

star

hydraulics ltd

SERVO TECHNOLOGY
AND RESEARCH

Model 500 Servovalve



- Nominal flows rates 1 to 60 l/min @ 70 bar
- Sapphire Technology
- Medium & High-Response characteristics
- Internal pilot supply
- Up to 500 bar supply pressure

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Nominal flow ratings	4, 10, 20, 40, 60 l/min at 70 bar p For other flow ratings contact factory						
Hysteresis	< 3% without dither						
Threshold	< 0.5% without dither						
Null bias	< 2%						
Null shift	<table> <tr> <td>with 40°C temp change</td> <td>< 2%</td> </tr> <tr> <td>with 70 bar supply pressure change</td> <td>< 2%</td> </tr> <tr> <td>with return pressure 0 to 35 bar</td> <td>< 2%</td> </tr> </table>	with 40°C temp change	< 2%	with 70 bar supply pressure change	< 2%	with return pressure 0 to 35 bar	< 2%
with 40°C temp change	< 2%						
with 70 bar supply pressure change	< 2%						
with return pressure 0 to 35 bar	< 2%						
Pressure gain	< 1% rated input signal for 60% of supply pressure						
Seal materials available	NBR, EPDM						
Operating temperature range	-30 °C to 130 °C						
Proof pressure	<table> <tr> <td>at pressure port</td> <td>150% max supply pressure</td> </tr> <tr> <td>at return port</td> <td>100% max supply pressure</td> </tr> </table>	at pressure port	150% max supply pressure	at return port	100% max supply pressure		
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Burst pressure	<table> <tr> <td>return port open</td> <td>250% max supply pressure</td> </tr> </table>	return port open	250% max supply pressure				
return port open	250% max supply pressure						
External leakage	zero						
Degree of protection	IP 65 (BS EN 60529 : 1992)						
Weight	2 kg						
Mounting position	Any, fixed or movable						

Supply filtration	<table> <tr> <td>minimum</td> <td>$_{10}$ 75 (10 micron abs)</td> </tr> <tr> <td>recommended</td> <td>$_5$ = 200 (5 micron abs)</td> </tr> </table>	minimum	$_{10}$ 75 (10 micron abs)	recommended	$_5$ = 200 (5 micron abs)		
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Fluid cleanliness level	<table> <tr> <td>minimum</td> <td>ISO 4406 - 16/13</td> <td>NAS 1638 - class 7</td> </tr> <tr> <td>recommended</td> <td>ISO 4406 - 13/10</td> <td>NAS 1638 - class 4</td> </tr> </table>	minimum	ISO 4406 - 16/13	NAS 1638 - class 7	recommended	ISO 4406 - 13/10	NAS 1638 - class 4
minimum	ISO 4406 - 16/13	NAS 1638 - class 7					
recommended	ISO 4406 - 13/10	NAS 1638 - class 4					
Supply pressure	<table> <tr> <td>min. to effect spool movement</td> <td>10 bar</td> </tr> <tr> <td>minimum recommended</td> <td>40 bar</td> </tr> <tr> <td>maximum continuous</td> <td>500 bar (NBR)</td> </tr> </table>	min. to effect spool movement	10 bar	minimum recommended	40 bar	maximum continuous	500 bar (NBR)
min. to effect spool movement	10 bar						
minimum recommended	40 bar						
maximum continuous	500 bar (NBR)						
Viscosity	VG 10 to 100 ISO 3448						
Fluid type	Petroleum based mineral oils For operation with other media contact factory						

Calculating output flow

The output flow for a given pressure drop can be calculated using the following:

$$q = q_N \sqrt{\frac{\rho_N}{\rho_V}}$$

Where:

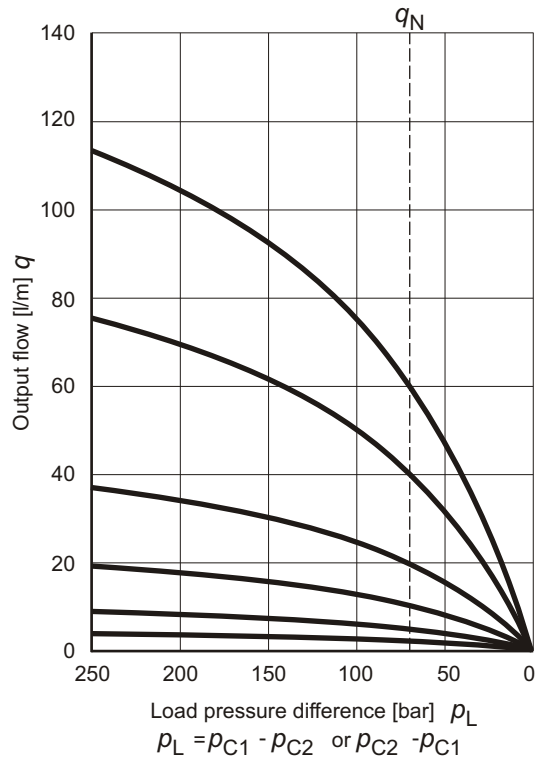
q = Output flow [l/min]

q_N = Rated flow [l/min]

ρ_N = Valve pressure drop [bar]

ρ_V = Rated valve pressure drop [bar]

Output flow versus load pressure difference

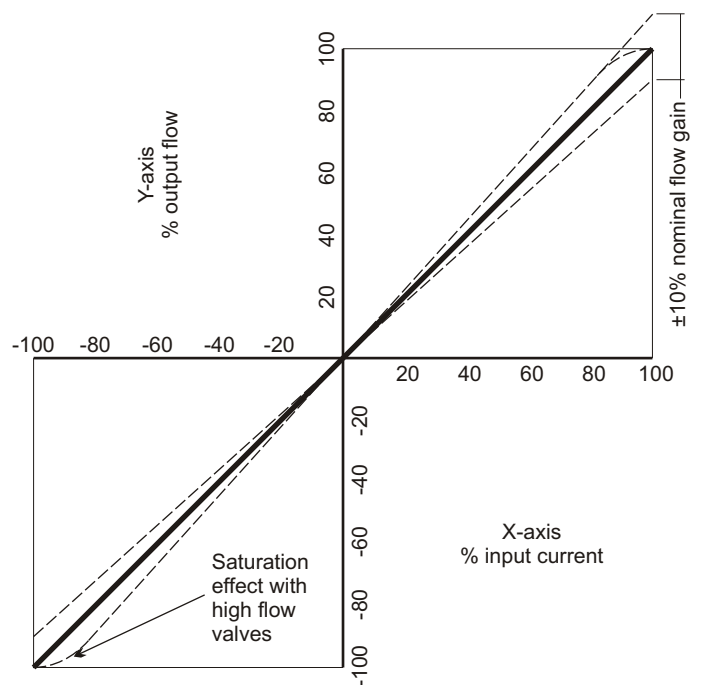


Internal leakage

This comprises of both pilot stage flow (tare leakage) and the second stage null leakage, typical values for this size of valve would be:

Rated flow	Internal leakage at 140 bar
4 l/min	< 1.0 l/min
10 l/min	< 1.2 l/min
20 l/min	< 1.6 l/min
40 l/min	< 1.6 l/min
60 l/min	< 1.6 l/min
75 l/min	< 1.6 l/min

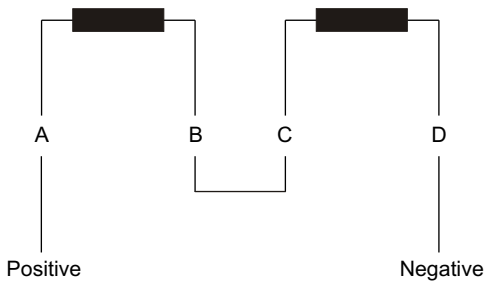
Output flow versus input signal at constant valve pressure drop



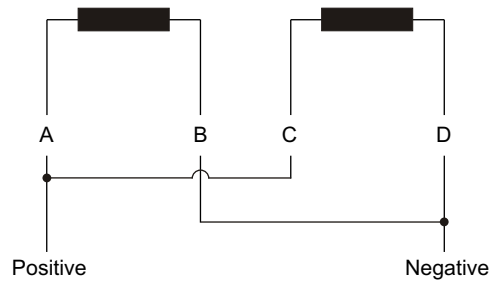
The flow tolerance for standard servovalves is $\pm 10\%$ of the nominal rated flow at $\pm 100\%$ input signal.

The rated flow is quoted at 70 bar p and 100% rated input signal.

Coil schematics



Series connection



Parallel connection

Output flow polarity

Flow in the direction of P→C2, C1→R will occur with the pilot stage coils configured as above.

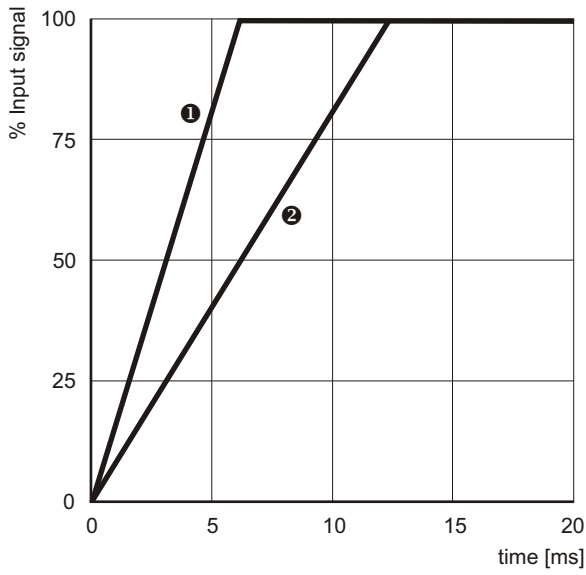
Coil options

Coil specification		Series connection		Parallel connection	
Rated signal [mA]	Resistance per coil [Ω]	Input current [mA]	Effective resistance [Ω]	Input current [mA]	Effective resistance [Ω]
10	1000	5	2000	10	500
15	200	7.5	400	15	100
20	1200	10	2400	20	600
30	300	15	600	30	150
30	800	15	1600	30	400
40	80	20	160	40	40
60	40	30	80	60	20
80	22	40	44	80	11
100	27	50	54	100	13.5
200	22	100	44	200	11

Electrical connection

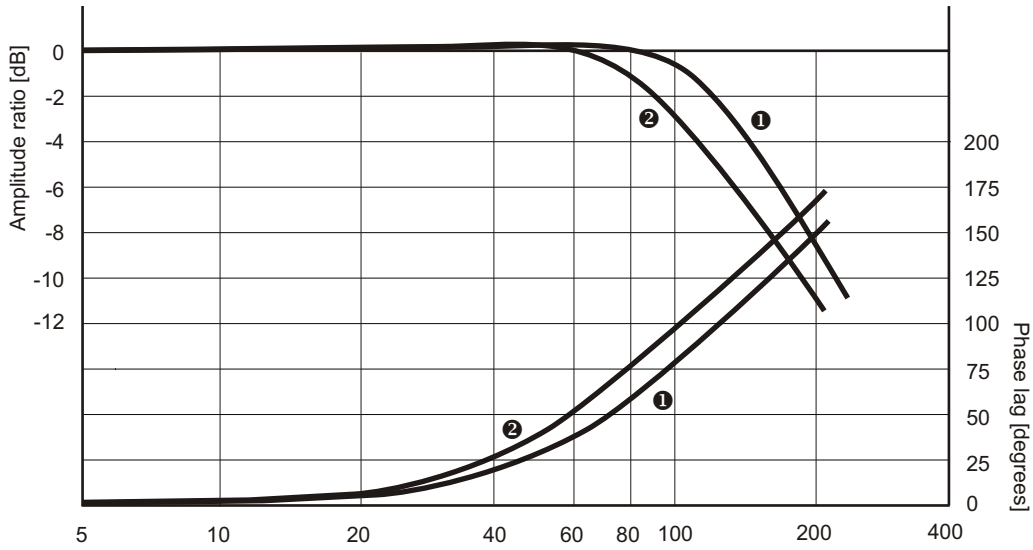
Standard connector is MS3102E-14S-2P (MIL-C-5015). Please contact factory for more options.

Transient Response (MR)

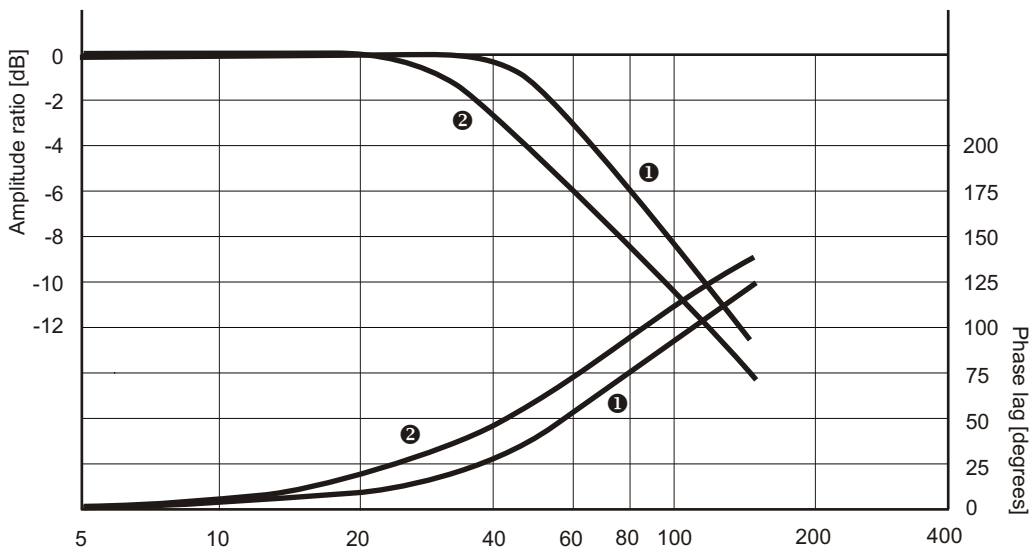


[1] Rated flow = 4 l/min
 [2] Rated flow = 60 l/min
 Supply pressure = 210 bar

Frequency Response (MR)

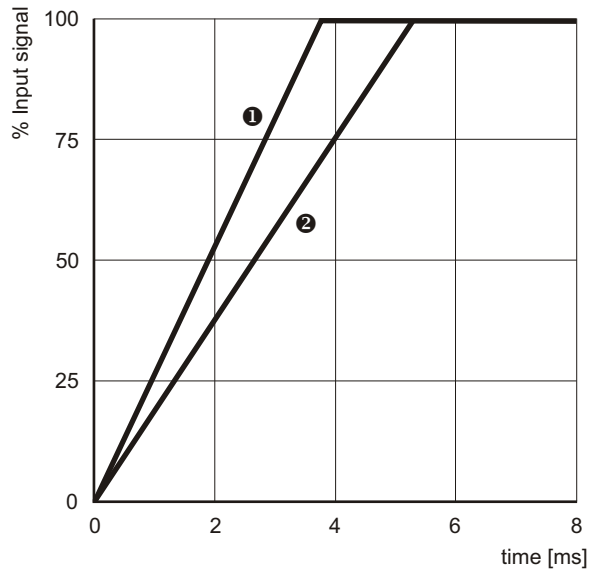


Input signal = 25%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 60 l/min
 Supply pressure = 210 bar



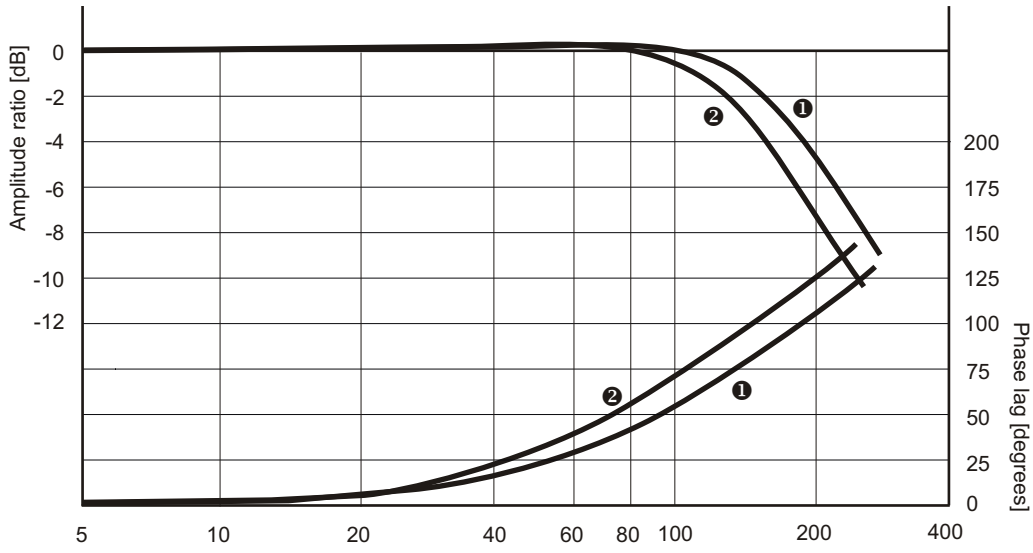
Input signal = 100%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 60 l/min
 Supply pressure = 210 bar

Transient Response (HR)

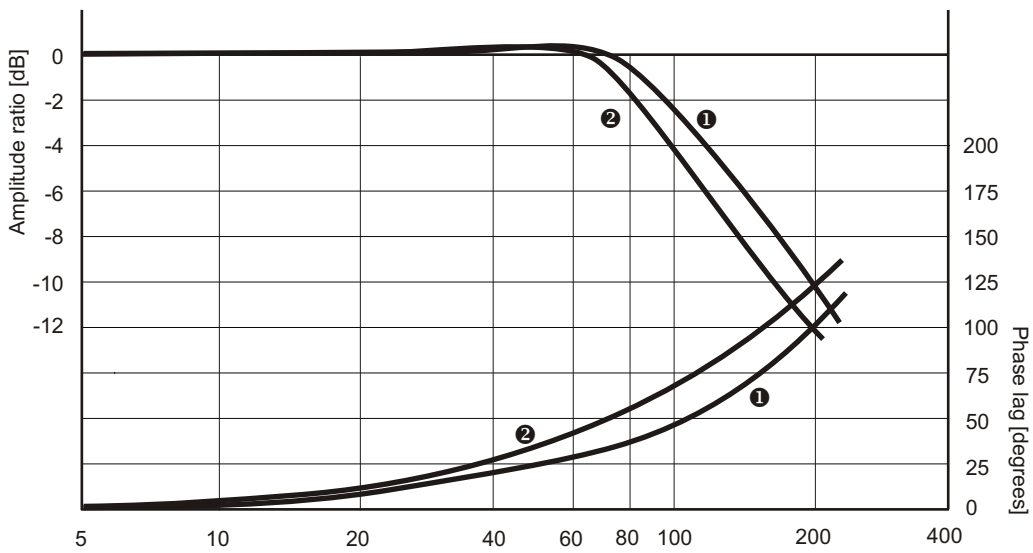


[1] Rated flow = 4 l/min
 [2] Rated flow = 40 l/min
 Supply pressure = 210 bar

Frequency Response (HR)

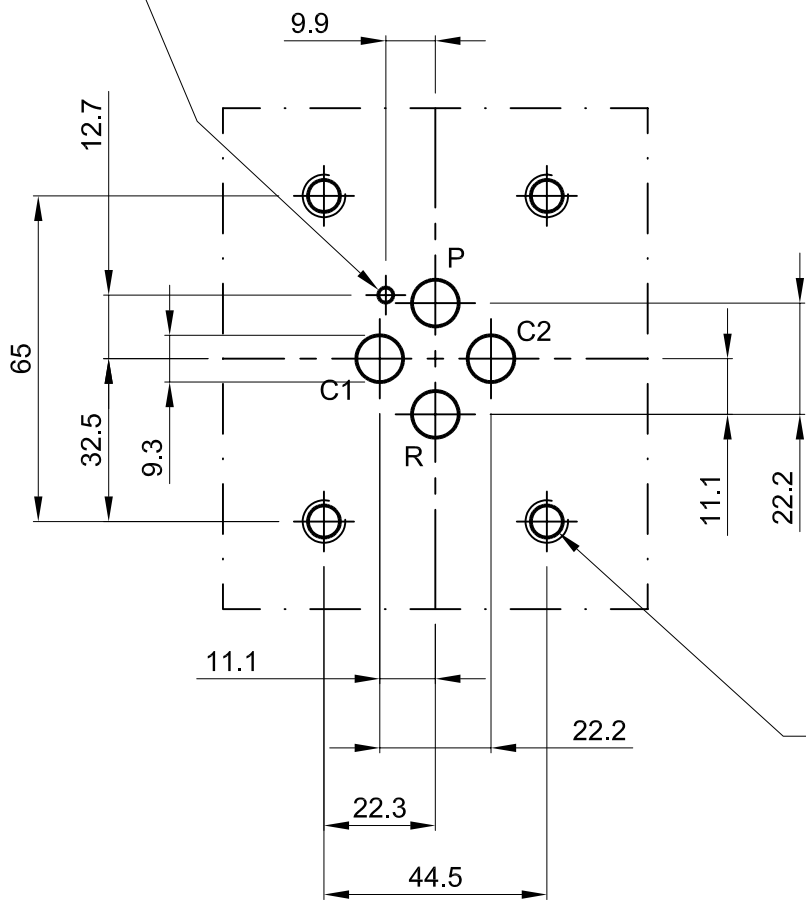


Input signal = 25%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 40 l/min
 Supply pressure = 210 bar



Input signal = 100%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 40 l/min
 Supply pressure = 210 bar

C/BORE FOR
LOC PIN
Ø3 X 5



M8 TYPICAL
4 PLCS

Manifold Dimensions Model 500

Dimensions in millimeters
3rd angle projection

Filename
MD500-1Q03-En

