

HQS2 Series

OPERATES AT 16 MPa

★ Compact design hydraulic cylinders in infinite pursuit of cost performance

We present "Reliability"

● **Aluminum body, compact design hydraulic cylinders**

Conforms to JIS B8367-6 and fatigue test class A1

● **8 types of cylinder bores**

φ20 · φ25 · φ32 · φ40 · φ50 · φ63 · φ80 · φ100

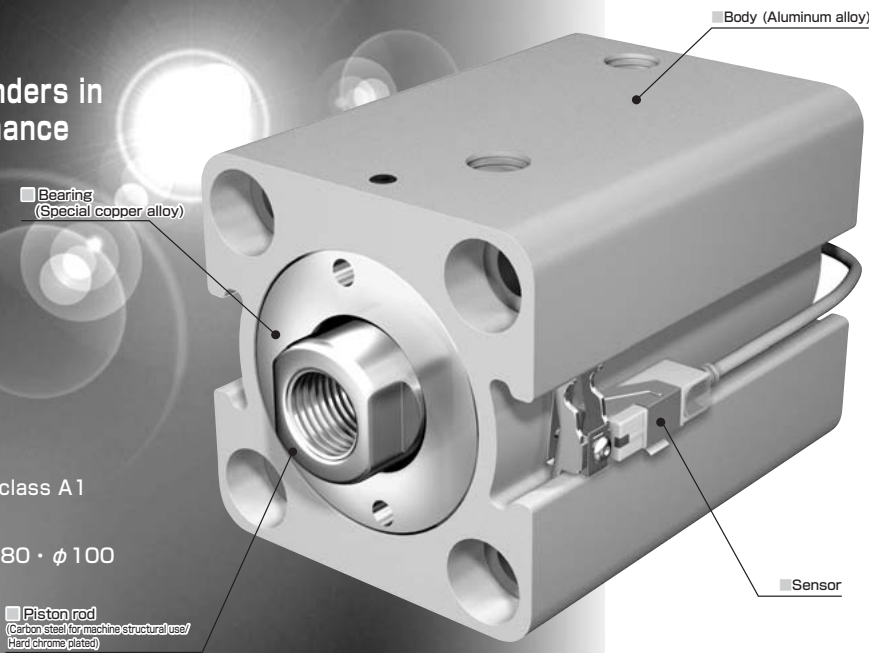
● **Rod Grand constructed of Special copper alloy bearings**

Improves wear resistance

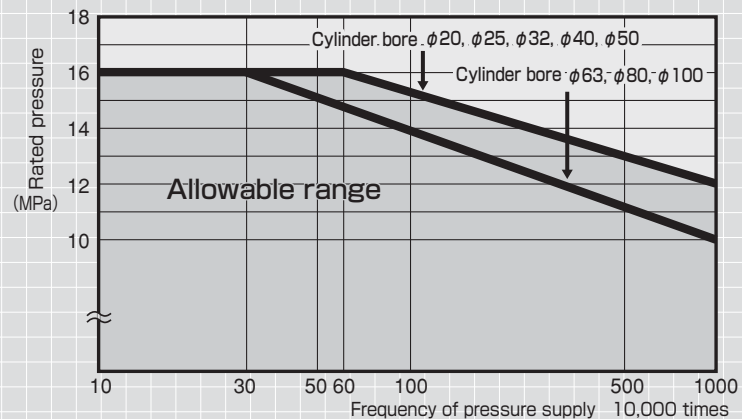
● **New design sensor brings maintainability**

Common to and usable for all tie rod type Switch Set Cylinders

- Sensor can be installed either on the right or left.
- Sensor slides freely.
- Cord can be extended to the rear or to the top.
- Sensors conforming to CE Marking are available.



Rated Pressure Diagram of HQS2



How to read the diagram

- Frequency of pressure supplied to the cylinder is taken along X-axis (horizontal).
- Move up vertically from the frequency, and the pressure where the line crosses the limit line of each bore indicates the pressure (rated pressure) at which the cylinder can be used up to the corresponding frequency of pressure supply. (Failure probability 1%)

Test method

To calculate the rated pressure, we conduct fatigue tests referring to the "Guidelines for selection and use of hydraulic cylinders, Annex 2: Strength test method of hydraulic cylinders," JFPS 1014:2002 (Japan Fluid Power Association Standards). In concrete, pressure is repeatedly applied to several tens of supply cylinders, and the frequency of failure is measured and processed statistically to obtain the rated pressure.

How to determine the rated pressure

Compatible with single rod type and double rod type

Double acting single rod



HQS2 · HQSW2



HQS2R · HQSW2R

Double acting double rod



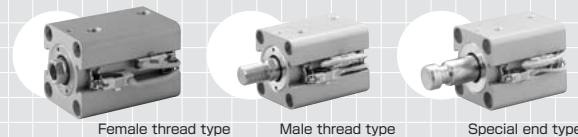
HQS2D · HQSW2D



HQS2RD · HQSW2RD

- The general purpose type and cutting oil proof type have the same dimensions.
- Installation dimensions are the same for both standard type and Switch Set.

For rod end specifications, female and male threads are available as well as various special end types.

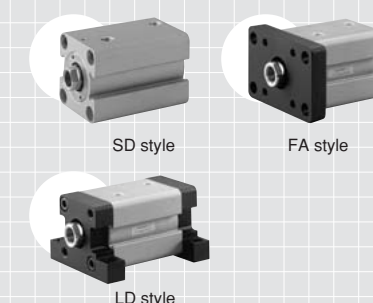


Reed sensor, solid state sensor, and cutting oil proof types are also available as standard.



- **Cutting oil proof type**
The dust wiper seal dedicated to the cutting oil proof type is used.

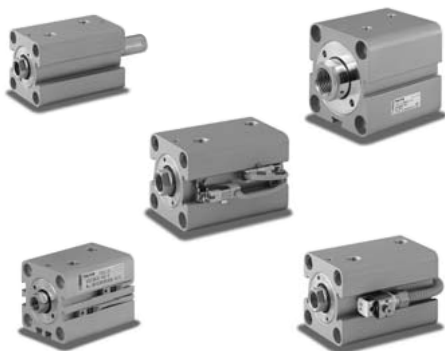
Wide selection of mounting accessories SD, FA, FB and LD styles



- **Stroke**
5 to 100 mm (depends on the bore)

Operates at up to 16 MPa depending on the frequency of pressure supply

- A wide selection of models is available with cylinder bores from 20 mm to 100 mm.
- Light-weight, compact design hydraulic cylinders with bodies constructed of special aluminum alloy.
- Cost-effective selection is available based on frequency of operation and working pressure.
- Aluminum body, compact design hydraulic cylinder in pursuit of cost performance.
- Special copper alloy bearings are adopted to improve wear resistance.



Standard Specifications

Type	General purpose type	Cutting oil proof type
Rated pressure (according to rated pressure diagram)	φ20, φ25, φ32, φ40, φ50 16 MPa (Fatigue durability (number of times) 6×10 ⁵) 12 MPa (Fatigue durability (number of times) 1×10 ⁷) φ63, φ80, φ100 16 MPa (Fatigue durability (number of times) 3×10 ⁵) 10 MPa (Fatigue durability (number of times) 1×10 ⁷)	
Proof test pressure	20 MPa	
Minimum operating pressure	0.3 MPa	
Working speed range	8 to 100mm/s	
Working temperature range (ambient temp. and oil temp.)	Standard type -10 to +70°C Switch Set AX/AZ type, T type -10 to +70°C WR/WS type -10 to +60°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 6H/6g	
Tolerance of stroke	0 to 0.8mm	
Mounting style	SD, LD, FA, FB	
Rod end threads	Female thread and male thread	
Applicable sensor for Switch Set	(φ20, φ25) T type HQS2R: (φ32 to φ100) AX/AZ type WR/WS type	HQSW2R:WR/WS type

Terminologies

Rated pressure

Working pressure which guarantees performance under a specified condition. The specified condition means our fatigue test with reference to the "Guidelines for selection and use of hydraulic cylinders, Annex 2: Strength test method of hydraulic cylinders," JFPS 1014:2002 (Japan Fluid Power Association Standards).

Proof test pressure

Static pressure used for inspection which does not cause abnormality when held for a specified time, and does not deteriorate cylinder performance when returning to the atmosphere pressure.

Minimum operating pressure

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

- Notes) ● This series of cylinders does not have air vents.
 ● Since lateral load (eccentric load) must not be applied to the piston rod, take care when installing the cylinder.

Double acting single rod



Standard type
(HQS2-HQSW2)



Switch Set
(HQS2R-HQSW2R)

Double acting double rod



Standard type
(HQS2D-HQSW2D)



Switch Set
(HQS2RD-HQSW2RD)

● The general purpose type and cutting oil proof type have the same dimensions.

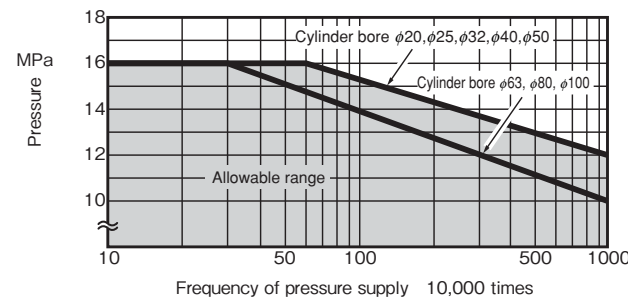
Product Lineup

Unit: mm

Series Variations	Type	Mounting style	φ20	φ25	φ32	φ40	φ50	φ63	φ80	φ100																																																																																																																										
General purpose type	Double acting single rod	Standard type	HQS2	SD	●	●	●	●	●	●	●																																																																																																																									
		LD-FA-FB	●	●	●	●	●	●	●	●	●																																																																																																																									
		Switch Set	HQS2R	SD	●	●	●	●	●	●	●																																																																																																																									
	LD-FA-FB	●	●	●	●	●	●	●	●	●	Double acting double rod	Standard type	HQS2D	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●	Switch Set	HQS2RD	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●	Cutting oil proof type	Double acting single rod	Standard type	HQSW2	SD	●	●	●	●	●	●	LD-FA-FB	●	●	●	●	●	●	●	●	Switch Set	HQSW2R	SD	●	●	●	●	●	●	●	LD-FA-FB	●	●	●	●	●	●	●	●	●	Double acting double rod	Standard type	HQSW2D	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●	Switch Set	HQSW2RD	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●
	Double acting double rod	Standard type	HQS2D	SD	●	●	●	●	●	●		●																																																																																																																								
		LD-FA	●	●	●	●	●	●	●	●		●																																																																																																																								
Switch Set		HQS2RD	SD	●	●	●	●	●	●	●																																																																																																																										
LD-FA	●	●	●	●	●	●	●	●	●	Cutting oil proof type	Double acting single rod	Standard type	HQSW2	SD	●	●	●	●	●	●	LD-FA-FB	●	●	●	●	●	●	●	●	Switch Set	HQSW2R	SD	●	●	●	●	●	●	●	LD-FA-FB	●	●	●	●	●	●	●	●	●	Double acting double rod	Standard type		HQSW2D	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●	Switch Set	HQSW2RD	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●																																									
Cutting oil proof type	Double acting single rod	Standard type	HQSW2	SD	●	●	●	●	●			●																																																																																																																								
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		Switch Set	HQSW2R	SD	●	●	●	●	●		●	●																																																																																																																								
	LD-FA-FB	●	●	●	●	●	●	●	●		●	Double acting double rod	Standard type	HQSW2D	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●	Switch Set	HQSW2RD	SD	●	●	●	●	●	●	●	LD-FA	●	●	●	●	●	●	●	●	●																																																																																
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Switch Set		HQSW2RD	SD	●	●	●	●	●	●	●																																																																																																																										
LD-FA	●	●	●	●	●	●	●	●	●																																																																																																																											

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

Rated Pressure Diagram



How to read the diagram

- Frequency of pressure supplied to the cylinder is taken along X-axis (horizontal).
- Move up vertically from the frequency, and the pressure where the line crosses the limit line of each bore indicates the pressure (rated pressure) at which the cylinder can be used up to the corresponding frequency of pressure supply. (Failure probability 1%)

How to order

General Purpose Type (Bore $\phi 20$ to $\phi 100$) The item enclosed by broken line needs not to be entered, if unnecessary. Semi-standard specification

● Standard type HQS2
 ● Switch Set HQS2R

6 SD 40 N 50 T G - L - V
6 SD 40 N 50 T G AH 2 - L - V

① Type
 ② Seal material
 ③ Mounting style
 ④ Cylinder bore
 ⑤ Cushioning
 ⑥ Stroke
 ⑦ Thread type
 ⑧ Port type
 ⑨ Sensor symbol
 ⑩ Sensor quantity
 ⑪ Lock nut
 ⑫ Air vent

Double acting single rod
 HQS2 : Standard type
 HQS2R : Switch Set
 Double acting double rod
 HQS2D : Standard type
 HQS2RD : Switch Set

3 Fluorocarbon
6 HNBR
 Note) The seal of cylinders with bores of 20 and 25 mm is only HNBR.

SD SD style (basic style)
LD LD style (end angles)
FA FA style (rod flange)
FB FB style (cap flange)
 Note) When ordering the mounting style LD or FA cylinder, it is necessary to change dimension WF of the SD style. For details, contact us.

Cylinder bore (mm) $\phi 20$ to $\phi 100$
 No cushion
 Cylinder stroke (mm)

None No air vent (standard)
V With air vent (order made: $\phi 32$ to $\phi 100$)
L With one lock nut
 Note) Available only for male thread type. Additional order is required when 2 or more lock nuts are necessary.

Sensor quantity (1 or 2)
 Sensor symbol
 Note) Select applicable sensors out of the Sensor List.

① Notes on ordering Switch Set
 ● When no sensor is required, specify 0 for the sensor symbol ⑨ and the sensor quantity ⑩.
 ● Sensors are not mounted on cylinders at delivery.

None Rc thread
G G thread
 Note) G thread is applicable only to the SD style.

None Female thread type (No entry for standard type)
T Male thread type
 Note) In case of double acting double rod type, both sides are male thread type.

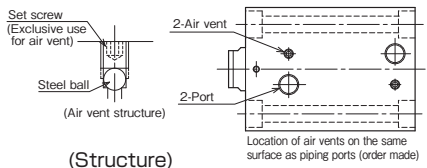
Adaptability of Fluid to Seal Material

Seal material	Adaptable fluid				
	Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	Water in oil fluid	Oil in water fluid
③ Fluorocarbon	○	×	○	○	○
⑥ HNBR	○	◎	×	◎	◎

Notes) 1. ○: Applicable ×: Inapplicable
 2. The ◎-marked items are recommended seal materials in case of giving the first priority to abrasion resistance.

Specification of air vent (order made)

The air vents are laid on the port surface and located symmetrical positions to the ports.



(Structure)
 Applicable to: Single rod, double rod SD/LD/FA/FB style
 Bore $\phi 32$ to $\phi 100$

How to order

Cutting Oil Proof Type (Bore $\phi 32$ to $\phi 100$) The item enclosed by broken line needs not to be entered, if unnecessary.

● Standard type HQSW2
 ● Switch Set HQSW2R

6 SD 40 N 50 T G - L - V
6 SD 40 N 50 T G 5 2 - L - V

① Type
 ② Seal material
 ③ Mounting style
 ④ Cylinder bore
 ⑤ Cushioning
 ⑥ Stroke
 ⑦ Thread type
 ⑧ Port type
 ⑨ Sensor symbol
 ⑩ Sensor quantity
 ⑪ Lock nut
 ⑫ Air vent

Double acting single rod
 HQSW2 : Standard type
 HQSW2R : Switch Set
 Double acting double rod
 HQSW2D : Standard type
 HQSW2RD : Switch Set

5 WR525 (rear wiring, w/5 m cord)
8 WR535 (upper wiring, w/5 m cord)
5F WR525F (rear wiring, w/5 m cord/flexible tube attached)
8F WR535F (upper wiring, w/5 m cord/flexible tube attached)
RA AX205WCE (rear wiring, w/5 m cord)
RB AZ205WCE (upper wiring, w/5 m cord)
2 WS235-1 (rear wiring, w/5 m cord)
1 WS245-1 (upper wiring, w/5 m cord)
2F WS235-1F (rear wiring, w/5 m cord/flexible tube attached)
1F WS245-1F (upper wiring, w/5 m cord/flexible tube attached)
 Note) For the details of types other than the above, refer to the general purpose type.

6 HNBR
 Cylinder bore (mm) $\phi 32$ to $\phi 100$
 Note) Bore size 20 mm and 25 mm are not available.

Note) For the details of types other than the above, refer to the general purpose type.

Cutting Oil Proof Type: Adaptability of cutting oil to seal material

Seal material	Nonaqueous cutting oil		Aqueous cutting oil
	Type 1	Type 2	
⑥ HNBR	○	×	○

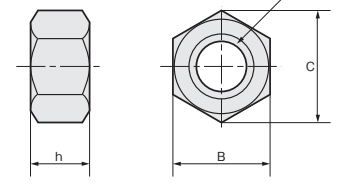
Note) ○: Applicable ×: Inapplicable

Port G thread type (only for SD style)

● Please specify the part number as following.
 (Example) HQS2 6SD63N30-G
 Port G thread type

Note) ● The port G thread has dimensions different from the standard dimensions depending on the bore. Refer to the dimensional tables.

Lock nut number for ordering



Dimensional Table

Bore	Part number	d	B	C	h
$\phi 20$	LNH-10F-H	M10×1.25	17	19.6	6
$\phi 25$	LNH-12F-H	M12×1.25	19	21.9	7
$\phi 32$	LNH-16F-H	M16×1.5	22	25.4	10
$\phi 40$	LNH-20F-H	M20×1.5	27	31.2	12
$\phi 50$	LNH-24F-H	M24×1.5	32	37.0	14
$\phi 63$	LNH-30F-H	M30×1.5	41	47.3	17
$\phi 80$	LNH-39F-H	M39×1.5	55	63.5	20
$\phi 100$	LNH-48F-H	M48×1.5	70	80.8	26

Sensor List (Bore φ20 and φ25)

Type	Sensor symbol	Load voltage range	Load current range	Max. switching capacity	Protective circuit	Indicating lamp	Wiring method	Cord length	Applicable load		
Reed sensor	UA TOH	DC: 12 · 24V	DC: 5 to 50mA	DC: 1.2W AC: 2VA	None	LED (lights in red when sensing)	0.2 mm ² , 2-core, outer dia. φ3.4 mm Rear wiring	1 m	Small relay, programmable controller		
	UB TOH3	AC: 100V	AC: 7 to 20mA					3 m			
	UC T5H	DC: 5 · 12 · 24V	DC: 50 mA or less			DC: 5 to 50mA AC: 20 mA or less	None	LED (lights in red when sensing)		0.2 mm ² , 2-core, outer dia. φ3.4 mm Upper wiring	1 m
	UD T5H3	AC: 100V	AC: 20 mA or less								3 m
	UE TOV	DC: 12 · 24V	DC: 5 to 50mA			DC: 5 to 50mA AC: 7 to 20mA	None	LED (lights in red when sensing)		0.2 mm ² , 2-core, outer dia. φ3.4 mm Upper wiring	1 m
	UF TOV3	AC: 100V	AC: 7 to 20mA								3 m
	UG T5V	DC: 5 · 12 · 24V	DC: 50 mA or less			DC: 50 mA or less AC: 20 mA or less	None	LED (lights in red when sensing)		0.2 mm ² , 2-core, outer dia. φ3.4 mm Upper wiring	1 m
	UH T5V3	AC: 100V	AC: 20 mA or less								3 m
Solid state sensor	UJ T2H	DC: 10 to 30V	5 to 20 mA	—	—	LED (lights in red when sensing)	0.2 mm ² , 2-core, outer dia. φ3.4 mm Rear wiring	1 m	Small relay, programmable controller		
	UK T2H3							3 m			
	UL T2YH							1 m			
	UM T2YH3							3 m			
	UN T3H	DC: 30 V or less	100 mA or less	Power supply voltage 10 to 30 V DC	Provided	LED (lights in red when sensing)	0.2 mm ² , 3-core, outer dia. φ3.4 mm Rear wiring	1 m			
	UP T3H3							3 m			
	UQ T2V	DC: 10 to 30V	5 to 20 mA	—	—	LED (lights in red when sensing)	0.2 mm ² , 2-core, outer dia. φ3.4 mm Upper wiring	1 m			
	UR T2V3							3 m			
	US T2YV							1 m			
	UT T2YV3							3 m			
	UU T3V	DC: 30 V or less	100 mA or less	Power supply voltage 10 to 30 V DC	Provided	LED (lights in red when sensing)	0.2 mm ² , 3-core, outer dia. φ3.4 mm Upper wiring	1 m			
	UV T3V3							3 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.).
 ● For the details of sensors, be sure to read 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.

Sensor Mountable Minimum Stroke

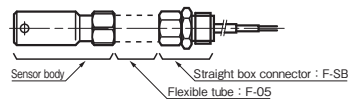
Bore	With one sensor				With two sensors			
	AX/AZ type	T type	WR type	WS type	AX/AZ type	T type	WR type	WS type
φ20								
φ25	-	5	-	-	-	10	-	-
φ32								
φ40								
φ50	5	-	5	10	10*	-	10	20
φ63								
φ80								
φ100								15

Notes ● When using two sensors of the WR or WS type, they cannot be mounted on the same surface.
 ● When two reed sensors are used on one surface at a stroke of 10 mm, adjust their positions because the sensors may interfere with each other.
 * If you want to mount AX or AZ type solid state sensors to a 10 mm stroke cylinder, use two sensor mounting grooves.

Notes on ordering WR or WS type sensors

● When ordering the cutting oil proof type sensors, WR and WS types, please be carefully following the following notification.

5	WR525	The sensor and straight box connector (F-SB) are combined (the flexible tube (F-0.5: 4.8 m) is required).
8	WR535	
2	WS235-1	
1	WS245-1	The flexible tube (F-0.5: 4.8 m) is attached to the sensor and straight box connector (F-SB).
5F	WR525F	
8F	WR535F	
2F	WS235-1F	
1F	WS245-1F	



Sensor List (Bore φ32 to φ100)

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 30V	DC:5 to 40mA	DC:1.5W AC:2VA	None	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Rear wiring	1.5m	Small relay, programmable controller			
	AG AX105CE							5m				
	AH AX111CE							1.5m				
	AJ AX115CE							5m				
	AE AX125CE	DC: 30 V or less AC: 120 V or less	DC: 40 mA or less AD: 20 mA or less	2VA	Provided	LED (lights in red when sensing)	4-pin connector type Rear wiring	0.5m				
	AK AX11ACE	AC:5 to 120V	5 to 20mA					0.5m				
	AL AX11BCE	DC:5 to 30V	5 to 40mA	1.5W	None	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Rear wiring	0.5m				
	5 WR525	DC:5 to 50V	DC:3 to 40mA	DC:1.5W AC:2VA				5m				
	5F WR525F	AC:5 to 120V	AC:3 to 20mA	DC:1.5W AC:2VA	None	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Upper wiring	5m				
	AP AZ101CE	1.5m										
	AR AZ105CE	5m										
	AS AZ111CE	1.5m										
	AT AZ115CE	5m										
	AN AZ125CE	DC: 30 V or less AC: 120 V or less	DC: 40 mA or less AD: 20 mA or less	2VA	Provided	LED (lights in red when sensing)	4-pin connector type Upper wiring	0.5m				
	AU AZ11ACE	AC:5 to 120V	5 to 20mA					0.5m				
	AW AZ11BCE	DC:5 to 30V	5 to 40mA	1.5W	Provided	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Rear wiring	5m				
AM AX135CE	AC/DC:90 to 240V	5 to 300mA	B contact output	5m								
AY AZ135CE	DC:5 to 50V	DC:3 to 40mA	DC:1.5W AC:2VA	None	LED (lights in red when sensing)	0.2 mm ² , 2-core, outer dia. φ4 mm Upper wiring	5m					
8 WR535							5m					
8F WR535F	AC:5 to 120V	AC:3 to 20mA	DC:1.5W AC:2VA	None	LED (lights in red when sensing)	0.2 mm ² , 2-core, outer dia. φ4 mm Upper wiring	5m					
Solid state sensor	BE AX201CE-1	DC:5 to 30V					5 to 40mA	—	Provided	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Rear wiring	1.5m
	BF AX205CE-1											5m
	CE AX211CE-1											1.5m
	CF AX215CE-1											5m
2 WS235-1	DC:10 to 30V	5 to 20mA					—	Provided	LED (two-LED type in red/green)	0.3 mm ² , 2-core, outer dia. φ4 mm Upper wiring	5m	
2F WS235-1F											5m	
BM AZ201CE-1	DC:5 to 30V	5 to 40mA					—	Provided	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Upper wiring	1.5m	
BN AZ205CE-1											5m	
CM AZ211CE-1											1.5m	
CN AZ215CE-1											5m	
Cutting oil proof type	RA AX205WCE	DC:5 to 30V					5 to 40mA	—	Provided	LED (lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm Rear wiring	5m
	RB AZ205WCE	5m										
Solid state sensor	1 WS245-1	DC:10 to 30V	5 to 20mA	—	Provided	LED (two-LED type in red/green)	0.3 mm ² , 2-core, outer dia. φ4 mm Upper wiring	5m				
	1F WS245-1F							5m				
	CT AX211CE-1	DC:5 to 30V	5 to 40mA	—	Provided	LED (two-LED type in red/green)	0.3 mm ² , 2-core, outer dia. φ4 mm Rear wiring	1.5m				
	CU AX215CE-1							5m				
	CV AX21BCE-1							0.5m				
	CW AZ211CE-1							1.5m				
	CX AZ215CE-1							5m				
	CY AZ21BCE-1							0.5m				

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 AX and AZ135CE is B contact. When the piston is detected, the sensor contact turns off (the lamp turns on).
 ● For the details of sensors, be sure to read the sensor specifications at the end of this catalog.
 ● WR and WS type sensors are cutting oil proof.
 ● We recommend AND Unit (AU series) for multiple sensors connected in series.
 For details, refer to AND Unit at the end of this catalog.

Standard type

AX type (rear wiring)

AZ type (upper wiring)



Cutting oil proof type

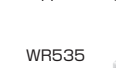
WR/WS type sensors

● Rear wiring

● Upper wiring



WR525
WS235-1



WR535
WS245-1



Standard Stroke Range

Table showing Standard Stroke Range for various cylinder types (Double acting single rod, Double acting double rod) across different series (Standard type, Switch Set) and bore sizes (φ20 to φ100).

○ : Standard range □ : Semi-standard range (The leadtime varies depending on the bore and stroke. For details, contact us.) ● For the minimum stroke of the Switch Set, refer to the sensor mountable minimum stroke table. Note 1) 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.

Weight Table/General purpose and cutting oil proof types

Unit: kg

Weight Table/General purpose and cutting oil proof types. Table providing weight details for various cylinder types and bore sizes, including mounting accessory weights and separate flange joint weights.

Sensor Additional Weight Table

Unit: kg

Sensor Additional Weight Table. Table detailing additional weights for different sensor types (AX/AZ, T0/T2/T3/T5, T2Y) and cord lengths.

Piston Pressurized Area Table

Unit: mm²

Piston Pressurized Area Table. Table showing piston pressurized area for various bore and rod diameters in double acting single and double rod configurations.

Calculation formula F=A·P·β(N), F: Cylinder force (N), A: Piston pressurized area (mm²), P: Working pressure (MPa), β: Load rate. Calculation example: Double acting single rod, bore φ40, Working pressure: 10 MPa, load rate: 0.8, Cylinder force on extension side (N) = 1257×10×0.8=10056 (N), Cylinder force on retraction side (N) = 876×10×0.8=7008 (N).

Space-saving Hydraulic Cylinders

Space-saving Hydraulic Cylinders

HQS2

HQS2

HQS2/THQS2 [Bore] CAD/DATA is available.

SD

Standard type

General purpose type HQS2 [6] SD [Bore] N [Stroke] \square T (ϕ 20 to ϕ 100)

Cutting oil proof type HQSW2 6 SD [Bore] N [Stroke] \square T (ϕ 32 to ϕ 100)

None : Female thread type
 \square : Male thread type

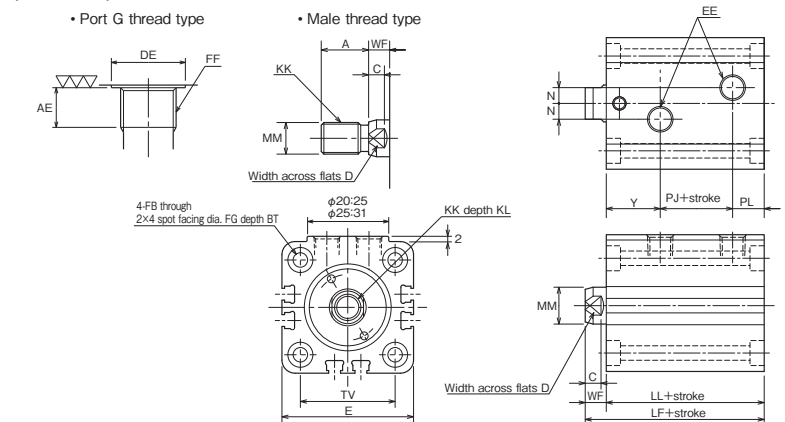
Switch Set

General purpose type HQS2R [6] SD [Bore] N [Stroke] \square T [Sensor symbol] [Sensor quantity] (ϕ 20 to ϕ 100)

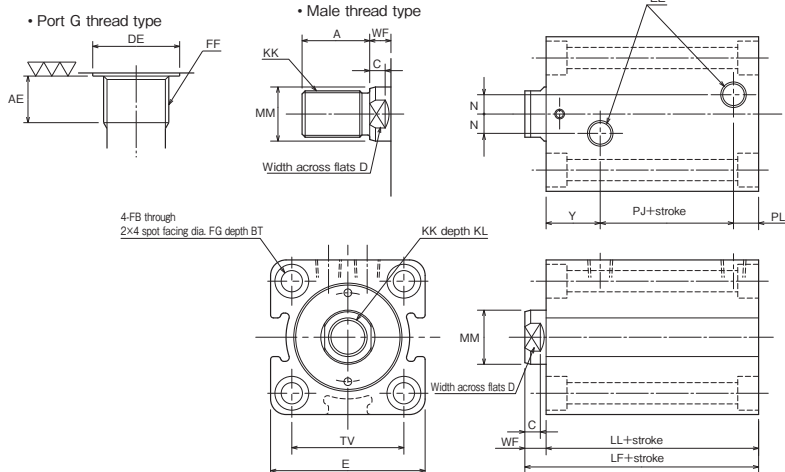
Cutting oil proof type HQSW2R 6 SD [Bore] N [Stroke] \square T [Sensor symbol] [Sensor quantity] (ϕ 32 to ϕ 100)

\square : Female thread type
 \square T : Male thread type

• Bore ϕ 20 and ϕ 25



• Bore ϕ 32 to ϕ 100



- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- The 100 mm bore cylinder has three sensor mounting grooves.

Dimensional Table

Symbol Bore	A	AE	BT	C	D	DE	E	EE	FB	FF	FG	KK		KL
												Female thread type	Male thread type	
ϕ 20	15(25)	8	5.4	6	10	ϕ 17.2	\square 44	Rc1/8	ϕ 5.5	G1/8	ϕ 9.5	M8×1.25	M10×1.25	10
ϕ 25	18(30)	8	5.4	6	12	ϕ 17.2	\square 50	Rc1/8	ϕ 5.5	G1/8	ϕ 9.5	M10×1.5	M12×1.25	12
ϕ 32	25(40)	8	6.5	7	14	ϕ 17.2	\square 62	Rc1/4	ϕ 6.6	G1/8	ϕ 11	M12×1.75	M16×1.5	15
ϕ 40	30(45)	8	8.6	7	19	ϕ 17.2	\square 70	Rc1/4	ϕ 9	G1/8	ϕ 14	M16×2	M20×1.5	20
ϕ 50	35(50)	12	10.8	8	24	ϕ 21.5	\square 80	Rc1/4	ϕ 11	G1/4	ϕ 17.5	M20×2.5	M24×1.5	24
ϕ 63	45(60)	12	13	9	30	ϕ 21.5	\square 94	Rc1/4	ϕ 14	G1/4	ϕ 20	M27×3	M30×1.5	33
ϕ 80	60(80)	12	15.2	14	41	ϕ 21.5	\square 114	Rc3/8	ϕ 16	G1/4	ϕ 23	M30×3.5	M39×1.5	36
ϕ 100	75(95)	12	17.5	22	50	ϕ 25.5	\square 138	Rc3/8	ϕ 18	G3/8	ϕ 26	M39×4	M48×1.5	45

Symbol Bore	LF	LL	MM	N		PJ		PL		TV	WF	Y	
				Rc thread	G thread	Rc thread	G thread	Rc thread	G thread			Rc thread	G thread
ϕ 20	51	43	ϕ 12	3	3	14.5	14.5	10	10	\square 30	8	18.5	18.5
ϕ 25	53	45	ϕ 14	6	6	12.5	12.5	12	12	\square 36	8	20.5	20.5
ϕ 32	64	54	ϕ 18	10	10	14	14	12	12	\square 47	10	28	28
ϕ 40	65	55	ϕ 22	10	10	16	16	12	12	\square 52	10	27	27
ϕ 50	71	60	ϕ 28	10	14	19	13.5	13	18.5	\square 58	11	28	28
ϕ 63	80	67	ϕ 36	10	16	24	20	13	17	\square 69	13	30	30
ϕ 80	95	78	ϕ 45	15	19	25	24	18	18	\square 86	17	35	36
ϕ 100	122	96	ϕ 56	15	18	26	26	28	28	\square 106	26	42	42

- Notes)
- When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 - The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 - 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 - 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 - The tolerance of MM is f8.

HQS2/THQS2 Bore CAD/DATA is available.

LD

Standard type

General purpose type HQS2 6 LD Bore N Stroke T ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2 6 LD Bore N Stroke T ($\phi 32$ to $\phi 100$)

None : Female thread type
 : Male thread type

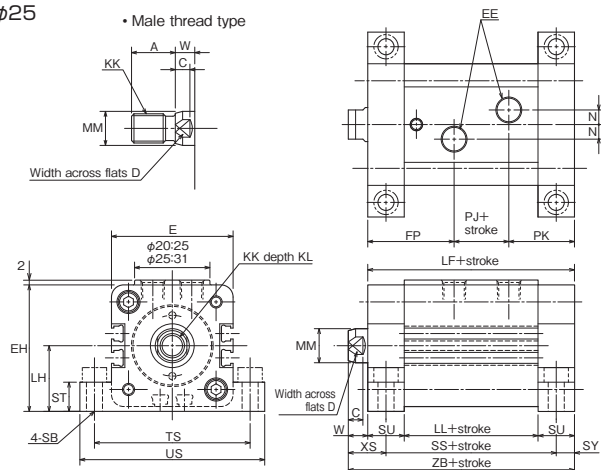
Switch Set

General purpose type HQS2R 6 LD Bore N Stroke T Sensor symbol Sensor quantity ($\phi 20$ to $\phi 100$)

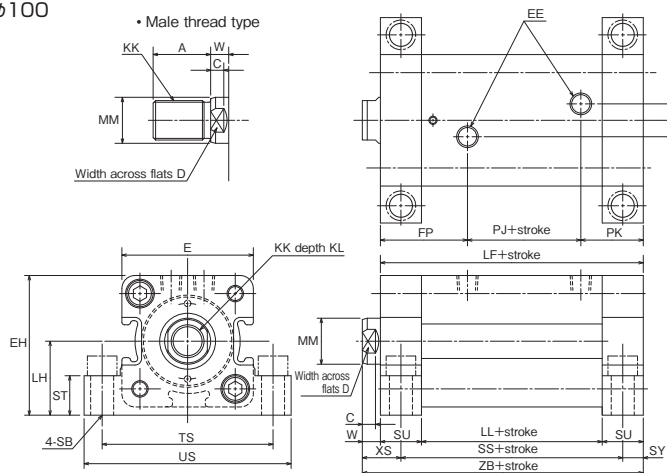
Cutting oil proof type HQSW2R 6 LD Bore N Stroke T Sensor symbol Sensor quantity ($\phi 32$ to $\phi 100$)

: Female thread type
 : Male thread type

• Bore $\phi 20$ and $\phi 25$



• Bore $\phi 32$ to $\phi 100$



- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- * When installing the cylinder on the grounding surface, be sure to use hex. socket head cap screws.
- The 100 mm bore cylinder has three sensor mounting grooves.

Dimensional Table

Symbol Bore	A	C	D	E	EE	EH	FP	KK		KL	LF	LH
								Female thread type	Male thread type			
$\phi 20$	15(25)	6	10	$\square 44$	Rc1/8	46	33.5	M8 \times 1.25	M10 \times 1.25	10	73	24 \pm 0.15
$\phi 25$	18(30)	6	12	$\square 50$	Rc1/8	52	35.5	M10 \times 1.5	M12 \times 1.25	12	75	27 \pm 0.15
$\phi 32$	25(40)	7	14	$\square 62$	Rc1/4	66	48	M12 \times 1.75	M16 \times 1.5	15	94	35 \pm 0.15
$\phi 40$	30(45)	7	19	$\square 70$	Rc1/4	72.5	47	M16 \times 2	M20 \times 1.5	20	95	37.5 \pm 0.15
$\phi 50$	35(50)	8	24	$\square 80$	Rc1/4	85	53	M20 \times 2.5	M24 \times 1.5	24	110	45 \pm 0.15
$\phi 63$	45(60)	9	30	$\square 94$	Rc1/4	97	55	M27 \times 3	M30 \times 1.5	33	117	50 \pm 0.15
$\phi 80$	60(80)	14	41	$\square 114$	Rc3/8	117	65	M30 \times 3.5	M39 \times 1.5	36	138	60 \pm 0.25
$\phi 100$	75(95)	22	50	$\square 138$	Rc3/8	140	77	M39 \times 4	M48 \times 1.5	45	166	71 \pm 0.25

Symbol Bore	LL	MM	N	PJ	PK	SB	SS	ST	SU	SY	TS	US	W	XS	ZB
$\phi 20$	43	$\phi 12$	3	14.5	25	6.6	58	12	15	7.5	58	70	8	15.5	81
$\phi 25$	45	$\phi 14$	6	12.5	27	6.6	60	12	15	7.5	64	76	8	15.5	83
$\phi 32$	54	$\phi 18$	10	14	32	9	74	16	20	10	79	94	10	20	104
$\phi 40$	55	$\phi 22$	10	16	32	11	75	20	20	10	90	108	10	20	105
$\phi 50$	60	$\phi 28$	10	19	38	14	85	24	25	12.5	104	126	11	23.5	121
$\phi 63$	67	$\phi 36$	10	24	38	16	92	30	25	12.5	121	146	13	25.5	130
$\phi 80$	78	$\phi 45$	15	25	48	18	108	35	30	15	144	172	17	32	155
$\phi 100$	96	$\phi 56$	15	26	63	22	131	43	35	17.5	174	208	26	43.5	192

- Notes:
- When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 - The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 - 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 - 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 - The tolerance of MM is f8.

HQS2/THQS2 [Bore] CAD/DATA is available.

FA

Standard type

General purpose type HQS2 [6] FA [Bore] N [Stroke] T ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2 6 FA [Bore] N [Stroke] T ($\phi 32$ to $\phi 100$)

None : Female thread type
T : Male thread type

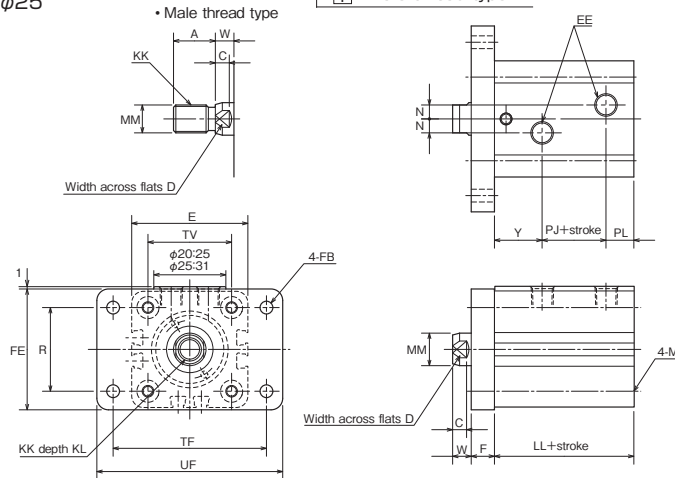
Switch Set

General purpose type HQS2R [6] FA [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 20$ to $\phi 100$)

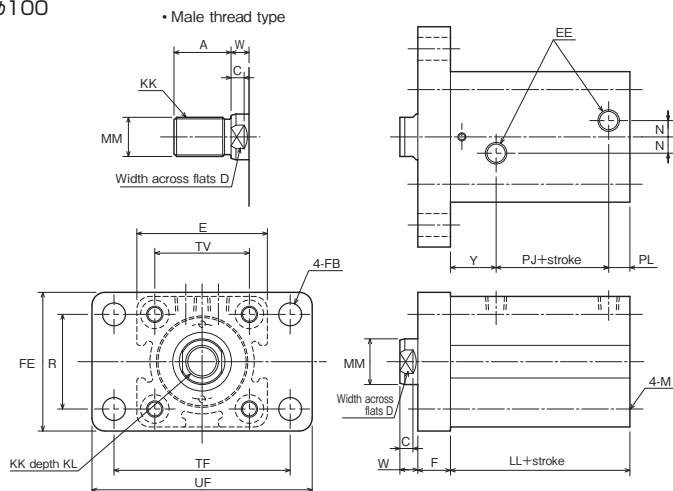
Cutting oil proof type HQSW2R 6 FA [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 32$ to $\phi 100$)

: Female thread type
 : Male thread type

- Bore $\phi 20$ and $\phi 25$



- Bore $\phi 32$ to $\phi 100$



- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- The 100 mm bore cylinder has three sensor mounting grooves.

Dimensional Table

Symbol Bore	A	C	D	E	EE	F	FB	FE	KK		KL	LL
									Female thread type	Male thread type		
$\phi 20$	15(25)	6	10	44	Rc1/8	10	$\phi 5.5$	46	M8×1.25	M10×1.25	10	43
$\phi 25$	18(30)	6	12	50	Rc1/8	10	$\phi 5.5$	52	M10×1.5	M12×1.25	12	45
$\phi 32$	25(40)	7	14	62	Rc1/4	15	$\phi 6.6$	62	M12×1.75	M16×1.5	15	54
$\phi 40$	30(45)	7	19	70	Rc1/4	20	$\phi 11$	70	M16×2	M20×1.5	20	55
$\phi 50$	35(50)	8	24	80	Rc1/4	20	$\phi 14$	85	M20×2.5	M24×1.5	24	60
$\phi 63$	45(60)	9	30	94	Rc1/4	20	$\phi 14$	98	M27×3	M30×1.5	33	67
$\phi 80$	60(80)	14	41	114	Rc3/8	25	$\phi 18$	118	M30×3.5	M39×1.5	36	78
$\phi 100$	75(95)	22	50	138	Rc3/8	30	$\phi 22$	150	M39×4	M48×1.5	45	96

Symbol Bore	M	MM	N	PJ	PL	R	TF	TV	UF	W	Y
$\phi 20$	M5×0.8	$\phi 12$	3	14.5	10	30	60	30	75	8	18.5
$\phi 25$	M5×0.8	$\phi 14$	6	12.5	12	36	66	36	80	8	20.5
$\phi 32$	M6×1	$\phi 18$	10	14	12	40	80	47	95	10	28
$\phi 40$	M8×1.25	$\phi 22$	10	16	12	46	96	52	118	10	27
$\phi 50$	M10×1.5	$\phi 28$	10	19	13	58	108	58	135	11	28
$\phi 63$	M12×1.75	$\phi 36$	10	24	13	65	124	69	150	13	30
$\phi 80$	M14×2	$\phi 45$	15	25	18	87	154	86	185	17	35
$\phi 100$	M16×2	$\phi 56$	15	26	28	109	190	106	230	26	42

- Notes) ● When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 ● The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 ● 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 ● 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 ● The tolerance of MM is f8.

Space-saving Hydraulic Cylinders

Space-saving Hydraulic Cylinders

HQS2

HQS2

HQS2/THQS2 [Bore] CAD/DATA is available.

FB

Standard type

General purpose type HQS2 6 FB Bore N Stroke T ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2 6 FB Bore N Stroke T ($\phi 32$ to $\phi 100$)

None : Female thread type
T : Male thread type

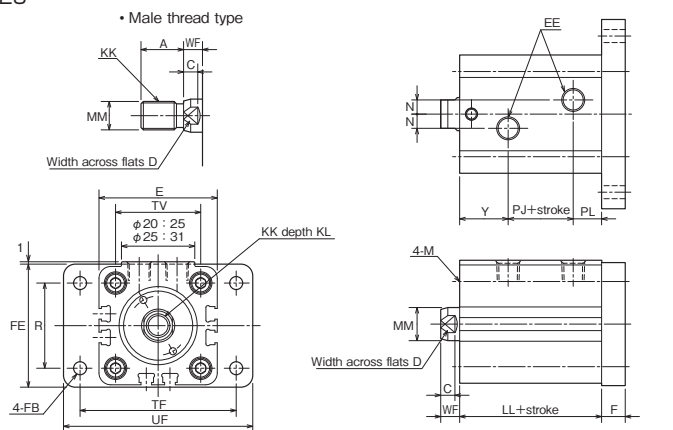
Switch Set

General purpose type HQS2R 6 FB Bore N Stroke T Sensor symbol Sensor quantity ($\phi 20$ to $\phi 100$)

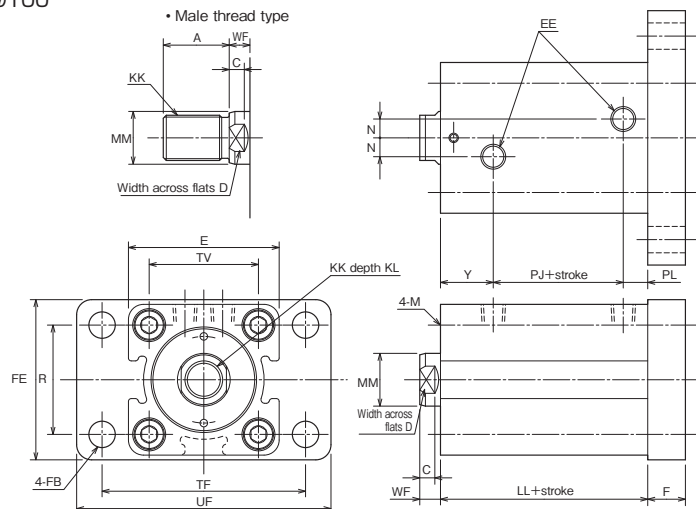
Cutting oil proof type HQSW2R 6 FB Bore N Stroke T Sensor symbol Sensor quantity ($\phi 32$ to $\phi 100$)

None : Female thread type
T : Male thread type

- Bore $\phi 20$ and $\phi 25$



- Bore $\phi 32$ to $\phi 100$



- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- The 100 mm bore cylinder has three sensor mounting grooves.

Dimensional Table

Symbol Bore	A	C	D	E	EE	F	FB	FE	KK		KL	LL
									Female thread type	Male thread type		
$\phi 20$	15(25)	6	10	$\square 44$	Rc1/8	10	$\phi 5.5$	46	M8 \times 1.25	M10 \times 1.25	10	43
$\phi 25$	18(30)	6	12	$\square 50$	Rc1/8	10	$\phi 5.5$	52	M10 \times 1.5	M12 \times 1.25	12	45
$\phi 32$	25(40)	7	14	$\square 62$	Rc1/4	15	$\phi 6.6$	62	M12 \times 1.75	M16 \times 1.5	15	54
$\phi 40$	30(45)	7	19	$\square 70$	Rc1/4	20	$\phi 11$	70	M16 \times 2	M20 \times 1.5	20	55
$\phi 50$	35(50)	8	24	$\square 80$	Rc1/4	20	$\phi 14$	85	M20 \times 2.5	M24 \times 1.5	24	60
$\phi 63$	45(60)	9	30	$\square 94$	Rc1/4	20	$\phi 14$	98	M27 \times 3	M30 \times 1.5	33	67
$\phi 80$	60(80)	14	41	$\square 114$	Rc3/8	25	$\phi 18$	118	M30 \times 3.5	M39 \times 1.5	36	78
$\phi 100$	75(95)	22	50	$\square 138$	Rc3/8	30	$\phi 22$	150	M39 \times 4	M48 \times 1.5	45	96

Symbol Bore	M	MM	N	PJ	PL	R	TF	TV	UF	WF	Y
$\phi 20$	M5 \times 0.8	$\phi 12$	3	14.5	10	30	60	$\square 30$	75	8	18.5
$\phi 25$	M5 \times 0.8	$\phi 14$	6	12.5	12	36	66	$\square 36$	80	8	20.5
$\phi 32$	M6 \times 1	$\phi 18$	10	14	12	40	80	$\square 47$	95	10	28
$\phi 40$	M8 \times 1.25	$\phi 22$	10	16	12	46	96	$\square 52$	118	10	27
$\phi 50$	M10 \times 1.5	$\phi 28$	10	19	13	58	108	$\square 58$	135	11	28
$\phi 63$	M12 \times 1.75	$\phi 36$	10	24	13	65	124	$\square 69$	150	13	30
$\phi 80$	M14 \times 2	$\phi 45$	15	25	18	87	154	$\square 86$	185	17	35
$\phi 100$	M16 \times 2	$\phi 56$	15	26	28	109	190	$\square 106$	230	26	42

- Notes) • When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 • The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 • 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 • 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 • The tolerance of MM is f8.

HQS2/THQS2 [Bore] CAD/DATA is available.

SD

Standard type

General purpose type HQS2D [6] SD [Bore] N [Stroke] T ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2D 6 SD [Bore] N [Stroke] T ($\phi 32$ to $\phi 100$)

None : Female thread type
T : Male thread type

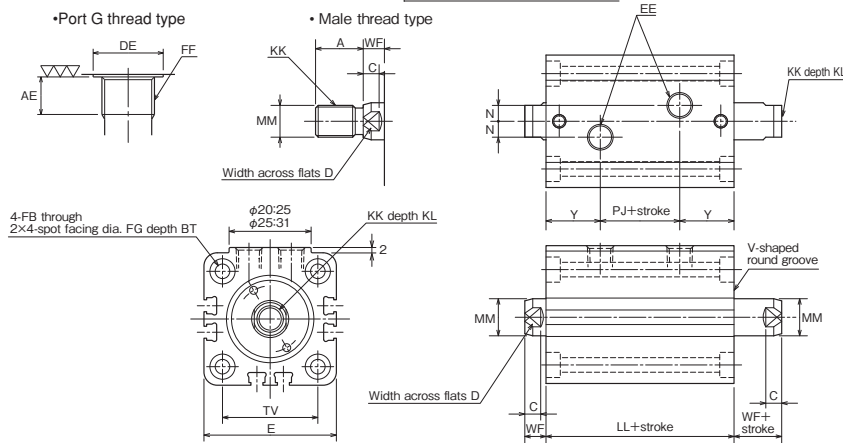
Switch Set

General purpose type HQS2RD [6] SD [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 20$ to $\phi 100$)

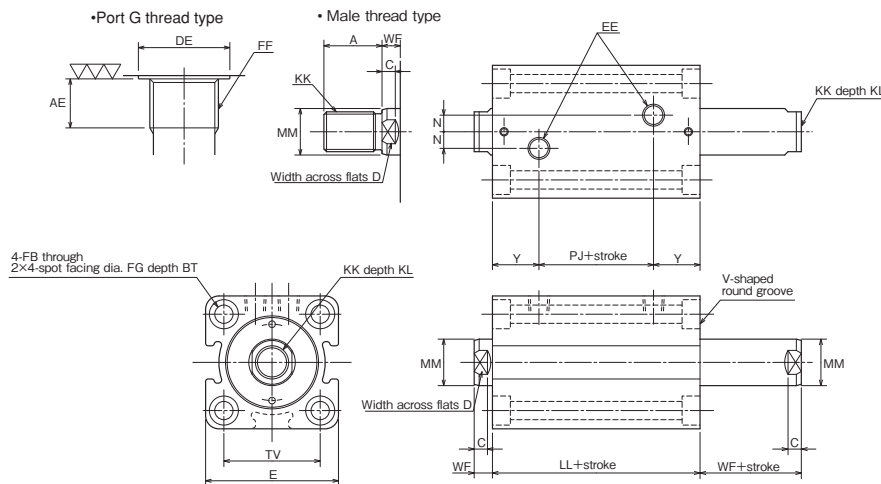
Cutting oil proof type HQSW2RD 6 SD [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 32$ to $\phi 100$)

[] : Female thread type
T : Male thread type

• Bore $\phi 20$ and $\phi 25$



• Bore $\phi 32$ to $\phi 100$



- The surface without V-shaped round grooves on the end face is the mounting surface.
- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- The 100 mm bore cylinder has three sensor mounting grooves.

Dimensional Table

Symbol Bore	A	AE	BT	C	D	DE	E	EE	FB	FF	FG	KK		KL
												Female thread type	Male thread type	
$\phi 20$	15(25)	8	5.4	6	10	$\phi 17.2$	$\square 44$	Rc1/8	$\phi 5.5$	G1/8	$\phi 9.5$	M8×1.25	M10×1.25	10
$\phi 25$	18(30)	8	5.4	6	12	$\phi 17.2$	$\square 50$	Rc1/8	$\phi 5.5$	G1/8	$\phi 9.5$	M10×1.5	M12×1.25	12
$\phi 32$	25(40)	8	6.5	7	14	$\phi 17.2$	$\square 62$	Rc1/4	$\phi 6.6$	G1/8	$\phi 11$	M12×1.75	M16×1.5	15
$\phi 40$	30(45)	8	8.6	7	19	$\phi 17.2$	$\square 70$	Rc1/4	$\phi 9$	G1/8	$\phi 14$	M16×2	M20×1.5	20
$\phi 50$	35(50)	12	10.8	8	24	$\phi 21.5$	$\square 80$	Rc1/4	$\phi 11$	G1/4	$\phi 17.5$	M20×2.5	M24×1.5	24
$\phi 63$	45(60)	12	13	9	30	$\phi 21.5$	$\square 94$	Rc1/4	$\phi 14$	G1/4	$\phi 20$	M27×3	M30×1.5	33
$\phi 80$	60(80)	12	15.2	14	41	$\phi 21.5$	$\square 114$	Rc3/8	$\phi 16$	G1/4	$\phi 23$	M30×3.5	M39×1.5	36
$\phi 100$	75(95)	12	17.5	22	50	$\phi 25.5$	$\square 138$	Rc3/8	$\phi 18$	G3/8	$\phi 26$	M39×4	M48×1.5	45

Symbol Bore	LL	MM	N		P/J		TV	WF	Y	
			Rc thread	G thread	Rc thread	G thread			Rc thread	G thread
$\phi 20$	54	$\phi 12$	3	3	17	17	$\square 30$	8	18.5	18.5
$\phi 25$	56	$\phi 14$	6	6	15	15	$\square 36$	8	20.5	20.5
$\phi 32$	72	$\phi 18$	10	10	16	16	$\square 47$	10	28	28
$\phi 40$	72	$\phi 22$	10	10	18	18	$\square 52$	10	27	27
$\phi 50$	75	$\phi 28$	10	14	19	19	$\square 58$	11	28	28
$\phi 63$	82	$\phi 36$	10	16	22	22	$\square 69$	13	30	30
$\phi 80$	95	$\phi 45$	15	19	25	23	$\square 86$	17	35	36
$\phi 100$	108	$\phi 56$	15	18	24	24	$\square 106$	26	42	42

- Notes
- When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 - The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 - 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 - 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 - The tolerance of MM is f8.

HQS2/THQS2 [Bore] CAD/DATA is available.

LD

Standard type

General purpose type HQS2D [6] LD [Bore] N [Stroke] T ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2D [6] LD [Bore] N [Stroke] T ($\phi 32$ to $\phi 100$)

None : Female thread type
T : Male thread type

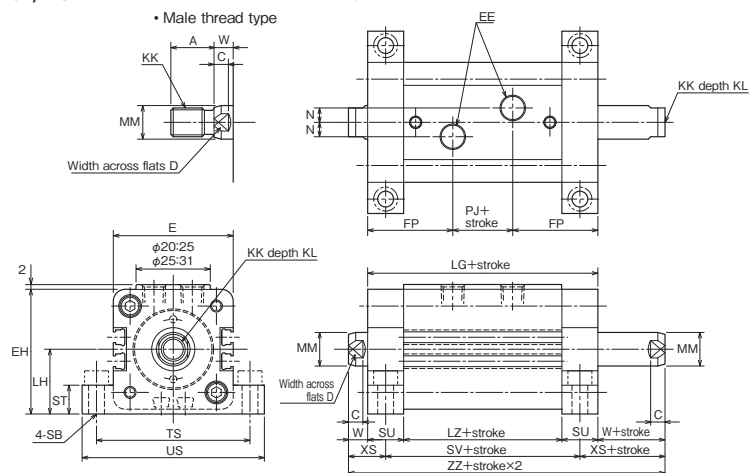
Switch Set

General purpose type HQS2RD [6] LD [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 20$ to $\phi 100$)

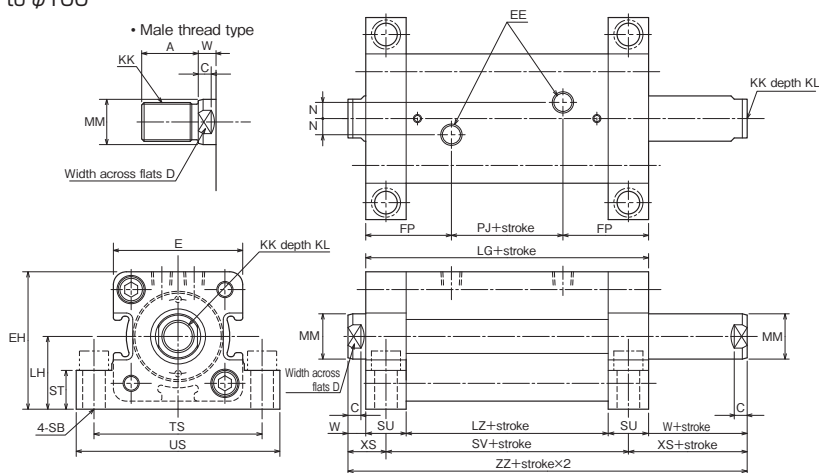
Cutting oil proof type HQSW2RD [6] LD [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 32$ to $\phi 100$)

: Female thread type
 : Male thread type

- Bore $\phi 20$ and $\phi 25$



- Bore $\phi 32$ to $\phi 100$



- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- *When installing the cylinder on the grounding surface, be sure to use hex. socket head cap screws.
- The 100 mm bore cylinder has three sensor mounting grooves.

Space-saving Hydraulic Cylinders

HQS2

Space-saving Hydraulic Cylinders

HQS2

Dimensional Table

Symbol Bore	A	C	D	E	EE	EH	FP	KK		KL	LG	LH
								Female thread type	Male thread type			
$\phi 20$	15(25)	6	10		Rc1/8	46	33.5	M8×1.25	M10×1.25	10	84	24±0.15
$\phi 25$	18(30)	6	12		Rc1/8	52	35.5	M10×1.5	M12×1.25	12	86	27±0.15
$\phi 32$	25(40)	7	14		Rc1/4	66	48	M12×1.75	M16×1.5	15	112	35±0.15
$\phi 40$	30(45)	7	19		Rc1/4	72.5	47	M16×2	M20×1.5	20	112	37.5±0.15
$\phi 50$	35(50)	8	24		Rc1/4	85	53	M20×2.5	M24×1.5	24	125	45±0.15
$\phi 63$	45(60)	9	30		Rc1/4	97	55	M27×3	M30×1.5	33	132	50±0.15
$\phi 80$	60(80)	14	41		Rc3/8	117	65	M30×3.5	M39×1.5	36	155	60±0.25
$\phi 100$	75(95)	22	50		Rc3/8	140	77	M39×4	M48×1.5	45	178	71±0.25

Symbol Bore	LZ	MM	N	PJ	SB	ST	SU	SV	TS	US	W	XS	ZZ
$\phi 20$	54	$\phi 12$	3	17	6.6	12	15	69	58	70	8	15.5	100
$\phi 25$	56	$\phi 14$	6	15	6.6	12	15	71	64	76	8	15.5	102
$\phi 32$	72	$\phi 18$	10	16	9	16	20	92	79	94	10	20	132
$\phi 40$	72	$\phi 22$	10	18	11	20	20	92	90	108	10	20	132
$\phi 50$	75	$\phi 28$	10	19	14	24	25	100	104	126	11	23.5	147
$\phi 63$	82	$\phi 36$	10	22	16	30	25	107	121	146	13	25.5	158
$\phi 80$	95	$\phi 45$	15	25	18	35	30	125	144	172	17	32	189
$\phi 100$	108	$\phi 56$	15	24	22	43	35	143	174	208	26	43.5	230

- Notes)
- When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 - The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 - 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 - 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 - The tolerance of MM is f8.

HQS2/THQS2 [Bore] CAD/DATA is available.

FA

Standard type

General purpose type HQS2D [6] FA [Bore] N [Stroke] T ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2D [6] FA [Bore] N [Stroke] T ($\phi 32$ to $\phi 100$)

Switch Set

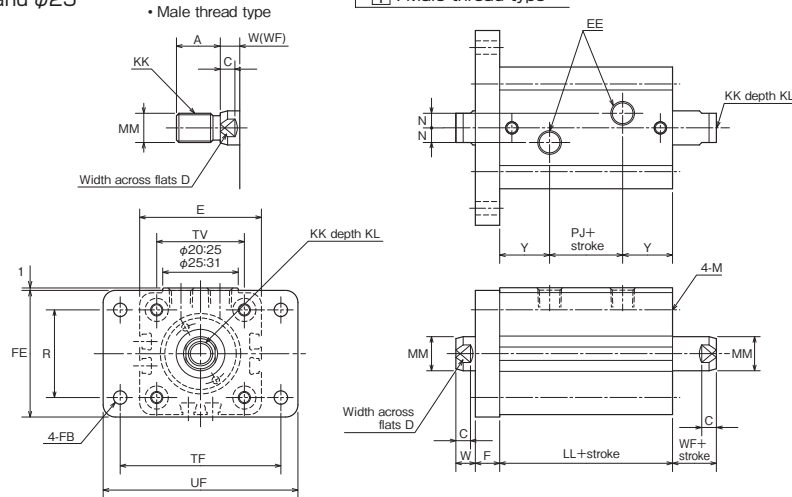
General purpose type HQS2RD [6] FA [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 20$ to $\phi 100$)

Cutting oil proof type HQSW2RD [6] FA [Bore] N [Stroke] T [Sensor symbol] [Sensor quantity] ($\phi 32$ to $\phi 100$)

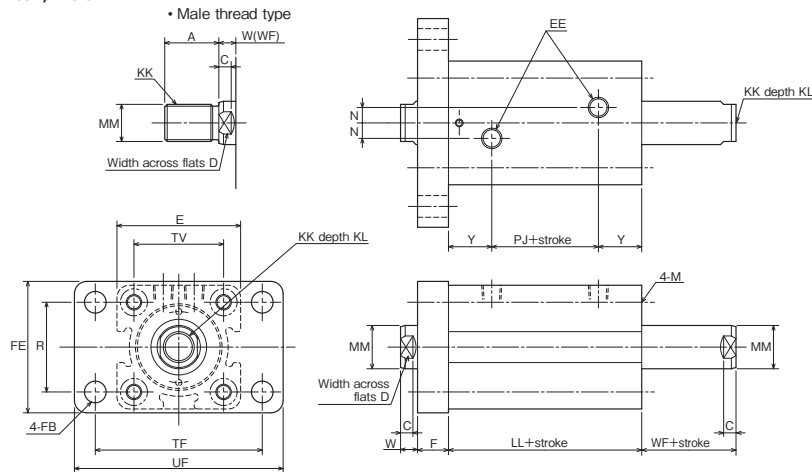
None : Female thread type
T : Male thread type

: Female thread type
 : Male thread type

• Bore $\phi 20$ and $\phi 25$



• Bore $\phi 32$ to $\phi 100$



- For the mounting of sensors, refer to the "dimensional drawings of Switch Set". All the contents other than sensor mounting dimensions are the same.
- The 100 mm bore cylinder has three sensor mounting grooves.

Dimensional Table

Symbol Bore	A	C	D	E	EE	F	FB	FE	KK		KL	LL
									Female thread type	Male thread type		
$\phi 20$	15(25)	6	10	44	Rc1/8	10	$\phi 5.5$	46	M8×1.25	M10×1.25	10	54
$\phi 25$	18(30)	6	12	50	Rc1/8	10	$\phi 5.5$	52	M10×1.5	M12×1.25	12	56
$\phi 32$	25(40)	7	14	62	Rc1/4	15	$\phi 6.6$	62	M12×1.75	M16×1.5	15	72
$\phi 40$	30(45)	7	19	70	Rc1/4	20	$\phi 11$	70	M16×2	M20×1.5	20	72
$\phi 50$	35(50)	8	24	80	Rc1/4	20	$\phi 14$	85	M20×2.5	M24×1.5	24	75
$\phi 63$	45(60)	9	30	94	Rc1/4	20	$\phi 14$	98	M27×3	M30×1.5	33	82
$\phi 80$	60(80)	14	41	114	Rc3/8	25	$\phi 18$	118	M30×3.5	M39×1.5	36	95
$\phi 100$	75(95)	22	50	138	Rc3/8	30	$\phi 22$	150	M39×4	M48×1.5	45	108

Symbol Bore	M	MM	N	PJ	R	TF	TV	UF	W	WF	Y
$\phi 20$	M5×0.8	$\phi 12$	3	17	30	60	30	75	8	8	18.5
$\phi 25$	M5×0.8	$\phi 14$	6	15	36	66	36	80	8	8	20.5
$\phi 32$	M6×1	$\phi 18$	10	16	40	80	47	95	10	10	28
$\phi 40$	M8×1.25	$\phi 22$	10	18	46	96	52	118	10	10	27
$\phi 50$	M10×1.5	$\phi 28$	10	19	58	108	58	135	11	11	28
$\phi 63$	M12×1.75	$\phi 36$	10	22	65	124	69	150	13	13	30
$\phi 80$	M14×2	$\phi 45$	15	25	87	154	86	185	17	17	35
$\phi 100$	M16×2	$\phi 56$	15	24	109	190	106	230	26	26	42

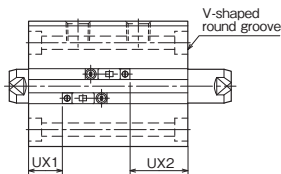
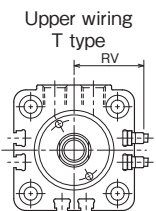
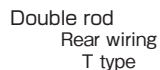
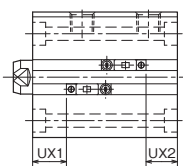
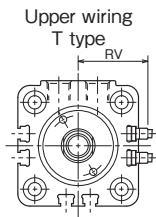
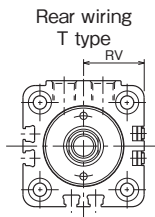
- Notes)
- When the lock nut is used, the parenthesized dimension A is recommended. (Order made)
 - The lock nut needs to be ordered separately. (Refer to the page of how to order.)
 - 20 mm and 25 mm bore cylinders with a stroke of 5 mm have the same body size as those with a stroke of 10 mm.
 - 20 mm and 25 mm bore sizes of the cutting oil proof type are not available.
 - The tolerance of MM is f8.

Switch Set

General purpose type	HQS2R(D)	6	Mounting style	Bore	N	Stroke	T	Sensor symbol	Sensor quantity
Cutting oil proof type	HQSW2R(D)	6	Mounting style	Bore	N	Stroke	T	Sensor symbol	Sensor quantity

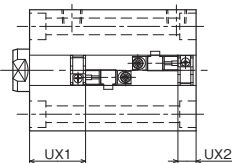
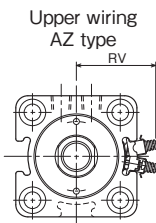
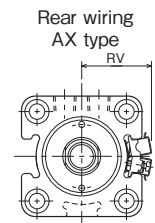
□ : Female thread type
 T : Male thread type

- Bore $\phi 20$ and $\phi 25$ Single rod

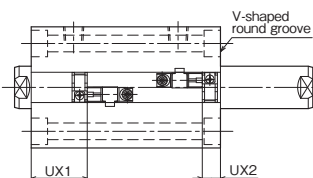
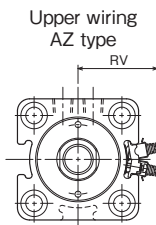
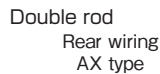


- The side without V-shaped round grooves on the end face corresponds to UX1.

- Bore $\phi 32$ to $\phi 100$ Single rod



- The 100 mm bore cylinder has three sensor mounting grooves.



- The 100 mm bore cylinder has three sensor mounting grooves.
- The side without V-shaped round grooves on the end face corresponds to UX1.

Space-saving Hydraulic Cylinders

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General purpose type

Dimensional Table (T/AX/AZ type)

Bore	RV						UX1						UX2							
	T0H·T5H T2H·T3H		T0V·T5V T2V·T3V		T2YH	T2YV	AX	AZ	Single rod			Double rod			Single rod			Double rod		
	T	AX	AZ	T	AX	AZ	T	AX	AZ	T	AX	AZ	T	AX	AZ	T	AX	AZ		
$\phi 20$	22	26	28	31	—	—	13	—	—	13	—	—	12	—	—	23	—	—		
$\phi 25$	25	29	31	34	—	—	14	—	—	14	—	—	13	—	—	24	—	—		
$\phi 32$	—	—	—	—	37	44	—	19	19	—	19	19	—	17	17	—	35	35		
$\phi 40$	—	—	—	—	41	48	—	20	20	—	20	20	—	17	17	—	34	34		
$\phi 50$	—	—	—	—	46	53	—	22	22	—	22	22	—	20	20	—	35	35		
$\phi 63$	—	—	—	—	54	61	—	24	24	—	24	24	—	25	25	—	40	40		
$\phi 80$	—	—	—	—	63	70	—	30	30	—	30	30	—	30	30	—	47	47		
$\phi 100$	—	—	—	—	76.5	83.5	—	36	36	—	36	36	—	42	42	—	53	53		

Note) Dimension UX is for reference only. For details, refer to the sensor mountable minimum stroke table.

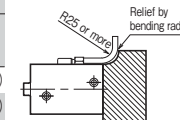
Operating Range and Hysteresis

Bore	Reed sensor						Solid state sensor									
	AX1**·AZ1**		T type		WR type		AX2**·AZ2**		AX*W·AZ*W		T2/T3 type		T2Y type		WS type	
	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis
$\phi 20$	—	—	3 to 10	2 or less	—	—	—	—	—	—	3 to 8	1 or less	5 to 10	1 or less	—	—
$\phi 25$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$\phi 32$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$\phi 40$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$\phi 50$	10 to 17	2 or less	—	—	10 to 17	2 or less	4 to 8	1 or less	15 to 22	2 or less	—	—	—	—	12 to 15	2 or less
$\phi 63$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$\phi 80$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$\phi 100$	6 to 14	—	—	—	7 to 15	2.5 or less	6 to 9	—	19 to 25	—	—	—	—	—	—	—

Cutting oil proof type

Dimensional Table

Bore	RV				RY				UX1			UX2		
	Rear wiring		Upper wiring		Rear wiring		Upper wiring		AX*W	WR	WS	AX*W	WR	WS
	AX*W	WR-WS	AZ*W	WR-WS	AX*W	WR-WS	AZ*W	WR-WS	AX*W	WR	WS	AX*W	WR	WS
$\phi 32$	37	53	44	53	74	106	88	106	13(13)	11(11)	15(15)	11(29)	12(28)	16(32)
$\phi 40$	41	57	48	57	82	114	96	114	14(14)	17(17)	20(20)	11(28)	14(33)	16(36)
$\phi 50$	46	62	53	62	92	124	106	124	16(16)	19(19)	21(21)	14(29)	16(35)	20(37)
$\phi 63$	54	69	61	69	108	138	122	138	17(17)	20(20)	24(24)	18(33)	21(36)	23(40)
$\phi 80$	63	79	70	79	126	158	140	158	22(22)	25(25)	29(29)	22(39)	25(43)	29(47)
$\phi 100$	76.5	91.5	83.5	91.5	153	183	167	183	27(27)	33(33)	35(35)	33(44)	40(50)	41(52)



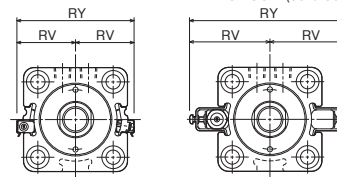
If the sensor cannot be mounted as shown above, use the upper wiring type.

- Notes) • Ensure that the bending radius of the flexible tube is R25 or more. If the bending radius is smaller, the wire may be broken.
 • The parenthesized values apply to the double rod cylinders.

Sensor Attachment Dimensions

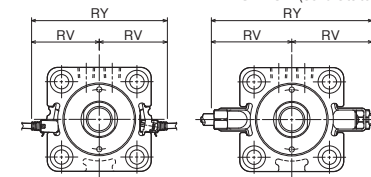
• Rear wiring

AX205W(solid state sensor) WR525(reed sensor)
 WS235-1(solid state sensor)



• Upper wiring

AZ205W(solid state sensor) WR535(reed sensor)
 WS245-1(solid state sensor)



*The 100 mm bore cylinder has mounting grooves in three surfaces.

Space-saving Hydraulic Cylinders

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Change of Rod End Shape

■ You can specify the shape and dimension of the rod end as shown below using the semi-standard symbols and dimension symbols. (No need to specify the dimension symbol if you order a cylinder with the basic dimensions. Specify only the semi-standard symbol.)

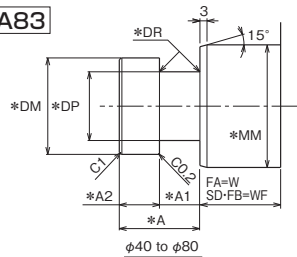
How to order

Series Model number - X

Semi-standard symbol Dimension symbol (Specify only when the dimension differs from the basic dimension.)

KM and KP need to be specified as a pair.

Example **A83**



Note) In the case of this shape, only dimension WF can be changed.

- Bore $\phi 40$, rod end shape: A83, WF=60
- HQS2 6SD40N50T-X A83
- WF=60

Special Rod End Shapes A00(T)

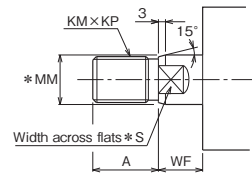


Table of Basic Dimensions (Standard dimensions)

Bore	A	KM	KP	*MM	*S	WF
$\phi 20$	15	10	1.25	$\phi 12$	10	8
$\phi 25$	18	12	1.25	$\phi 14$	12	8
$\phi 32$	25	16	1.5	$\phi 18$	14	10
$\phi 40$	30	20	1.5	$\phi 22$	19	10
$\phi 50$	35	24	1.5	$\phi 28$	24	11
$\phi 63$	45	30	1.5	$\phi 36$	30	13
$\phi 80$	60	39	1.5	$\phi 45$	41	17
$\phi 100$	75	48	1.5	$\phi 56$	50	26

A54

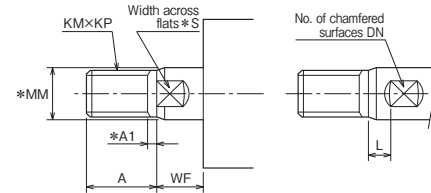


Table of Basic Dimensions

Bore	A	*A1	DN	KM	KP	L	*MM	*S	WF
$\phi 20$	15	4	2	10	1.25	0	$\phi 12$	10	8
$\phi 25$	18	4	2	12	1.25	0	$\phi 14$	12	8
$\phi 32$	25	4	2	16	1.5	0	$\phi 18$	14	10
$\phi 40$	30	4	2	20	1.5	0	$\phi 22$	19	10
$\phi 50$	35	4	2	24	1.5	0	$\phi 28$	24	11
$\phi 63$	45	4	2	30	1.5	0	$\phi 36$	30	13
$\phi 80$	60	4	2	39	1.5	0	$\phi 45$	41	17
$\phi 100$	75	4	2	48	1.5	0	$\phi 56$	50	26

A81

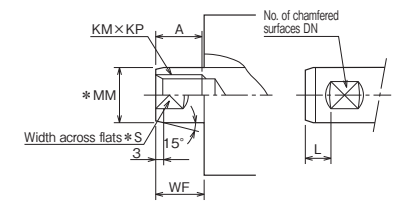


Table of Basic Dimensions

Bore	A	DN	KM	KP	L	*MM	*S	WF
$\phi 20$	10	2	8	1.25	0	$\phi 12$	10	8
$\phi 25$	12	2	10	1.5	0	$\phi 14$	12	8
$\phi 32$	15	2	12	1.75	0	$\phi 18$	14	10
$\phi 40$	20	2	16	2	0	$\phi 22$	19	10
$\phi 50$	24	2	20	2.5	0	$\phi 28$	24	11
$\phi 63$	33	2	27	3	0	$\phi 36$	30	13
$\phi 80$	36	2	30	3.5	0	$\phi 45$	41	17
$\phi 100$	45	2	39	4	0	$\phi 56$	50	26

A51

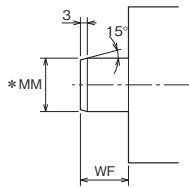
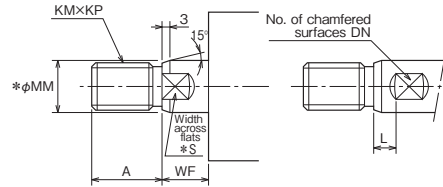


Table of Basic Dimensions

Bore	*MM	WF
$\phi 20$	$\phi 12$	8
$\phi 25$	$\phi 14$	8
$\phi 32$	$\phi 18$	10
$\phi 40$	$\phi 22$	10
$\phi 50$	$\phi 28$	11
$\phi 63$	$\phi 36$	13
$\phi 80$	$\phi 45$	17
$\phi 100$	$\phi 56$	26

A53



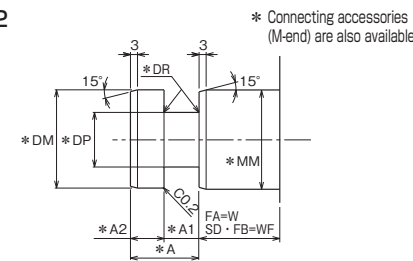
Note) Increase dimension WF by dimension L.

Table of Basic Dimensions

Bore	A	DN	KM	KP	L	*MM	*S	WF
$\phi 20$	15	2	10	1.25	0	$\phi 12$	10	8
$\phi 25$	18	2	12	1.25	0	$\phi 14$	12	8
$\phi 32$	25	2	16	1.5	0	$\phi 18$	14	10
$\phi 40$	30	2	20	1.5	0	$\phi 22$	19	10
$\phi 50$	35	2	24	1.5	0	$\phi 28$	24	11
$\phi 63$	45	2	30	1.5	0	$\phi 36$	30	13
$\phi 80$	60	2	39	1.5	0	$\phi 45$	41	17
$\phi 100$	75	2	48	1.5	0	$\phi 56$	50	26

Use this shape to move the width across flats S of 'A00(T)'.

A82



* Connecting accessories (M-end) are also available.

Table of Basic Dimensions (Standard dimensions)

Bore	*A	*A1	*A2	*DM	*DP	*DR	*MM	W	WF
		$+0.5$ -0.5	-0.2 -0.3		-0.2 -0.3			FA style	SD/FB style
$\phi 20$	25	12.5	12.5	$\phi 12$	$\phi 8$	0.5	$\phi 12$	20	20
$\phi 25$	25	12.5	12.5	$\phi 14$	$\phi 10$	0.5	$\phi 14$	20	20
$\phi 32$	25	12.5	12.5	$\phi 18$	$\phi 13$	1.0	$\phi 18$	30	30
$\phi 40$	25	12.5	12.5	$\phi 22$	$\phi 16$	1.5	$\phi 22$	35	35
$\phi 50$	25	12.5	12.5	$\phi 28$	$\phi 21$	1.5	$\phi 28$	35	35
$\phi 63$	30	15	15	$\phi 36$	$\phi 26$	2.0	$\phi 36$	40	40
$\phi 80$	30	15	15	$\phi 45$	$\phi 31$	2.0	$\phi 45$	45	45
$\phi 100$	40	20	20	$\phi 56$	$\phi 38$	3.0	$\phi 56$	55	55

A83

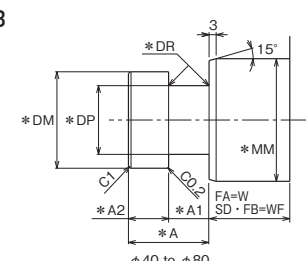


Table of Basic Dimensions (Standard dimensions)

Bore	*A	*A1	*A2	*DM	*DP	*DR	*MM	W	WF
		$+0.5$ -0.3	-0.2 -0.3	-0.1 -0.4	-0.2 -0.3			FA style	SD/FB style
$\phi 40$	25	12.5	12.5	$\phi 18$	$\phi 13$	1.0	$\phi 22$	35	35
$\phi 50$	25	12.5	12.5	$\phi 22$	$\phi 16$	1.5	$\phi 28$	35	35
$\phi 63$	25	12.5	12.5	$\phi 28$	$\phi 21$	1.5	$\phi 36$	40	40
$\phi 80$	30	15	15	$\phi 36$	$\phi 26$	2.0	$\phi 45$	45	45

- The *-marked dimension is fixed.
- If it is necessary to change the fixed dimension, consult us.

- The *-marked dimension is fixed.
- If it is necessary to change the fixed dimension, consult us.

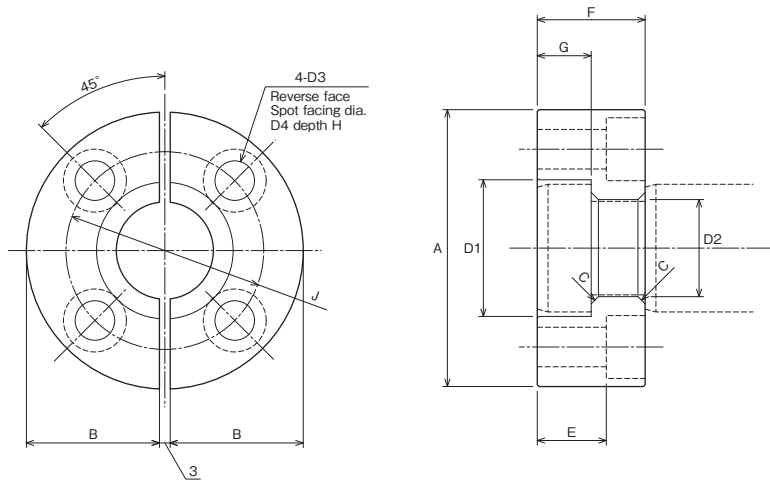
Space-saving Hydraulic Cylinders

Space-saving Hydraulic Cylinders

HQS2

HQS2

Separate flange joint (M-end): Only for rod end shape A82



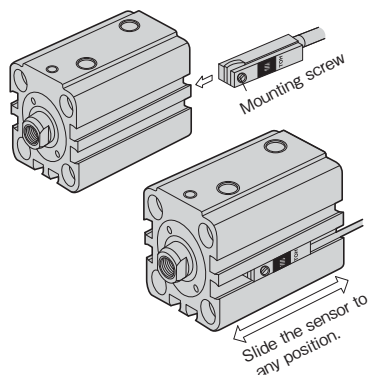
● Additional order must be made for this item. Specify as RMH-**.

Dimensional Table

Symbol Bore	Part number	A	B	C	D1	D2	D3	D4	E	F	G	H	J
φ20	RMH-12	φ44	20.5	0.5	φ13	φ8.5	φ5.5	φ9.5	19.6	25	12.5	5.4	φ29
φ25	RMH-14	φ46	21.5	0.5	φ15	φ10.5	φ5.5	φ9.5	19.6	25	12.5	5.4	φ31
φ32	RMH-18	φ49	23	1	φ19	φ13.5	φ6.6	φ11	18.5	25	12.5	6.5	φ34
φ40	RMH-22	φ57	27	1.5	φ23	φ16.5	φ9	φ14	16.4	25	12.5	8.6	φ40
φ50	RMH-28	φ71	34	1.5	φ29	φ21.5	φ11	φ17.5	14.2	25	12.5	10.8	φ50
φ63	RMH-36	φ77	37	2	φ38	φ27	φ11	φ17.5	19.2	30	15	10.8	φ55
φ80	RMH-45	φ100	48.5	2	φ48	φ33	φ14	φ20	17	30	15	13	φ76
φ100	RMH-56	φ124	60.5	3	φ60	φ41	φ18	φ26	22.5	40	20	17.5	φ92

Setting method of sensor detecting position

T type sensor (φ20 and φ25)



1. Fit the sensor into the groove as shown left.
2. Slide the sensor to any position. Installing in the center of operating range provides the most stable detection.
3. To detect the cylinder stroke end, mount the sensor at dimension UX (optimum setting position).
4. After sliding the sensor to the detecting position, tighten the mounting screw.

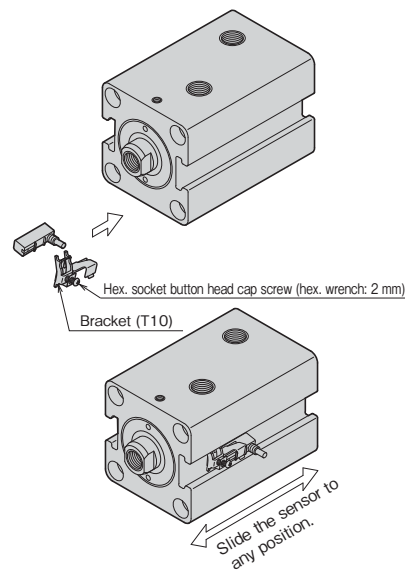
Torque of Mounting Screw

Sensor type	T0·T5·T2·T3	T2Y
Nominal dia. of mounting screw	M2.5	M3
Mounting screw tightening tool	Precision slotted screwdriver	Small-sized Phillips-head screwdriver
Tightening torque	Approx. 0.1 to 0.2 N·m	Approx. 0.4 N·m

Note) If the tightening torque is improper, the sensor may be dislocated, or the sensor body may be damaged.

AX/AZ type sensor (φ32 to φ100)

AX/AZ type bracket screw tightening torque: Approx. 0.4 N·m

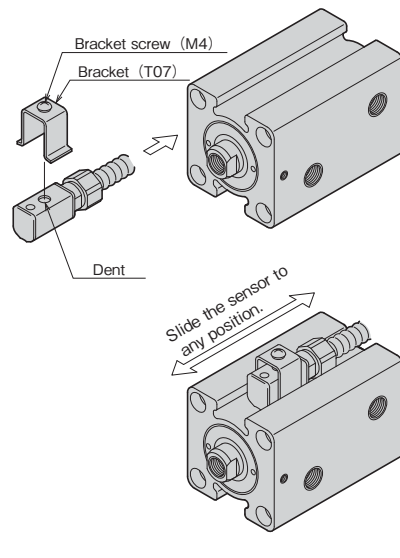


1. Loosen the bracket screw, and fit the bracket in the center of the sensor.
2. Insert the sensor combined with the bracket into the sensor mounting part of the cylinder body.
3. Slide the sensor to any position. Installing in the center of operating range provides the most stable detection.
4. To detect the cylinder stroke end, mount the sensor at dimension UX (optimum setting position).
5. After sliding the sensor to the detecting position, tighten the bracket screw.

Note) If the tightening torque is improper, the sensor may be dislocated, or the sensor body may be damaged.

WR/WS type sensor (φ32 to φ100)

WR/WS type bracket screw tightening torque: Approx 0.6 N·m



Precautions for use

- When using the cylinder with stroke adjuster tighten the screw(s) to the rod end completely so that no load is applied to the piston rod screw section.
- Since side load (eccentric load) must not be applied to the piston rod, take care when installing the cylinder.
- When operating the cylinder for the first time, discharge air from the piping. After discharging air, run the cylinder at a reduced pressure, and gradually increase the pressure to the working pressure. Note) Since HQS2 Series has no air vents, take air bleeding from the piping.
- To install the cylinder, use four hex. socket head cap screws (JIS B1176, strength class 10.9 or more).
- When using mounting bolts, screw the bolts into mounting materials by 80% or more of the screw diameter. The material of the mounting materials must have strength equal to SS400.
- When using nuts to tighten mounting bolts, use steel nuts with a strength class of 6 or more. (However, DO NOT use the type-3 nuts.)
- When using mounting bolts to secure the cylinder body, be sure to tighten them according to the following specified torque.

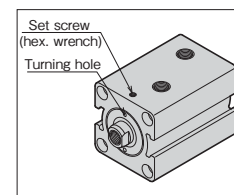
Cylinder Mounting Bolt Tightening Torque

Cylinder bore	Mounting bolt size	Tightening torque
φ20	M5×0.8	4.8
φ25	M5×0.8	4.8
φ32	M6×1	5.9
φ40	M8×1.25	14.0
φ50	M10×1.5	28.0
φ63	M12×1.75	49.0
φ80	M14×2	77.0
φ100	M16×2	120.0

- When tightening the piston rod end screw of a double acting double rod cylinder, use the width across flats on the side on which the screw is tightened. Since the piston rod of a double rod type cylinder is fastened with screws, take care that rotating force at both ends of the piston rod is not applied to the rod.

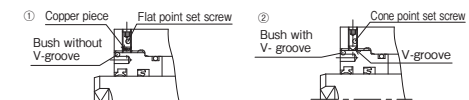
Notes on disassembly and reassembly

- After removing the set screw, use the turning hole of the bush to remove the bush from the cylinder. When a jig is removed from the rod end screw, burrs may occur on the width across flats of the rod. Remove the burrs with a file, etc. and remove the bush.



Note) A copper piece may have been set under the set screw.

- When a copper piece is equipped under the set screw to protect the bush, remove it before tightening the bush.
- The center height of cylinders of the mounting style LD has been determined before shipment. When reassembling such a cylinder, adjust the center height.
- After tightening the bush; In case of ①, place the copper piece under the set screw and tighten it. In case of ②, tighten the set screw without placing the copper piece.



Components Combination List

No.	Screw on bush	Copper piece	Set screw type
①	Without V-groove	Required	Flat point
②	With V-groove	—	Cone point

Seal replacement

- When disassembling the cylinder, replace all seals.
- General purpose types (HQS2, HQS2D, HQS2R and HQS2RD): The piston seals, rod seals, dust wipers and bush O-rings are replaceable.
- Cutting oil proof types (HQSW2, HQSW2D, HQSW2R and HQSW2RD): The piston seals, rod seals and bush O-rings are replaceable. The dust wiper 1 of any cutting oil proof type cylinder has been press-fitted into the bush, and is integrated with the bush. Although it can be removed, doing so may damage the bush. It is recommended to replace the bush as well when replacing the dust wiper. The dust wiper 1 is not included in the seal set. If it is necessary, separately make an order.
- Since the piston and rod have been locked, the piston rod O-ring cannot be replaced.

Dimensions of bush turning hole



* General purpose type: Bore φ20 to φ100 * Cutting oil proof type: Bore φ32 to φ100

Unit: mm

Bore	a	d	PCD	Bore	a	d	PCD
φ20	4	4	23	φ50	8	5	46
φ25	4	4	25	φ63	8	5	58
φ32	5	4	32	φ80	10	8	70
φ40	7	4	38	φ100	12	10	85