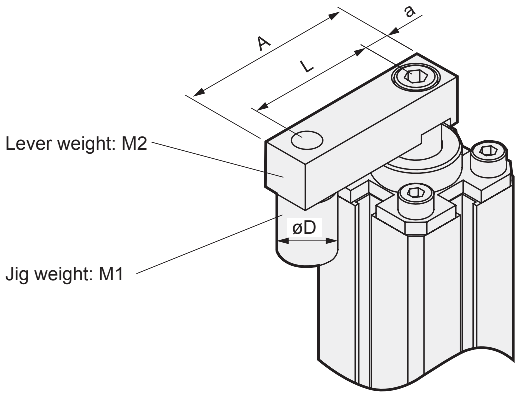
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MecHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Technical data (selection example)

[Specifications]

- Required clamping force: 400 N
- Working pressure: 0.5 MPa
- Maximum piston speed: 100 mm/s
- Lever shape
  M2:0.31 kg   L:0.080 m
  A:0.1 m   a:0.010 m
- Jig shape
  M1:0.04 kg   D:0.020 m



1. Calculate the required pressurized area.

$$\text{Required pressurized area (mm}^2\text{)} = \frac{\text{Required clamping force (N)}}{\text{Working pressure (MPa)xefficiency}} = \frac{400}{0.5\text{x}80\%} = 1{,}000\ (\text{mm}^2)$$

Note) Efficiency varies depending on lever length or cylinder resistance.

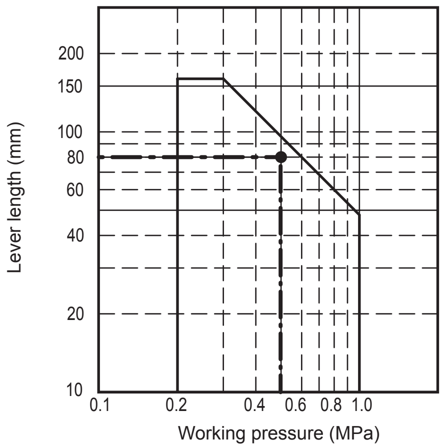
2. Select the cylinder size from the pressurized area (retracted side) given in the specifications list.

ø40 pressurized area: 1,055 (mm^2) > required pressurized area: 1,000 (mm^2)

3. Confirm the allowable lever length.

Working pressure 0.5 MPa, lever length 80 mm
Confirm with the graph on page 1115
→ Within usable range

[Allowable lever length]



4. Confirm the allowable moment of inertia for lever.

Calculating moment of inertia
(Use the formula for concentrated load on page 1114)

$$\text{Moment of inertia } I = M_1 (R_1^2 + K_1^2) + \frac{M_2 R_2^2}{3}$$

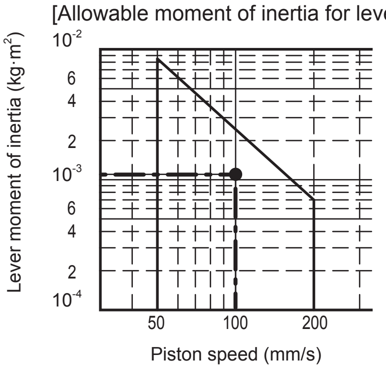
$$R_1 = L,\ R_2 = A - a,\ K_1^2 = \frac{D^2}{8}$$

$$I = 0.04\text{x}(0.08^2 + \frac{0.02^2}{8}) + \frac{0.31\text{x}(0.1-0.01)^2}{3}$$

$$= 1.10\text{x}10^{-3}\ \text{kg}\cdot\text{m}^2$$

Moment of inertia 1.10x10^{-3} kg·m^2
Maximum piston speed 100 mm/s
Confirm with the graph on page 1115
→ Within usable range

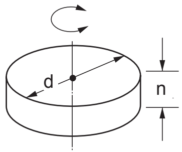
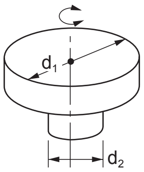
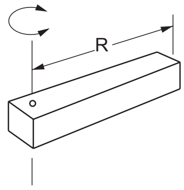
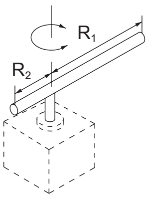
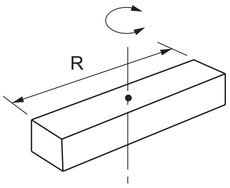
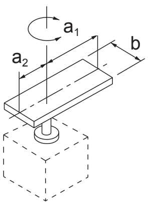
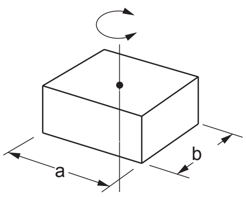
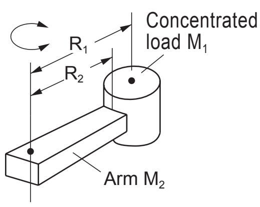
[Allowable moment of inertia for lever]



Based on the above, size ø40 is selected.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MecHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Figure for moment of inertia calculation

Shape	Sketch	Requirements	Moment of inertia I kg·m^2	Rotation radius K_1^2	Remarks
Dial plate		● Diameter d (m) ● Weight M (kg)	$I = \frac{Md^2}{8}$	$\frac{d^2}{8}$	● No mounting direction
Circular stepped plate		● Diameter d_1(m) d_2(m) ● Weight d_1 Part M_1 (kg) d_2 Part M_2 (kg)	$I = \frac{1}{8}(M_1d_1^2+M_2d_2^2)$	$\frac{d_1^2+d_2^2}{8}$	● Ignore when the d_2 section is extremely small compared to the d_1 section
Bar (center of rotation at end)		● Bar length R (m) ● Weight M (kg)	$I = \frac{MR^2}{3}$	$\frac{R^2}{3}$	● The mounting direction is horizontal.
Thin rod		● Bar length R_1 R_2 ● Weight M_1 M_2	$I = \frac{M_1.R_1^2}{3} + \frac{M_2.R_2^2}{3}$	$\frac{R_1^2+R_2^2}{3}$	● The mounting direction is horizontal.
Bar (center of rotation / gravity)		● Bar length R (m) ● Weight M (kg)	$I = \frac{MR^2}{12}$	$\frac{R^2}{12}$	● No mounting direction
Thin rectangle plate (rectangular parallelepiped)		● Plate length a_1 a_2 ● Side length b ● Weight M_1 M_2	$I = \frac{M_1}{12}(4a_1^2+b^2) + \frac{M_2}{12}(4a_2^2+b^2)$	$\frac{(4a_1^2+b^2)+(4a_2^2+b^2)}{12}$	● The mounting direction is horizontal.
Rectangular parallelepiped		● Side length a (m) ● Weight b (m) M(kg)	$I = \frac{M}{12}(a^2+b^2)$	$\frac{a^2+b^2}{12}$	● No mounting direction
Concentrated load		● Shape of concentrated load ● Length to center of gravity of concentrated load R_1 ● Arm length R_2 (m) ● Concentrated load weight M_1 (kg) ● Arm weight M_2 (kg)	$I = M_1(R_1^2+k_1^2) + \frac{M_2R_2^2}{3}$	Calculate k_1^2 according to shape of concentrated load	● The mounting direction is horizontal. ● When M_2 is extremely small compared to M_1, it may be calculated as $M_2 = 0$