

Small-bore hydraulic cylinders

- Tie rod type small-bore hydraulic cylinders.
- Slipper seal is used as the piston seal.
- Copper alloy bushing, and wear ring fitted to piston.
- Reed sensors or solid state sensors can be selected.

Solid state sensors which can be easily set in the optimum positions through visual check are available.

(Note) Slipper Seal is the registered trade mark of Nippon Valqua Industries, Ltd.



Standard Specifications

Type	Standard type	Switch Set
Nominal pressure	3.5 MPa	
Maximum allowable pressure	4 MPa	
Proof test pressure	5 MPa	
Working speed range	0.1 to 300 mm/s	
Working temperature range (ambient/fluid temperature)	- 10 to + 70°C (No freezing)	
Structure of cushioning	None	
Adaptable fluid	Petroleum-based fluid (When using another fluid, refer to the table of fluid adaptability.)	
Tolerance for thread	JIS 6g/6H	
Tolerance of stroke	0 to 250 mm ^{+1.0} ₀ 251 to 600 mm ^{+1.4} ₀	
Mounting style	SD, LB, FA, FB, CA, CB with pin	
Accessories	Rod end attachments	Rod eye (S-end), rod clevis (Y-end), floating joint (F-end)
	Others	CB bracket

Adaptability of Fluid to Seal Material

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

Sensor Mountable Minimum Stroke

Bore	With one sensor		With two sensors	
	AX/AZ type	SR type	AX/AZ type	SR type
φ20	10		20	
φ25				
φ32				

Terminologies

Nominal pressure

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

Maximum allowable pressure

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

Proof test pressure

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

- (Notes)
- The hydraulic pressure generated in a cylinder due to the inertia of load must be lower than the maximum allowable pressure.
 - For the internal structure, refer to the sectional drawings at the end of this catalog.

Standard Stroke Range

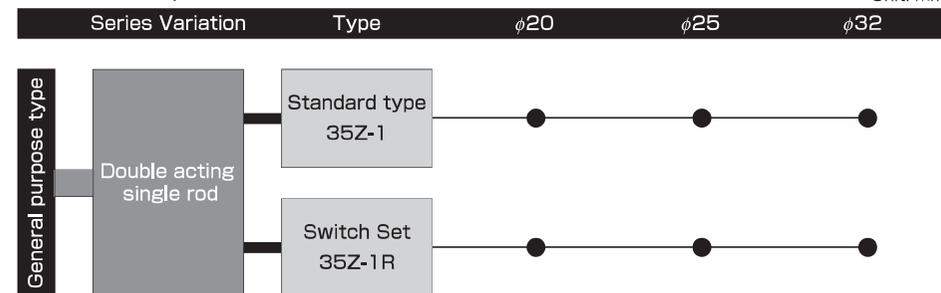
Unit: mm

Type	Bore		
	φ20	φ25	φ32
Standard type	400	500	600
Switch Set	400	500	600

- The above strokes indicate the maximum available strokes for the standard type.
- For the rod buckling, check with the buckling chart in the selection materials. Contact us for longer strokes.

Product Lineup

Unit: mm



- (Notes)
- When using a sensor, use a Switch Set Cylinder.
 - No sensor can be mounted onto the standard type cylinder.

Double acting single rod



Standard type (35Z-1)



Switch Set (35Z-1R)

Weight Table

Unit: kg

Bore mm	Basic weight			Mounting accessory weight					Rod end attachment weight		
	Basic style 35Z-1	Switch Set 35Z-1R	Additional weight per mm of stroke	LB style	FA style FB style	CA style	CB style with pin/split pin	CB style with bracket	Rod eye (S-end)	Rod clevis (Y-end) with pin	Floating joint (F-end)
φ20	0.390	0.395	0.00223	0.135	0.130	0.105	0.105	0.350	0.075	0.10	0.11
φ25	0.473	0.480	0.00265	0.150	0.145	0.120	0.125	0.350	0.075	0.10	0.11
φ32	0.632	0.638	0.00316	0.200	0.155	0.180	0.165	0.465	0.110	0.17	0.19

Sensor Additional Weight

Unit: kg

Bore mm	Sensor	AX/AZ type			SR type
		Cord length 1.5 m	Cord length 5 m	With connector	Cord length 5 m
φ20	0.05	0.13	0.04	0.22	
φ25					
φ32					

[Calculation formula] Cylinder weight (kg)=basic weight+(cylinder stroke (mm)×additional weight per mm of stroke)+(sensor additional weight×sensor quantity)+mounting accessory weight+rod end attachment weight

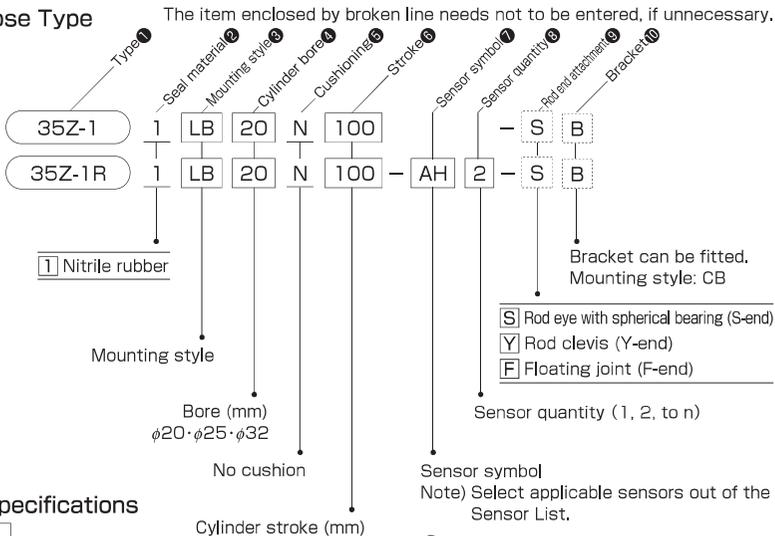
[Calculation example] 35Z-1R, bore φ32, cylinder stroke 300 mm, 2 pcs of AX101 (cord length 1.5 m), LB style, rod eye (S-end) 0.638+(300×0.00316)+(0.05×2)+0.200+0.110=1.996kg

How to order

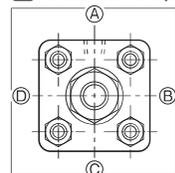
General Purpose Type

The item enclosed by broken line needs not to be entered, if unnecessary.

Standard type



Standard specifications



- No cushion on both ends
- Port position A

Change of port position

The standard port position is A. When modifying the positions, enter the symbol shown in the dimensional drawings.

Example) 35Z-1R 1LB20N100 - B 0 AH 2
 Port position (A, B, C, D) No cushion

Adaptability of Fluid to Seal Material

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

Note) ○: Applicable ×: Inapplicable

End Lock Nut Part Number

Bore	Part number
$\phi 20$	LNA-10B-H
$\phi 25$	
$\phi 32$	LNA-12B-H

Standard Stroke Range

Unit: mm

Bore Type	$\phi 20$	$\phi 25$	$\phi 32$
	Standard type	400	500
Switch Set	400	500	600

- The above strokes indicate the maximum available strokes for the standard type.
- For the rod buckling, check with the buckling chart in the selection materials. Contact us for longer strokes.

Sensor Mountable Minimum Stroke

Unit: mm

Bore	With one sensor		With two sensors	
	AX/AZ type	SR type	AX/AZ type	SR type
$\phi 20$	10		20	
$\phi 25$				
$\phi 32$				

Sensor List

■ Semi-standard

Type	Sensor symbol	Load voltage range	Load current range	Max. switching capacity	Protective circuit	Indicating lamp	Wiring method	Cord length	Applicable load
Reed sensor	AF AX101CE	DC: 5 to 30 V AC: 5 to 120 V	DC: 5 to 40 mA AC: 5 to 20 mA	DC: 1.5 W AC: 2 VA	None	LED (Lights in red when sensing)	0.3 mm ² , 2-core, outer dia. $\phi 4$ mm, rear wiring	1.5 m	Small relay, programmable controller
	AG AX105CE							5 m	
	AH AX111CE				1.5 m				
	AJ AX115CE				5 m				
	AE AX125CE	DC: 30 V or less AC: 120 V or less	DC: 40 mA or less AC: 20 mA or less	2 VA	None	None	5 m		
	AK AX11ACE	AC: 5 to 120 V	5 to 20 mA				0.5 m		
	AL AX11BCE	DC: 5 to 30 V	5 to 40 mA	1.5 W	Provided	LED (Lights in red when sensing)	4-pin connector type, rear wiring	0.5 m	
	AM AX135CE	AC/DC: 90 to 240 V	5 to 300 mA	B contact output	Provided	LED (Lights in red when not sensing)	0.3 mm ² , 2-core, outer dia. $\phi 4$ mm, rear wiring	5 m	
	S SR405	AC: 80 to 220 V	2 to 300 mA	30 VA	Provided	Neon lamp (Lights when not sensing)	0.5 mm ² , 2-core, outer dia. $\phi 6$ mm, rear wiring	5 m	
	Solid state sensor	BE AX201CE-1	DC: 5 to 30 V	5 to 40 mA	—	Provided	LED (Lights in red when sensing)	0.3 mm ² , 2-core, outer dia. $\phi 4$ mm, rear wiring	
BF AX205CE-1		5 m							
CE AX211CE-1		1.5 m							
CF AX215CE-1		5 m							
CT AX211CE-1		0.3 mm ² , 2-core, outer dia. $\phi 4$ mm, rear wiring					1.5 m		
CU AX215CE-1		5 m							
CV AX21BCE-1		4-pin connector type, rear wiring					0.5 m		
CW AZ211CE-1		0.3 mm ² , 2-core, outer dia. $\phi 4$ mm, upper wiring					1.5 m		
CX AZ215CE-1		5 m							
CY AZ21BCE-1		4-pin connector type, upper wiring					0.5 m		

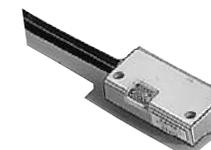
- Notes) • For the sensors without a protective circuit, be sure to provide a protective circuit (SK-100) with the load when using any induction load (relay, etc.).
- The output logic of AX135CE is B contact. When the piston is detected, the sensor contact turns off (the lamp turns on).
 - For handling of sensors, be sure to see the sensor specifications at the end of this catalog.
 - We recommend AND Unit (AU series) for multiple sensors connected in series. For details, refer to AND Unit at the end of this catalog.

AX type sensor

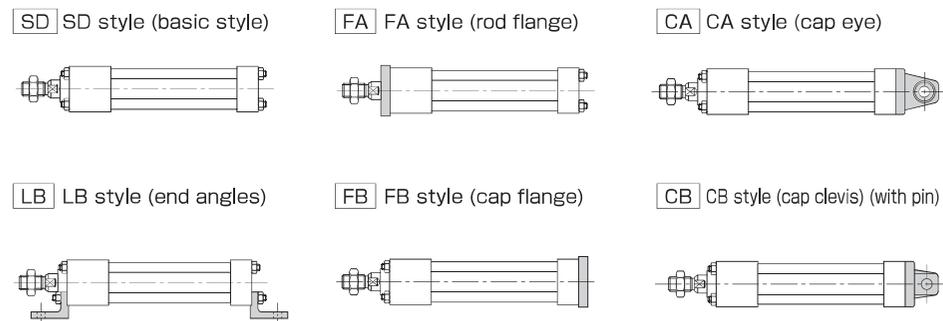
Cord type Connector type



SR type sensor



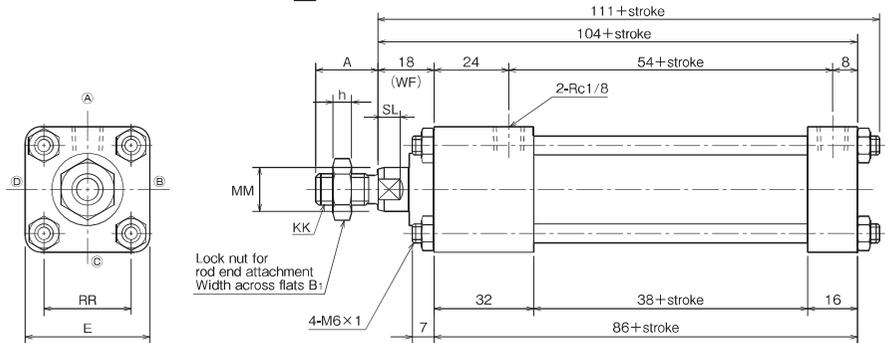
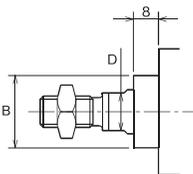
Mounting Style



CAD/DATA is available.

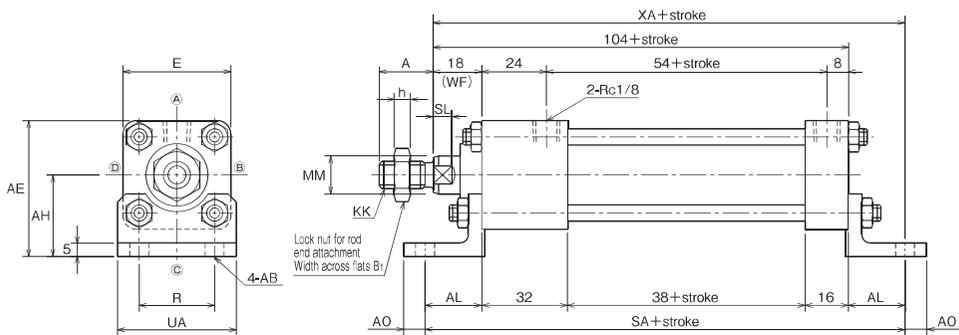
SD

35Z-1 1SD Bore N Stroke



LB

35Z-1 1LB Bore N Stroke



● For the mounting of sensors, refer to the dimensional drawings of Switch Set.

Dimensional Table

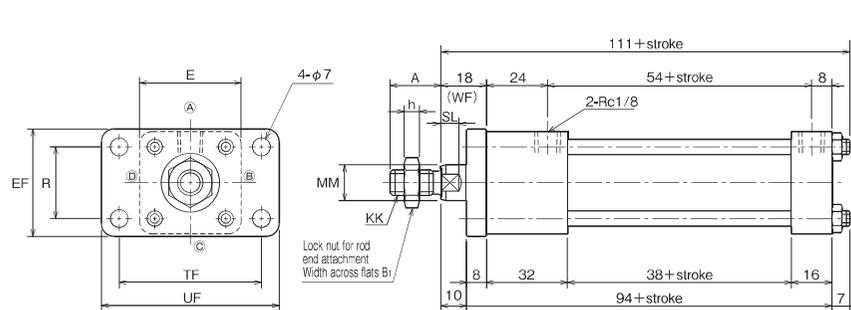
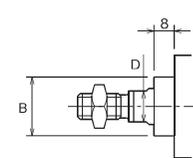
Symbol	A	AB	AE	AH	AL	AO	B	B ₁	D	E	h	KK	MM	R	RR	SA	SL	UA	XA
φ20	20(17)	φ7	46.5	28	21	8	φ21f9	17	10	□37	6	M10×1.25	φ12	25	□25	128	7	41	125
φ25	20(17)	φ7	50	30	21	8	φ23f9	17	12	□40	6	M10×1.25	φ14	28	□28	128	7	44	125
φ32	24(21)	φ9	55.5	33	23	10	φ30f9	19	13	□45	7	M12×1.25	φ16	33	□33	132	8	54	127

- The parenthesized values of dimension A are the lengths of threaded portions.
- The tolerance of MM is f8.

CAD/DATA is available.

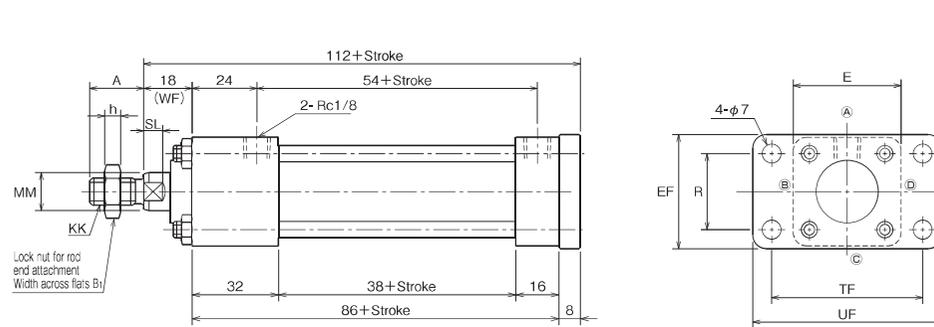
FA

35Z-1 1FA Bore N Stroke



FB

35Z-1 1FB Bore N Stroke



● For the mounting of sensors, refer to the dimensional drawings of Switch Set.

Dimensional Table

Symbol	A	B	B ₁	D	E	EF	h	KK	MM	R	SL	TF	UF
φ20	20(17)	φ21f9	17	10	□37	39	6	M10×1.25	φ12	25	7	54	68
φ25	20(17)	φ23f9	17	12	□40	42	6	M10×1.25	φ14	28	7	56	70
φ32	24(21)	φ30f9	19	13	□45	47	7	M12×1.25	φ16	33	8	58	72

- The parenthesized values of dimension A are the lengths of threaded portions.
- The tolerance of MM is f8.