Suitable for positioning and clamping work

- Body screwed type hydraulic cylinders for 21 MPa.
- The external surface of the body is threaded.
- The rod end is female threaded for mounting a jig.
- To ensure reliable clamping force, an air vent is provided as a standard feature.

Standard Specifications

Type	Single acting type (spring return)
Cylinder bore mm	ϕ12·ϕ20·ϕ32
Nominal pressure	21 MPa
Maximum allowable pressure	25 MPa
Proof test pressure	31.5 MPa
Minimum operating pressure	0.5 MPa
Working speed range	ϕ12: 100 mm/s or less ϕ20 and ϕ32: 200 mm/s or less
Working temperature range (ambient temp. and oil temp.)	−10 to +80℃ (No freezing)
Structure of cushioning	None
Adaptable fluid	Petroleum-based fluid (When using other fluid, refer to the table of fluid adaptability.)
Tolerance for thread	JIS 6g/6H
Tolerance of stroke	$^{+1.0}_{0}$ mm
Mounting style	Body screwed type (with one nut)

Terminologies

Nominal pressure
Pressure given to a cylinder for convenience of naming.
It is not always the same as the working pressure (rated pressure) that guarantees performance under the specified conditions.

Maximum allowable pressure
Maximum allowable pressure generated in a cylinder (surge pressure, etc.).

Proof test pressure
Test pressure against which a cylinder can withstand without unreliable performance at the return to nominal pressure.

Minimum operating pressure
Minimum pressure at which cylinder installed horizontally operates under no load.

Note) ●The hydraulic pressure generated in a cylinder due to the inertia of load must be lower than the maximum allowable pressure.

Standard Stroke

Unit: mm

Cylinder bore \ Stroke	5	10	20
ϕ12	○	○	—
ϕ20	—	○	○
ϕ32	—	○	○

Adaptability of Fluid to Seal Material

Seal material	Adaptable fluid				
	Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	Water in oil fluid	Oil in water fluid
Nitride rubber	○	○	×	○	○

Note) ○: Applicable ×: Inapplicable
Consult us before using the △-marked items.

Pressurized Area

Unit: mm²

Bore mm	Pressurized area
ϕ12	113
ϕ20	314
ϕ32	804

Weight Table

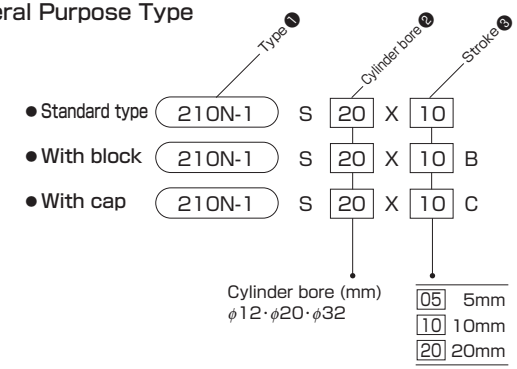
Unit: g

Bore mm	Basic weight			Additional weight	
	Stroke 5	Stroke 10	Stroke 20	Block	Cap
ϕ12	90	100	—	260	70
ϕ20	—	223	253	430	140
ϕ32	—	872	972	1150	340

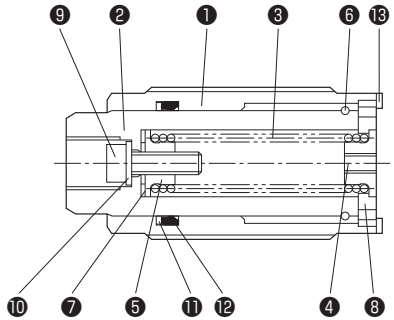
Calculation formula: Cylinder weight (g)=basic weight+additional weight
Calculation example: Bore ϕ20, cylinder stroke 20 mm, with a block
253+430=683g

● How to order

General Purpose Type



Sectional Drawing



Parts List

No.	Name	Material	Quantity
❶	Body	Carbon steel for mechanical structures	1
❷	Piston rod	Carbon steel for mechanical structures (hard chrome plated)	1
❸	Spring	Piano wire	1
❹	Spring hook A	Carbon steel for mechanical structures	1
❺	Spring hook B	Carbon steel for mechanical structures	1

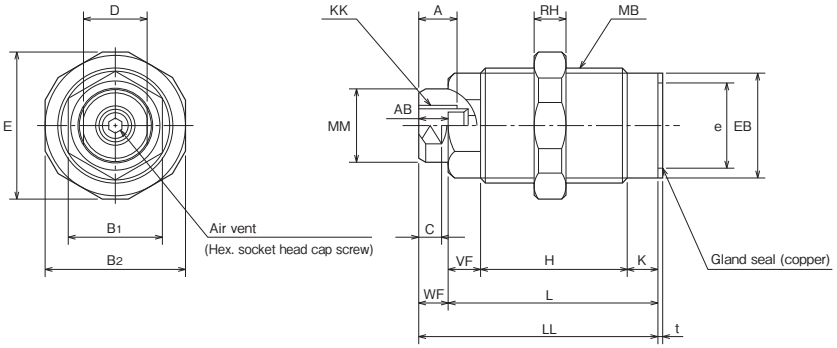
No.	Name	Material	Quantity
❻	Stop ring	Spring steel	1
❼	Toothed washer	——	1
❽	End plate	Carbon steel for mechanical structures	1
❾	Hex. socket head cap screw (air vent)	——	1
❿	Plain washer	Brass	1

Seal List

Bore \ Name	⓫Back-up ring for rod	⓬Rod seal	⓭Gland seal
Material	Fluorocarbon	Nitride rubber (NBR)	Copper
Quantity	1	1	1
ϕ12	For P-12	PS-12	ϕ15×ϕ19.5×t1
ϕ20	For P-20	PS-20	ϕ22×ϕ27.5×t1
ϕ32	For P-32	PS-32	ϕ32×ϕ45.5×t2

Standard Type

210N-1 S Bore × Stroke



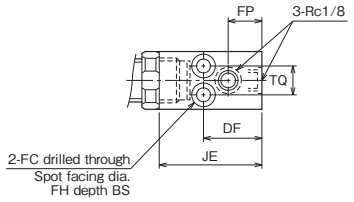
Bore \ Symbol	A	AB	B1	B2	C	D	E	e	EB	H			K	KK
										5	10	20		
ϕ 12	7	6.5	HEX17	27	6	11	ϕ 28	ϕ 15	ϕ 20	23	28	—	6	M8×1.25
ϕ 20	10	8.2	HEX24	36	6	17	ϕ 38	ϕ 22	ϕ 28	—	28	38	8	M10×1.5
ϕ 32	16	13.4	HEX41	55	8.5	27	ϕ 58	ϕ 36	ϕ 46	—	42	52	9	M16×2

Bore \ Symbol / Stroke	L			LL			MB	MM	RH	t	VF	WF
	5	10	20	5	10	20						
ϕ 12	35	40	—	42	47	—	M22×1.5	ϕ 11.5	8	1	6	7
ϕ 20	—	44	54	—	52	62	M30×1.5	ϕ 19.5	8	1	8	8
ϕ 32	—	63	73	—	73	83	M48×1.5	ϕ 31.5	12	2	12	10

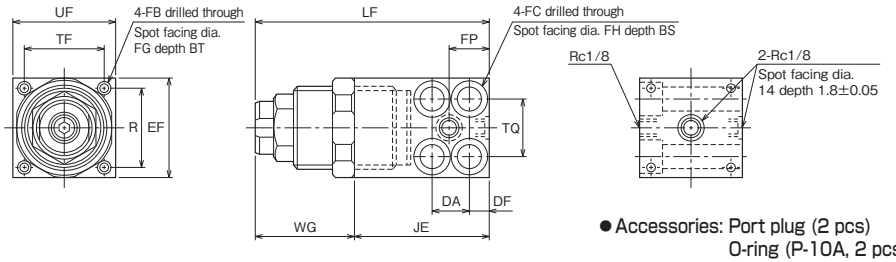
With Block

210N-1 S Bore × Stroke – B

● Bore ϕ12 and ϕ20



● Bore ϕ32



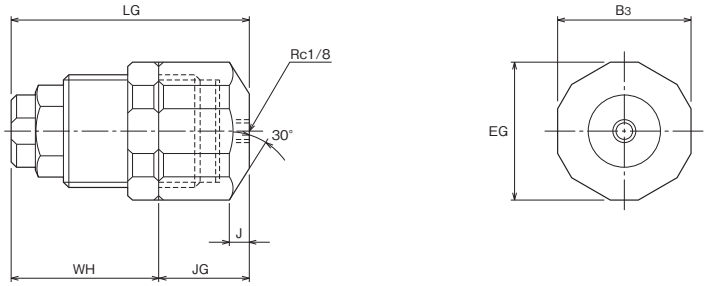
Recommended Hex. Socket Head Cap Screw

Bore mm \ Item	When mounted with end angles	When mounted with flange
ϕ 12	M6×35 ℓ	M3×50 ℓ
ϕ 20	M10×40 ℓ	M4×55 ℓ
ϕ 32	M12×60 ℓ	M4×75 ℓ

● Accessories: Port plug (2 pcs)
O-ring (P-10A, 2 pcs)

With Cap

210N-1 S Bore × Stroke – C



Bore \ Symbol	B3	BS	BT	DA	DF	EF	EG	FB	FC	FG	FH	FP	J	JE	JG
ϕ 12	27	6.5	3.5	—	28	28	ϕ 28	ϕ 3.5	ϕ 6.5	ϕ 6	ϕ 10.5	16	4	50	26
ϕ 20	36	10.2	4.5	—	24	38	ϕ 38	ϕ 4.5	ϕ 10.5	ϕ 7.4	ϕ 16.6	9	6	56	32
ϕ 32	55	12.5	4.5	20	10.5	58	ϕ 58	ϕ 4.5	ϕ 12.5	ϕ 7.5	ϕ 18.5	22	8	75	38

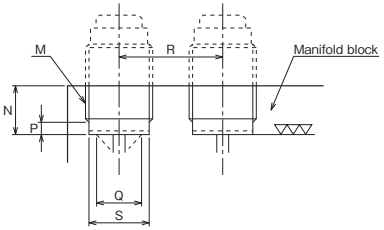
Bore \ Symbol / Stroke	LF			LG			R	TF	TQ	UF	WG			WH		
	5	10	20	5	10	20					5	10	20	5	10	20
ϕ 12	78	83	—	56	61	—	19	25	14	33	28	33	—	30	35	—
ϕ 20	—	88	98	—	66	76	26.6	30.6	18	40	—	32	42	—	34	44
ϕ 32	—	117	127	—	88	98	46	46	35	58	—	42	52	—	50	60

Installation

- Design the manifold block for installation of a standard type cylinder referring to the following dimensional table.

Recommended dimension for manufacturing manifold block

To use more than one cylinder, design the manifold block based on the dimensions shown in the following table.



Dimensional Table

Unit: mm

Symbol / Bore	M	N (min)	P (max)	Q (max)	R (min)	S (min) (tolerance)
ϕ12	M22×1.5	13.5	6.5	ϕ15	30	ϕ20
ϕ20	M30×1.5	22	8.5	ϕ22	40	ϕ28
ϕ32	M48×1.5	31	10.5	ϕ36	60	ϕ46

- When installing the cylinder body on the manifold block, tighten the body to the following tightening torque.

Tightening Torque

Bore mm	Tightening torque N·m
ϕ12	45
ϕ20	80
ϕ32	220

- To secure a cylinder with block, use bolts with the specified size and conforming to the specified strength class (refer to JIS B8354).
- When securing a cylinder with cap, put an article with a sufficient strength between the cap and lock nut. If the strength is insufficient, the specified output may not be obtained.
- When the piston rod is used downward or horizontally, the piston may not return due to the jig weight. The jig weight must be less than the value shown in the table. When fitting a jig with a weight higher than the value shown in the table, provide an external returning mechanism.

Maximum Mountable Jig Weight

Bore mm	Maximum jig weight kg
ϕ12	0.5
ϕ20·ϕ32	1.0

- Tighten the lock nut to about a half of the cylinder body tightening torque.

Use environment

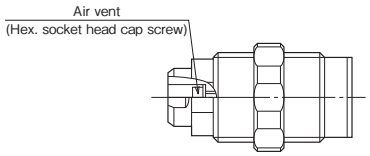
- Do not use the cylinders in a place where they may be splashed with cutting oil.
- If they are used in a place where they are splashed with water, the piston rods may rust.

Piping method

- Select piping parts which sufficiently withstand the conditions of use.
- Before using the piping parts, sufficiently flush them.

Operation

- Tighten the cylinder body to the specified torque on the manifold block.
- Before fitting the end accessories to the body, take air bleeding from the cylinder body and piping.



Take air bleeding from the cylinder in accordance with the following procedures.

1. Feed oil at a low pressure (0.5 MPa or less) to the cylinder to move the piston rod forward.
2. Hold the piston rod with a spanner, and loosen the hex. socket head cap screw in the end of the piston rod. If oil is not dumped after loosening the bolt two turns, loosen the hex. socket head cap screw further some turns, and rattle the bolt to dump free air.
3. After air bleeding, tighten the hex. socket head cap screw to the torque shown in the following table.

Tightening Torque

Unit: N·m

Item / Bore	Hex. socket head cap screw size	Tightening torque
ϕ12	M3	1.8
ϕ20	M4	3.5
ϕ32	M6	11

- Operate the cylinder at a low pressure to check for abnormalities.
- Apply the regular pressure to the cylinder to check that the cylinder operates without any abnormality and oil does not leak from any part.
- Fit the rod end accessory to re-check the operation at a low pressure, and gradually increase the pressure to the specified value.

Inspection

- Check oil leakage, and check the operation of the cylinder by comparison with the initial conditions.

Disposal

- Disassemble the cylinder, sort the disassembled components by material (iron, copper, aluminum, resin, rubber, waste oil, etc.), and then dispose of them.
- Piston rods are hard chrome plated. When disposing of them, consult with a disposal company.
- Dispose of resin base and rubber base components as nonflammable wastes.
- When disposing of waste oil, conform to related laws and rules.

CAUTION

- Do not reuse used gland seals. (Once loosened, it cannot be used.)
- Sufficiently take air bleeding not only from the cylinder, but also from the piping. Insufficient air bleeding may cause operation failures as shown below.

Phenomena

- The cylinder causes stick-ship phenomenon.
- Smooth speed control cannot be made.
- Temperature rise caused by adiabatic compression can damage the seals.
- Shock and vibration are given to the outside.