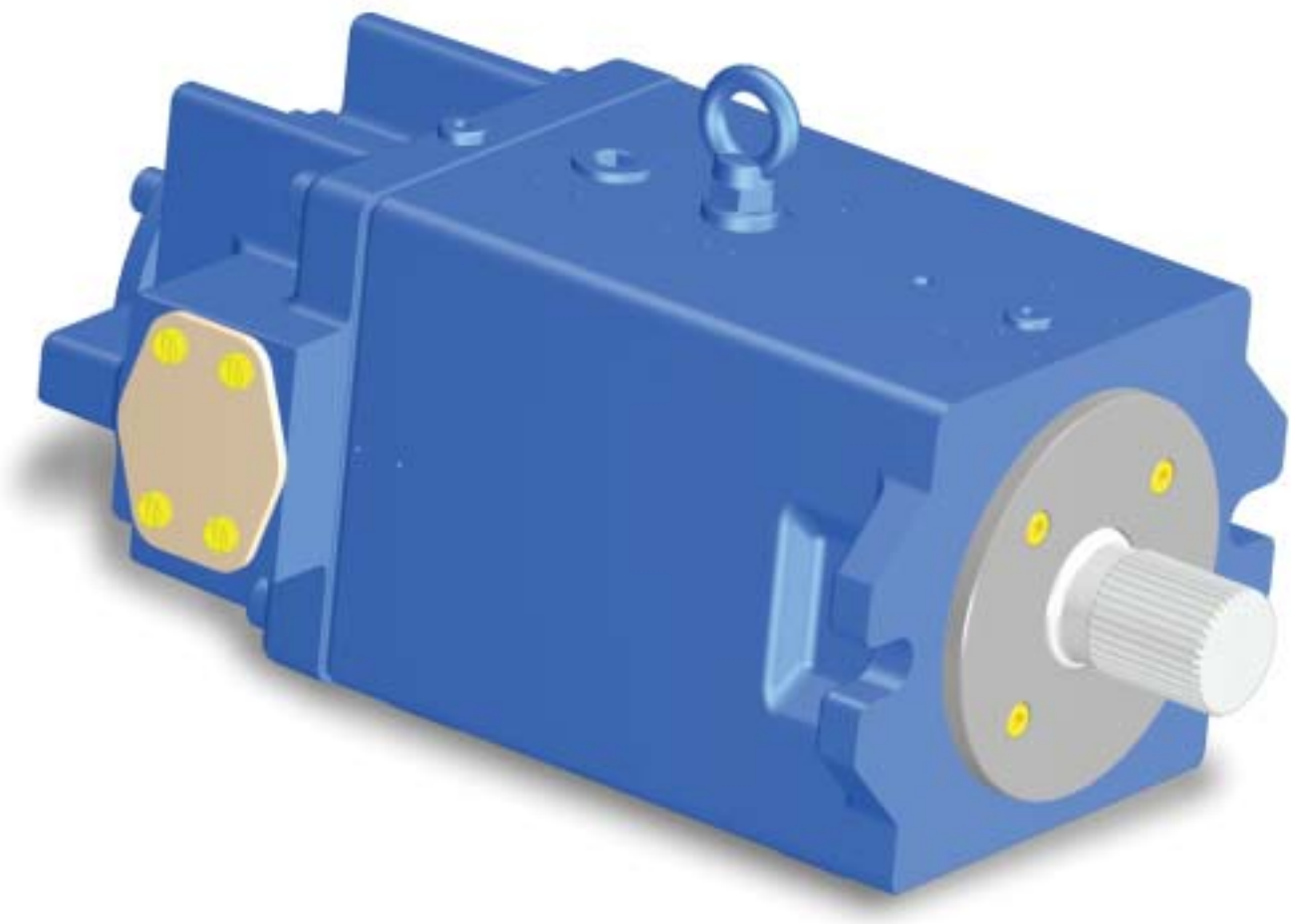
ENGINEERING
TOMORROW

Hydrokraft Piston Motors

Technical Information

MVX



BC441963615995en-000101

Table of Contents

* Dimensions - MFXS -250 / MVXS-250 ask for special drawings.
Used only for replacement.
For new applications please use MFWS / MVWS.

** MFXS / MVXS -130/180, for new applications please use MFWS / MVWS-130/180.

Introduction

- Axial piston motors with swashplate design and can be applied to hydrostatic drives.
- Pressure up to 350 bar.Rated speed up to 1800 min-1.
- A range of control options allow matching of motors to any application.
- Rotating and pressure loaded parts are pressure balanced.
- High efficiency from automatic pressure balancing of cylinder block to valve plate.
- Oversized shaft bearings for long life and thru-drive capability.
- Highly resistant to dirt because of automatic wear compensation.
- Low sound level assured by swashplate design and other proven features.

AVAILABLE DISPLACEMENT SIZES
066 ccm
090 ccm
130 ccm
180 ccm

Displacement controls:

ES - Electric motor displacement control

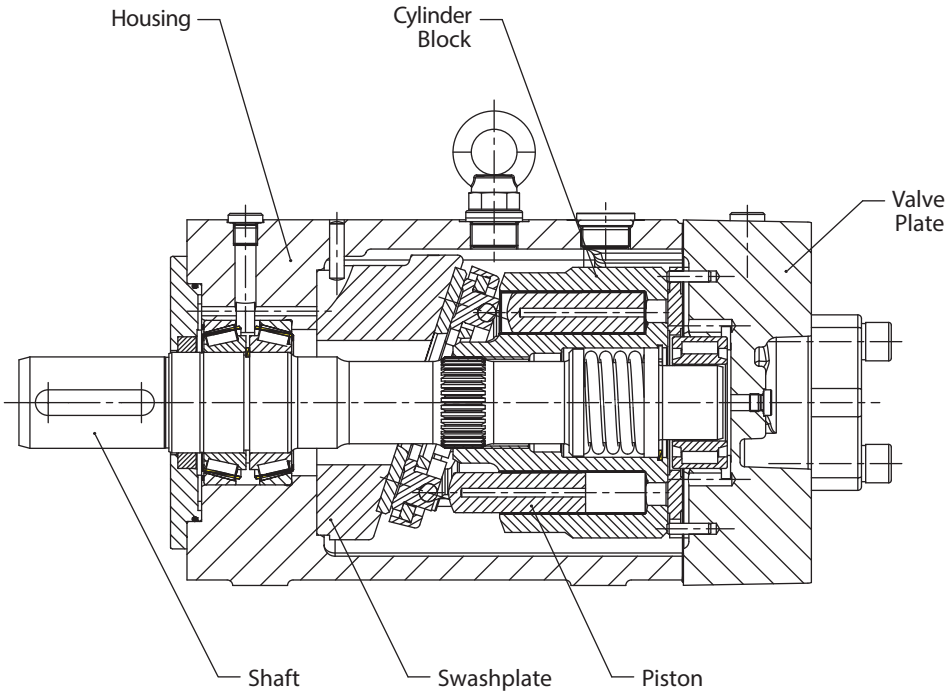
HG - Handwheel displacement control (Special feature)

FE - Screw adjustment control (Special feature)

DP - Pressure signal displacement control

SP - Electro hydraulic displacement control

Typical section of MFX motor



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

Model Code

Fixed & Variable
Displacement Motors

"X" Series

Form Page

The following 42-digit coding system has been developed to identify all of the configuration options for the "X" series fixed and variable displacement motors. Use this model code to specify a unit with the desired features. All 42-digits must be present when ordering. You may want to photocopy the matrix below to ensure, that each number is entered in the correct box. If adjustments other than the standard setting (character 34… 37) or special features (character 38 … 40) are needed, please provide the information when ordering.

Some characters are already filled out. For such characters there is no option available.

Explanation for each character can be found as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
M		**X**	**S**	**–**				**M**			**B**			**1**	**R**			**S**	**V**		**A**

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
																		1	**0**

SPECIFY NON STANDARD ADJUSTMENT BELOW

SPECIFY SPECIAL FEATURE BELOW

Model Code

Motors

"X" Series - Basic Motor

M * X S — * * * M * * B * * 1 R * * S V * A #

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

1 Motor
M – Motor

2 Displacement
F – Fixed Displacement
V – Variable Displacement

3 Pump Series
X – "X" Series (was 20 design)

4 Configuration
S – Single Unit

5 Separator — Separator

6 7 8 Displacement Size
066 – 66 cm^3/r [4.0 in^3/rev]
090 – 90 cm^3/r [5.5 in^3/rev]
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] (for Spares only)
??? – Non-Standard Displacement (MFX Only)

9 Basic Standard
M – Metric

10 11 Mounting Flange
02 – ISO 3019/2-125A2HW
04 – ISO 3019/2-160A2HW
06 – ISO 3019/2-200A2HW
See Chart Below

12 Rotation Direction
B - Both

13 Adjustment Stops
0 – No Stop
4 – Mechanical Adjustment Stop Side A (MVX only)
5 – Mechanical Adjustment Stop Side B (MVX only)
6 – Mechanical Adjustment Stops Side A and B (MVX only)
NOTE:
4 is used as max. Adjustment on Side A.
5 is used as min. Adjustment stop side A.
When **0** is specified, min. Adjustment Stop is set at 35 % of Vgmax
6 is the combination of **4** and **5** together

14 Thru-Drive Options
0 – None
K – Tachogenerator
E – Speed Limit Switch (Two Switches)

15 Main Ports
1 – SAE Ports - Metric Bolts

16 Main Port Orientation R
– Radial (Side Ports)

17 18 Main Drive Shaft End
1 – ISO Straight Key
2 – ISO Spline

19 Drive Shaft Seal Configuration
S – Single Shaft Seal

20 Seal Material
V - Viton*
*Viton is a trademark of E.I. Dupont (other materials available, contact your Danfoss Representative)

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

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

23 Add Control Model Code – Code (characters 23...37) on the following pages

MOUNTING FLANGE OPTIONS AVAILABLE	*066*	*090*	*130*	*180*	*250*
ISO 3019/2-125A2HW	18	19			
ISO 3019/2-160A2HW			20	21	
ISO 3019/2-200A2HW					22

Model Code

Motors

"X" Series - No Control

0	0	0	0	0	A	0	0	0	0	0	0	0	0	0	#
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

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 12 if required.

Model Code

Motors

"X" Series - ES Control

E	S	*	0	0	A	0	0	*	*	0	*	*	*	*	#
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

23 24 Control Type

ES – Electric Motor Displacement Control

25 Displacememt Adjustment Options

M – Electric Motor - (Fast Response)

N – Electric Motor - (Medium Response)

P – Electric Motor - (Slow Response)

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

31 Position Monitoring

A – 4 Limit Switches **B** – 8 Limit Switches

P – 4 Limit Switches + Sensor

T – 8 Limit Switches + Sensor

32 Electric Motor Type

2 – Motor with Brake (IP-54)

3 – Motor without Brake (Explosion Proof)

33 Control Voltage

0 – Not Applicable

34 35 36 37 Customer Adjustment Specification

0000 – None

???? – Yes (final number will be assigned by Eaton. Specify on table below)

38 Special Features

Add special feature description (characters 38...42) on page 12 if required.

CUSTOMER ADJUSTMENT SPECIFICATIONS

		Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments Set at		rpm	1500	—	
Mech. Stop Side A (Used as Max. Adjustment Stop Side A)		cm^3/rev	Vg_{max}		
Mech. Stop Side B (Used as Max. Adjustment Stop Side A)		cm^3/rev	$35\,^5/_8\,Vg_{max}$		< 35% not possible
Displacement Adjusted to		cm^3/rev	60% Vg_{max}		
Position Monitoring Switch	1	cm^3/rev	35% Vg_{max}		< 35% not possible
	2	cm^3/rev	95% Vg_{max}		> 95% not possible
	3	cm^3/rev	—		
	4	cm^3/rev	—		
	5	cm^3/rev	—		
	6	cm^3/rev	—		
	7	cm^3/rev	—		
	8	cm^3/rev	—		

Model Code

Motors

"X" Series - HG Control

H	G	0	0	0	A	0	0	0	0	0	*	*	*	*	#
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

23 24 Control Type

HG – Handwheel Displacement Control

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

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 12 if required.

CUSTOMER ADJUSTMENT SPECIFICATIONS

	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments Set at	rpm	1500	—	
Displacement Adjusted to	cm^3/rev	Vg_{max}		

Model Code

Motors

"X" Series - FE Control

F	E	0	0	0	A	0	0	0	0	0	*	*	*	*	#
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

23 24 Screw Adjustment Displacement Control

FE – Screw Adjustment Displacement Control

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 AdjustmentSpecification

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 12 if required.

CUSTOMER ADJUSTMENT SPECIFICATIONS

	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments Set at	rpm	1500	—	
Displacement Adjusted to	cm^3/rev	Vg_{max}		

Model Code

Motors

"X" Series - DP Control

D	P	*	0	0	A	0	0	0	0	0	*	*	*	*	#
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

23 24 Control Type

DP – Pressure Signal Adjustment Displacement Control

25 Displacement Adjustment Options

G – Mounting Interface Cetop 3 Only
H – Remote Port G 1/4
J – Proportional Relief inc. Electronics

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

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 12 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)	cm^3/rev.	Vg_{max}		
Mech. Stop Side B (used as min Adjustment Stop Side A)	cm^3/rev.	35% of Vg_{max}		<35% not possible

Model Code

Motors

"X" Series - SP Control

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

23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38

23 24 Control Type

SP – Proportional Valve Displacement Control

25 Displacement Adjustment Options

C – W ith CETOP 3 Prop Valve KDG4V 3

F – W ith CETOP 5 Prop Valve

26 27 Electronic Controls

3 – ER 9.3 - 10 (CETOP 3)

4 – ER 9.4 - 10 (CETOP 5)

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 Elec 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...40) on page 12 if required.

***CUSTOMER ADJUSTMENT SPECIFICATIONS**

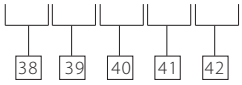
	Unit	Standard Adjustment	Customer Specified Adjustment	Remarks
All Revolution Adjustments below set at ..	rpm	1500	—	
Pilot Pressure	bar	60	—	
Mech. Stop Side A (used as max Adjustment Stop Side A)	cm^3/rev.	Vg_{max}		
Mech. Stop Side B (used as min Adjustment Stop Side B)	cm^3/rev.	35% of Vg_{max}		
Max. Stop by Control Side A	cm3/rev.	95% of Vg_{max}	EI Card AdjustmentRefer to EI card Manual done by customer	
Min. Stop by Control Side A	cm^3/rev.	35% of Vg_{max}+/-2.5%	EI Card AdjustmentRefer to EI card Manual done by customer	
Ramp Time 0→ A For 100% Stroke	sec	0	EI Card AdjustmentRefer to EI card Manual done by customer	
Ramp Time A →0 For 100% Stroke	sec	0	EI Card AdjustmentRefer to EI card Manual done by customer	
Preset Input Signals S1....S4	L/min	—	EI Card AdjustmentRefer to EI card Manual done by customer	

Model Code

Motors

"X" Series - Special Features

*** * * 1 0**



38 39 40 **Special Features**

000 – None

??? – Defined by Eaton

41 42 **Design Number 10** – Design Number

Motor Specifications- U.S.

MODEL			MFW/MVW 66	MFW/MVW 90	MFW/MVW 130	MFW/MVW 180
Design			swashplate type			
Type of mounting			Flange- or foot-mounted. Combination units foot mounted only.			
Pipe connection SAE Flange	B A	psi	1"=6000 1"=6000	1"=6000 1"=6000	1"=6000 1"=6000	11/4"=6000 1 1/4"=6000
Direction of rotation			Bi - directional			
Speed range	n_{min}[1] n_{max}[2]	rpm	80 1800			
Installation position			Optional, see mounting information			
Ambient temperature range	min max	°F	–4 122			
Weight	M	lbs.	121	165	234	251
Mass of inertia	J	lb ft2	0.38	0.38	1.068	1.068

HYDRAULIC CHARACTERISTICS						
Nominal pressure (100% duty cycle)	p_N	psi	5000			
Output pressure	p_{Amin} / p_{Bmin} p_{Bmax} / p_{Amax}	psi	30 Pressure can be applied to the motor outlet but the sum of p_{Amax} and p_{Bmax} must not exceed the maximum value of 6090psi			
Maximum pressure to DIN 24312	p_{max}	psi	6090			
Hydraulic fluid			Hydraulic oil to DIN 51524 part 2. Refer to section Aplication Data-Fluid Recommendations			
Hydraulic fluid temperature range	min max	°F	–13 (on startup) 194			
Viscosity range for continuous operation	min max	cSt cSt	10 75			
Maximum permissible start viscosity	max	cSt	1000			
Filtering	ISO 4406		18/15/13			
Maximum geometric absorption rate[3]	V_{gmax}	in^3	4.1	5.5	7.9	11.0
Minimum geometric absorption rate	V_{gmin}	in^3	When no minimum adjustment stop is specified, min. geometric absorption rate is set at 35% of Vgmax			
Maximum geometric motor flow	Q_g	USgpm	31.4	42.8	61.8	85.6
Case pressure	p_{Vmax}	psi	max. 7.2psi over p_{Amin} /p_{Bmin}, p_{Vmax} = 58psi abs., p_{Vmax} = 87psi abs. with special shaft seal			

DRIVE						
Maximum driving torque - (p_{Amax} or p_{Bmax}, η=100%)	M1 single	lb.ft	325	444	640	887
Maximum power consumption - n=1800 rpm (p_{Amax} or p_{Bmax}, η=100%)	P1 single	hp	112	152	220	304

COMBINATION UNITS						
Maximum driving torque - comb. unit	M1	lb.ft	2x 325	2x 444	2x 640	2x 887 (splined shaft only)

1) Minimum speed for continuous operation

2) Higher speed available on request

3) Tolerance + 1%

Motor Specifications- Metric

MODEL			MFW/MVW 66	MFW/MVW 90	MFW/MVW 130	MFW/MVW 180
Design			swashplate type			
Type of mounting			Flange or foot-mounted. Combination units foot mounted only.			
Pipe connection SAE Flange	B A	psi	1" = 6000 1" = 6000	1" = 6000 1" = 6000	1" = 6000 1" = 6000	1 1/4" = 6000 1 1/4" = 6000
Direction of rotation			Bi - directional			
Speed range	n_{min}[1] n_{max}[2]	min^{-1}	80 1800			
Installation position			Optional, see mounting information			
Ambient temperature range	Min max	°C	–20 50			
Weight	M	kg	55	75	106	114
Mass of inertia	J	$kg\,m^2$	0,016	0,016	0,045	0,045

HYDRAULIC CHARACTERISTICS						
Nominal pressure (100% duty cycle)	p_N	bar	350			
Output pressure	p_{Amin} / p_{Bmin} p_{Bmax} / p_{Amax}	bar	2 Pressure can be applied to the motor outlet but the sum of p_{Amax} and p_{Bmax} must not exceed the maximum value of 420 bar			
Maximum pressure to DIN 24312	p_{max}	bar	420			
Hydraulic fluid			Hydraulic oil to DIN 51524 part 2. Refer to section Aplication Data-Fluid Recommendations			
Hydraulic fluid temperature range	min max	°C	–25 (on startup) 90			
Viscosity range for continuous operation	min max	cSt cSt	10 75			
Maximum permissible start viscosity	max	cSt	1000			
Filtering	ISO 4406		18/15/13			
Maximum geometric absorption rate[3]	V_{gmax}	cm^3	66	90	130	180
Minimum geometric absorption rate	V_{gmin}	cm^3	When no minimum adjustment stop is specified, min. geometric absorption rate is set at 35% of Vgmax			
Maximum geometric motor flow	Q_g l / min		119	162	234	324
Case pressure	p_{vmax}	bar	max. 0.5 bar over p_{Amin} / p_{Bmin} , p_{vmax} = 4 bar abs., p_{vmax} = 6 bar abs. with special shaft seal			

DRIVE						
Maximum driving torque - single unit (p_{Amax} or p_{Bmax}, n=100%)	$M_{1\ Single}$	Nm	441	602	869	1203
Maximum power consumption - n=180 min^{-1} (p_{Amax} or p_{Bmax}, n=100%)	$P_{1\ Single}$	kW	83	114	164	227

COMBINATION UNITS						
Maximum driving torque - comb. unit	M_1	Nm	2x441	2x602	2x869	2x1203 (splined shaft only)

1) Minimum speed for continuous operation

2) Higher speed available on request

3) Tolerance + 1%

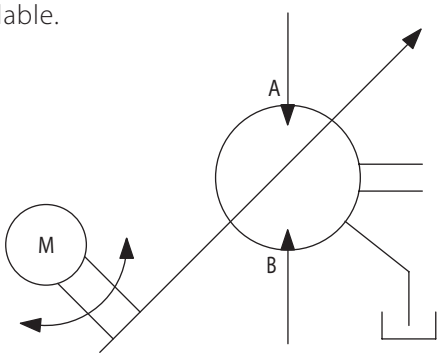
ElectricMotor Displacement Control ES

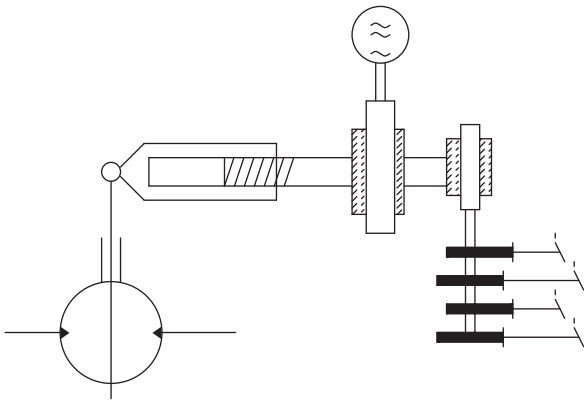
"X" Series - Motors

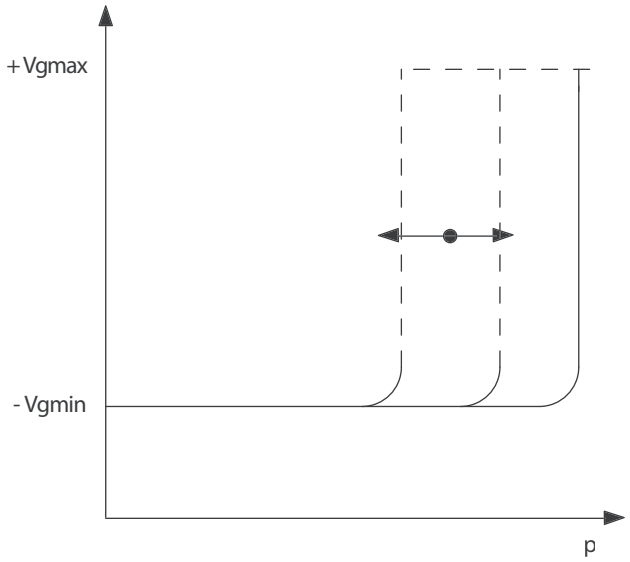
This ES control adjusts the swashplate angle of the pump by means of a three phaseelectric servo motor, worm gearing and a switch box with 4 or (optional) 8 limit switches for different positions. A potentiometer for steplessadjustment and/or position monitoring is also available.

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 times are not variable during operation).

Explosion protection versions arealso available.







MVX Response times ES - Control

	THEORETICAL RESPONSE TIME (SEC) FOR MAXIMUM DISPLACEMENT						***CHARACTER IN MODEL CODE POS.25***
Size	***066 / 090***		***130 / 180***		***250***		
Frequency Hz	50	60	50	60	50	60	
Fast	5	4	12	10	10	9	M
Medium	16	13	23	19	20	16	N
Slow	25	21	35	30	31	26	P

Response time from Vgmin (35%) to +Vgmax (100%)

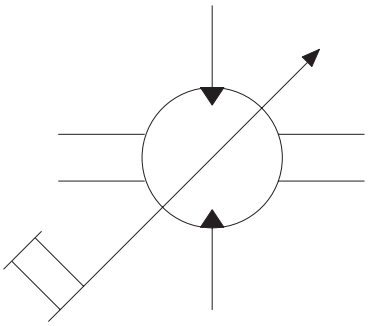
FE, HG Manual Adjustment Displacement Control

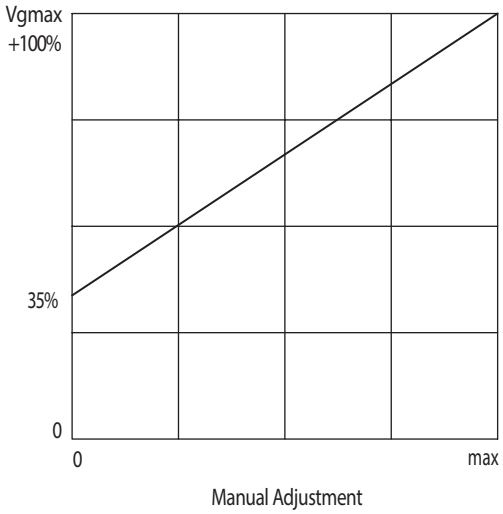
"X" Series - Motors

FE The FE control isa displacement control where the motor's swashplate angle is adjusted by a screw.

HG The HG control is a displacement control where the motor's swashplate angle can be adjusted by a handwheel.

The max. (and/or min.) swashplate angle can be limited by a spacer inside the control cylinder (pos. no. 13 in model coding, options 4, 5 or 6 in combination with customer adjustment specification in position 34-37 for the set values). The setting must be defined before ordering and cannot be modified during operation.





DP Pressure Signal Adjustment Displacement Control

"X" Series - Motors

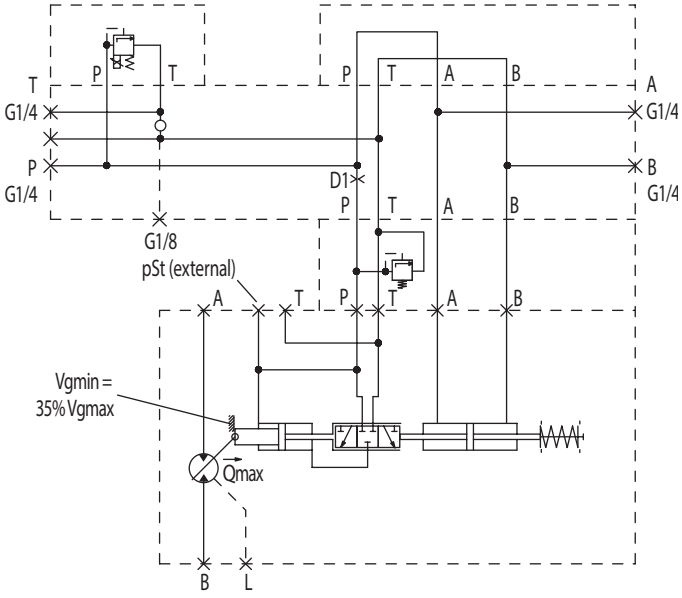
The swivel angle of the motor is proportional to the pilot pressure.

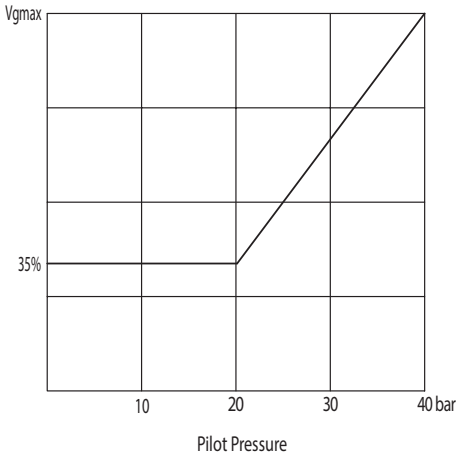
A separate pilot oil circuit is necessary. This circuit should be external to prevent the influence of variable motor speed to the pilot oil flow i.e. response time. From this the control pressure is reduced to the desired set value by means of a suitable pressure control valve (with P-T line) and throttle in P line 0.8Ø (0.03 in).

The DP control can be usedfor stepless adjustment of the swashplate angle with standard requirements in dynamic and precision. No feedback signal is needed, an optical indicator recommended (pos. 21 in model coding, option "V").

The maximum swashplate angle of the motor can be limited mechanically to between 50% and 100% by a screw. As an additional option the max. (and/or min.) value can be limited by a spacer inside the control cylinder (pos. no. 13 in model coding, options 4, 5 or 6 in combination with customer adjustment specification in position 34-37 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.





SIZE	RESPONSE TIME (SEC) WITH 12 L/MIN PILOT OIL FLOW (STANDARD)	PILOT PRESSURE PST (BAR)
066/090	0,5	60
130/180	0,7	60
250	0,9	60

Response time from Vgmin (35%) to +Vgmax (100%)

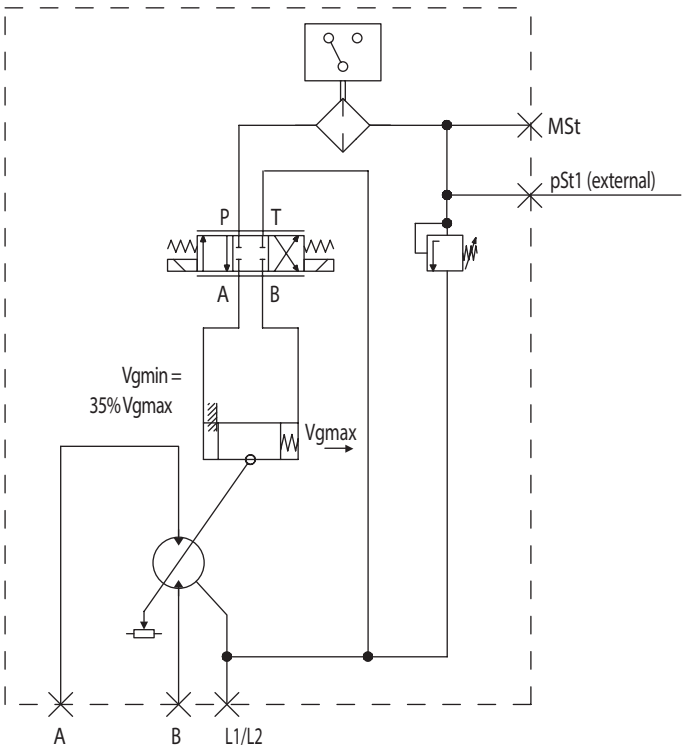
Electrohydraulic Servo Adjustment "SP"

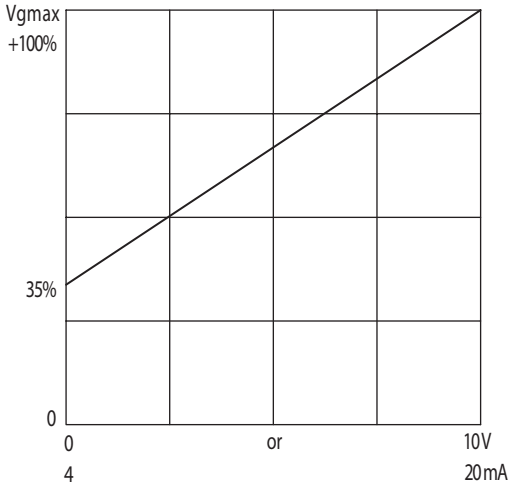
"X" Series - Motors

The Electro hydraulic displacement control works without throttle losses within electrically adjustable limits. This is done by controlling swashplate angle with electrical feedback (electrical closed loop control). A separate pilot oil circuit is necessary. This circuit should be external to prevent the influence of variable motor speed to the pilot oil flow i.e. response time. The swashplate angle is recorded as an electrical signal and lead back to the control card. The proportional valve and servo piston transform the output signal of thecontrol card to the desired setting. This results in very precise and dynamic control.

Hysteresis, consistency: approximately 1% of end value.

The maximum swashplate angle of the motor can be limited mechanically to between 50% and 100% by screw. As an additional option the max. (and/or min.) flow can be limited by a spacer inside the control cylinder (pos. no. 13 in model coding, options 4, 5 or 6 in combination with customer adjustment specification in position 40-43 for the set values). This solution is also recommended for very rough operating conditions and the need for very exact repeatability over a long time period. The setting must be defined before ordering and cannot be modified during operation.





Electrohydraulic Servo Adjustment "SP" (Cont.)

"X" Series - Motors

Response Times - Electronic Control Cards

PROPORTIONAL VALVE	PILOT OIL FLOW L/MIN (USGPM)	PILOT OIL PRESSURE PST BAR (PSI)	CONTROL ELECTRONICS (AMP. CARD)	RESPONSE TIME VMIN< >VMAX [MS]	UNIT SIZE CM^3	SERVO PISTON DIAMETER MM (IN)	STROKE MM (IN)	VOLUME CM^3 (IN^3) PER CHAMBER
Medium response		60 (857)		170	066 / 090	40 / 30 (1.57 / 1.18)	18 (.71)	10,0 (.611)
KDG4V3-2 C20NMUH760	12 (3.17)	60 (857)	ER9.3-10	230	130 / 180	55 / 38 (2.16 / 1.49)	23 (.89)	28,3 (1.725)
(CETOP3)		60 (857)		375	250	70 / 50 (2.76 / 1.97)	28 (1.11)	52,6 (3.213)
High response (CETOP5)	On request							

The ER9.3-10 and ER 9.4-10 (for High Response) digital Amplifier cards are optimized for use with the SP - Control. Please ask for separate Documentation. Software is available for parameter setting and storing (database function). Contact Danfoss to request free of charge manual and software CD.

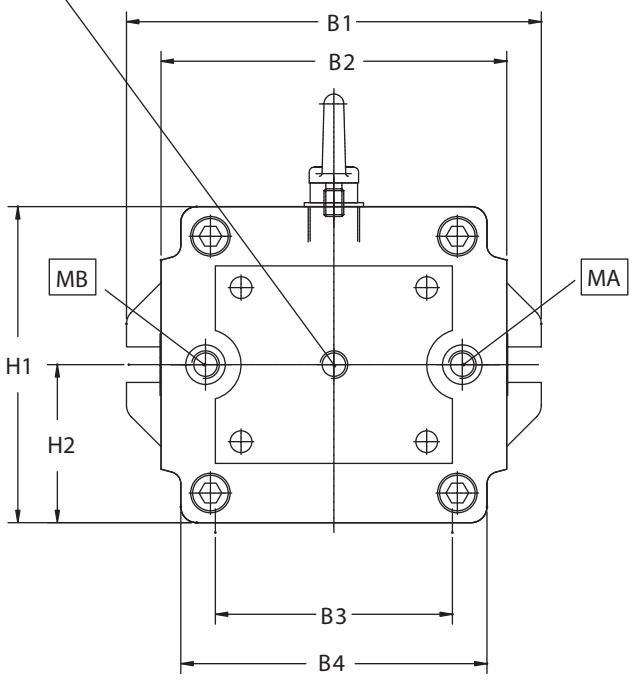
Dimensions - MFXS 066, 090, 130, 180

L1 Drainage resp. filling of the housing

MA Gauge port G1/4"

MB Gauge port G1/4"

Screw for ventilation of housing in case of vertical mounting (shaft downwards) G1/4" (M10x1 – at motors built 1986 and earlier)



Non-Standard Displacement:

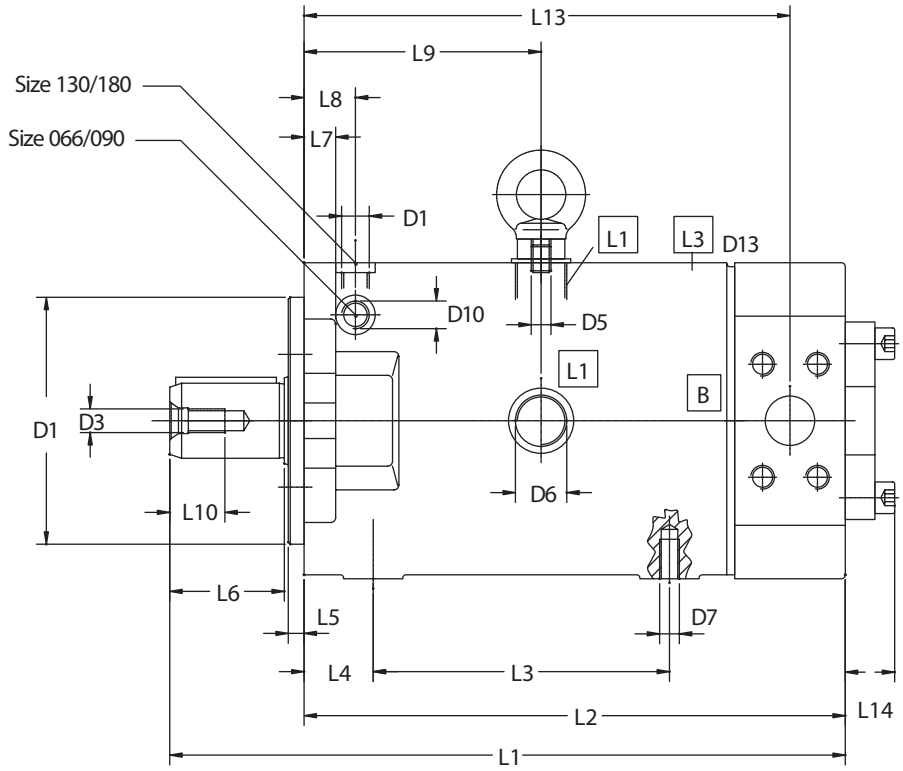
SIZE	REDUCED DISPLACEMENT AVAILABLE
066	55 or 44 ccm / rev
090	75 or 60 ccm / rev
130	115 or 94 ccm / rev
180	160 or 130 ccm / rev

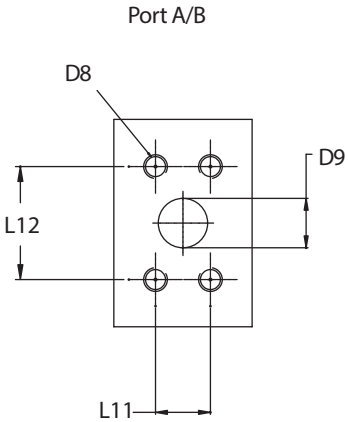
DIRECTION OF ROTATION	INLET PORT (HIGH PRESSURE SIDE)	OUTLET PORT (LOW PRESSURE SIDE)
Right Hand Rotation	B	A
Left Hand Rotation	A	B

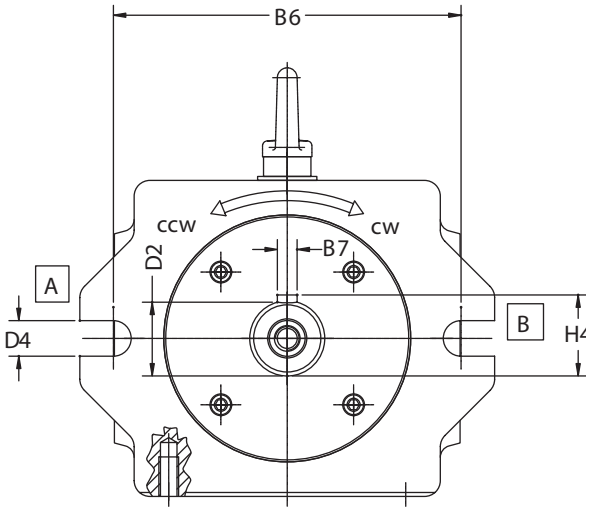
SIZE	SAE-FLANGE 6000PSI
066	1″
090	1″
130	1″
180	1 1/4″

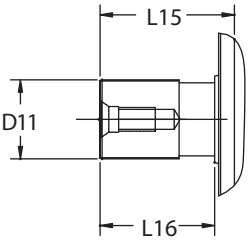
SIZE	B1	B2	B3	B4 h9	B6	B7
066	210	175	120	155	180	10
090	210	175	120	155	180	10
130	260	240	150	200	224	14
180	260	240	150	200	224	14

SIZE	D1 h8	D2 k6	D3	D4	D5	D6 Light Execution	D7	DEEP	D8	DEEP	D9	D10	D11	D12	D13
066	125	38	M12	18	M10	M26x1.5	M10	20	M12	18	25	R1/4″	W40x1.25x10a	R1/4″	M26x1.5
090	125	38	M12	18	M10	M26x1.5	M10	20	M12	18	25	R1/4″	W40x1.25x10a	R1/4″	M26x1.5
130	160	50	M16	22	M10	M26x1.5	M12	20	M12	20	25	R1/4″	W50x1.25x10a	R1/4″	11/16-12UNF
180	160	50	M16	22	M10	M26x1.5	M12	20	M14	25	30	R1/4″	W50x1.25x10a	R1/4″	11/16-12UNF







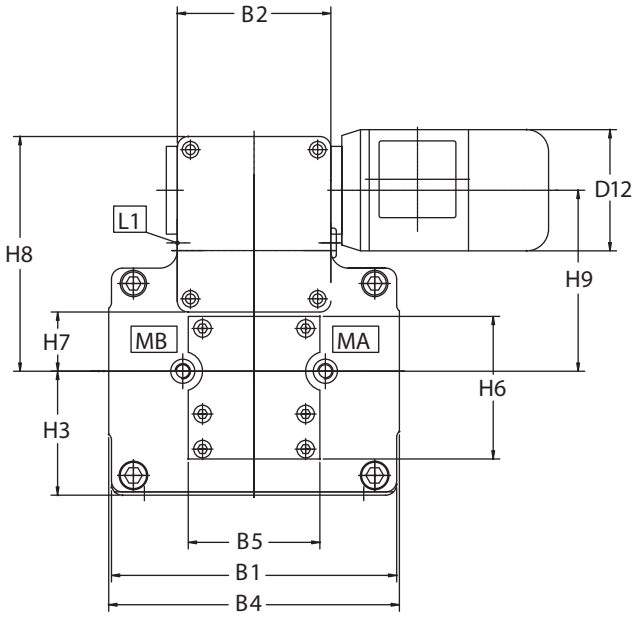


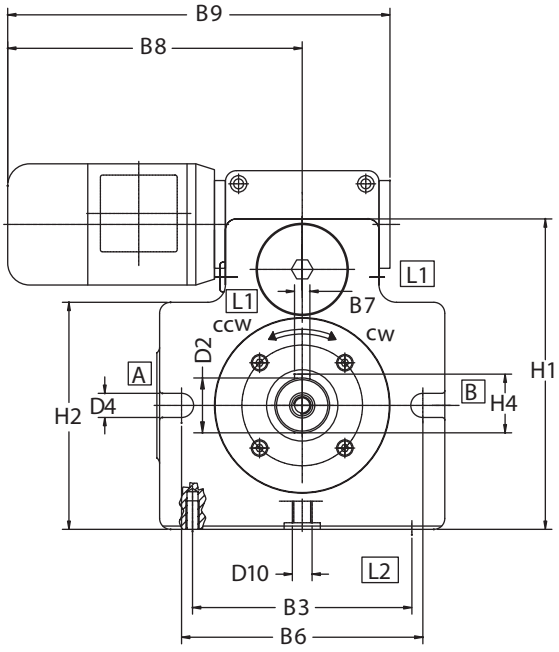
SIZE	H1	H2	H4
066	160	80	41
090	160	80	41
130	200	100	53.5
180	200	100	53.5

SIZE	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
066	342	274	150	35	8	58	16	26	120	28	27.8	57.2	246	—
090	342	274	150	35	8	58	16	26	120	28	27.8	57.2	246	—
130	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26
180	433	341	185	40	9	82	20	32	148	36	31.8	66.7	306	26

Dimensions - MVXS 066, 090, 130, 180

Displacement Control
By Electric Motor, ES





L1 Two drain ports, one supplied plugged.

L2 Supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards.

L3 Oil filling or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing downwards.

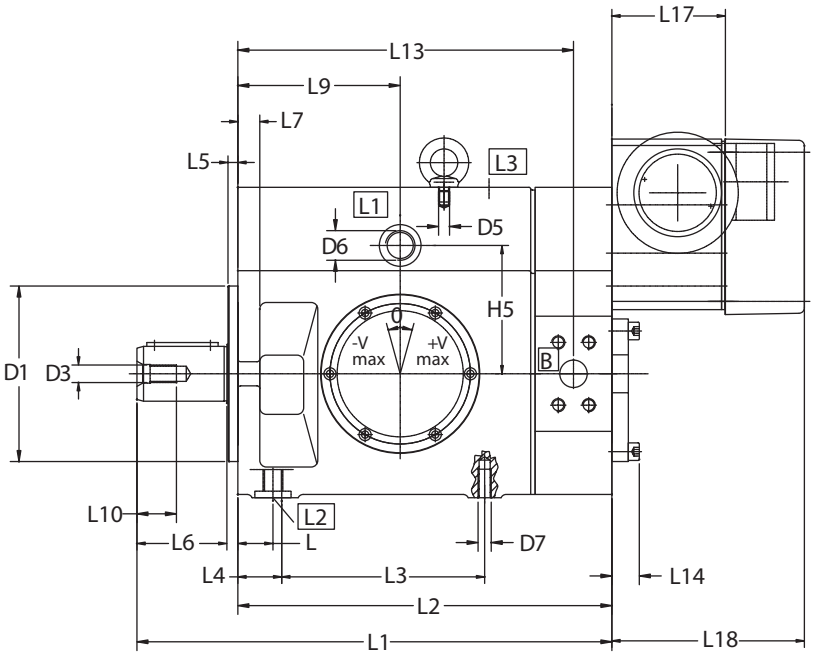
MA Gauge port G1/4"

MB Gauge port G1/4"

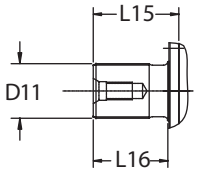
DIRECTION OF ROTATION	INLET PORT (HIGH PRESSURE SIDE)	OUTLET PORT (LOW PRESSURE SIDE)
Right Hand Rotation	B	A
Left Hand Rotation	A	B

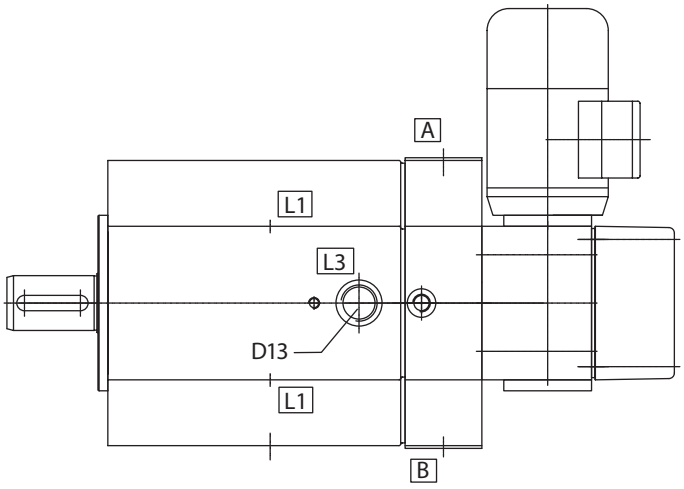
SIZE	B1	B2	B3	B4	B5	B6	B7 h9	B8	B9
066	210	116	160	235	120	180	10	276.5	334.5
090	210	116	160	235	120	180	10	276.5	334.5
130	260	140	200	265	120	224	14	288.5	368.5
180	260	140	200	265	120	224	14	288.5	368.5

SIZE	D1 h8	D2 k6	D3	D4	D5	D6 LightExecution	D7	DEEP	D8	DEEP	D9	D10	DEEP	D11	D12	D13 SAEJ475
066	125	38	M12	18	M10	M22x1.5	M10	20	M12	18	25	M18x1.5	12	W40x1.25x10a	110.5	7/8-14 UNF
090	125	38	M12	18	M10	M22x1.5	M10	20	M12	20	25	M18x1.5	12	W40x1.25x10a	110.5	7/8-14 UNF
130	160	50	M16	22	M10	M26x1.5	M12	26	M12	20	25	M18x1.5	12	W50x1.25x10a	110.5	11/16-12UNF
180	160	50	M16	22	M10	M26x1.5	M12	26	M14	22	30	M18x1.5	12	W50x1.25x10a	110.5	11/16-12UNF

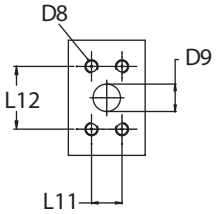


For Splined Data See Table





Port A/B

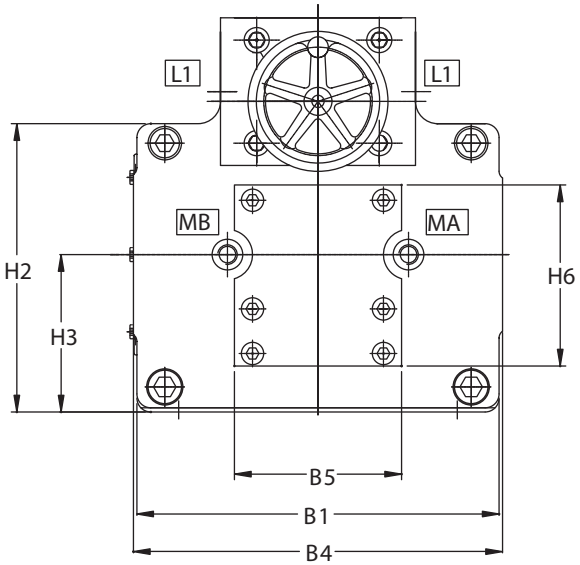


SIZE	H1	H2	H3	H4	H5	H6	H7	H8	H9
066	227	162	90	41	93	130	53	168	122
090	227	162	90	41	93	130	53	168	122
130	283	207	113	53.5	117	130	58.5	214	165
180	283	207	113	53.5	117	130	58.5	214	165

SIZE	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18
066	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	78	153.5
090	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	78	153.5
130	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26	78	68	100	175.5
180	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26	78	68	100	175.5

Dimensions - MVXS 066, 090, 130, 180

Handwheel Control, HG



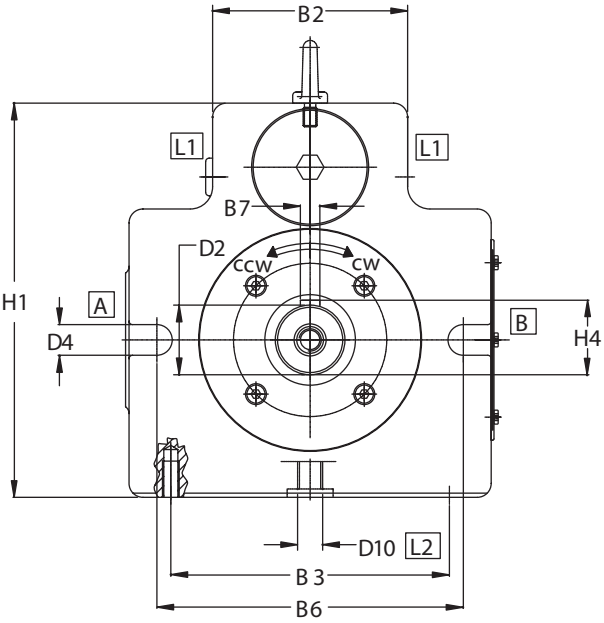
L1 Two drain ports, one supplied plugged.

L2 Supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards.

L3 Oil filling or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing downwards.

MA Gauge port G1/4"

MB Gauge port G1/4"

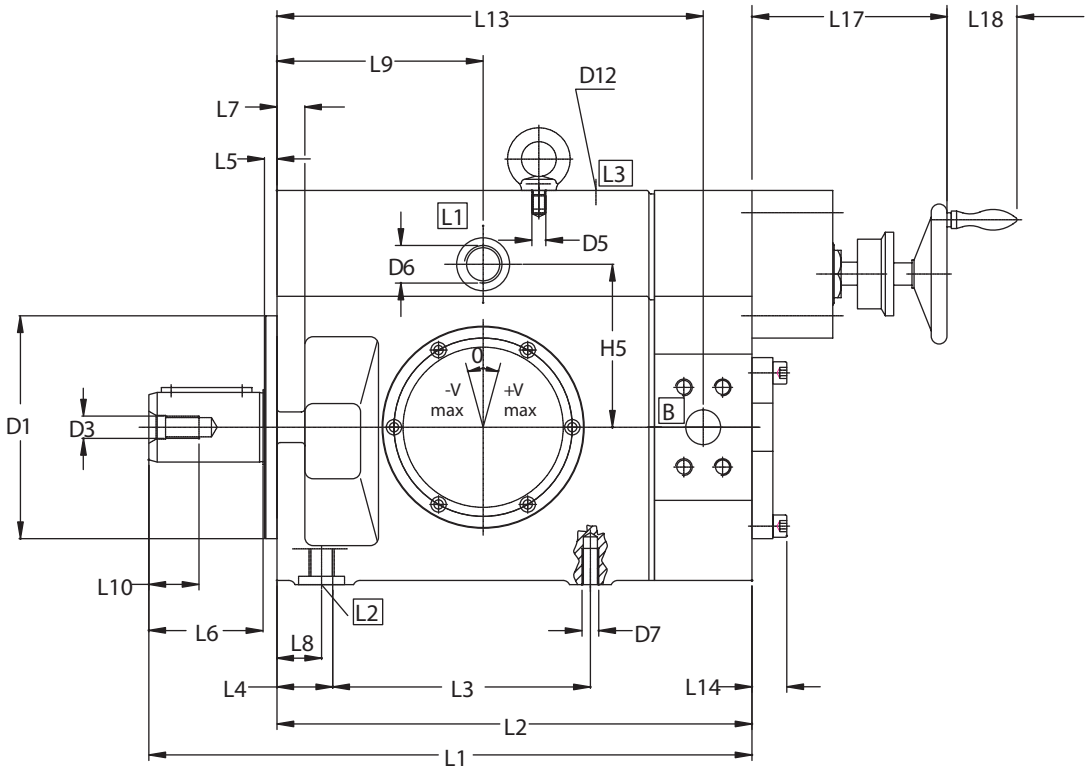


DIRECTION OF ROTATION	INLET PORT (HIGH PRESSURE SIDE)	OUTLET PORT (LOW PRESSURE SIDE)
Right Hand Rotation	B	A
Left Hand Rotation	A	B

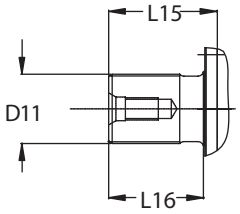
SIZE	SAE-FLANGE 6000PSI
066	1″
090	1″
130	1″
180	1 1/4″

SIZE	B1	B2	B3	B4	B5	B6	B7 h9
066	210	116	160	235	120	180	10
090	210	116	160	235	120	180	10
130	260	140	200	265	120	224	14
180	260	140	200	265	120	224	14

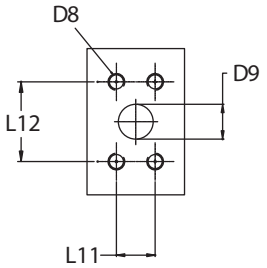
SIZE	D1 h8	D2 k6	D3	D4	D5	D6 LightExecution	D7	DEEP	D8	DEEP	D9	D10	DEEP	D11	D12 SAEJ475
066	125	38	M12	18	M10	M22x1.5	M10	20	M12	18	25	M18x1.5	12	W40x1.25x10a	7/8-14 UNF
090	125	38	M12	18	M10	M22x1.5	M10	20	M12	20	25	M18x1.5	12	W40x1.25x10a	7/8-14 UNF
130	160	50	M16	22	M10	M26x1.5	M12	26	M12	20	25	M18x1.5	12	W50x1.25x10a	11/16-12 UNF
180	160	50	M16	22	M10	M26x1.5	M12	26	M14	22	30	M18x1.5	12	W50x1.25x10a	11/16-12 UNF



For Splined Data See Table



Port A/B

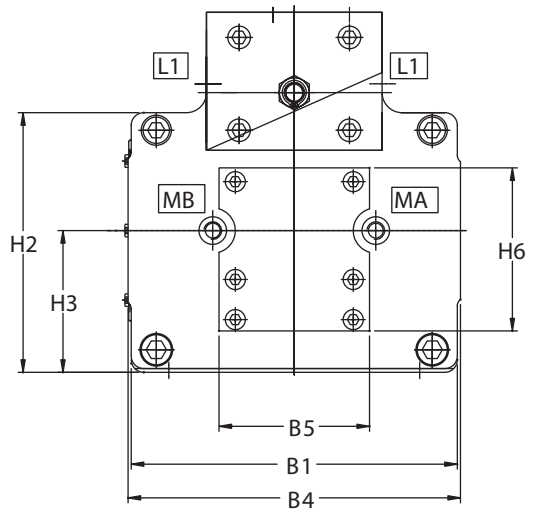


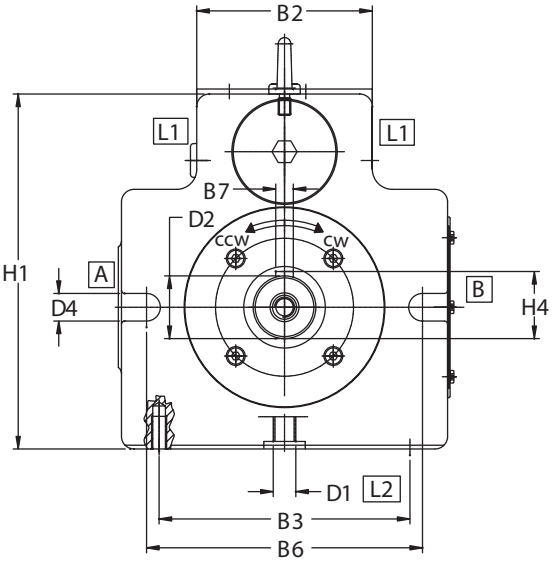
SIZE	H1	H2	H3	H4	H5	H6
066	227	162	90	41	93	130
090	227	162	90	41	93	130
130	283	207	113	53.5	117	130
180	283	207	113	53.5	117	130

SIZE	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18
066	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	130	46
090	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	130	46
130	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26	78	68	130	46
180	433	341	185	40	9	82	20	32	148	36	31.8	66.2	306	26	78	68	130	46

Dimensions - MVXS 066, 090, 130, 180

Adjustment Screw Control, FE





L1 Two drain ports, one supplied plugged.

L2 Supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards.

L3 Oil filling or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing downwards.

MA Gauge port G1/4"

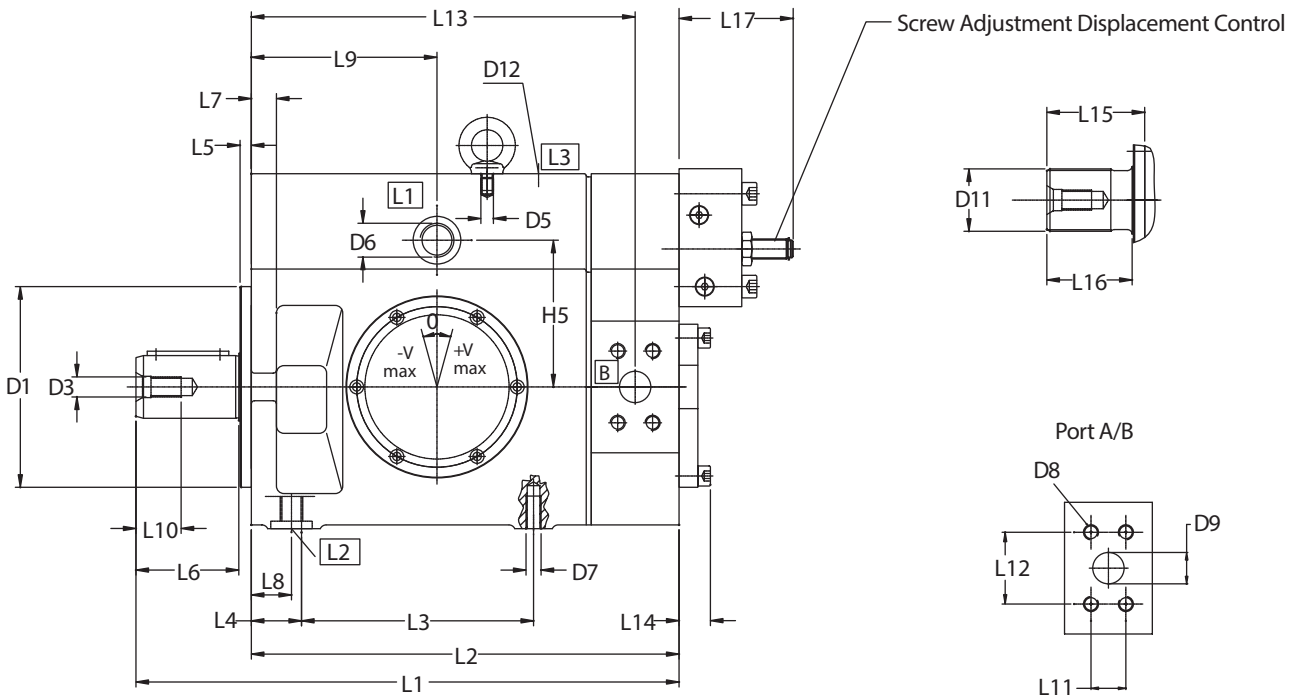
MB Gauge port G1/4"

DIRECTION OF ROTATION	INLET PORT (HIGH PRESSURE SIDE)	OUTLET PORT (LOW PRESSURE SIDE)
Right Hand Rotation	B	A
Left Hand Rotation	A	B

SIZE	SAE-FLANGE 6000PSI
066	1″
090	1″
130	1″
180	1 1/4″

SIZE	B1	B2	B3	B4	B5	B6	B7 h9
066	210	116	160	235	120	180	10
090	210	116	160	235	120	180	10
130	260	140	200	265	120	224	14
180	260	140	200	265	120	224	14

SIZE	D1 h8	D2 k6	D3	D4	D5	D6 LightExecution	D7	DEEP	D8	DEEP	D9	D10	DEEP	D11	D12 SAEJ475
066	125	38	M12	18	M10	M22x1.5	M10	20	M12	18	25	M18x1.5	12	W40x1.25x10a	7/8-14UNF
090	125	38	M12	18	M10	M22x1.5	M10	20	M12	20	25	M18x1.5	12	W40x1.25x10a	7/8-14 UNF
130	160	50	M16	22	M10	M26x1.5	M12	26	M12	20	25	M18x1.5	12	W50x1.25x10a	11/16-12 UNF
180	160	50	M16	22	M10	M26x1.5	M12	26	M14	22	30	M18x1.5	12	W50x1.25x10a	11/16-12 UNF

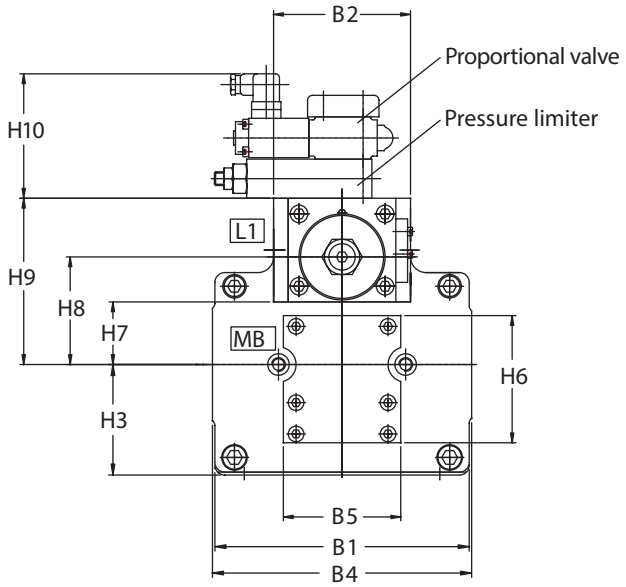


SIZE	H1	H2	H3	H4	H5	H6
066	227	162	90	41	93	130
090	227	162	90	41	93	130
130	283	207	113	53.5	117	130
180	283	207	113	53.5	117	130

SIZE	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17
066	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	90
090	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	90
130	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26	78	68	90
180	433	341	185	40	9	82	20	32	148	36	31.8	66.2	306	26	78	68	90

Dimensions - MVXS 066, 090, 130, 180

Pressure Signal
Displacement Control, DP



T Return line of control circiut G1/2"

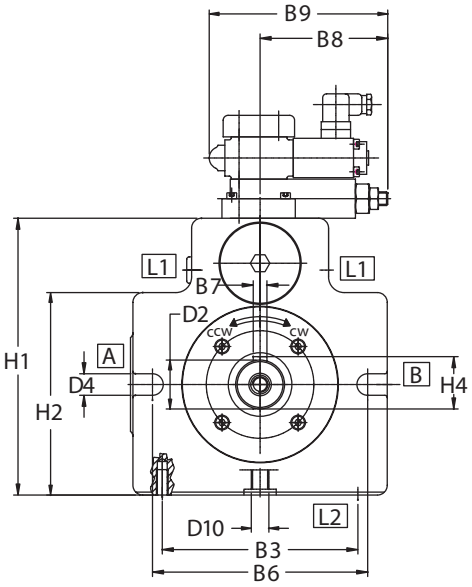
L1 Two drain ports, one supplied plugged.

L2 Supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards.

L3 Oil filling or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing downwards.

MA Gauge port system pressure G1/4"

MB Gauge port system pressure G1/4"

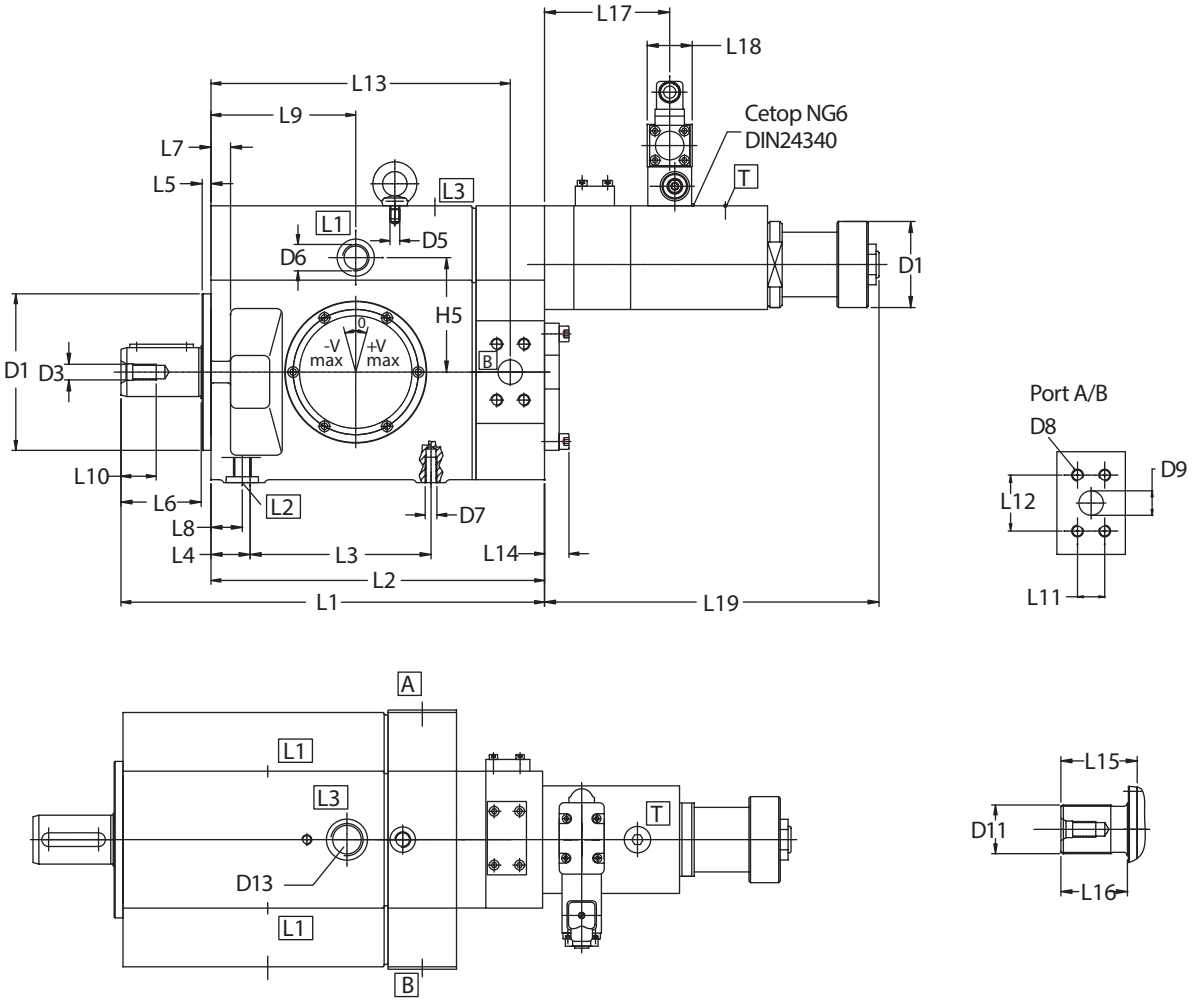


DIRECTION OF ROTATION	INLET PORT (HIGH PRESSURE SIDE)	OUTLET PORT (LOW PRESSURE SIDE)
Right Hand Rotation	B	A
Left Hand Rotation	A	B

SIZE	SAE-FLANGE 6000PSI
066	1"
090	1"
130	1"
180	1 1/4"

SIZE	B1	B2	B3	B4	B5	B6	B7 h9	B8	89
066	210	116	160	235	120	180	10	130.5	182.5
090	210	116	160	235	120	180	10	130.5	182.5
130	260	140	200	265	120	224	14	130.5	182.5
180	260	140	200	265	120	224	14	130.5	182.5

SIZE	D1 h8	D2 k6	D3	D4	D5	D6 LightExecution	D7	DEEP	D8	DEEP	D9	D10	DEEP	D11	D12	D13 SAEJ475
066	125	38	M12	18	M10	M22x1.5	M10	20	M12	18	25	M18x1.5	12	W40x1.25x10a	64	7/8-14 UNF
090	125	38	M12	18	M10	M22x1.5	M10	20	M12	20	25	M18x1.5	12	W40x1.25x10a	64	7/8-14 UNF
130	160	50	M16	22	M10	M26x1.5	M12	26	M12	20	25	M18x1.5	12	W50x1.25x10a	88	1 1/16-12 UNF
180	160	50	M16	22	M10	M26x1.5	M12	26	M14	22	30	M18x1.5	12	W50x1.25x10a	88	1 1/16-12 UNF

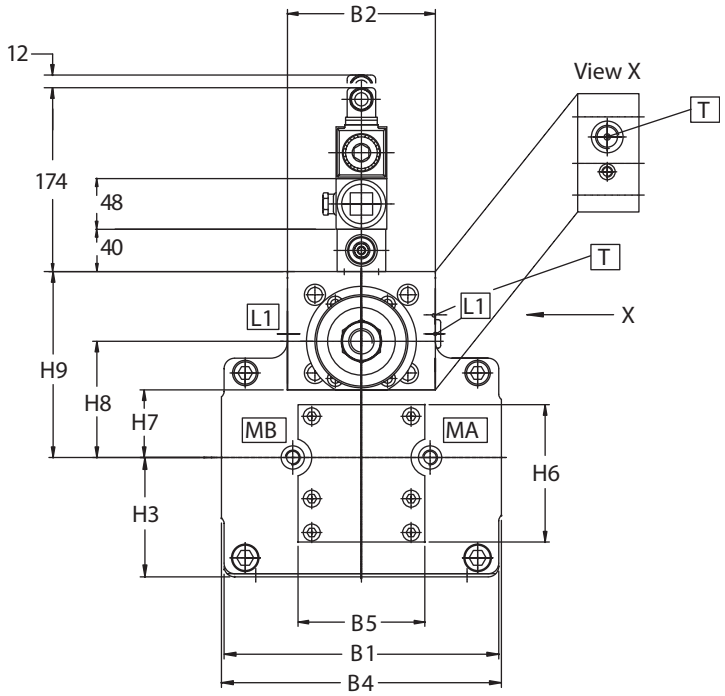


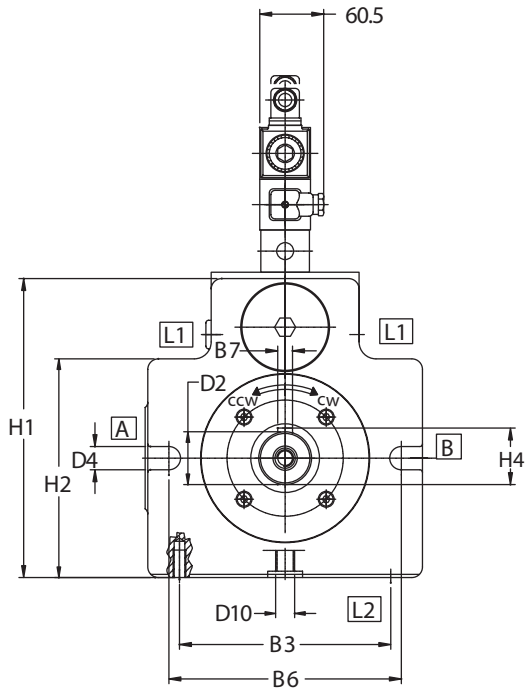
SIZE	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
066	227	162	90	41	93	130	53	88	137	127
090	227	162	90	41	93	130	53	88	137	127
130	283	207	113	53.5	117	130	64	110	170	127
180	283	207	113	53.5	117	130	64	110	170	127

SIZE	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19
066	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	104	46	267
090	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	104	46	267
130	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26	78	68	128	46	342
180	433	341	185	40	9	82	20	32	148	36	31.8	66.7	306	26	78	68	128	46	342

Dimensions - MVXS 066, 090, 130, 180

Electro Hydraulic Displacement Control, SP





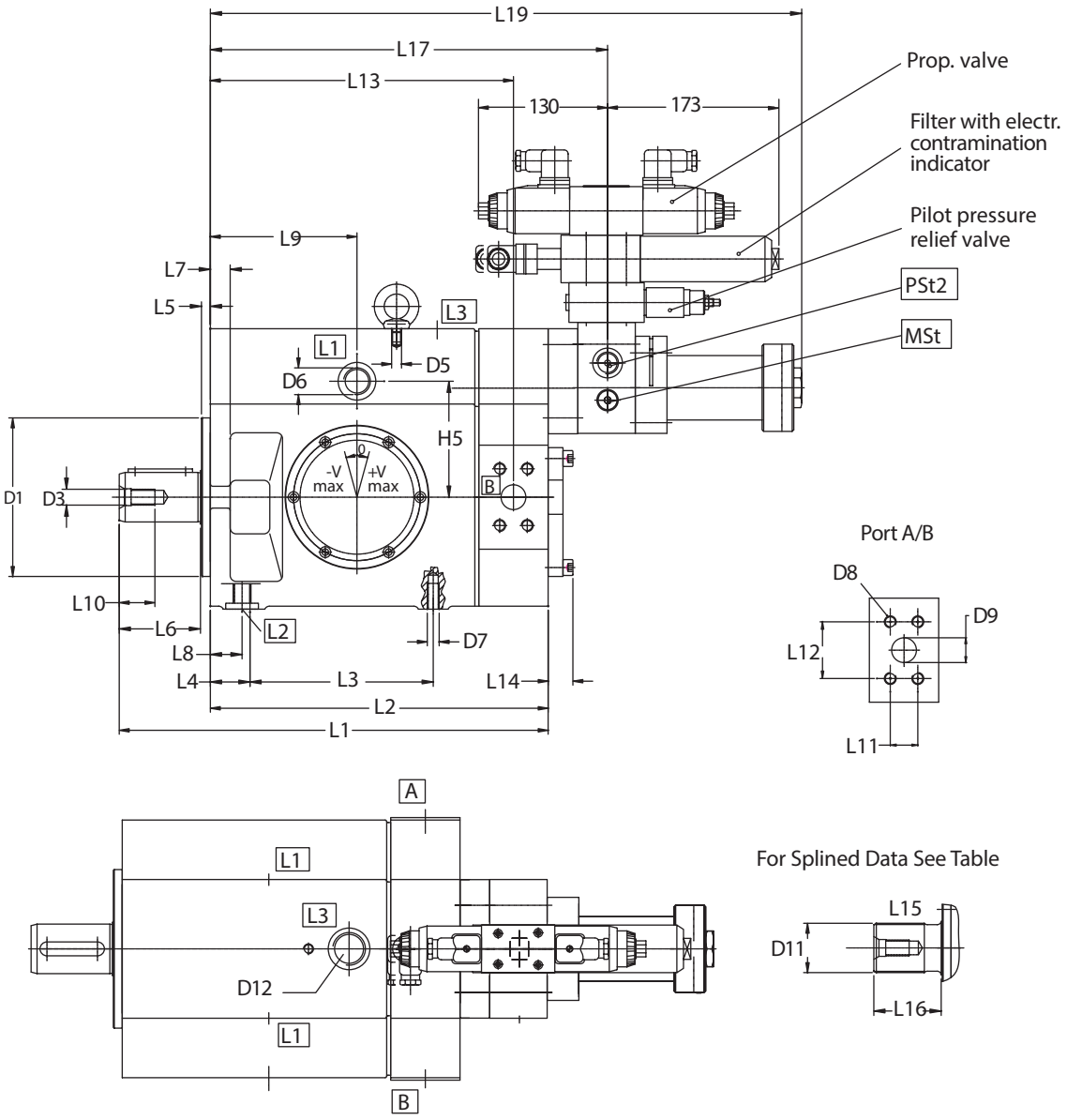
- A System pressure port (see detail) System
- B pressure port (see detail) Two drain ports,
- L1 one supplied plugged.
- L2 Supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards.
- L3 Oil filling or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing downwards.
- MA Gauge port system pressure G1/4"
- MB Gauge port system pressure G1/4"
- MSt Gauge port pilot pressure G1/4"
- PSt2 Pilot pressure port G1/2"
- T Return line of control circuit G1/2"
- (...) Normally plugged

DIRECTION OF ROTATION	INLET PORT (HIGH PRESSURE SIDE)	OUTLET PORT (LOW PRESSURE SIDE)
Right Hand Rotation	B	A
Left Hand Rotation	A	B

SIZE	SAE-FLANGE 6000PSI
066	1″
090	1″
130	1″
180	1 1/4″

SIZE	B1	B2	B3	B4	B5	B6	B7 h9
066	210	116	160	235	120	180	10
090	210	116	160	235	120	180	10
130	260	140	200	265	120	224	14
180	260	140	200	265	120	224	14

SIZE	D1 h8	D2 k6	D3	D4	D5	D6 LightExecution	D7	DEEP	D8	DEEP	D9	D10	DEEP	D11 SAEJ475	D12
066	125	38	M12	18	M10	M22x1.5	M10	20	M12	18	25	M18x1.5	12	W40x1.25x10a	7/8-14 UNF
090	125	38	M12	18	M10	M22x1.5	M10	20	M12	20	25	M18x1.5	12	W40x1.25x10a	7/8-14 UNF
130	160	50	M16	22	M10	M26x1.5	M12	26	M12	20	25	M18x1.5	12	W50x1.25x10a	1 1/16-12 UNF
180	160	50	M16	22	M10	M26x1.5	M12	26	M14	22	30	M18x1.5	12	W50x1.25x10a	1 1/16-12 UNF



SIZE	H1	H2	H3	H4	H5	H6	H7	H8	H9
066	227	162	90	41	93	130	53	88	143
090	227	162	90	41	93	130	53	88	143
130	283	207	113	53.5	117	130	64	110	176
180	283	207	113	53.5	117	130	64	110	176

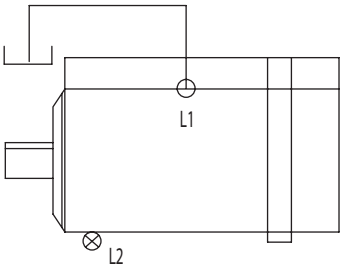
SIZE	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18
066	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	328	501
090	342	274	150	35	8	58	16	26	120	28	27.8	57.2	245.6	25	68	58	328	501
130	433	341	185	40	9	82	20	32	148	36	27.8	57.2	306	26	78	68	401	597
180	433	341	185	40	9	82	20	32	148	36	31.8	66.7	306	26	78	68	401	597

Installation position

Shaft horizontal

Highest drain port is to be used. Drain line must be arranged in such a way that motor housing is kept full at all times. If necessary, the drain line is to be looped above the motor.

Drain piping

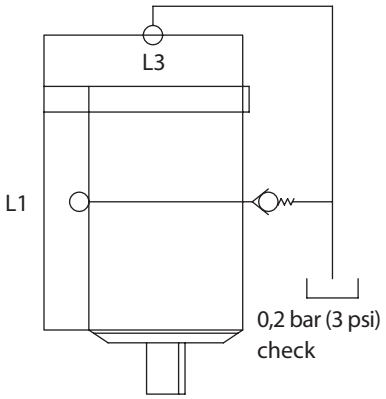


Note:

Drain piping shown,with respect to installation positions, is required for proper bearing lubrication. Also, see case flushing information next page.

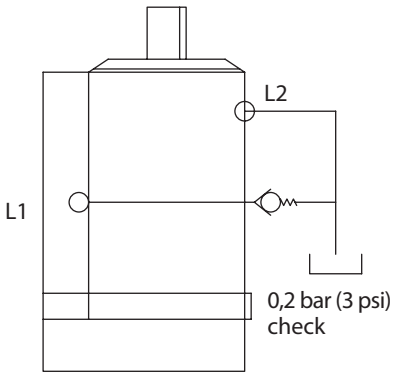
Shaft down

Use venting port L3 (provided only on request). Pre-load drain port L1 with 0,2 bar (3 psi).



Shaft up

Use venting port L2. Pre-load drain port L1 with 0,2 bar (3 psi).



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 motor case should be >1% of maximum 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-based fluids. Good filtration is therefore critical.
- The motors will provide exceptional life when used with a good quality clean fluid at the motor's rating specified for that fluid.

Fluids

Motors 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 so with hydraulic motors. This becomes even more of a factor when alternative fluids are used. All typesof alternative fluids require extensive maintenance in order to maintain proper levels of water content, acidity, viscosity and contamination.

Fluid Cleanliness

These motors are rated for anti-wear petroleum fluids with a contamination level of 18/15/13 per ISO 4406. Operation in fluids with higher contaminate levels is not recommended, and may reduce the life of the motor's components. Fluids other than petroleum, severe service cycles, or extreme temperatures are cause for adjustment of these codes. Please contact your Danfoss representative for special duty cycle recommendations.

Danfoss motors, as well as any variable displacement piston motors, will operate with apparent satisfaction in fluids up to the rating specified here. Experience has shown, however, that motor and hydraulic systems lives are not optimized with high fluid contamination levels (high ISO cleanliness codes).

Proper fluid condition is essential for a 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 Danfoss publication 561 - "Vickers by Danfoss Guide to Systemic Contamination Control" - available from your local Danfoss distributor.

In this publication, filtration and cleanliness levels for extending the life ofaxial piston motors 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 motors must include the supplementary designation of the required control type.

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%

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