

**EATON** | **Vickers**

## Hydrokraft Open Loop Piston Pumps

Technical Catalog

PVW



**VICKERS**<sup>®</sup>

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# Introduction

- Axial piston pumps with swash plate design for reliable operation and long life.
- Pressure up to 420 bar. Rated speed up to 1800 min<sup>-1</sup>. Higher speeds possible.
- Oversize shafts and bearings.
- Rotating and pressure loaded parts are pressure balanced.
- Through drive enable multiple pump installations from a single shaft. Multiple pump combinations are also available.
- Integrated pilot pump, filter and pressure relief valves available.
- “Building block” design gives these pumps a wide range of application.
- Fast response times.

## AVAILABLE DISPLACEMENT SIZES

250 ccm
360 ccm
500 ccm
750 ccm

### Displacement Controls: Typical Section of Open Loop PVW - Pump

**ES** - Electric motor displacement control

**DF** - Pressure compensator controlled

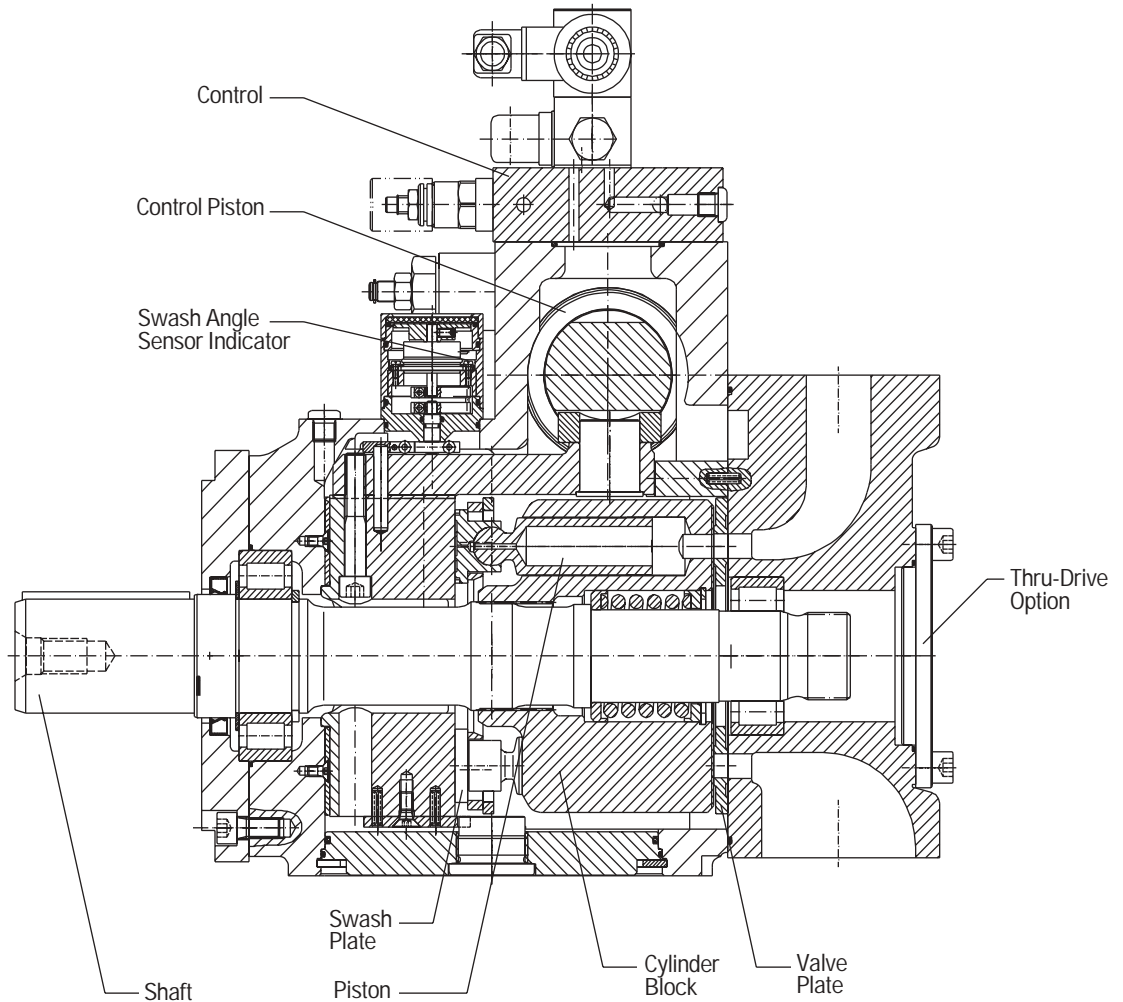
**LR** - Power control with pressure limiter

**SP, SM** - Displacement proportional to electric signal

**DP** - Displacement proportional to pressure signal

#### Extra functions available for SP, SM & DP:

Pressure Limitation and/or power control overriding function.



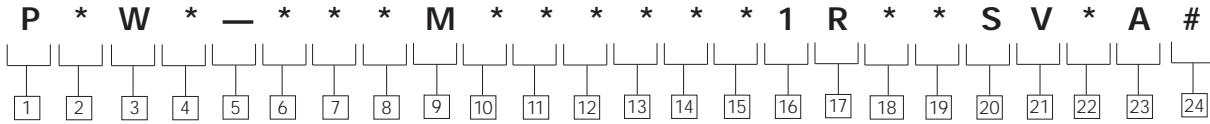
Dimensional information listed in this catalog is subject to change without notice.



# Model Code

## Open Loop Pumps

### "W" Series - Basic Pumps



**1 Pump**  
P – Open Loop Pump

**2 Displacement**  
F – Fixed  
V – Variable

**3 Pump Series**  
W – "W" Series (was 30 design)

**4 Configuration**  
S – Single Unit  
F – Front Unit  
M – Middle Unit  
R – Rear Unit

**5 Separator**

**6 7 8 Displacement cm<sup>3</sup>/r**  
250 – 250 cm<sup>3</sup>/r [15.3 in<sup>3</sup>/rev]  
360 – 360 cm<sup>3</sup>/r [22.0 in<sup>3</sup>/rev]  
500 – 500 cm<sup>3</sup>/r [30.5 in<sup>3</sup>/rev]  
750 – 750 cm<sup>3</sup>/r [45.8 in<sup>3</sup>/rev]  
??? – Non-Standard Displacement (PFW Only)

**9 Basic Standard**  
M – Metric

**10 11 Mounting Flange**  
07 – ISO 3019/2-200B4HW  
08 – ISO 3019/2-250B4HW  
\* See Chart Below

**12 Rotation Direction**  
R - Right Hand [CW]  
L - Left Hand [CCW]

**13 Adjustment Stops**  
0 – No Stop  
4 – Mechanical Adjustment Stop Side A (PVW only)  
5 – Mechanical Adjustment Stop Side B (PVW only)  
6 – Mechanical Adjustment Stops Side A and B (PVW only)

NOTE:  
4 is used as max. Adjustment on Side A.  
5 is used as min. Adjustment stop side A.

**14 15 Thru-Drive Options**  
00 – None  
0A – SAE A  
0B – SAE B  
0C – SAE C  
0D – ISO125A2HW  
0E – ISO160A2HW  
0F – ISO125B4HW  
0G – ISO160B4HW  
0H – ISO200B4HW  
0J – ISO250B4HW  
0P – Pilot Pump (8cm<sup>3</sup>/r.) (PVW only)  
0PP – Double Pilot Pump (8 + 8 cm<sup>3</sup>/r.) (PVW only)  
\*\* See Chart Below

**16 Main Ports**  
1 – SAE Ports - Metric Bolts

**17 Main Port Orientation**  
R – Radial (Side Ports)

**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 – Viton\*  
\*Viton is a trademark of E.I. Dupont (other materials available, contact your Eaton representative.)

**22 Yoke Position Indicator**  
0 – No Position Indicator  
V – Visual Position Indicator  
P – Position Sensor  
M – Sensor with Visual Indicator

**23 Surface Finish**  
A – Blue Painted  
\*Other options on special request available. Contact Eaton Sales.

**24 Add Control Model Code**  
Code (characters 24...43) on the following pages

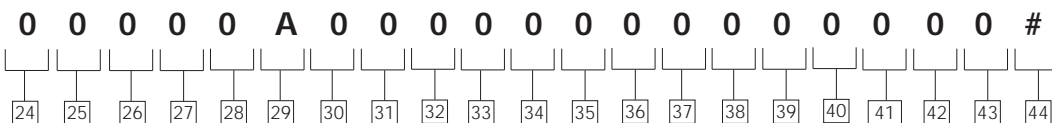
*MOUNTING FLANGE OPTIONS AVAILABLE	250	360	500	750
ISO 3019/2-200B4HW	•	•		
ISO 3019/2-250B4HW			•	•

**THRU-DRIVE OPTIONS AVAILABLE	250	360	500	750
00	•	•	•	•
0A	•	•	•	•
0B	•	•	•	•
0C	•	•	•	•
0D	•	•	•	•
0E	•	•	•	•
0F	•	•	•	•
0G	•	•	•	•
0H	•	•	•	•
0J			•	•

# Model Code

Open Loop Pumps

"W" Series - No Control



**24 25 Control Type**

**00** – No Control  
(for PFW only)

**26 Displacement Adjustment Options**

**0** – Not Applicable

**27 28 Electronic Controls**

**00** – Not Required

**29 Yoke Displacement Zone**

**A** – Single Side of Center "A"

**30 Extra Functions**

**0** – Not Required

**31 Pressure Control Options**

**0** – Not Applicable

**32 33 34 Power Control**

**000** – Not Applicable

**35 Pilot Oil Filter**

**0** – Not Applicable

**36 Bypass/Venting Valve**

**0** – Not Applicable

**37 Position Monitoring**

**0** – No Position Monitoring

**38 Electric Motor Type**

**0** – No Electric Motor

**39 Control Voltage**

**0** – Not Applicable

**40 41 42 43 Customer Adjustment Specification**

**0000** – None

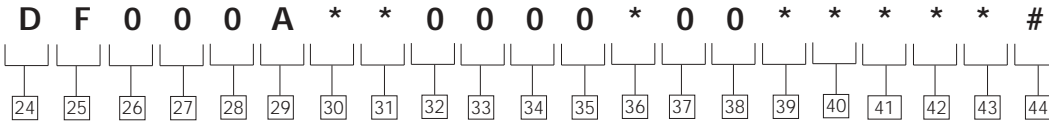
**44 Special Features**

Add special feature description (characters 44...46) on page 14 if required.

# Model Code

Open Loop Pumps

"W" Series - DF Control



**24 25 Control Type**  
**DF** – Pressure Compensator

**26 Displacement Adjustment Options**  
**0** – Not Applicable

**27 28 Electronic Controls**  
**00** – Not Required

**29 Yoke Displacement Zone**  
**A** – Single Side of Center "A"

**30 Extra Functions**  
**0** – Not Required  
**1** – Load Sensing Extra Function

**31 Pressure Control Options**  
**0** – Not Applicable  
**F** – Remote Port Only  
**K** – Electro Proportional Relief Valve  
 - Incl. Electronic Card

**32 33 34 Power Control**  
**000** – Not Applicable

**35 Pilot Oil Filter**  
**0** – Not Applicable

**36 Venting Valve**  
**0** – Not Applicable  
**1** – With Solenoid Valve

**37 Position Monitoring**  
**0** – No Position Monitoring

**38 Electric Motor Type**  
**0** – No Electric Motor

**39 Control Voltage**  
**0** – Not Applicable  
**B** – 110 AC 50 HZ/  
 120 AC 60 HZ  
**D** – 220 AC 50 HZ/  
 240 AC 60 HZ  
**G** – 12 VDC  
**H** – 24 VDC

**40 41 42 43 Customer Adjustment Specification**  
**0000** – None  
**????** – Yes (final number will be assigned by Eaton. Specify on table below)

**44 Special Features**  
 Add special feature description (characters 44...46) on page 14 if required.

CUSTOMER ADJUSTMENT SPECIFICATIONS

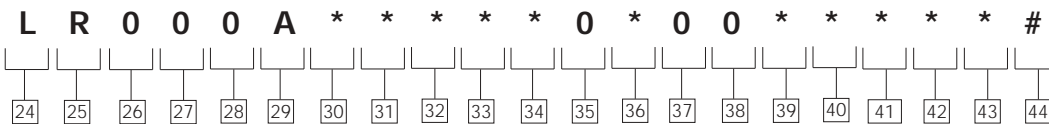
	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments below set at ..	rpm	1500	-	
Mech. Stop Side A (used as max Adjustment Stop Side A)	L/min	Q <sub>max</sub>	-	
Mech. Stop Side B (used as min Adjustment Stop Side B)	L/min	Q <sub>min</sub>	-	
Pressure Control Main Stage	bar	20	-	
Pressure Control Pilot Valve	bar	90	-	
Load Sense p	bar	15	-	<15% bar not possible



# Model Code

Open Loop Pumps

"W" Series - LR Control



**24 25 Control Type**

LR – Power Control

**26 Displacement Adjustment Options**

0 – Not Applicable

**27 28 Electronic Controls**

00 – Not Required

**29 Yoke Displacement Zone**

A – Single Side of Center "A"

**30 Extra Functions**

- 1 – Load Sensing & Pressure Limiter Extra Function
- 2 – Pressure Limiter Extra Function

**31 Pressure Control Options**

- 0 – Not Applicable
- F – Remote Port Only
- K – Electro Proportional Relief Valve - Incl. Electronic Card

**32 33 34 Power Control Define**

- 000 - Not Applicable
- ??? - KW at 1500 rpm

**35 Pilot Oil Filter**

0 – Not Applicable

**36 Venting Valve**

- 0 – Not Applicable
- 1 – With Solenoid Valve

**37 Position Monitoring**

0 – No Position Monitoring

**38 Electric Motor Type**

0 – No Electric Motor

**39 Control Voltage**

- 0 – Not Applicable
- B – 110 AC 50 HZ/ 120 AC 60 HZ
- D – 220 AC 50 HZ/ 240 AC 60 HZ
- G – 12 VDC
- H – 24 VDC

**40 41 42 43 Customer Adjustment Specification**

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

**44 Special Features**

Add special feature description (characters 44...46) on page 14 if required.

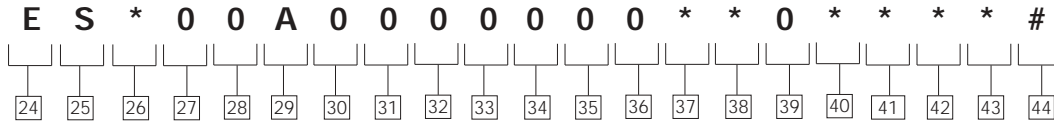
CUSTOMER ADJUSTMENT SPECIFICATIONS

	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)	L/min	Q <sub>max</sub>	.	
Mech. Stop Side B (used as min Adjustment Stop Side B)	L/min	Q <sub>min</sub>	.	
Pressure Control Main Stage	bar	20	.	
Pressure Control Pilot Valve	bar	90	.	
Load Sense p	bar	15	.	<15% bar not possible

# Model Code

Open Loop Pumps

"W" Series - ES Control



- [24][25] Control Type**  
**ES** – Electric Motor Displacement Control
- 
- [26] Displacement Adjustment Options**  
**M** – Electric Motor - Fast Response\*  
**N** – Electric Motor - Medium Response\*  
**P** – Electric Motor - Slow Response\*
- 
- [27][28] Electronic Controls**  
**00** – Not Required
- 
- [29] Yoke Displacement Zone**  
**A** – Single Side of Center "A"

- [30] Extra Functions**  
**0** – Not Required
- 
- [31] Pressure Control Options**  
**0** – Not Applicable
- 
- [32][33][34] Power Control**  
**000** – Not Applicable
- 
- [35] Pilot Oil Filter**  
**0** – Not Applicable
- 
- [36] Venting Valve**  
**0** – Not Applicable

- [37] Position Monitoring**  
**A** – 4 Limit Switches  
**B** – 8 Limit Switches  
**P** – 4 Limit Switches w/Sensor  
**T** – 8 Limit Switches w/Sensor
- 
- [38] Electric Motor Type**  
**2** – Motor With Brake (IP-54)  
**3** – Motor Without Brake (Explosion Proof)
- 
- [39] Control Voltage of Venting Valve**  
**0** – Not Applicable

- [40][41][42][43] Customer Adjustment Specification**  
**0000** – None  
**????** – Yes (final number will be assigned by Eaton. Specify on table below)
- 
- [44] Special Features**  
 Add special feature description (characters 44...46) on page 14 if required.

**\*Response Time (sec) for Zero to Maximum Displacement**

SIZE	250		360		500		750	
Frequency	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Fast	8	7	11	9	10	8	14	12
Medium	20	17	27	23	24	20	35	29
Slow	40	33	55	46	48	40	70	58

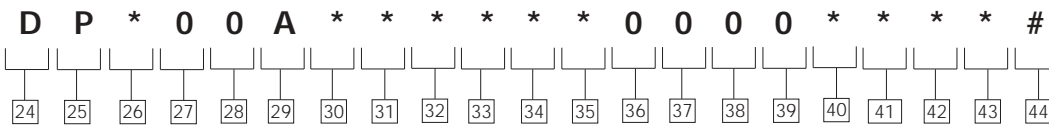
**CUSTOMER ADJUSTMENT SPECIFICATIONS**

	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)	L/min	$Q_{max}$		
Mech. Stop Side B (used as min Adjustment Stop Side B)	L/min	$Q_{min}$		
Displacement Adjusted to ...	cm <sup>3</sup> /rev.	-50% $Q_{max}$		
Position Monitoring Switch	1 L/min	0		
	2 L/min	95% of $Q_{max}$		<95% not possible
	3 L/min			
	4 L/min			
	5 L/min			
	6 L/min			
	7 L/min			
	8 L/min			

# Model Code

Open Loop Pumps

"W" Series - DP Control



**[24][25] Control Type**  
**DP** – Pressure Signal Displacement Control

**[26] Displacement Adjustment Options**  
**G** – Mounting Interface CETOP 3 Only  
**H** – Remote Port G 1/4  
**J** – Proportional Relief Inc. Electronics

**[27][28] Electronic Controls**  
**00** – Not Required

**[29] Yoke Displacement Zone**  
**A** – Single Side of Center “A”

**[30] Extra Functions**  
**0** – Not Required  
**4** – Pressure Limiter Overriding Function  
**5** – Pressure Limiter & Power Control Overriding Function

**[31] Pressure Control Options**  
**0** – Not Applicable  
**F** – Remote Port Only  
**K** – Electro Prop. Relief Valve - Incl. Electronic Card

**[32][33][34] Power Control**  
**000** – Not Applicable  
**???** – KW at 1500 rpm

**[35] Pilot Oil Filter**  
**0** – Not Applicable  
**V** – Filter with Visual Indicator  
**E** – Filter with Electrical Indicator

**[36] Venting Valve**  
**0** – Not Applicable

**[37] Position Monitoring**  
**0** – No Position Monitoring

**[38] Electric Motor Type**  
**0** – No Electric Motor

**[39] Control Voltage of Venting Valve**  
**0** – Not Applicable

**[41][42][43] Customer Adjustment Specification**  
**0000** – None  
**????** – Yes (final number will be assigned by Eaton. Specify on table below)

**[44] Special Features**  
 Add special feature description (characters 44...46) on page 14 if required.

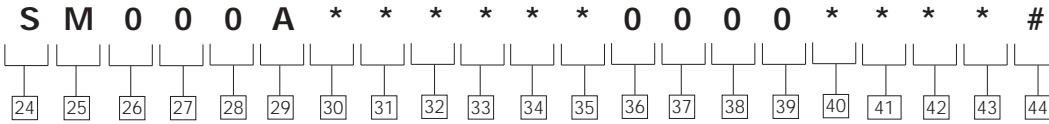
**\*CUSTOMER ADJUSTMENT SPECIFICATIONS**

	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments below set at ..	rpm	1500	-	
Pilot Pressure Size 250 & 360	bar	60	-	
Pilot Pressure Size 500 & 750	bar	80	-	
Mech. Stop Side A (used as max Adjustment Stop Side A)	L/min	Q <sub>max</sub>		
Mech. Stop Side B (used as min Adjustment Stop Side A)	L/min	Q <sub>min</sub>		
Pressure Override Side A	bar	90		

# Model Code

## Open Loop Pumps

"W" Series - SM Control



**24 25 Control Type**  
**SM** – Servo Adjustment Displacement Control - Mech. Feedback

**26 Displacement Adjustment Options**  
**0** – Not Applicable

**27 28 Electronic Controls**  
**00** – Not Required

**29 Yoke Displacement Zone**  
**A** – Single Side of Center "A"

**30 Extra Functions**  
**0** – Not Required  
**4** – Pressure Limiter Override Function  
**5** – Pressure Limiter & Power Control Override Function

**31 Pressure Control Options**  
**0** – Not Applicable  
**F** – Remote Port Only  
**K** – Electro Proportional Relief Valve - Incl. Electronic Card

**32 33 34 Power Control**  
**000** – Not Applicable  
**???** – KW at 1500 rpm

**35 Pilot Oil Filter**  
**0** – Not Applicable  
**V** – Filter with Visual Indicator  
**E** – Filter with Electrical Indicator

**36 Venting Valve**  
**0** – Not Applicable

**37 Position Monitoring**  
**0** – No Position Monitoring

**38 Electric Motor Type**  
**0** – No Electric Motor

**39 Control Voltage of Venting Valve**  
**0** – Not Applicable

**40 41 42 43 Customer Adjustment Specification**  
**0000** – None  
**????** – Yes (final number will be assigned by Eaton. Specify on table below)

**44 Special Features**  
 Add special feature description (characters 44...46) on page 14 if required.

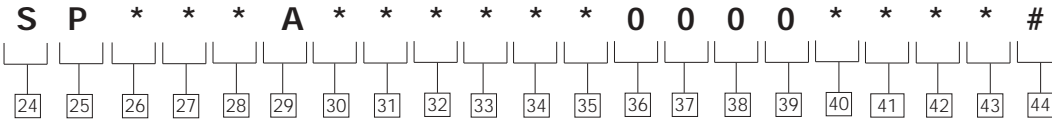
**\*CUSTOMER ADJUSTMENT SPECIFICATIONS**

	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)	L/min	Q <sub>max</sub>		
Mech. Stop Side B (used as min Adjustment Stop Side B)	L/min	Q <sub>miin</sub>		
Pressure Override Side A	bar	90		<95% not possible

# Model Code

Open Loop Pumps

"W" Series - SP Control



- 24 25 Control Type**  
**SP** – Proportional Valve Adjustment Displacement Control
- 
- 26 Displacement Adjustment Options**  
**C** – With CETOP 3 Prop Valve KDG4V 3  
**F** – With CETOP 5 Prop Valve
- 
- 27 28 Electronic Controls**  
**03** – ER 9.3 - 10 (CETOP 3)  
**04** – ER 9.4 - 10 (CETOP 5)
- 
- 29 Yoke Displacement Zone**  
**A** – Single Side of Center "A"

- 30 Extra Functions**  
**0** – Not Required  
**4** – Pressure Limiter Overriding Function  
**5** – Pressure Limiter and Power Control Overriding Function
- 
- 31 Pressure Control Options**  
**0** – Not Applicable  
**F** – Remote Port Only  
**K** – Electro Proportional Relief Valve - Including Electronic Card
- 
- 32 33 34 Power Control**  
**000** – Not Applicable  
**???** – KW at 1500 rpm

- 35 Pilot Oil Filter**  
**0** – Not Applicable  
**V** – Filter with Visual Indicator  
**E** – Filter with Electrical Indicator
- 
- 36 Venting Valve**  
**0** – Not Applicable
- 
- 37 Position Monitoring**  
**0** – No Position Monitoring
- 
- 38 Elec Motor Type**  
**0** – No Electric Motor
- 
- 39 Control Voltage of Venting Valve**  
**0** – Not Applicable

- 40 41 42 43 Customer Adjustment Specification**  
**0000** – None  
**????** – Yes (final number will be assigned by Eaton. Specify on table below)
- 
- 44 Special Features**  
 Add special feature description (characters 44...46) on page 14 if required.

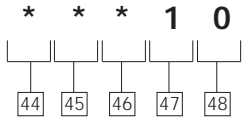
\*CUSTOMER ADJUSTMENT SPECIFICATIONS

	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)	L/min	Q <sub>max</sub>		
Mech. Stop Side B (used as min Adjustment Stop Side B)	L/min	Q <sub>miin</sub>		
Max. Stop by Control Side A	L/min	95% Q <sub>max</sub>	EI Card Adjustment done by customer	Refer to EI card Manual
Min. Stop by Control Side A	L/min	0+/-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

# Model Code

Open Circuit Pumps

"W" Series -  
Special Features



**44 45 46 Special Features**

**000** – None

**\*\*\*** – Defined by Eaton

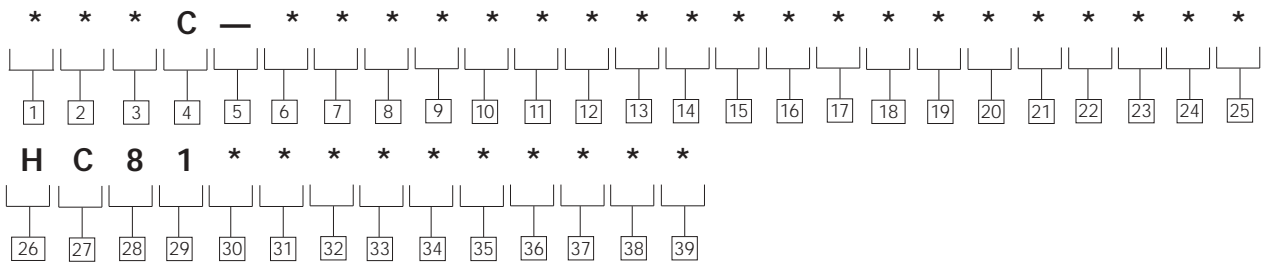
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**47 48 Design Number**

**10** – Design Number

# Model Code

## Combination Units



### 1 Combination Unit

- P – Pump
- T – Transmission Pump
- M – Motor

### 2 Displacement

- F – Filled
- V – Variable

### 3 Pump Series

- W – “W” Series  
(was 30 design)
- X – “X” Series  
(was 20 design)

### 4 Combination Unit

C

### 5 Separator

### 6 7 8 First

#### Displacement cm<sup>3</sup>/r

- 066 – 66 cm<sup>3</sup>/r [4.0 in<sup>3</sup>/rev]
- 090 – 90 cm<sup>3</sup>/r [5.5 in<sup>3</sup>/rev]
- 130 – 130 cm<sup>3</sup>/r [7.9 in<sup>3</sup>/rev]
- 180 – 180 cm<sup>3</sup>/r [11.0 in<sup>3</sup>/rev]
- 250 – 250 cm<sup>3</sup>/r [15.3 in<sup>3</sup>/rev]
- 360 – 360 cm<sup>3</sup>/r [22.0 in<sup>3</sup>/rev]
- 500 – 500 cm<sup>3</sup>/r [30.5 in<sup>3</sup>/rev]
- 750 – 750 cm<sup>3</sup>/r [45.8 in<sup>3</sup>/rev]

### 9 10 First Control Type

- 00 – No Control (for Fixed Displacement Only)
- DF – Pressure Compensator
- LR – Power Control
- ES – Electric Motor Control
- HG – Handwheel  
Displacement Control
- FE – Screw Adjustment  
Displacement Control
- SM – Servo Adjustment  
Displacement Control -  
Mech Feedback
- DP – Pressure Signal  
Displacement Control
- SP – Proportional Valve  
Displacement Control

### 11 12 13 Second

#### Displacement cm<sup>3</sup>/r

- 066 – 66 cm<sup>3</sup>/r [4.0 in<sup>3</sup>/rev]
- 090 – 90 cm<sup>3</sup>/r [5.5 in<sup>3</sup>/rev]
- 130 – 130 cm<sup>3</sup>/r [7.9 in<sup>3</sup>/rev]
- 180 – 180 cm<sup>3</sup>/r [11.0 in<sup>3</sup>/rev]
- 250 – 250 cm<sup>3</sup>/r [15.3 in<sup>3</sup>/rev]
- 360 – 360 cm<sup>3</sup>/r [22.0 in<sup>3</sup>/rev]
- 500 – 500 cm<sup>3</sup>/r [30.5 in<sup>3</sup>/rev]
- 750 – 750 cm<sup>3</sup>/r [45.8 in<sup>3</sup>/rev]

### 14 15 Second Control Type

- 00 – No Control (for Fixed Displacement Only)
- DF – Pressure Compensator
- LR – Power Control
- ES – Electric Motor Control
- HG – Handwheel  
Displacement Control
- FE – Screw Adjustment  
Displacement Control
- SM – Servo Adjustment  
Displacement Control -  
Mech Feedback
- DP – Pressure Signal  
Displacement Control
- SP – Proportional Valve  
Displacement Control

### 16 17 18 Third

#### Displacement cm<sup>3</sup>/r

- 000 – Not Required
- 066 – 66 cm<sup>3</sup>/r [4.0 in<sup>3</sup>/rev]
- 090 – 90 cm<sup>3</sup>/r [5.5 in<sup>3</sup>/rev]
- 130 – 130 cm<sup>3</sup>/r [7.9 in<sup>3</sup>/rev]
- 180 – 180 cm<sup>3</sup>/r [11.0 in<sup>3</sup>/rev]
- 250 – 250 cm<sup>3</sup>/r [15.3 in<sup>3</sup>/rev]
- 360 – 360 cm<sup>3</sup>/r [22.0 in<sup>3</sup>/rev]
- 500 – 500 cm<sup>3</sup>/r [30.5 in<sup>3</sup>/rev]
- 750 – 750 cm<sup>3</sup>/r [45.8 in<sup>3</sup>/rev]

### 19 20 Third Control Type

- 00 – No Control (for Fixed Displacement Only)
- DF – Pressure Compensator
- LR – Power Control
- ES – Electric Motor Control
- HG – Handwheel  
Displacement Control
- FE – Screw Adjustment  
Displacement Control
- SM – Servo Adjustment  
Displacement Control -  
Mech Feedback
- DP – Pressure Signal  
Displacement Control
- SP – Proportional Valve  
Displacement Control

### 21 22 23 Fourth Displacement cm<sup>3</sup>/r

- 000 – Not Required
- 066 – 66 cm<sup>3</sup>/r [4.0 in<sup>3</sup>/rev]
- 090 – 90 cm<sup>3</sup>/r [5.5 in<sup>3</sup>/rev]
- 130 – 130 cm<sup>3</sup>/r [7.9 in<sup>3</sup>/rev]
- 180 – 180 cm<sup>3</sup>/r [11.0 in<sup>3</sup>/rev]
- 250 – 250 cm<sup>3</sup>/r [15.3 in<sup>3</sup>/rev]
- 360 – 360 cm<sup>3</sup>/r [22.0 in<sup>3</sup>/rev]
- 500 – 500 cm<sup>3</sup>/r [30.5 in<sup>3</sup>/rev]
- 750 – 750 cm<sup>3</sup>/r [45.8 in<sup>3</sup>/rev]

- 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 Eaton 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.

### 24 25 Fourth Control Type

- 00 – No Control (for Fixed Displacement Only)
- DF – Pressure Compensator
- LR – Power Control
- ES – Electric Motor Control
- HG – Handwheel  
Displacement Control
- FE – Screw Adjustment  
Displacement Control
- SM – Servo Adjustment  
Displacement Control -  
Mech Feedback
- DP – Pressure Signal  
Displacement Control
- SP – Proportional Valve  
Displacement Control

### 26 27 28 29 Assembly Numbers

HC81 – Defined By Eaton

30 31 32 33 34 35 36 37 38 39

### Assembly Numbers

Defined By Eaton

# Model Code

Examples for  
Combination Units

## Example 1: Combination of two open loop pumps

Model Code Front Unit	PVWF-500M08R0001R02SVMASPC03A000000000000000010
Model Code Rear Unit	PVWR-250M07R0001R02SVMASPC03A000000000000000010
Model Code Combination Unit	PVWC-500SP250SP0000000000HC81*****

## Example 2: Combination of one closed loop - and two open loop pumps (For other product model codes refer to the according catalog)

Mode Code Front Unit	TVWF-500M08R0000H1R02SVMA20SPC03C00000000E000H000000010
Model Code Middle Unit	PVWM-250M07R0001R02SV0ADF000A000000000000000010
Model Code Rear Unit	PFXR-130M02R00P1A02SV0A00000A000000000000000010
Model Code Combination Unit	TVWC-500SP250DF1300000000HC81*****



# Pump Specifications - US

MODEL			PFW/PVW 250	PFW/PVW 360	PFW/PVW 500	PFW/PVW 750
Design			Swashplate - Axial piston pump			
Type of mounting			Flange or foot-mounted. Combination units foot mounted only			
Pipe connection SAE Flange	B A	psi	3 1/2" = 500 1 1/2" = 6000	3 1/2" = 500 1 1/2" = 6000	5" = 500 2" = 6000	5" = 500 2" = 6000
Direction of rotation			Clockwise when viewing shaft end of pump Counterclockwise available on request			
Speed range	$n_{min}$ $n_{max}$	rpm	150 1800	1500	1800	1200
Installation position			Optional, see mounting information			
Ambient temperature range	min max	°F	-4 122			
Weight	m	lb	467	485	750	871
Mass of inertia	J	lb ft <sup>2</sup>	3.46	3.61	11.9	13.1

## HYDRAULIC CHARACTERISTICS

Nominal pressure (100% duty cycle)	$p_N$	psi	5075			
Input pressure	$p_{1min}$ $p_{1max}$	psi psi	14,5 abs 725			
Max. pressure to DIN 24312	$p_{2max}$	psi	6090			
Hydraulic fluid			Hydraulic oil to DIN 51524 part 2. Refer to section Application Data-Fluid Recommendations			
Hydraulic fluid temperature range	min max	°F	-13 194			
Viscosity range for continuous operation	min max	cSt cSt	10 75			
Maximum permissible start viscosity	max	cSt	1000			
Cleanliness acc.	ISO 4406		18/15/13			
Maximum geometric Displacement n= 1500 rpm n= 1800 rpm	$V_g$	in <sup>3</sup>	15.2	22	30.5	45.7 (at 1200 rpm)
Maximum geometric Pump flow n= 1500 rpm n= 1800 rpm	$Q_g$	Usgpm	99 119	142 -	198 238	238 (at 1200 rpm) -
Case pressure	$p_{vmax}$	psi	max. 7.2psi over $p_1$ $p_{vmax} = 58$ psi abs.			
Pilot Pump	V	in <sup>3</sup>	0.5			
Pilot pressure	$p_{st}$	psi	870	870	1160	1160

## DRIVE

Maximum Driving torque - ( $p_{2max}$ , $\eta = 100\%$ )	M1 single	lb.ft	1232	1774	2463	3688
Maximum Power consumpt. - ( $p_{2max}$ , 1800 rpm, $\eta = 100\%$ )	P1 single	hp	422 (at 1800 rpm)	507 (at 1500 rpm)	845 (at 1800 rpm)	845 (at 1200 rpm)

## COMBINATION UNITS

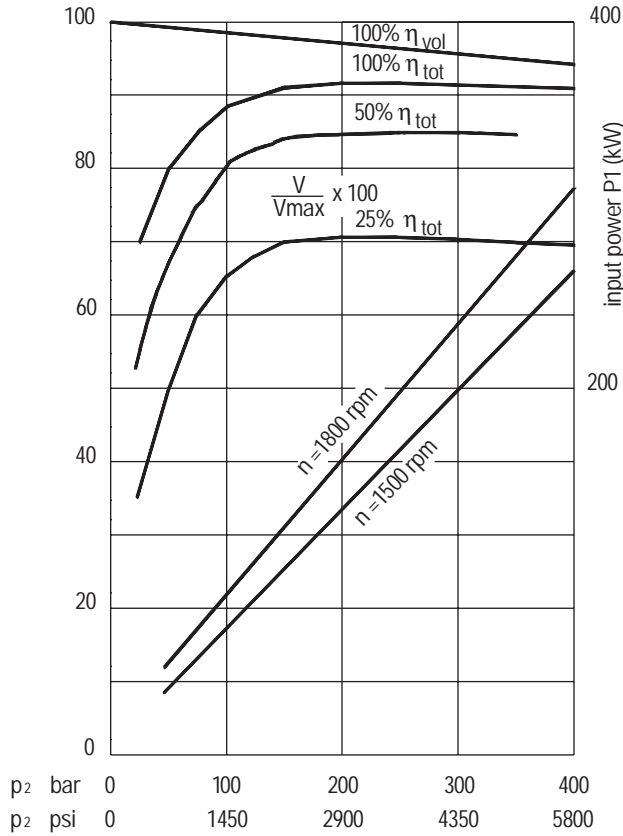
Maximum driving torque combination unit splined shaft only	M1	lb.ft	2x 1232	2x 1774	3688	3688
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# Pump Specifications - Metric

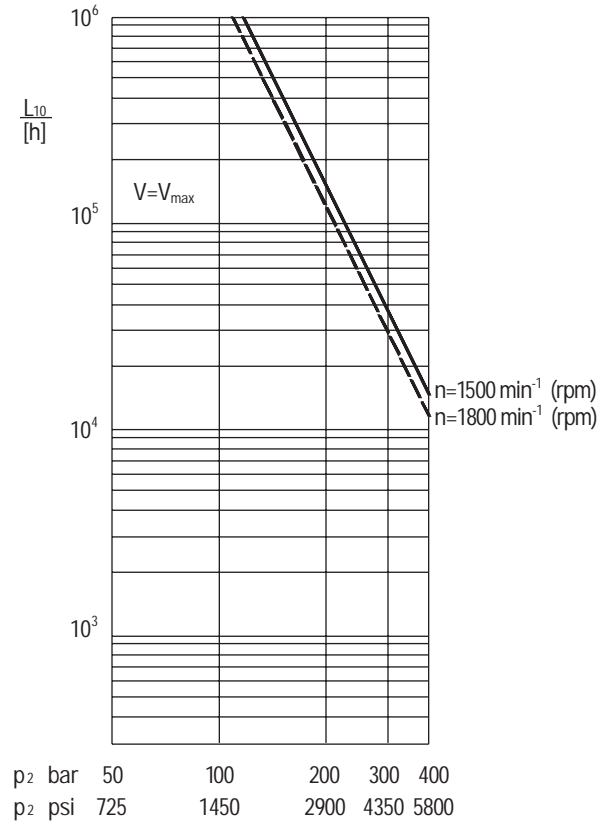
MODEL			PFW/PVW 250	PFW/PVW 360	PFW/PVW 500	PFW/PVW 750
Design			Swashplate - Axial piston pump			
Type of mounting			Flange or foot-mounted. Combination units foot mounted only			
Pipe connection SAE Flange	B A	psi	3 1/2" = 500 1 1/2" = 6000	3 1/2" = 500 1 1/2" = 6000	5" = 500 2" = 6000	5" = 500 2" = 6000
Direction of rotation			Clockwise when viewing shaft end of pump Counterclockwise available on request			
Speed range	$n_{min}$ $n_{max}$	min <sup>-1</sup>	150 1800	1500	1800	1200
Installation position			Optional, see mounting information			
Ambient temperature range	min max	°C	-20 +50			
Weight	m	kg	212	220	340	395
Mass of inertia	J	kg m <sup>2</sup>	0.146	0.152	0.5	0.55
<b>HYDRAULIC CHARACTERISTICS</b>						
Nominal pressure (100% duty cycle)	$p_N$	bar	350			
Input pressure	$p_{1min}$ $p_{1max}$	bar bar	1 abs 50			
Maximum pressure to DIN 24312	$p_{2max}$	bar	420			
Hydraulic fluid			Hydraulic oil to DIN 51524 part 2. Refer to section Application Data-Fluid Recommendations			
Hydraulic fluid temperature range	min max	°C	-25 90			
Viscosity range for continuous operation	min max	cSt cSt	10 75			
Max.perrmissible start viscosity	max	cSt	1000			
Cleanliness acc.	ISO 4406		18/15/13			
Maximum geometric Displacement	$n = 1500 \text{ min}^{-1}$ $n = 1800 \text{ min}^{-1}$	$V_g$	250 250	360 -	500 410	750 (at 1200 min <sup>-1</sup> ) -
Maximum geometric Pump flow	$n = 1500 \text{ min}^{-1}$ $n = 1800 \text{ min}^{-1}$	$Q_g$	375 375	540 -	750 738	900 (at 1200 min <sup>-1</sup> ) -
Case pressure	$p_{vmax}$	bar	max. 0.5 bar over $p_1$ , $p_{vmax} = 4 \text{ bar abs.}$			
Pilot Pump	V	cm <sup>3</sup>	8			
Pilot pressure	$p_{St}$	bar	60	60	80	80
<b>DRIVE</b>						
Maximum Driving torque - ( $p_{2max}$ , $\eta = 100\%$ )	M1 single	Nm	1670	2405	3340	5000
Max.Power consumpt. - ( $p_{2max}$ , $\eta = 100\%$ )	P1 single	kW	315 (at 1800 min <sup>-1</sup> )	378 (at 1500 min <sup>-1</sup> )	630 (at 1800 min <sup>-1</sup> )	630 (at 1200 min <sup>-1</sup> )
<b>COMBINATION UNITS</b>						
Maximum driving torque combination unit splined shaft only	M1	Nm	2x1670	2x 2405	5000	5000

# Performance Curves - 250 Series

**Power efficiency performance curve**



**Roller bearing life**



**Combination units**

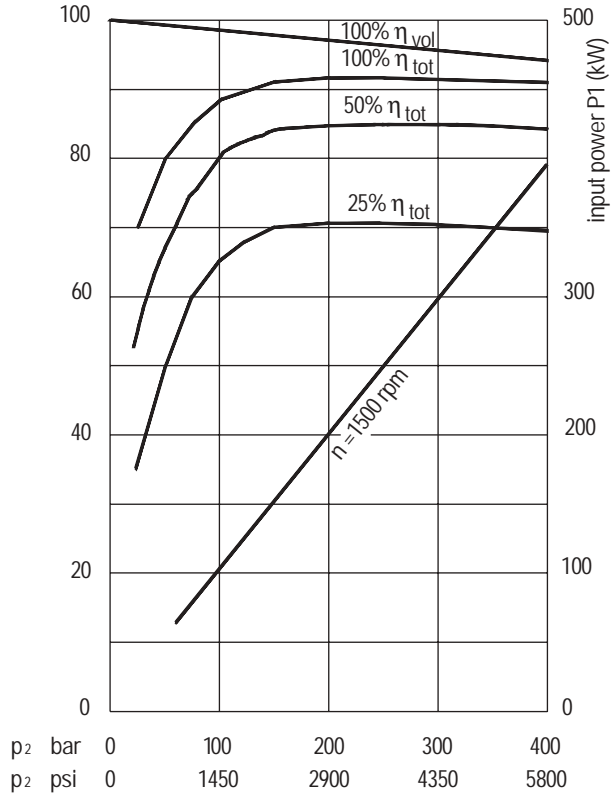
For combination pumps the characteristic values are as for the individual units.

**For reduced swash-angle:**

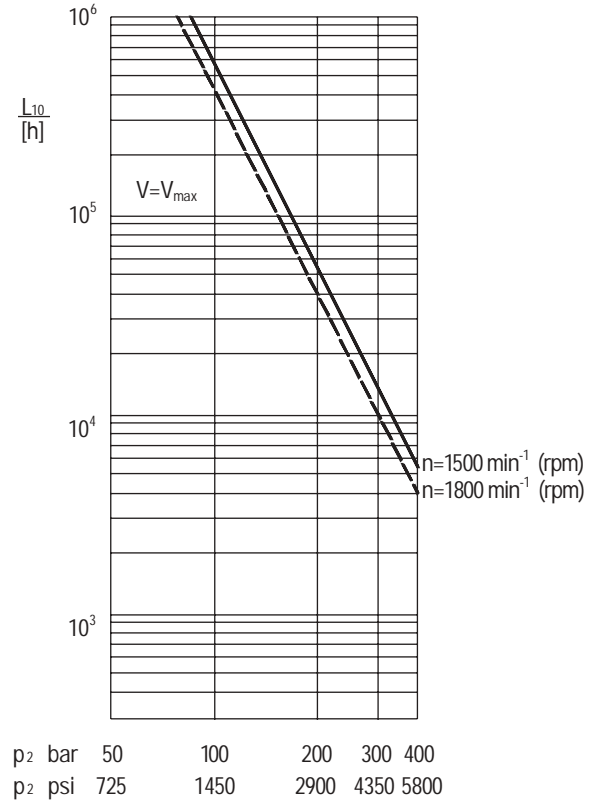
$$L_h = (L \text{ at } V_{max}) \times \frac{1}{\left(\frac{V}{V_{max}}\right)^{\frac{10}{3}}}$$

# Performance Curves - 360 Series

**Power efficiency  
performance curve**



**Roller bearing life**



**Combination units**

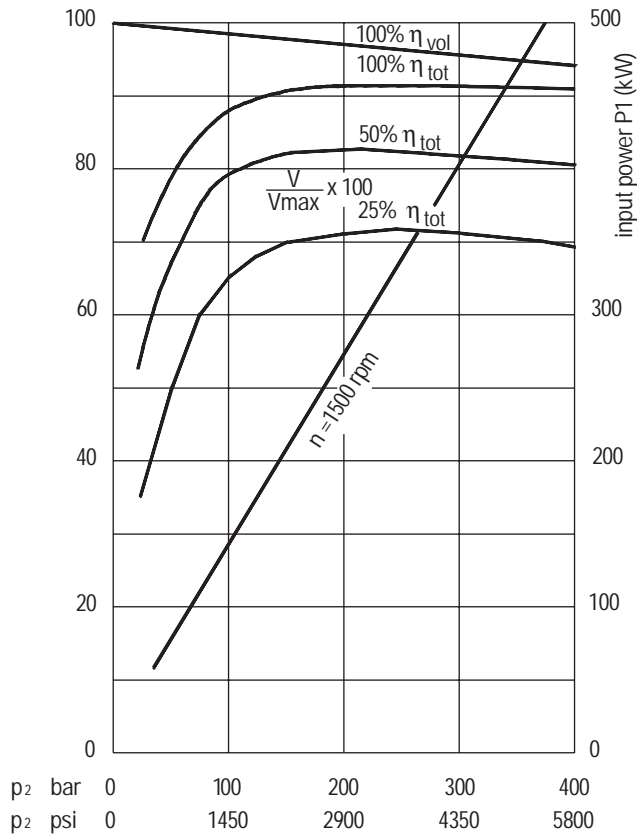
For combination pumps the characteristic values are as for the individual units.

**For reduced swash-angle:**

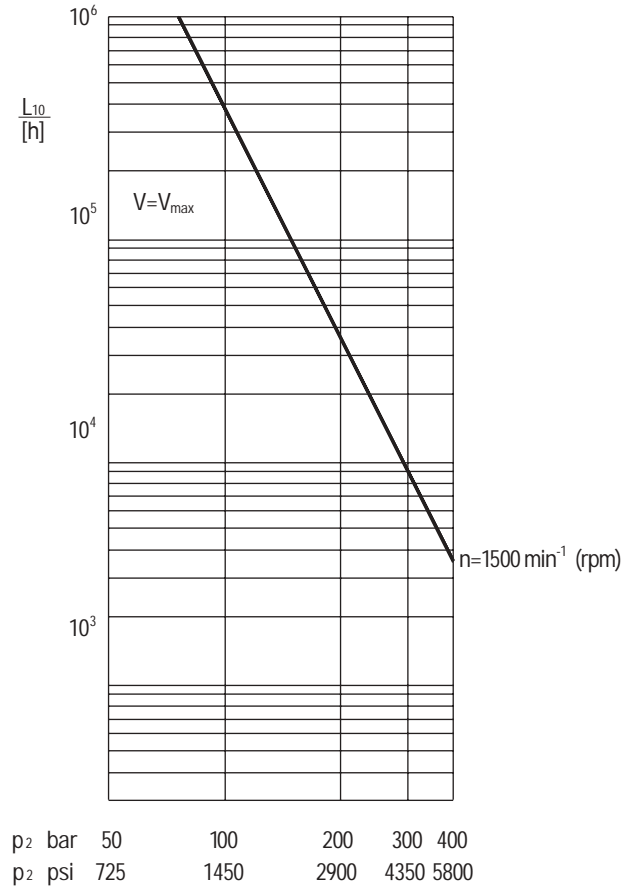
$$L_h = (L \text{ at } V_{max}) \times \frac{1}{\left(\frac{V}{V_{max}}\right)^{\frac{10}{3}}}$$

# Performance Curves - 500 Series

**Power efficiency performance curve**



**Roller bearing life**



**Combination units**

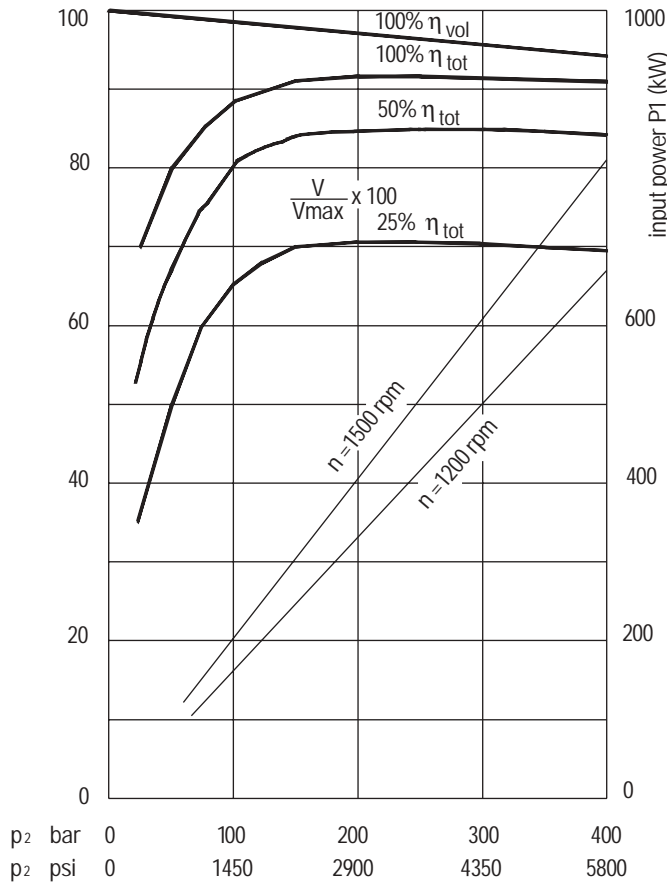
For combination pumps the characteristic values are as for the individual units.

**For reduced swash-angle:**

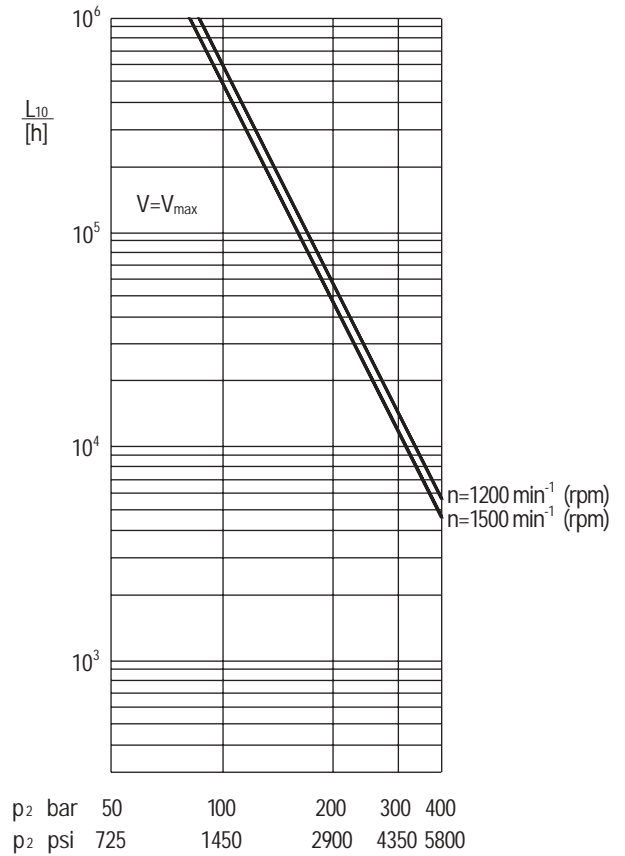
$$L_h = (L \text{ at } V_{max}) \times \frac{1}{\left(\frac{V}{V_{max}}\right)^{\frac{10}{3}}}$$

# Performance Curves - 750 Series

**Power efficiency performance curve**



**Roller bearing life**



**Combination units**

For combination pumps the characteristic values are as for the individual units.

**For reduced swash-angle:**

$$L_h = (L \text{ at } V_{max}) \times \frac{1}{\left(\frac{V}{V_{max}}\right)^{\frac{10}{3}}}$$

# Electric Motor Displacement Control ES

Open Loop Pumps

"W" Series

This unit is used for flow adjustment. It has a three phase electric servo motor, worm gearing and a switch box with 4 or (optional) 8 limit switches for different positions. A potentiometer for stepless adjustment

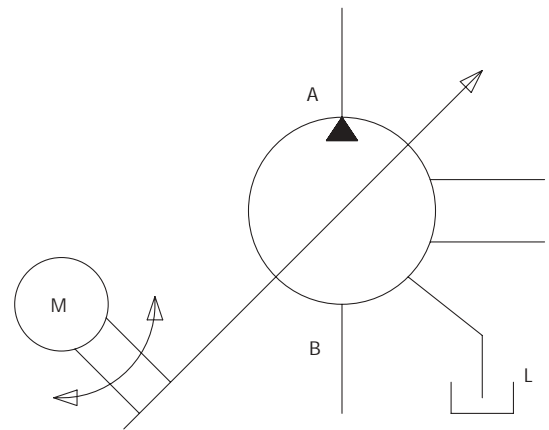
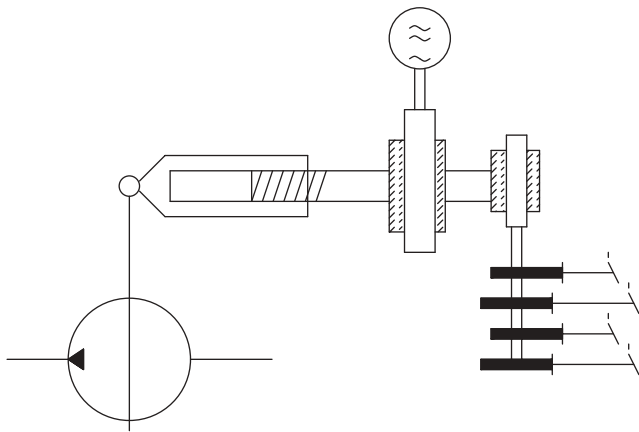
and/or position monitoring is also available.

The response times from zero to maximum depends on the chosen ratio and the (fixed) speed of the servo motor (this means

that once the control is defined and built the response time are not variable during operation.)

Explosion Protection versions are also available.

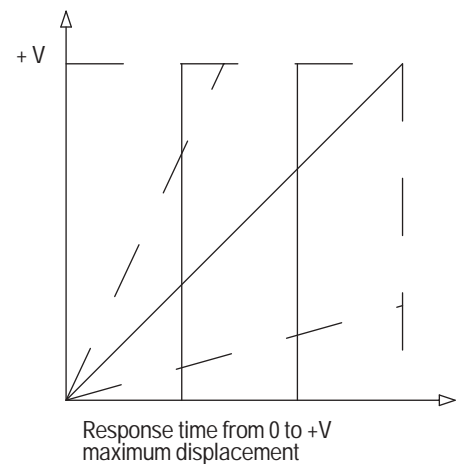
**No Pressure/Power Limiter possible!**



Theoretical Response Time (sec) for Maximum Displacement

SIZE	250		360		500		750	
Frequency	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Fast	8	7	11	9	10	8	14	12
Medium	20	17	27	23	24	20	35	29
Slow	40	33	55	46	48	40	70	58

Response time from 0 to +Qmax



# DF, LR Displacement Controls

Open Loop Pumps

"W" Series

Energy saving hydraulic drives are possible with pressure compensated and/or power controlled pumps, especially in combination with the load-sensing option.

**DF** The system pressure remains constant for the entire volume flow rate. System pressure can be set either manually, hydraulically or electronically. The standard Hydrokraft pressure compensator is pilot

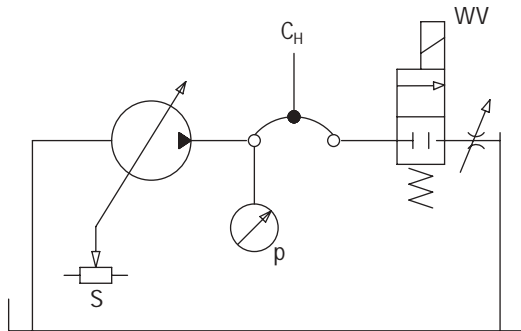
operated, has a remote port and is very stable.

**LR** The p/Q characteristic curve is a hyperbola. For constant speed, the drive torque, i.e. the power used, is held constant. The power hyperbola can be continuously adjusted between Pmin and Pmax. Pmin is given by the minimum set value of control's main stage (app. 20 bar) and power loss of the pump.

Both controllers can be combined with another or with additional options, for possible variations, see the model coding and circuit diagrams. The maximum flow of the pump can be limited mechanically to between 50% and 100% by screw. As an additional option the maximum (or minimum) flow can also be limited by a spacer inside the control cylinder (position no.13 in model coding, options

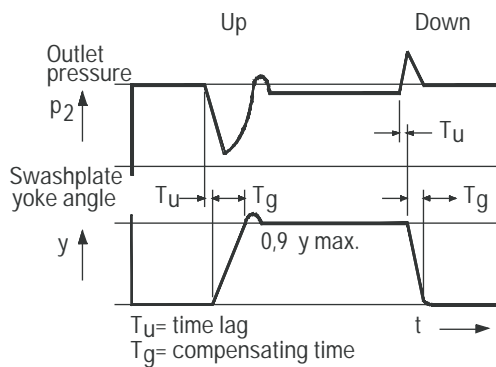
4, 5 or 6 in combination with customer adjustment speculation position 40-43 for the set values).

This solution is also recommended for very rough operating conditions and the need of a very exact repeatability over a long time period. The setting must be defined before ordering and cannot be modified during operation.

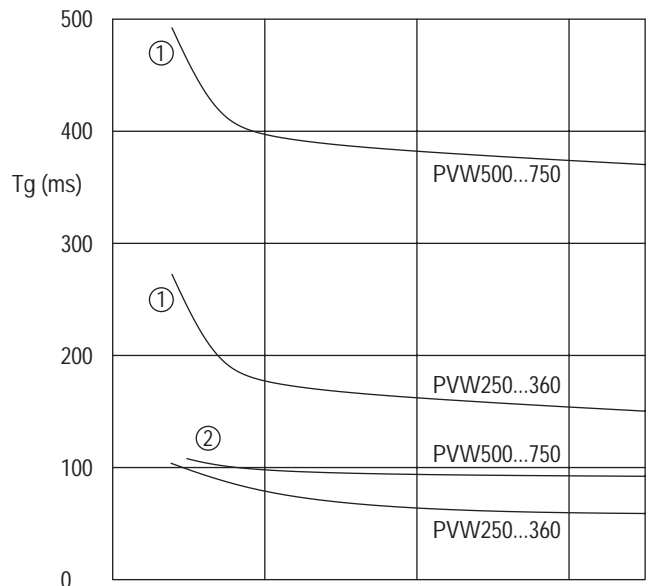


Typical controller action: (Closing/opening the directional control valve WV)

CH - 50mm ID x 2 meters



- (1) On stroke control time  $T_g$  (0 → 0.9 y max.)
- (2) Off stroke control time  $T_g$  (0.9 y max. → 0)





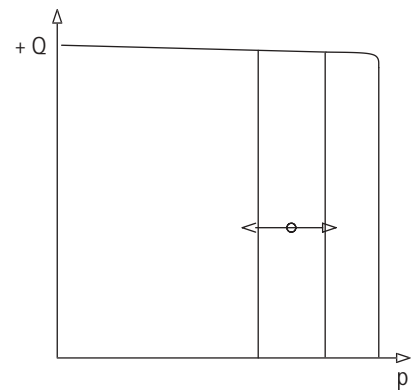
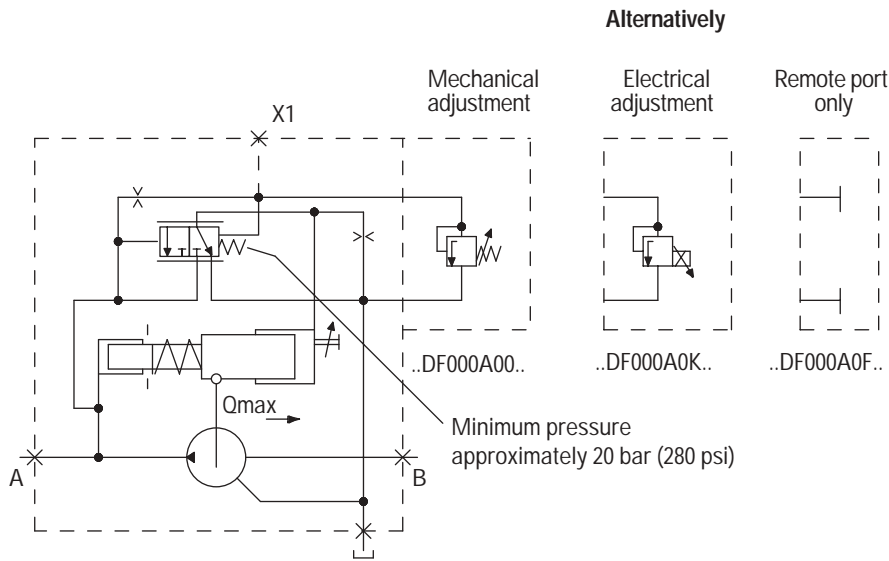
# DF, LR Controls

## Open Loop Pumps

"W" Series

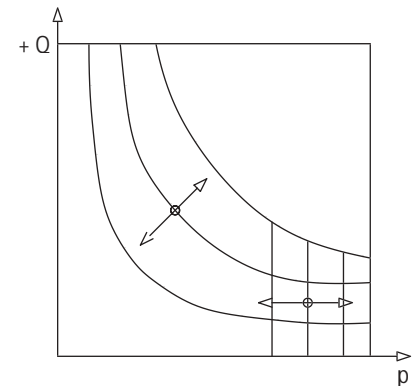
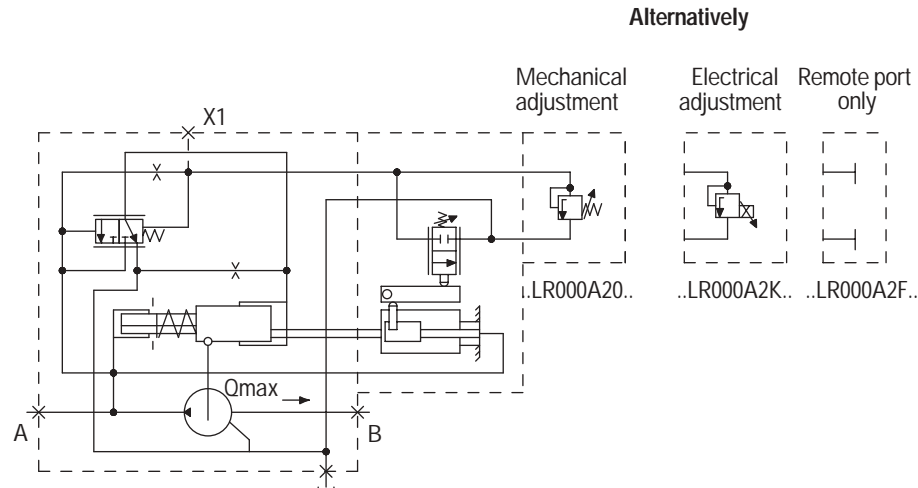
### DF Pressure Compensator DF000A...

Control valve adjustable mechanically, electrically or remote port only



### LR Power Control with overriding pressure limiter LR000A2...

Pressure control pilot valve adjustable mechanically, electrically or remote port only



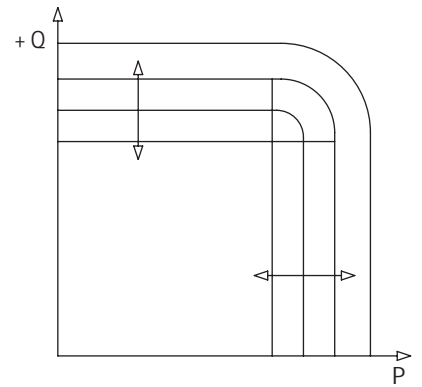
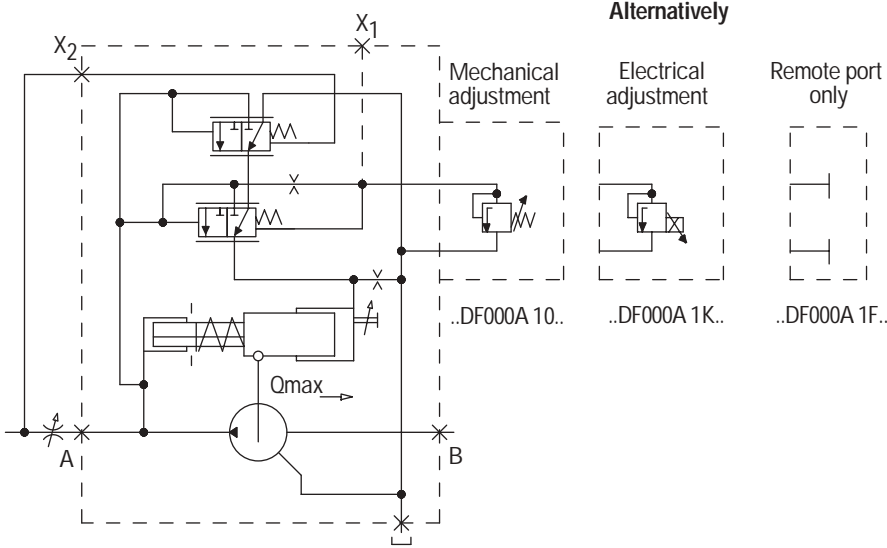
# DF, LR Controls

Open Loop Pumps

"W" Series

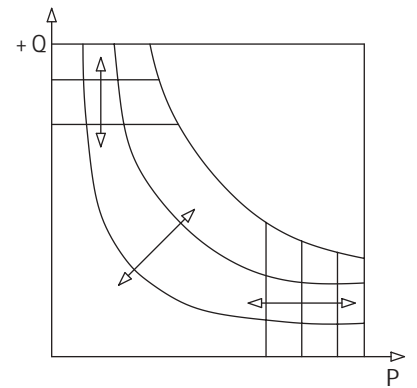
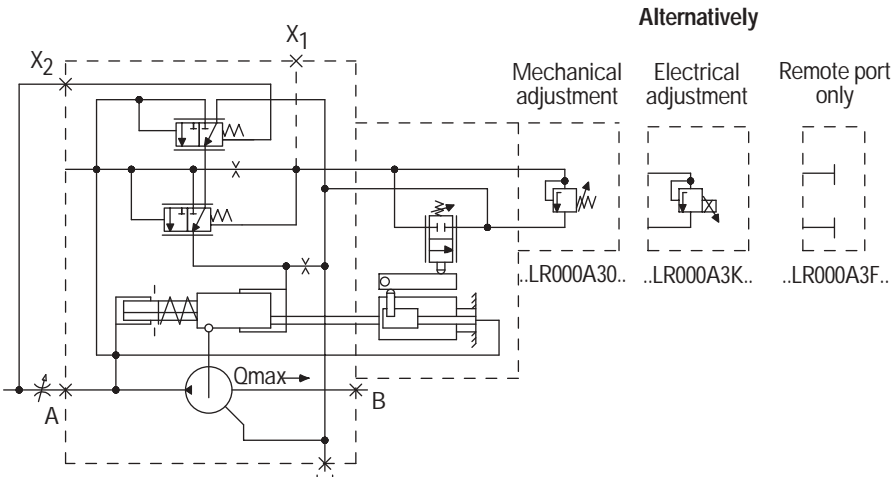
**DF Pressure Compensator**  
with load sensing

**DF000A1...**  
Control valve adjustable  
mechanically, electrically or  
remote port only



**LR Power Control**  
with load sensing and  
pressure limiter

**LR000A3...**  
Pressure control pilot valve  
adjustable mechanically,  
electrically or remote port only



# Pressure Signal Displacement Control DP

Open Loop Pumps

"W" Series

The output flow of the pump is proportional to the pilot pressure.

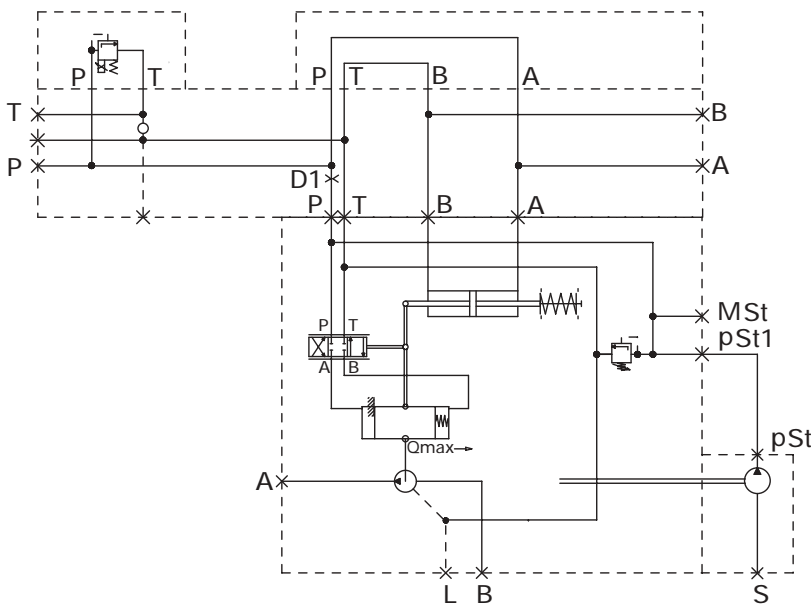
A separate pilot oil circuit is necessary. From this, the control pressure is reduced to the desired set value by means of a suitable pressure control valve (with P-T line) and throttle in P line 0.8 Ø (0.03 in).

The DP control can be used for steepless flow control with standard requirements for dynamic and precision control. No feedback signal is needed, an optical indicator is recommended (position 22 in model coding, option "V").

A pilot oil filter can be mounted in-line between pump and control (pos. 35 in model coding, option "V" or "E").

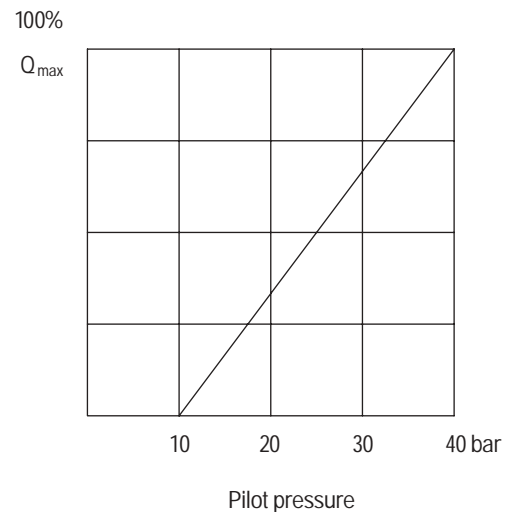
The maximum flow of the pump can be limited mechanically to between 50% and 100% by a screw. As an additional option, the maximum (and/or minimum) flow can be limited by a spacer inside the control cylinder (position no. 13 in model coding, options 4, 5 or 6 in combination with cust. adj. spec. pos. 40-43 for the set values).

This solution is also recommended for very rough operating conditions and the need of a very exact repeatability over a long time period. The setting must be defined before ordering and cannot be modified during operation.



The output flow of the pump is proportional to the pilot pressure.

SIZE	RESPONSE TIME (SEC) 12 L/MIN PILOT OIL FLOW	PILOT PRESSURE P <sub>St</sub> BAR
250/360	1.0	60
500/750	2.2	80



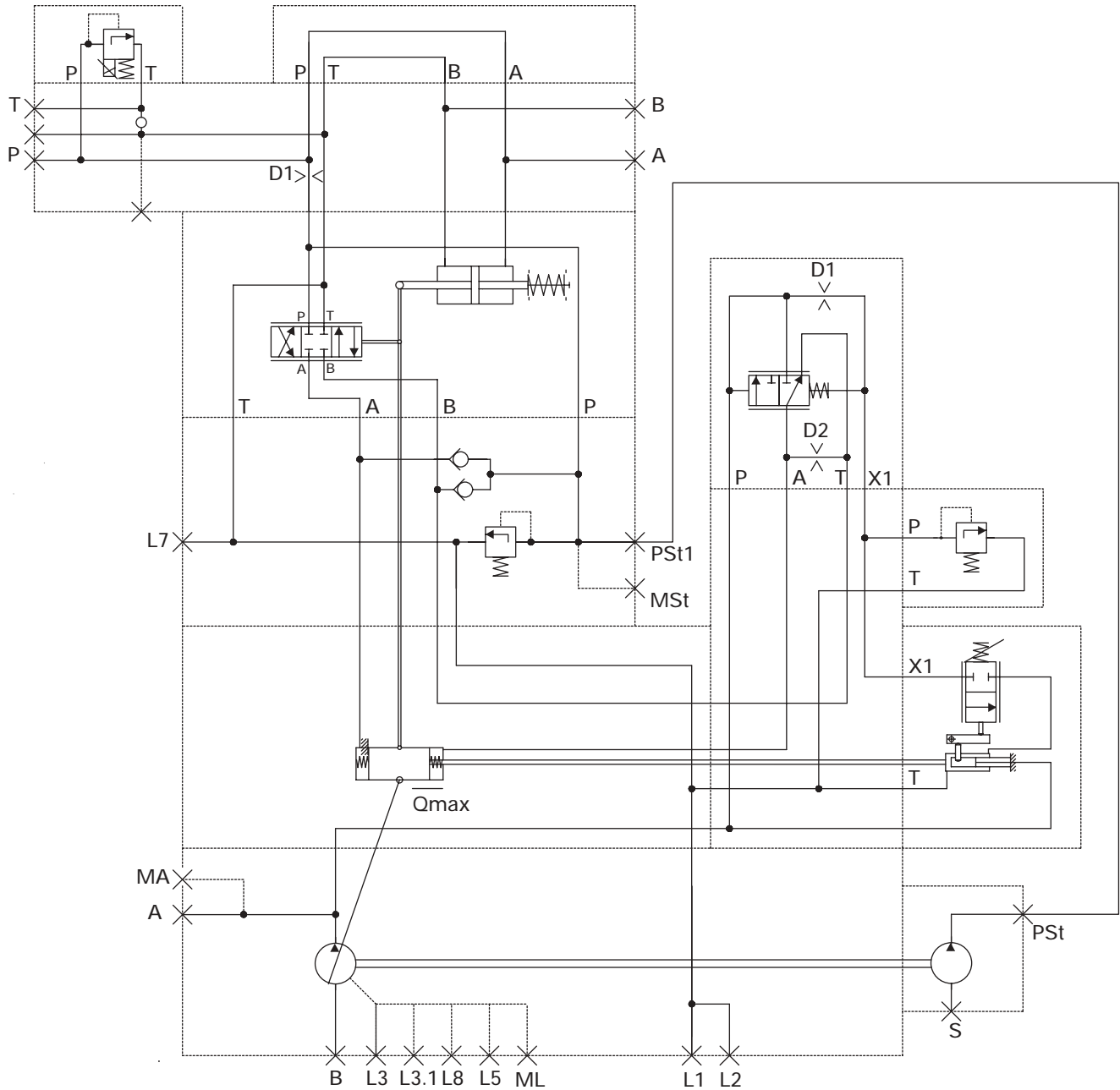
# Example for PVW... DP Control with pressure & power limiter

Open Loop Pumps

"W" Series

DP Control with pressure  
limiter and power  
control overriding function

example shown:  
**DPJ00A5...**



Note: A setting of the pressure limiter and/or power control  
lower than the pilot pressure Pst is not possible!

# Proportional Valve Displacement Control SP

Open Loop Pumps

"W" Series

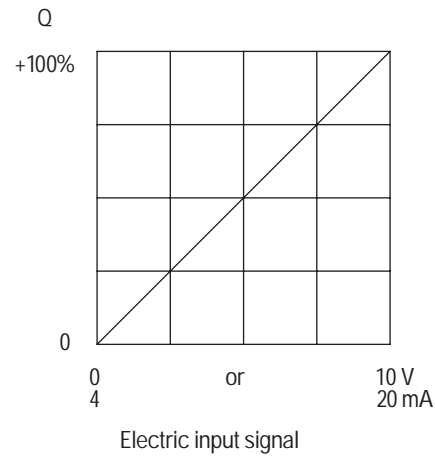
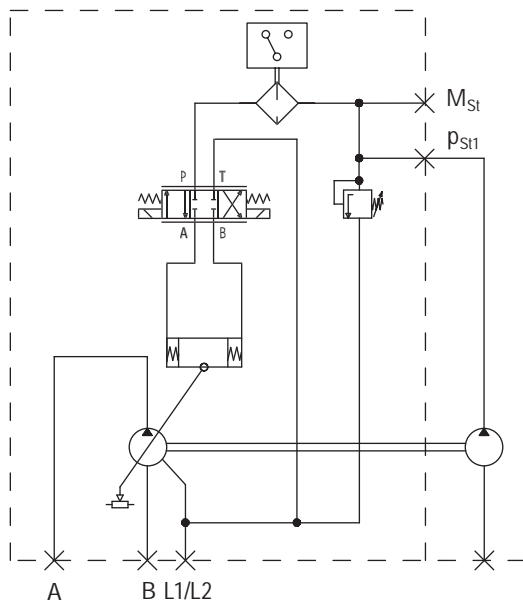
The electrohydraulic displacement control operates a hydrostatic drive and works without throttle losses within electrically adjustable limits. This is done by controlling delivery flow with electrical swash plate angle feedback (electrical closed-loop control). All control values are recorded as an electrical signal and lead back to the control card. The proportional valve and servo piston

transform the output signal of the control card to the desired setting. This results in a very precise and dynamic control.

Hysteresis, consistency: approximately 1% of end value. The SP control can also be combined with hydro-mechanical relief valves for pressure and/or power. Electrical solution for pressure and power override control is in preparation.

The maximum flow of the pump can be limited mechanically to between 50 and 100% by a screw. As an additional option the maximum (and/or minimum) flow can be limited by a spacer inside the control cylinder (position no. 14 in model coding, options 4, 5 or 6 in combination with customer adjustment speculation position 40-43 for the set values). This solution is also recommended for

very rough operating conditions and the need of a very exact repeatability over a long time period. The setting must be defined before ordering and cannot be modified during operation.



## Response Times - Electronic Control Cards

PROPORTIONAL VALVE	PILOT OIL FLOW	CONTROL PRESSURE PST	CONTROL ELECTRONICS	RESPONSE TIME	UNIT SIZE	SERVO PISTON DIAMETER	STROKE	VOLUME
	L/min (USgpm)	bar (psi)	(Amp.card)[ms]	0 < > Vmax (ms)	cm <sup>2</sup> (in <sup>2</sup> )	mm (in)	mm (in)	cm <sup>3</sup> (in <sup>3</sup> ) per chamber
Medium response KDG4V3* (CETOP 3)	12 (3.17)	60 (857)	ER 9.3-10	500	250 (15.2)	75 (2.95)	18 (.71)	79 (4.82)
		60 (857)		700	360 (21.9)	75 (2.95)	25 (.98)	110 (6.71)
		80 (1142)		650	500 (30.5)	75 (2.95)	22 (.87)	97 (5.92)
		80 (1142)		850	750 (45.8)	75 (2.95)	30 (1.18)	132 (8.06)
High response (CETOP 5)				ON REQUEST				

\*KDG4V3-2C20NMUH760

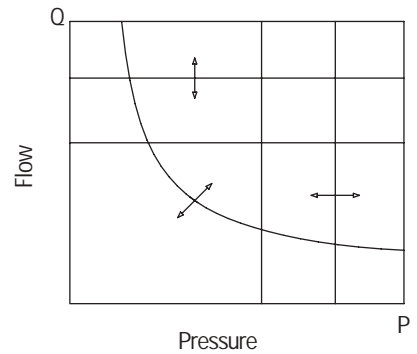
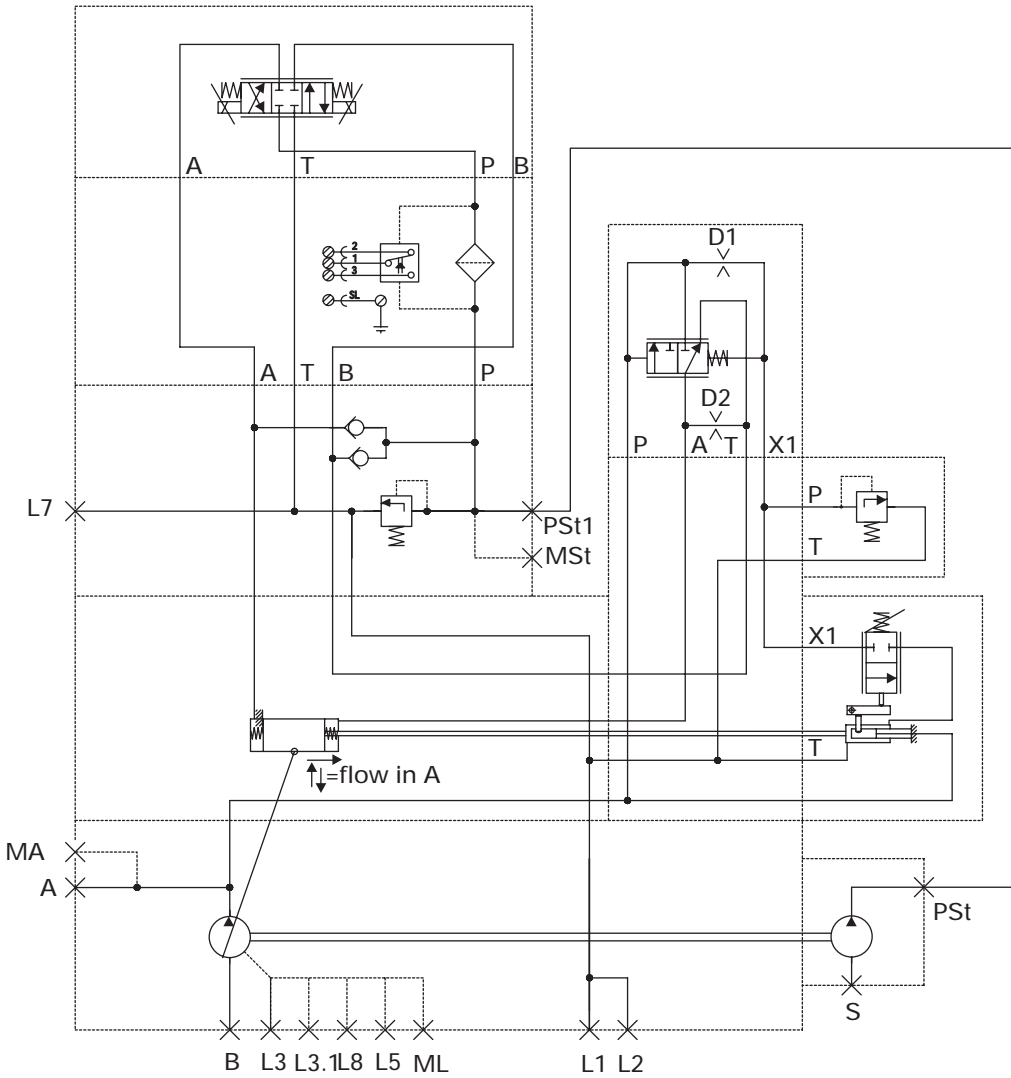
# Electrohydraulic Servo Adjustment "SP"

Open Loop Pumps

"W" Series

SP control with pressure limiter and power control overriding function.

example shown: **SPC03A50...E...**



Note: A setting of the pressure limiter and/or power control lower than the pilot pressure Pst is not possible!

# Servo Adjustment Displacement Control with Mechanical Feedback SM

Open Loop Pumps

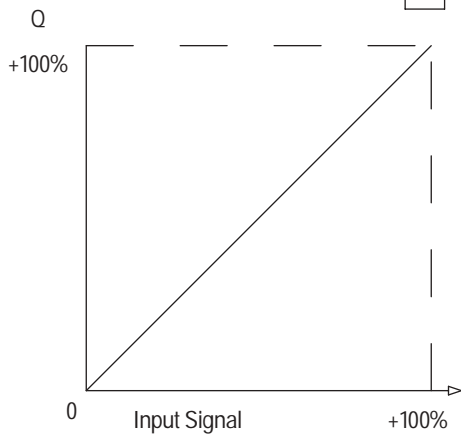
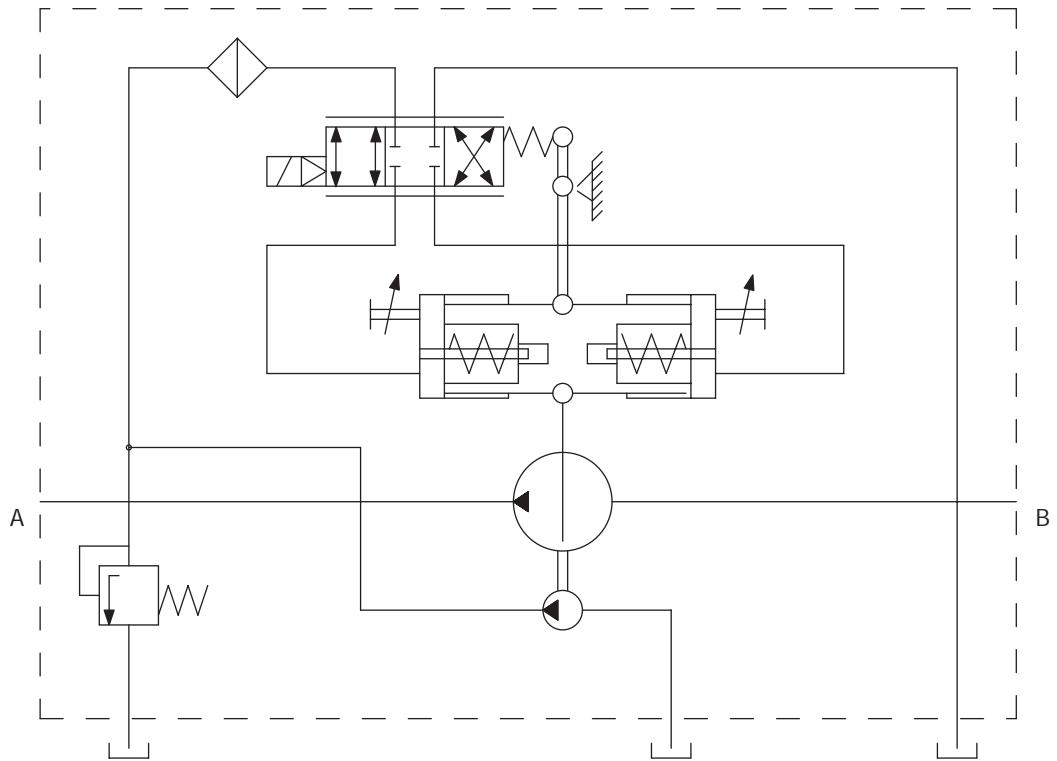
"W" Series

The Servo displacement control SM operates a hydrostatic drive and works without throttle losses within electrically adjustable limits. This is done by controlling delivery flow with mechanical

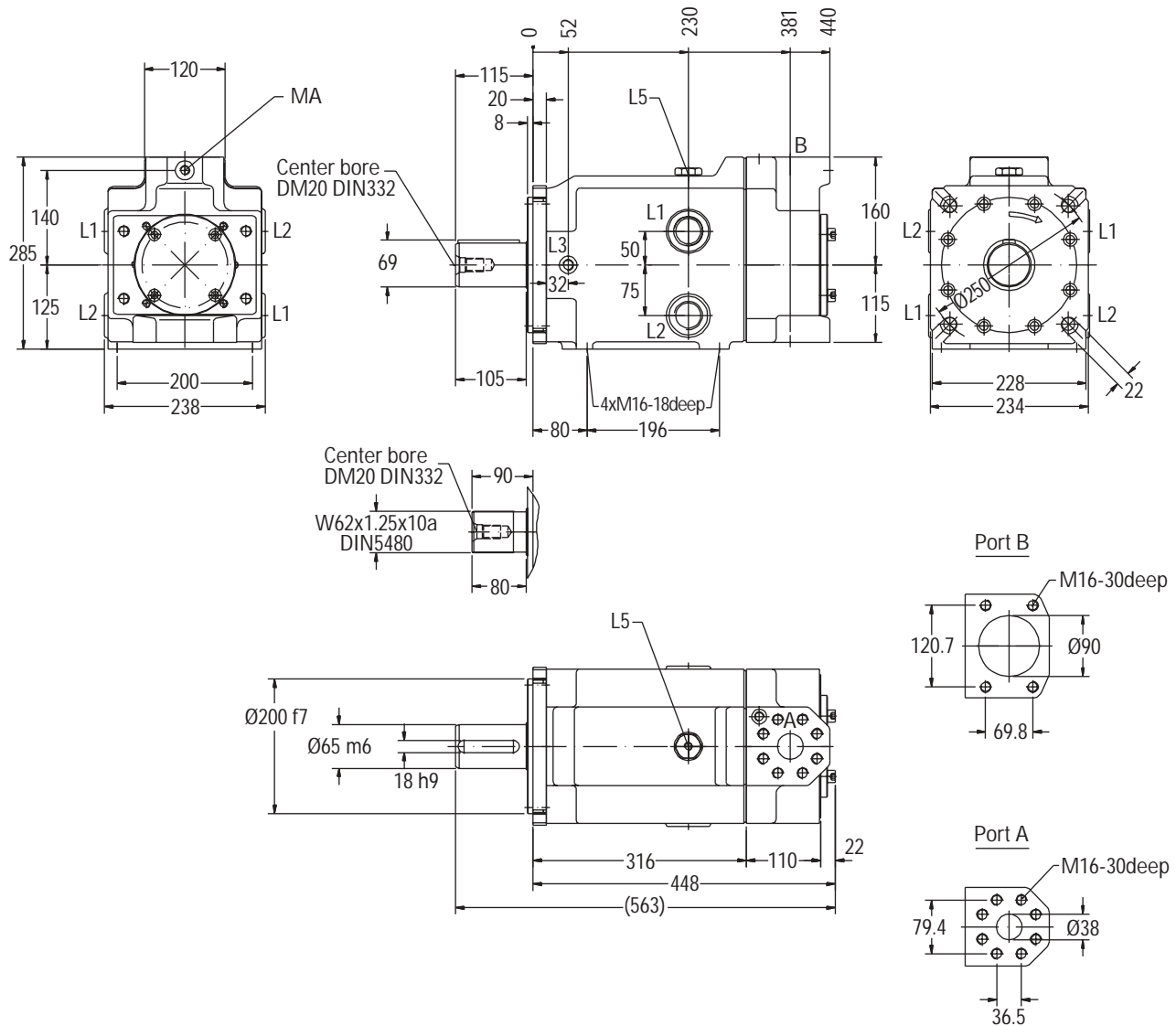
swashplate angle feedback (mechanical closed-loop-control). No electronic control card is necessary. The proportional valve and servo piston transform the input signal to the valve to the desired

setting. Input signal for Servo-valve is 0-100 mA. The dynamic is similar to the SP control. Hysteresis, consistency: maximum 8% of end value. The SM control can also be combined with hydro-mechanical

relief valves for pressure and/or power. Also available in explosion proof class version for hazardous duty.



# Pump Dimensions PFWS - 250

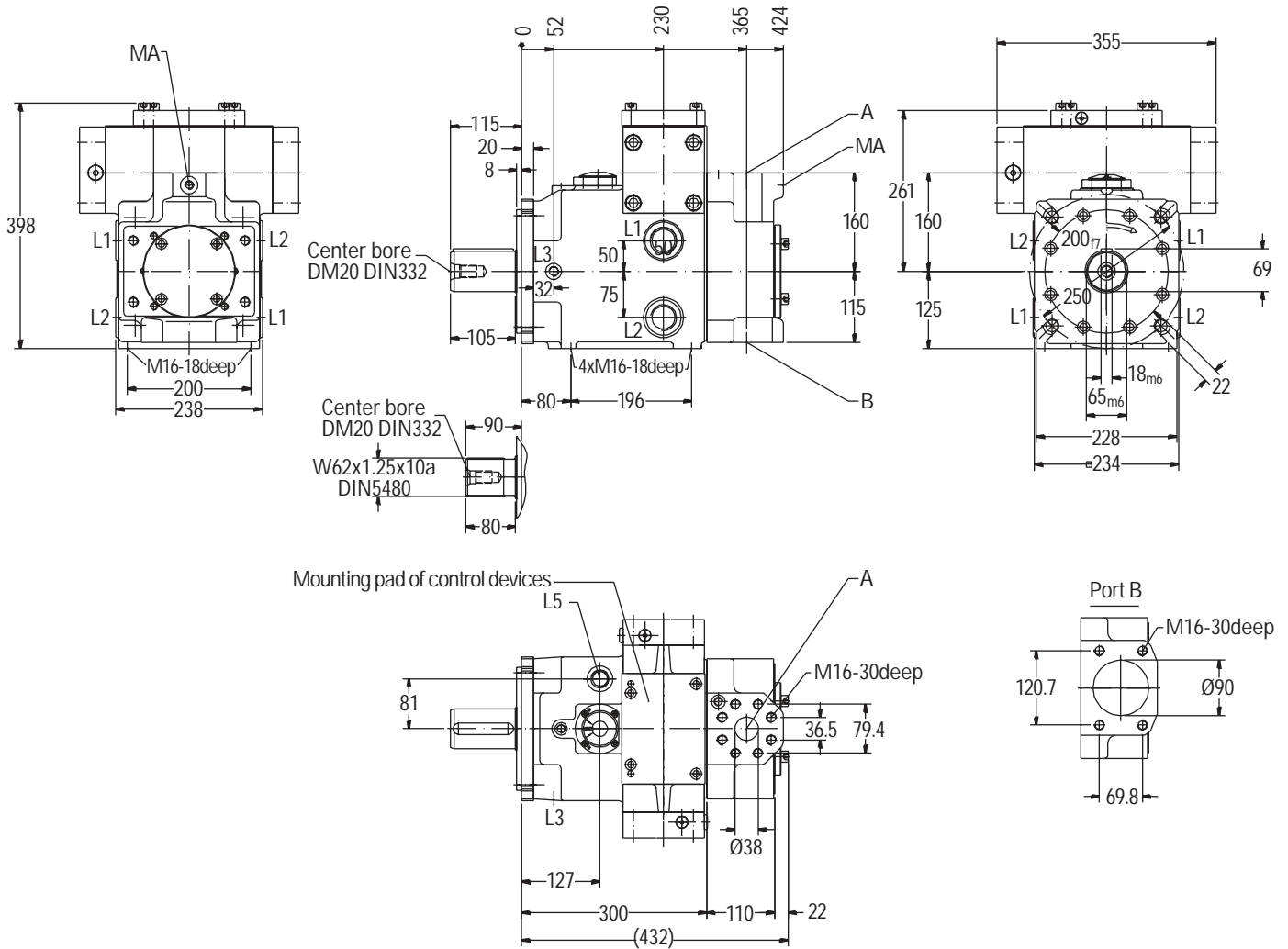


CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT	Non-Standard Displacements:	
				STANDARD DISPLACEMENT	REDUCED DISPLACEMENT
to + Vmax	Right hand	B	A	250 ccm/rev	Available 220 or 200 ccm/rev

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(...)	Normally plugged
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L5)	Oil fill plug	(MA)	Gauge port system pressure G 1/4"



# Pump Dimensions PVWS - 250 Side Ports



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

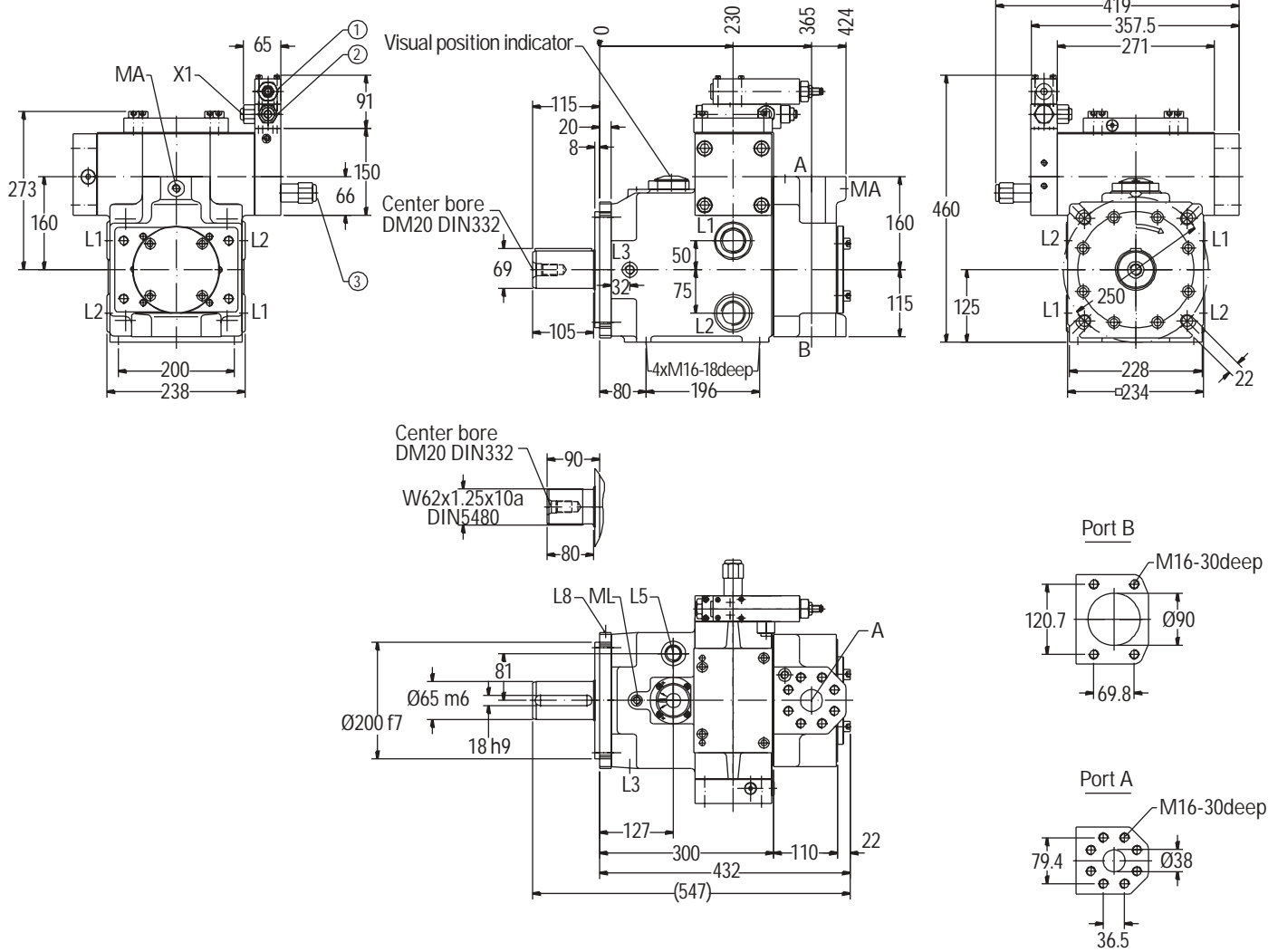
A	System pressure port SAE 1 1/2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(...)	Normally plugged
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L5)	Oil fill plug	(MA)	Gauge port system pressure G 1/4"

# Pump Dimensions - PVWS - 250

DF, 2 stage pilot valve

- 1 Pilot valve (2nd stage)
- 2 Pressure compensator (1st stage)
- 3 Max flow adjustment

**X1** Remote port pressure limiter  
**DF000A ...**



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

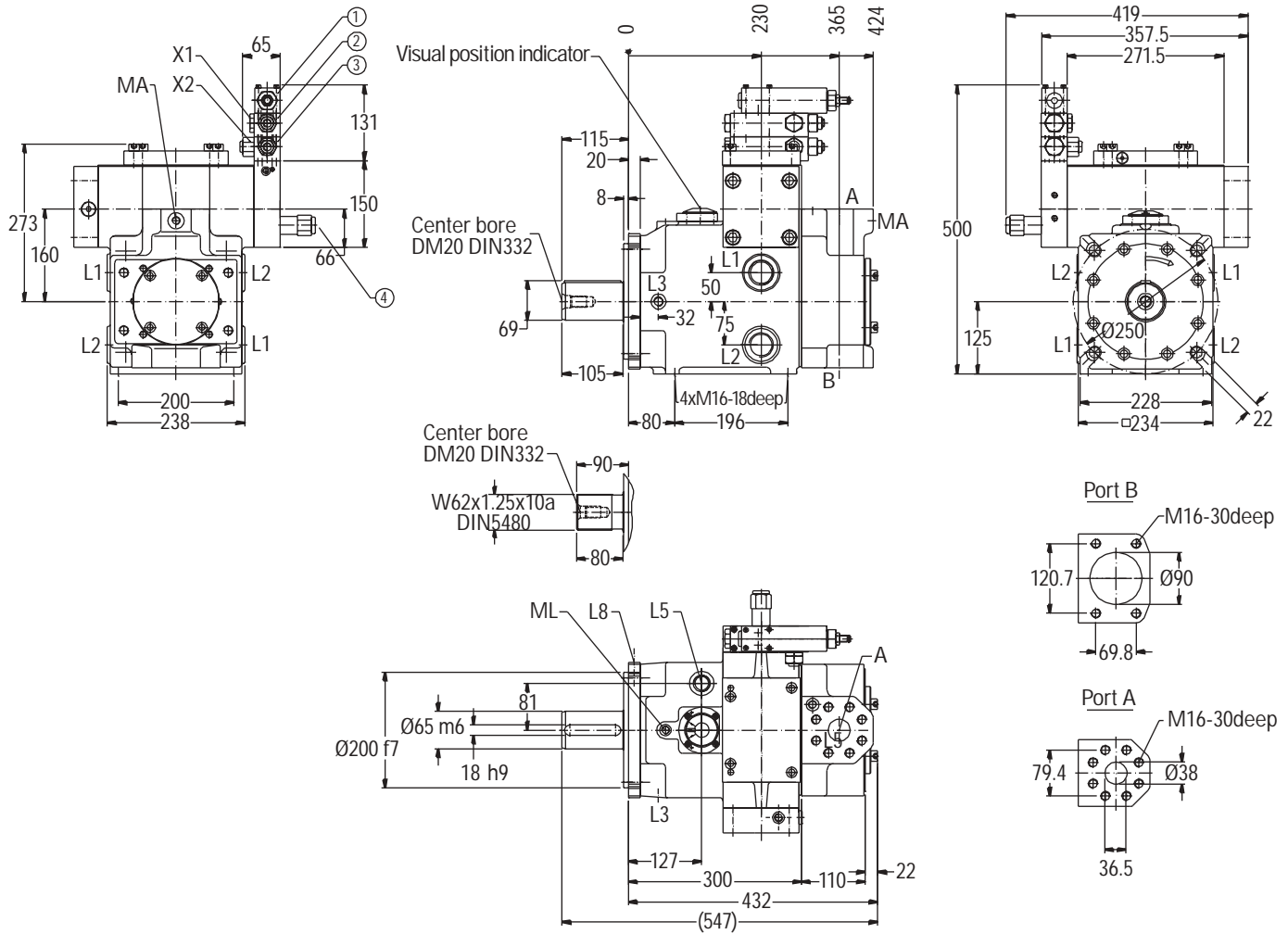
A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8) Air bleed port G 1/4" (MA) Gauge port system pressure G 1/4"	(X1) Gauge port of case pressure G 1/4"	Gauge port G 1/4" x 12.5 deep
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(MA) Gauge port system pressure G 1/4"	(...)	Normally plugged
(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(ML)		

# Pump Dimensions - PVWS - 250

DF, with load sensing valve

- 1 Pilot valve (2nd stage)
- 2 Pilot compensator (1st stage)
- 3 Load sensing valve
- 4 Max flow adjustment

- X1 Remote port pressure limiter
- X2 Load sense port
- DF000A1 ...



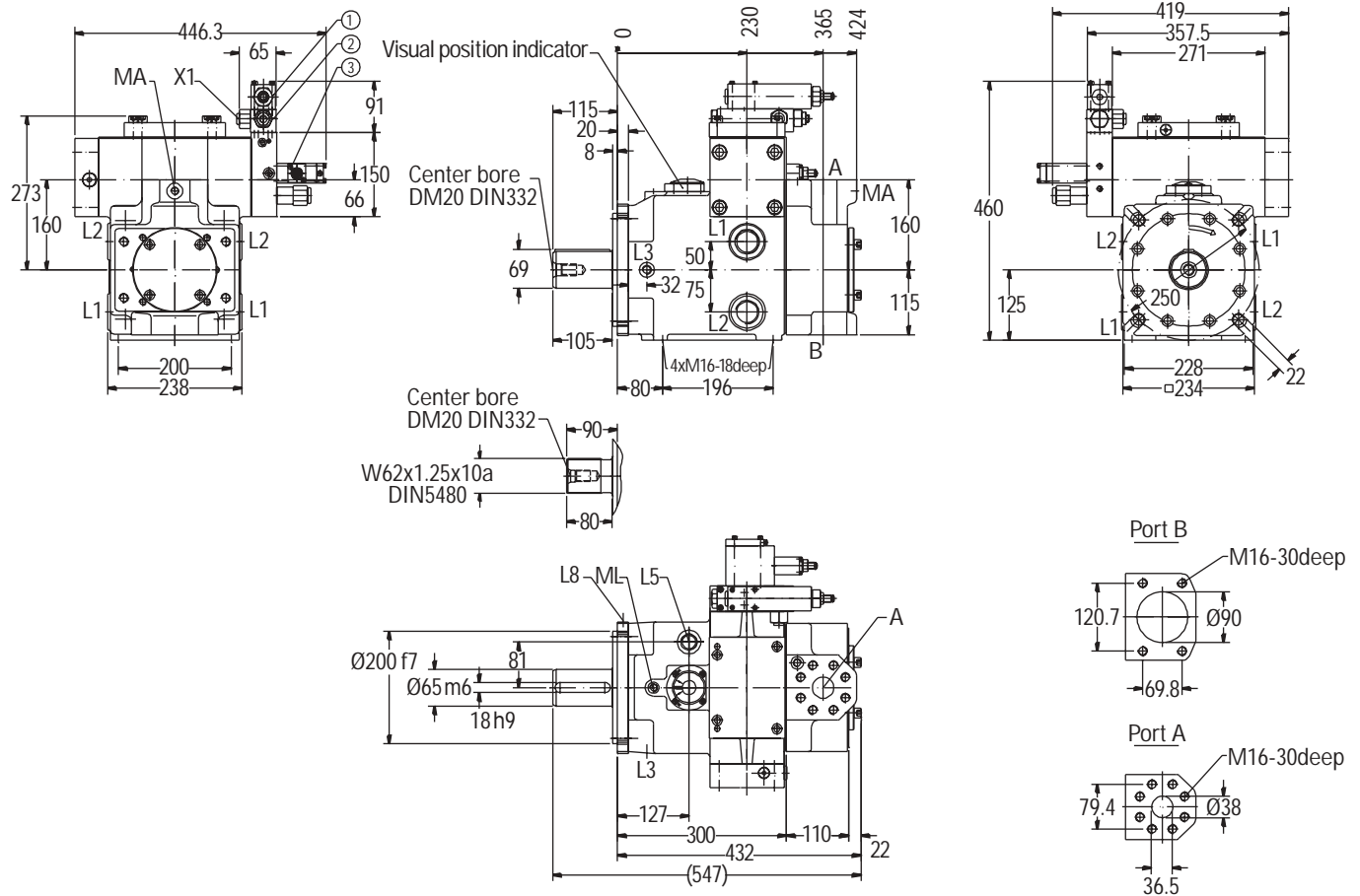
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8) Air bleed port G 1/4" (MA) Gauge port system pressure G 1/4" (...)	X2 Gauge port G 1/4" x 12.5 deep
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML) Gauge port of case pressure G 1/4"	(...) Normally plugged
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(X1) Gauge port G 1/4" x 12.5 deep	

# Pump Dimensions - PVWS - 250

LR, with pressure limiter

- 1 Pilot valve (2nd stage)
  - 2 Pilot compensator (1st stage)
  - 3 Power limiter valve
  - 4 Max flow adjustment
  - X1 Remote port pressure limiter
- LR000A2 ...**



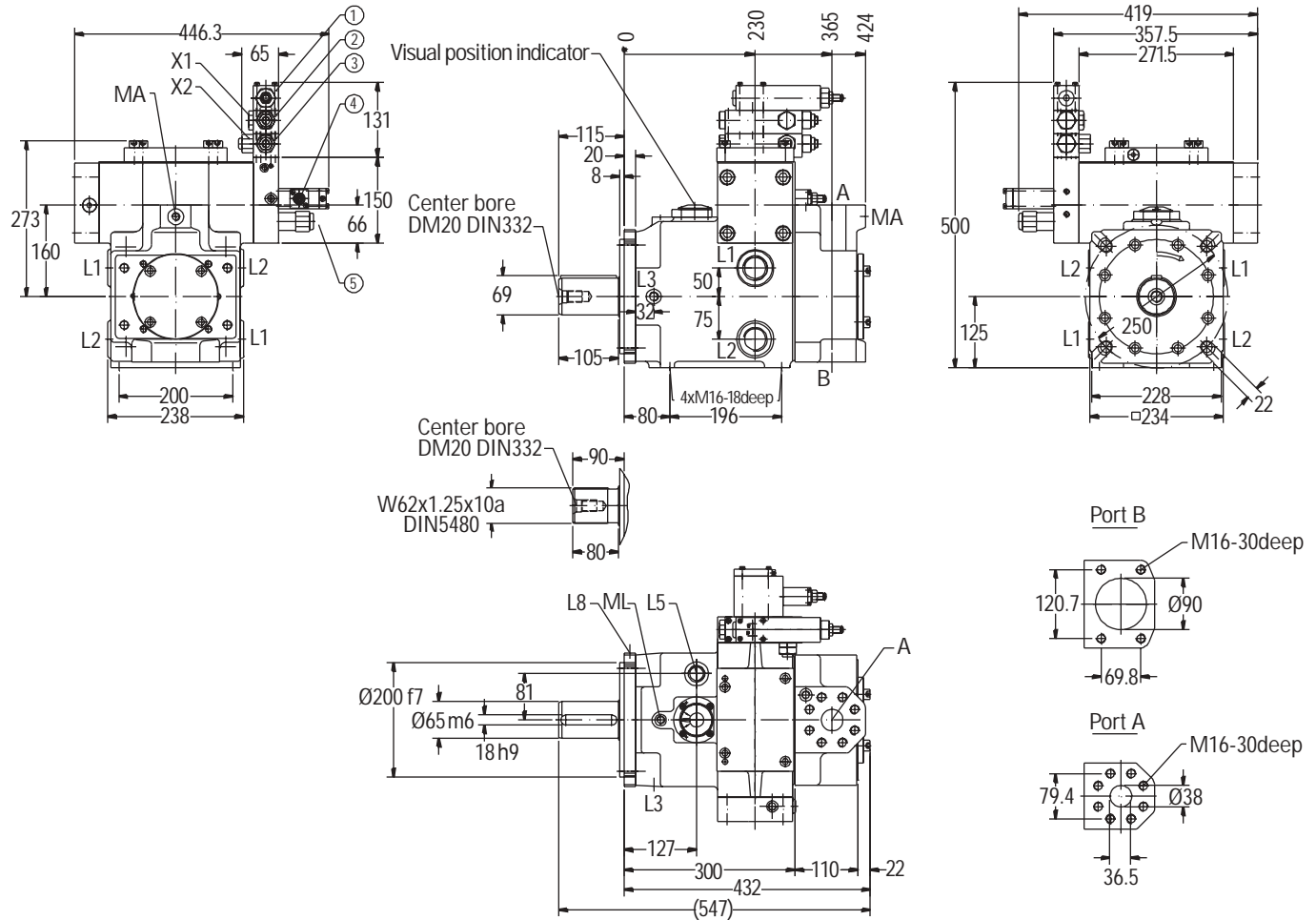
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8)	Air bleed port G 1/4" (MA)	(...)	Normally plugged
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"		
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(X1)	Gauge port G 1/4" x 12.5 deep		

# Pump Dimensions - PVWS - 250

LR, with load sensing valve

- 1 Pilot valve (2nd stage)
- 2 Pilot compensator (1st stage)
- 3 Load sensing valve
- 4 Power limiter valve
- 5 Max flow adjustment
- X1 Remote port pressure limiter
- X2 Load sense port
- LR000A3 ...



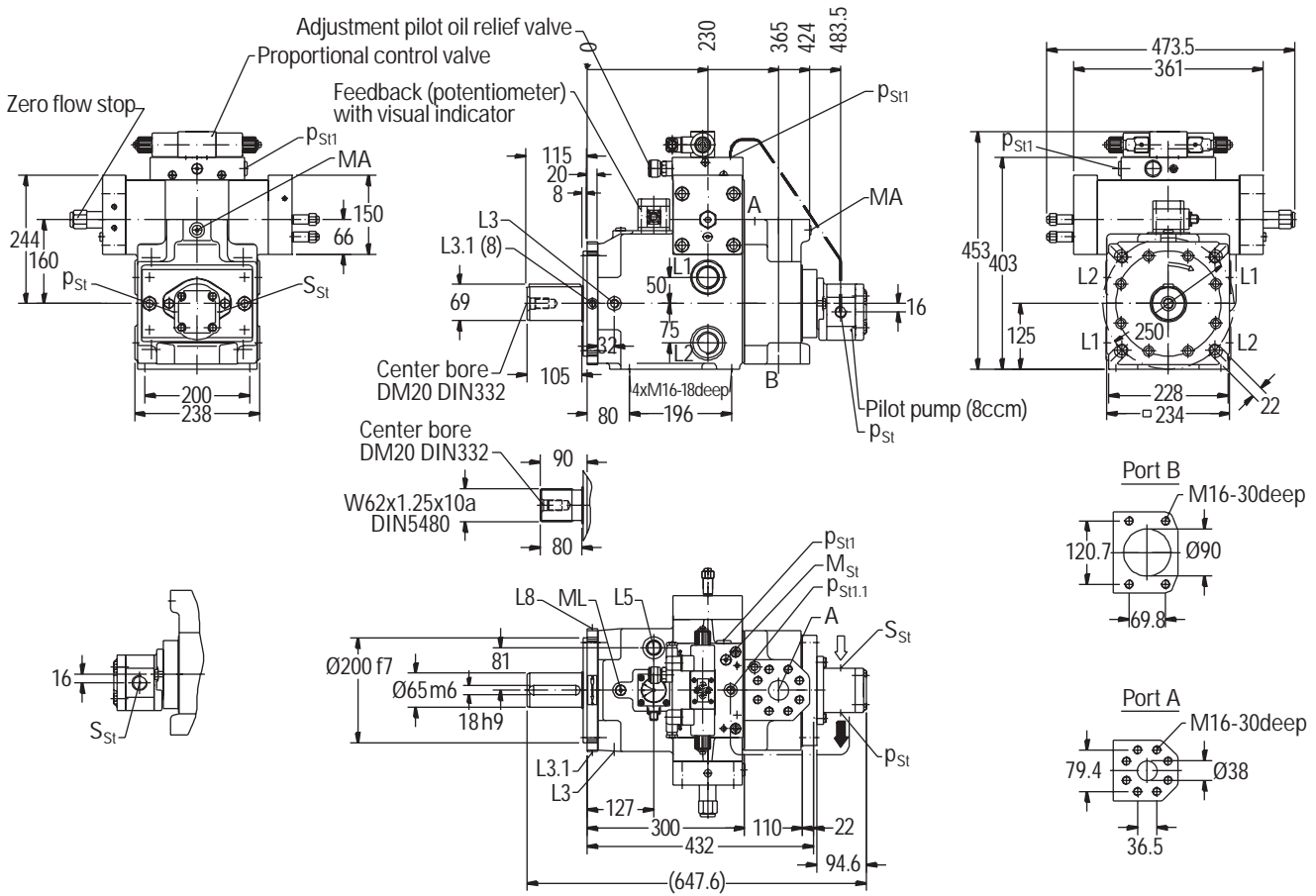
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G1 1/4" per mounting position use upper port	(L8) Air bleed port G 1/4"	(MA) Gauge port system pressure G 1/4"	X2	Gauge port G 1/4" x 12.5 deep
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML) Gauge port of case pressure G 1/4"	(X1) Gauge port G 1/4" x 12.5 deep	(...)	Normally plugged
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B				

# Pump Dimensions - PVWS - 250

SP

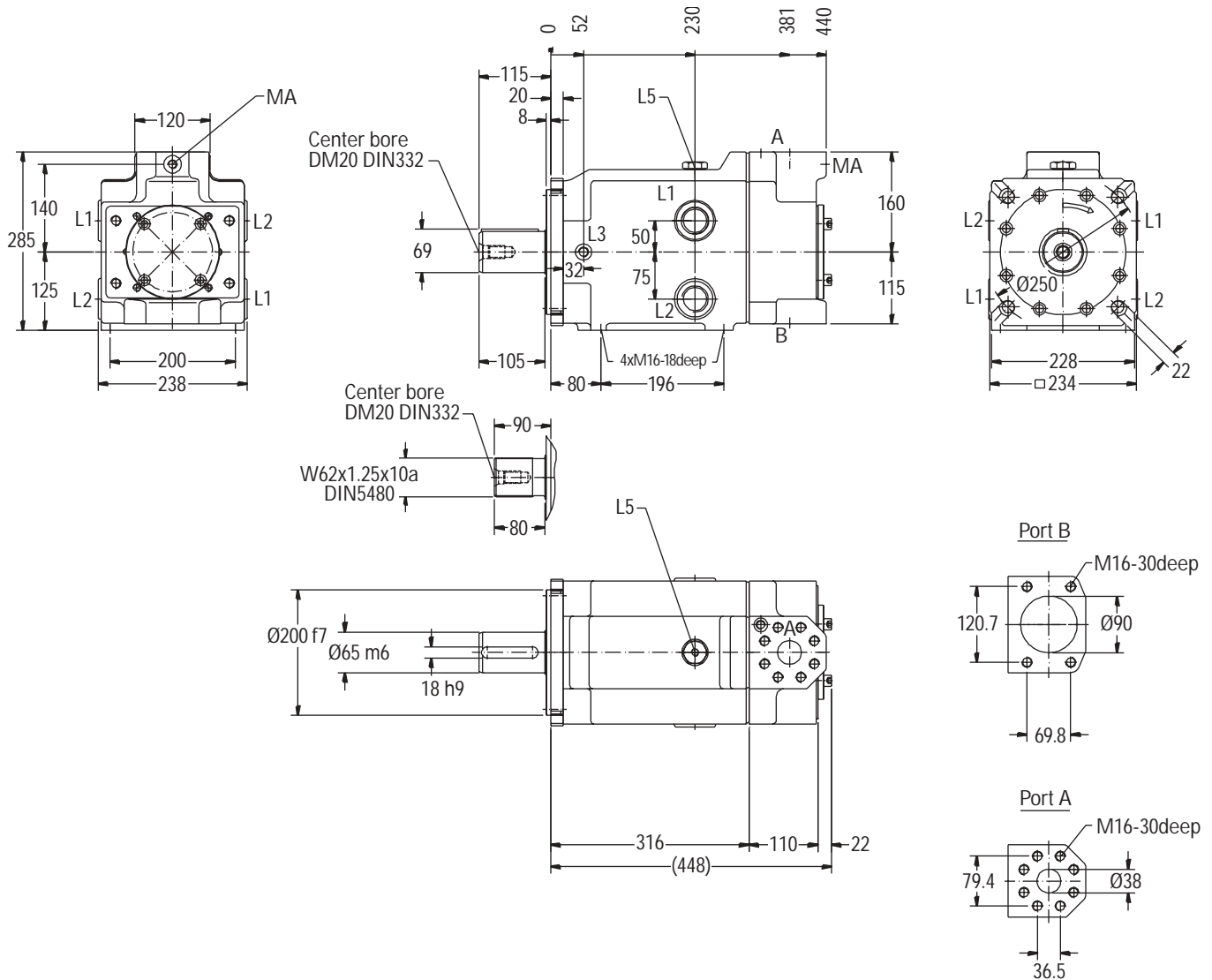
SPC03A ...



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(MA)	Gauge port system pressure G 1/4"	(PSt1)	Port of pilot pressure G 1/2" (alternatively PSt1 or PSt1.1)
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"	(PSt1.1)	Port of pilot pressure G 3/8"
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L3.1)	Port G 1/4"	(MSt)	Gauge port pilot pressure G 1/4"	XA	Pilot port pressure control G 1/4"
		(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	SSt	Suction port of pilot pump G 3/4"	(...)	Normally plugged
		(L8)	Air bleed port G 1/4"	PSt	Outlet port of pilot pump G 1/2"		

# Pump Dimensions - PFWS - 360

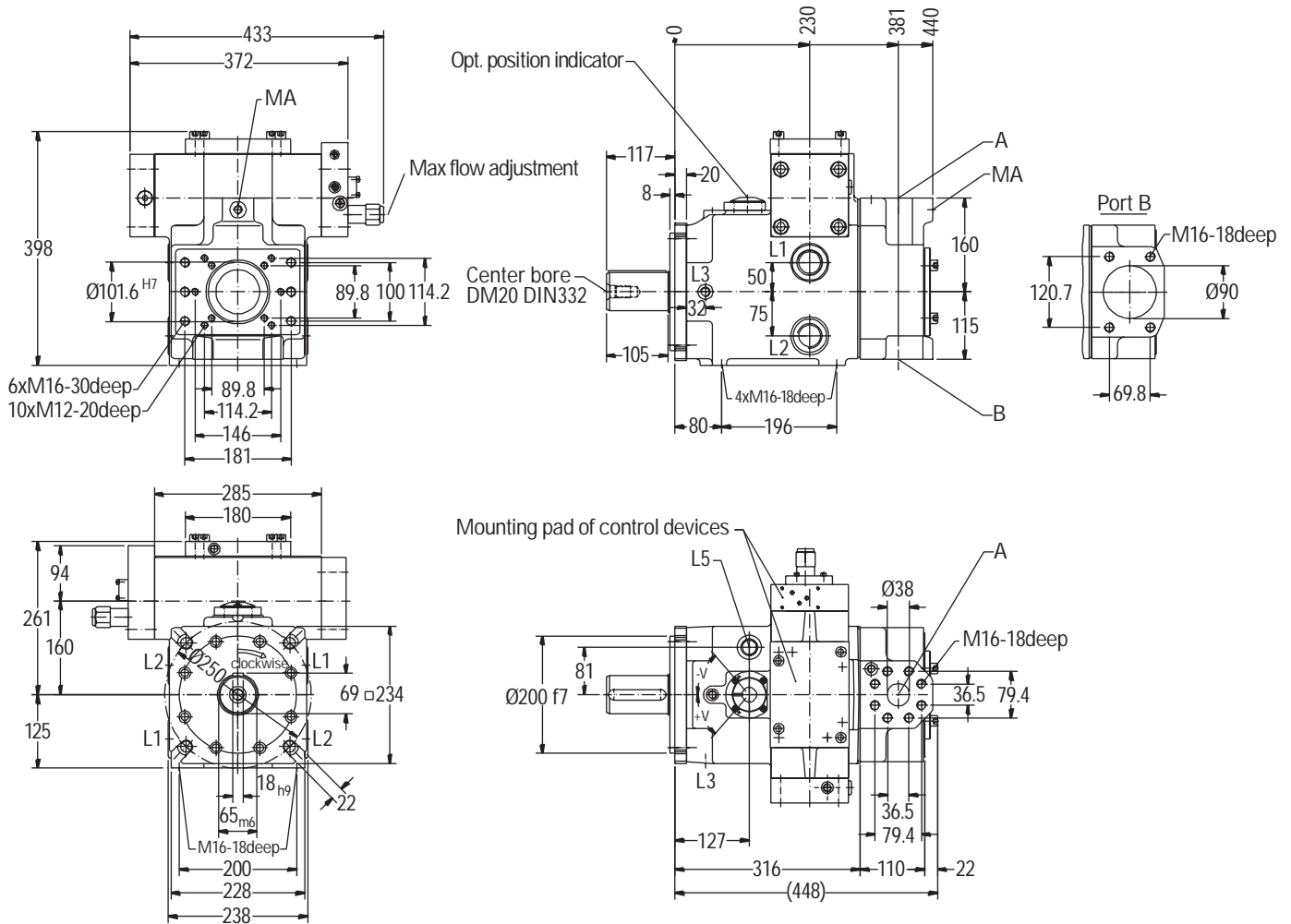


CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT	Non-Standard Displacements:	
				STANDARD DISPLACEMENT	REDUCED DISPLACEMENT
to + Vmax	Right hand	B	A	360 ccm/rev	Available 308.5 ccm/rev

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(MA)	Gauge port system pressure G 1/4"
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(...)	Normally plugged

# Pump Dimensions - PVWS - 360

Side ports



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(MA)	Gauge port system pressure G 1/4"
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(...)	Normally plugged

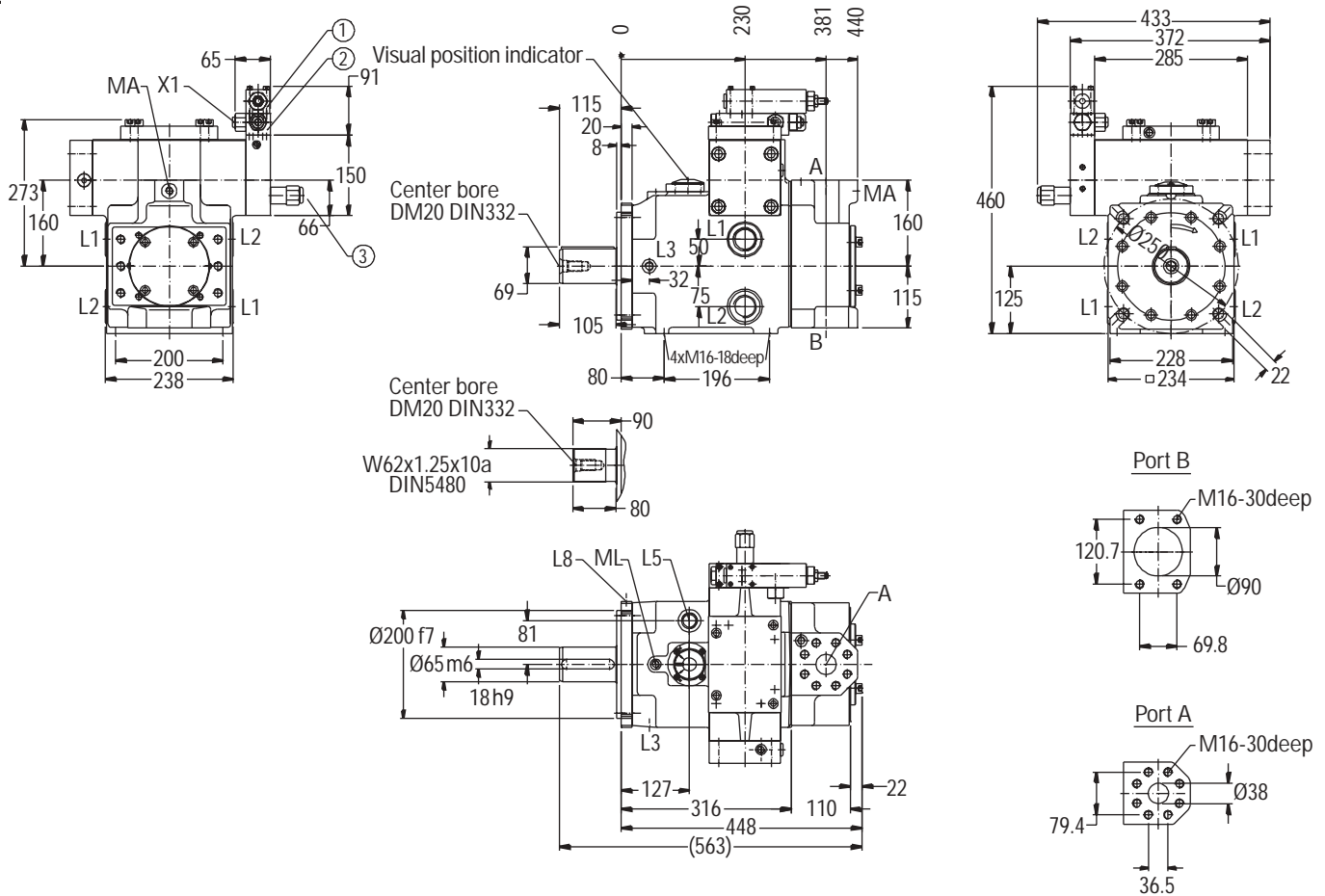


# Pump Dimensions - PVWS - 360

DF, 2 stage pilot valve

- 1 Pilot valve (2nd stage)
- 2 Pressure compensator (1st stage)
- 3 Max flow adjustment

**X1** Remote port pressure limiter  
**DF000A ...**



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

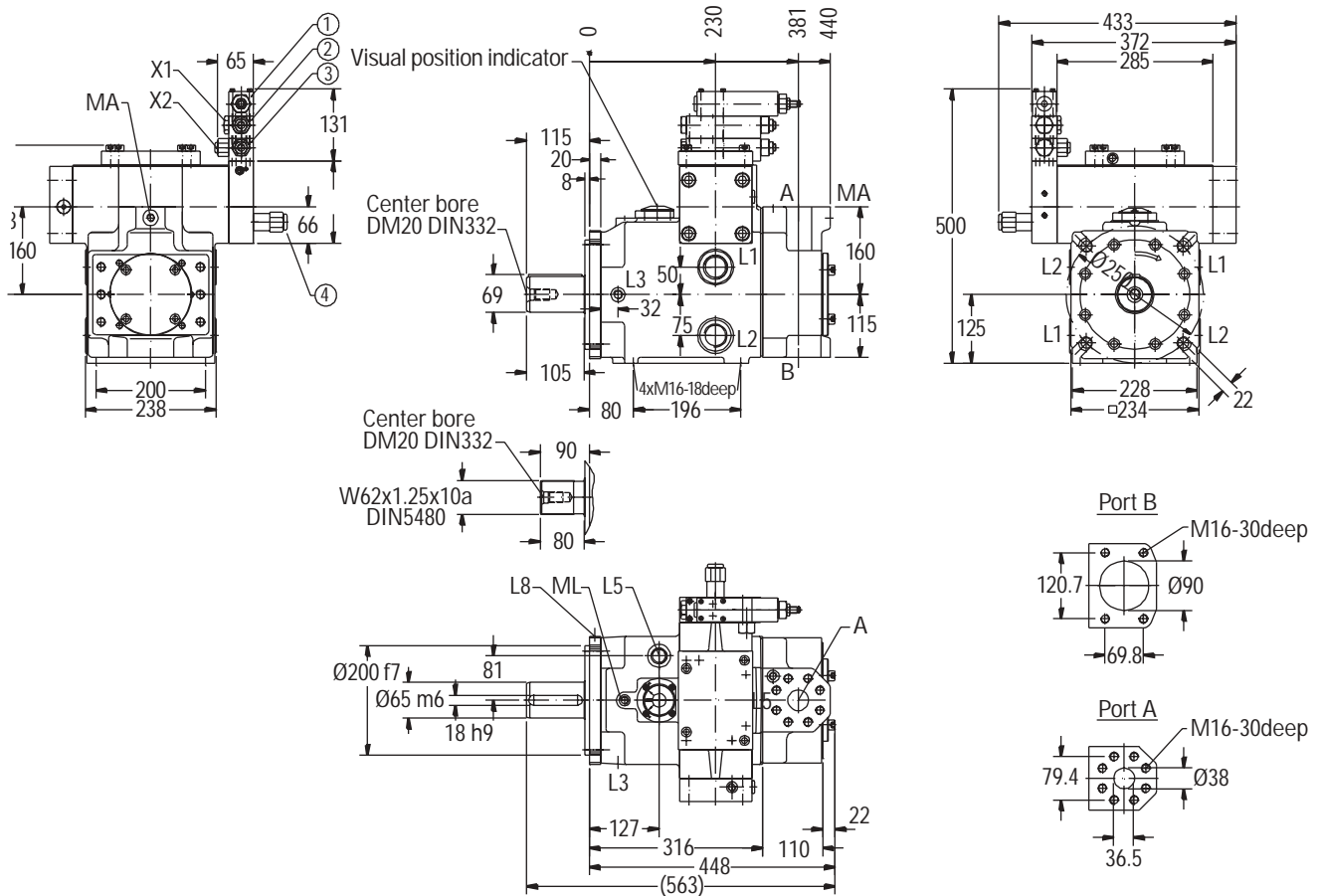
A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8)	Air bleed port G 1/4" (...)	Normally plugged
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"	
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(X1)	Gauge port G 1/4" x 12.5 deep	

# Pump Dimensions - PVWS - 360

DF, with load sensing valve

- 1 Pilot valve (2nd stage)
- 2 Pressure compensator (1st stage)
- 3 Load sensing valve
- 4 Max flow adjustment

- X1 Remote port pressure limiter
- X2 Load sense port DF000A1 ...



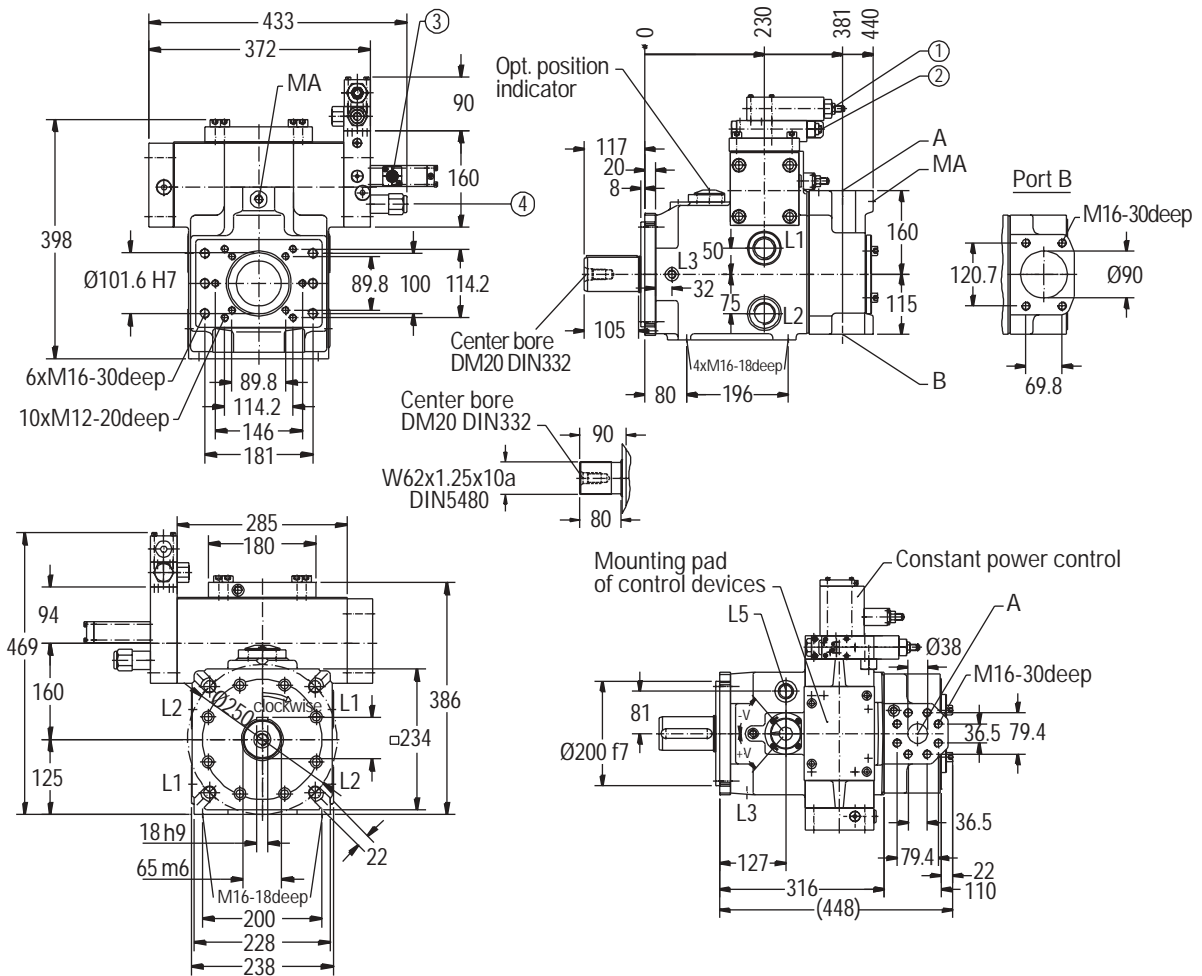
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8)	Air bleed port G 1/4"	X2	Gauge port G 1/4" x 12.5 deep
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"	(...)	Normally plugged
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(X1)	Gauge port G 1/4" x 12.5 deep		

# Pump Dimensions - PVWS - 360

LR, with pressure limiter

- 1 Pilot valve (2nd stage)
  - 2 Pressure compensator (1st stage)
  - 3 Power limitation valve
  - 4 Max flow adjustment
  - X1 Remote port pressure limiter
- LR000A2 ...**



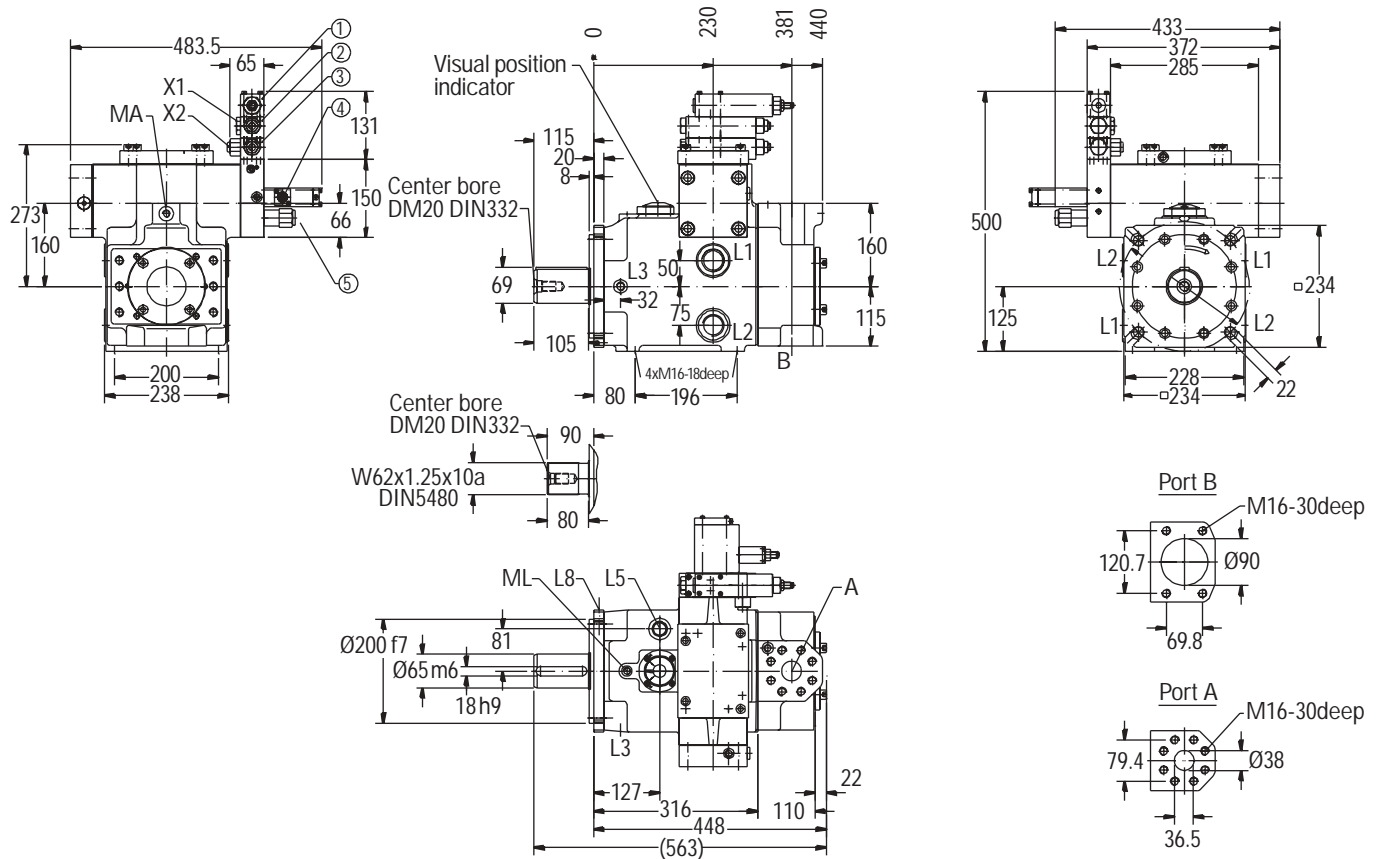
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8)	Air bleed port G 1/4" (...)	Normally plugged
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"	
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(X1)	Gauge port G 1/4" x 12.5 deep	

# Pump Dimensions - PVWS - 360

LR, with load sensing valve

- 1 Pilot valve (2nd stage)
- 2 Pressure compensator (1st stage)
- 3 Load sensing valve
- 4 Power limitation valve
- 5 Max flow adjustment
- X1 Remote port pressure limiter
- X2 Load sense port
- LR000A3 ...



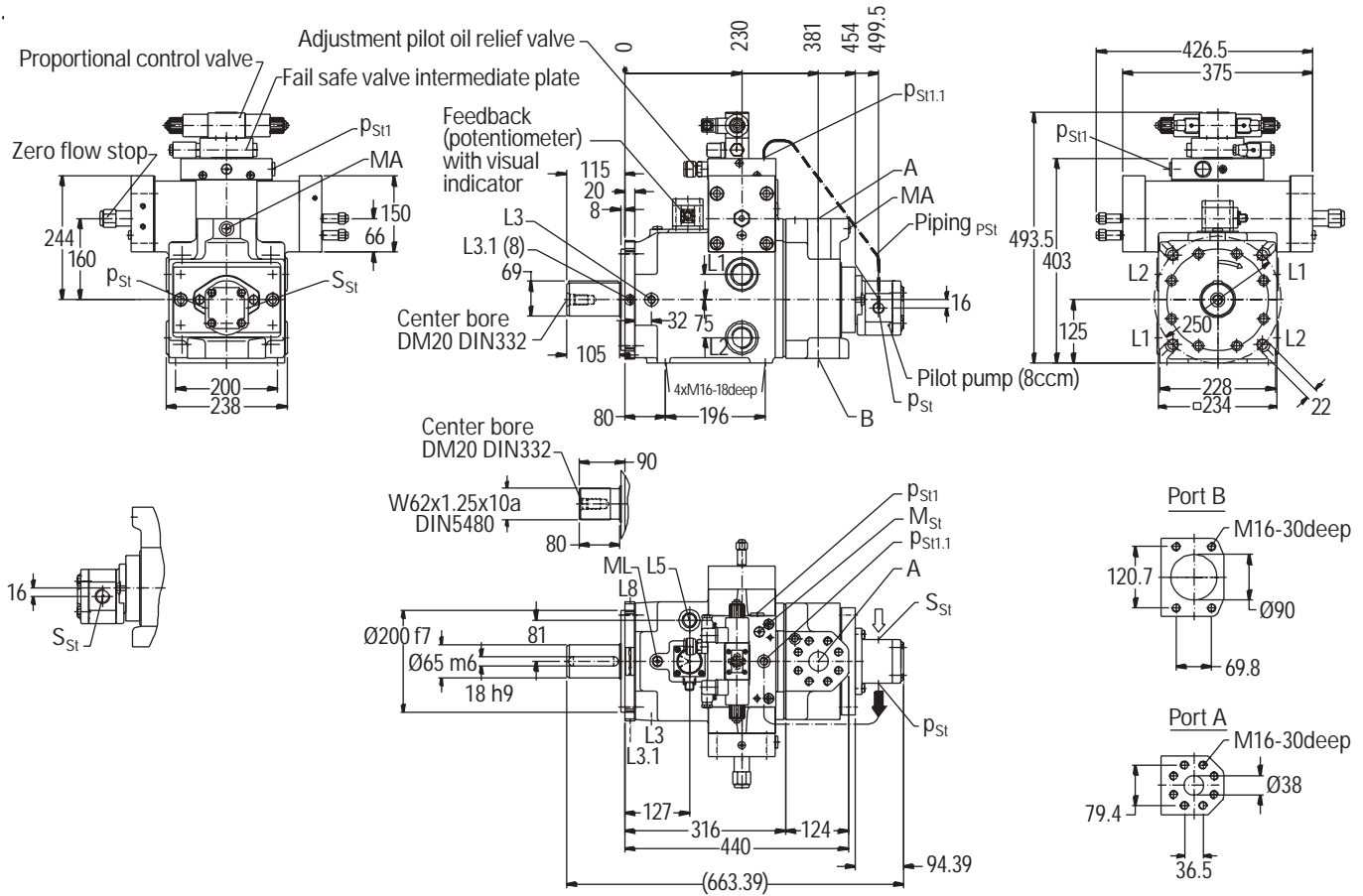
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(L8) Air bleed port G 1/4" (MA) Gauge port system pressure G 1/4" (...)	X2 Gauge port of case pressure G 1/4" (X1) Gauge port G 1/4" x 12.5 deep	Gauge port G 1/4" x 12.5 deep Normally plugged
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"	
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(X1)	Gauge port G 1/4" x 12.5 deep	

# Pump Dimensions - PVWS - 360

SP

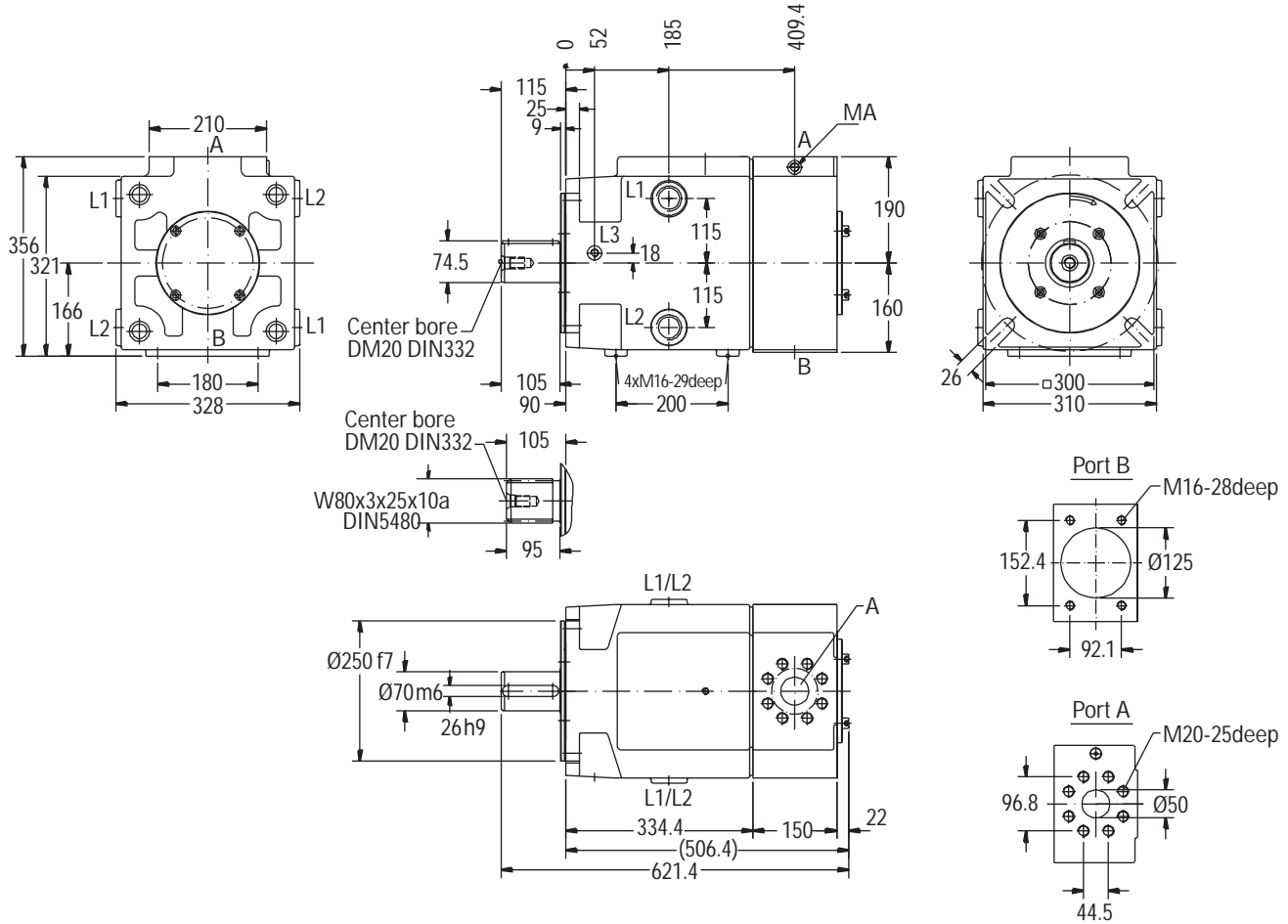
SPC03A ...



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 1 1/2", 415 bar (6000psi)	L2	Drain port G 1 1/4" per mounting position use upper port	(MA)	Gauge port system pressure G 1/4"	(PSt1)	Port of pilot pressure G 1/2" (alternatively PSt1 or PSt1.1)
B	Inlet connection SAE 3 1/2", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"	(PSt1.1)	Port of pilot pressure G 3/8"
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L3.1)	Port G 1/4"	SSt	Suction port of pilot pump G 3/4"	(...)	Normally plugged
		(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	PSt	Outlet port of pilot pump G 1/2"		
		(L8)	Air bleed port G 1/4"				

# Pump Dimensions - PFWS - 500



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT	Non-Standard Displacements:	
				STANDARD DISPLACEMENT	REDUCED DISPLACEMENT
to + Vmax	Right hand	B	A	500 ccm/rev	Available 467 or 364 ccm/rev

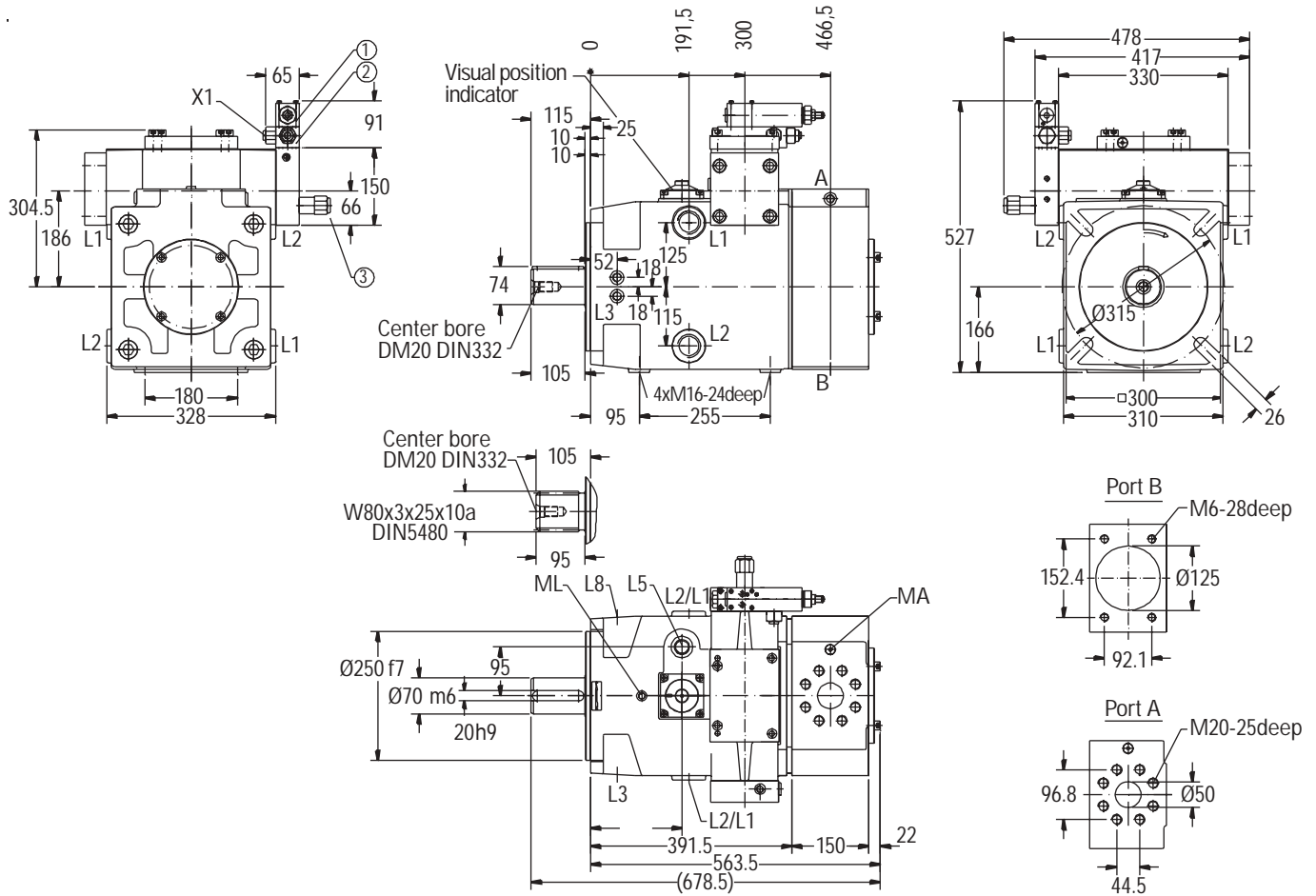
A	System pressure port SAE 2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 1/4" (shaft upwards)	(...)	Normally plugged
B	Inlet connection SAE 5", 35 bar (500psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(MA)	Gauge port system pressure G 1/4"		

# Pump Dimensions - PVWS - 500

DF, 2 stage pilot valve

- 1 Pilot valve (2nd stage)
- 2 Pressure compensator (1st stage)
- 3 Max flow adjustment

**X1** Remote port pressure limiter  
**DF000A ...**



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

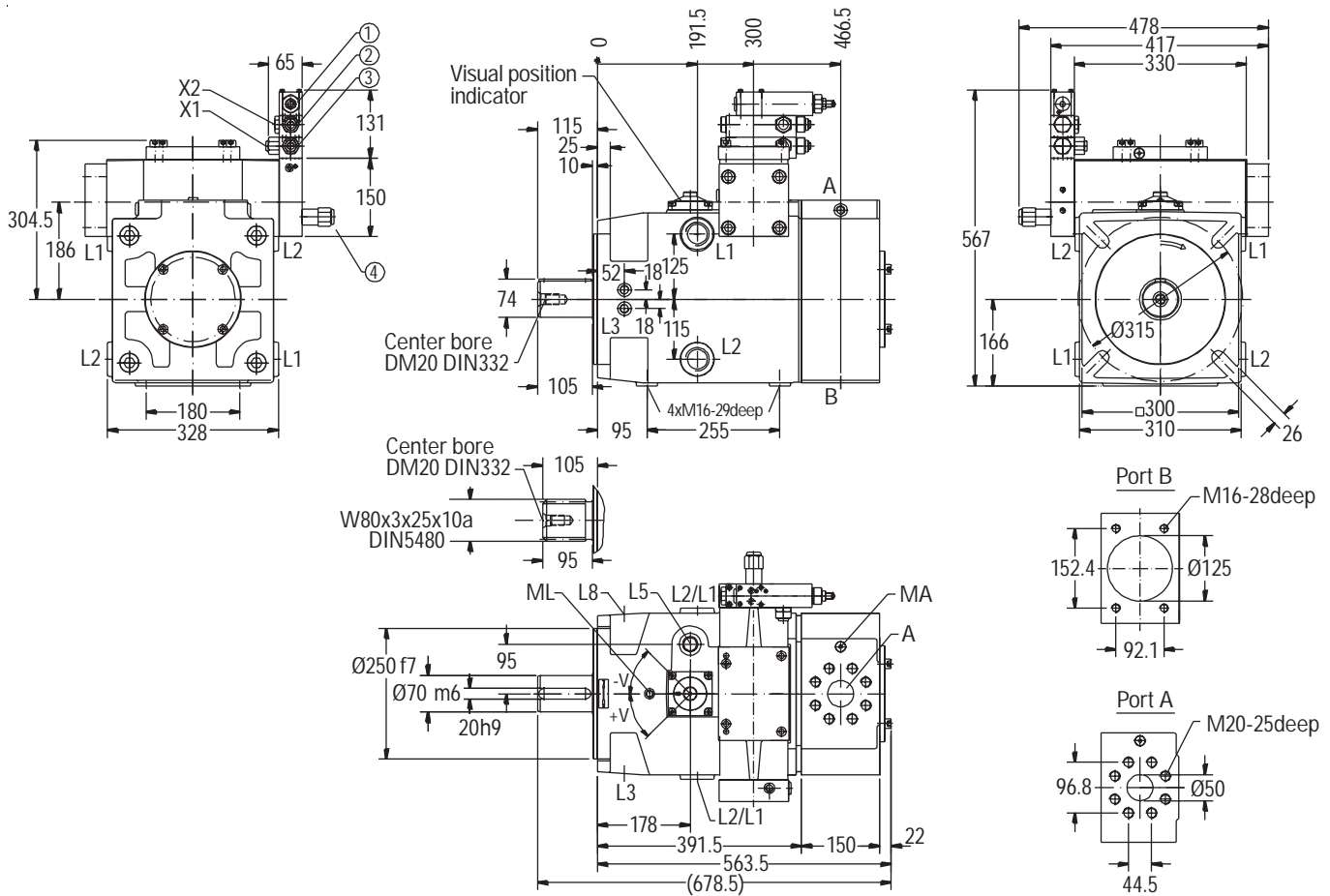
A	System pressure port SAE 2", 415 bar (6000psi)	(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 1/4" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"
B	Inlet connection SAE 5", 35 bar (500psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(L5)	Oil fill plug G 1 1/2"	(X1)	Gauge port G 1/4" x 12.5 deep
				(L8)	Air bleed port G 1/4"	(...)	Normally plugged
				(MA)	Gauge port system pressure G 1/4"		

# Pump Dimensions - PVWS - 500

DF, with load sensing valve

- 1 Pilot valve (2nd stage)
- 2 Pressure compensator (1st stage)
- 3 Load sensing valve
- 4 Max flow adjustment

- X1 Load sense port
  - X2 Remote port pressure limiter
- DF000A1 ...**



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

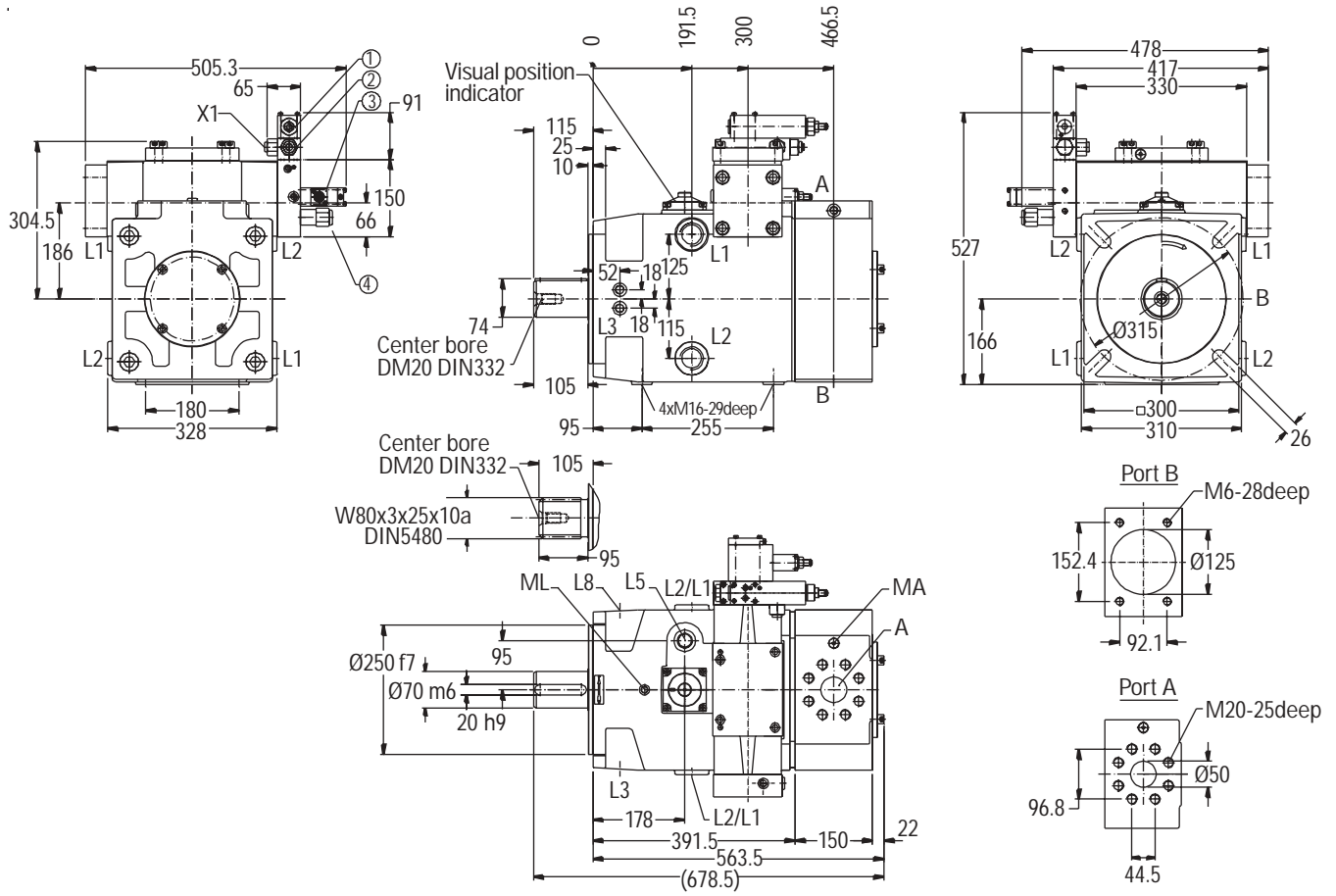
A	System pressure port SAE 2", 415 bar (6000psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(L8)	Air bleed port G 1/4"	X2	Gauge port G 1/4" x 12.5 deep
B	Inlet connection SAE 5", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 1/4" (shaft upwards)	(MA)	Gauge port system pressure G 1/4"	(...)	Normally plugged
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug G 1 1/2"	(ML)	Gauge port of case pressure G 1/4"		
				(X1)	Gauge port G 1/4" x 12.5 deep		



# Pump Dimensions - PVWS - 500

LR, with pressure limiter

- 1 Pilot valve (2nd stage)
  - 2 Pressure compensator (1st stage)
  - 3 Power limitation valve
  - 4 Max flow adjustment
  - X1 Remote port pressure limiter
- LR000A2 ...**



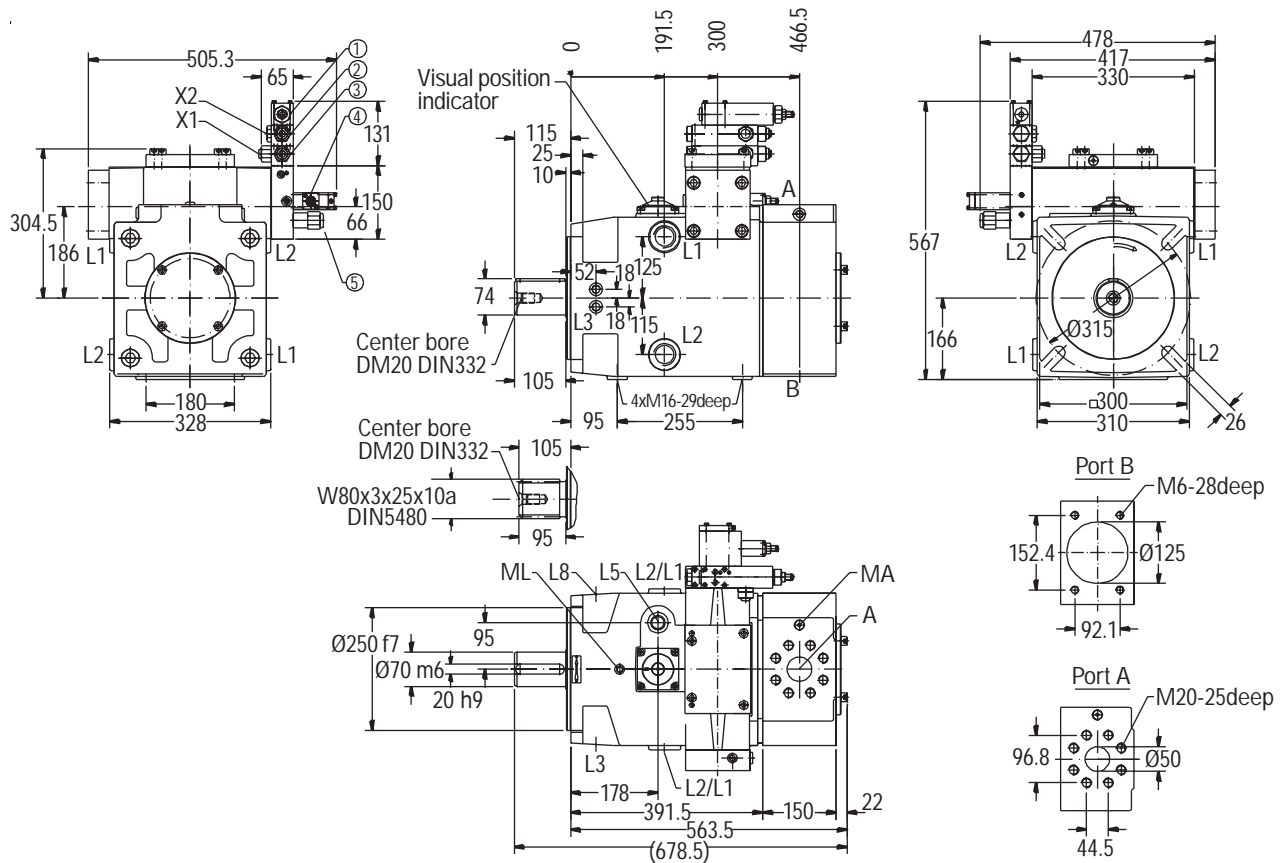
CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 2", 415 bar (6000psi)	(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 1/4" (shaft upwards)	(ML)	Gauge port of case pressure G 1/4"
B	Inlet connection SAE 5", 35 bar (500psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(L5)	Oil fill plug G 1 1/2"	(X1)	Gauge port G 1/4" x 12.5 deep
				(L8)	Air bleed port G 1/4"	(...)	Normally plugged
				(MA)	Gauge port system pressure G 1/4"		

# Pump Dimensions - PVWS- 500

LR, with load sensing valve

- 1 Pilot valve (2nd stage)
  - 2 Pressure compensator (1st stage)
  - 3 Load sensing valve
  - 4 Power limitation valve
  - 5 Max flow adjustment
  - X1 Load sense port
  - X2 Remote port pressure limiter
- LR000A3 ...**

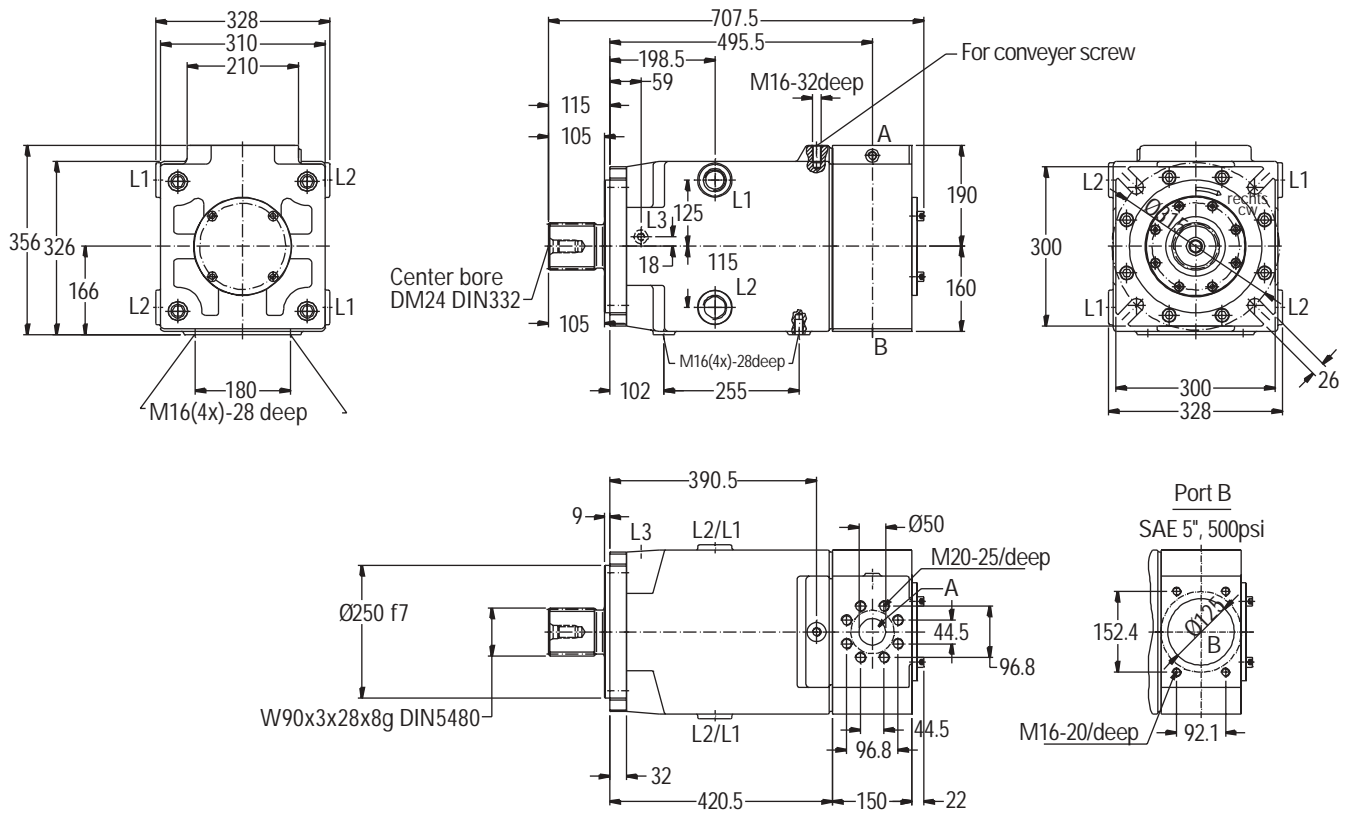


CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

A	System pressure port SAE 2", 415 bar (6000psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(L8) Air bleed port G 1/4" (MA) Gauge port system pressure G 1/4" (...)	X2 Gauge port G 1/4" x 12.5 deep
B	Inlet connection SAE 5", 35 bar (500psi)	(L3)	Ventilation port for vertical mounting G 1/4" (shaft upwards)	(ML) Gauge port of case pressure G 1/4"	(...) Normally plugged
(L1)	Drain port 1 5/8" - 12 UNF - 2B per mounting position use upper port	(L5)	Oil fill plug G 1 1/2"	(X1) Gauge port G 1/4" x 12.5 deep	

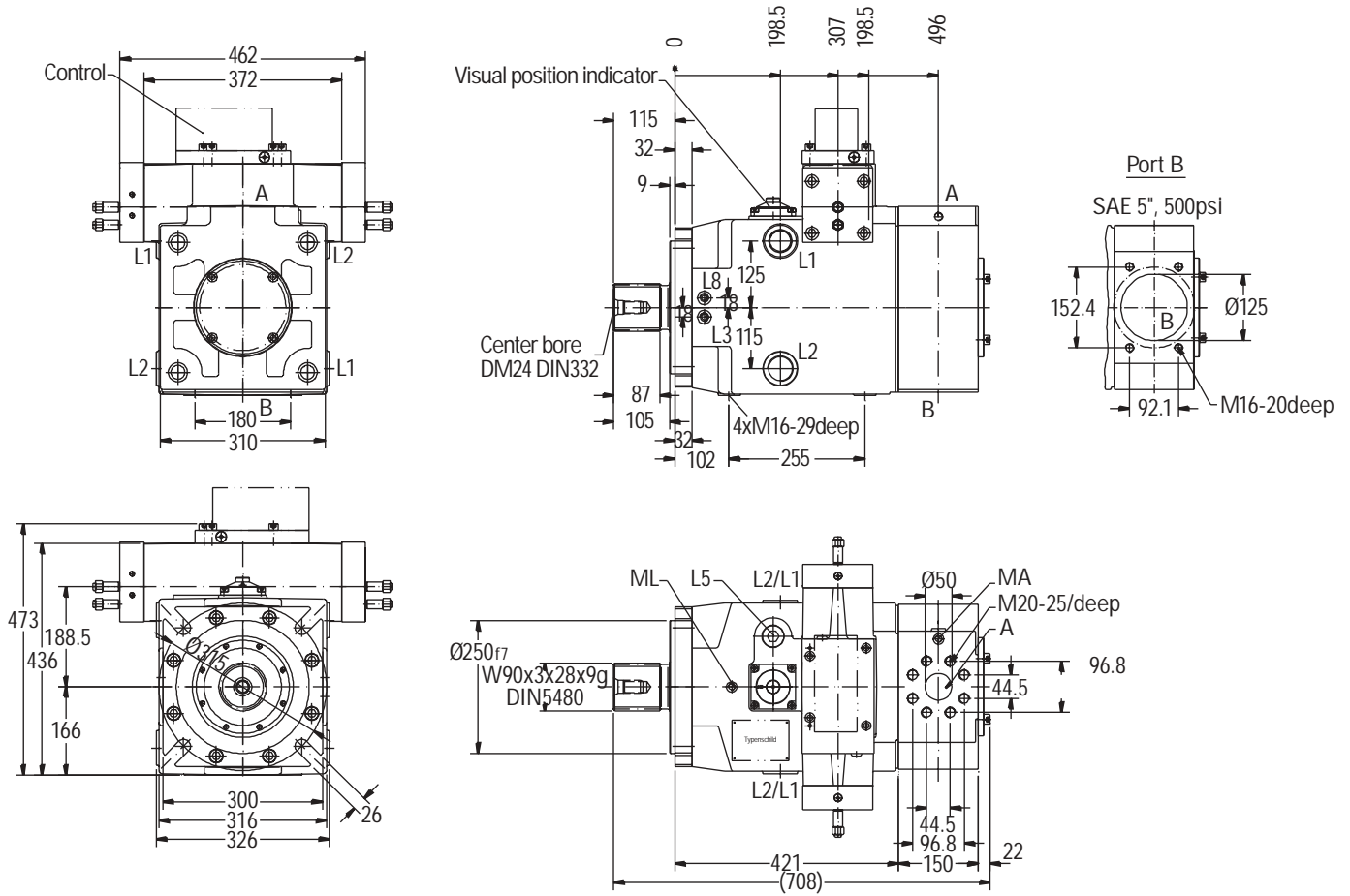


# Pump Dimensions - PFWS - 750



CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT	Non-Standard Displacements:		
to + Vmax	Right hand	B	A	STANDARD DISPLACEMENT	REDUCED DISPLACEMENT	
				750 ccm/rev	Available 712.5 ccm/rev	
A	System pressure port SAE 2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 1/4" (shaft upwards)	(...) Normally plugged
B	Inlet connection SAE 5", 35 bar (500psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(MA)	Gauge port system pressure G 1/4"	

# Pump Dimensions - PVWS - 750

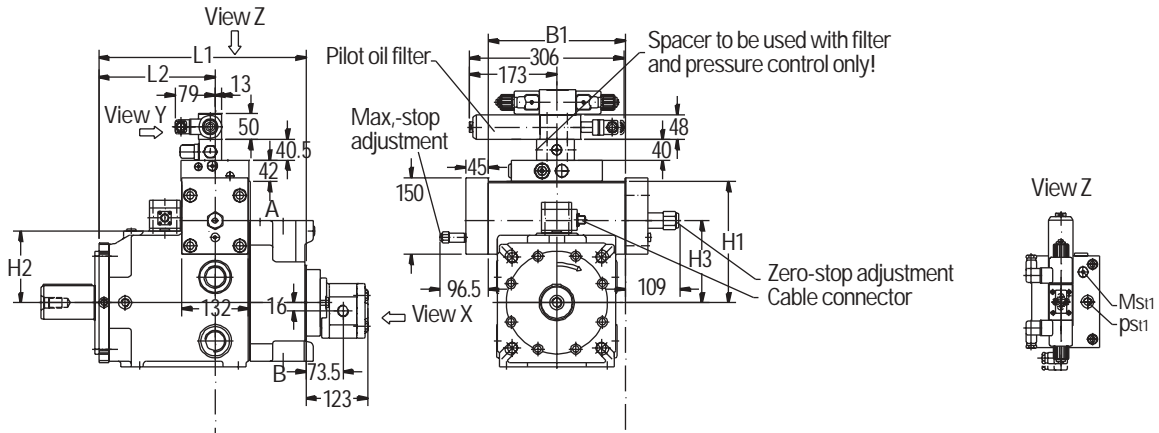


CONTROL	DIRECTION OF ROTATION	INPUT	OUTPUT
to + Vmax	Right hand	B	A

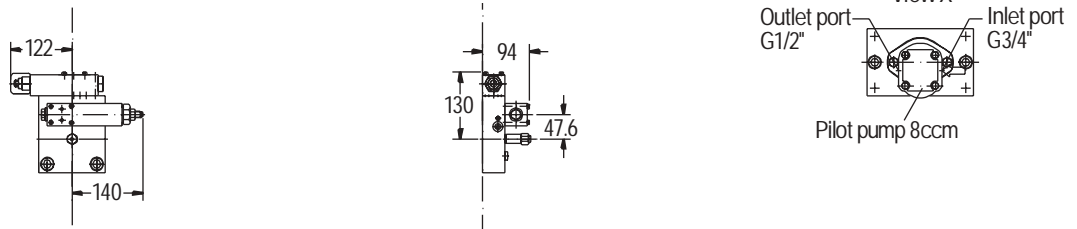
A	System pressure port SAE 2", 415 bar (6000psi)	(L1)	Drain port 15/8" - 12 UNF - 2B per mounting position use upper port	(L3)	Ventilation port for vertical mounting G 3/8" (shaft upwards)	(ML)	Gauge port case pressure G 1/4"
B	Inlet connection SAE 5", 35 bar (500psi)	L2	Drain port G 1 1/2" per mounting position use upper port	(L5)	Oil fill plug 1 1/16" - 12 UNF - 2B	(...)	Normally plugged
				(MA)	Gauge port system pressure G 1/4"		

# Dimensions - PVWS- 250/360/500/750 SP Controls

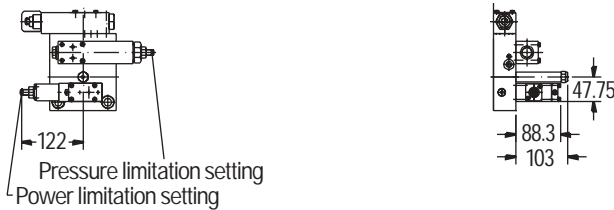
**SPC03A ...** With CETOP 3  
Prop. relief valve



**SPC03A4 ...** With pressure  
limiter overriding function



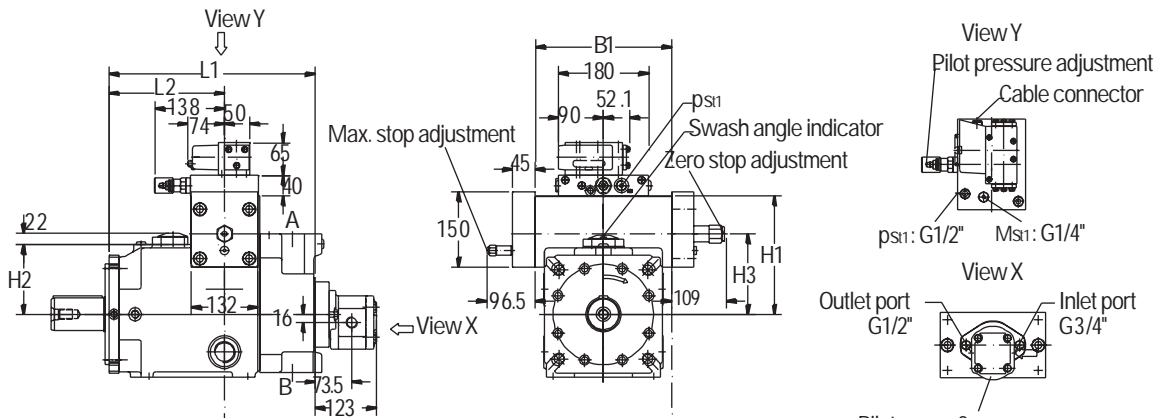
**SPC03A5 ...** With pressure  
limiter and power  
control overriding function



	L1	L2	B1	H1	H2	H3
250	410	230	271	236	135	160
360	426	230	285	236	135	160
500	541,5	300	330	267,5	172	186
750	571	307	372	270	172	188,5

# Dimensions - PVWS - 250/360/500/750 SM Controls

## SM000A ...

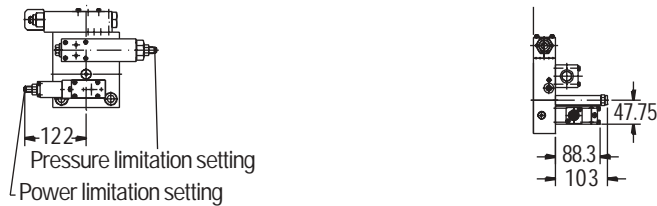


Pilot pump 8 ccm  
pilot-oil-filtration: in line filter installed between pilot pump and ps1

## SM000A4 ... With pressure limiter overriding function



## SM000A5 ... With pressure limiter and power control overriding function

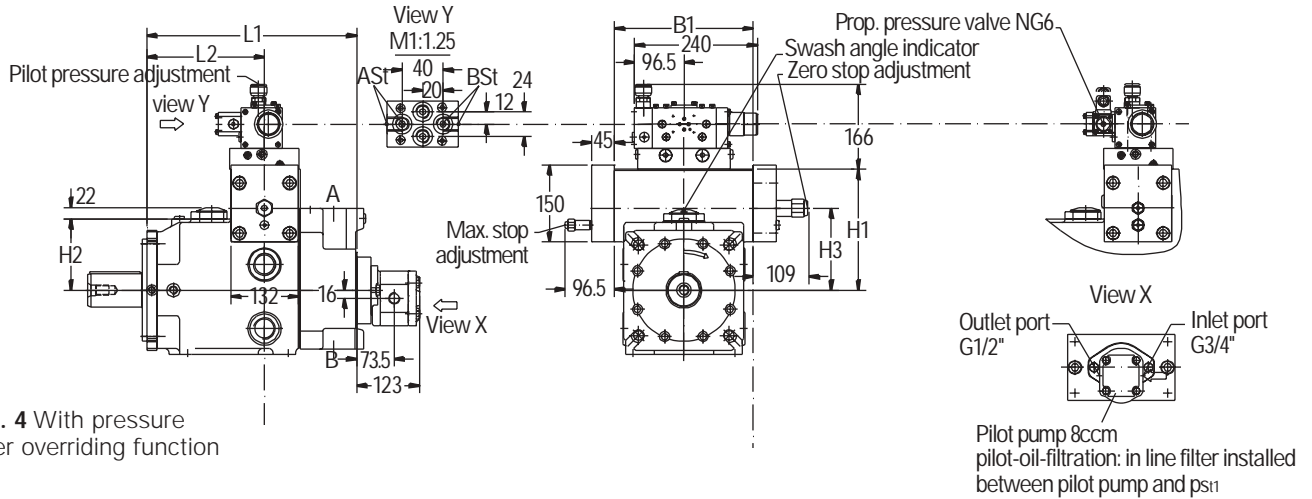


Optional pilot oil filter will be mounted by piping between pilot pump outlet port "pSt" and the "pst1" port.

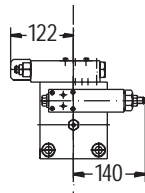
	L1	L2	B1	H1	H2	H3
250	410	230	271	236	135	160
360	426	230	285	236	135	160
500	541,5	300	330	267,5	172	186
750	571	307	372	270	172	188,5

# Dimensions - PVWS - 250/360/500/750 DP Controls

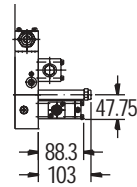
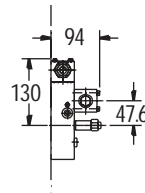
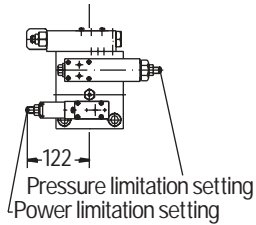
DPH ... DPG ... DPJ...



DP ... 4 With pressure limiter overriding function



DP ... 5 With pressure limiter and power control overriding function

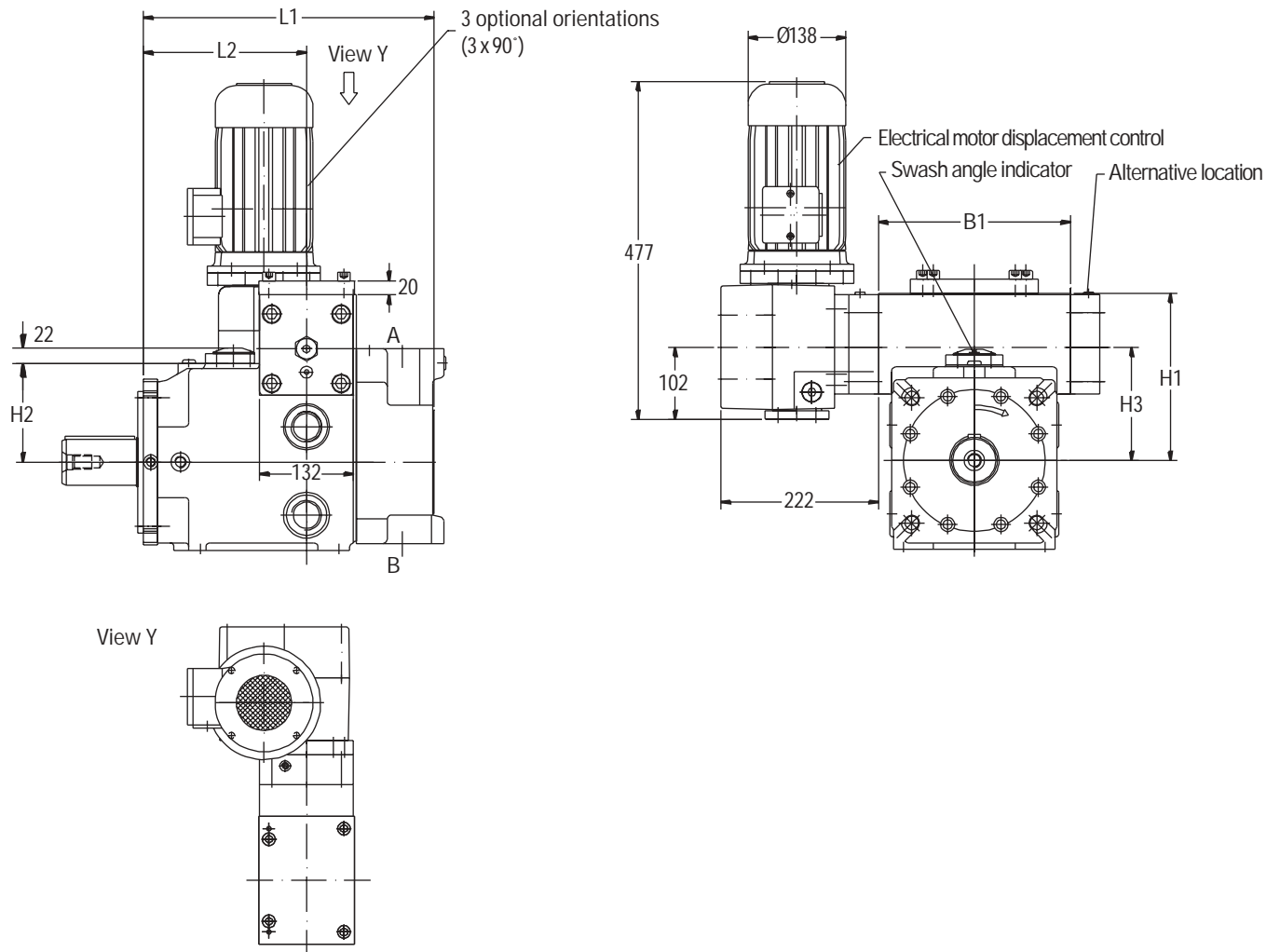


Optional pilot oil filter will be mounted by piping between pilot pump outlet port "pS1" and the "pst1" port.

	L1	L2	B1	H1	H2	H3
250	410	230	271	236	135	160
360	426	230	285	236	135	160
500	541,5	300	330	267,5	172	186
750	571	307	372	270	172	188,5

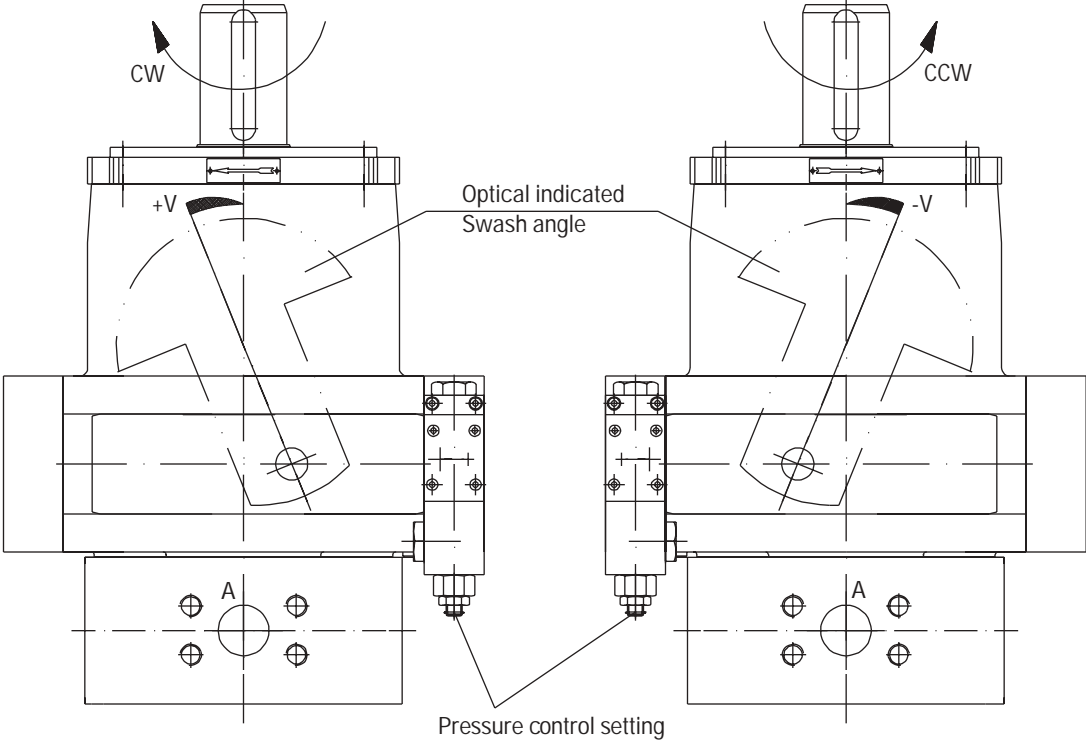


Dimensions -  
 PVW -  
 250/360/500/750  
 ES Control

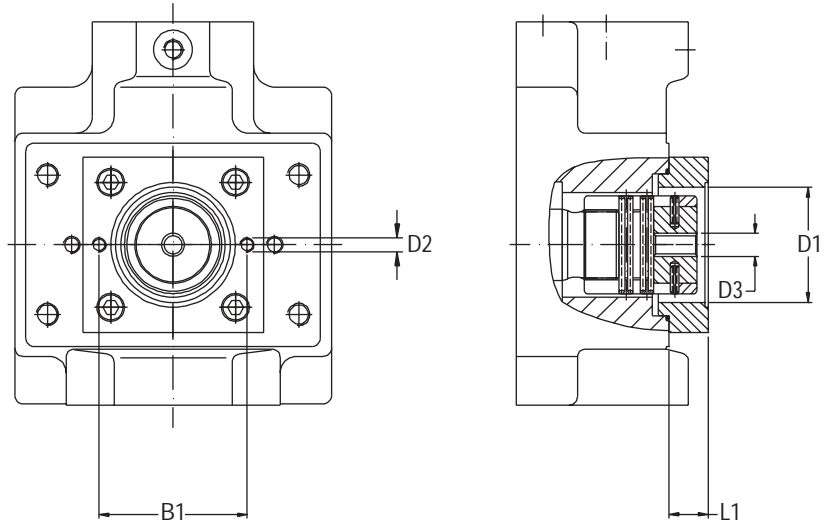


	L1	L2	B1	H1	H2	H3
250	410	230	271	236	135	160
360	426	230	285	236	135	160
500	541,5	300	330	267,5	172	186
750	571	307	372	270	172	188,5

Swash  
Angle/Flow  
Direction

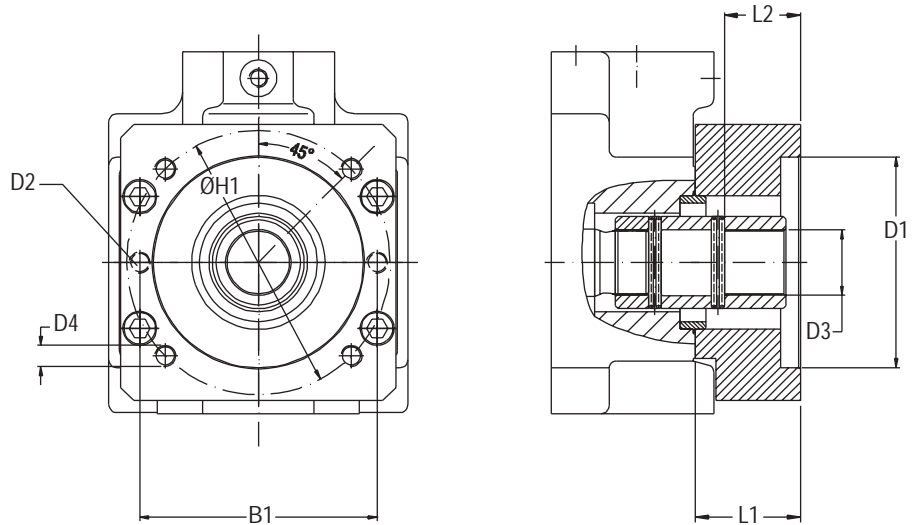


# Thru - Drives PVW 250 to 750 SAE "A, B, C" Pump



SIZE 250/750	B1	D1	D2	D3	L1
SAE"A"	106	82,6	M10 x 16 deep	16/32DP-9T	28
SAE"B"	146	102	M12 x 20 deep	16/32DP-13T	28
SAE"C"	181	127	M16 x 20 deep	12/24DP-14T	28

## ISO Pump



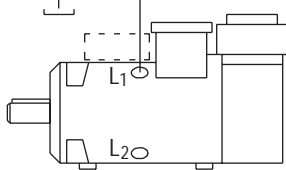
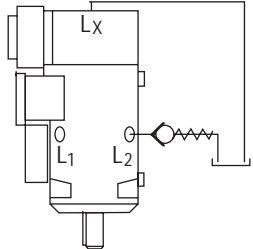
SIZE 250/360	B1	D1	D2	D3 (DIN 5480)	D4	H1	L1
ISO - 125	180	125	M16 x 20	N40x1.25x10a	M12 x 18 deep	160	92
ISO - 160	-	160	-	N50x1.25x10a	M16 x 20 deep	200	92
ISO - 200	-	200	-	N62x1.25x10a	M20	250	92

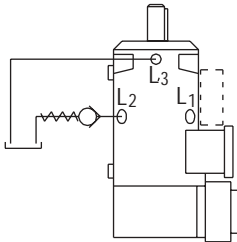
SIZE 500/750	B1	D1	D2	D3 (DIN 5480)	D4	H1	L1
ISO - 125	180	125	M16 x 20	N40x1.25x10a	M12 x 18 deep	160	75
ISO - 160	-	160	-	N50x1.25x10a	M16 x 20 deep	200	75
ISO - 200	-	200	-	N62x1.25x10a	M20	250	75
ISO - 250	-	250	-	N80x3x28x10a	M24	315	75

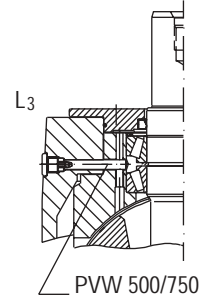
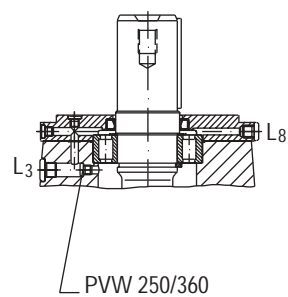
# Application Data

## Installation Position

Installation position is optional, however, note bearing lubrication with respect to mounting

INSTALLATION POSITION	DRAIN PIPING	INSTALLATION POSITION	DRAIN PIPING
<p>Shaft horizontal</p> <p>Pump can be rotated freely about the lateral axis</p> <p>Use the highest case drain connection L<sub>1</sub> or L<sub>2</sub></p>		<p>Shaft pointed downwards</p> <p>Use ventilation line L<sub>x</sub> (Provided only on request)</p> <p>Pre load drain connection L<sub>2</sub> (L<sub>1</sub>) with 0,2 bar (2.9psi)</p>	

INSTALLATION POSITION	DRAIN PIPING	INSTALLATION POSITION	DRAIN PIPING
<p>Shaft pointed upwards</p> <p>Use ventilation line L<sub>3</sub></p> <p>Pre load drain port case drain connection L<sub>2</sub> (L<sub>1</sub>) with 0.2 bar (2.9psi)</p>		<p>Vertically mounted</p> <p>Internal connection close with plug G 1/8"</p> <p>Horizontally mounted</p> <p>Internal connection open L<sub>3</sub> plugged</p>	<p>Internal connection to be closed with pin no. HC406082101401</p>



# Application Data

## Fluid Recommendations

### Case Flushing Requirements

A check valve must not be used in the drain pipe. The drain pipe must interminate below the oil level in the reservoir.

For all other conditions with low pressure < 20 bar (<300 psi) and low flow (<10% of Qmax), case flushing is required.

For operation with special fluids HFB and HFC, case flushing is recommended.

### Flushing Flow

Flushing flow via the pump case should be >1% of maximum pump flow. Maximum flushing flow depends on case pressure.

### Notes:

- All listed ratings are based on the use of a good quality fluid.
- Alternative fluids have a reduced tolerance for contamination over petroleum base fluids. good filtration is therefore, critical.
- The pumps will provide exceptional life when used with a good quality clean fluid at the pump ratings specified for that fluid.

### Fluids

Pumps in the catalog are primarily designed to operate with conventional petroleum based hydraulic oil. Alternative fluids and restrictions:

- Fluid maintenance is critical to the durability of all hydraulic components, and particularly with hydraulic pumps. This becomes even more of a factor when alternative fluids are used. All types of alternative fluids require extensive maintenance in order to maintain proper levels of water content, acidity, viscosity and contamination.

### Fluid Cleanliness

These pumps are rated for anti-wear petroleum fluids with a contamination level of 18/15/13 per ISO 4406. Operation in fluids with levels more contamination than this is not recommended and may reduce the life of the pump's components. Fluids other than petroleum, severe service cycles, or temperature extremes are cause for adjustment

of these codes. Please contact your Eaton representative for special duty cycle recommendations.

Eaton pumps, as well as any variable displacement piston pumps, will operate with apparent satisfaction in fluids up to the rating specified here. Experience has shown, however, that pump and hydraulic system life is not optimized with high fluid contamination levels (high ISO cleanliness codes).

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Eaton publication 561- "Vickers Guide to Systemic Contamination Control"-available from your local Eaton distributor.

In this publication, filtration and cleanliness levels for extending the life of axial piston pumps

and other system components are listed. Included is an excellent discussion of the selection of products needed to control fluid condition.

### Ordering Procedure

When ordering, please specify full model designation of items required; see "Model Codes" section of this catalog.

Note the following:

- Designation of variable displacement pumps must include the supplementary designation of the required control.

### FLUIDS

TYPE	CLASSIFICATION	MAX. PRESSURE BAR	MAX. SPEED RPM	RECOMMENDED SEAL MATERIAL	MAX OPERATING TEMPERATURE °C	BEARING LIFE
Oil in Water Emulsion	HFAE	Not Rated				0
Water in oil Emulsion	HFB	250	1800	Fluorocarbon	49	50%
Water Glycol	HFC	250	1800	Fluorocarbon	49	25%
Phosphate Ester	HFDR	350/420	1800	Fluorocarbon	66	100%
Polyol Ester	HFDU	350/420	1800	Fluorocarbon	66	100%

\*Refer to the general specifications for the displacement speed limitation

# Notes

# Notes

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