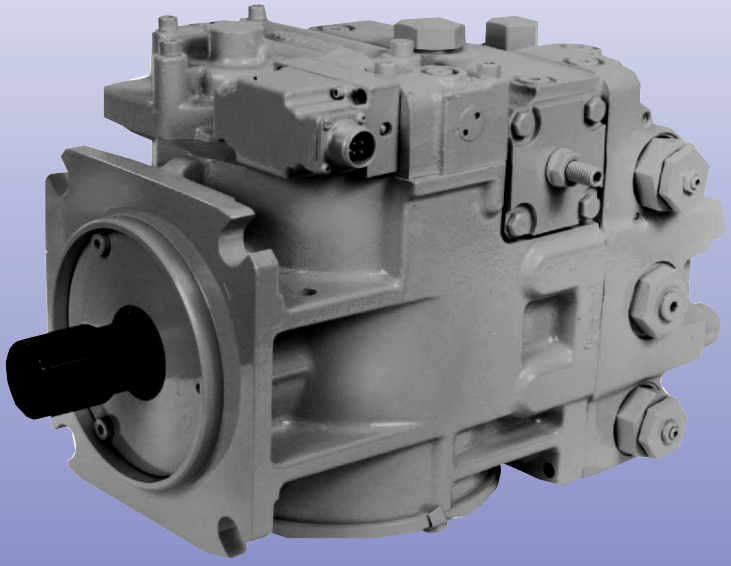
CONTENTS

SAUER SUNDSTRAND

Series 90



Axial Piston Pumps Technical Information

Technical Data

Table 1

		Dimension	Frame Size 030	042	055	075	100	130	180	250
Displacement		**cm^3**	**30**	**42**	**55**	**75**	**100**	**130**	**180**	**250**
		in^3	1.83	2.56	3.35	4.57	6.10	7.93	10.98	15.25
Input speed	Minimum	min^{-1} (rpm)	500	500	500	500	500	500	500	500
	Rated *	min^{-1} (rpm)	4 200	4 200	3 900	3 600	3 300	3 100	2 600	2 300
	Maximum *	min^{-1} (rpm)	4 600	4 600	4 250	3 950	3 650	3 400	2 850	2 500
	Max. Attainable *	min^{-1} (rpm)	5 000	5 000	4 700	4 300	4 000	3 700	3 150	2 750
Theoretical Torque		**Nm/bar**	**0.48**	**0.67**	**0.88**	**1.19**	**1.59**	**2.07**	**2.87**	**3.97**
		in lb/1000 psi	290	410	530	730	970	1 260	1 750	2 433
Mass moment of inertia of the int. rotating parts		**kg m^2**	**0.0023**	**0.0039**	**0.0060**	**0.0096**	**0.0150**	**0.023**	**0.0380**	**0.0650**
		lb • ft^2	0.0546	0.0926	0.1424	0.2280	0.3560	0.5460	0.9020	1.5430
Weight (with MA Control)		**kg**	**28**	**34**	**40**	**49**	**68**	**88**	**136**	**154**
		lb	62	75	88	108	150	195	300	340

* General Technical Specifications, see page 12

Determination of Nominal Pump Size

Inch-System:

Pump output flow: $Q = \frac{PD \cdot PS \cdot EV}{231}$ gpm

Input torque: $PT = \frac{PD \cdot p}{2 \cdot \pi \cdot ET}$ lbf•in

Input power: $p = \frac{PD \cdot PS \cdot p}{396\,000 \cdot ET}$ hp

Metric-System:

Pump output flow: $Qe = \frac{Vg \cdot n \cdot hv}{1\,000}$ l/min

Input torque: $Me = \frac{Vg \cdot \Delta p}{20 \cdot \pi \cdot hmh}$ Nm

Input power: $Pe = \frac{Me \cdot n}{9\,550} = \frac{Qe \cdot \Delta p}{600 \cdot ht}$ kW

Description:

Inch-System:

PD	=	Pump displacement per rev.	in^3
PS	=	Hydrostatic pump speed	rpm
p	=	Differential hydraulic pressure	psi
EV	=	Pump volumetric efficiency	
ET	=	Pump mechanical - hydraulic (Torque) efficiency	

Metric-System:

Vg	=	Pump displacement per rev.	cm^3
Δp	=	pHD - pND	bar
hv	=	Pump volumetric efficiency	
hmh	=	Pump mechanical -	

External Load Limits (Continued)

Mounting Flange Loads

Adding tandem mounted auxiliary pumps and/or subjecting pumps to high shock loads may result in excessive loading of the mounting flange. The overhung load moment for multiple pump mounting may be estimated as shown in the accompanying figure.

Estimating Overhung Load Moments

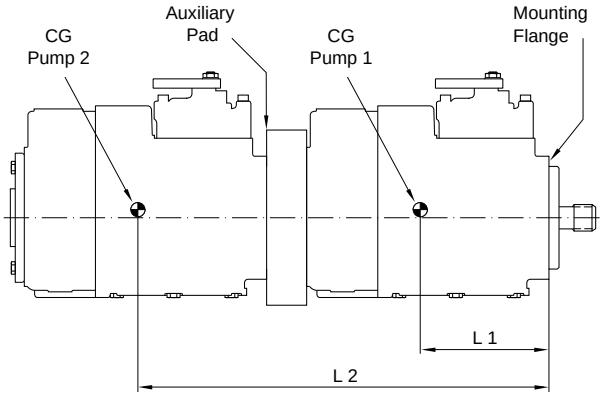
W = Weight of pump [kg]
L = Distance from mounting flange to pump center of gravity (refer to pump installation drawings) [m]

$$M_R = G_R (W_1L_1 + W_2L_2 + ... + W_nL_n)$$
$$M_S = G_S (W_1L_1 + W_2L_2 + ... + W_nL_n)$$

Where:
M_R = Rated load moment [Nm]
M_S = Shock load moment [Nm]
G_R = Rated (vibratory) acceleration ("g"s) * [m/s²]
G_S = Maximum shock acceleration ("g"s) * [m/s²]

* Calculations will be carried out by multiphying the gravity (g = 9.81 m/s²) with a given factor. This factor depends on the application.

Figure 19: Overhung load moments



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Allowable overhung load moment values are shown in the accompanying table. Exceeding these values will require additional pump support.

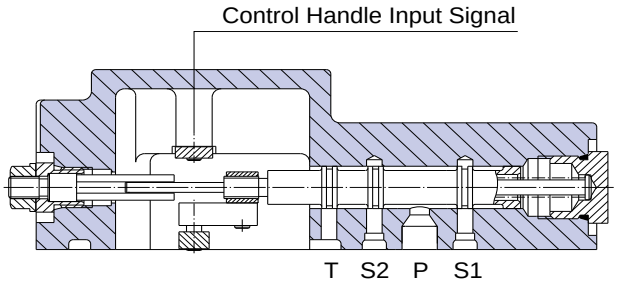
Table 9: Allowable overhung load moments

Frame Size	Rated Moment M_R		Shock Load Moment M_S	
	Nm	lbf•in	Nm	lbf•in
030	860	7 600	3 020	26 700
042	860	7 600	3 020	26 700
055	1 580	14 000	5 650	50 000
075	1 580	14 000	5 650	50 000
100	1 580	14 000	5 650	50 000
130	3 160	28 000	10 730	95 000
180	6 070	54 000	20 600	182 000
250	6 070	54 000	20 600	182 000

Controls - Circuit Diagram, Nomenclature and Description (Continued)

Non-linear Manual Displacement Control (MDC), Option NA (Continued)

Figure 36: Cross-section of non-linear manual displacement control valve



S1 = Servo Side 1
S2 = Servo Side 2

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External Control Handle Requirements
Torque required to move handle to maximum displacement is 0,68 to 0,9 Nm (6 to 8 lbf•in).
Maximum allowable input torque is 17 Nm (150 lbf•in).

Figure 37: Pump displacement vs control lever rotation

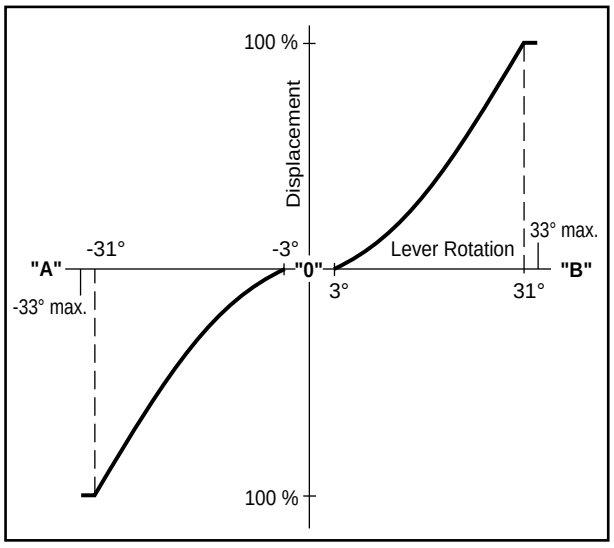

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Table 20: Pump output flow direction vs. control handle rotation

Input Shaft Rotation	CW		CCW	
Handle Rotation	"A" (CCW)	"B" (CW)	"A" (CCW)	"B" (CW)
Port A Flow	Out	In	In	Out
Port B Flow	In	Out	Out	In

Refer to dimensions for port locations

Response Time
(applies also for Option MA and MB)
The time required for the pump output flow to change from zero to full flow (acceleration) or full flow to zero (deceleration) is a function of the size of the orifice in the control flow passage.
A range of orifice sizes is available for the Series 90 Manual Displacement Control to assist in matching the rate of swashplate response to the acceleration and deceleration requirements of the application. **Testing should be carried out to determine the proper orifice selection for the desired response.**

Typical response times between neutral and full flow at the following conditions:

Δp =	210 bar	(3 000 psi)
Temperature =	50 °C	(122 °F)
Charge Pressure =	24 bar	(340 psi)

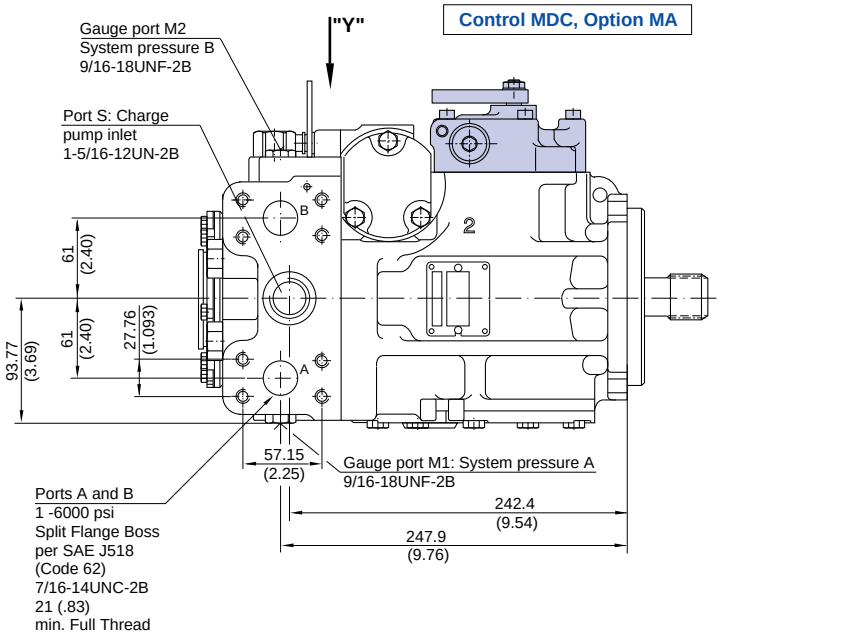
Table 21: Typical response times

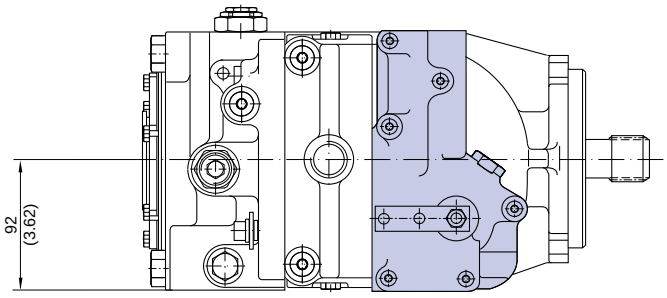
Frame Size	Maximum Time Seconds (Smallest Orifice) Option 01	Minimum Time Seconds (No Orifice) Option 00
030	1.5	0.60
042	1.9	0.22
055	3.6	0.27
075	3.7	0.32
100	4.8	0.42
130	7.5	0.70
180	7.5	0.55
250	9.0	9.0

Dimensions • Frame Size 075 (Continued)

Continued Figure 41: Axial Piston Variable Displacement Pump with Manual Displacement Control (MDC) mm (in.)

Endcap Twin Ports, Option 8





View "Y"

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Notes