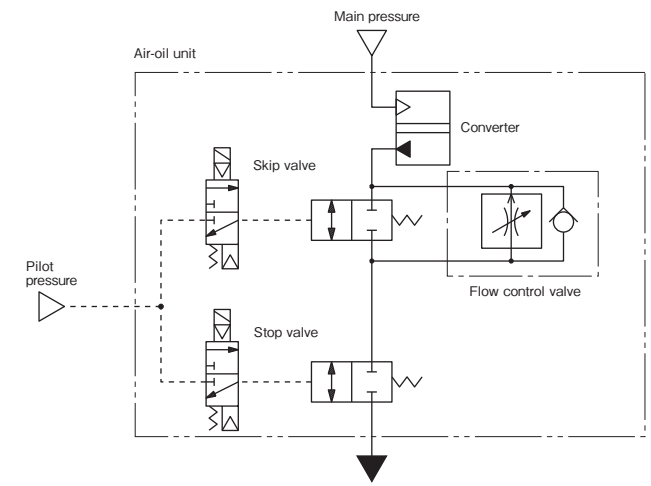


Magnetic Proximity Sensor Specifications

Type	ZR3 (with lamp) (cord length 1.5 m)	
Load voltage range	AC	5 to 120 V
	DC	5 to 50 V
Load current range	AC	3 to 20 mA
	DC	3 to 40 mA
Max. switching capacity	AC	2.0 VA
	DC	1.5 W
Internal voltage drop	2 V (at 10 mA) or 3 V or less (at 40 mA)	
Leakage current	0	
Working time	1 ms or less	
Return time	1 ms or less	
Impact resistance	294 m/s ² (unrepeated)	
Ambient temperature	-10 to +70°C (No freezing)	
Wiring method	0.2 mm ² ×2-core, outer dia. φ3 mm (oil-resistant cable cord)	
Protection structure	IP67 (IEC Standard), JIS C0920 (dust-proof and erosion-resistant)	
Indicating lamp	LED (Lights when sensing)	
Electric circuit		
	Applicable load	Small relay, programmable controller

1. When 100 V AC is used, be sure to provide the protective circuit SK-100.
2. When using any induction load (relay, etc.), be sure to provide a protective circuit (SK-100) with the load.
3. For the detailed sensor specifications and handling procedures, see the sensor specifications at the end of this catalog.

Internal Circuit



The above figure is the circuit diagram of AHU2-063-***-FDA0.

Air-oil units which convert pneumatic pressure to hydraulic pressure to realize stable speed control

- Easy cylinder speed control.
- A model suitable for purpose of use can be selected.
- Fluid level sensors are available.
- Hydraulic control is easily realized.
- Space-saving design.



Main Body Specifications

Item	Control valve		With flow control valve (with pressure compensation)				With throttle valve				Converter block	
	Compound valve	With skip valve/stop valve	With skip valve	With stop valve	---	With skip valve/stop valve	With skip valve	With stop valve	---	With stop valve	---	
Working pressure range	Main pressure	0.2 to 1 MPa				0.05 to 1 MPa				0 to 1 MPa		
	Pilot pressure	0.3×main pressure+0.25 MPa to 0.7 MPa										
Proof test pressure	1.5 MPa											
Working fluid	Petroleum-based fluid(10×10 ⁻⁶ to 100×10 ⁻⁶ m ² /s)											
Fluid/ambient temperature	-5 to +50°C (No freezing)											
Flow rate limit (Note 1)	40 ℓ /min											
Min. control flow rate (Note 2)	0.06 ℓ /min				0.1 ℓ /min				---			
Pressure compensation capacity	Flow rate change caused by load fluctuation of 60% or less is within ±10%.											
Installing direction	Perpendicular direction											

(Note 1) Flow rate at converter fluid surface speed of 200 mm/s. If the unit is used at a higher flow rate, the controllability will be considerably degraded.
 (Note 2) When the viscosity of hydraulic fluid is 100×10⁻⁶ m²/s

Converter Capacity

Capacity	0.16 ℓ	0.25 ℓ	0.4 ℓ	0.63 ℓ	1 ℓ	1.6 ℓ
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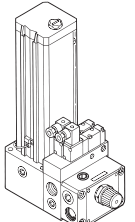
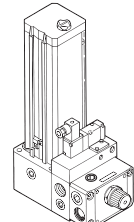
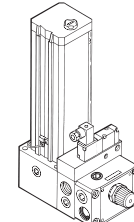
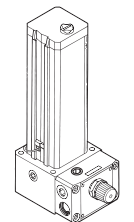
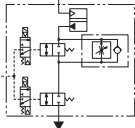
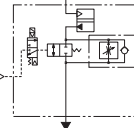
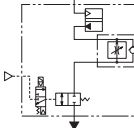
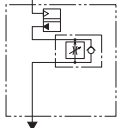
Solenoid Specifications: Skip valve/stop valve

Rated voltage	AC100V50/60Hz, AC200V50/60Hz, 24 V DC		
Allowable voltage range	±10%		
Insulation class	Class B		
Starting current	100 V AC	50Hz: 36mA	60Hz: 32mA
	200 V AC	50Hz: 18mA	60Hz: 16mA
Holding current	100 V AC	50Hz: 24mA	60Hz: 20mA
	200 V AC	50Hz: 12mA	60Hz: 10mA
	24 V DC	75mA	

Basic Weight		Unit: kg		Additional Weight		Unit: kg	
Bore	Capacity	φ63		Control valve	Flow control valve	Compound valve	Sensor additional weight (1 pc.)
0.16 ℓ	1.41			Throttle valve	0.61	With skip valve/With stop valve	1.82
0.25 ℓ	1.51			With skip valve	0.91	With stop valve	0.91
0.4 ℓ	1.68			Stop valve for converter	1.12		
0.63 ℓ	1.93						
1 ℓ	2.3						
1.6 ℓ	2.98						

Calculation formula: Air-oil unit weight (kg)=basic weight+additional weight
 Calculation example: AHU063-010-FDA01-C1 Converter capacity 1 ℓ
 With flow control valve, with skip valve/stop valve, with sensor
 2.3+0.61+1.82+0.023=4.753 (kg)

Outline of Models

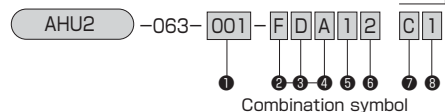
Control valve		With flow control valve (with pressure compensation)							
Compound valve		With skip valve/stop valve	With skip valve	With stop valve	—				
Use		<ul style="list-style-type: none"> Intermediate stop Inching 2-step speed switching (fast/slow) Emergency stop 	<ul style="list-style-type: none"> 2-step speed switching (fast/slow) 	<ul style="list-style-type: none"> Intermediate stop Inching Emergency stop 	<ul style="list-style-type: none"> Speed control 				
Appearance	Converter capacity symbol								
	Effective capacity								
	001						0.16ℓ		
	002						0.25ℓ		
	004						0.4ℓ		
	006						0.63ℓ		
010	1ℓ								
016	1.6ℓ								
Symbol									
<p>● These diagrams show meter-out circuits. On meter-in circuits, the flow control valve and throttle valve are positioned in different directions.</p> <p>● NC skip valve and stop valve are used in these diagrams.</p>									
Compound valve	Skip valve	N.C(normally closed)	○	—	○	○	—	—	
		N.O(normally open)	—	○	—	—	○	—	
	Stop valve	N.C(normally closed)	○	—	—	—	○	—	
		N.O(normally open)	—	—	○	—	—	○	
Combination symbol		FDA	FDC	FDD	FKA	FKC	FTA	FTD	FNO

Model Number

When placing an order, specify the model number shown below.

● Air-oil units

When no sensor is required, these items need not be entered.

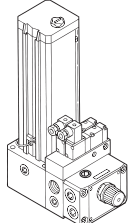
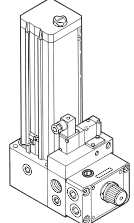
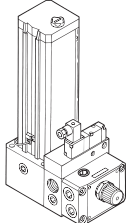
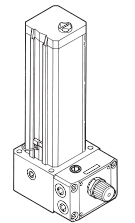
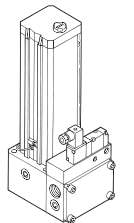
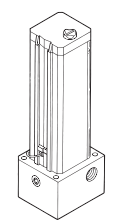
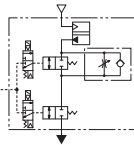
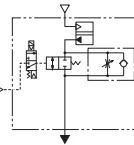
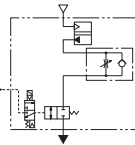
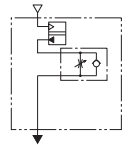
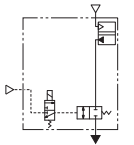
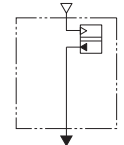


● Converter only

When no sensor is required, these items need not be entered.



1	Converter capacity		4	Combination of compound valve				
	001	0.16ℓ		006	0.63ℓ	Symbol	skip valve	stop valve
	002	0.25ℓ		010	1ℓ	A	NC	NC
2	Control valve	004	0.4ℓ	016	1.6ℓ	C	NO	NC
		F	With flow control valve	D	NC	NO		
		S	With throttle valve	O	—	—		
3	Compound valve	O	Without control valve	5	Control method of control valves (flow control valve and throttle valve)			
		D	With skip valve/stop valve		0	Meter-out control		
		K	With skip valve		1	Meter-in control		
6	Solenoid voltage	T	With stop valve	6	Solenoid voltage			
		N	Without compound valve		1	100 V AC 50/60Hz		
		2	200 V AC 50/60Hz					
7	Sensor symbol	8	24 V DC	7	Sensor symbol			
		C	ZR3(with lamp)1.5m					
		8	24 V DC		8	Sensor quantity		

With throttle valve			Converter						
With skip valve/stop valve	With skip valve	With stop valve	—	With stop valve	Converter only				
<ul style="list-style-type: none"> Intermediate stop Inching 2-step speed switching (fast/slow) Emergency stop 	<ul style="list-style-type: none"> 2-step speed switching (fast/slow) 	<ul style="list-style-type: none"> Intermediate stop Inching Emergency stop 	<ul style="list-style-type: none"> Speed control 	<ul style="list-style-type: none"> Intermediate stop Inching Emergency stop 	—				
									
									
○	—	○	○	—	—				
—	○	—	—	○	—				
○	○	—	—	—	—				
—	—	—	○	—	—				
—	—	—	—	○	—				
SDA	SDC	SDD	SKA	SKC	STA	STD	SNO	OTA	No symbol

● To change the compound valve type from normally closed to normally open, it is necessary to replace the solenoid valve with a proper one. The solenoid valves have the same shape.

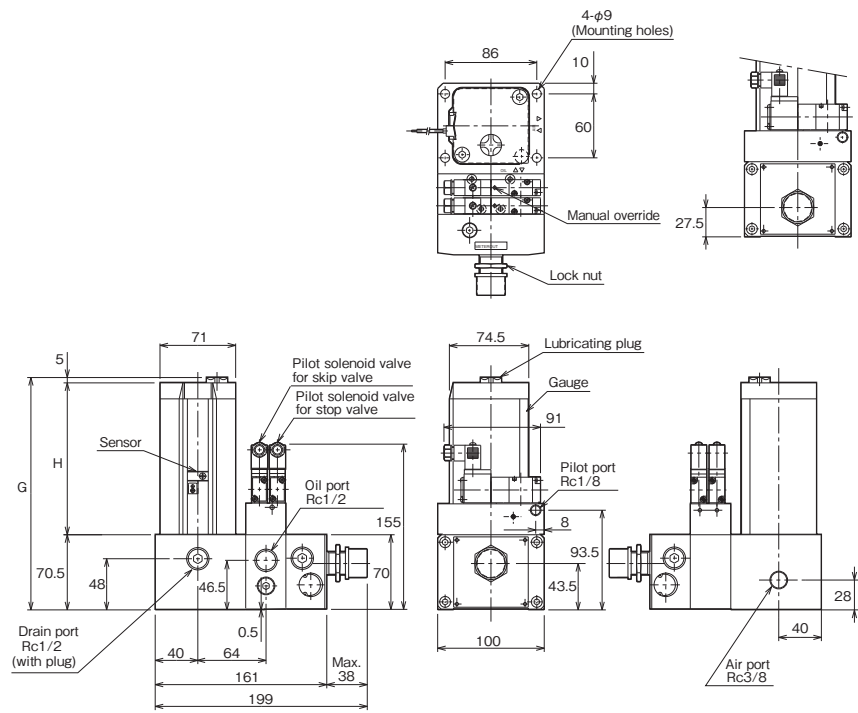
● Part number of sensor only



With flow control valve/with throttle valve

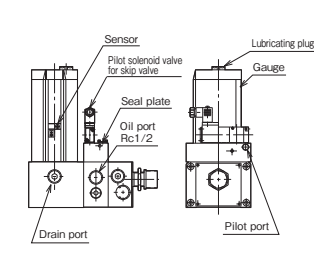
- With skip valve/stop valve

- In the case of meter-in control

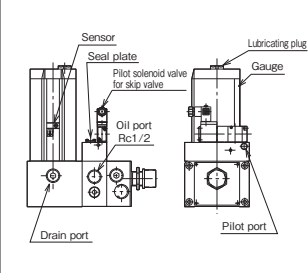


- This drawing shows the appearance of a unit with flow control valve.
- This drawing shows the appearance of a meter-out control type unit.

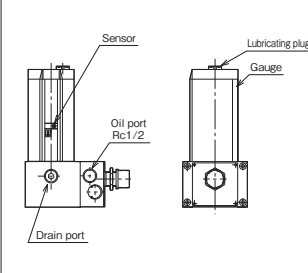
- With skip valve



- With stop valve



- With control valve only



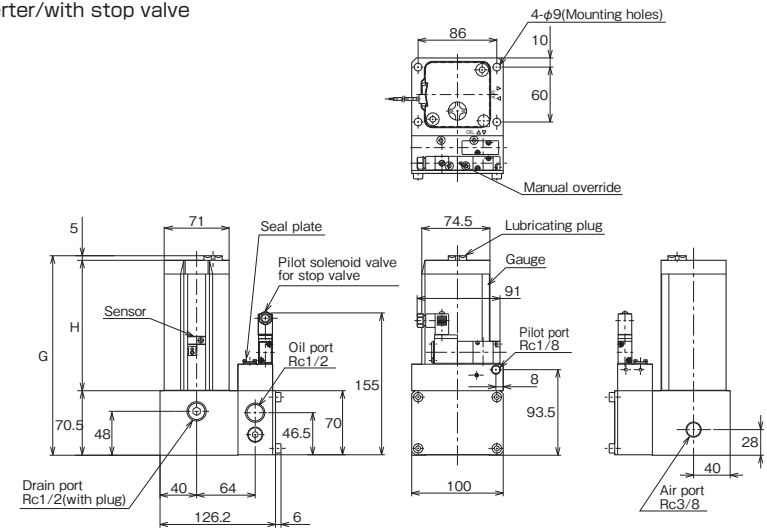
- For the detailed dimensions, see the unit with skip valve/stop valve.

Dimensional Table

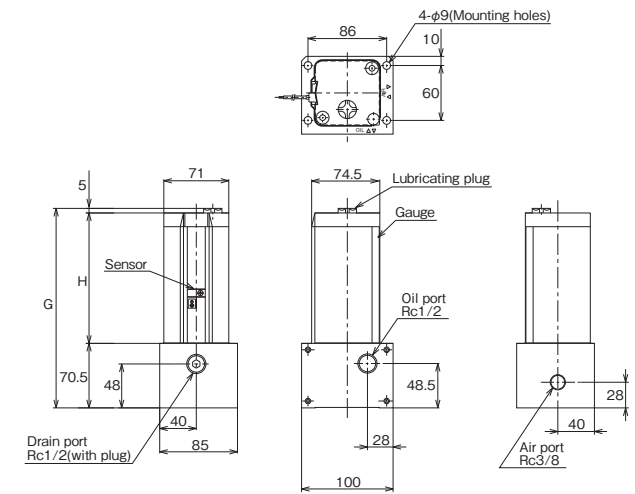
Symbol	G						H					
	0.16l	0.25l	0.4l	0.63l	1l	1.6l	0.16l	0.25l	0.4l	0.63l	1l	1.6l
Bore	218	245	290	358	468	648	142.5	169.5	214.5	282.5	392.5	572.5
φ63												

Converter

- Converter/with stop valve



- Converter

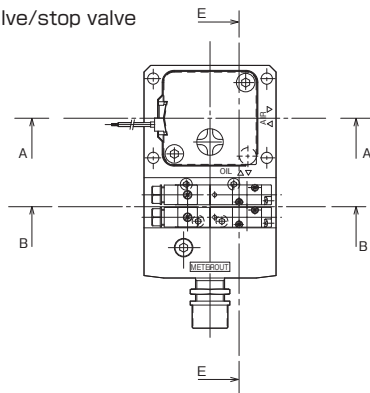


Dimensional Table

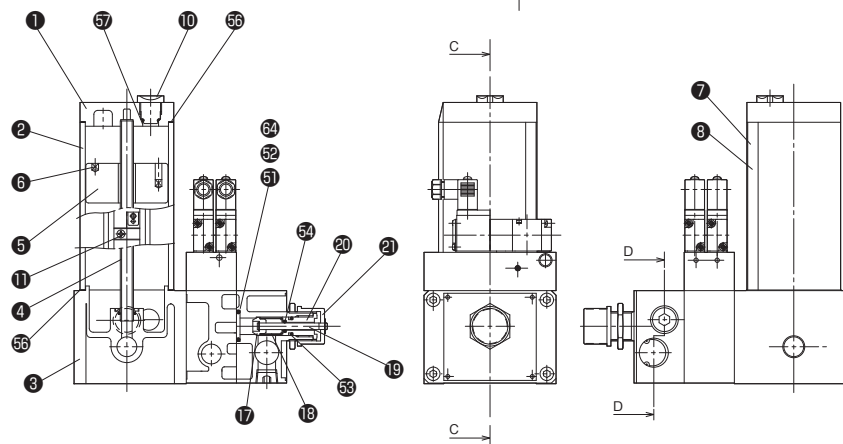
Symbol	G						H					
	0.16l	0.25l	0.4l	0.63l	1l	1.6l	0.16l	0.25l	0.4l	0.63l	1l	1.6l
Bore	218	245	290	358	468	648	142.5	169.5	214.5	282.5	392.5	572.5
φ63												

With flow control valve/with throttle valve

- With skip valve/stop valve

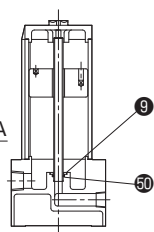


Section C-C

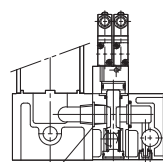


- The unit with flow control valve and the unit with throttle valve have the same appearance.
- This drawing shows the appearance of a meter-out control type unit.

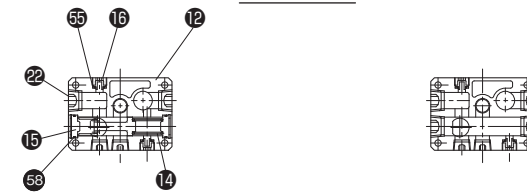
Section A-A



Section E-E



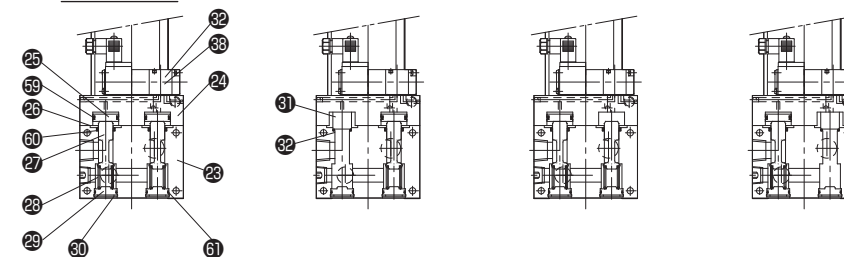
Section D-D



- With flow control valve

- With throttle valve

Section B-B



- With skip valve/stop valve (with flow control valve /with throttle valve)

- With skip valve (with flow control valve /with throttle valve)

- With stop valve (with flow control valve /with throttle valve)

- With stop valve (without control valve)

Parts List

No.	Name	Material	Qty.	No.	Name	Material	Qty.	No.	Name	Material	Qty.
1	Pneumatic cover	Aluminum alloy	1	12	Control valve body	Aluminum alloy	1	23	Main body	Aluminum alloy	1
2	Tube	Aluminum alloy	1	13	Spool	Stainless steel	1(0)	24	Piston cover	Aluminum alloy	1
3	Hydraulic cover	Aluminum alloy	1	14	Spring for spool	Stainless steel	1(0)	25	Piston	Aluminum alloy	2/1
4	Pneumatic piping	Aluminum alloy	1	15	Spring guide	Aluminum alloy	2(0)	26	Retainer	Cold rolled steel	2/1
5	Float	Foamed resin	1	16	Air vent plug	Carbon steel for general structure	2	27	Spool	Stainless steel	2/1
6	Magnet	—	2	17	Check needle	Copper alloy	1	28	Spring	Stainless steel	2/1
7	Level gauge	—	1	18	Check spring	Stainless steel	1	29	Spring guide	Aluminum alloy	2
8	Gauge cover	Aluminum alloy	1	19	Shaft	Stainless steel	1	30	Set ring	—	2
9	Retainer	Stainless steel	1	20	Bush	Aluminum alloy	1	31	Spacer	Aluminum alloy	1
10	Lubricating plug	Resin	1	21	Handle	Aluminum alloy	1	32	Stop valve	—	1
11	Sensor	—	—	22	Hex. plug	—	2(4)	33	Skip valve	—	1

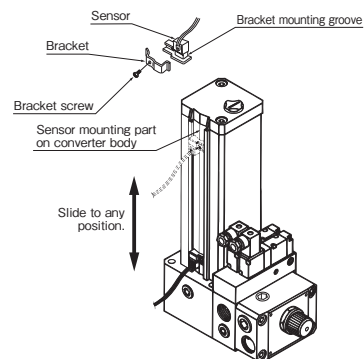
Seal List

No.	Name	Material	Part number	Qty.	No.	Name	Material	Part number	Qty.
34	Pneumatic piping O-ring	Nitrile rubber	P-10	1	35	O-ring for spring guide	Nitrile rubber	S-20	2(0)
31	O-ring	Nitrile rubber	P-34	1	36	Piston seal	Nitrile rubber	MY-21	2/1
32	O-ring	Nitrile rubber	P-22	1	37	Rod seal	Nitrile rubber	PS-14	2/1
33	O-ring for bush	Nitrile rubber	P-10A	1	38	O-ring for spring guide	Nitrile rubber	S-20	1
34	O-ring for shaft	Nitrile rubber	P-6	1	39	O-ring for spacer	Nitrile rubber	P-14	1
35	Seal for air vent plug	Fluoric resin	CF-12	2	40	O-ring	Nitrile rubber	P-22	2
36	Tube gasket	Nitrile rubber	—	2	41	O-ring	Nitrile rubber	P-20	2
37	O-ring for lubricating plug	Nitrile rubber	7.6X12.4X2.4	1					

- The parenthesized numbers are the quantities of parts for throttle valve. The numbers after / are the quantities of parts for unit with stop valve/skip valve.

Sensor setting procedures

Tightening torque: Approx. 0.4 N·m



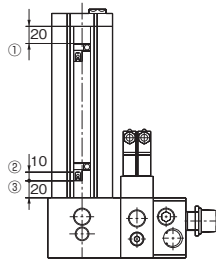
1. Place the bracket in the bracket mounting groove in the ZR3 type sensor.
2. Insert the sensor combined with the bracket into the sensor mounting part on the converter body.
3. Slide the sensor to any detecting position.
4. After sliding the sensor to the detecting position, tighten the bracket screw.

Note) Tighten the screw to the appropriate tightening torque. Tightening torque: Approx. 0.4 N·m. Inappropriate tightening torque may cause the off-center of the sensor position or damage to the sensor body.

Optimum sensor setting position

Uses of level sensor

- ① For checking the upper limit level
- ② For warning about lower limit level to alert to add oil
- ③ For warning about lower limit level to stop machine



Note) Carefully check the sensor installation direction.