



INGEGNERIA E SISTEMI SRL

Solutions for Testing and General automation

TESTING SERVOACTUATORS



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MAIN FEATURES

Whenever high-fidelity closed-loop position/force control is required, a high-performance actuator become an essential part of a testing machine, a comparative overview of main kind of technologies available can be find in figures here below.

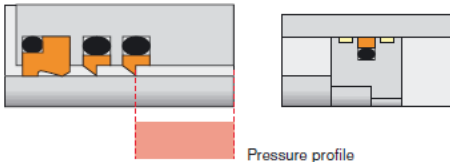
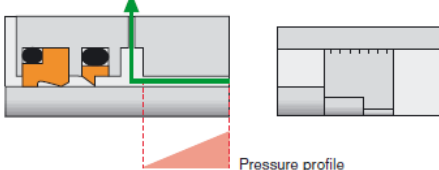
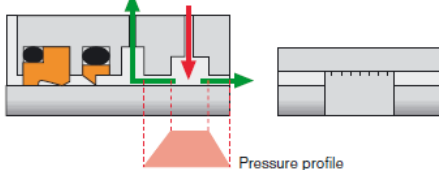
	Industrial Cylinder with seals	Hydrodynamic Servocylinder	Hydrostatic Servocylinder
			
Bearing	Sliding bearing	Hydrostatic plain gap storage bearing	Hydrostatic pocket bearing
Operating pressure	280 bar	280 bar	280 bar
Seals	Pressure-loaded	Pressure-relieved	Pressure-relieved
Friction	Pressure-dependent, transverse force-dependent	Pressure-independent, transverse force-dependent	Pressure-independent, transverse force-independent
Absorption of transverse forces	Restricted	Restricted	High absorption of transverse forces
Max. frequency	5 Hz	50 Hz	Limited by servo-valve
Max. velocity	0.5 m/s	2 m/s	5 m/s
Position transducer	Magnetostrictive	LVDT or magnetostrictive	LVDT or magnetostrictive
Type of connection	Subplate	Integrated control block	Subplate or control block

Figure 1: Comparison between different actuator technologies



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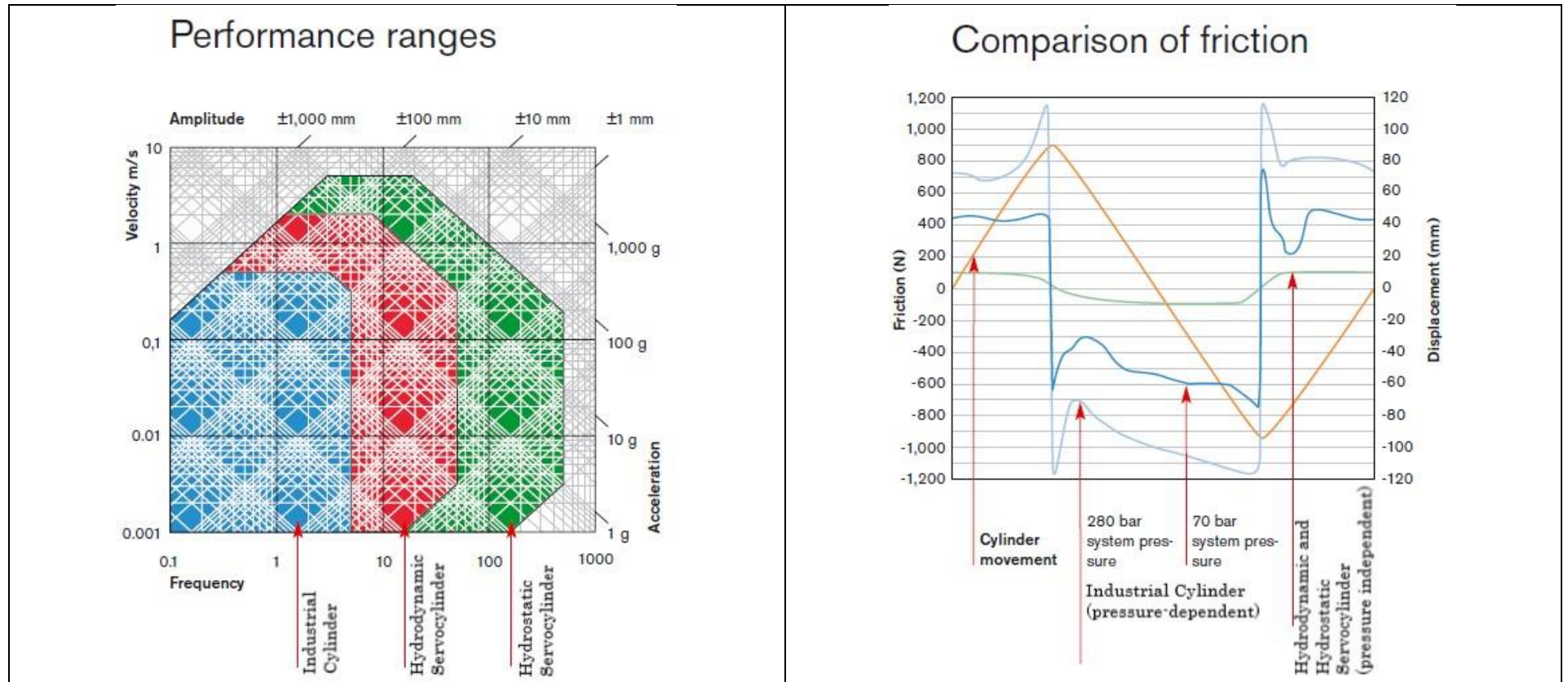


Figure 2: Performance ranges and qualitative friction comparison



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Most typical actuators used in a testing machine are of Hydrodynamic and Hydrostatic kind, since both of them can give the utmost reliability in term of control accuracy, main benefits can be summarized as follow:

- high speed admissible,
- very low speed smoothly controlled,
- very low dynamic friction,
- stick-slip free.

Additionally an Hydrostatic Servocylinder is equipped with **hydrostatic pocket bearings**, which allow the actuator to sustain also higher side loads radially applied to cylinder rod, in figure here below the basic concept of how external force can be balanced is displayed.

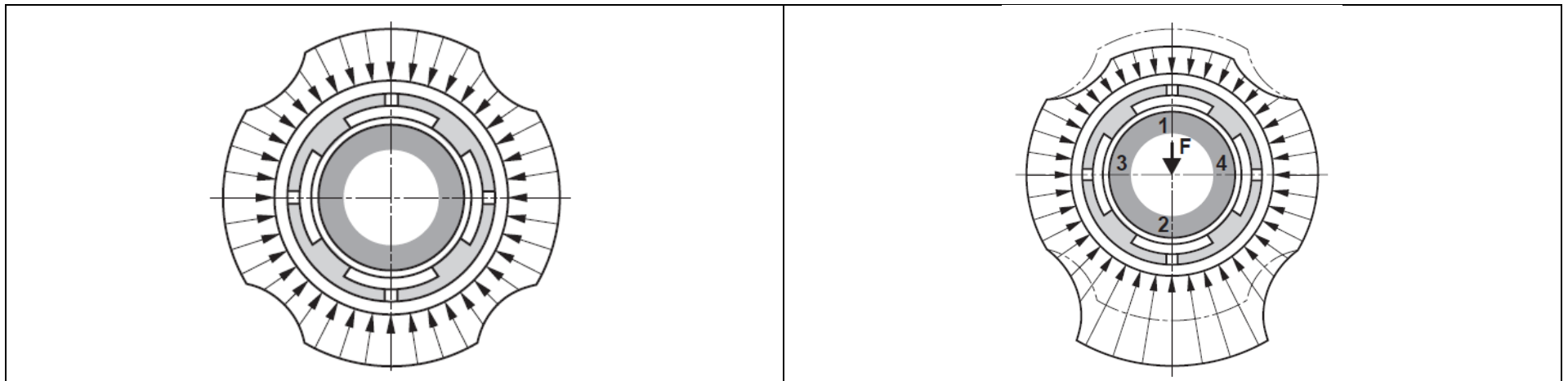


Figure 3: Sectional view of cylinder rod, hydrostatic pockets and pressure distribution with and without external Force



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Radial load F pushes cylinder rod to choke the pocket bearing on the opposite side, so creating an asymmetrical pressure distribution, which can compensate the external force.

In some case hydrostatic pocket bearings can be replaced with low-friction rigid bearings.

Standard operating conditions for all kind of actuators:

Working fluid:	HLP ISO VG 32 / 46 MIL-PRF-5606 / 83282 / 87257 other fluids on request (Skydrol)
Working pressure:	up to 315 bar
Maximum speed:	4 m/s (higher speed on request)
Temperature range:	+30°C ÷ + 65 °C



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Standard sizes for Servocylinder:

(customized size available on request, both mill-type and tie-rod type compatible with MTS dimensions)

All actuators can be equipped with accessories at customer choice:

- mounting front flange,
- anti-backlash swivel clevis (up to 4000 kN dynamic load),
- vertical pedestal,
- rod anti-rotation,
- position transducer (LVDT or magnetostrictive),
- load cell,
- spiral washer.





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Rod diameter [mm]	Piston diameter [mm]	Working stroke (pk-pk) [mm]	Braking stroke (both sides) [mm]
32	36 – 44· 48 – 54 · 55	50 – 100 – 150 – 200 · 250	15
40	47·51·54·57·59·63·68·70	50 – 100 – 150 – 200 – 250 – 300 – 350 – 400 · 450	15
50	59·62·64·67·73·76·80·87	50 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	15
63	70·75·77·81·85·95·102· 107·110	50 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	20
80	90·95·98·101·107·113· 117·127·137·142·148·150	50 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	20
100	115·121·128·139·154· 161·169·170	50 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	22,5
125	140·143·149·158·168· 176·185·200·217·220	50 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	22,5
160	181·187·196·204·211· 220·225·237·253·260	100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	25
200	240·243·251·256·269· 280·299·320·330	100 – 150 – 200 – 250 – 300 – 350 – 400 – 450 · 500	25

Figure 4: Standard sizes



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Valve block on board of Servocylinder: (**customized size available on request**)

Valve block can be designed and provided according to machine performances, including:

- Servovalves (both Bosch Rexroth and Moog available),
- Accumulators on P and T lines,
- Measuring point (P-T-A-B-PIL-DR),

On request

- passive and active load abort function,
- pressure relief valves to protect against maximum static and dynamic load,
- nozzle stabilizer.
- other functions on customer request.

INGEGNERIA E SISTEMI SRL
Via Marina, 6 – 20212 – Milan (Italy)

info@ing-sistemi.it

www.ing-sistemi.it