump Size	130	180	250	360	500	750

		Pump Size	130	180	250	360	500	750
39	Control Voltage							
0	– Not applicable		●	●	●	●	●	●
40 41	Customer Adjustment Specification							
42 43								
0000	– None ****		●	●	●	●	●	●
	– Danfoss assigned number as per data specified in table below		○	○	○	○	○	○
44 45 46	Special Features							
000	– None ***		●	●	●	●	●	●
	– Defined by Danfoss		○	○	○	○	○	○
47 48	Design Number **							
	– 10-99 assigned by Danfoss		●	●	●	●	●	●
		Pump Size	130	180	250	360	500	750

Example for Customer Adjustment Specifications

Special Pressure Adjustment	Main Stage Pressure Control	Pilot Valve Pressure Control	Load Sense Δp
Standard setting (bar)	20	90	15
Max. setting (bar)	40	350	40
Customer-specified adjustment (bar)	.....	.....	.....

Note: Setting must be at least 30 bar.

Special Max. Displ. Adjustment	Minimum Displacement	Maximum Displacement
Standard	0 cm ³ /rev	100%
Customer-specified adjustment (cm ³ /rev)	.....	.....

Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.

Modelcode PWW

LR-Control

L R 0 0 0 A * * * * * 0 * 0 0 * * * * * * * * * *
 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

	Pump Size	130	180	250	360	500	750
24/25 Control Type							
LR – Power control		●	●	●	●	●	●
26 Displacement Adjustment Options							
0 – Not applicable							
27/28 Electronic Controls							
0 – Not applicable							
29 Yoke Displacement Zone							
A – Single side of centre “A”		●	●	●	●	●	●
30 Additional Functions							
2 – Pressure limiter		●	●	●	●	●	●
3 – Load sensing and pressure limiter (standard $\Delta p = 15$ bar)▲		●	●	●	●	●	●
▲ To select Power Control without Pressure Limiter, specify ... LR ... A2F .							
31 Pressure Control Options							
0 – None i.e. pilot operated with remote port (standard arrangement)		●	●	●	●	●	●
F – Remote port without pilot valve		○	○	○	○	○	○
K – Electro-proportional relief valve, complete with electronic card		X	X	X	X	X	X
S – Slow upstroke screw adjustment		○	○	○	○	○	○
32/33/34 Power Control Specification							
*** – 3-digit value in kW at 1500 rev/min		●	●	●	●	●	●
35 Pilot Oil Filter							
0 – Not applicable							
36 Unloading Valve							
0 – None		●	●	●	●	●	●
1 – Solenoid valve		X	X	X	X	X	X
37 Position Monitoring							
0 – Not applicable							
38 Electric Motor Type							
0 – Not applicable							

	Pump Size	130	180	250	360	500	750
39 Control Voltage							
0 – Not applicable		●	●	●	●	●	●
40/41 Customer Adjustment Specification							
42/43							
0000 – None ****		●	●	●	●	●	●
– Danfoss assigned number as per data specified in table below		○	○	○	○	○	○
44/45/46 Special Features							
000 – None ***		●	●	●	●	●	●
– Defined by Danfoss		○	○	○	○	○	○
47/48 Design Number **							
– 10-99 assigned by Danfoss		●	●	●	●	●	●

◇ Example for Customer Adjustment Specifications

Special Pressure Adjustment	Main Stage Pressure Control	Pilot Valve Pressure Control	Load Sense Δp
Standard setting (bar)	20	90	15
Max. setting (bar)	40	350	40
Customer-specified adjustment (bar)	.....	.....	.....
Note: Setting must be at least 30 bar.			
Special Max. Displ. Adjustment	Minimum Displacement	Maximum Displacement	
Standard	0 cm ³ /rev	100%	
Customer-specified adjustment (cm ³ /rev)	.....	.....	
Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.			

Modelcode PVW

SP-Control

S P * * * A * * * * * 0 0 0 0 * * * * * * * * *

24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

Pump Size		130	180	250	360	500	750
24 25	Control Type						
SP	– Displacement adjustment via proportional valve	●	●	●	●	●	●
26	Displacement Adjustment Options						
A	– CETOP 3 interface only	○	○	○	○	○	○
B	– CETOP 5 interface only	○	○	○	○	○	○
C	– CETOP 3 proportional valve KDG4V-3	x	x	x	x	x	x
D	– CETOP 3 proportional valve KBSDG4V-3 with OBE	x	x	x	x	x	x
E	– CETOP 5 proportional valve KBSDG4V-5 with OBE	x	x	x	x	x	x
F	– CETOP 5 servo-valve	x	x	x	x	x	x
27 28	Electronic Amplifier Control						
03	– ER 9.3-10 ▲	x	x	x	x	x	x
04	– ER 9.4-10 (CETOP 3) servo	x	x	x	x	x	x
00	– No amplifier card	●	●	●	●	●	●
▲ Amplifier card required for 26 = C, D, E							
29	Yoke Displacement Zone						
A	– Single side of centre "A"	●	●	●	●	●	●
30	Additional Functions						
0	– None	●	●	●	●	●	●
4	– Pressure limiter override	●	●	●	●	●	●
5	– Pressure limiter and power limiter override	●	●	●	●	●	●
31	Pressure Control Options						
0	– None i.e. pilot operated with remote port (standard arrangement)	●	●	●	●	●	●
F	– Remote port without pilot valve	○	○	○	○	○	○
K	– Electro-proportional relief valve, complete with electronic card	x	x	x	x	x	x
32 33 34	Power Control Specification						
***	– 3-digit value in kW at 1500 rev/min	●	●	●	●	●	●
Note If no power limiter override: 000							
35	Pilot Oil Filter						
0	– None	○	○	○	○	○	○
V	– Filter with visual indicator	○	○	○	○	○	○
E	– Filter with electrical indicator	x	x	x	x	x	x
36	Venting Valve						
0	– Not applicable						
Pump Size		130	180	250	360	500	750

Pump Size		130	180	250	360	500	750
37	Position Monitoring						
0	– Not applicable						
38	Electric Motor Type						
0	– Not applicable						
39	Venting Valve Control Voltage						
0	– Not applicable						
40 41 42 43	Customer Adjustment Specification						
0000	– None ****	●	●	●	●	●	●
	– Danfoss assigned number as per data specified in table below ◇	○	○	○	○	○	○
44 45 46	Special Features						
000	– None ***	●	●	●	●	●	●
	– Defined by Danfoss	○	○	○	○	○	○
47 48	Design Number **						
	– 10-99 assigned by Danfoss	●	●	●	●	●	●
Pump Size		130	180	250	360	500	750

◇ Example for Customer Adjustment Specifications

Special Pressure Adjustment	Main Stage Pressure Control	Pilot Valve Pressure Control	Load Sense Δp
Standard setting (bar)	20	90	15
Max. setting (bar)	40	350	40
Customer-specified adjustment (bar)	.....	.....	.....
Note: Setting must be at least 30 bar.			
Special Max. Displ. Adjustment	Minimum Displacement	Maximum Displacement	
Standard	0 cm ³ /rev	100%	
Customer-specified adjustment (cm ³ /rev)	.....	.....	
Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.			

Modelcode PWW

ST-Control

S T * * * A * * * * * * * 0 0 0 * * * * * * * *

24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

	Pump Size	130	180	250	360	500	750
24|25 Control Type							
ST – Electronic flow control by proportional valve		●	●	●	●	●	●
26 Displacement Adjustment Options							
C – With CETOP 3 proportional valve		x	x	x	x	x	x
A – With CETOP 3 interface (no valve)		●	●	●	●	●	●
D – CETOP 3 proportional valve KBSDG4V-3 with OBE (electr. amplifier necessary for flow control)		x	x	x	x	x	x
E – CETOP 5 proportional valve KBSDG4V-5 with OBE (electr. amplifier necessary for flow control)		x	x	x	x	x	x
G – CETOP 3 AxisPro OBE valve with integr. flow control (no add. amplifier necessary)		x	x	x	x	x	x
H – CETOP 5 Axis-Pro OBE valve with integr. flow control (no add. amplifier necessary)		x	x	x	x	x	x
27|28 Electronic Amplifier							
03 – With ER9.3 amplifier card 1)		x	x	x	x	x	x
05 – With DIN rail module 1)		x	x	x	x	x	x
00 – Without electronics		●	●	●	●	●	●
0A – AxisPro Command 0-10V 2)		x	x	x	x	x	x
0B – AxisPro Command 4-20mA 2)		x	x	x	x	x	x
0C – AxisPro Command by CAN-Bus 2)		x	x	x	x	x	x
0D – AxisPro Command special feature 2)		x	x	x	x	x	x
29 Yoke Displacement Zone							
A – Single side of centre "A"		●	●	●	●	●	●
30 Additional Functions							
0 – Without additional options		●	●	●	●	●	●
4 – Pressure limiter override		○	○	○	○	○	○
5 – Pressure limiter and power limiter override		○	○	○	○	○	○
31 Pressure Control Options							
0 – Including pilot relief valve and remote port option		●	●	●	●	●	●
F – Remote port only		○	○	○	○	○	○
K – Proportional relief valve + EEA-PAM amplifier card		x	x	x	x	x	x
L – Proportional relief valve with integrated Electronics OBE		x	x	x	x	x	x
32|33|34 Power Control Setting options							
000 – No power limiter override		●	●	●	●	●	●
*** – 3-digit value in kW at 1500 rpm		○	○	○	○	○	○
	Pump Size	130	180	250	360	500	750

	Pump Size	130	180	250	360	500	750
35 Pilot Oil Filter							
0 – Without filter		●	●	●	●	●	●
E – Filter with electr. indicator		x	x	x	x	x	x
36 Pilot oil supply							
A – Internal pilot oil supply only		●	●	●	●	●	●
B – External pilot oil supply only		○	○	○	○	○	○
C – Internal + external pilot oil supply by check valve		○	○	○	○	○	○
37 Position Monitoring							
0 – Not applicable							
38 Electric MotorType							
0 – Not applicable							
39 Control Voltage							
0 – Not applicable							
40|41|42|43 Customer Adjustment Specification							
0000 – None ****		●	●	●	●	●	●
– Danfoss assigned number as per data specified in table below		○	○	○	○	○	○
44|45|46 Special Features							
000 – None ***		●	●	●	●	●	●
– Defined by Danfoss		○	○	○	○	○	○
47|48 Design Number **							
– 10-99 assigned by Danfoss		●	●	●	●	●	●
	Pump Size	130	180	250	360	500	750

Example for customer adjustment specifications A4/A5 29 30

Special pressure adjustment	Main stage pressure control	Pilot valve ▲ pressure control
Standard setting (bar)	20	90
Max. setting (bar)	40	350
Customer-specified adjustment (bar)	.....	.....
▲ Note: Setting must be at least 30bar.		
Special max. Displ. Adjustment	Minimum displacement	Maximum displacement
Standard	0 cm³/rev	100%
Customer-specified adjustment (cm³/rev)	.....	.....
Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option. Max. displacement adjustable by screw or by stop ring- refer basic pump model code pos 13.		

1) Only for pos. 26 C, D, and E and 2) Only for pos. 26 G and H

Modelcode PVW

DP-Control

D P * 0 0 A * * * * * 0 0 0 0 * * * * * * * *
 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

	Pump Size	130	180	250	360	500	750
24 25 Control Type							
DP – Displacement adjustment proportional to pilot pressure		●	●	●	●	●	●
26 Displacement Adjustment Options							
G – CETOP 3 interface only		●	●	●	●	●	●
H – Remote port G ¹ / ₄ "		●	●	●	●	●	●
J – Proportional KCG relief valve including EEA-PAM amplifier card		X	X	X	X	X	X
27 28 Control Electronics							
00 – Not applicable							
29 Yoke Displacement Zone							
A – Single side of centre "A"		●	●	●	●	●	●
30 Additional Functions							
0 – None		●	●	●	●	●	●
4 – Pressure limiter override		●	●	●	●	●	●
5 – Pressure limiter and power limiter override		●	●	●	●	●	●
31 Pressure Control Options							
0 – None i.e. pilot operated with remote port (standard arrangement)		●	●	●	●	●	●
F – Remote port without pilot valve		○	○	○	○	○	○
K – Electro-proportional relief valve, complete with electronic card		X	X	X	X	X	X
32 33 34 Power Control Specification							
*** – 3-digit value in kW at 1500 rev/min		●	●	●	●	●	●
Note If no power limiter override: 000							
35 Pilot Oil Filter							
0 – None		●	●	●	●	●	●
V – In-line filter with visual indicator		○	○	○	○	○	○
E – In-line filter with electrical indicator		X	X	X	X	X	X
36 Venting Valve							
0 – Not applicable							
37 Position Monitoring							
0 – Not applicable							
Pump Size		130	180	250	360	500	750

	Pump Size	130	180	250	360	500	750
38 Electric MotorType							
0 – Not applicable							
39 Venting Valve Control Voltage							
0 – Not applicable							
40 41 Customer Adjustment Specification							
42 43 0000 – None (standard) ****		●	●	●	●	●	●
– Danfoss assigned number as per data specified in table below		○	○	○	○	○	○
44 45 46 Special Features							
000 – None ***		●	●	●	●	●	●
– Defined by Danfoss		○	○	○	○	○	○
47 48 Design Number **							
– 10-99 assigned by Danfoss		●	●	●	●	●	●
Pump Size		130	180	250	360	500	750

Example for Customer Adjustment Specifications

Special Pressure Adjustment	Main Stage Pressure Control	Pilot Valve Pressure Control	Load Sense Δp
Standard setting (bar)	20	90	15
Max. setting (bar)	40	350	40
Customer-specified adjustment (bar)	.....	.....	.....
Note: Setting must be at least 30 bar.			
Special Max. Displ. Adjustment	Minimum Displacement	Maximum Displacement	
Standard	0 cm ³ /rev	100%	
Customer-specified adjustment (cm ³ /rev)	.....	.....	
Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.			

Modelcode PWW

PQ-Control

PQ * 00 * 0 0 000000 0 0 0 0 0 ****
 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

Pump Size		130	180	250	360	500	750
24 25	Control Type						
PQ	– Proportional valve multifunctional control (PpQ controller)	●	●	●	●	●	●
26	Displacement Adjustment Options						
A	– CETOP 3 interface only	○	○	○	○	○	○
B	– CETOP 5 interface only	○	○	○	○	○	○
D	– CETOP 3 proportional valve + OBE	x	x	x	x	x	x
E	– CETOP 5 proportional valve + OBE	x	x	x	x	x	x
27 28	Control Electronic						
00	– W ithout electronics (to be ordered separately)	●	●	●	●	●	●
29	Yoke Displacement Zone						
A	– No pressure sensor one side▲	x	x	x	x	x	x
C	– No pressure sensor either side▲	●	●	●	●	●	●
D	– Pressure sensor 4-20 mA one side	x	x	x	x	x	x
E	– Pressure sensor 4-20 mA both sides	x	x	x	x	x	x
▲ W ithout pressure sensor but with G ¹ / ₂ " thread to fit user-provided ATEX pressure sensor.							
30	Additional Functions						
0	– Not required	●	●	●	●	●	●
31	Pressure Control Options						
0	– Not required for this control type	●	●	●	●	●	●
32 33 34 35 36 37	Power Control Specification						
000	– Not applicable for this control type						
000							
38	Pilot Oil Filter						
0	– No filter (standard)	●	●	●	●	●	●
39	Failsafe Valve						
0	– Not applicable						
Note: Not required if integrated in proportional valve with OBE.							
Pump Size		130	180	250	360	500	750

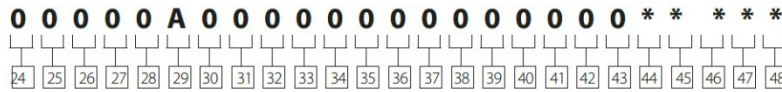
Pump Size		130	180	250	360	500	750
40	Position Monitoring						
0	– Not applicable						
41	Electric Motor Type						
0	– Not required for this control type	●	●	●	●	●	●
42	Failsafe Valve Control Voltage						
0	– Not applicable						
43 44 45 46	Customer Adjustment Specification						
0000	– None ****	●	●	●	●	●	●
	– Danfoss assigned number as per data specified in table below	○	○	○	○	○	○
◇							
Pump Size		130	180	250	360	500	750

◇ Example for Customer Adjustment Specifications

Special Max.	Minimum	Maximum
Displ. Adjustment	Displacement	Displacement
Standard	0 cm ³ /rev	100%
Customer-specified adjustment (cm ³ /rev)		
Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.		

Modelcode PFW

No Control, Fixed Displacement



- Preferred standard option
- Other standard option
- Special option on request
- X Not available

	Pump Size	130	180	250	360	500	750
Control Type							
00 – No control (PFW only, not available on sizes 130 & 180)				●	●	●	●
Displacement Adjustment Options							
0 – Not applicable							
Control Electronics							
0 – Not applicable							
Yoke Displacement Zone							
A – Single side of centre "A"				●	●	●	●
Additional Functions							
0 – Not applicable							
Pressure Control Options							
0 – Not applicable							
Power Control Specification							
000 – Not applicable							
Pilot Oil Filter							
0 – Not applicable							

		Pump Size	130	180	250	360	500	750
36	Bypass/Venting Valve							
0	– Not applicable							
37	Position Monitoring							
0	– Not applicable							
38	Electric MotorType							
0	– Not applicable							
39	Control Voltage							
0	– Not applicable							
40 41 42 43	Customer Adjustment Specification							
0000	Not applicable							
44 45 46	Special Features							
000	– None ***				●	●	●	●
	– Defined by Danfoss				●	●	●	●
47 48	Design Number **							
	– 10-99 assigned by Danfoss				●	●	●	●
		Pump Size	130	180	250	360	500	750

Combination Pump Unit

Typical Combination Units ¹⁾		Model Code
2 open-loop pumps	Front Unit	PVWF-500M08R0041R02SVMASPC03A0000000000000000010
	Rear Unit	PVWR-250M07R0001R02SVMASPC03A0000000000000000010
	Combination Unit	PVWC-500SP250SP0000000000HC81*****
1 closed-loop pump +	Front Unit	TVWF-500M08R0000H1R02SVMA20SPC03C00000000E000H000000010
	Middle Unit	PVWM-250M07R00E1R02SVQADF000A0000000000000000010
	Rear Unit	PFXR-130M02R00P1A02SV0A00000A0000000000000000010
2 open-loop pumps	Combination Unit	TVWC-500SP250DF1300000000HC81*****
Note: ISO spline shafts should be specified for combination units due to their higher torque capability.		For model codes of other individual units, see relevant catalogs.

Specifying Combination Pumps	individual Model Codes of each unit.	combination, a separate Model Code should be compiled using the Form page at the beginning of the Model Codes section.	combination, defined by Danfoss and stated on the order acknowledgement.
For a combination of two or more units, a Combination Model Code should be compiled in addition to the	The first displacement represents the largest unit, and so on.	Characters <u>26</u> to <u>39</u> of the Combination Model Code will be part number of the	Front and middle units must each feature the through-drive option of the following unit in the combination.
	For each unit included in the		

¹⁾ Modelcodes shown here are for non-ATEX units and are only a reference to understanding combination of tandem unit modelcodes

TVW Closed Loop Transmission Pumps 130 – 750 cc

The below illustration and the following sections describe how to identify parts of the model code and availability of certain part options based on frame size. The limitations to the standard catalog are a result of the performed ignition risk analysis. The limitations largely concern the control options (28-46) which can only be supplied in non-electric versions. To add ATEX electronic flow control valves (not supplied with unit), standard valve interface and separate special ATEX yoke position sensor can be supplied on request.

For pump technical specifications, see standard TVW catalog *BC442765831329en*.

T V W * - * * * M * * * * * * * 1 R * * S V * * * O #																	● Preferred standard option ● Other standard option ○ Special option on request X Not available		
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28-55																			
Pump Size		130	180	250	360	500	750	Pump Size		130	180	250	360	500	750				
1	Pump							18	Main Ports										
T	- Transmission pump	●	●	●	●	●	●	1	- SAE ports - Metric bolts	●	●	●	●	●	●				
2	Displacement							19	Main Port Orientation										
V	- Variable	●	●	●	●	●	●	R	- Radial (side ports)	●	●	●	●	●	●				
3	Pump Series							20 21	Main Drive Shaft End										
W	- „W“ series	●	●	●	●	●	●	01	- ISO straight key	●	●	●	●	●	X				
4	Configuration							02	- ISO splines	●	●	●	●	●	●				
S	- Single unit	●	●	●	●	●	●	05	- ISO special splines	○	○	○	○	○	X				
F	- Front unit	○	○	○	○	○	○	D1	- SAE D keyed 7/8"	○	○	X	X	X	X				
M	- Middle unit	○	○	○	○	○	○	D2	- SAE D splined 8/16 13T	○	○	X	X	X	X				
R	- Rear unit	○	○	○	○	○	○	E2	- SAE E splined 8/16 13T	X	X	○	○	X	X				
5	Separator	●	●	●	●	●	●	F2	- SAE F splines 8/16 15T	X	X	○	○	X	X				
6 7 8	Displacement cm³/rev (in³/rev)							22	Drive Shaft Seal Configuration										
130	- 130 cm³/rev (8 in³/rev)	●	X	X	X	X	X	S	- Single shaft seal	●	●	●	●	●	●				
180	- 180 cm³/rev (11 in³/rev)	X	●	X	X	X	X	23	Seal Material										
250	- 250 cm³/rev (15.3 in³/rev)	X	X	●	X	X	X	V	- FKM	●	●	●	●	●	●				
360	- 360 cm³/rev (22.0 in³/rev)	X	X	X	●	X	X	F	- FKM + front bearing flushing prepared	○	○	○	○	○	○				
500	- 500 cm³/rev (30.5 in³/rev)	X	X	X	X	●	X	K	- FKM with HP lubrication	○	○	○	○	○	○				
750	- 750 cm³/rev (45.8 in³/rev)	X	X	X	X	X	●	24	Yoke Position Indicator										
9	Basic Standard							0	- No position indicator	○	○	○	○	○	○				
M	- Metric	●	●	●	●	●	●	V	- Visual indicator	●	●	●	●	●	●				
10 11	Mounting Flange							ATEX Sensor Version on request, sold separately											
05	- ISO 3019/2-160B4HW	●	●	X	X	X	X	25	Surface Coating										
07	- ISO 3019/2-200B4HW	X	X	●	●	X	X	A	- Painted black	●	●	●	●	●	●				
08	- ISO 3019/2 8 bolt metric	X	X	X	X	●	●	▽ Other finishes on request.											
0D	- SAE D 4-hole flange	○	○	X	X	X	X	26	Transmission circuit										
0E	- SAE E 4-hole flange	X	X	○	○	X	X	0	- No trans. circuit (with interface closed by plate)	●	●	●	●	●	●				
0F	- SAE F 4-hole flange	X	X	○	○	X	X	1	- with trans. circuit, filter visual ind., with HP relief	●	●	●	●	●	X				
12	Rotation							2	- with trans. circuit, filter Elec.ind., with HP relief	X	X	X	X	X	X				
R	- Clockwise	●	●	●	●	●	●	3	- with trans. circuit, without filter, with HP relief	●	●	●	●	●	●				
L	- Counter-clockwise	○	○	○	○	○	○	4	- with 2nd B-port, no trans. circuit, (interface closed by plate)	X	X	X	X	●	●				
13	Maximum Displacement Screws							5	- with 2nd B-port, transm.block, filter electr.ind, no HP relief,	X	X	X	X	X	X				
0	- Displacement adjusting screw							6	- with 2nd B-port, transm.block, no filter, no HP relief,	X	X	X	X	●	●				
	With control DP/SP/	X	X	●	●	●	X	7	- with 2nd B-port, transm.block, filter electr.ind, with HP relief,	X	X	X	X	X	X				
	With control DP or SP + DF	X	X	●	●	●	X	8	- with 2nd B-port, transm.block, no filter, with HP relief,	X	X	X	X	●	●				
	With control DP or SP (+ DF) + LR/ES	X	X	X	X	X	X	27	Zero Position valve										
4	- Fixed mechanical stop ring side A	○	○	○	○	○	○	0	- No Zero Position valve	●	●	●	●	●	●				
5	- Fixed mechanical stop ring side B	○	○	○	○	○	○	A	- with Zero Position valve	X	X	X	X	X	X				
6	- Fixed mech. stop ring sides A & B	○	○	○	○	○	○	28-46	Control Type										
Note: Customer adjustment required								SP*	Electrical Flow Control (Neutral at Min.)	○	○	○	○	○	○				
4 used as max. volume adjustment side A								DP	Hydraulic Flow Control (Neutral at Min.)	●	●	●	●	●	●				
5 used as min. volume stop side A								ES	Electric Motor Flow Control	X	X	X	X	X	X				
								*Only valve interface, no electronic valves added.											
								ATEX yoke sensor can be ordered separately											
14 15	Thru-Drive Options							46-55	Special Features/ Customer Adj. Spec.										
16 17																			
00TP	- None	●	●	●	●	●	●												
0000	- None	●	●	●	●	●	●												
000A	- SAE A	○	○	○	○	○	○												
000B	- SAE B	○	○	○	○	○	○												
000C	- SAE C	○	○	○	○	○	○												
000P	- Pilot pump	X	X	X	X	X	X												
0*	- * assigned by Engineering	○	○	○	○	○	○												
Pump Size		130	180	250	360	500	750												

SP-Control

BC482851190480en-000101

Modelcode TVW

DP-Control

D	P	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0	*	*	*	*	*	*	*		
28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55

		Pump Size	130	180	250	360	500	750
28 29	Control Type							
DP	– Displacement adjustment proportional to pilot pressure		●	●	●	●	●	●
30	Displacement Adjustment Options							
G	– CETOP 3 interface only		●	●	●	●	●	●
H	– Remote port G 1/4"		●	●	●	●	●	●
J	– Proportional KCG relief valve including EEA-PAM amplifier card		X	X	X	X	X	X
K	– with Prop. Relief & Direct.Valve incl. Electr.		X	X	X	X	X	X
L	– with double acting Prop.Relief valve		X	X	X	X	X	X
M	– with OBE Prop.Relief valve (single side operation only)		X	X	X	X	X	X
N	– with OBE Prop.Relief valve (double acting, overcenter)		X	X	X	X	X	X
31 32	Control Electronics							
00	– Without amplifier card		●	●	●	●	●	●
0L	– Prop.Relief with 7pole connector, 4-20mA, option N only		X	X	X	X	X	X
01	– (31,32) Prop.Relief valve with DIN43650 Plug incl. EEA.PAM		X	X	X	X	X	X
03	– (31,32) Prop.Relief valve with DIN43650 Plug incl. ER9.3		X	X	X	X	X	X
10	– (31,32) Prop.Relief valve with Deutsch-Plug, X no Amp. card		X	X	X	X	X	X
11	– (31,32) Prop.Relief valve with Deutsch-Plug, X incl. EEA-PAM		X	X	X	X	X	X
13	– (31,32) Prop.Relief valve with Deutsch-Plug, X incl. ER9.3		X	X	X	X	X	X
Note	options 01-13 only for pos.30 = L Amplifier cards can be ordered seperately (for non-EX atmospheres)							
33	Yoke Displacement Zone							
A	– Single Side of Center "A"		○	○	○	○	○	○
C	– Over Center		●	●	●	●	●	●
34	Additional Functions							
0	– Not required for this control type		○	○	○	○	○	○
1	– Pressure limiter overriding function side A		○	○	○	○	○	○
2	– Pressure limiter overriding function side B		○	○	○	○	○	○
3	– Pressure limiter overriding function side A and B		●	●	●	●	●	●
4	– Pressure limiter and power control overriding function side A		○	○	○	○	○	○
5	– Pressure limiter and power control overriding function side B		○	○	○	○	○	○
6	– Pressure limiter and power control overriding function side A and B		○	○	○	○	○	○
7	– Pressure limiter function side A and B power, control function side A		○	○	○	○	○	○
8	– Pressure limiter function side A and B power, control function side B		○	○	○	○	○	○
35	Pressure Control Options							
0	– Not required for this control type		●	●	●	●	●	●
F	– Remote port, only side A		○	○	○	○	○	○
G	– Remote port, only side B		○	○	○	○	○	○
H	– Remote port, only side A and B		○	○	○	○	○	○
A	– Electro Proportional Relief Valve Side A		X	X	X	X	X	X
B	– Electro Proportional Relief Valve Side B		X	X	X	X	X	X
K	– Electro Proportional Relief Valve Side A&B		X	X	X	X	X	X
		Pump Size	130	180	250	360	500	750

		Pump Size	130	180	250	360	500	750
36 37 38 39 40 41	Power Control Specification							
???	kW at 1500 RPM Side A							
000???	– ??? kW at 1500 RPM Side B							
Note : If no power limiter override: 000 000"								
42	Pilot Oil Filter							
0	– None							
43	Fail Safe Valve							
0	– Not applicable							
44	Position Monitoring							
0	– Not applicable							
45	Electric Motor Type							
0	– Not applicable							
46	Control Volatage of Zero Position Valve and Directional Control Valve							
0	– Not applicable							
47 48 49 50	Customer Adjustment Specification							
0000	– None		●	●	●	●	●	●
****	– Danfoss assigned number as per data specified in table below ∅		○	○	○	○	○	○
51 52 53	Special Features							
000	– None		●	●	●	●	●	●
***	– Defined by Danfoss		○	○	○	○	○	○
54 55	Design Number							
**	– 10-99 assigned by Danfoss		●	●	●	●	●	●
		Pump Size	130	180	250	360	500	750

● Preferred standard option
○ Other standard option
○ Special option on request
X Not available

∅ Example for Customer Adjustment Specifications

Special Pressure Adjustment	Main Stage Pres sure Control	Pilot Valve Pres sure Control	Pres Load Sense ∆p
Standard setting (bar)	20	90	
Max. setting (bar)	40	350	
Customer-specified adjustment (bar)	*****	*****	*****

Special Max. Displ. Adjustment	Minimum Displacement	Maximum Displacement
Standard	0 cm3/rev	100%
Customer-specified adjustment (cm³/rev)	*****	*****

Note:Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.

Combination Pump Unit

[illegible]

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

[1]		Combination Unit							
T	-	Transmission Pump		.	.	.	.	.	.
[2]		Displacement							
V	-	Variable		.	.	.	.	.	.
[3]		Pump Series							
W	-	"W" Series (was 30 design)		.	.	.	.	.	.
[4]		Configuration							
C	-			.	.	.	.	.	.
[5]		Separator		.	.	.	.	.	.
[6][7][8]		First Displacement cm³/r							
130	-	130 cm ³ /r [7.9 in ³ /rev]		.	X	X	X	X	X
180	-	180 cm ³ /r [11.0 in ³ /rev]		X	.	X	X	X	X
250	-	250 cm ³ /r [15.3 in ³ /rev]		X	.	X	.	X	X
360	-	360 cm ³ /r [22.0 in ³ /rev]		X	X	X	.	X	.
500	-	500 cm ³ /r [30.5 in ³ /rev]		X	X	X	X	X	.
750	-	750 cm ³ /r [45.8 in ³ /rev]		.o	.o	.o	.o	.	X
[9][10]		First Control Type							
DP	-	Pressure Signal Displacement Control		.	.	.	.	.	.
SP	-	Proportional Valve Displacement Control		.o	.o	.o	.o	.o	.
[11][12]		Second Displacement cm³/r							
[13]									
130	-	130 cm ³ /r [7.9 in ³ /rev]							
180	-	180 cm ³ /r [11.0 in ³ /rev]		.	.	X	X	X	X
250	-	250 cm ³ /r [15.3 in ³ /rev]		X	X	.	.	X	X
360	-	360 cm ³ /r [22.0 in ³ /rev]		X	X	X	X	.	.
500	-	500 cm ³ /r [30.5 in ³ /rev]		X	X	X	X	.	.
750	-	750 cm ³ /r [45.8 in ³ /rev]		X	X	X	X	.	.
[14][15]		Second Control Type							
DP	-	Pressure Signal Displacement Control		.	.	.	.	X	X
SP	-	Proportional Valve Displacement Control		.o	.o	.o	.o	.	.
[16][17]		Third Displacement cm³/r							
[18]									
130	-	130 cm ³ /r [7.9 in ³ /rev]		.	.	.	.	.	.
180	-	180 cm ³ /r [11.0 in ³ /rev]		.	.	.	.	.	.
250	-	250 cm ³ /r [15.3 in ³ /rev]		X	X	X	X	X	X
360	-	360 cm ³ /r [22.0 in ³ /rev]		X	X	X	X	X	X
500	-	500 cm ³ /r [30.5 in ³ /rev]		.o	.o	.o	.o	.o	.o
750	-	750 cm ³ /r [45.8 in ³ /rev]		.o	.o	.o	.o	.	.

[illegible]

- For a combination of two or more units fill out this Combination Model Code.
- Start with the biggest size unit for the first displacement.
- For each unit included in this combination, a separate model code must be chosen. Use the form on page 5.
- Character 26 to 39 will be P/N of the combination. This number will be defined by Danfoss and provided in the order acknowledgement.
- Charge and Pilot Pump through drive option must be specified on the rear unit of the combination (as a special feature).
- Front and middle units shall have the through drive option of the following unit in the combination.

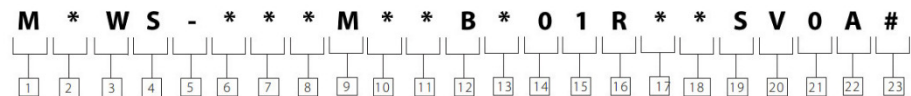
Model Code Combination Unit

TVWC-500SP250SP0000000000HC81*****

MVW / MFW Hydraulic Motors 250 – 750 cc

The below illustration and the following sections describe how to identify parts of the model code and availability of certain part options based on frame size. The limitations to the standard catalog are a result of the performed ignition risk analysis. The limitations largely concern the control options (24-48) which can only be supplied in non-electric versions. To add ATEX electronic flow control valves (not supplied with unit), standard valve interface and separate special ATEX yoke position sensor can be supplied on request.

For motor technical specifications, see standard MVW catalog [BC441566952790en](#).

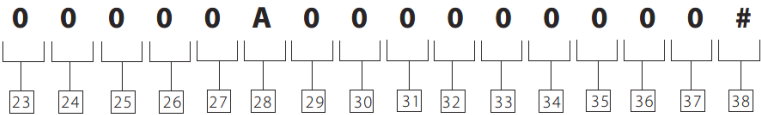


1 Motor M – Base Motor	9 Basic Standard M – Metric	14 Thru-drive Options 0 – None Thru-drive can be prepared for EX II 2G db eb IIC T6 Gb Tachogenerator (sold separately)	21 Yoke Position Indicator 0 – No Position Indicator ATEX Sensor Version on Request, sold separately
2 Displacement F – Fixed V – Variable	10 11 Mounting Flange 7 – ISO 3019/2-200B4HW 8 – ISO 3019/2-250B4HW *See Chart below	15 Main Ports 1 – SAE Ports - Metric Bolts	22 Surface Finish A – Black Painted Other options on special request available. Contact Danfoss Sales.
3 Pump Series W – “W” Series (was 30 design)	12 Rotation Direction B – Both Directions	16 Main Port Orientation R – Radial (Side Ports)	23–37 Control Model Code Code (characters 23...37) on the following pages.
4 Configuration S – Single Unit	13 Adjustment Stops 0 – No Stop 4 – Mechanical Adjustment Stop Side A (MVW only) 5 – Mechanical Adjustment Stop Side B (MVW only) 6 – Mechanical Adjustment Stops Side A and B (MVW only) NOTE: 4 is used as maximum Adjustment on Side A. 5 is used as minimum Adjustment stop side A. When 0 is specified, minimum Adjustment Stop is set at 35% of Vgmax. 6 is the combination of 4 and 5 together.	17 18 Main Drive Shaft End 1 – ISO Straight Key 2 – ISO Spline	00 – No Control - MFW Fixed Units Only DF – Pressure Compensator (+Remote) DP – Hydraulic Flow Control SP – Electronic Flow Control
5 Separator 6 7 8 Displacement cm³/r 250 – 250 cm³/r [15.3 in³/rev] 360 – 360 cm³/r [22.0 in³/rev] 500 – 500 cm³/r [30.5 in³/rev] 750 – 750 cm³/r [45.8 in³/rev] ??? – Non-Standard Displacement (MFW Only)		19 Drive Shaft Seal Configuration S – Single Shaft Seal	38–42 Special Features Option for prepared thru-drive for Tachogenerator with protect. II 2G Ex db eb IIC T6 Gb (Gas) Tachogenerator sold separately. Final assembly and assessment done by customer
		20 Seal Material V – Viton* *Viton is a trademark of E.I. DuPont (other materials available, contact your Danfoss representative)	
MOUNTING FLANGE OPTIONS AVAILABLE	250 360 500 750		
ISO 3019/2-200B4HW	• •		
ISO 3019/2-250B4HW		• •	



Modelcode MFW

No Control, Fixed Displacement



23 24 Control Type
00 – No Control
(for MFW only)

25 Displacement Adjustment Options
0 – Not Applicable

26 27 ElectronicControls
00 – Not Required

28 Yoke Displacement Zone
A – Single Side of Center "A"

29 Extra Functions 0
– Not Required

30 Pressure Control Options
0 – Not Applicable

31 Position Monitoring 0
– No Position Monitoring

32 Electric Motor Type 0
– No Electric Motor

33 Control Voltage 0
– Not Applicable

34 35 36 37 Customer Adjustment Specification
0000 – None

38 Special Features
Add special feature description (characters 44...46) on page 11 if required.



Modelcode MWV

DF-Control

D

F

0

0

0

A

0

*

0

0

0

*

*

*

*

#

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

23 24

Control Type

DF – Pressure Compensator

25

Displacement Adjustment Options

0 – Not Applicable

26 27

Electronic Controls

00 – Not Required

28

Yoke Displacement Zone

A – Single Side of Center "A"

29

Extra Functions

0 – Not Required

30

Pressure Control Options

0 – Not Applicable
F – Remote Port Only

31

Position Monitoring 0

– No Position Monitoring

32

Electric Motor Type 0

– No Electric Motor

33

Control Voltage 0

– Not Applicable

34 35 36 37

Customer Adjustment Specification

0000 – None
???? – Yes (Final number will be assigned by Danfoss. Specify on table below)

38

Special Features

Add special feature description (characters 38...42) on page 11 if required.

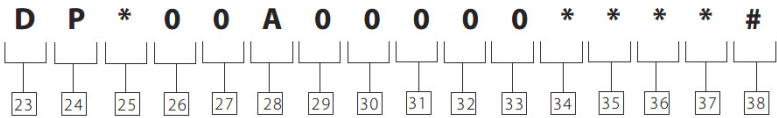
CUSTOMER ADJUSTMENT SPECIFICATIONS

	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments below set at ...	rpm	1500	-	-
Mech. Stop Side A (used as max Adjustment Stop Side A)	cm³/rev	Vgmax	-	-
Mech. Stop Side B (used as min Adjustment Stop Side A)	cm³/rev	35% of Vgmax	-	<35% not possible
Pressure Control Main Stage	bar	20	-	-
Pressure Control Pilot Valve	bar	90	-	-



Modelcode MW

DP-Control



2324

Control Type

DP – Pressure Signal Adjustment
Displacement Control

25

Displacement Adjustment Options

G – Mounting Interface Cetop 3 Only
H – Remote Port G 1/4

2627

Electronic Controls

00 – Not Required

28

Yoke Displacement Zone

A – Single Side of Center “A”

29

Extra Functions 0

– Not Required

30

Pressure Control Options

0 – Not Applicable

31

Position Monitoring

0 –No Position Monitoring

32

Electric Motor Type 0

– No Electric Motor

33

Control Voltage

0 – Not Applicable

34353637

Customer Adjustment Specification

0000 – None
???? – Yes (Final number will be assigned by Danfoss. Specify on table below.)

38

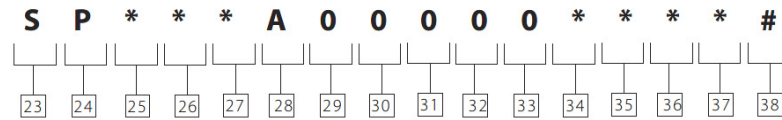
Special Features

Add special feature description (characters 38...42) on page 11 if required.

CUSTOMER ADJUSTMENT SPECIFICATIONS				
	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments below set at ...	rpm	1500	-	-
Pilot Pressure for Size 250 & 360 (External)	bar	60	-	-
Pilot Pressure for Size 500 & 750 (External)	bar	80	-	-
Mech. Stop Side A (used as max Adjustment Stop Side A)	cm³/rev	Vgmax	-	-
Mech. Stop Side B (used as min Adjustment Stop Side A)	cm³/rev	35% of Vgmax	-	<35% not possible

Modelcode MWV

SP-Control



[23] [24] Control Type

SP – Proportional Valve Adjustment Displacement Control

[25] Displacement Adjustment Options

A – CETOP 3 interface only
B – CETOP 5 interface only

[26] [27] Electronic Controls

00 – Not available
Note: Amplifier Cards can be ordered separately (for non-EX atmospheres)

[28] Yoke Displacement Zone

A – Single Side of Center "A"

[29] Extra Functions 0

– Not Required

[30] Pressure Control Options

0 – Not Applicable

[31] Position Monitoring 0

– No Position Monitoring
Can be prepared for ATEX swash plate sensor (sold separately!)

[32] Electric Motor Type 0

– No Electric Motor

[33] Control Voltage 0

– Not Applicable

[34] [35] [36] [37] Customer Adjustment Specification

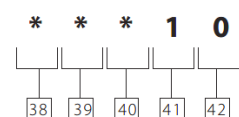
0000 – None
???? – Yes (Final number will be assigned by Danfoss. Specify on table below.)

[38] Special Features

Add special feature description (characters 38...42) on page 11 if required.
ATEX swash sensor must be ordered separately (specific to unit)

CUSTOMER ADJUSTMENT SPECIFICATIONS

	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments below set at ...	rpm	1500	-	-
Pilot Pressure	bar	60	-	-
Mech. Stop Side A (used as max Adjustment Stop Side A)	cm ³ /rev	Vgmax	-	-
Mech. Stop Side B (used as min Adjustment Stop Side A)	cm ³ /rev	35% of Vgmax	-	<35% not possible
Max. Stop by Control Side A	cm ³ /rev	95% of Vgmax	EI Card Adjustment done by customer	Refer to EI Card Manual
Min. Stop by Control Side A	cm ³ /rev	35% of Vgmax+/-2.5%	EI Card Adjustment done by customer	Refer to EI Card Manual
Ramp Time 0 → A For 100% Stroke	sec	0	EI Card Adjustment done by customer	Refer to EI Card Manual
Ramp Time A → 0 For 100% Stroke	sec	0	EI Card Adjustment done by customer	Refer to EI Card Manual
Preset Input Signals S1....S4	L/min	-	EI Card Adjustment done by customer	Refer to EI Card Manual



[38] [39] [40] Special Features

000 – None
******* – Defined by Danfoss

[41] [42] Design Number

10 – Design Number

PVX / PFX Open Loop Pumps 66 – 250 cc

The below illustration and the following sections describe how to identify parts of the model code and availability of certain part options based on frame size. The limitations to the standard catalog are a result of the performed ignition risk analysis. The limitations largely concern the control options (24-48) which can only be supplied in non-electric versions.

For pump technical specifications, see standard PVX catalog BC442975253403en.

P V X * - * * * M * * * * * 1 * * * S * * A * * ...

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 - 48

	Pump Size	66	90	130	180	250
1 Pump						
P – Open loop pump		•	•	•	•	•
2 Displacement						
V – Variable		•	•	•	•	•
F – Fixed		•	•	•	•	X
3 Pump Series						
X – “X” series		•	•	•	•	•
4 Configuration						
S – Single unit		•	•	•	•	•
F – Front unit		•	•	•	•	•
M – Middle unit		•	•	•	•	•
R – Rear unit		•	•	•	•	•
5 Separator		•	•	•	•	•
6 7 8 Displacement cm³/rev (in³/rev)						
066 – 066 cm ³ /rev (4 in ³ /rev) ▲		•	X	X	X	X
090 – 090 cm ³ /rev (5.5 in ³ /rev)		X	•	X	X	X
130 – 130 cm ³ /rev (8 in ³ /rev)		X	X	•	X	X
180 – 180 cm ³ /rev (11 in ³ /rev)		X	X	X	•	X
250 – 250 cm ³ /rev (15.3 in ³ /rev)		X	X	X	X	•
*** – Non-standard (PFX only) ◇		•	•	•	•	X
◇ Non-standard displacements (cm ³ /rev):						
066 – 44/50						
090 – 75						
130 – 94/112						
180 – 160						
9 Basic Standard						
M – Metric		•	•	•	•	•
10 11 Mounting Flange						
02 – ISO 3019/2-125A2SW		•	•	X	X	X
04 – ISO 3019/2-160A2SW		X	X	•	•	X
06 – ISO 3019/2-200A2SW		X	X	X	X	•
12 Rotation Direction						
R – Clockwise		•	•	•	•	X
L – Counter-clockwise		•	•	•	•	X
13 Maximum displacement						
0 – Max. displacement adjusting screw		•	•	•	•	•
With control DF/ZP		•	•	•	•	•
With control ST +DF		•	•	•	•	•
With control ST +LR		X	X	X	X	X
With control LR/SP/FM/ES		X	X	X	X	X
4 – Fixed mechanical stop ring side A (max displacement)		•	•	•	•	•
5 – Fixed mechanical stop ring side B (min. displacement)		•	•	•	•	•
Pump Size		66	90	130	180	250

	Pump Size	66	90	130	180	250
14 15 Thru drive options						
00 – None		•	•	•	•	•
0A – SAE A		•	•	•	•	•
0B – SAE B		•	•	•	•	•
0C – SAE C		•	•	•	•	•
0P – Pilot pump (8cm ³ /rev)		X	X	X	X	X
0X – For tandem units		•	•	•	•	•
16 Main Ports						
1 – SAE ports - Metric bolts		•	•	•	•	•
17 Main port orientation						
R – Radial (side ports)		•	•	•	•	•
A – Axial (in-line rear)		•	•	•	•	•
▼ For fixed units only radial ports available						
18 19 Main drive shaft end						
01 – ISO straight key		•	•	•	•	•
02 – ISO spline		•	•	•	•	•
20 Drive shaft seal configuration						
S – Single shaft seal		•	•	•	•	•
21 Seal material						
V – FKM		•	•	•	•	•
F – FKM + front bearing flushing prepared		•	•	•	•	•
K – FKM with HP lubrication		•	•	•	•	•
L – For HFC Hp-Lub + front flushing		•	•	•	•	•
M – For HFC Hp-Lub + front + rear flushing		•	•	•	•	•
G – For HFC front + rear flushing		•	•	•	•	•
A – EPDM / PTFE		•	•	•	•	•
22 Yoke position indicator						
0 – No position indicator		•	•	•	•	•
V – Visual indicator		•	•	•	•	•
P – Voltage indicator ▲		X	X	X	X	X
M – Voltage + visual indicator ▲		X	X	X	X	X
L – Current + visual indicator		X	X	X	X	X
▲ SP control only						
23 Surface coating						
A – Painted black ▼		•	•	•	•	•
0 – Rust inhibitor oil		X	X	X	X	X
▼ Other finishes on request.						
24 - 48 Control model code						
DF – Pressure Compensator (+LS) (+remote)		•	•	•	•	•
LR – Power Limiter Control (+DF)		•	•	•	•	•
ST – Electronic Flow Control		X	X	X	X	X
FM – Screw Adjustment Control		•	•	•	•	•
ZP – Dual Displacement Control		X	X	X	X	X
SP – Electronic Flow Control, neutral at min.		X	X	X	X	X
ES – Electric Motor Flow Control		X	X	X	X	X

Modelcode PVX

DF-Control

D F 0 0 0 A * * 0 0 0 0 * 0 0 * * * * * * * * * *
 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

	Pump Size	66	90	130	180	250
24 25 Control Type						
DF – Pressure compensator		●	●	●	●	●
26 Displacement adjustment options						
0 – Not applicable						
27 28 Electronic amplifier						
00 – Not applicable						
29 Yoke displacement zone						
A – Single side of centre "A"		●	●	●	●	●
30 Additional functions						
0 – None		●	●	●	●	●
1 – Load sensing (standard $\Delta p = 15$ bar)		●	●	●	●	●
A – 2-level pressure compensator, 4/2 solenoid valve		X	X	X	X	X
B – 2-level pressure compensator, 4/3 solenoid valve		X	X	X	X	X
31 Pressure control options						
0 – None i.e. pilot operated with remote port (standard arrangement)		●	●	●	●	●
F – Remote port without pilot valve		○	○	○	○	○
K – Electro - proportional relief valve, complete with electronic card		X	X	X	X	X
L – Electro - proportional relief valve with OBE		X	X	X	X	X
S – Slow upstroke screw adjustment		○	○	○	○	○
32 33 34 Power control						
000 – Not applicable						
35 Pilot oil filter						
0 – Not applicable						
Pump Size		66	90	130	180	250

	Pump Size	66	90	130	180	250
36 Venting valve						
0 – None		●	●	●	●	●
1 – Solenoid valve		X	X	X	X	X
37 Position monitoring						
0 – Not applicable						
38 Electric motor type						
0 – Not applicable						
39 Control voltage						
0 – Not applicable		●	●	●	●	●
40 41 Customer adjustment specification						
42 43						
0000 – None		●	●	●	●	●
**** – Danfoss assigned number as per data specified in table below ◊		○	○	○	○	○
44 45 46 Special features						
000 – None		●	●	●	●	●
*** – Defined by Danfoss		○	○	○	○	○
47 48 Design number						
** – 10-99 assigned by Danfoss		●	●	●	●	●
Pump Size		66	90	130	180	250

◊ Example for customer adjustments specifications

Special pressure adjustment	Main stage pressure control	Pilot valve ▲ pressure control	Load sense Δp
Standard setting (bar)	20	90	15
Max. setting (bar)	40	350	40
Customer-specified adjustment (bar)	.....	.....	.....

▲ Note: Setting must be at least 30bar.

Special max. Displ. Adjustment	Minimum displacement	Maximum displacement
Standard	0 cm ³ /rev	100%
Customer-specified adjustment (cm ³ /rev)	.....	.....

Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option. Max. displacement adjustable by screw or by stop ring- refer basic pump model code pos 13.

Modelcode PVX

LR-Control

L R 0 0 0 A * * * * * 0 * 0 0 * * * * * * * * * * * *

24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

	Pump Size	66	90	130	180	250
24 25 Control type						
LR – Power control		●	●	●	●	●
26 Displacement adjustment options						
0 – Not applicable						
27 28 Electronic amplifier						
00 – Not applicable						
29 Yoke displacement zone						
A – Single side of centre “A”		●	●	●	●	●
30 Additional functions						
2 – Pressure limiter ▲		●	●	●	●	●
3 – Load sensing and pressure limiter (standard Δp = 15 bar)		●	●	●	●	●
▲ To select Power Control without Pressure Limiter, specify ... LR ... A2F.						
31 Pressure control options						
0 – None i.e. pilot operated with remote port (standard arrangement)		●	●	●	●	●
F – Remote port without pilot valve		○	○	○	○	○
K – Electro - proportional relief valve, complete with electronic card		X	X	X	X	X
L – Electro - proportional relief valve with OBE		X	X	X	X	X
S – Slow upstroke screw adjustment		○	○	○	○	○
32 33 34 Power control specification						
*** – 3-digit value in kW at 1500 rpm		●	●	●	●	●
35 Pilot oil filter						
0 – Not applicable						
Pump Size	66	90	130	180	250	

	Pump Size	66	90	130	180	250
36 Venting valve						
0 – None		●	●	●	●	●
1 – Solenoid valve		X	X	X	X	X
37 Position monitoring						
0 – Not applicable						
38 Electric motor type						
0 – Not applicable						
39 Control Voltage						
0 – Not applicable		●	●	●	●	●
40 41 Customer adjustment specification						
42 43						
0000 – None		●	●	●	●	●
**** – Danfoss assigned numbers as per data specified in table below ◇		○	○	○	○	○
44 45 46 Special features						
000 – None		●	●	●	●	●
*** – Defined by Danfoss		○	○	○	○	○
47 48 Design number						
** – 10-99 assigned by Danfoss		●	●	●	●	●
Pump Size	66	90	130	180	250	

◇ Example for customer adjustment specifications A2 29 30

Special pressure adjustment	Main stage pressure control	Pilot valve ▲ pressure control	Load sense Δp
Standard setting (bar)	20	90	15
Max. setting (bar)	40	350	40
Customer-specified adjustment (bar)	.....	.....	.....

▲ Note: Setting must be at least 30bar.

Special max. Displ. Adjustment	Minimum displacement	Maximum displacement
Standard	0 cm ³ /rev	100%
Customer-specified adjustment (cm ³ /rev)	.....	.....

Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option. Max. displacement adjustable by screw or by stop ring- refer basic pump model code pos 13.

Modelcode PVX

FM-Control

F M 0 0 0 A 0 0 0 0 0 0 0 0 0 0 0 * * * * * * * * *

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

		Pump Size					
		66	90	130	180	250	
24 25	Control type						
FM	– Screw adjustment control displacement range 50-100%	•	•	•	•	•	
26	Displacement adjustment options						
G	– Not applicable						
27 28	Electronic amplifier						
00	– Not applicable						
29	Yoke displacement zone						
A	– Single side of centre “A”	•	•	•	•	•	
30	Additional functions						
0	– Not applicable						
31	Pressure control options						
0	– Not applicable						
32 33 34	Power control specification						
000	– Not applicable						
35	Pilot oil filter						
0	– Not applicable						
		Pump Size	66	90	130	180	250

		Pump Size	66	90	130	180	250
36	Venting valve						
0	– Not applicable						
37	Position monitoring						
0	– Not applicable						
38	Electric motor type						
0	– Not applicable						
39	Control voltage						
0	– Not applicable						
40 41	Customer adjustment specification						
42 43							
0000	– None		●	●	●	●	●
****	– Danfoss assigned number as per data specified in table below ∅		○	○	○	○	○
44 45 46	Special features						
000	– None		●	●	●	●	●
***	– Defined by Danfoss		○	○	○	○	○
47 48	Design number						
**	– 10-99 assigned by Danfoss		●	●	●	●	●
Pump Size		66	90	130	180	250	

- Notes:
- Adjustable only with load pressure ≤30 bar
 - Factory setting 100%

∅ Example for customer adjustment specifications		
Special max. Displ. adjustment	Minimum displacement	Maximum displacement
Standard	50%	100%
Customer-specified adjustment (cm³/rev)		
.....		
Note: Special pressure adjustments and/or maximum displacement adjustments are the most common reasons for using this option.		



Modelcode PFX

No Control, Fixed Displacement

P F X * - * * * ... 0 0 0 0 0 A 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 * * * * *

1 2 3 4 5 6 7 8 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

- Preferred standard option
- Other standard option
- Special option on request
- X Not available

			Pump Size	66	90	130	180	250
2	Displacement							
V	–	Variable		•	•	•	•	•
F	–	Fixed		•	•	•	•	X
6	7	8	Displacement cm ³ /rev (in ³ /rev)					
066	–	066 cm ³ /rev (4 in ³ /rev) ▲		•	X	X	X	X
090	–	090 cm ³ /rev (5.5 in ³ /rev)		X	•	X	X	X
130	–	130 cm ³ /rev (8 in ³ /rev)		X	X	•	X	X
180	–	180 cm ³ /rev (11 in ³ /rev)		X	X	X	•	X
250	–	250 cm ³ /rev (15.3 in ³ /rev)		X	X	X	X	X
***	–	Non-standard(PFX only) ◇		○	○	○	○	X
◇ Non-standard displacements (cm ³ /rev):								
066	–	44/50						
090	–	75						
130	–	94/112						
180	–	160						
24	25	Control type		•	•	•	•	X
00	–	No control		•	•	•	•	X
26	Displacement adjustment options							
0	–	Not applicable						
27	28	Control electronics						
00	–	Not applicable						
29	Yoke displacement zone							
A	–	Single side of center "A"		•	•	•	•	X
30	Additional functions							
0	–	Not applicable						
31	Pressure control options							
0	–	Not applicable						
32	33	34	Power control specification					
000	–	Not applicable						
35	Pilot oil filter							
0	–	Not applicable						
			Pump Size	66	90	130	180	250

		Pump Size	66	90	130	180	250
36	Venting valve						
0	– Not applicable						
37	Position monitoring						
0	– Not applicable						
38	Electric motor type						
0	– Not applicable						
39	Control voltage						
0	– Not applicable						
40 41 42 43	Customer adjustment specification						
000–	None		•	•	•	•	X
44 45 46	Special features						
000	None		•	•	•	•	X
***	Defined by Danfoss		◦	◦	◦	◦	X
47 48	Design number						
**	10-99 assigned by Danfoss		•	•	•	•	X
		Pump Size	66	90	130	180	250

Modelcode PVXC

Combination Pump Unit

P * X C - * H C 8 1 * * * * * * * * * *

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

		Unit Position			
		1	2	3	4
1	Combination unit				
P	– Pump	•	•	•	•
2	Displacement				
F	– Fixed	•	•	•	•
V	– Variable	•	•	•	•
3	Pump Series				
X	– “X” series (ex-30 design)	•	•	•	•
4	Unit type				
C	– Combination unit	•	•	•	•
5	Separator				
6	7	8	First displacement cm³/rev (in³/rev)		
066	–	66 (4.0)	•		
090	–	90 (5.5)	•		
130	–	130 (7.9)	•		
180	–	180 (11.0)	•		
250	–	250 (15.3)	•		
For special displacements, see basic pumpmodelcode					
9	10	First control type			
00	–	No control (Fixed displacement only)	•		
DF	–	Pressure compensator	•		
LR	–	Power limiter control	•		
FM	–	Screw adjustment flow control	•		
		Unit Position			
		1	2	3	4

Unit Position					1	2	3	4
11	12	13	Second displacement cm³/rev (in³/rev)					
– Options as first displacement						•		
14	15	Second control type						
– Options as first displacement						•		
16	17	18	Third displacement					
0 – Options as displacement							•	
19	20	Third control type						
A – Options as control							•	
21	22	23	Fourth displacement					
– Options as displacement								•
24	25	Fourth control type						
– Options as control								•
26	27	Assembly number						
28	29	HC81			•	•	•	•
30	31	32	Assembly number					
33	34	35	Assembly number					
36	37	38	Defined by Danfoss		•	•	•	•
39								
Unit Position					1	2	3	4

MFX Hydraulic Motors 66 – 180 cc

The below illustration and the following sections describe how to identify parts of the model code and availability of certain part options based on frame size. The limitations to the standard catalog are a result of the performed ignition risk analysis.

For motor technical specifications, see standard MVX/MFX catalog BC441963615995en.

M	F	X	S	—	*	*	*	M	*	*	B	0	0	1	R	*	*	S	V	0	A	0	0	0	0	0	0	A	0	0	0	0	0	0	0	#																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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M – Motor												02 – ISO 3019/2-125A2HW												S – Single Shaft Seal												A – Single Side of Center “A”																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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F – Fixed Displacement												06 – ISO 3019/2-200A2HW																								– Not Required																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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X – “X” Series (was 20 design)																B - Both																								0 – Not Applicable																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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066 – 66 cm³/r [4.0 in³/rev]																				Thru-drive can be prepared for EX II 2G db eb IIC T6 Gb Tachogenerator (sold separately)																								33 Control Voltage 0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
090 – 90 cm³/r [5.5 in³/rev]																																												– Not Applicable																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
130 – 130 cm³/r [7.9 in³/rev]																																												34 35 36 37 Customer Adjustment Specification																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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ATEX Certified Swash Plate Position Feedback Sensor

Sensor only available for W-Design units (PVW, TVW, MVW). It is generally preferred to use sensor-less **DP-Control** to realize flow control within explosive atmospheres.

If electronic flow control (SP-control) shall be realized within explosive atmospheres, a swash angle feedback sensor must be installed by the customer. An ATEX certified sensor can be supplied by Danfoss with all necessary retrofit components as well as installation instructions. For more information on available signal types and connectors please refer to a Danfoss representative. The sensor is not part of the unit's declaration of conformity as it is not considered part of the equipment and it can be operated without it. The conformity of the final assembly of pump and sensor must be assessed by the customer.

The sensor can be used:

- a) In zone 2 (Gas, Category 3G) in the explosion groups IIA, IIB, IIC
- b) In zone 22 (Dust, Category 3D) at dusts with a minimum ignition energy of > 3 mJ

The qualification with regard to the surface temperature is T4; for all gases, vapors and mists with an ignition temperature >135 °C the equipment is not an ignition source.

In dust-hazardous area, 101 °C is the reference temperature for further considerations with regard to a safe distance from the glowing temperature (to be decided by the operator)

Refer to the supplied ATEX sensor instruction manual for further information and installation requirements.

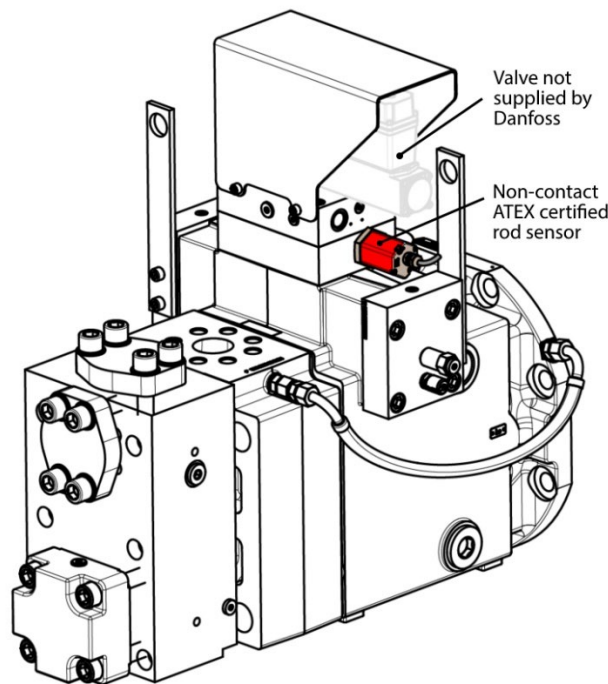


Figure 6: Example of PVW-500 with ATEX sensor assembly

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- Electric motors
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- Gear pumps
- Hydraulic integrated circuits (HICs)
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- Hydrostatic pumps
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- Steering components and systems
- Telematics
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