

# Model 1652 Servovalve



- Nominal flows rates 1 to 60 l/min @ 70 bar
- ISO 4401-05 mounting pattern
- Standard Industrial range
- External pilot supply

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|                                    |  |  |
|------------------------------------|--|--|
| <b>Nominal flow ratings</b>        | 4, 10, 20, 40, 60 l/min at 70 bar $p$<br>For other flow ratings contact factory  |  |
| <b>Hysteresis</b>                  | < 5% without dither  |  |
| <b>Threshold</b>                   | < 2% without dither  |  |
| <b>Null bias</b>                   | < 2%   |  |
| <b>Null shift</b>                  | with 40°C temp change < 3%<br>with 35 bar supply pressure change < 3%<br>with return pressure 0 to 35 bar < 3%                             |  |
| <b>Pressure gain</b>               | < 2% rated input signal for 60% of supply pressure   |  |
| <b>Seal materials available</b>    | FPM, NBR, EPDM   |  |
| <b>Operating temperature range</b> | -30 °C to 130 °C   |  |
| <b>Proof pressure</b>              | at pressure port 150% max supply pressure<br>at return port 100% max supply pressure   |  |
| <b>Burst pressure</b>              | return port open 250% max supply pressure  |  |
| <b>External leakage</b>            | zero   |  |
| <b>Degree of protection</b>        | IP 65 (BS EN 60529 : 1992)   |  |
| <b>Weight</b>                      | 1.1 kg   |  |
| <b>Mounting position</b>           | Any, fixed or movable  |  |
| <b>Supply filtration</b>           | minimum $\geq 75$ (10 micron abs)<br>recommended $\geq 200$ (5 micron abs)   |  |
| <b>Fluid cleanliness level</b>     | minimum ISO 4406 - 16/13    NAS 1638 - class 7<br>recommended ISO 4406 - 13/10    NAS 1638 - class 4                                       |  |
| <b>Supply pressure</b>             | min. to effect spool movement 3.5 bar<br>minimum recommended 15 bar<br>maximum continuous 210 bar (FPM)                      315 bar (NBR) |  |
| <b>Viscosity</b>                   | VG 10 to 100 ISO 3448  |  |
| <b>Fluid type</b>                  | Petroleum based mineral oils<br>For operation with other media contact factory   |  |

### Calculating output flow

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

$$q = q_N \sqrt{\frac{\Delta p_N}{\Delta p_V}}$$

Where:

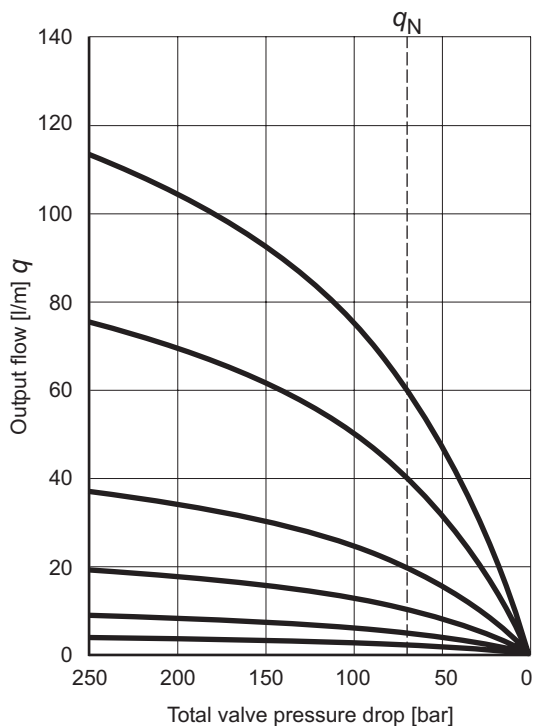
$q$  = Output flow [l/min]

$q_N$  = Rated flow [l/min]

$\Delta p_N$  = Valve pressure drop [bar]

$\Delta p_V$  = Rated valve pressure drop [bar]

Output flow versus load pressure difference

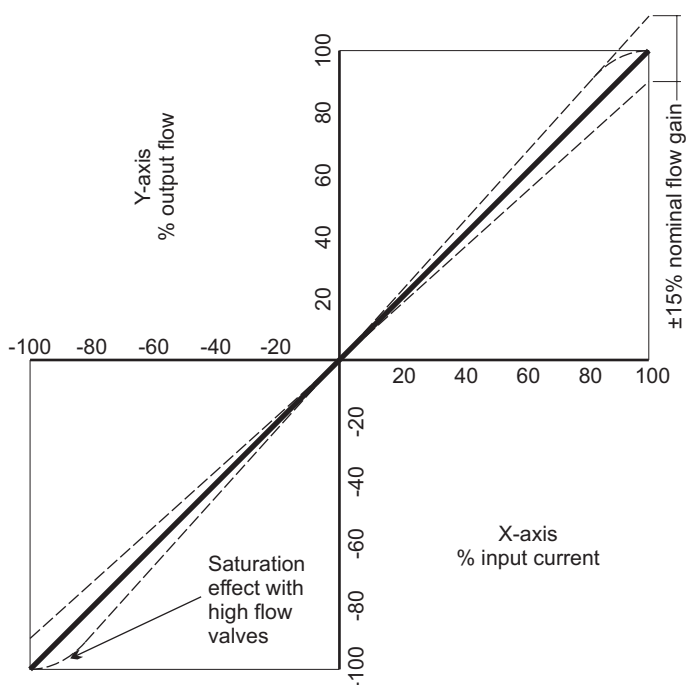


### Internal leakage

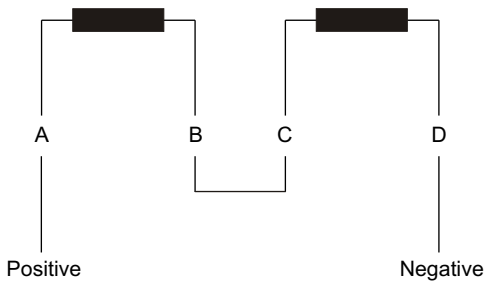
This comprises of both pilot stage flow (tare leakage) and the second stage null leakage, typical values for this size of valve would be:

| 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                   |

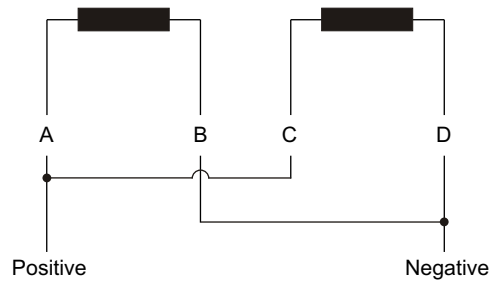
Output flow versus input signal at constant valve pressure drop



**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.

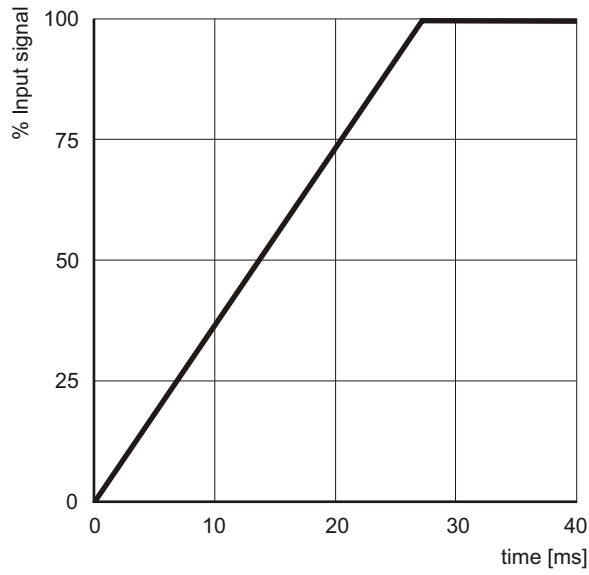
**Coil options**

| 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                        |
| 15                 | 350                       | 7.5                | 700                        | 15                  | 175                        |
| 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                         |
| 60                 | 320                       | 30                 | 640                        | 60                  | 160                        |
| 80                 | 22                        | 40                 | 44                         | 80                  | 11                         |
| 100                | 27                        | 50                 | 54                         | 100                 | 13.5                       |
| 200                | 22                        | 100                | 44                         | 200                 | 11                         |

**Electrical connection**

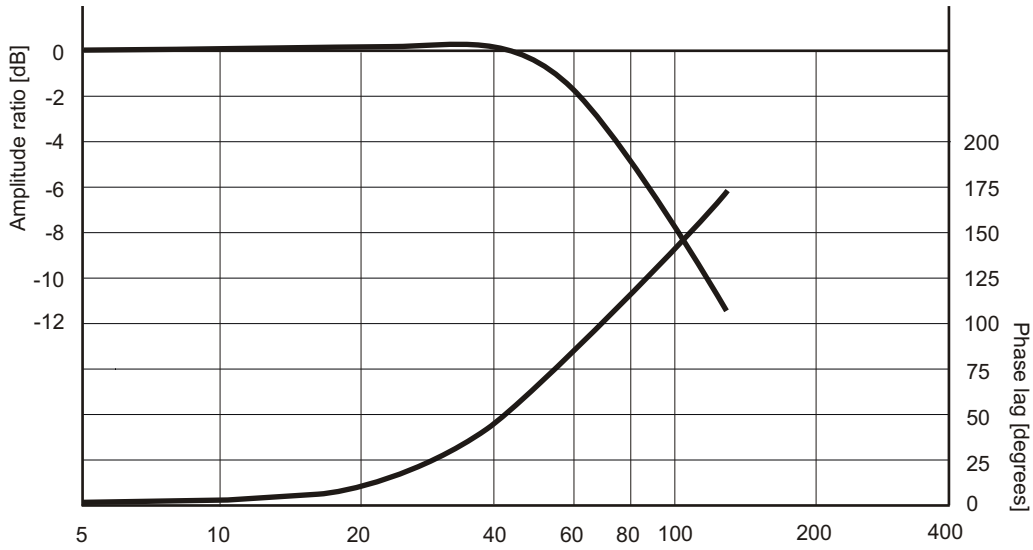
Standard connector is MS3102E-14S-2P (MIL-C-5015). Please contact factory for more options.

# Transient Response

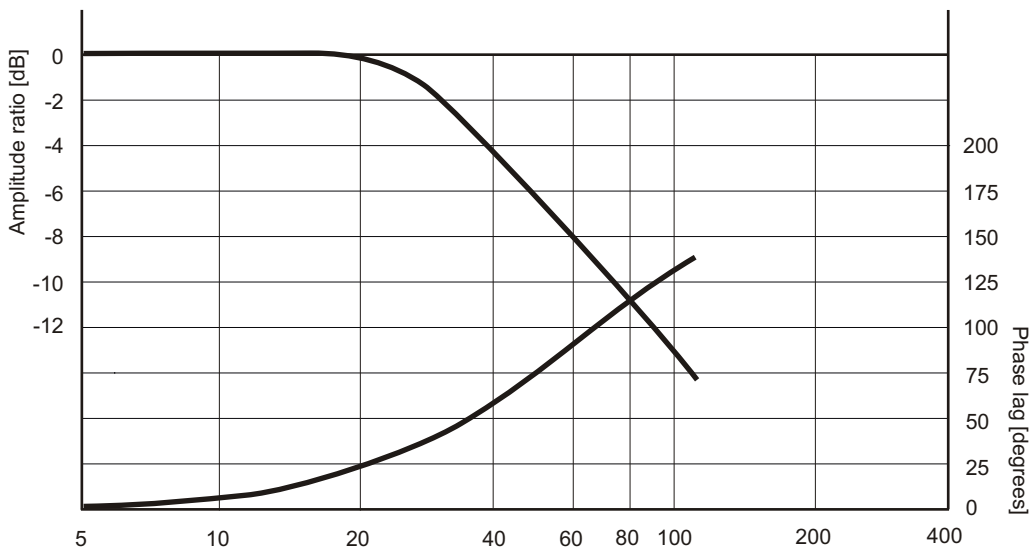


Supply pressure = 210 bar

# Frequency Response



Input signal = 25%  
Supply pressure = 210 bar



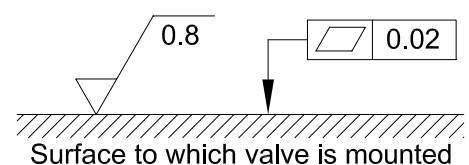
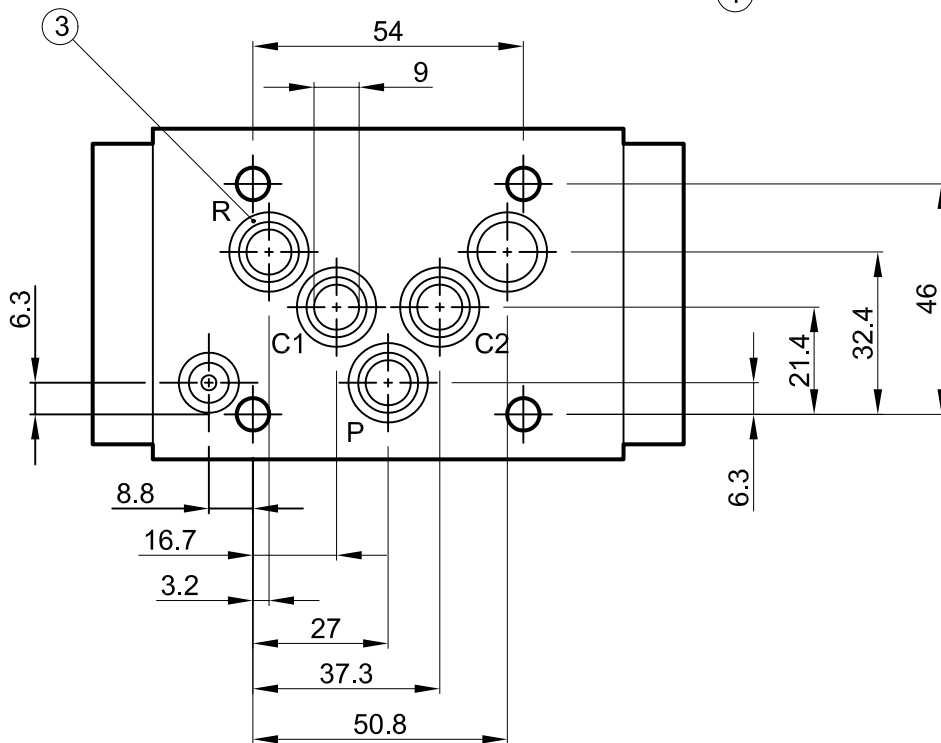
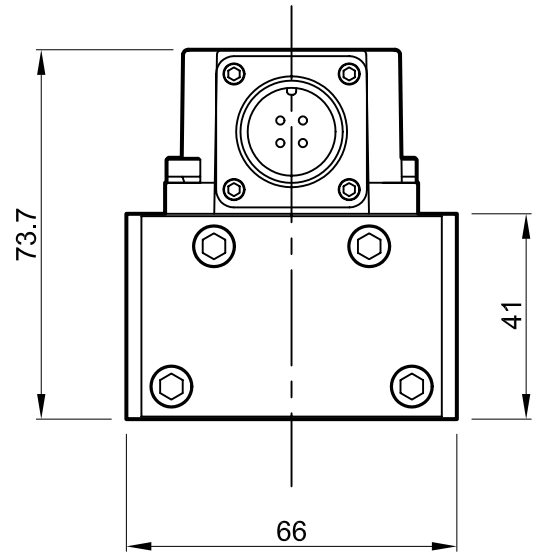
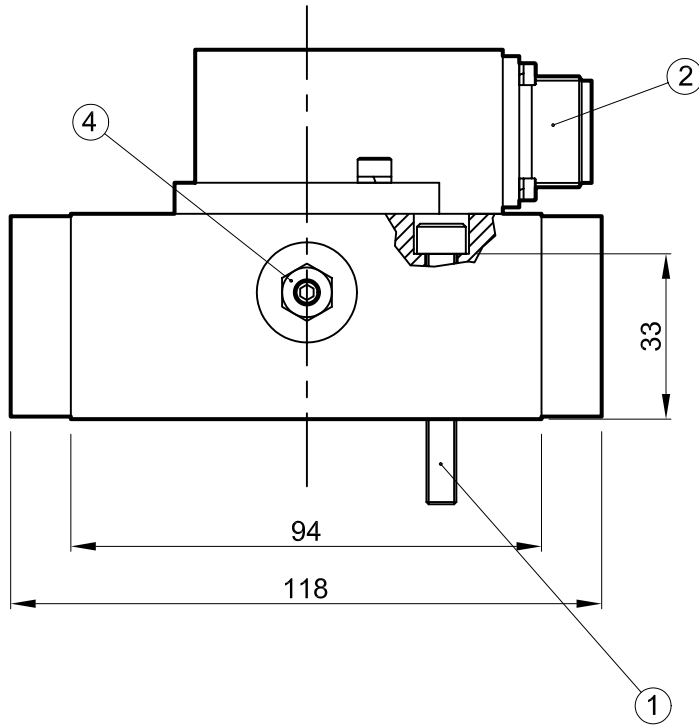
Input signal = 100%  
Supply pressure = 210 bar

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  $180^\circ$  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).

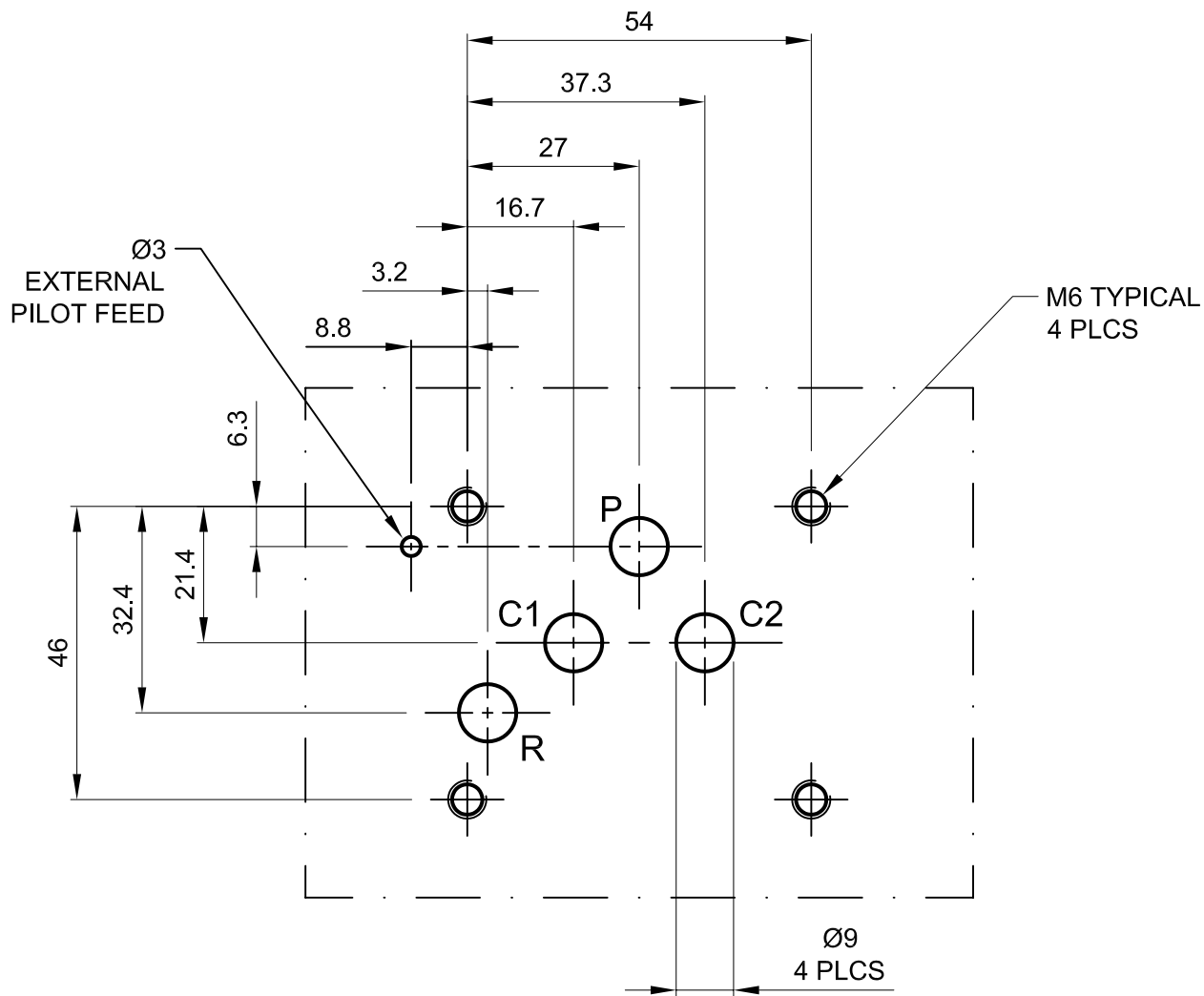
4. Null adjust requires 10 A/F ring spanner and 2.5 hexagon key. Flow out of C2 will increase with clockwise rotation of key.



## Installation Details Model 1652

Dimensions in millimeters  
3rd angle projection

Filename



# Manifold Dimensions Model 1652

Dimensions in millimeters  
3rd angle projection

Filename

