

star

hydraulics ltd

SERVO TECHNOLOGY
AND RESEARCH

Model 1652 Servovalve



- Nominal flows rates 1 to 60 l/min @ 70 bar
- DIN 24 340 mounting pattern
- Sapphire Technology
- Medium & High-Response characteristics
- External pilot supply

econ
FLUID POWER

上海益控精密机械有限公司

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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	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	FPM, NBR, EPDM	
Operating temperature range	-30 °C to 130 °C	
Proof pressure	at pressure port 150% max supply pressure at return port 100% max supply pressure	
Burst pressure	return port open 250% max supply pressure	
External leakage	zero	
Degree of protection	IP 65 (BS EN 60529 : 1992)	
Weight	1.1 kg	
Mounting position	Any, fixed or movable	
Supply filtration	minimum ≥ 75 (10 micron abs) recommended ≥ 200 (5 micron abs)	
Fluid cleanliness level	minimum ISO 4406 - 16/13 NAS 1638 - class 7 recommended ISO 4406 - 13/10 NAS 1638 - class 4	
Supply pressure	min. to effect spool movement 3.5 bar minimum recommended 15 bar maximum continuous 210 bar (FPM) 315 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:

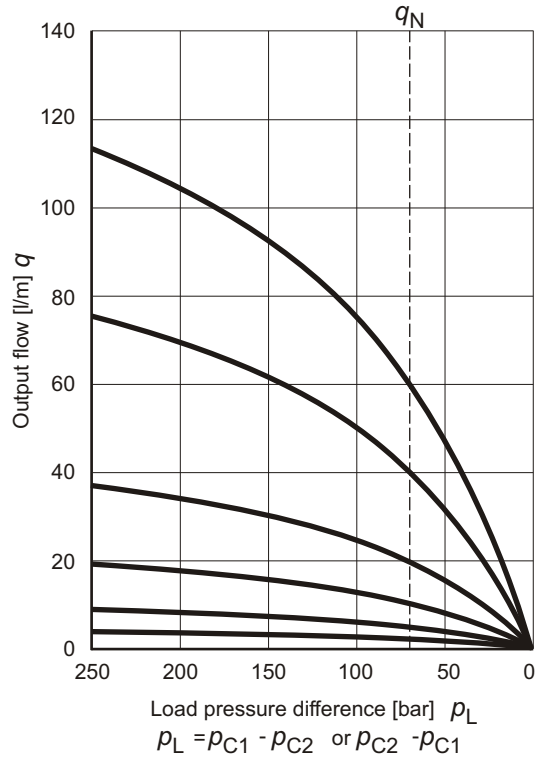
q = Output flow [l/min]

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

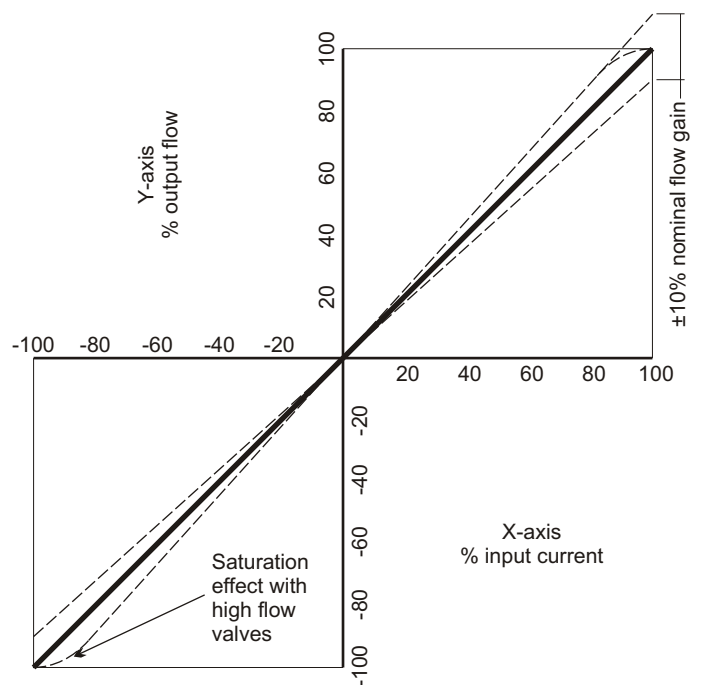


Internal leakage

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	< 1.2 l/min
10 l/min	< 1.6 l/min
20 l/min	< 2 l/min
40 l/min	< 2 l/min
60 l/min	< 2 l/min

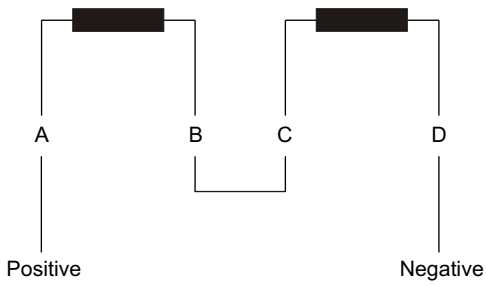
Output flow versus input signal at constant valve pressure drop



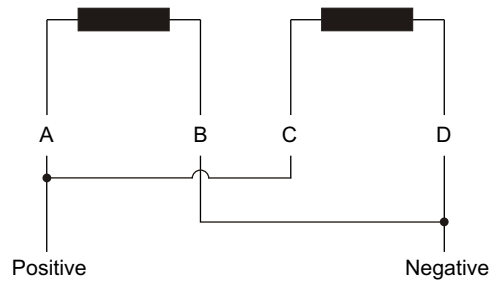
The flow tolerance for standard servovalves is $\pm 10\%$ of the nominal rated flow at $\pm 100\%$ input signal.

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.

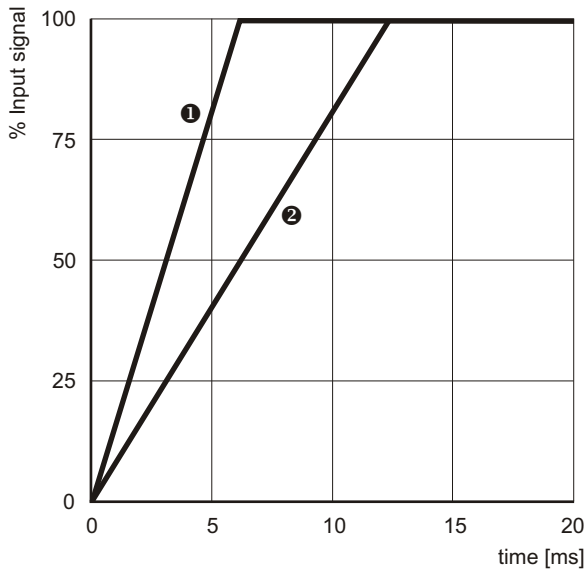
Coil options

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

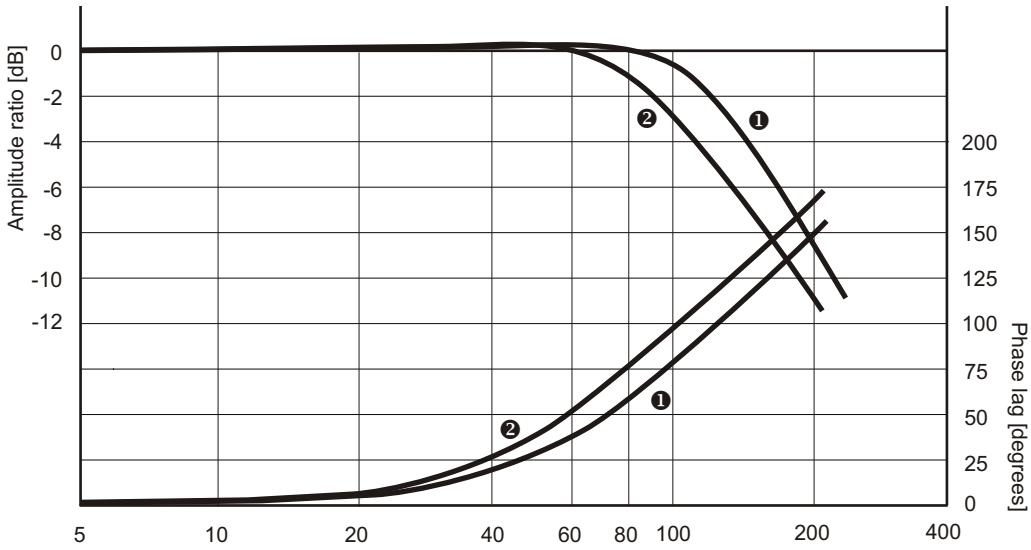
Standard connector is MS3102E-14S-2P (MIL-C-5015). Please contact factory for more options.

Transient Response (MR)

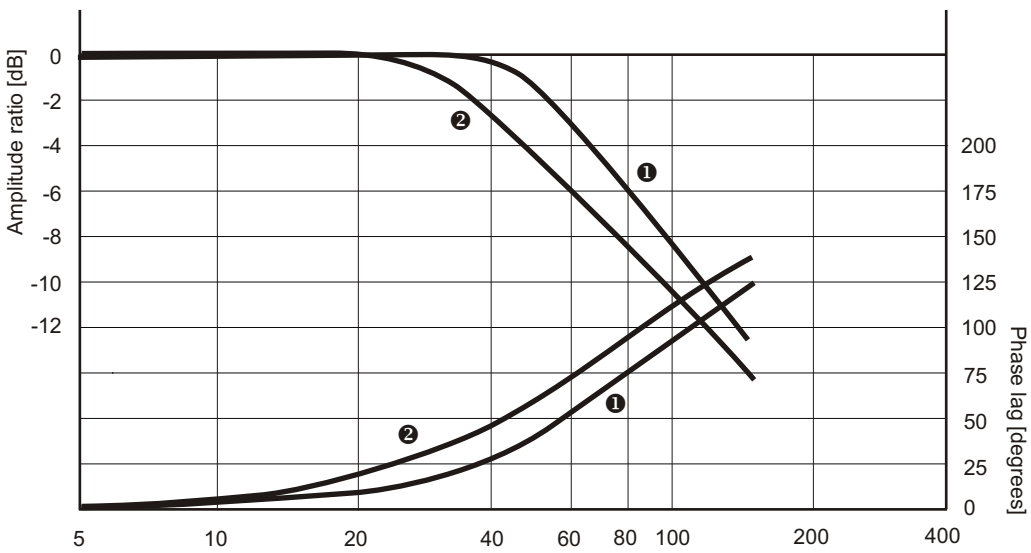


[1] Rated flow = 4 l/min
 [2] Rated flow = 60 l/min
 Supply pressure = 210 bar

Frequency Response (MR)

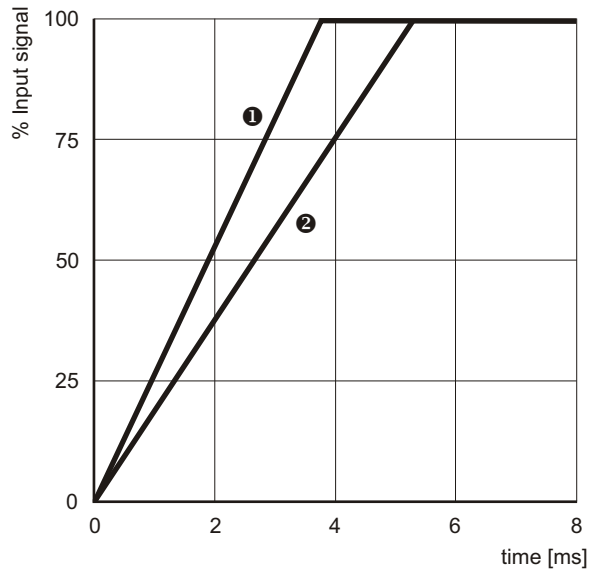


Input signal = 25%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 60 l/min
 Supply pressure = 210 bar



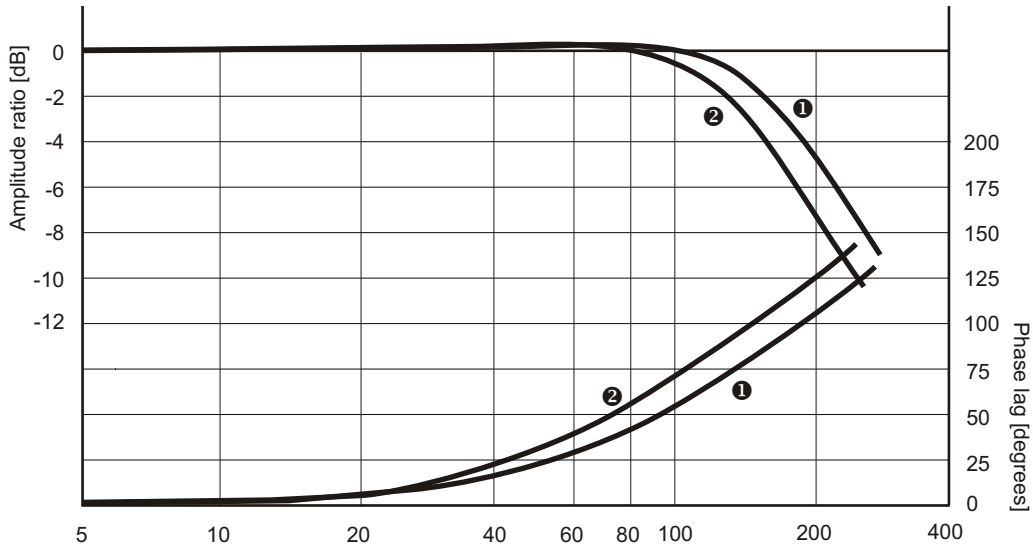
Input signal = 100%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 60 l/min
 Supply pressure = 210 bar

Transient Response (HR)

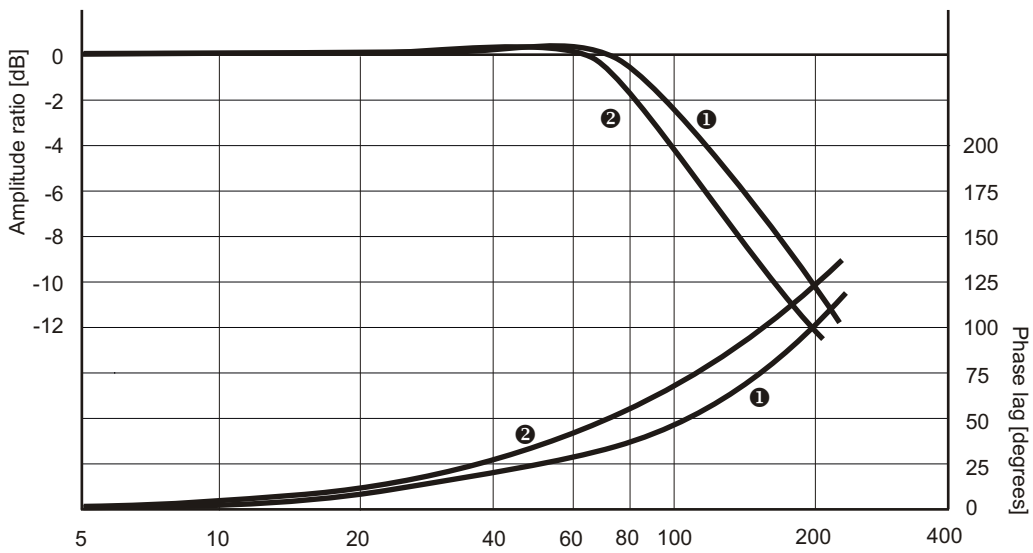


[1] Rated flow = 4 l/min
 [2] Rated flow = 40 l/min
 Supply pressure = 210 bar

Frequency Response (HR)



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



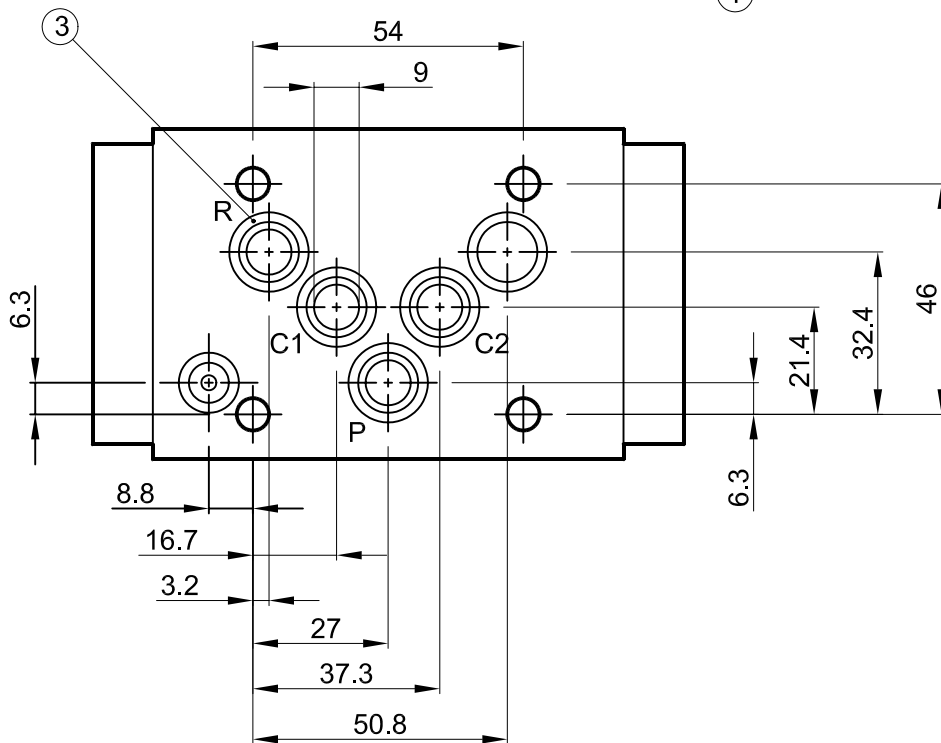
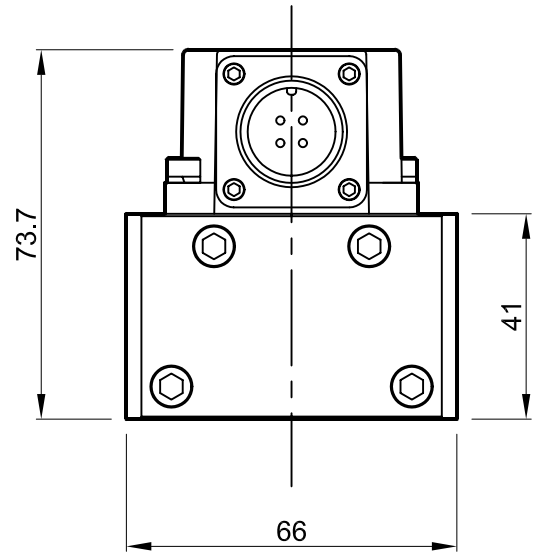
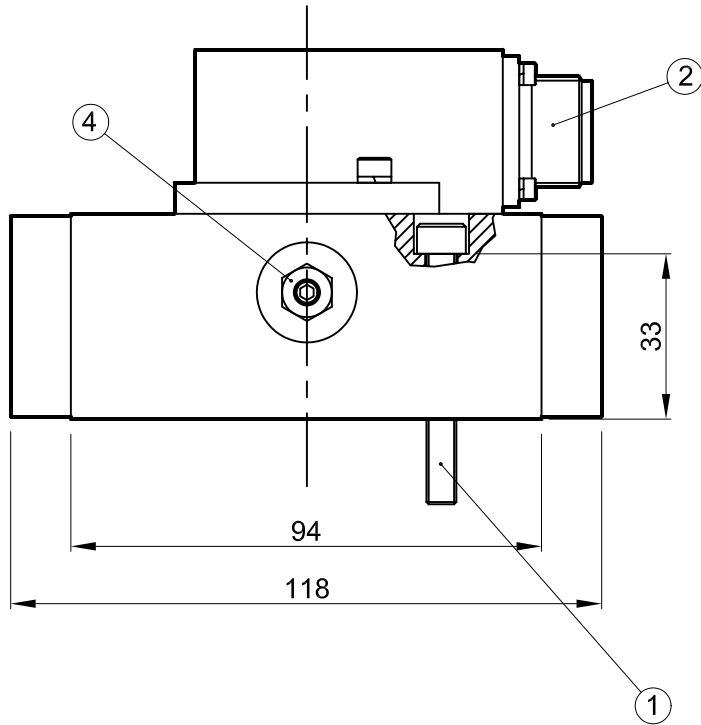
Input signal = 100%
 [1] Rated flow = 4 l/min
 [2] Rated flow = 40 l/min
 Supply pressure = 210 bar

1. Suggested mounting bolts M6 x 50 long high tensile steel socket head cap screws.

2. 4-way electrical connector mates with MS3106-14S-2S or equivalent. Is available at $\pm 90^\circ$ and 180° to position shown (advise desired position at time of order).

3. Base O-Rings: 12.0 I/D x 2.0 section (5 pcs). 8.0 I/D x 2.0 section (1 pc).

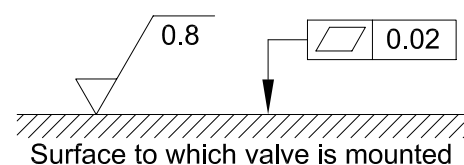
4. Null adjust requires 10 A/F ring spanner and 2.5 hexagon key. Flow out of C2 will increase with clockwise rotation of key.

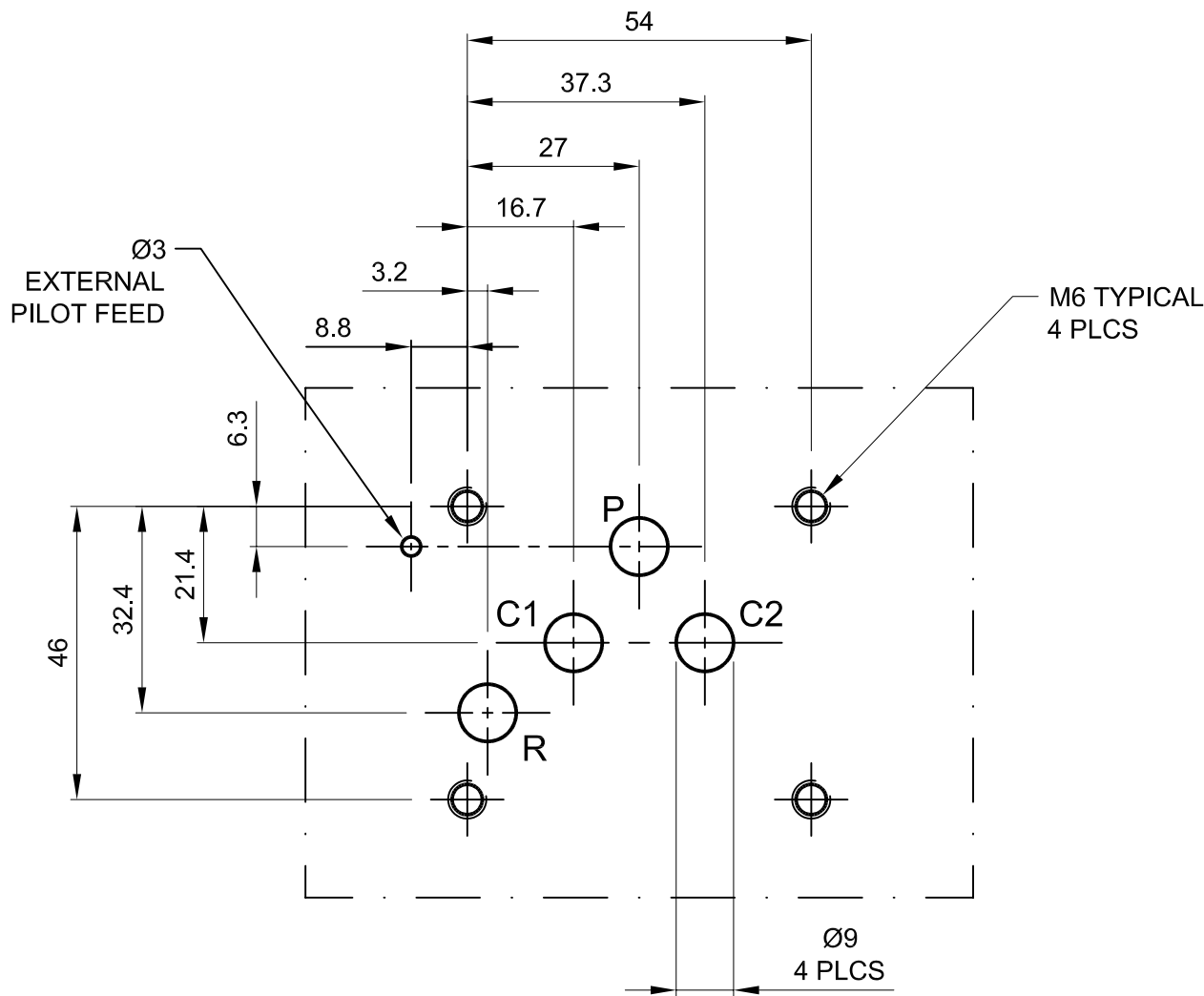


Installation Details Model 1652

Dimensions in millimeters
3rd angle projection

Filename
ID1652-2Q02-En





Manifold Dimensions Model 1652

Dimensions in millimeters
3rd angle projection

Filename
MD1652-1Q03-En

