2

HINAKA

Hydraulic drives

JIS Standard Compliance

Standard Series

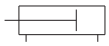
Hydraulc Cyl Inder Selection

Pressure Source (MPa)

Cylinder type is selected according to size of air pressure source at work site.

Actuator

Double Action：
Piston rod launched and returned by liquid oil.



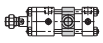
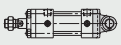
Function
Buffer or No Buffer or Sensor

Buffers Installed：
Piston slows as it approaches front and rear caps.
Buffers Not Installed：
Piston hits front and rear caps producing noise and rapid wear and tear.
Sensor：
There is a computer controlled sensor device.

Environment
Climate, Dust, Corrosion, Vibration, Etc.

Choose accessories appropriate to local conditions.

Space Dimensions (Mounting)
LA, LB, FA or FB, etc.

FA		TC	
LB		CB	

Choose mounting based on cylinder model and size of both work area and machine.

Force Required

Calculate required force according to pressure source (MPa) and cylinder model.

Output Force / Return Force

Output and return force are estimated according to hydraulic cylinder type and size.

Piston Pressurized Area Table：

Unit：N

Bore Size (ømm)	**15B** Hydraulic Cylinder (14MPa)		**5H** Hydraulic Cylinder (5MPa)		**HJ2** Compact Hydraulic Cylinder (5MPa)	
	A1	A2	A1	A2	A1	A2
32	804	550	804	603	804	603
40	1257	863	1257	1056	1257	1056
50	1963	1348	1963	1569	1963	1649
63	3117	2127	3117	2723	3117	2803
80	5027	3436	5027	4411	5027	4536
100	7854	5391	7854	6892	7854	7363

Theoretical Force Formula：

Cylinder Output Force

F1=A1×P×β(N)

Cylinder Return Force

F2=A2×P×β(N)

A1：Output Cross-Section (mm^2)

$$A1=\frac{\pi}{4}D^2$$

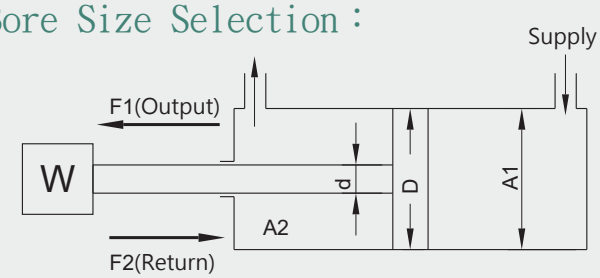
A2：Return Cross-Section (mm^2)

$$A2=\frac{\pi}{4}(D^2-d^2)$$

SI Unit Conversion：

- **Pressure** 1MPa=10.2kgf/cm^2
- **Torque** 1N.m=0.1kgf/m
- **Acceleration** 1m/s^2=0.1G
- **Force, Load** 1N=0.1kgf
- **Vacuum Pressure** -1kgf/cm^2=-7.5mmHg

Bore Size Selection：



β：Loading Factor
(The actual output force depends on many variables such as the state of the bore surface, pressure loss due to machine, piping, as well as moving speed, making it difficult to measure actual efficiency. Keep a sufficient tolerance margin when designing.)

D：Hydraulic Cylinder Diameter (mm)

d：Hydraulic Cylinder Piston Rod Diameter (mm)

P：Site Pressure Source (MPa)

〈Example Question 1〉

What is the output and return force for a cylinder bore diameter **ø100** and supplied pressure **7 Mpa**?

Estimated Output (N)：Site Pressure Supply Source (MPa)×A1: Output Cross-Section (mm^2)×Load Factor =7×7854×0.8=43982(N)

Estimated Return (N)：Site Pressure Supply Source (MPa)×A2: Return Cross-Section (mm^2)×Load Factor =7×5391×0.8=30190(N)

〈(Example Question 2〉

What is the bore diameter where the supplied pressure is **7Mpa**, cylinder output force is **43000N**?

$$\text{Piston Pressurized Area}=\frac{\text{Hydraulic Cylinder Output (N)/Load Factor}}{\text{Site Pressure Supply Source (MPa)}}$$

$$=\frac{43000/0.8}{7}=7679(mm^2)$$

Piston Pressurized Area 7679(mm^2) has a value close to ø100 in the table, therefore the bore diameter is ø100.