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 / Compound valve		With flow control valve (with pressure compensation)				With throttle valve				Converter block	
		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℃ (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} m^2/s

Converter Capacity

Capacity	0.16 ℓ	0.25 ℓ	0.4 ℓ	0.63 ℓ	1 ℓ	1.6 ℓ

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

Capacity \ Bore	ϕ63
0.16 ℓ	1.41
0.25 ℓ	1.51
0.4 ℓ	1.68
0.63 ℓ	1.93
1 ℓ	2.3
1.6 ℓ	2.98

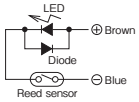
Additional Weight

Unit: kg

Control valve	Flow control valve	0.61
	Throttle valve	0.61
Compound valve	With skip valve/With stop valve	1.82
	With skip valve	0.91
	With stop valve	0.91
	Stop valve for converter	1.12
Sensor additional weight (1 pc.)		0.023

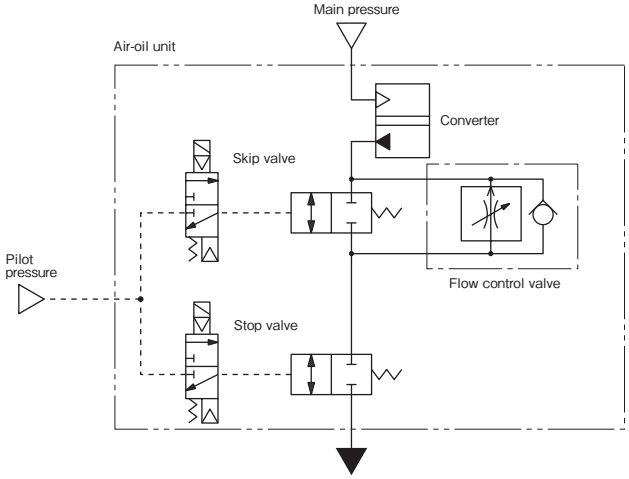
Calculation formula: Air-oil unit weight (kg)=basic weight+additional weight
Calculation example: AHU063-010-FDA01-C1 Converter capacity 1 ℓ
With flow control valve, with skip valve/stop valve, with sensor
2.3+0.61+1.82+0.023=4.753(kg)

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℃ (No freezing)
Wiring method		0.2 mm^2×2-core, outer dia. ϕ3 mm (oil-resistant cabtyre 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

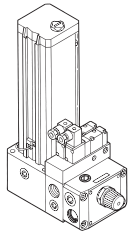
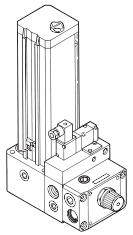
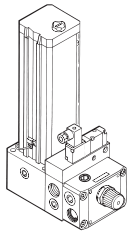
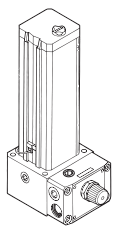
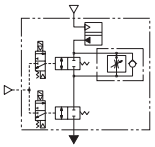
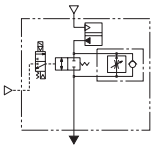
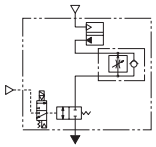
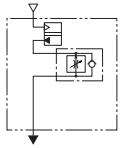
1. When 100 V AC is used, be sure to provide the protective circuit SK-100.
2. When using any induction load (relay, etc.), be sure to provide a protective circuit (SK-100) with the load.
3. For the detailed sensor specifications and handling procedures, see the sensor specifications at the end of this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

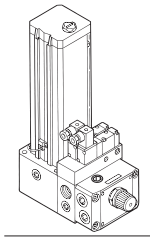
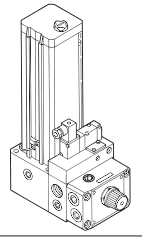
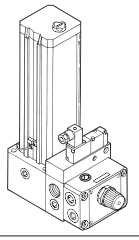
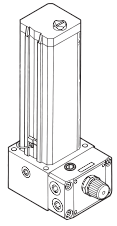
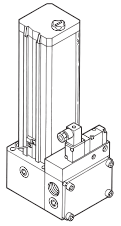
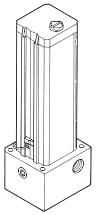
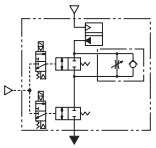
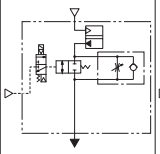
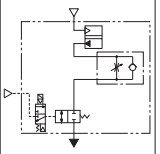
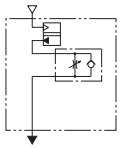
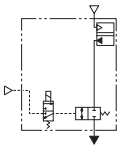
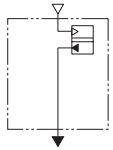
Internal Circuit



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

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			・Intermediate stop ・Inching ・2-step speed switching (fast/slow) ・Emergency stop			・2-step speed switching (fast/slow)		・Intermediate stop ・Inching ・Emergency stop	・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 ●These diagrams show meter-out circuits. On meter-in circuits, the flow control valve and throttle valve are positioned in different directions. ●NC skip valve and stop valve are used in these diagrams.									
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

With throttle valve							Converter	
With skip valve/stop valve			With skip valve		With stop valve	——	With stop valve	Converter only
・Intermediate stop ・Inching ・2-step speed switching (fast/slow) ・Emergency stop			・2-step speed switching (fast/slow)		・Intermediate stop ・Inching ・Emergency stop	・Speed control	・Intermediate stop ・Inching ・Emergency stop	——
								
								
○	—	○	○	—	—	—	—	—
—	○	—	—	○	—	—	—	—
○	○	—	—		○	—	○	—
—	—	○	—		—	○	—	—
SDA	SDC	SDD	SKA	SKC	STA	STD	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

ZR3 –A
Sensor type

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.

AHU2 –063– 001 – F D A 1 2 C 1
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽
Combination symbol

●Converter only

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

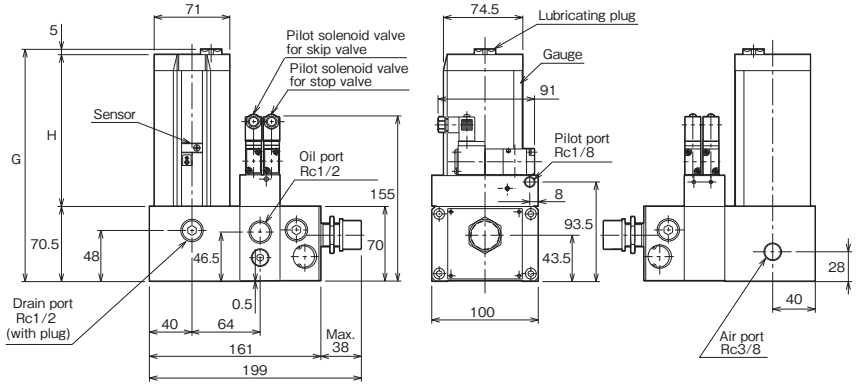
AHU2 –063– 001 C 1
❶ ❼ ❽

❶	Converter capacity				
	001	0.16ℓ	006	0.63ℓ	
	002	0.25ℓ	010	1ℓ	
	004	0.4ℓ	016	1.6ℓ	
❷	Control valve				
	F	With flow control valve			
	S	With throttle valve			
	O	Without control valve			
❸	Compound valve				
	D	With skip valve/stop valve			
	K	With skip valve			
	T	With stop valve			
	N	Without compound valve			

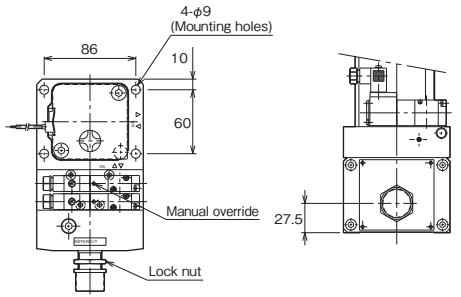
❹	Combination of compound valve		
	Symbol	skip valve	stop valve
	A	NC	NC
	C	NO	NC
	D	NC	NO
	O	—	—
❺	Control method of control valves (flow control valve and throttle valve)		
	0	Meter-out control	
	1	Meter-in control	
❻	Solenoid voltage		
	1	100 V AC 50/60Hz	
	2	200 V AC 50/60Hz	
	8	24 V DC	
❼	Sensor symbol		
	C	ZR3(with lamp)1.5m	
❽	Sensor quantity		

With flow control valve/with throttle valve

● With skip valve/stop valve

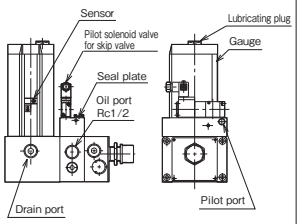


● In the case of meter-in control

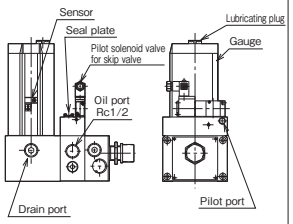


● This drawing shows the appearance of a unit with flow control valve.
● This drawing shows the appearance of a meter-out control type unit.

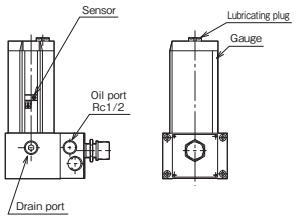
● With skip valve



● With stop valve



● With control valve only



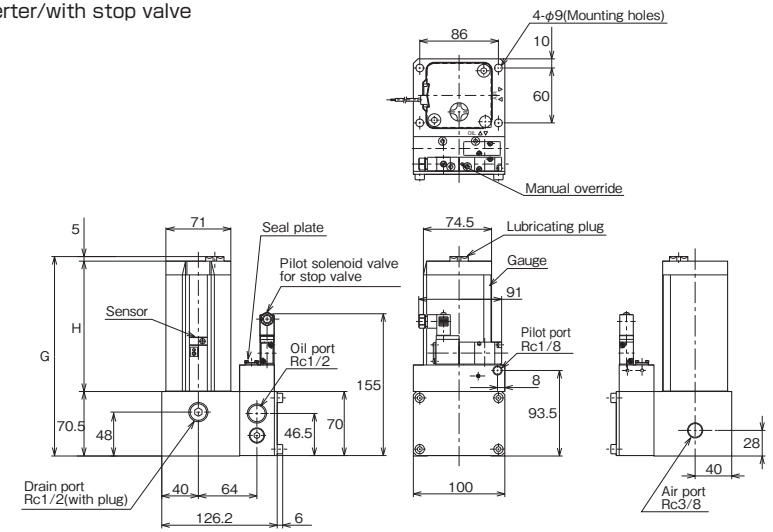
● For the detailed dimensions, see the unit with skip valve/stop valve.

Dimensional Table

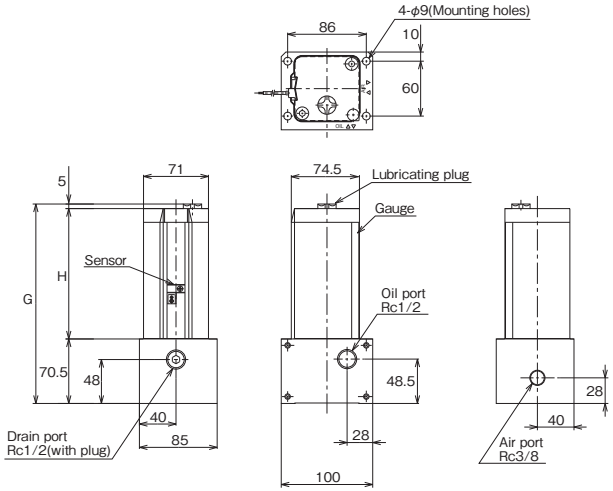
Symbol / Bore	G						H					
	0.16ℓ	0.25ℓ	0.4ℓ	0.63ℓ	1ℓ	1.6ℓ	0.16ℓ	0.25ℓ	0.4ℓ	0.63ℓ	1ℓ	1.6ℓ
φ63	218	245	290	358	468	648	142.5	169.5	214.5	282.5	392.5	572.5

Converter

● Converter/with stop valve



● Converter

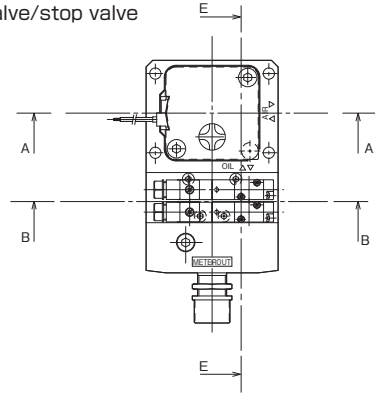


Dimensional Table

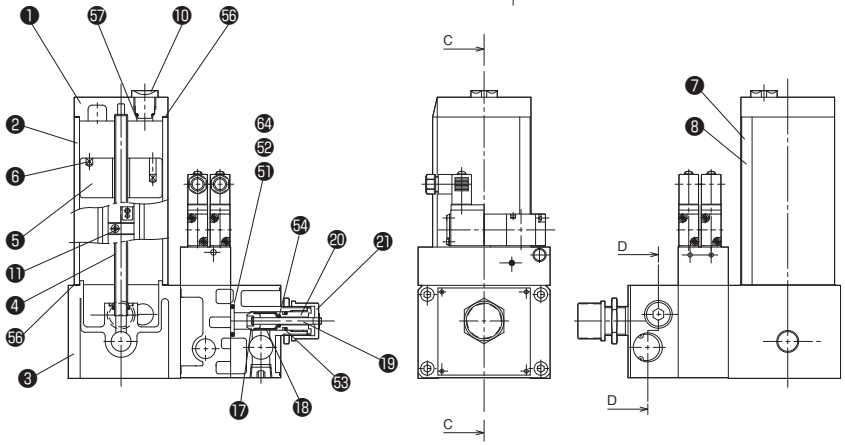
Symbol / Bore	G						H					
	0.16ℓ	0.25ℓ	0.4ℓ	0.63ℓ	1ℓ	1.6ℓ	0.16ℓ	0.25ℓ	0.4ℓ	0.63ℓ	1ℓ	1.6ℓ
φ63	218	245	290	358	468	648	142.5	169.5	214.5	282.5	392.5	572.5

With flow control valve/with throttle valve

● With skip valve/stop valve

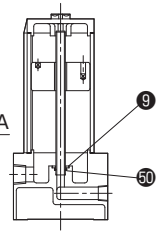


Section C-C

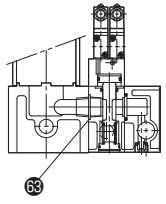


● The unit with flow control valve and the unit with throttle valve have the same appearance.
● This drawing shows the appearance of a meter-out control type unit.

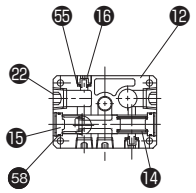
Section A-A



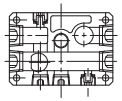
Section E-E



Section D-D

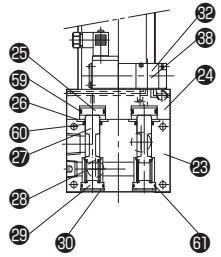


● With flow control valve

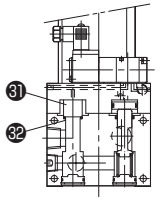


● With throttle valve

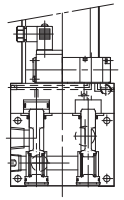
Section B-B



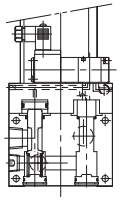
● With skip valve/stop valve (with flow control valve /with throttle valve)



● 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.
❶	Pneumatic cover	Aluminum alloy	1
❷	Tube	Aluminum alloy	1
❸	Hydraulic cover	Aluminum alloy	1
❹	Pneumatic piping	Aluminum alloy	1
❺	Float	Foamed resin	1
❻	Magnet	—	2
❼	Level gauge	—	1
❽	Gauge cover	Aluminum alloy	1
❾	Retainer	Stainless steel	1
❿	Lubricating plug	Resin	1
⓫	Sensor	—	—

No.	Name	Material	Qty.
⓬	Control valve body	Aluminum alloy	1
⓭	Spool	Stainless steel	1(0)
⓮	Spring for spool	Stainless steel	1(0)
⓯	Spring guide	Aluminum alloy	2(0)
⓰	Air vent plug	Carbon steel for general structure	2
⓱	Check needle	Copper alloy	1
⓲	Check spring	Stainless steel	1
⓳	Shaft	Stainless steel	1
⓴	Bush	Aluminum alloy	1
㉑	Handle	Aluminum alloy	1
㉒	Hex. plug	—	2(4)

No.	Name	Material	Qty.
㉓	Main body	Aluminum alloy	1
㉔	Piston cover	Aluminum alloy	1
㉕	Piston	Aluminum alloy	2/1
㉖	Retainer	Cold rolled steel	2/1
㉗	Spool	Stainless steel	2/1
㉘	Spring	Stainless steel	2/1
㉙	Spring guide	Aluminum alloy	2
㉚	Set ring	—	2
㉛	Spacer	Aluminum alloy	1
㉜	Stop valve	—	1
㉝	Skip valve	—	1

Seal List

No.	Name	Material	Part number	Qty.
㊿	Pneumatic piping O-ring	Nitrile rubber	P-10	1
㊶	O-ring	Nitrile rubber	P-34	1
㊷	O-ring	Nitrile rubber	P-22	1
㊸	O-ring for bush	Nitrile rubber	P-10A	1
㊹	O-ring for shaft	Nitrile rubber	P-6	1
㊺	Seal for air vent plug	Fluoric resin	CF-12	2
㊻	Tube gasket	Nitrile rubber	—	2
㊼	O-ring for lubricating plug	Nitrile rubber	7.6X12.4X2.4	1

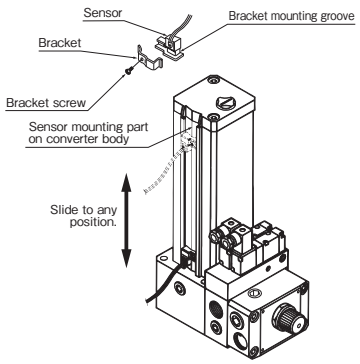
No.	Name	Material	Part number	Qty.
㊽	O-ring for spring guide	Nitrile rubber	S-20	2(0)
㊾	Piston seal	Nitrile rubber	MY-21	2/1
㊿	Rod seal	Nitrile rubber	PS-14	2/1
(51)	O-ring for spring guide	Nitrile rubber	S-20	1
(52)	O-ring for spacer	Nitrile rubber	P-14	1
(53)	O-ring	Nitrile rubber	P-22	2
(54)	O-ring	Nitrile rubber	P-20	2

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

Air-oil Unit
AHU2-063

Sensor setting procedures

Tightening torque: Approx. 0.4 N·m



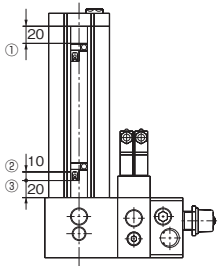
1. Place the bracket in the bracket mounting groove in the ZR3 type sensor.
2. Insert the sensor combined with the bracket into the sensor mounting part on the converter body.
3. Slide the sensor to any detecting position.
4. After sliding the sensor to the detecting position, tighten the bracket screw.

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

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



Note) Carefully check the sensor installation direction.