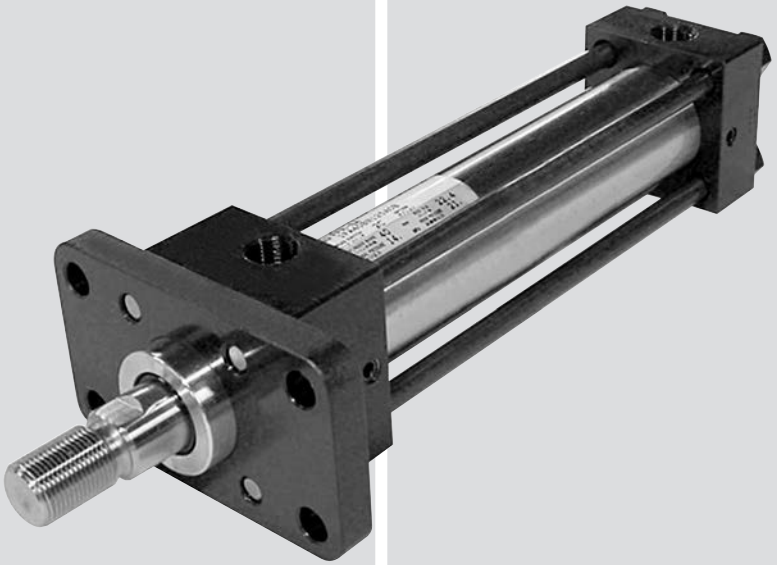
F Series

7・14MPa



Tie Rod Type Cylinder

F Series ■ 7・14MPa

■Features

Excellent Dependability

The sliding part of the rod is of high-quality chrome-plated construction and a soft bronze casting is used for the rod bushing to prevent scarring of the rod with high performance U-shape packing used as the rod packing. These features provide reliability and durability while protecting against oil leakage.

Perfect Cushion Construction

Tapered cushion construction is incorporated into our standard cylinders and results in an approximate reduction of 50% of surge pressure as compared to conventional cylinders. This cushion construction provides ideal smooth stoppage over a very short time.

Switch adjusted

Our high-performance reliable dustproof switches (magnetic proximity switches) are standard. Because of their unified compact construction, there is no need to attach external sensors, thereby making cylinder installation very efficient.

■Specifications

Series Name	F	
Nominal Pressure Note1)	7MPa : FS　14MPa : FF	
Model	Standard : FS、FF	Switch adjusted : FSR、FFR
Bore	φ32・φ40・φ50・φ63・φ80・φ100 φ125・φ140・φ150・φ160・φ180 φ200・φ224・φ250	φ32・φ40・φ50・φ63・φ80・φ100 φ125・φ140
Maximum Allowable Pressure Note2)	7MPa　Cap Side:8.8MPa Head Side:Rod Type A14.7MPa、Rod Type B12.7MPa、Rod Type C10.8MPa 14MPa　Cap Side:17.7MPa Head Side:Rod Type A17.7MPa、Rod Type B17.7MPa、Rod Type C13.7MPa	
Proof Pressure	FS : 10.5MPa　FF : 21MPa	
Minimum Working Pressure Note3)	FS: Less than 0.29MPa　FF: Less than 0.56MPa	
Thread Tolerance	JIS6g/6H (Corresponds to JIS Grade 2)	
Range of Operating Temperature Note4)	Standard Specifications: -10℃ to +80℃ High Temperature Specifications: -10℃ to +120℃	Standard Specifications: -10℃ to +60℃ High Temperature Specifications: -10℃ to +100℃
Hydraulic Oil Applied	General purpose mineral hydraulic oil (When using operating oils other than above, be sure to report the brand name(s) after referring to the Packing materials on P.15)	
Adjustment Standard	Governed by Former JIS B 8354	

Note 1) "Nominal pressure" means pressure to be applied to the cylinder for the convenience in series name identification. Nominal pressure is not always equal to the rated pressure (operating pressure at which the cylinder performance is assured under specified conditions).
Note 2) "Maximum allowable pressure" means the maximum pressure generated in the cylinder that the cylinder can withstand (e.g. surge pressure).
Note 3) The Minimum Working Pressure is the value when the pressure is supplied from the cap side.
Note 4) In switch adjusted specifications, the temperature limit for the switch body should be under 60℃. (Select a special high-temperature switch when temperatures will exceed 60℃)

■Ranges of Operating Speed

Bore	Range
φ32 to φ63	8 to 400mm/s
φ80 to φ125	8 to 300mm/s
φ140 to φ250	8 to 200mm/s

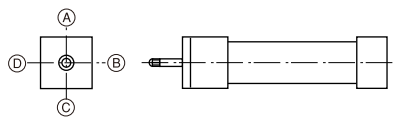
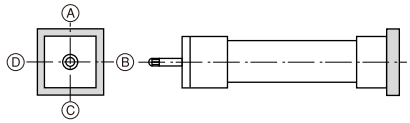
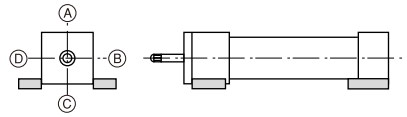
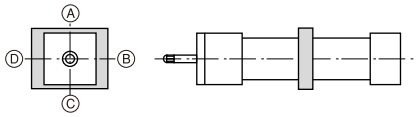
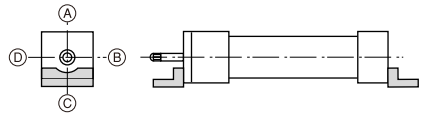
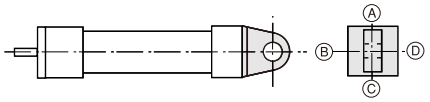
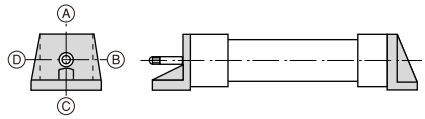
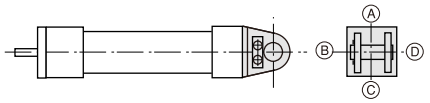
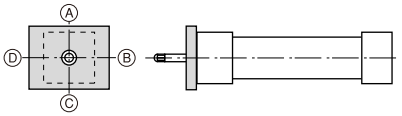
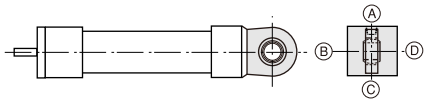
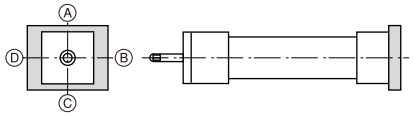
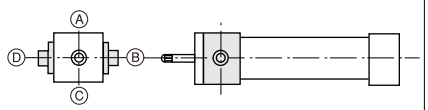
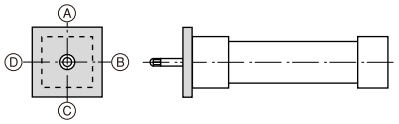
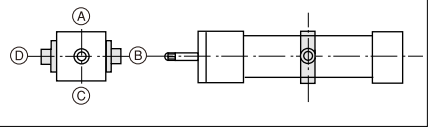
Note 1) Keep the inertial load pressures generated within the cylinder chamber below the maximum allowable pressure.
Note 2) The Minimum Cylinder Speed does not include cushion stroke operation.

■Maximum Stroke

Bore	Maximum Stroke
φ32	1,200mm
φ40 or φ50	1,500mm
φ63 or φ80	1,600mm
φ100 to φ250	2,000mm

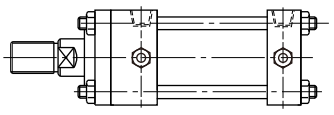
Note 1) This is the Maximum Stroke for the standard item produced.
Note 2) Please consider the rod buckling separately.

■Mounting Type

Format	Code	Appearance	Format	Code	Appearance
Basic	S		note1) Cap Side Square Flange	FD	
Axial Right Angle Direction Foot	LA		Middle Rectangular Flange	CF	
Axis Direction Foot (Only for 7MPa)	LB		Single Protrusion Clevis	CA	
Axis Direction Foot	LC		Double Protrusion Clevis	CB	
Head Side: Rectangular Flange	FA		Spherical Bearing Single Protrusion Clevis	CC	
Cap Side Rectangular Flange	FB		Head Side Integral Trunnion	TA	
note1) Head Side: Square Flange	FC		Middle Trunnion	TC	

Note 1) In the case of the φ32 cylinder, the FC Format and the FD Format are considered to be non-standard.
Note 2) ⒶⒷⒸⒹ are the positioning relationships for the port valve, etc.

■Cover Securing Formats

Securing Format	Appearance
Tie-rod System	

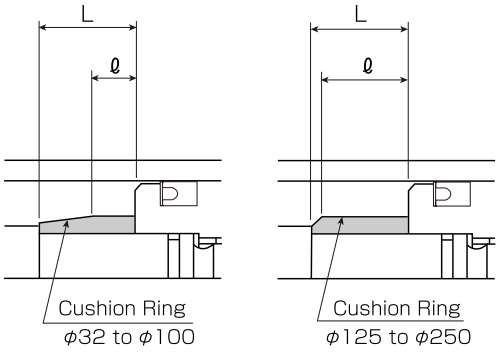
■Cushion Symbols

Code	B	R	H	N
Attachment Section	Cushion on Both Sides	Head-side Cushion	Cap-side Cushion	No Cushion

Note 1) The φ32 A rod does not have a cushion on the Head-side. The cushion for the φ40 A rod is a fixed cushion on the head side.
Note 2) For the double A rods (φ32 and φ40), the cushion (including a fixed cushion) cannot be produced.

■Cushion Shape

Taper processing derived from unique calculations for cushion rings has been implemented so that the inertia from high speed moving objects is absorbed in order to accomplish stoppage without shock in a very short time.



Units:㎜

Bore	Cushion Ring Length (L)	Cushion Ring Parallel Section Length (ℓ)
φ32	15	6
φ40 to φ63	20	8
φ80 to φ100	25	8
φ125 to φ160	25	21
φ180 to φ224	30	26
φ250	35	31

Note 1) When stoppage is not done at the end of the stroke at a distance of 3mm or more beforehand, the cushion effect is weakened and this should be taken into consideration. (Note that this is from φ32 to φ100)
Note 2) When a cushion with a stroke shorter than the cushion ring length is used, the cushion will remain expanded, so this should also be taken into consideration.

■Stroke Tolerance: Grade A

Units:㎜

Stroke	100 or less	101 to 250	251 to 630	631 to 1,000	1,001 to 1,600	1,601 to 2,000
Allowable Value	+0.8 0	+1.0 0	+1.25 0	+1.4 0	+1.6 0	+1.8 0

Note) The dimensions and precision of other parts conform to the former JIS B 8354 standard.

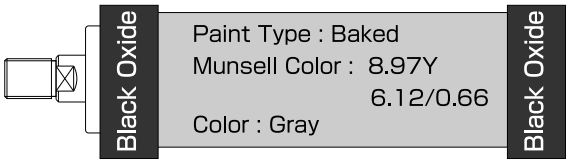
■Slide Section Processing

Piston Rod: Hard chrome plating processing (more than 2/100mm)

■Tube Coating Colors

Standard

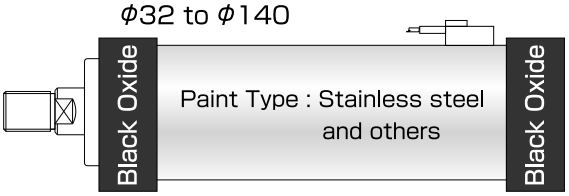
φ32 to φ180



φ200 to φ250

Switch Adjusted Specifications

φ32 to φ140

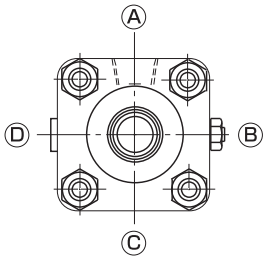


Note) If you have any questions with regard to the type of paint, please contact us.

■Port/Valve Locations

In each of the dimension diagrams for mounting, the base position is given as A as seen from the rod side with the following positions expressed as BCD continuing in a clockwise direction.

1) The standard positions are: A……port B……Cushion Valve C……Check Valve D……Air Bleed



2) In the case where differences from the standard positions have been specified, these are indicated by Ⓐ, Ⓑ, Ⓒ, Ⓓ.
3) In the case of no cushion, the standard positions are indicated by ⒶⓄⒹ.
4) In the TA mounting type, the basic position for the head side is ⒶⒸⒸ or ⒶⓄⒸ.
5) In the case of a fixed cushion, there is no cushion valve so this is annotated as Ⓞ.
6) In the case where there is no air bleed, this is indicated by ⊖.
The cylinder equipped with a cushion valve, no air bleed and two check valves is indicated as Ⓞ.
7) In the case where the head side and the cap side positions are different, they are indicated as ⒶⒷⒹ and ⒷⒸⒹ with the former being the head side and the latter being the cap side. In the case where they are depicted on two levels, the upper level is the cap side and the lower level is the head side.

■Packing Materials

Code	1	2	3	9
Material	Nitrile Rubber	Urethane Rubber Note 2)	Fluoric Rubber Note 3)	Hydrogenated Nitrile Rubber
Range of operating temperature	−10℃ to +80℃	−10℃ to +80℃	−10℃ to +120℃	−10℃ to +120℃
General-purpose mineral hydraulic oil	○	◎	○	○
Emulsions of water in mineral oil	○	△	○	◎
Emulsions of mineral oil in water	○	△	○	◎
Water + Glycol-type Operating Oil	○	×	×	◎
Phosphate Ester fluid	×	×	○	×
Fatty Acid Ester fluid	○	×	△	△

Note 1) The ◎ or ○ mark indicates its use is possible. The X mark indicates it is not possible to use it. Regarding the △ mark, consult us for details. The ◎ mark indicates the packing material recommended for applications where wear resistance is important.
Note 2) Urethane rubber specifications for φ40C rods and φ32 use cannot be produced.
Note 3) Specifications for fluoric rubber for φ32C rods/nitrile rubber specifications for use in high temperature cannot be produced.
Note 4) Nitrile rubber for coolant proof applications is identified by a "6", and the fluoric rubber by a "7".

■Code

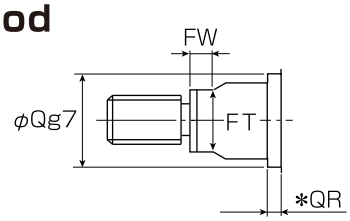
The switch codes are not necessary for the standard specifications.

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲
FS-	SA	1	TC	100	B	B	320	A	B	D-					-Y	P	N	J
FFR-	SA	1	TC	100	B	B	320	A	B	D-	2C				-Y	P	N	J

①Series Name	FS: 7 MPa, FF: 14MPa
②Switch Adjusted Specifications	"R" is affixed in the case of cylinders with switch adjusted specifications. FSR: 7MPa switch adjusted specifications; FFR: 14MPa switch adjusted specifications
③Single/Double Classification	S: Single Rod Type W: Double Rod Type
④Standard Special Note1) Classification	A: Standard Dimensions
⑤Packing Material	1. Nitrile Rubber (Standard) 2. Urethane Rubber 3. Fluoric Rubber 6. Coolant Proof Nitrile Rubber 7. Coolant Proof Fluoric Rubber 9. Hydrogenated Nitrile Rubber
⑥Mounting	S・LA・LB・LC・FA・FB・FC・FD・CF・CA・CB・CC・TA・TC
⑦Bore (㎜)	32・40・50・63・80・100・125・140・150・160・180・200・224・250 (Specifications for switch adjusted:φ32 toφ140;φ32 toφ180 is standard for the Double Rod Type. The Double Rod Type with switch adjusted specifications is standard).
⑧Type of Rod	A: A Rod (Standard Equivalent) B: B Rod (Standard) C: C Rod (Standard)
⑨Cushion Format	B: Cushion on Both Sides R: Head-side Cushion H: Cap-side Cushion N: No Cushion
⑩Stroke Length (㎜)	Indicate the stroke (refer to P.13 for Maximum Stroke)
⑪Port Location	Refer to P.15 and then indicate A, B, C or D.
⑫Cushion Valve Location	Refer to P.15 and then indicate A, B, C or D. O: No Cushion or Fixed Cushion
⑬Air Bleed Location	Refer to P.15 and then indicate A, B, C or D. No notation : Not necessary (Standard Equivalent)
⑭Switch Quantity Note2)	Mentioned the quantity. 1A. When the switch is not needed in a switch-adjusted specifications.
⑮Switch Type	C:T0V3 J:T0V5 CK:T5V3 CL:T5V5 DT:T2V3 DU:T2V5 CW:T2YV3 CH:T0H3 JH:T0H5 FJ: T0V-0.5 (For a DC connector system) FW: T0V-0.5 (For an AC connector system) XX: Special Part Please refer to P.138 for more detailed information on switches.
⑯End Joint	T: Single Protrusion End Joint Y: Double Protrusion End Joint S: Spherical Bearing End Joint F: F Connector No notation: None
⑰Pin	P: CB or the Y joint has a pin attached P2: CB and the Y joint have a pin attached G: Pin with Grease Nipple No notation: None (at φ125 or less, the pin is attached as standard equipment)
⑱Lock Nut	N: Available (3 types) N2: Two lock nuts (3 types × 2 pieces) No notation: None
⑲Bellows	J: Neoprene JS: Silicon Glass Cloth JA: Aluminum Foil Glass Cloth JC: Conex No notation: None (In the case where there are any other material specifications, please specify them).

Note 1) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.
Note 2) Switches are shipped unattached to prevent breakage.

S Single Rod

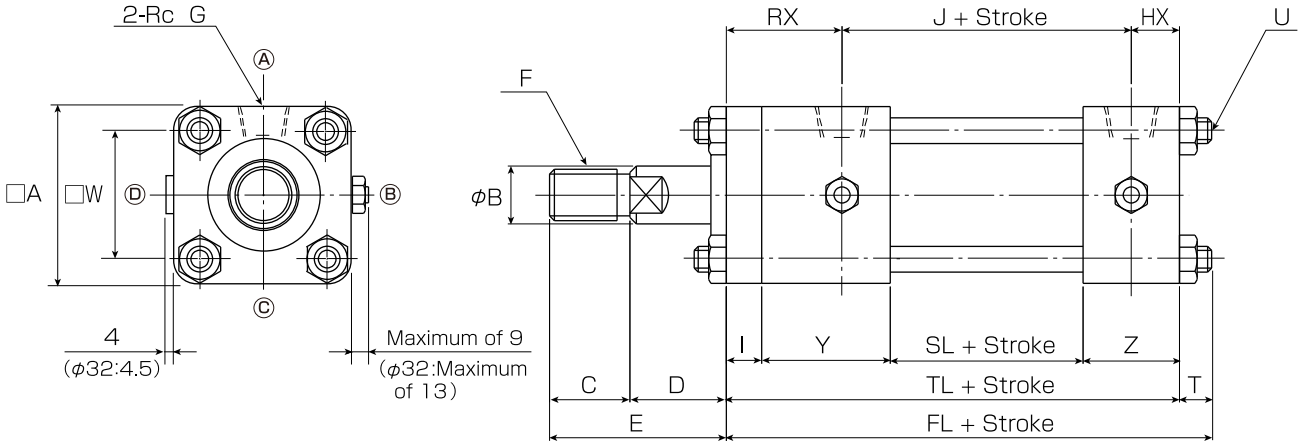


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ, Ⓑ, Ⓒ, Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P. 50.
Note 3) The check valve of A rod of the inside diameter 32 and the inside diameter 50 comes out of 4 mm from a cover side.

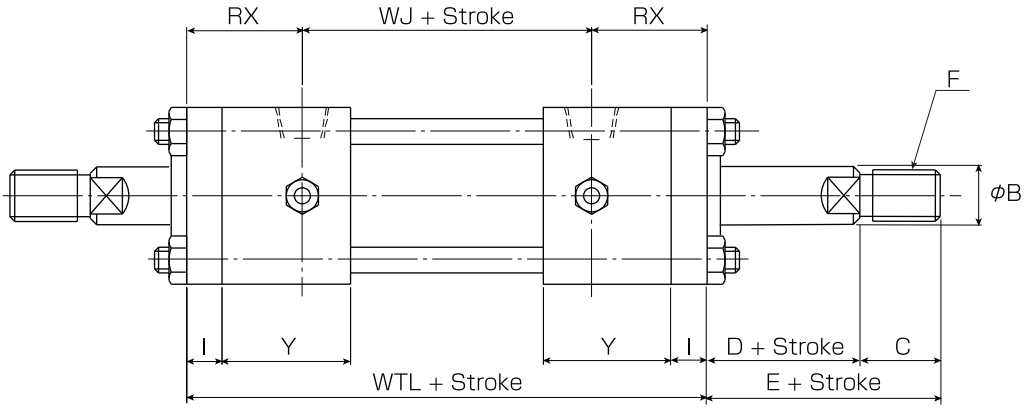
■S Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod							D	TL	J	FL	RX	HX	SL	I	Y	Z	T	U	□A	□W	Rc G
	φB	C	E	F	φQ	FT	FW															
φ32	18	25	55	M16 P1.5	35	14	10	30	141	90	151	36	15	60	11	40	30	10	M8 P1.25	55	40	3/8
φ40	22.4	30	60	M20 P1.5	40	19	10	30	141	90	153	36	15	64	11	38	28	12	M10 P1.25	65	45	3/8
φ50	28	35	65	M24 P1.5	46	24	10	30	155	96	167	42	17	66	13	44	32	12	M10 P1.25	75	52	1/2
φ63	35.5	45	80	M30 P1.5	55	30	15	35	163	102	178	44	17	72	15	44	32	15	M12 P1.5	90	65	1/2
φ80	45	60	95	M39 P1.5	65	41	15	35	184	108	202	56	20	72	18	56	38	18	M16 P1.5	110	80	3/4
φ100	56	75	115	M48 P1.5	80	50	20	40	192	114	212	58	20	78	20	56	38	20	M18 P1.5	135	98	3/4
φ125	71	95	140	M64 P2	95	65	25	45	220	129	243	66	25	83	24	65	48	23	M22 P1.5	165	122	1
φ140	80	110	160	M72 P2	105	75	25	50	230	137	254	68	25	91	26	65	48	24	M24 P1.5	185	138	1
φ150	85	115	165	M76 P2	110	80	30	50	240	145	267	70	25	99	28	65	48	27	M27 P1.5	196	148	1
φ160	90	120	175	M80 P2	115	85	30	55	253	155	280	73	25	109	31	65	48	27	M27 P1.5	210	160	1
φ180	100	140	195	M95 P2	125	95	30	55	275	171	304	74	30	115	33	69	58	29	M30 P1.5	235	182	1 1/4
φ200	112	150	205	M100 P2	140	105	30	55	301	181	332	85	35	111	37	83	70	31	M33 P1.5	262	200	1 1/2
φ224	125	180	240	M120 P2	150	120	35	60	305	180	341	90	35	110	42	83	70	36	M39 P1.5	292	225	1 1/2
φ250	140	195	260	M130 P2	170	133	45	65	346	197	385	107	42	113	47	102	84	39	M42 P1.5	325	250	2

S Double Rod



※φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

■Double Rod

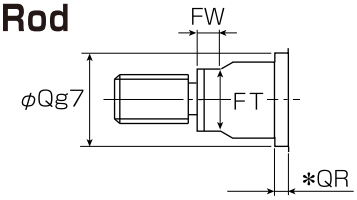
Units:㎜

Symbol / Bore	Double Rod	
	WTL	WJ
φ32	166	94
φ40	166	94
φ50	182	98
φ63	194	106
φ80	222	110
φ100	232	116
φ125	264	132
φ140	276	140
φ150	288	148
φ160	304	158
φ180	322	174
φ200	362	192
φ224	370	190
φ250	416	202

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

LA Single Rod

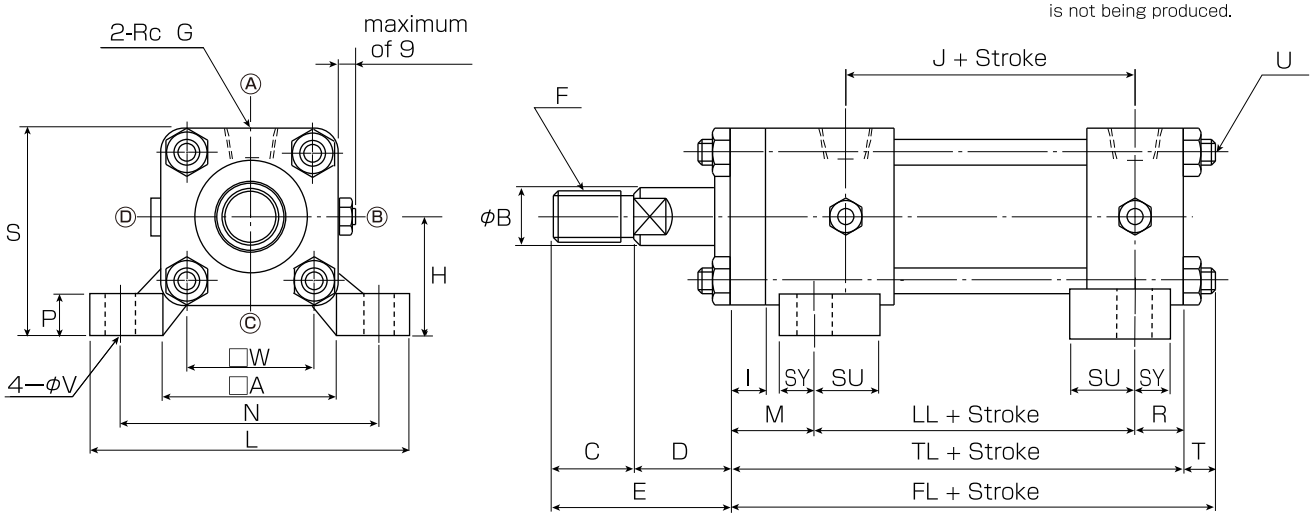


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

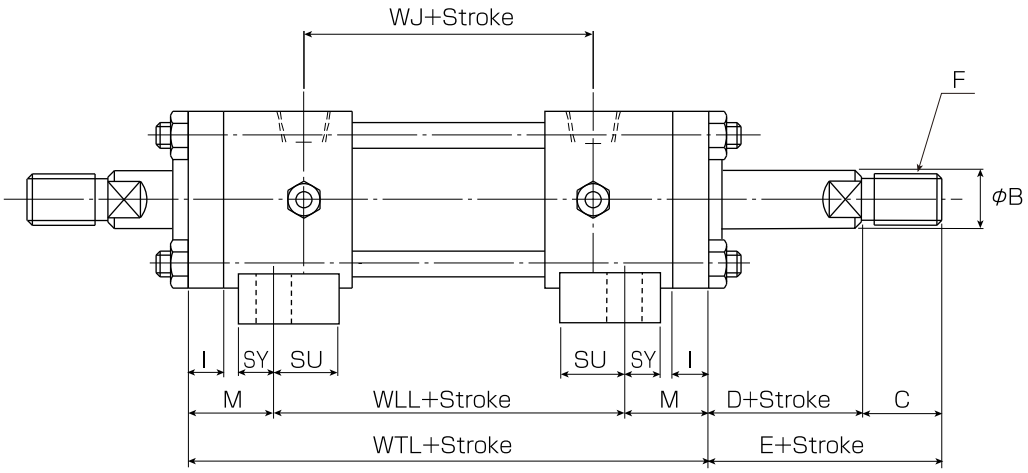
■LA Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Bore \ Symbol	B Rod φB	C	E	F	D	TL	J	LL	FL	I	M	R	T	SU	SY	U	□A	□W	N	L	P	H	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	98	151	11	27	16	10	31	13	M8 P1.25	55	40	88	108	14	35 ±0.15	62.5	11	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	98	153	11	27	16	12	31	13	M10 P1.25	65	45	95	118	14	37.5 ±0.15	70	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	108	167	13	30	17	12	34	14	M10 P1.25	75	52	115	145	17	45 ±0.15	82.5	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	106	178	15	36	21	15	32	18	M12 P1.5	90	65	132	165	19	50 ±0.15	95	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	124	202	18	39	21	18	42	18	M16 P1.5	110	80	155	190	25	60 ±0.25	115	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	122	212	20	45	25	20	38	22	M18 P1.5	135	98	190	230	27	71 ±0.25	138.5	22	3/4
φ125	71	95	140	M64 P2	45	220	129	136	243	24	54	30	23	41	25	M22 P1.5	165	122	224	272	32	85 ±0.25	167.5	26	1
φ140	80	110	160	M72 P2	50	230	137	144	254	26	56	30	24	41	25	M24 P1.5	185	138	250	300	35	95 ±0.25	187.5	26	1
φ150	85	115	165	M76 P2	50	240	145	146	267	28	61	33	27	38	28	M27 P1.5	196	148	270	320	37	106 ±0.25	204	30	1
φ160	90	120	175	M80 P2	55	253	155	150	280	31	67	36	27	40	31	M27 P1.5	210	160	285	345	42	112 ±0.25	217	33	1
φ180	100	140	195	M95 P2	55	275	171	172	304	33	68	35	29	50	34	M30 P1.5	235	182	315	375	47	125 ±0.25	242.5	33	11/4
φ200	112	150	205	M100 P2	55	301	181	186	332	37	76	39	31	56	38	M33 P1.5	262	200	355	425	52	140 ±0.25	271	36	11/2
φ224	125	180	240	M120 P2	60	305	180	186	341	42	80.5	38.5	36	56	38	M39 P1.5	292	225	395	475	52	150 ±0.25	296	42	11/2
φ250	140	195	260	M130 P2	65	346	197	206	385	47	93.5	46.5	39	68	46	M42 P1.5	325	250	425	515	57	170 ±0.25	332.5	45	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

LA Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

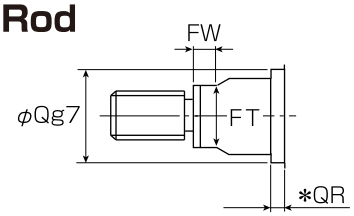
■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WLL	WTL	WJ
φ32	112	166	94
φ40	112	166	94
φ50	122	182	98
φ63	122	194	106
φ80	144	222	110
φ100	142	232	116
φ125	156	264	132
φ140	164	276	140
φ150	166	288	148
φ160	170	304	158
φ180	186	322	174
φ200	210	362	192
φ224	209	370	190
φ250	229	416	202

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

LB (Only for 7MPa) Single Rod

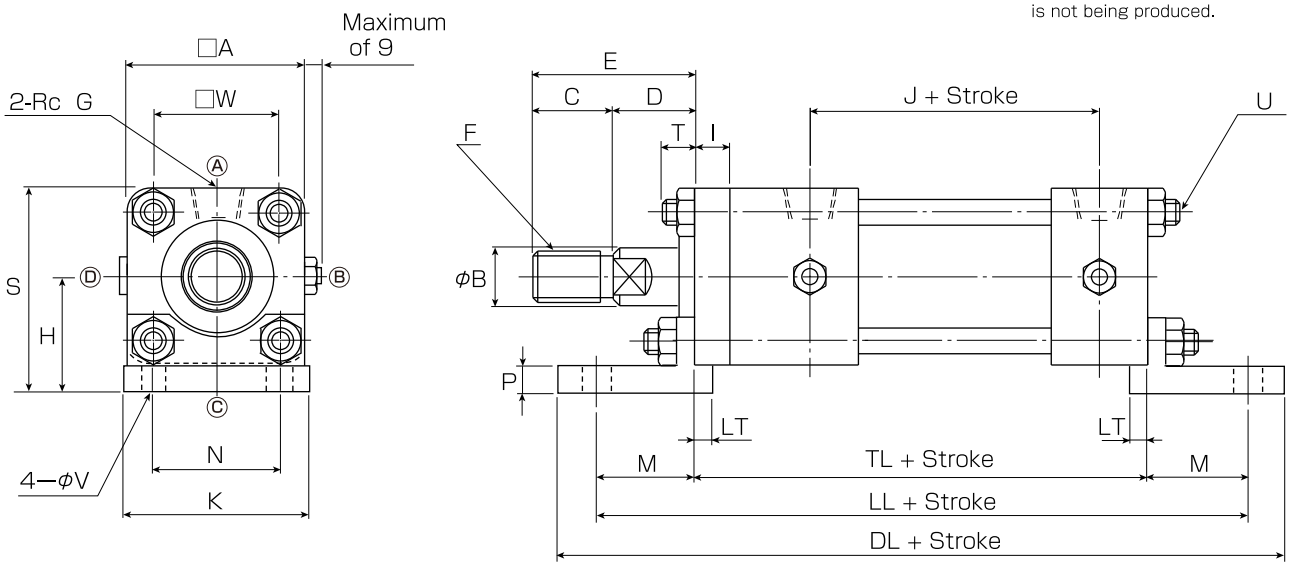


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■LB Type Basic Table of Dimensions

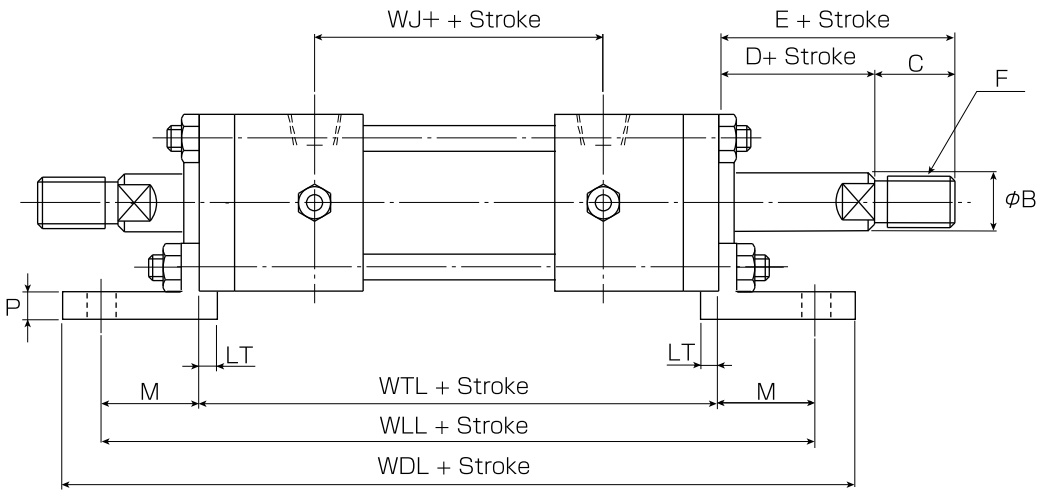
[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	I	LL	DL	M	LT	P	T	U	□A	□W	N	K	H	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	11	205	231	32	(3)	7	10	M8 P1.25	55	40	40	63	40 ±0.15	67.5	11	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	11	205	231	32	(3)	7	12	M10 P1.25	65	45	46	69	43 ±0.15	75.5	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	13	225	255	35	(3)	7	12	M10 P1.25	75	52	58	85	50 ±0.15	87.5	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	15	247	283	42	(3)	10	15	M12 P1.5	90	65	65	98	60 ±0.15	105	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	18	284	324	50	0	14	18	M16 P1.5	110	80	87	118	72 ±0.25	127	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	20	302	348	55	0	14	20	M18 P1.5	135	98	109	150	85 ±0.25	152.5	22	3/4
φ125	71	95	140	M64 P2	45	220	129	24	352	410	66	0	14	23	M22 P1.5	165	122	130	175	105 ±0.25	187.5	26	1
φ140	80	110	160	M72 P2	50	230	137	26	370	430	70	0	17	24	M24 P1.5	185	138	145	195	115 ±0.25	207.5	26	1
φ150	85	115	165	M76 P2	50	240	145	28	390	450	75	0	17	27	M27 P1.5	196	148	155	210	123 ±0.25	221	30	1
φ160	90	120	175	M80 P2	55	253	155	31	403	473	75	0	17	27	M27 P1.5	210	160	170	225	132 ±0.25	237	33	1
φ180	100	140	195	M95 P2	55	275	171	33	445	525	85	0	20	29	M30 P1.5	235	182	185	243	148 ±0.25	265.5	33	11/4
φ200	112	150	205	M100 P2	55	301	181	37	497	577	98	0	26	31	M33 P1.5	262	200	206	272	165 ±0.25	296	36	11/2
φ224	125	180	240	M120 P2	60	305	180	42	535	625	115	0	30	36	M39 P1.5	292	225	230	310	185 ±0.25	331	42	11/2
φ250	140	195	260	M130 P2	65	346	197	47	606	706	130	0	36	39	M42 P1.5	325	250	250	335	208 ±0.25	370.5	45	2

Note 1) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.
Note 2) The size of () of the sign LT has variation in a numerical value.

LB (Only for 7MPa) Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

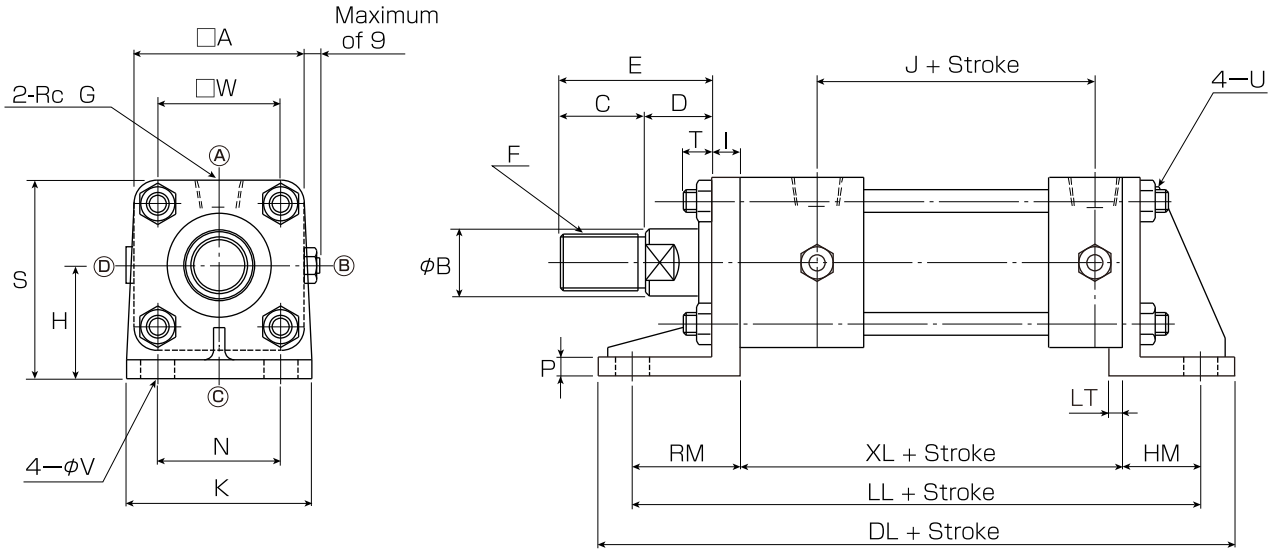
■Double Rod

Units:㎜

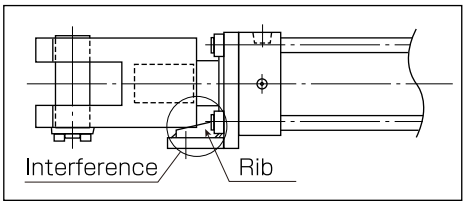
Symbol / Bore	Double Rod			
	WLL	WTL	WJ	WDL
φ32	230	166	94	256
φ40	230	166	94	256
φ50	252	182	98	282
φ63	278	194	106	314
φ80	322	222	110	362
φ100	342	232	116	388
φ125	396	264	132	454
φ140	416	276	140	476
φ150	438	288	148	498
φ160	454	304	158	524
φ180	492	322	174	572
φ200	558	362	192	638
φ224	600	370	190	690
φ250	676	416	202	776

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

LC Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.
Note 4) When the double protrusion end joint (Y end) is mounted as shown on the right, it may touch the rib of the LC bracket. In this case, consult us.



■LC Type Basic Table of Dimensions

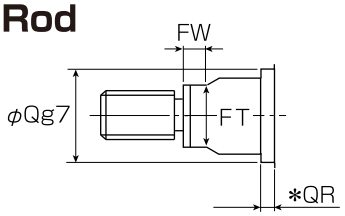
[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Bore \ Symbol	B Rod φB	C	E	F	D	XL	J	I	LL	DL	RM	HM	LT	P	T	U	□A	□W	N	K	H	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	130	90	11	205	231	43	32	(3)	7	10	M8 P1.25	55	40	40	63	40 ±0.15	67.5	11	3/8
φ40	22.4	30	60	M20 P1.5	30	130	90	11	205	231	43	32	(3)	7	12	M10 P1.25	65	45	46	69	43 ±0.15	75.5	11	3/8
φ50	28	35	65	M24 P1.5	30	142	96	13	225	255	48	35	(3)	7	12	M10 P1.25	75	52	58	85	50 ±0.15	87.5	14	1/2
φ63	35.5	45	80	M30 P1.5	35	148	102	15	247	283	57	42	(3)	10	15	M12 P1.5	90	65	65	98	60 ±0.15	105	18	1/2
φ80	45	60	95	M39 P1.5	35	166	108	18	284	324	68	50	0	14	18	M16 P1.5	110	80	87	118	72 ±0.25	127	18	3/4
φ100	56	75	115	M48 P1.5	40	172	114	20	302	348	75	55	0	14	20	M18 P1.5	135	98	109	150	85 ±0.25	152.5	22	3/4
φ125	71	95	140	M64 P2	45	196	129	24	352	410	90	66	0	14	23	M22 P1.5	165	122	130	175	105 ±0.25	187.5	26	1
φ140	80	110	160	M72 P2	50	204	137	26	370	430	96	70	0	18	24	M24 P1.5	185	138	145	195	115 ±0.25	207.5	26	1
φ150	85	115	165	M76 P2	50	212	145	28	390	450	103	75	0	18	27	M27 P1.5	196	148	155	210	123 ±0.25	221	30	1
φ160	90	120	175	M80 P2	55	222	155	31	403	473	106	75	0	18	27	M27 P1.5	210	160	170	225	132 ±0.25	237	33	1
φ180	100	140	195	M95 P2	55	242	171	33	445	525	118	85	0	20	29	M30 P1.5	235	182	185	243	148 ±0.25	265.5	33	1 1/4
φ200	112	150	205	M100 P2	55	264	181	37	497	577	135	98	0	25	31	M33 P1.5	262	200	206	272	165 ±0.25	296	36	1 1/2
φ224	125	180	240	M120 P2	60	263	180	42	535	625	156	116	0	30	36	M39 P1.5	292	225	230	310	185 ±0.25	331	42	1 1/2
φ250	140	195	260	M130 P2	65	299	197	47	606	706	176	131	0	35	39	M42 P1.5	325	250	250	335	208 ±0.25	370.5	45	2

Note 1) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.
Note 2) The size of () of the sign LT has variation in a numerical value.

LC Double Rod

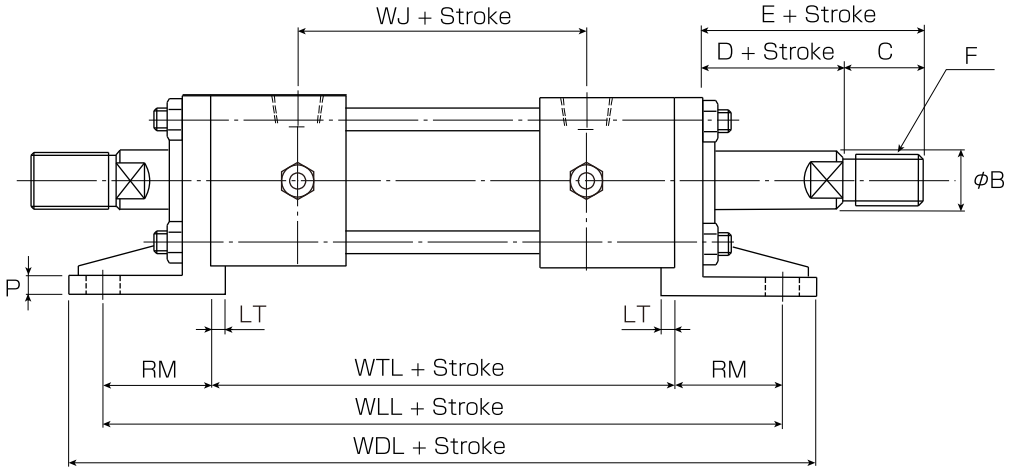


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ250 :10
A Rods	φ40 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

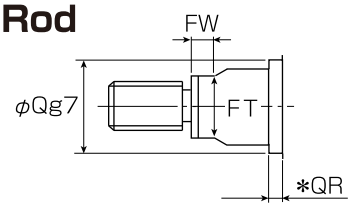
Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

■Double Rod

Units:mm

Symbol / Bore	Double Rod			
	WLL	WTL	WJ	WDL
φ32	230	144	94	256
φ40	230	144	94	256
φ50	252	156	98	282
φ63	278	164	106	314
φ80	322	186	110	362
φ100	342	192	116	388
φ125	396	216	132	454
φ140	416	224	140	476
φ150	438	232	148	498
φ160	454	242	158	524
φ180	492	256	174	572
φ200	558	288	192	638
φ224	598	286	190	688
φ250	674	322	202	774

FA Single Rod

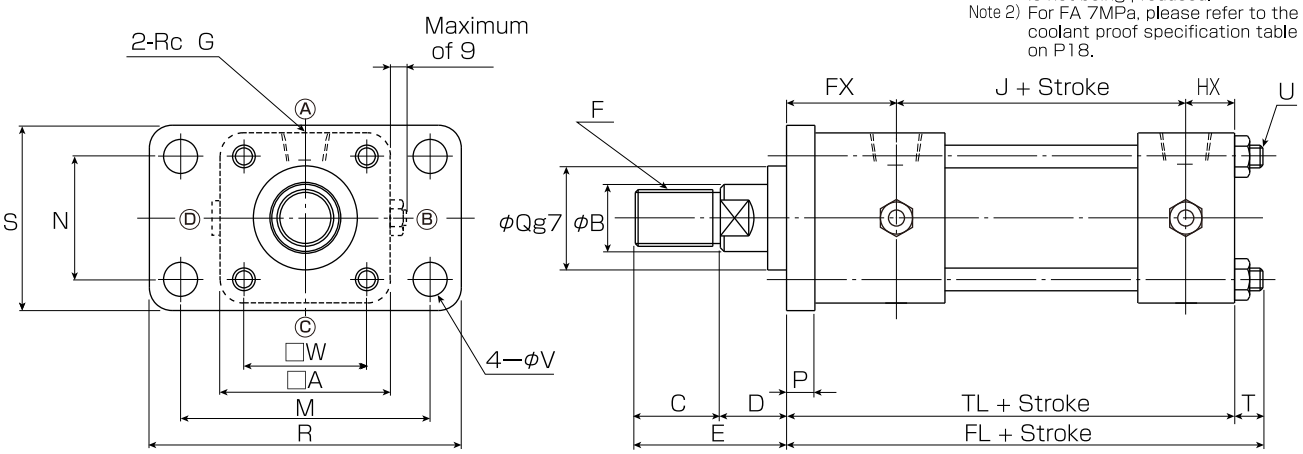


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 to φ250 :10
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications (For FA・14MPa)			
Bore	A rod	B rod	C rod
φ32	7	9	8
φ40	9	9	9
φ50	6	9	9
φ63	8	9	9
φ80	14	9	9
φ100	—	10	9

Note 1) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.
Note 2) For FA 7MPa, please refer to the coolant proof specification table on P18.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

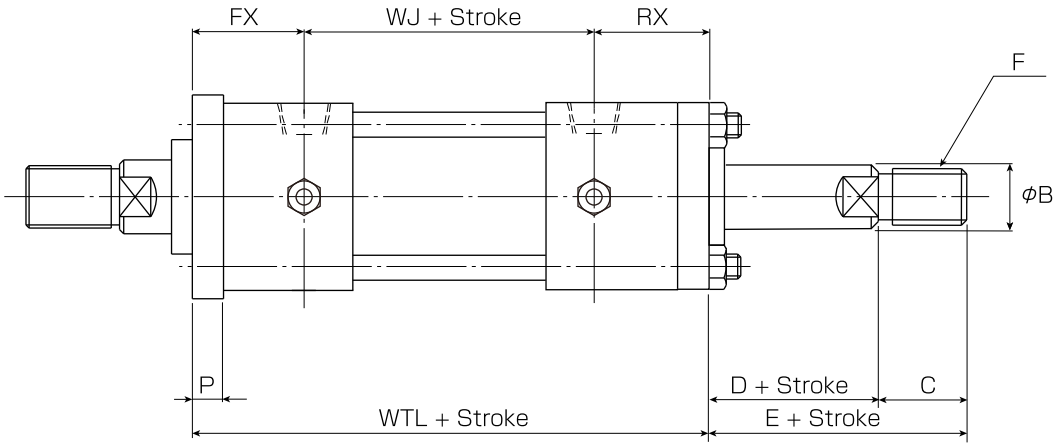
■FA Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	φQ	D	TL	J	FL	FX	HX	P	T	U	□A	□W	M	R	N	S	φV	Rc G
φ32	18	25	55	M16 P1.5	35	30	143	90	153	38	15	13	10	M8 P1.25	55	40	88	109	40	63	11	3/8
φ40	22.4	30	60	M20 P1.5	40	30	141 (143)	90	153 (155)	36 (38)	15	11 (13)	12	M10 P1.25	65	45	95	118	46	69	11	3/8
φ50	28	35	65	M24 P1.5	46	30	155 (160)	96	167 (172)	42 (47)	17	13 (18)	12	M10 P1.25	75	52	115	145	58	85	14	1/2
φ63	35.5	45	80	M30 P1.5	55	35	163 (168)	102	178 (183)	44 (49)	17	15 (20)	15	M12 P1.5	90	65	132	165	65	98	18	1/2
φ80	45	60	95	M39 P1.5	65	35	184 (190)	108	202 (208)	56 (62)	20	18 (24)	18	M16 P1.5	110	80	155	190	87	118	18	3/4
φ100	56	75	115	M48 P1.5	80	40	192 (200)	114	212 (220)	58 (66)	20	20 (28)	20	M18 P1.5	135	98	190	224	109	145	22	3/4
φ125	71	95	140	M64 P2	95	45	220 (229)	129	243 (252)	66 (75)	25	24 (33)	23	M22 P1.5	165	122	224	272	130	175	26	1
φ140	80	110	160	M72 P2	105	50	230 (241)	137	254 (265)	68 (79)	25	26 (37)	24	M24 P1.5	185	138	250	300	145	195	26	1
φ150	85	115	165	M76 P2	110	50	240 (251)	145	267 (278)	70 (81)	25	28 (39)	27	M27 P1.5	196	148	270	315	155	206	30	1
φ160	90	120	175	M80 P2	115	55	253 (263)	155	280 (290)	73 (83)	25	31 (41)	27	M27 P1.5	210	160	285	335	170	218	33	1
φ180	100	140	195	M95 P2	125	55	275 (288)	171	304 (317)	74 (87)	30	33 (46)	29	M30 P1.5	235	182	315	375	185	243	33	1 1/4
φ200	112	150	205	M100 P2	140	55	301 (315)	181	332 (346)	85 (99)	35	37 (51)	31	M33 P1.5	262	200	355	425	206	272	36	1 1/2
φ224	125	180	240	M120 P2	150	60	304 (321)	180	340 (357)	89 (106)	35	41 (58)	36	M39 P1.5	292	225	395	462	230	300	42	1 1/2
φ250	140	195	260	M130 P2	170	65	345 (364)	197	384 (403)	106 (125)	42	46 (65)	39	M42 P1.5	325	250	425	515	250	335	45	2

Note1) theses ( ) is at 14MPa. All other dimensions are common dimensions for 7/14MPa.
Note2) Please refer to the S Type specifics on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FA Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	8	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12 (10)	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12 (7)	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13 (8)	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12 (14)	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14 (15)	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17 (8)	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17 (6)	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15 (4)	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16 (6)	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18 (5)	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19 (5)	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	10	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	10	65

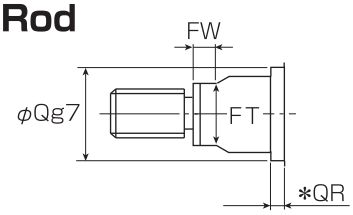
■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WTL	WJ	RX
φ32	168	94	36
φ40	166 (168)	94	36
φ50	182 (187)	98	42
φ63	194 (199)	106	44
φ80	222 (228)	110	56
φ100	232 (240)	116	58
φ125	264 (273)	132	66
φ140	276 (287)	140	68
φ150	288 (299)	148	70
φ160	304 (314)	158	73
φ180	322 (335)	174	74
φ200	362 (376)	192	85
φ224	369 (386)	190	90
φ250	415 (434)	202	107

Note1) theses ( ) is at 14MPa. All other dimensions are common dimensions for 7/14MPa.
Note2) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note3) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

FB Single Rod

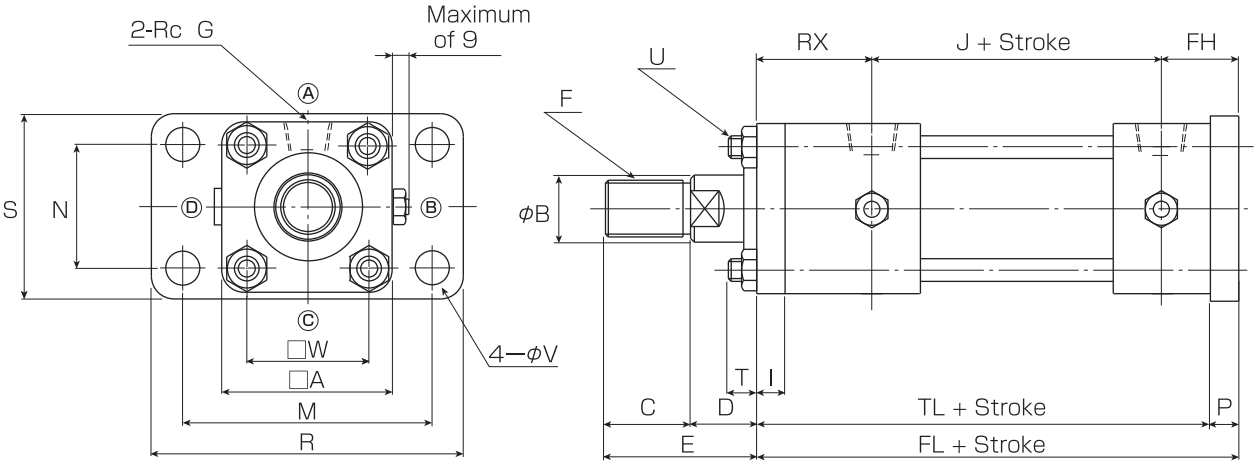


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■FB Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	RX	FH	P	T	I	U	□A	□W	M	R	N	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	154	36	28	13	10	11	M8 P1.25	55	40	88	109	40	63	11	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	152 (154)	36	26 (28)	11 (13)	12	11	M10 P1.25	65	45	95	118	46	69	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	168 (173)	42	30 (35)	13 (18)	12	13	M10 P1.25	75	52	115	145	58	85	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178 (183)	44	32 (37)	15 (20)	15	15	M12 P1.5	90	65	132	165	65	98	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202 (208)	56	38 (44)	18 (24)	18	18	M16 P1.5	110	80	155	190	87	118	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212 (220)	58	40 (48)	20 (28)	20	20	M18 P1.5	135	98	190	224	109	145	22	3/4
φ125	71	95	140	M64 P2	45	220	129	244 (253)	66	49 (58)	24 (33)	23	24	M22 P1.5	165	122	224	272	130	175	26	1
φ140	80	110	160	M72 P2	50	230	137	256 (267)	68	51 (62)	26 (37)	24	26	M24 P1.5	185	138	250	300	145	195	26	1
φ150	85	115	165	M76 P2	50	240	145	268 (279)	70	53 (64)	28 (39)	27	28	M27 P1.5	196	148	270	315	155	206	30	1
φ160	90	120	175	M80 P2	55	253	155	284 (294)	73	56 (66)	31 (41)	27	31	M27 P1.5	210	160	285	335	170	218	33	1
φ180	100	140	195	M95 P2	55	275	171	308 (321)	74	63 (76)	33 (46)	29	33	M30 P1.5	235	182	315	375	185	243	33	11/4
φ200	112	150	205	M100 P2	55	301	181	338 (352)	85	72 (86)	37 (51)	31	37	M33 P1.5	262	200	355	425	206	272	36	11/2
φ224	125	180	240	M120 P2	60	305	180	346 (363)	90	76 (93)	41 (58)	36	42	M39 P1.5	292	225	395	462	230	300	42	11/2
φ250	140	195	260	M130 P2	65	346	197	392 (411)	107	88 (107)	46 (65)	39	47	M42 P1.5	325	250	425	515	250	335	45	2

Note1) Theses ( ) is at 14MPa. All other dimensions are common dimensions for 7/14MPa.
Note2) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FB

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

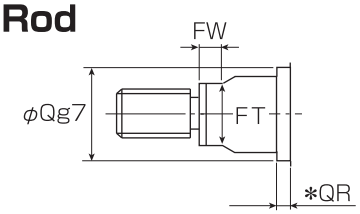
Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

FC Single Rod

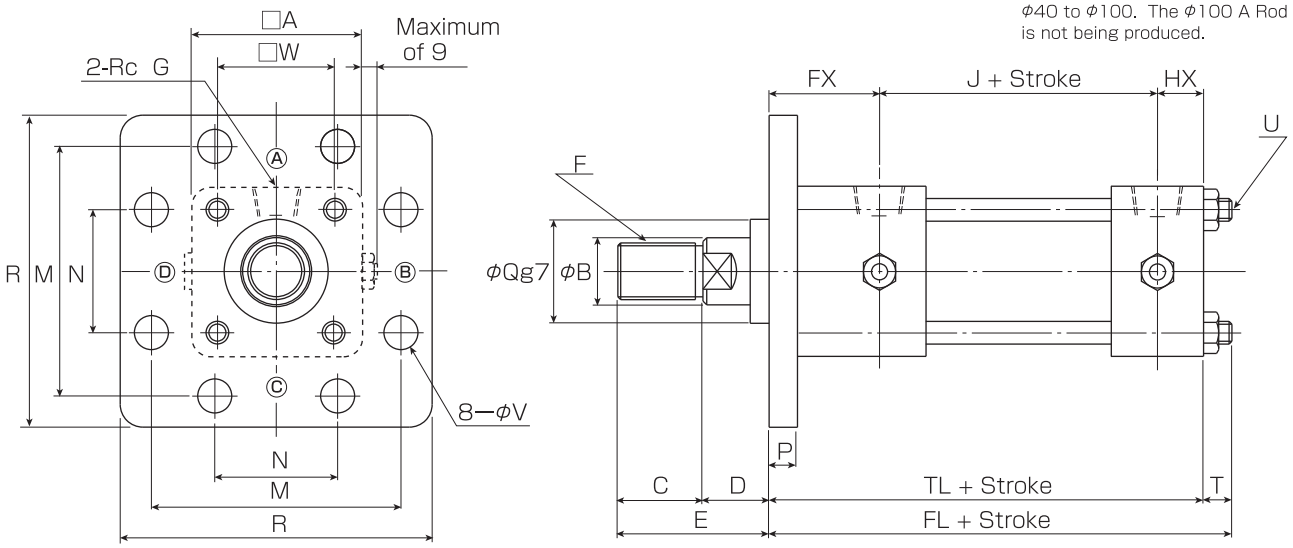


*QR Dimensions

Standard Specifications	
B, C Rods	φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ40 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■FC Type Basic Table of Dimensions

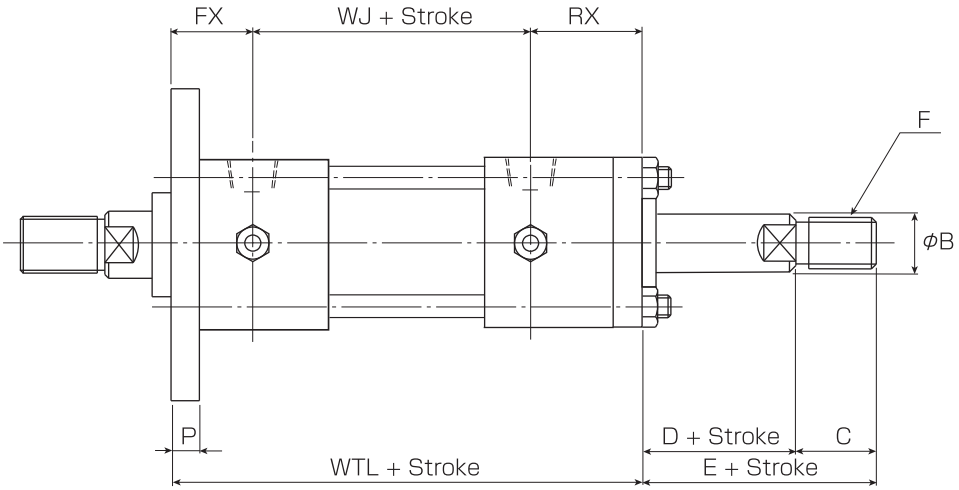
[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	φQ	D	TL	J	FL	FX	HX	P	T	U	□A	□W	N	M	R	φV	RcG
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	22.4	30	60	M20 P1.5	40	30	141	90	153	36	15	11	12	M10 P1.25	65	45	46	95	118	11	3/8
φ50	28	35	65	M24 P1.5	46	30	155	96	167	42	17	13	12	M10 P1.25	75	52	58	115	145	14	1/2
φ63	35.5	45	80	M30 P1.5	55	35	163	102	178	44	17	15	15	M12 P1.5	90	65	65	132	165	18	1/2
φ80	45	60	95	M39 P1.5	65	35	184	108	202	56	20	18	18	M16 P1.5	110	80	87	155	190	18	3/4
φ100	56	75	115	M48 P1.5	80	40	192	114	212	58	20	20	20	M18 P1.5	135	98	109	190	224	22	3/4
φ125	71	95	140	M64 P2	95	45	220	129	243	66	25	24	23	M22 P1.5	165	122	130	224	272	26	1
φ140	80	110	160	M72 P2	105	50	230	137	254	68	25	26	24	M24 P1.5	185	138	145	250	300	26	1
φ150	85	115	165	M76 P2	110	50	240	145	267	70	25	28	27	M27 P1.5	196	148	155	270	315	30	1
φ160	90	120	175	M80 P2	115	55	253	155	280	73	25	31	27	M27 P1.5	210	160	170	285	335	33	1
φ180	100	140	195	M95 P2	125	55	275	171	304	74	30	33	29	M30 P1.5	235	182	185	315	375	33	1 1/4
φ200	112	150	205	M100 P2	140	55	301	181	332	85	35	37	31	M33 P1.5	262	200	206	355	425	36	1 1/2
φ224	125	180	240	M120 P2	150	60	304	180	340	89	35	41	36	M39 P1.5	292	225	230	395	475	42	1 1/2
φ250	140	195	260	M130 P2	170	65	345	197	384	106	42	46	39	M42 P1.5	325	250	250	425	515	45	2

Note) Please refer to the S Type specifics on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FC Double Rod



*ϕ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	ϕB	C	E	F	ϕQ	FT	FW	ϕB	C	E	F	ϕQ	FT	FW	QR	D
ϕ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ϕ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
ϕ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
ϕ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
ϕ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
ϕ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
ϕ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
ϕ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
ϕ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
ϕ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
ϕ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
ϕ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
ϕ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	10	65
ϕ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	10	65

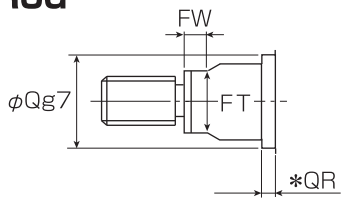
■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WTL	WJ	RX
ϕ32	—	—	—
ϕ40	166	94	36
ϕ50	182	98	42
ϕ63	194	106	44
ϕ80	222	110	56
ϕ100	232	116	58
ϕ125	264	132	66
ϕ140	276	140	68
ϕ150	288	148	70
ϕ160	304	158	73
ϕ180	322	174	74
ϕ200	362	192	85
ϕ224	369	190	90
ϕ250	415	202	107

Note) The cushion for the ϕ40 A Rod is a fixed cushion on the head-side.

FD Single Rod

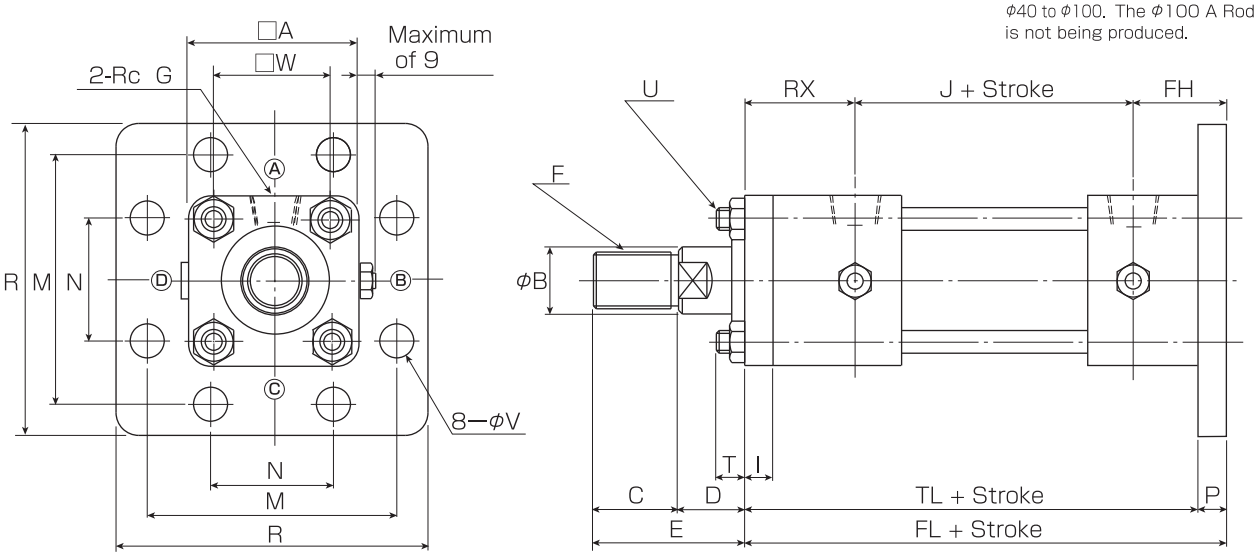


*QR Dimensions

Standard Specifications	
B, C Rods	φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ40 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■FD Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	RX	FH	P	T	I	U	□A	□W	N	M	R	φV	RcG
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	22.4	30	60	M20 P1.5	30	141	90	152	36	26	11	12	11	M10 P1.25	65	45	46	95	118	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	168	42	30	13	12	13	M10 P1.25	75	52	58	115	145	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178	44	32	15	15	15	M12 P1.5	90	65	65	132	165	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202	56	38	18	18	18	M16 P1.5	110	80	87	155	190	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212	58	40	20	20	20	M18 P1.5	135	98	109	190	224	22	3/4
φ125	71	95	140	M64 P2	45	220	129	244	66	49	24	23	24	M22 P1.5	165	122	130	224	272	26	1
φ140	80	110	160	M72 P2	50	230	137	256	68	51	26	24	26	M24 P1.5	185	138	145	250	300	26	1
φ150	85	115	165	M76 P2	50	240	145	268	70	53	28	27	28	M27 P1.5	196	148	155	270	315	30	1
φ160	90	120	175	M80 P2	55	253	155	284	73	56	31	27	31	M27 P1.5	210	160	170	285	335	33	1
φ180	100	140	195	M95 P2	55	275	171	308	74	63	33	29	33	M30 P1.5	235	182	185	315	375	33	1 1/4
φ200	112	150	205	M100 P2	55	301	181	338	85	72	37	31	37	M33 P1.5	262	200	206	355	425	36	1 1/2
φ224	125	180	240	M120 P2	60	305	180	346	90	76	41	36	42	M39 P1.5	292	225	230	395	475	42	1 1/2
φ250	140	195	260	M130 P2	65	346	197	392	107	88	46	39	47	M42 P1.5	325	250	250	425	515	45	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FD

■C/A Rods

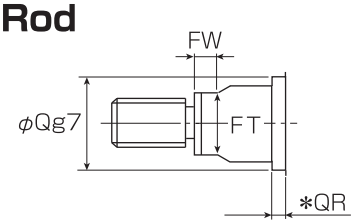
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

CF Single Rod

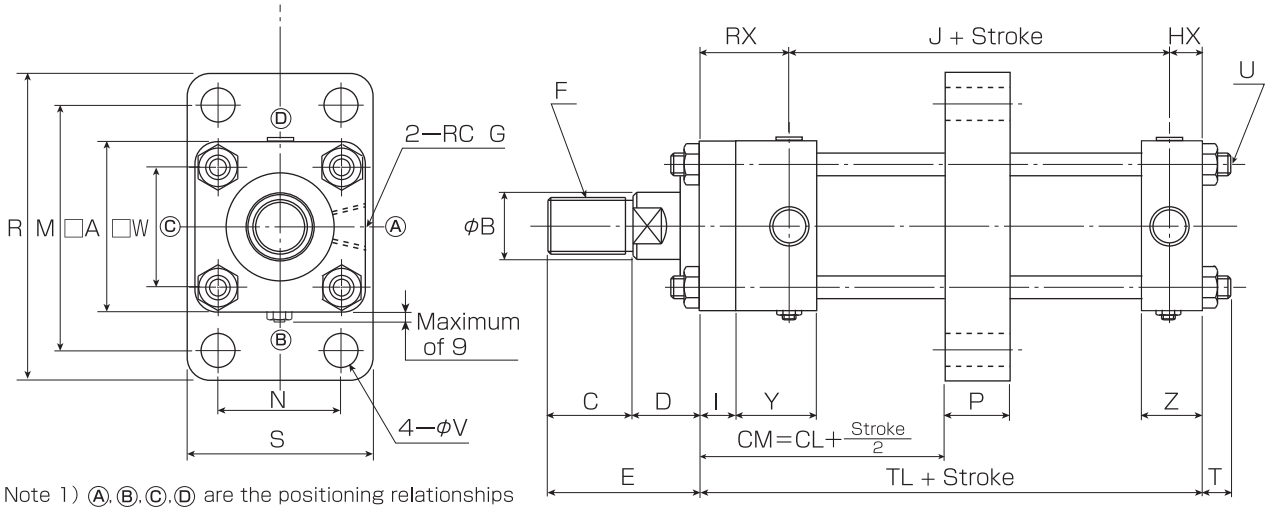


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

* If the CL dimension is different from that given in the catalog, specify it separately.
For a cylinder with switch, the switch cannot be mounted depending on the stroke and the CL dimension. Decimal digits of the CL dimension are omitted.

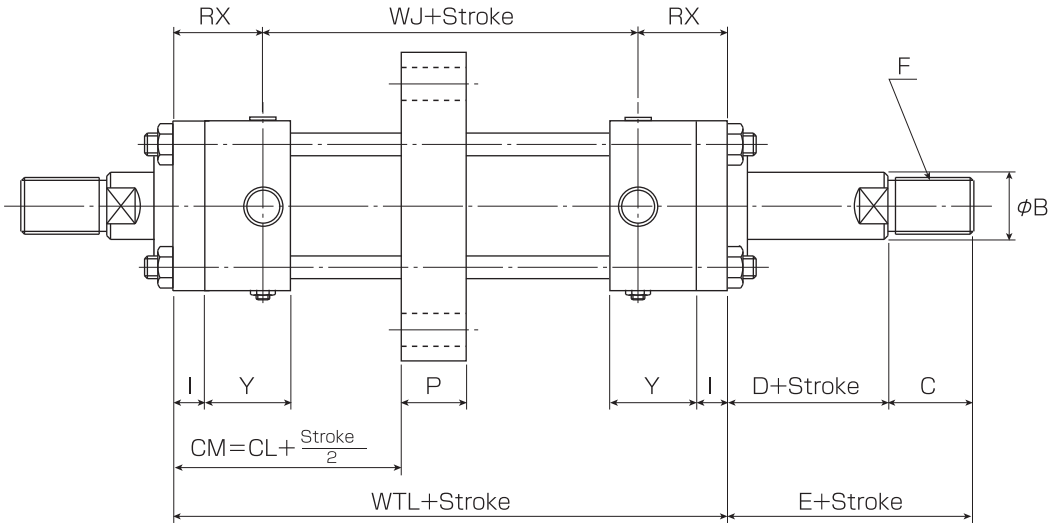
■CF Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	G	D	TL	J	RX	HX	I	Y	Z	T	U	□A	□W	N	M	CL	φV	S	R	P
φ32	18	25	55	M16 P1.5	3/8	30	141	90	36	15	11	40	30	10	M8 P1.25	55	40	40	88	69	11	63	109	28
φ40	22.4	30	60	M20 P1.5	3/8	30	141	90	36	15	11	38	28	12	M10 P1.25	65	45	46	95	69	11	69	118	28
φ50	28	35	65	M24 P1.5	1/2	30	155	96	42	17	13	44	32	12	M10 P1.25	75	52	58	115	75	14	85	145	33
φ63	35.5	45	80	M30 P1.5	1/2	35	163	102	44	17	15	44	32	15	M12 P1.5	90	65	65	132	76	18	98	165	42
φ80	45	60	95	M39 P1.5	3/4	35	184	108	56	20	18	56	38	18	M16 P1.5	110	80	87	155	90	18	118	190	42
φ100	56	75	115	M48 P1.5	3/4	40	192	114	58	20	20	56	38	20	M18 P1.5	135	98	109	190	90	22	145	224	52
φ125	71	95	140	M64 P2.0	1	45	220	129	66	25	24	65	48	23	M22 P1.5	165	122	130	224	104	26	175	272	57
φ140	80	110	160	M72 P2.0	1	50	230	137	68	25	26	65	48	24	M24 P1.5	185	138	145	250	100	26	195	300	77
φ150	85	115	165	M76 P2.0	1	50	240	145	70	25	28	65	48	27	M27 P1.5	196	148	155	270	106	30	206	315	77
φ160	90	120	175	M80 P2.0	1	55	253	155	73	25	31	65	48	27	M27 P1.5	210	160	170	285	109	33	218	335	87
φ180	100	140	195	M95 P2.0	1 1/4	55	275	171	74	30	33	69	58	29	M30 P1.5	235	182	185	315	113	33	243	375	97
φ200	112	150	205	M100 P2.0	1 1/2	55	301	181	85	35	37	83	70	31	M33 P1.5	262	200	206	355	124	36	272	425	107
φ224	125	180	240	M120 P2.0	1 1/2	60	305	180	90	35	42	83	70	36	M39 P1.5	292	225	230	395	123	42	300	462	117
φ250	140	195	260	M130 P2.0	2	65	346	197	107	42	49	102	84	39	M42 P1.5	325	250	250	425	148	45	335	515	117

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

CF Double Rod



■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

■Double Rod

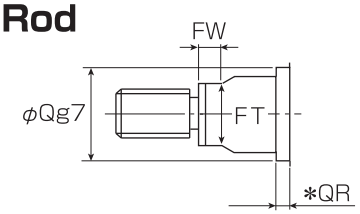
Units:㎜

Symbol / Bore	Double Rod	
	WTL	WJ
φ32	166	94
φ40	166	94
φ50	182	98
φ63	194	106
φ80	222	110
φ100	232	116
φ125	264	132
φ140	276	140
φ150	288	148
φ160	304	158
φ180	322	174
φ200	362	192
φ224	370	190
φ250	416	202

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

CA Single Rod

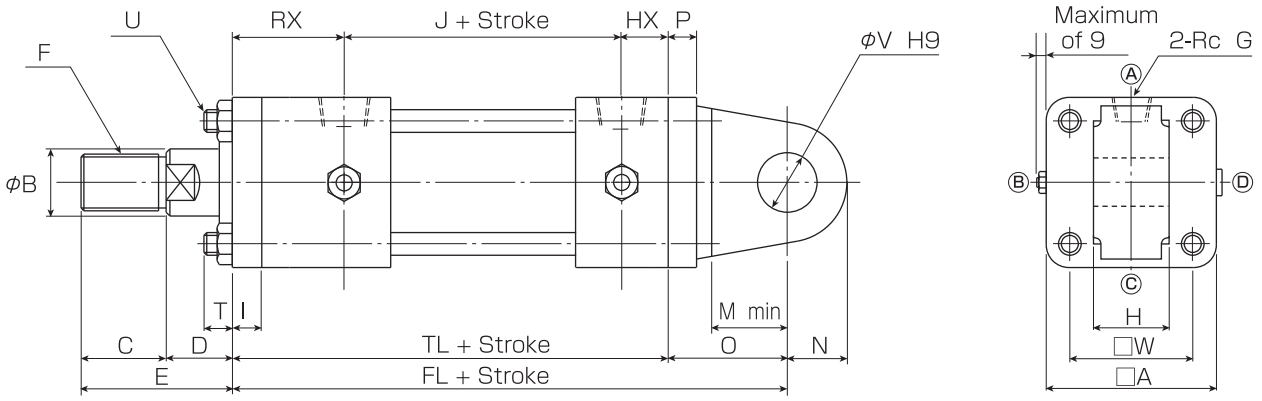


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ, Ⓑ, Ⓒ, Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■CA Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	RcG
φ32	18	25	55	M16 P1.5	30	141	90	179	36	15	11	10	11	22	16	38	16	M8 P1.25	55	40	25 $^{-0.1}_{-0.4}$	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	179	36	15	11	12	11	20	16	38	16	M10 P1.25	65	45	25 $^{-0.1}_{-0.4}$	3/8
φ50	28	35	65	M24 P1.5	30	155	96	200	42	17	13	12	13	25	20	45	20	M10 P1.25	75	52	31.5 $^{-0.1}_{-0.4}$	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	226	44	17	15	15	15	40	31.5	63	31.5	M12 P1.5	90	65	40 $^{-0.1}_{-0.4}$	1/2
φ80	45	60	95	M39 P1.5	35	184	108	256	56	20	18	18	18	40	31.5	72	31.5	M16 P1.5	110	80	40 $^{-0.1}_{-0.4}$	3/4
φ100	56	75	115	M48 P1.5	40	192	114	276	58	20	20	20	20	50	40	84	40	M18 P1.5	135	98	50 $^{-0.1}_{-0.4}$	3/4
φ125	71	95	140	M64 P2	45	220	129	320	66	25	24	23	24	63	50	100	50	M22 P1.5	165	122	63 $^{-0.1}_{-0.4}$	1
φ140	80	110	160	M72 P2	50	230	137	350	68	25	26	24	26	80	63	120	63	M24 P1.5	185	138	80 $^{-0.1}_{-0.6}$	1
φ150	85	115	165	M76 P2	50	240	145	362	70	25	28	27	28	80	63	122	63	M27 P1.5	196	148	80 $^{-0.1}_{-0.6}$	1
φ160	90	120	175	M80 P2	55	253	155	390	73	25	31	27	31	90	71	137	71	M27 P1.5	210	160	80 $^{-0.1}_{-0.6}$	1
φ180	100	140	195	M95 P2	55	275	171	425	74	30	33	29	33	100	80	150	80	M30 P1.5	235	182	100 $^{-0.1}_{-0.6}$	1 1/4
φ200	112	150	205	M100 P2	55	301	181	471	85	35	36	31	37	115	90	170	90	M33 P1.5	262	200	125 $^{-0.1}_{-0.6}$	1 1/2
φ224	125	180	240	M120 P2	60	305	180	490	90	35	43	36	42	125	100	185	100	M39 P1.5	292	225	125 $^{-0.1}_{-0.6}$	1 1/2
φ250	140	195	260	M130 P2	65	346	197	531	107	42	48	39	47	125	100	185	100	M42 P1.5	325	250	125 $^{-0.1}_{-0.6}$	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

CA

■C/A Rods

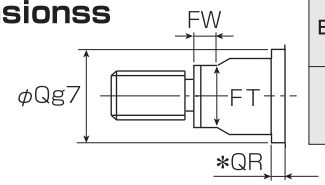
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

CC : Single Protrusion Clevis with Spherical Bearing Table of Dimensionss

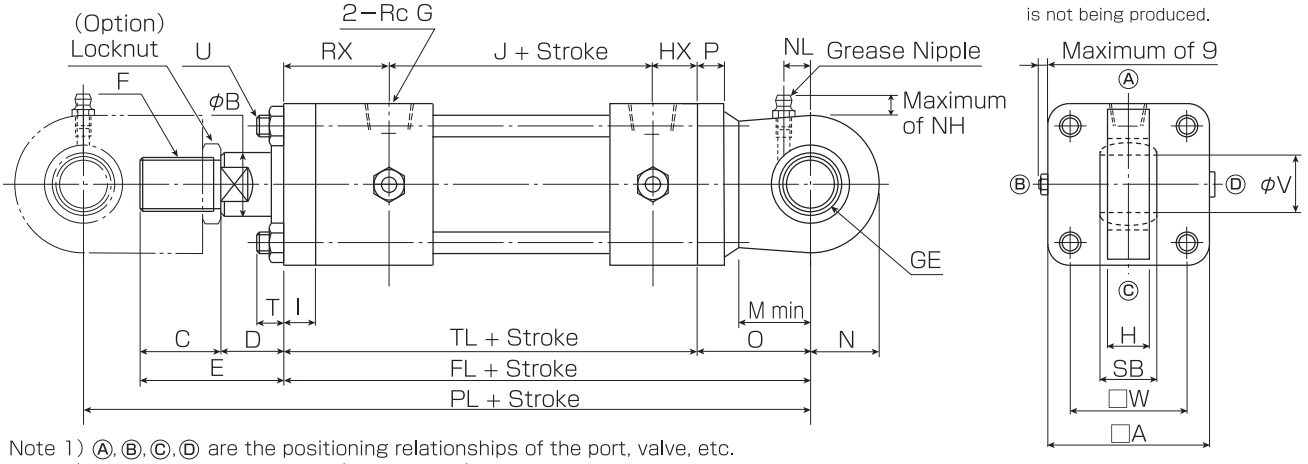


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ125 :10
A Rods	φ40 to φ125 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ, Ⓑ, Ⓒ, Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.
Note 4) No grease is applied. Lubricate the bearing from the grease nipple appropriately.
Note 5) The bearing bore diameter and mounting width conform to JIS B8369.

■CC Type (Spherical Bearing) Basic Table of Dimensions

Units:mm

Symbol / Bore	B Rod φB	C	E	F	φQ	FT	FW	D	TL	J	FL	PL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	SB	RcG	GE
φ32	18	40	70	M16 P1.5	35	14	10	30	141	90	185	292	36	15	11	10	11	25	27.5	44	20	M8 P1.25	55	40	13	16	3/8	SA1-20 or equivalent
φ40	22.4	45	75	M20 P1.5	40	19	10	30	141	90	185	294	36	15	11	12	11	25	27.5	44	20	M10 P1.25	65	45	13	16	3/8	SA1-20 or equivalent
φ50	28	50	80	M24 P1.5	46	24	10	30	155	96	208	330	42	17	13	12	13	31	32.5	53	25	M10 P1.25	75	52	17	20	1/2	SA1-25 or equivalent
φ63	35.5	60	95	M30 P1.5	55	30	15	35	163	102	227	378	44	17	15	15	15	38	40	64	30	M12 P1.5	90	65	19	22	1/2	SA1-30 or equivalent
φ80	45	80	115	M39 P1.5	65	41	15	35	184	108	265	448	56	20	18	18	18	48	50	81	40	M16 P1.5	110	80	23	28	3/4	SA1-40 or equivalent
φ100	56	95	135	M48 P1.5	80	50	20	40	192	114	288	509	58	20	20	20	20	58	62	96	50	M18 P1.5	135	98	30	35	3/4	SA1-50 or equivalent
φ125	71	125	170	M64 P2	95	65	25	45	220	129	337	610	66	25	24	23	24	72	77	117	60	M22 P1.5	165	122	38	44	1	SA1-60 or equivalent

Note 1) The Spherical Bearing uses an oil supply system; however, it should be oiled periodically from the Grease Nipple.
Note 2) "Dimension PL" indicates a dimension of the cylinder with lock nut.

■Pin with Grease Nipple

Units:mm

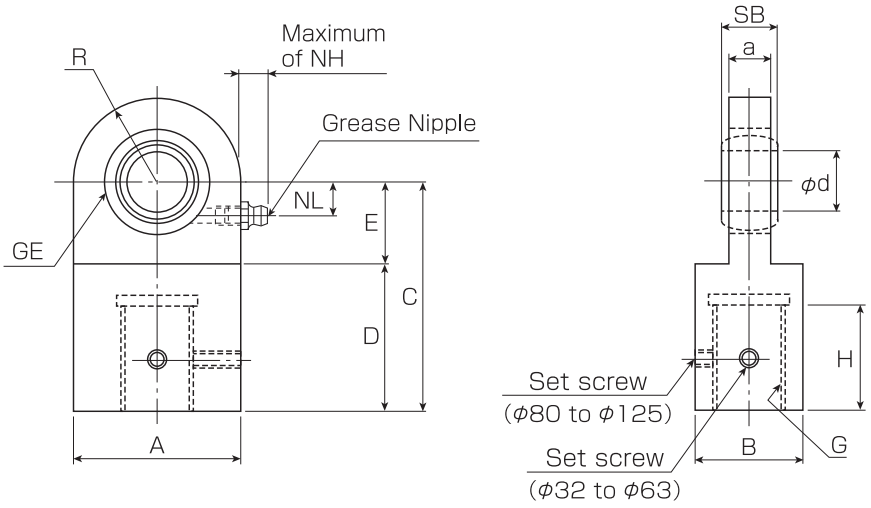
Symbol / Bore	Grease Nipple form	NL	NH
φ32	JIS A-M6F	11	11
φ40	JIS A-M6F	11	11
φ50	JIS A-M6F	14	11
φ63	JIS A-M6F	15	11
φ80	JIS A-Rc 1/8	20	15
φ100	JIS A-Rc 1/8	24	15
φ125	JIS A-Rc 1/8	28	15

■Mass Table

Units:kg

Symbol / Bore	Basic Mass (Stroke: 0mm) A Rod	B Rod	C Rod	Stroke Mass per 100mm A Rod	B Rod	C Rod
φ32	3.8	3.7	3.6	1.1	0.9	0.8
φ40	4.7	4.6	4.5	1.2	1.0	0.9
φ50	7.3	7.0	6.9	1.7	1.4	1.2
φ63	12.1	11.4	11.0	2.5	2.0	1.7
φ80	20.6	19.7	18.7	4.1	3.4	3.0
φ100	33.2	31.2	29.8	6.1	4.9	4.2
φ125	60.4	56.6	53.6	9.5	7.6	6.4

End Joint with Spherical Bearing : S type



Note1) No grease is applied. Lubricate the bearing from the grease nipple appropriately.
Note2) The bearing bore diameter and mounting width conform to JIS B8369.

■Spherical Bearing End Joint Dimension Table 〈B(A), C Rods〉

Units:mm

Symbol / Bore	φd	a	SB	A	B	C	D	E	G		H		R	GE	Parts Code	
									B Rod	C Rod	B Rod	C Rod			B Rod	C Rod
φ32	20	13	16	55	32	67	42	25	M16 P1.5	M12 P1.5	27	22	27.5	SA1-20 or equivalent	SJ-F32B	SJ-F32C
φ40	20	13	16	55	32	67	42	25	M20 P1.5	M16 P1.5	32	27	27.5	SA1-20 or equivalent	SJ-F40B	SJ-F40C
φ50	25	17	20	65	40	78	47	31	M24 P1.5	M20 P1.5	37	32	32.5	SA1-25 or equivalent	SJ-F50B	SJ-F50C
φ63	30	19	22	80	50	98	60	38	M30 P1.5	M24 P1.5	47	37	40	SA1-30 or equivalent	SJ-F63B	SJ-F63C
φ80	40	23	28	100	65	125	77	48	M39 P1.5	M30 P1.5	62	47	50	SA1-40 or equivalent	SJ-F80B	SJ-F80C
φ100	50	30	35	120	80	152	94	58	M48 P1.5	M39 P1.5	77	62	60	SA1-50 or equivalent	SJ-F100B	SJ-F100C
φ125	60	38	44	150	100	190	118	72	M64 P2.0	M48 P1.5	97	77	75	SA1-60 or equivalent	SJ-F125B	SJ-F125C

Note) The Spherical Bearing uses an oil supply system; however, it should be oiled periodically to the bearing pin.

■Pin with Grease Nipple

Units:mm

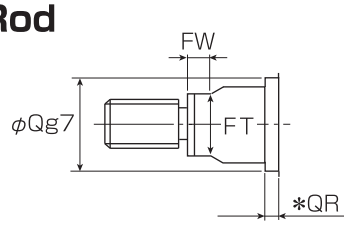
Symbol / Bore	Grease Nipple Form	NL	NH
φ32	JIS A-M6F	11	11
φ40	JIS A-M6F	11	11
φ50	JIS A-M6F	14	11
φ63	JIS A-M6F	15	11
φ80	JIS A-Rc 1/8	20	15
φ100	JIS A-Rc 1/8	24	15
φ125	JIS A-Rc 1/8	28	15

■Mass Table

Units:kg

Symbol / Bore	B Rod	C Rod
φ32	0.84	0.86
φ40	0.80	0.84
φ50	1.02	1.08
φ63	2.53	2.66
φ80	4.86	5.18
φ100	9.02	9.53
φ125	17.32	18.67

CB Single Rod

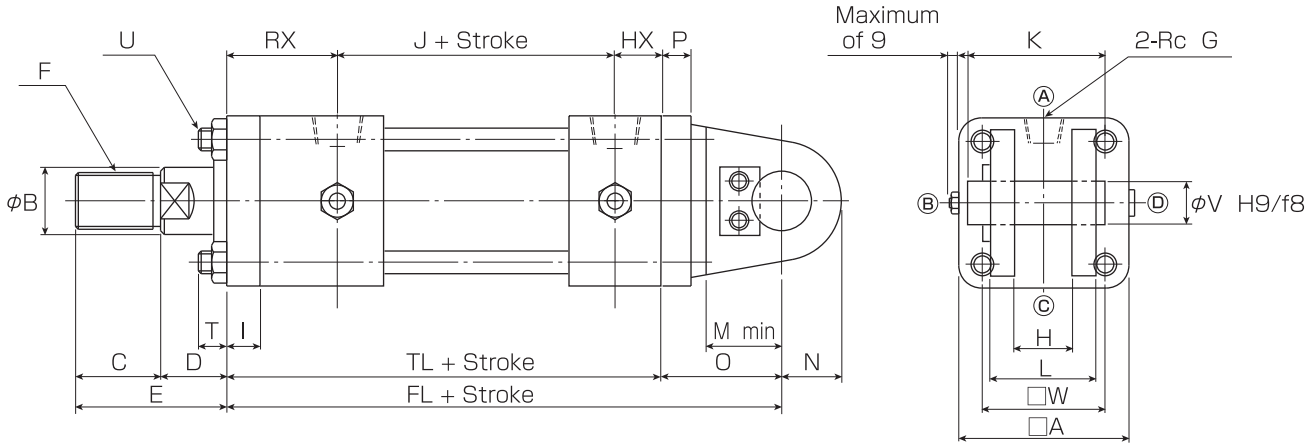


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) Pins are included as standard up to φ125. They are offered as options above φ140.
Note 3) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 4) The 32 bore check valve will just be out of 4mm from the cover surface.

■CB Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

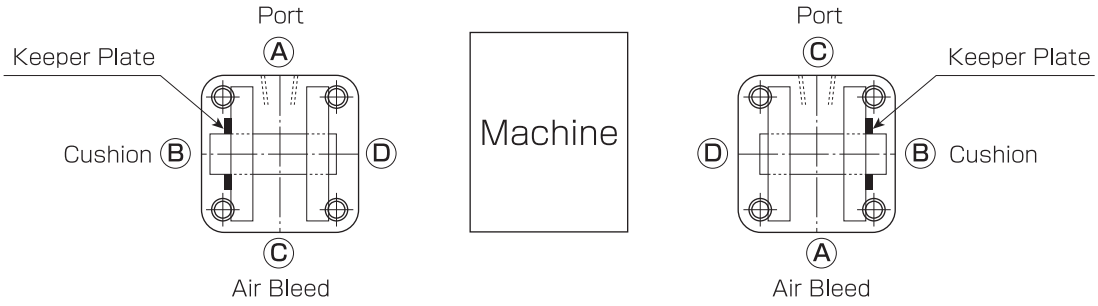
Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	L	K	RcG
φ32	18	25	55	M16 P1.5	30	141	90	179	36	15	11	10	11	20	16	38	16	M8 P1.25	55	40	25 +0.4 +0.1	50	62	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	179	36	15	11	12	11	20	16	38	16	M10 P1.25	65	45	25 +0.4 +0.1	50	62	3/8
φ50	28	35	65	M24 P1.5	30	155	96	200	42	17	13	12	13	25	20	45	20	M10 P1.25	75	52	31.5 +0.4 +0.1	63.5	76.5	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	226	44	17	15	15	15	40	31.5	63	31.5	M12 P1.5	90	65	40 +0.4 +0.1	80	93	1/2
φ80	45	60	95	M39 P1.5	35	184	108	256	56	20	18	18	18	40	31.5	72	31.5	M16 P1.5	110	80	40 +0.4 +0.1	80	93	3/4
φ100	56	75	115	M48 P1.5	40	192	114	276	58	20	20	20	20	50	40	84	40	M18 P1.5	135	98	50 +0.4 +0.1	100	117	3/4
φ125	71	95	140	M64 P2	45	220	129	320	66	25	24	23	24	63	50	100	50	M22 P1.5	165	122	63 +0.4 +0.1	126	143	1
φ140	80	110	160	M72 P2	50	230	137	350	68	25	26	24	26	80	63	120	63	M24 P1.5	185	138	80 +0.6 +0.1	160	183	1
φ150	85	115	165	M76 P2	50	240	145	362	70	25	28	27	28	80	63	122	63	M27 P1.5	196	148	80 +0.6 +0.1	160	183	1
φ160	90	120	175	M80 P2	55	253	155	390	73	25	31	27	31	90	71	137	71	M27 P1.5	210	160	80 +0.6 +0.1	160	183	1
φ180	100	140	195	M95 P2	55	275	171	425	74	30	33	29	33	100	80	150	80	M30 P1.5	235	182	100 +0.6 +0.1	200	225	1 1/4
φ200	112	150	205	M100 P2	55	301	181	471	85	35	36	31	37	115	90	170	90	M33 P1.5	262	200	125 +0.6 +0.1	251	276	1 1/2
φ224	125	180	240	M120 P2	60	305	180	490	90	35	41	36	42	125	100	185	100	M39 P1.5	292	225	125 +0.6 +0.1	251	280	1 1/2
φ250	140	195	260	M130 P2	65	346	197	531	107	42	48	39	47	125	100	185	100	M42 P1.5	325	250	125 +0.6 +0.1	251	280	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

CB

About opposite layout

The CB mounting is equipped with a keeper plate for fastening the pin. Normally, the keeper plate is located at the B position. If you order the opposite layout to use two cylinders, specify the model code that indicates the opposite layout: For example: “ABC” (as shown on the left), or “CBA” (as shown on the right).



■C/A Rods

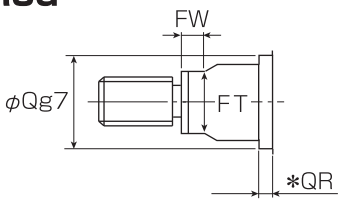
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod ' s.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

TA Single Rod

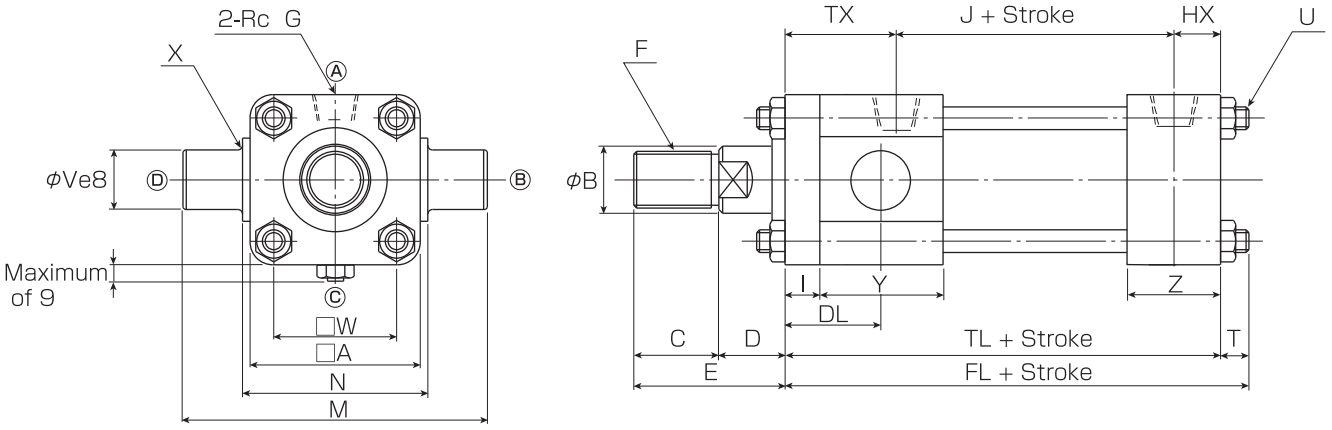


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

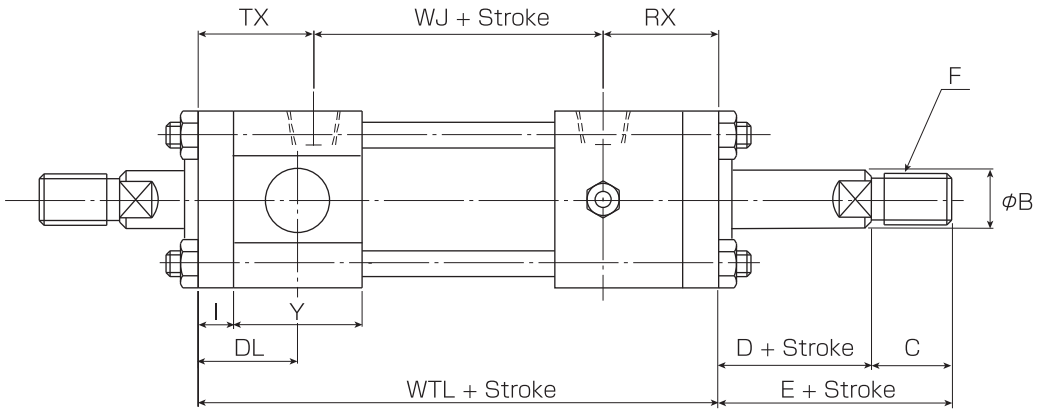
■TA Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	TX	HX	I	Y	Z	DL	T	U	□A	□W	N	M	X	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	151	36	15	11	40	30	32	10	M8 P1.25	55	40	58 $^{0}_{-0.3}$	98	R2	20	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	153	36	15	11	38	28	32	12	M10 P1.25	65	45	69 $^{0}_{-0.3}$	109	R2	20	3/8
φ50	28	35	65	M24 P1.5	30	155	96	167	42	17	13	44	32	36	12	M10 P1.25	75	52	85 $^{0}_{-0.35}$	135	R2.5	25	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178	44	17	15	44	32	39	15	M12 P1.5	90	65	98 $^{0}_{-0.35}$	161	R2.5	31.5	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202	56	20	18	56	38	47	18	M16 P1.5	110	80	118 $^{0}_{-0.35}$	181	R2.5	31.5	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212	58	20	20	56	38	49	20	M18 P1.5	135	98	145 $^{0}_{-0.4}$	225	R3	40	3/4
φ125	71	95	140	M64 P2	45	220	129	243	66	25	24	65	48	58	23	M22 P1.5	165	122	175 $^{0}_{-0.4}$	275	R3	50	1
φ140	80	110	160	M72 P2	50	241	137	265	79	25	26	76	48	62	24	M24 P1.5	185	138	195 $^{0}_{-0.46}$	321	R4	63	1
φ150	85	115	165	M76 P2	50	251	145	278	81	25	28	76	48	62	27	M27 P1.5	196	148	206 $^{0}_{-0.46}$	332	R4	63	1
φ160	90	120	175	M80 P2	55	273	155	300	93	25	31	85	48	71	27	M27 P1.5	210	160	218 $^{0}_{-0.46}$	360	R4	71	1
φ180	100	140	195	M95 P2	55	301	171	330	100	30	33	95	58	81	29	M30 P1.5	235	182	243 $^{0}_{-0.46}$	403	R4	80	1 1/4
φ200	112	150	205	M100 P2	55	325	181	356	109	35	37	107	70	90	31	M33 P1.5	262	200	272 $^{0}_{-0.52}$	452	R5	90	1 1/2
φ224	125	180	240	M120 P2	60	339	180	375	124	35	42	117	70	100	36	M39 P1.5	292	225	300 $^{0}_{-0.52}$	500	R5	100	1 1/2
φ250	140	195	260	M130 P2	65	361	197	400	122	42	47	117	84	105	39	M42 P1.5	325	250	335 $^{0}_{-0.57}$	535	R5	100	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

TA Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

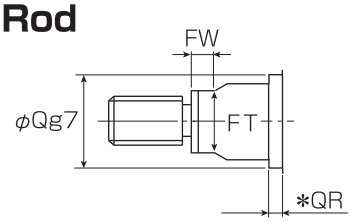
■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WTL	WJ	RX
φ32	166	94	36
φ40	166	94	36
φ50	182	98	42
φ63	194	106	44
φ80	222	110	56
φ100	232	116	58
φ125	264	132	66
φ140	287	140	68
φ150	299	148	70
φ160	324	158	73
φ180	348	174	74
φ200	386	192	85
φ224	404	190	90
φ250	431	202	107

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

TC Single Rod

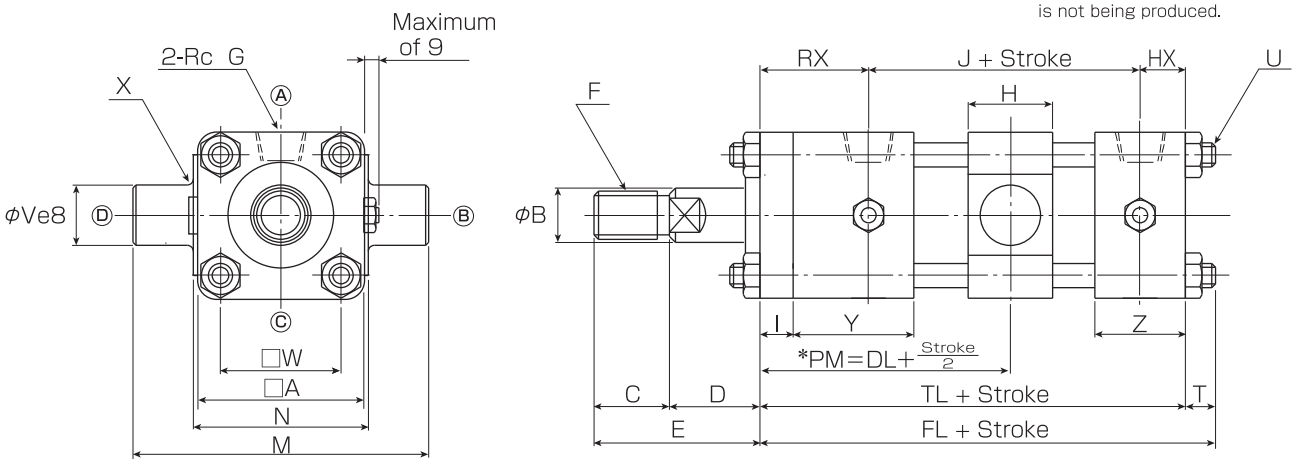


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.
※When the size of PM differs from the notation of a catalogue, please direct independently.
Keep in mind that a switch may not be attached with a stroke depending on PM size in the case of switch adjusted specifications. smallness of PM size several or less points are omitted.

■TC Type Basic Table of Dimensions

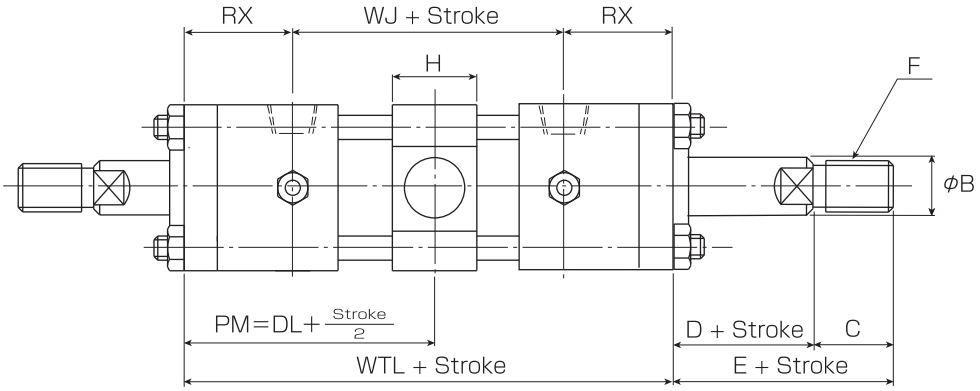
[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	DL	RX	HX	I	Y	Z	T	H	U	□A	□W	N	M	X	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	151	83	36	15	11	40	30	10	28	M8 P1.25	55	40	58 $^{0}_{-0.3}$	98	R2	20	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	153	83	36	15	11	38	28	12	28	M10 P1.25	65	45	69 $^{0}_{-0.3}$	109	R2	20	3/8
φ50	28	35	65	M24 P1.5	30	155	96	167	91	42	17	13	44	32	12	33	M10 P1.25	75	52	85 $^{0}_{-0.35}$	135	R2.5	25	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178	97	44	17	15	44	32	15	42	M12 P1.5	90	65	98 $^{0}_{-0.35}$	161	R2.5	31.5	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202	111	56	20	18	56	38	18	42	M16 P1.5	110	80	118 $^{0}_{-0.35}$	181	R2.5	31.5	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212	116	58	20	20	56	38	20	52	M18 P1.5	135	98	145 $^{0}_{-0.4}$	225	R3	40	3/4
φ125	71	95	140	M64 P2	45	220	129	243	132	66	25	24	65	48	23	57	M22 P1.5	165	122	175 $^{0}_{-0.4}$	275	R3	50	1
φ140	80	110	160	M72 P2	50	230	137	254	138	68	25	26	65	48	24	77	M24 P1.5	185	138	195 $^{0}_{-0.46}$	321	R4	63	1
φ150	85	115	165	M76 P2	50	240	145	267	144	70	25	28	65	48	27	77	M27 P1.5	196	148	206 $^{0}_{-0.46}$	332	R4	63	1
φ160	90	120	175	M80 P2	55	253	155	280	152	73	25	31	65	48	27	87	M27 P1.5	210	160	218 $^{0}_{-0.46}$	360	R4	71	1
φ180	100	140	195	M95 P2	55	275	171	304	161	74	30	33	69	58	29	97	M30 P1.5	235	182	243 $^{0}_{-0.46}$	403	R4	80	1 1/4
φ200	112	150	205	M100 P2	55	301	181	332	177	85	35	37	83	70	31	107	M33 P1.5	262	200	272 $^{0}_{-0.52}$	452	R5	90	1 1/2
φ224	125	180	240	M120 P2	60	305	180	341	181	90	35	42	83	70	36	117	M39 P1.5	292	225	300 $^{0}_{-0.52}$	500	R5	100	1 1/2
φ250	140	195	260	M130 P2	65	346	197	385	206	107	42	47	102	84	39	117	M42 P1.5	325	250	335 $^{0}_{-0.57}$	535	R5	100	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

TC Double Rod



*ϕ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	ϕB	C	E	F	ϕQ	FT	FW	ϕB	C	E	F	ϕQ	FT	FW	QR	D
ϕ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
ϕ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
ϕ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
ϕ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
ϕ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
ϕ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
ϕ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
ϕ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
ϕ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
ϕ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
ϕ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
ϕ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
ϕ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
ϕ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

■Double Rod

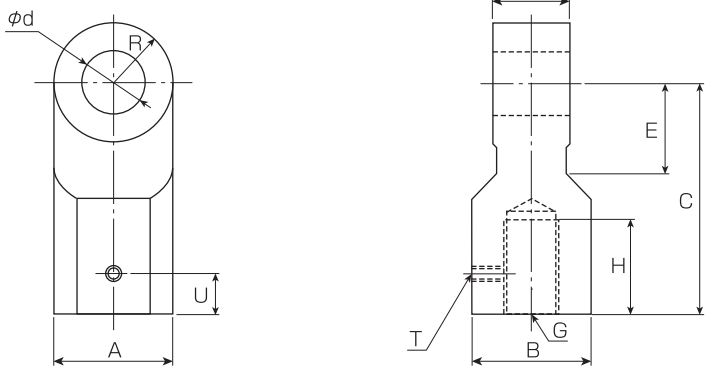
Units:㎜

Symbol / Bore	Double Rod	
	WTL	WJ
ϕ32	166	94
ϕ40	166	94
ϕ50	182	98
ϕ63	194	106
ϕ80	222	110
ϕ100	232	116
ϕ125	264	132
ϕ140	276	140
ϕ150	288	148
ϕ160	304	158
ϕ180	322	174
ϕ200	362	192
ϕ224	370	190
ϕ250	416	202

Note1) The cushion for the ϕ40 A Rod is a fixed cushion on the head-side.
Note2) The ϕ32 A Rod corresponds to the standard.There is no cushion on the head side.

■Single Protrusion End Joint : T type

Bore	Material
φ32 to φ125	Spheroidal Graphite Iron Casting



■Single Protrusion End Joint Dimension Table 〈B(A), C Rods〉

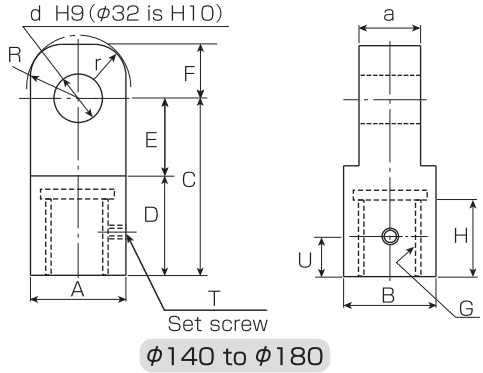
Units:㎜

Symbol / Bore	φd	a	A	B	C	E	G		H		R	T	U		Parts Code	
							B Rod	C Rod	B Rod	C Rod			B Rod	C Rod	B Rod	C Rod
φ32	16	25 $^{-0.1}_{-0.4}$	34	39	60	23	M16 P1.5	M12 P1.5	32	25	18	Note) M8	10	10	TJ-F32B	TJ-F32C
φ40	16	25 $^{-0.1}_{-0.4}$	34	39	60	23	M20 P1.5	M16 P1.5	35	32	18	M8	10	10	TJ-F40B	TJ-F40C
φ50	20	31.5 $^{-0.1}_{-0.4}$	42	47	70	28	M24 P1.5	M20 P1.5	38	35	22	M8	10	10	TJ-F50B	TJ-F50C
φ63	31.5	40 $^{-0.1}_{-0.4}$	62	62	115	43	M30 P1.5	M24 P1.5	47	38	33	M8	20	20	TJ-F63B	TJ-F63C
φ80	31.5	40 $^{-0.1}_{-0.4}$	62	62	115	43	M39 P1.5	M30 P1.5	62	47	33	M8	20	20	TJ-F80B	TJ-F80C
φ100	40	50 $^{-0.1}_{-0.4}$	82	82	145	55	M48 P1.5	M39 P1.5	77	62	43	M10	25	25	TJ-F100B	TJ-F100C
φ125	50	63 $^{-0.1}_{-0.4}$	102	102	180	65	M64 P2	M48 P1.5	97	77	53	M10	25	25	TJ-F125B	TJ-F125C

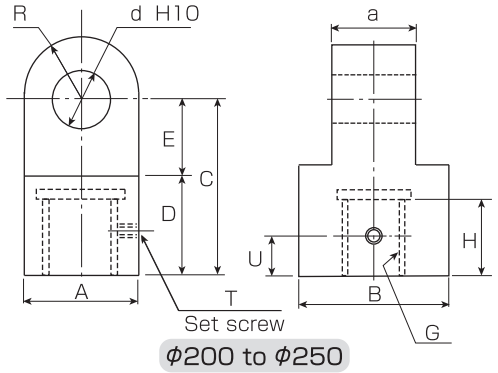
Note) The φ32 C rod of dimension "T" becomes M6.

■Single Protrusion End Joint : T type

Bore	Material
φ140 to φ250	Rolled Steels for General structure



φ140 to φ180



φ200 to φ250

■Single Protrusion End Joint Dimension Table 〈B(A), C Rods〉

Units:㎜

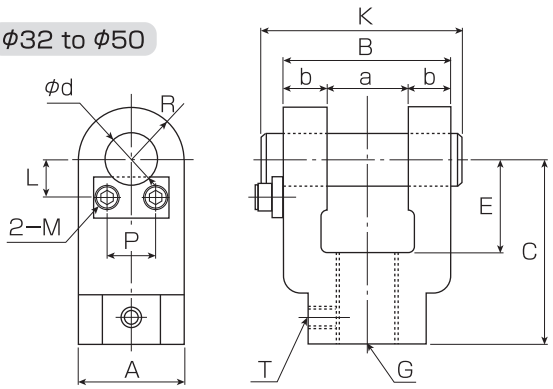
Symbol / Bore	φd	a	A	B	C	D	E	F	G		H		r	R	T	U		Parts Code	
									B Rod	C Rod	B Rod	C Rod				B Rod	C Rod	B Rod	C Rod
φ140	63	80 $^{-0.1}_{-0.6}$	120	120	225	140	85	65	M72 P2	M56 P2	112	82	42	71.5	M10	60	45	TJ-F140B	TJ-F140C
φ150	63	80 $^{-0.1}_{-0.6}$	120	120	225	140	85	65	M76 P2	M60 P2	117	87	42	71.5	M10	60	45	TJ-F150B	TJ-F150C
φ160	71	80 $^{-0.1}_{-0.6}$	140	140	240	150	90	70	M80 P2	M64 P2	122	97	54	76	M10	65	50	TJ-F160B	TJ-F160C
φ180	80	100 $^{-0.1}_{-0.6}$	160	160	270	170	100	80	M95 P2	M72 P2	142	112	62	87.5	M10	75	60	TJ-F180B	TJ-F180C

Symbol / Bore	φd	a	A	B	C	D	E	G		H		R	T	U		Parts Code	
								B Rod	C Rod	B Rod	C Rod			B Rod	C Rod	B Rod	C Rod
φ200	90	125 $^{-0.1}_{-0.6}$	180	180	310	180	130	M100 P2	M80 P2	155	125	90	M10	78	65	TJ-F200B	TJ-F200C
φ224	100	125 $^{-0.1}_{-0.6}$	200	200	370	230	140	M120 P2	M95 P2	185	145	100	M10	95	75	TJ-F224B	TJ-F224C
φ250	100	125 $^{-0.1}_{-0.6}$	200	200	370	230	140	M130 P2	M100 P2	200	155	100	M10	100	78	TJ-F250B	TJ-F250C

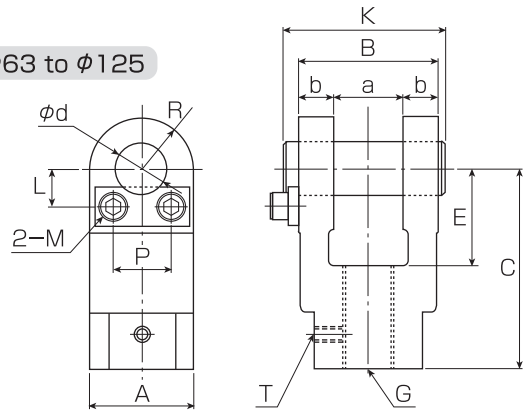
■Double Protrusion End Joint : Y type

Bore	Material
φ32 to φ125	Spheroidal Graphite Iron Casting

φ32 to φ50



φ63 to φ125



■Double Protrusion End Joint Dimension Table 〈B(A), C Rods〉

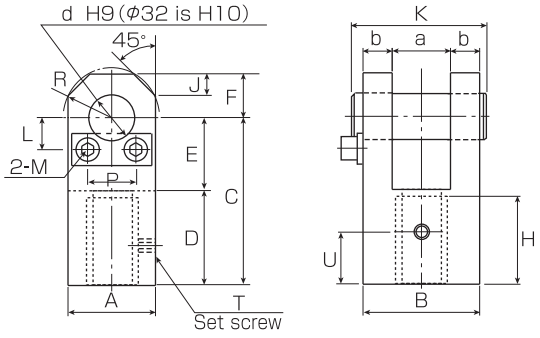
Units:㎜

Symbol / Bore	φd	a	b	A	B	C	E	G		R	K	T	M	L	P	Parts Code	
								B Rod	C Rod							B Rod	C Rod
φ32	16	25 $^{+0.4}_{+0.1}$	12.5	34	50	60	27	M16 P1.5	M12 P1.5	18	62	Note) M8	M6	12.5	18	YJ-F32B	YJ-F32C
φ40	16	25 $^{+0.4}_{+0.1}$	12.5	34	50	60	27	M20 P1.5	M16 P1.5	18	62	M8	M6	12.5	18	YJ-F40B	YJ-F40C
φ50	20	31.5 $^{+0.4}_{+0.1}$	16	42	63.5	70	32	M24 P1.5	M20 P1.5	22	76.5	M8	M6	14.5	18	YJ-F50B	YJ-F50C
φ63	31.5	40 $^{+0.4}_{+0.1}$	20	62	80	115	50	M30 P1.5	M24 P1.5	33	93	M8	M10	22	33	YJ-F63B	YJ-F63C
φ80	31.5	40 $^{+0.4}_{+0.1}$	20	62	80	115	50	M39 P1.5	M30 P1.5	33	93	M8	M10	22	33	YJ-F80B	YJ-F80C
φ100	40	50 $^{+0.4}_{+0.1}$	25	82	100	145	65	M48 P1.5	M39 P1.5	43	117	M10	M10	25	40	YJ-F100B	YJ-F100C
φ125	50	63 $^{+0.4}_{+0.1}$	31.5	102	126	180	75	M64 P2	M48 P1.5	53	143	M10	M10	29	50	YJ-F125B	YJ-F125C

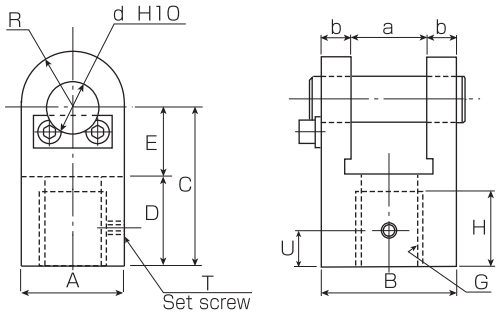
Note) The φ32 C rod of T becomes M6.

■Double Protrusion End Joint : Y type

Bore	Material
φ32 to φ250	Rolled Steels for General structure



φ140 to φ180



φ200 to φ250

■Double Protrusion End Joint Dimension Table 〈B(A), C Rods〉

Pins up to φ125 are standard. φ140 and above are options.

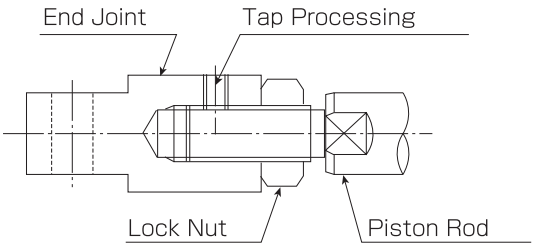
Units:㎜

Symbol / Bore	φd	a	b	A	B	C	D	E	F	G		H		J	R	K	T	U		M	L	P	Parts Code	
										B Rod	C Rod	B Rod	C Rod					B Rod	C Rod				B Rod	C Rod
φ140	63	80 $^{+0.6}_{+0.1}$	40	120	160	225	135	90	65	M72 P2	M56 P2	112	82	30	71.5	183	M10	60	45	M12	37	63	YJ-F140B	YJ-F140C
φ150	63	80 $^{+0.6}_{+0.1}$	40	120	160	225	135	90	65	M76 P2	M60 P2	117	87	30	71.5	183	M10	60	45	M12	37	63	YJ-F150B	YJ-F150C
φ160	71	80 $^{+0.6}_{+0.1}$	40	140	160	240	140	100	70	M80 P2	M64 P2	122	97	40	76	183	M10	65	50	M12	40	71	YJ-F160B	YJ-F160C
φ180	80	100 $^{+0.6}_{+0.1}$	50	160	200	270	160	110	80	M95 P2	M72 P2	142	112	45	87.5	225	M10	75	60	M14	45.5	80	YJ-F180B	YJ-F180C

Symbol / Bore	φd	a	b	A	B	C	D	E	G		H		R	T	U		M	L	P	Parts Code	
									B Rod	C Rod	B Rod	C Rod			B Rod	C Rod				B Rod	C Rod
φ200	90	125 $^{+0.6}_{+0.1}$	50	180	225	310	180	130	M100 P2	M80 P2	155	125	90	M10	78	65	M14	48	90	YJ-F200B	YJ-F200C
φ224	100	125 $^{+0.6}_{+0.1}$	63	200	251	370	230	140	M120 P2	M95 P2	185	145	100	M10	95	75	M16	54	100	YJ-F224B	YJ-F224C
φ250	100	125 $^{+0.6}_{+0.1}$	63	200	251	370	230	140	M130 P2	M100 P2	200	155	100	M10	100	78	M16	54	100	YJ-F250B	YJ-F250C

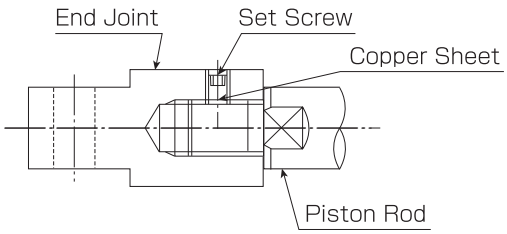
■Shipping Methods for Cylinders with End Joint

① When a cylinder with a lock nut and end joint is ordered



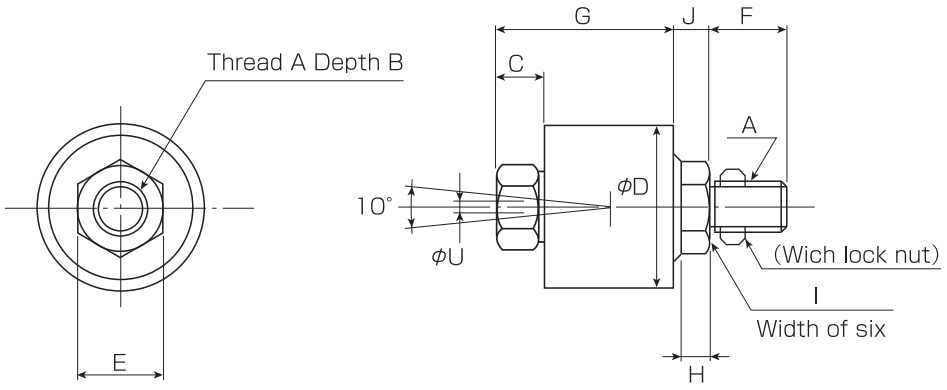
The end joint and lock nut are loosely assembled on the piston rod before shipping.
The lock nut is not tightened so it will have to be tightened after adjusting the position of the end joint.

② When a cylinder is ordered with the end joint only.



The end joint will be tightened onto the piston rod and fixed with a set screw before shipping.

■F Connector



※Cannot be used with full output norminal pressure. Confirm the usage load before use.

■Table of Dimensions

Units:㎜

Bore / Symbol B Rod	Symbol C Rod	Parts Code	A	B	C	D	E	F	G	H	I	J	U	Usage loads (N) Pull	Usage loads (N) Push	Mass (kg)
φ32	φ40	F-16	M16P1.5	13	17 ±1.0	45	23	24	52 ±1.0	6	23	6	2	to 5290	to 19600	0.40
φ40	φ50	F-20	M20P1.5	20	24.5 ±1.0	61	32	32	68 ±1.0	6	29	11.5	3	to 7640	to 39200	1.10
φ50	φ63	F-24	M24P1.5	22	34.5 ±1.0	61	35	32	78 ±1.0	6	29	11.5	3	to 7640	to 39200	1.10
φ63	φ80	F-30	M30P1.5	22	36.5 ±1.0	69	41	42	88.5±1.0	8	35	15	3	to 13520	to 78400	1.80

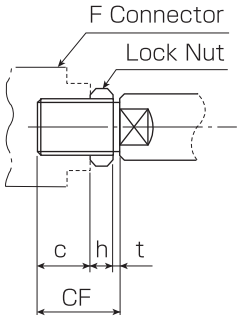
Note 1) It is possible to turn the thread section; however, it is not a joint for rotation so it cannot be used for turning.
Note 2) Supplying oil is unnecessary and grease lubricant is used to fill it.
Note 3) Cannot be reused after disassembly.
Note 4) The usage loads in the Table of Dimensions are values from static load tests.
Note 5) In the case of loads where there are repeated shocks, the usage load value will decrease, so this should be taken into consideration.
Note 6) The F connector cannot be used with the rotary bracket (mounting type: TC, CA and CB).

■The screw length with F Connector

Units:㎜

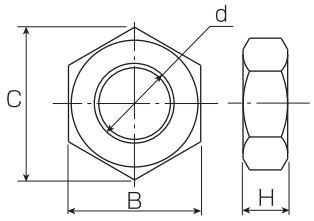
Bore / Symbol B Rod	Symbol C Rod	Parts Code	A	B	c	h	t	Size CF (The screw length.)
φ32	φ40	F-16	M16P1.5	13	12.5	10	2.5	25
φ40	φ50	F-20	M20P1.5	20	19.5	12	3.5	35
φ50	φ63	F-24	M24P1.5	22	21.5	14	4.5	40
φ63	φ80	F-30	M30P1.5	22	21.5	18	5.5	45

Note 1) The size CF (The screw length) is the one having calculated for the reference.
Note 2) Three types of lock nuts are available.

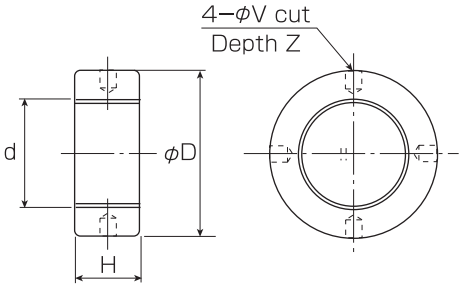


■Lock Nut

Bore	Material
φ32 to φ250	Rolled Steels for General structure



φ32 to φ180 ※φ200 to φ224 are only for the C Rod.



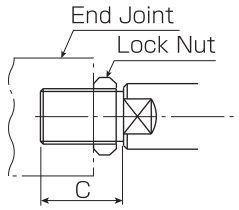
φ200 to φ250

■Table of Dimensions 〈B(A), C Rods〉

Units:mm

Bore \ Symbol	B(A) Rod				C Rod				Parts Code	
	d	H	B	C	d	H	B	C	B Rod	C Rod
φ32	M16 P1.5	10	24	27.7	M12 P1.5	7	19	21.9	LN-F32B	LN-F32C
φ40	M20 P1.5	12	30	34.6	M16 P1.5	10	24	27.7	LN-F40B	LN-F40C
φ50	M24 P1.5	14	36	41.6	M20 P1.5	12	30	34.6	LN-F50B	LN-F50C
φ63	M30 P1.5	18	46	53.1	M24 P1.5	14	36	41.6	LN-F63B	LN-F63C
φ80	M39 P1.5	23	60	69.3	M30 P1.5	18	46	53.1	LN-F80B	LN-F80C
φ100	M48 P1.5	29	75	86.5	M39 P1.5	23	60	69.3	LN-F100B	LN-F100C
φ125	M64 P2	38	95	110	M48 P1.5	29	75	86.5	LN-F125B	LN-F125C
φ140	M72 P2	42	105	121	M56 P2	34	85	98.1	LN-F140B	LN-F140C
φ150	M76 P2	46	110	127	M60 P2	36	90	104	LN-F150B	LN-F150C
φ160	M80 P2	48	115	133	M64 P2	38	95	110	LN-F160B	LN-F160C
φ180	M95 P2	57	135	156	M72 P2	42	105	121	LN-F180B	LN-F180C
φ200	—	—	—	—	M80 P2	48	115	133	—	LN-F200C
φ224	—	—	—	—	M95 P2	57	135	156	—	LN-F224C

Bore \ Symbol	B(A) Rod					C Rod					Parts Code	
	d	H	φD	φV	Z	d	H	φD	φV	Z	B Rod	C Rod
φ200	M100 P2	45	155	15	18	—	—	—	—	—	LN-F200B	—
φ224	M120 P2	55	185	15	18	—	—	—	—	—	LN-F224B	—
φ250	M130 P2	60	205	15	18	M100 P2	45	155	15	18	LN-F250B	LN-F250C



※The length of the thread (C Dimension) of the piston rod with a lock nut is based on an insertion length of 80% of the thread diameter, so in cases where it is insufficient, use the dimensions in the illustration above.

■Recommended Thread Lengths with Lock Nuts

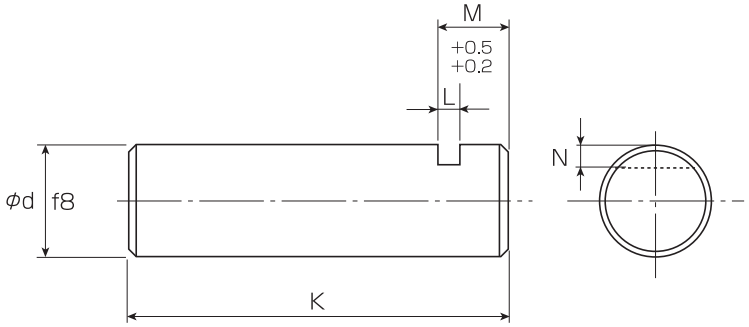
Units:mm

Bore \ Symbol	C Dimension (thread length)		
	A Rod	B Rod	C Rod
φ32	—	40	30
φ40	45	45	40
φ50	50	50	45
φ63	60	60	50
φ80	80	80	60
φ100	95	95	80
φ125	125	125	95
φ140	140	140	105
φ150	150	150	120
φ160	155	155	125
φ180	185	185	140
φ200	190	190	155
φ224	230	230	180
φ250	250	250	190

The recommended thread length with lock nut is adjusted in the case of equipped with the end joint and the lock nut.

■Pin

Bore	Material
φ32 to φ250	Carbon Steel for Machine Structual Use

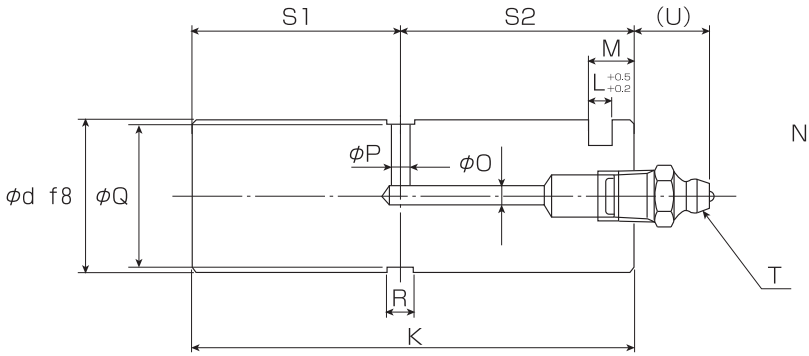


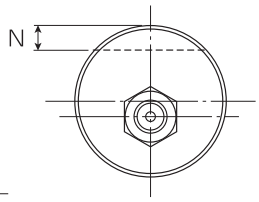
■Table of Dimensions

Units:mm

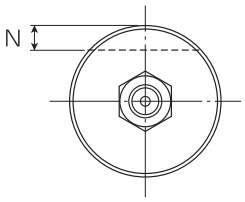
Bore \ Symbol	φd	L	M	N	K
φ32	16	4.5	7.5	3.5	62
φ40	16	4.5	7.5	3.5	62
φ50	20	4.5	8.5	3.5	76.5
φ63	31.5	6	9	5.5	93
φ80	31.5	6	9	5.5	93
φ100	40	6	12	6.5	117
φ125	50	6	12	7.5	143
φ140	63	9	18	10	183
φ150	63	9	18	10	183
φ160	71	9	18	11	183
φ180	80	9	20	12	225
φ200	90	9	19	15	276 (For CB) 250 (For Y Joint)
φ224	100	12	24	15.5	280
φ250	100	12	24	15.5	280

■Pin with Grease Nipple





φ32 to φ40



φ50 to φ250

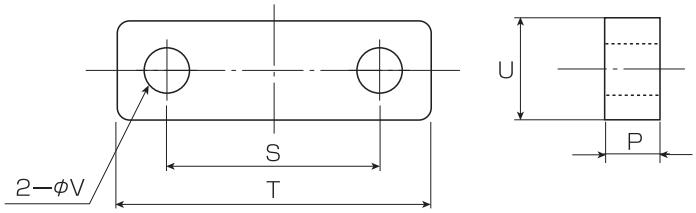
■Table of Dimensions

Units:mm

Symbol / Bore	φd	L	M	N	K	O	P	Q	R	S1	S2	T	(U)
φ32	16	4.5	8.5	3.5	62	3	3	15	5	29.5	32.5	A-R 1/8	(15)
φ40	16	4.5	8.5	3.5	62	3	3	15	5	29.5	32.5	A-R 1/8	(15)
φ50	20	4.5	8.5	3.5	76.5	3	3	19	5	36.5	40	A-R 1/8	(15)
φ63	31.5	6	9	5.5	93	3	3	30.5	5	44	49	A-R 1/8	(15)
φ80	31.5	6	9	5.5	93	3	3	30.5	5	44	49	A-R 1/8	(15)
φ100	40	6	12	6.5	117	5	5	39	7	55	62	A-R 1/4	(18)
φ125	50	6	12	7.5	143	5	5	49	7	68	75	A-R 1/4	(18)
φ140	63	9	18	10	183	5	5	62	7	85	98	A-R 1/4	(18)
φ150	63	9	18	10	183	5	5	62	7	85	98	A-R 1/4	(18)
φ160	71	9	18	11	183	5	5	70	7	85	98	A-R 1/4	(18)
φ180	80	9	20	12	225	5	5	79	7	105	120	A-R 1/4	(18)
φ200 For CB	90	9	19	15	276	11	8	88	10	131.5	144.5	A-R 1/4	(18)
φ200 For Y					250					118.5	131.5		
φ224	100	12	24	15.5	280	11	8	98	10	130.5	149.5	A-R 1/4	(18)
φ250	100	12	24	15.5	280	11	8	98	10	130.5	149.5	A-R 1/4	(18)

■Keeper Plate

Bore	Material
φ32 to φ250	Rolled Steels for General Structure



■Table of Dimensions

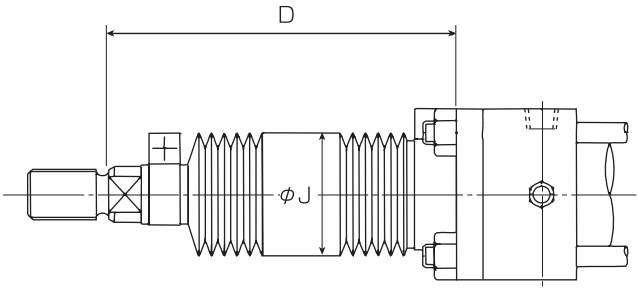
Units:mm

Symbol / Bore	φV	U	P	S	T	With Hex Hole Bolt
φ32	6.5	16	4.5	18	28	M6
φ40	6.5	16	4.5	18	28	M6
φ50	6.5	16	4.5	18	28	M6
φ63	11	22	6	33	55	M10
φ80	11	22	6	33	55	M10
φ100	11	22	6	40	62	M10
φ125	11	22	6	50	72	M10
φ140	14	30	9	63	93	M12
φ150	14	30	9	63	93	M12
φ160	14	30	9	71	101	M12
φ180	16	35	9	80	115	M14
φ200	16	35	9	90	125	M14
φ224	18	38	12	100	140	M16
φ250	18	38	12	100	140	M16

■Bellows

J : (Material: Neoprene, Heat Resistant : 100℃)
JC : (Material: Conex, Heat Resistant : 220℃)
JS : (Material: Silicon Glass Cloth, Heat Resistant : 220℃)
JA : (Material: Aluminum Leaf Glass Cloth, Heat Resistant : 350℃)

Note 1) The Heat Resistance indicates the maximum allowable temperature for Bellows.
Caution is advised because it differs from the heat resistant temperature of the cylinder body.
Note 2) Bellows is sent out after installing it on the cylinder.
Note 3) As for cylinders originally equipped with bellows, please specify the serial number or dimension D (in the illustration below) when ordering a replacement without the bellows.



■Table of Dimensions [Neoprene (J), Conex (JC)]

Units:㎜

Symbol / Bore	B・C Rod J 5 to 49	B・C Rod J from 50	B・C Rod D	A Rod J 5 to 49	A Rod J from 50	A Rod D
φ32	55	42	$\frac{ST}{3.5}$ +45	—	—	—
φ40	65	45	$\frac{ST}{3.5}$ +45	70	55	$\frac{ST}{3.5}$ +45
φ50	65	55	$\frac{ST}{3.5}$ +45	80	70	$\frac{ST}{3.5}$ +45
φ63	80	65	$\frac{ST}{4}$ +55	85	80	$\frac{ST}{4}$ +55
φ80	100	80	$\frac{ST}{4}$ +55	105	85	$\frac{ST}{4}$ +55
φ100	115	100	$\frac{ST}{4}$ +55	105	105	$\frac{ST}{4}$ +55
φ125	115	115	$\frac{ST}{5}$ +65	135	135	$\frac{ST}{5}$ +55
φ140	138	138	$\frac{ST}{5}$ +65	150	150	$\frac{ST}{5}$ +65
φ150	148	148	$\frac{ST}{5}$ +65	155	155	$\frac{ST}{5}$ +65
φ160	160	160	$\frac{ST}{5}$ +65	170	170	$\frac{ST}{5}$ +65
φ180	182	182	$\frac{ST}{5}$ +65	185	185	$\frac{ST}{5}$ +65
φ200	200	200	$\frac{ST}{5}$ +65	210	210	$\frac{ST}{5}$ +65
φ224	225	225	$\frac{ST}{6}$ +80	230	230	$\frac{ST}{5}$ +80
φ250	250	250	$\frac{ST}{6}$ +80	260	260	$\frac{ST}{6}$ +80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 5-strokes cannot be manufactured.

■Table of Dimensions [Silicon Glass Cloth(JS)]

Units:㎜

Symbol / Bore	B・C Rod J 6 to 59	B・C Rod J from 60	B・C Rod D	A Rod J 6 to 59	A Rod J from 60	A Rod D
φ32	55	45	$\frac{ST}{3}$ +45	—	—	—
φ40	55	45	$\frac{ST}{3}$ +45	65	55	$\frac{ST}{3}$ +45
φ50	65	55	$\frac{ST}{3}$ +45	80	65	$\frac{ST}{3}$ +45
φ63	80	65	$\frac{ST}{3}$ +55	85	80	$\frac{ST}{3}$ +55
φ80	100	80	$\frac{ST}{3}$ +55	105	85	$\frac{ST}{3}$ +55
φ100	115	100	$\frac{ST}{3.2}$ +55	105	105	$\frac{ST}{3.2}$ +55
φ125	115	115	$\frac{ST}{3.2}$ +65	135	135	$\frac{ST}{3.2}$ +55
φ140	138	138	$\frac{ST}{3.2}$ +65	150	150	$\frac{ST}{3.2}$ +65
φ150	148	148	$\frac{ST}{3.7}$ +65	150	150	$\frac{ST}{3.7}$ +65
φ160	160	160	$\frac{ST}{3.7}$ +65	165	165	$\frac{ST}{3.7}$ +65
φ180	182	182	$\frac{ST}{4}$ +65	175	175	$\frac{ST}{4}$ +65
φ200	200	200	$\frac{ST}{4.5}$ +65	200	200	$\frac{ST}{4.5}$ +65
φ224	225	225	$\frac{ST}{4.5}$ +80	225	225	$\frac{ST}{4.5}$ +80
φ250	250	250	$\frac{ST}{4.5}$ +80	250	250	$\frac{ST}{4.5}$ +80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 6-strokes cannot be manufactured.

■Table of Dimensions [Aluminum Foil Glass Cloth (JA)]

Units:㎜

Symbol / Bore	B・C Rod J 7 to 69	B・C Rod J from 70	B・C Rod D	A Rod J 7 to 69	A Rod J from 70	A Rod D
φ32	50	45	$\frac{ST}{2.5}$ +45	—	—	—
φ40	55	50	$\frac{ST}{2.5}$ +45	70	55	$\frac{ST}{2.5}$ +45
φ50	70	55	$\frac{ST}{2.5}$ +45	80	65	$\frac{ST}{2.5}$ +45
φ63	80	70	$\frac{ST}{2.5}$ +55	85	80	$\frac{ST}{3.5}$ +55
φ80	100	80	$\frac{ST}{3.5}$ +55	105	85	$\frac{ST}{3.5}$ +55
φ100	120	100	$\frac{ST}{3.5}$ +55	105	105	$\frac{ST}{3.5}$ +55
φ125	120	120	$\frac{ST}{3.5}$ +65	135	135	$\frac{ST}{4}$ +55
φ140	130	130	$\frac{ST}{4}$ +65	150	150	$\frac{ST}{4.5}$ +65
φ150	135	135	$\frac{ST}{4}$ +65	150	150	$\frac{ST}{4.5}$ +65
φ160	140	140	$\frac{ST}{4.5}$ +65	170	170	$\frac{ST}{4.5}$ +65
φ180	150	150	$\frac{ST}{4.5}$ +65	180	180	$\frac{ST}{4.5}$ +65
φ200	170	170	$\frac{ST}{4.5}$ +65	220	220	$\frac{ST}{5}$ +65
φ224	180	180	$\frac{ST}{5}$ +80	230	230	$\frac{ST}{5}$ +80
φ250	205	205	$\frac{ST}{5}$ +80	260	260	$\frac{ST}{5}$ +80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 7-strokes cannot be manufactured.

■Mass Table (B, C Rods)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)																						Stroke Mass per 100mm	
	S		LA・LB		LC		FA		FB		FC		FD		CF		CA・CB		TC		TA			
	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod
φ32	3.1	3.0	3.5	3.4	3.7	3.6	3.3	3.2	3.5	3.4	—	—	—	—	4.2	4.1	3.5	3.4	3.4	3.3	3.1	3.0	0.9	0.8
φ40	3.9	3.8	4.4	4.3	4.6	4.5	4.1	4.0	4.4	4.1	4.6	4.5	4.9	4.6	5.2	5.1	4.5	4.4	4.5	4.4	4.0	3.9	1.0	0.9
φ50	5.9	5.8	6.3	6.2	7.0	6.9	6.3	6.2	6.9	6.8	7.2	7.1	7.8	7.7	8.2	8.1	6.9	6.8	6.7	6.6	5.6	5.5	1.4	1.2
φ63	9.1	8.7	9.9	9.5	11.0	10.6	9.6	9.2	10.6	10.2	10.9	10.5	11.9	11.5	12.7	12.3	11.1	10.7	10.5	10.1	9.2	8.8	2.0	1.7
φ80	16.1	15.1	17.5	16.6	20.0	19.0	17.0	16.0	18.6	17.7	18.9	17.9	20.5	19.6	20.8	19.8	18.9	18.0	18.0	17.1	16.1	15.2	3.4	3.0
φ100	24.9	23.5	27.2	25.8	30.4	29.0	26.7	25.3	29.4	28.0	29.5	28.1	32.2	30.8	33.0	31.6	31.1	29.7	28.5	27.1	25.7	24.3	4.9	4.2
φ125	44.9	42.0	49.7	46.8	54.4	51.5	48.4	45.5	53.2	50.3	53.4	50.5	58.2	55.3	57.5	54.6	56.5	53.6	51.3	48.4	47.9	45.0	7.6	6.4
φ140	60.1	56.0	66.0	51.8	72.1	57.9	63.5	59.4	70.1	65.9	69.9	65.8	76.5	72.3	81.1	77.0	76.2	72.0	69.0	64.8	66.8	52.6	9.4	8.0
φ150	68.9	63.7	76.8	71.6	84.4	79.2	74.2	69.0	82.5	77.3	81.8	76.6	90.1	84.9	91.4	86.2	88.0	82.8	79.8	74.6	78.7	73.5	10.9	9.2
φ160	81.1	75.7	90.2	84.7	98.9	93.4	87.9	82.5	97.3	92.1	97.4	92.0	107.1	101.6	109.4	104.0	104.2	98.7	94.3	88.8	95.5	90.0	13.9	12.0
φ180	112.9	105.5	126.7	119.3	139.0	131.6	122.6	115.2	136.3	128.3	135.4	128.0	149.1	141.4	152.3	144.9	151.0	143.6	133.8	126.4	135.9	128.5	17.4	15.1
φ200	155.4	147.1	171.3	163.0	188.0	179.7	163.3	155.0	182.7	174.4	182.2	173.9	201.6	193.3	213.0	204.7	203.6	195.3	180.2	171.9	181.2	172.9	21.4	18.7
φ224	195.5	189.8	232.0	218.3	255.5	241.8	207.5	201.8	243.0	229.3	231.6	225.9	267.1	253.4	265.5	259.8	267.3	253.6	236.0	222.3	253.5	239.8	27.2	23.8
φ250	269.0	254.0	309.2	294.0	341.7	326.5	284.0	269.0	322.2	307.0	317.5	302.5	355.7	340.5	357.4	342.4	339.2	324.0	309.2	294.0	315.2	300.0	33.6	29.6

■Mass Table (A Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)											Stroke Mass per 100mm
	S	LA・LB	LC	FA	FB	FC	FD	CF	CA・CB	TC	TA	
	A Rod											
φ32	3.2	3.6	3.8	3.4	3.6	—	—	4.3	3.6	3.5	3.2	1.1
φ40	4.0	4.5	4.7	4.2	4.5	4.7	5.0	5.3	4.6	4.6	4.1	1.2
φ50	6.2	6.6	7.3	6.6	7.2	7.5	8.1	8.5	7.2	7.0	5.9	1.7
φ63	9.8	10.3	11.7	10.3	11.0	11.6	12.3	13.4	11.5	10.9	9.6	2.5
φ80	17.0	18.4	20.9	17.9	19.5	19.8	21.4	21.7	19.8	18.9	17.0	4.1
φ100	26.9	29.2	32.4	28.7	31.4	31.5	34.2	35.0	33.1	30.5	27.7	6.1
φ125	48.8	53.6	58.3	52.3	57.1	57.3	62.1	61.4	60.4	55.2	51.8	9.5
φ140	65.9	71.8	77.9	69.3	75.9	75.7	82.3	86.9	82.0	74.8	72.6	11.6
φ150	73.8	81.7	89.3	79.1	87.4	86.7	95.0	96.3	92.9	84.7	83.6	12.6
φ160	87.1	96.2	104.9	93.9	103.6	103.4	113.1	115.4	110.2	100.3	101.5	16.6
φ180	123.5	137.3	149.6	133.2	146.9	146.0	159.7	162.9	161.6	144.4	146.5	20.9
φ200	168.9	184.8	201.5	176.8	196.2	195.7	215.1	226.5	217.1	193.7	194.7	25.8
φ224	219.2	251.7	275.2	227.2	262.7	251.3	286.8	289.2	287.0	255.7	273.2	33.4
φ250	299.3	339.5	372.0	314.3	352.5	347.8	386.0	387.7	369.5	339.5	345.5	41.5

Calculation Formula :

With regard to Cylinder (kg) = Basic Mass + (Stroke 100mm), Added Mass $\times \frac{\text{Stroke}}{100}$)

Calculation Example:

Type FA100B140B1000··· $26.7 + (4.9 \times \frac{1000}{100}) = 75.7$kg

■End Joint Mass Table

Units: kg

Symbol / Bore	Single Protrusion End Joint		Double Protrusion End Joint		Lock Nut	
	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod
φ32	0.57	0.59	0.59	0.61	0.05	0.02
φ40	0.53	0.57	0.56	0.59	0.05	0.02
φ50	0.89	0.95	1.23	1.27	0.08	0.05
φ63	2.91	3.04	3.83	3.99	0.16	0.08
φ80	2.59	2.91	3.62	3.83	0.32	0.16
φ100	5.51	6.02	7.77	8.17	0.64	0.32
φ125	10.44	11.79	14.80	16.01	1.34	0.64
φ140	20.80	22.90	29.60	31.30	1.70	1.00
φ150	20.20	22.50	29.10	30.90	1.80	1.30
φ160	29.00	31.50	36.30	38.30	2.20	1.34
φ180	44.50	49.00	49.60	53.40	3.20	1.70
φ200	45.20	47.90	45.60	47.70	4.10	2.20
φ224	56.10	61.80	66.10	69.70	6.50	3.20
φ250	56.40	69.80	67.30	72.40	8.30	4.10

Note) The A Rod End joint has characteristics common to Rod B.

■Double Rod Mass Table (B, C Rods)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)																Stroke Mass per 100mm	
	S		LA・LB		LC		FA		FC		CF		TC		TA			
	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod
φ32	3.7	3.6	4.1	4.0	4.1	4.0	3.9	3.8	——	——	4.8	4.7	4.0	3.9	3.7	3.6	1.22	0.98
φ40	4.8	4.7	5.3	5.2	5.3	5.2	5.0	4.9	5.5	5.4	6.1	6.0	5.4	5.3	4.9	4.8	1.49	1.20
φ50	7.3	7.1	7.7	7.5	8.0	7.8	7.7	7.5	8.6	8.4	9.6	9.4	8.1	7.9	7.0	6.8	2.18	1.67
φ63	11.5	10.8	12.3	11.6	12.8	12.1	12.0	11.3	13.3	12.6	15.1	14.4	12.9	12.2	11.6	10.9	3.32	2.46
φ80	20.6	19.1	22.0	20.6	23.0	21.5	21.5	20.0	23.4	21.9	25.3	23.8	22.5	21.1	20.6	19.2	5.53	4.30
φ100	32.3	30.2	34.6	32.5	35.8	33.7	34.1	32.0	36.9	34.8	40.4	38.3	35.9	33.8	33.1	31.0	8.38	6.51
φ125	57.8	53.1	62.6	57.9	63.2	58.5	61.3	56.6	66.3	61.6	70.4	65.7	64.2	59.5	60.8	56.1	13.51	10.27
φ140	77.6	70.8	83.5	66.6	85.2	78.4	81.0	74.2	87.4	80.6	98.6	91.8	86.5	79.6	84.3	67.4	17.29	12.54
φ150	89.3	81.1	97.2	89.0	98.2	90.0	94.6	86.4	102.2	94.0	111.8	103.6	100.2	92.0	99.1	90.9	19.81	14.73
φ160	108.0	97.0	117.1	106.0	118.5	107.5	114.8	103.8	124.3	113.3	136.3	125.3	121.2	110.1	122.4	111.3	24.39	18.53
φ180	143.9	131.0	157.7	144.8	158.2	145.3	153.6	140.7	166.4	153.5	183.3	170.4	164.8	151.9	166.9	154.0	30.35	23.39
φ200	199.0	185.1	215.3	201.0	220.2	206.3	207.3	193.0	226.2	211.9	256.6	242.7	224.2	209.9	225.2	210.9	37.64	29.19
φ224	250.3	234.4	286.8	262.9	283.4	267.5	262.3	264.4	286.4	270.5	320.3	304.4	290.8	266.9	308.3	284.4	48.39	37.36
φ250	353.7	324.8	393.9	364.8	399.0	370.1	368.7	339.8	402.2	373.3	442.1	413.2	393.9	364.8	399.9	370.8	61.39	47.39

■Double Rod Mass Table (A Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)								Stroke Mass per 100mm
	S	LA・LB	LC	FA	FC	CF	TC	TA	
φ32	——	——	——	——	——	——	——	——	——
φ40	5.0	5.5	5.5	5.2	5.7	6.3	5.6	5.1	1.98
φ50	7.7	8.1	8.4	8.1	9.0	10.0	8.5	7.4	3.02
φ63	12.3	12.8	13.6	12.8	14.1	15.9	13.4	12.1	4.63
φ80	21.9	23.3	24.3	22.8	24.7	26.6	23.8	21.9	7.58
φ100	35.0	37.3	38.5	36.8	39.6	43.1	38.6	35.8	12.01
φ125	63.1	67.9	68.5	66.6	71.6	75.7	69.5	66.1	19.99
φ140	84.8	90.7	92.4	88.2	94.6	105.8	93.7	91.5	24.55
φ150	95.4	103.3	104.3	100.7	108.3	117.9	106.3	105.2	25.55
φ160	113.3	122.4	123.8	120.1	129.6	141.6	126.5	127.7	32.84
φ180	156.9	170.7	171.2	166.6	179.4	196.3	177.8	179.9	42.09
φ200	216.5	232.4	237.7	224.4	243.3	274.1	241.3	242.3	53.59
φ224	278.5	311.0	311.6	286.5	310.6	348.5	315.0	332.5	69.70
φ250	389.1	429.3	434.4	404.1	437.6	477.5	429.3	435.3	87.44

HORIUCHI MACHINERY

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