INSTRUCTION MANUAL

MEMBRANE AIR DRYER

IDG10・IDG10H
IDG20・IDG20H

MEMBRANE AIR DRYER UNIT (TYPE M)

IDG10M3・IDG10HM3
IDG20M3・IDG20HM3

MEMBRANE AIR DRYER UNIT (TYPE V)

IDG10V3・IDG10HV3
IDG20V3・IDG20HV3

Before operating, You should first thoroughly read this manual.
Keep this instruction manual.
Specification and equipment are subject to change without any obligation on the part of the manufacturer.

Contents

Safety Cautions

Each and individual product have its own operating specification. Operate product under conditions which are out of specification, could lead to failure of product. Follow and confirm product specification and operating cautionary points before and during installation, as well as operating of product.

⚠Caution	Ignoring of emphasized notification could cause mis-handle of product which may lead to the injured of people and the damage of things.

1. General Safety Information

[Make sure to read this instruction manual before operating.]

⚠ Caution 1－1 Operation

·Make sure to operate within specifications. (Refer to P. 9.)

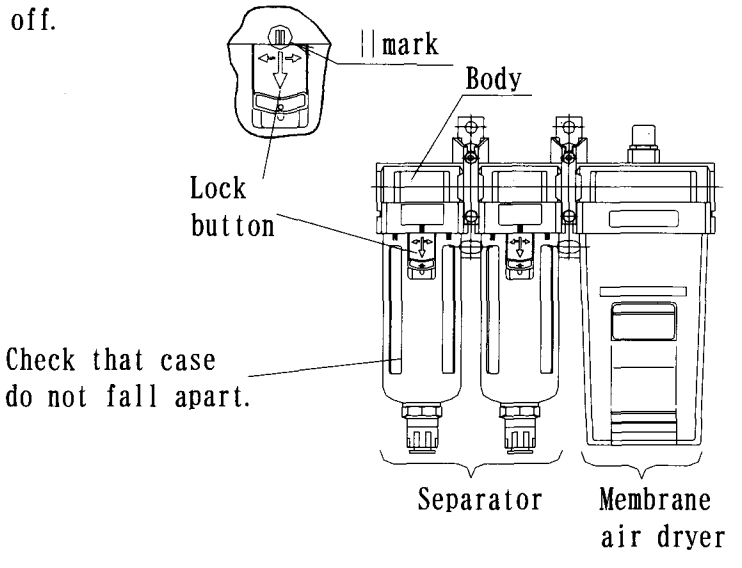
·Any of substances in table 1 should not be contained in compressed air and surrounding.
[Damage to product could result from their use.]

Table 1. Harmful Substances

Type	Harmful Substances
Solvent	Acetone, Benzene, Phenol, Toulene, Trichloroethylene, Xylene, Cresol, Thinner, Aniline, Chloroform, Dioxane, Methyl Alcohol, Tetrahydrofuran, Methylene Chloride, Cyclohexanone, Carbon Tetrachloride, etc.
Acid	Surfuric Acid, Nitric Acid, Hydrochloric Acid, Acetic Acid, Lactic Acid, Chromic Acid, etc.
Gas	Chlorine, Sulfurous Acid, Hydrogen Sulfide, Bromine, etc.
Oil	Hydraulic Fluid (Phosphatic Ester), Fuel Oil, Water Soluble Cutting Fluid (Alkaline), Kerosene, etc.

- Do not use it as breathing air dehumidifier.
- Do not install in places subjected to vibration.
- Before permitting the flow of compressed air, confirm separator's (in unit condition) case is not removable. (Refer to drawing.)
- Do not cover outlet portion of purging air .
[If this portion is covered, it could lowers performance.]

Surely confirm that the center of black lock button on case meets ‖ mark on body and the case does not come off.



⚠ Caution 1－2 Installation

- Flush pipes before installation.
- Keep minimum clearance of 100mm under this equipment. (Refer to P. 7, 8.)
- There is no fixed installation position for membrane air dryer.
  However, membrane air dryer unit should be installed in vertical direction.
- Do not confuse inlet and outlet of compressed air. (Refer to drawing.)
- On inlet side of membrane air dryer, install mist separator and micro-mist separator.
  [Without them, it does not perform well because water and oil flow in.]

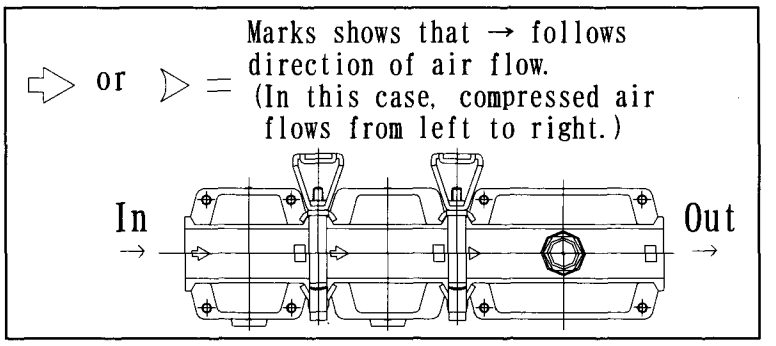
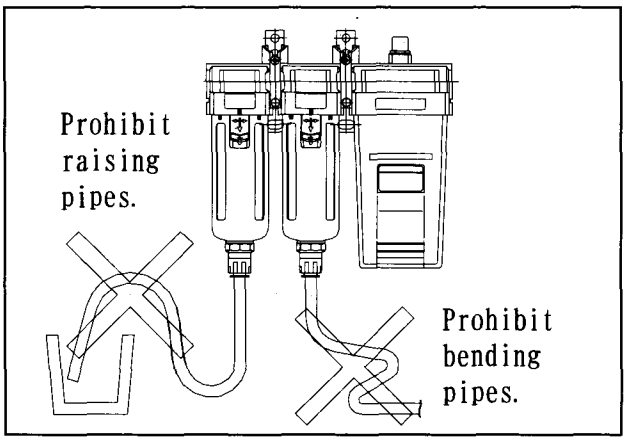


Table 2. Recommendable Separator

Description	Model Number
Mist Separator	AM150C－□□C AFM30－□□C
Micro-mist Separator	AMD150C－□□C AFD30－□□C

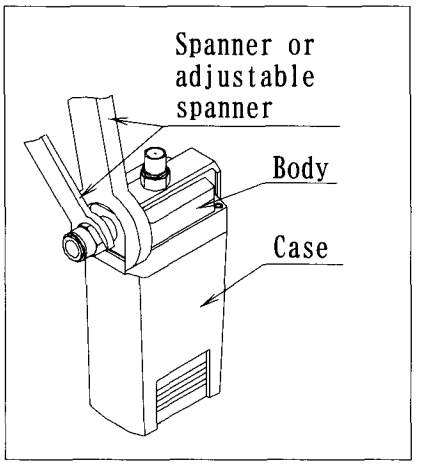
- Do not raise or bend drain pipes of each separators.
  [Do not raise or bend drain pipes, otherwise drain do not exhaust out and performance of the membrane air dryer.]
- Drain piping of each separators should be O.D. 10mm (Thread type: NPT: O.D. 3/8 inch) I.D. min 6.5 mm {1/4 inch} and max. 5 m {16.4ft.} in length.
- Install pressure reducing valve on outlet side of membrane air dryer.



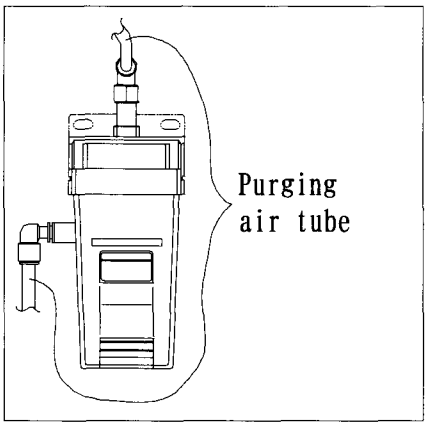
- Tighten pipes fixing body (die cast part) with spanner or adjustable spanner.
  Must not tighten while holding case by hands.
  [It could cause damage to case.]

Table 3. Tightening Torque

Port Size	Tightening Torque N·m {Lb-ft}
1／4	12～14 {8.9～10.3}
3／8	22～24 {16.2～17.7}



- Tube size with one touch fitting (Option P) for purging use please refer to P. 7 for purging air tube size and length of tube should be 5 m and below. For purging air tube 5 m and above, please do not install valve if tube is bend or constructed. (Refer to drawing.)
  If the dehumidifying performance will lower.



2. Maintenance

⚠ Caution

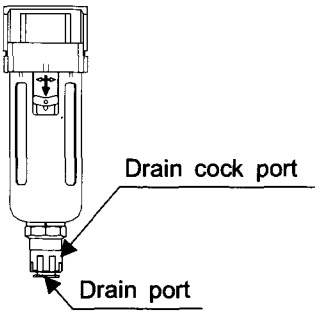
Make sure that equipment is depressurized to zero before maintenance.

[It is dangerous resulting in damage and slipping out of parts.]

2－1 Dairy maintenance

a. Ensure that drain, which gather in internal mist separator and micro-mist separator installed of inlet side, does not go beyond the maximum drain level during operation. [Going over the maximum drain level, drain flows in and causes drop in performance.]

b. Check that the mist separator and micro-mist separator at the inlet work smoothly and they regularly exhaust drainage before operating the membrane air dryer unit. Maintain the auto drain with the following procedure if any failures such as exhausting failure or leakage occur.
〈How to remove foreign matter〉
After removing the tube connected to the drain port, apply air pressure to the inlet port, and turn the drain cock clockwise to let air blow from the drain port for several seconds.
This operation may remove the foreign matter, and the operation may become normal. (See the right figure.)



c. Confirm normal performance of membrane air dryer by color of grains inside the dew point checker. (When color of grains turns pink, white, brown or black, refer to P. 4 and P. 10)

Table 4. Condition of Membrane Air Dryer

Color of Dew point checker	Condition of Function
Blue	Functioning normally
Pink, White, Brown, Black	Performance is going down

Note: It takes approximately one hour after supplying air for grains dew point checker to react.

2－2 Bi-yearly maintenance

・Replace the element of the mist separator and micro-mist separator at the inlet after 2 years of operation using the procedure shown in "Replacement of Element" (P. 5). However, if the pressure drop of each separator of the membrane air dryer unit reaches 0.1 MPa replace the element even if the unit has not been operated for 2 years.

2－3 Maintenance : Once in 10 years

・Basically, the membrane module set should be replaced based on section C of "2-1 Daily Maintenance."
However, if the membrane module set is regularly replaced, the reference of the replacement interval should be 10 years, although this interval varies depending on the operating conditions. The above mentioned interval is applicable if the membrane module set is provided with the micro-mist separator at the upstream side. However, if the color of the dew point indicator changes to the color shown in section C of "2-1 Daily Maintenance" within 10 years, replace the membrane module set as shown in "Replacement of Module Set" on page 4.
〈Discoloration of hollow fiber membrane〉
When the hollow fiber membrane comes in contact with air, it discolors from a milky color to light brown and then dark brown. The closer to the inlet the hollow fiber membrane is, the greater the discoloration becomes due to temperature and humidity. As this phenomenon occurs because of a natural reaction between components in the air and the hollow fiber membrane, it is not a failure nor does it indicate performance deterioration.

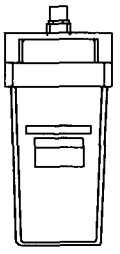
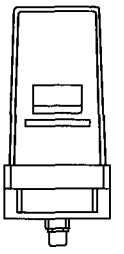
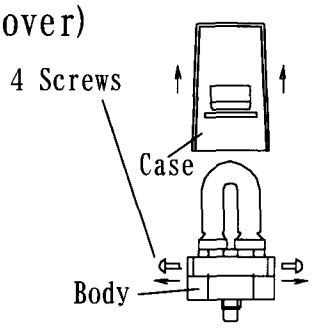
3. Spare parts

⚠ Caution

Make sure that equipment is depressurized to zero before maintenance.

3－1 Replacement of Module set

①Make sure that equipment is depressurized to zero before maintenance.
②Invent the module set before dismantling.
③Remove screw (4 pieces) attaching case to body and remove the case vertically.
④Remove screw (6 pieces) attaching module to body, then remove module set (old) from body.
⑤Dismantle the 3 o-ring old part.
⑥Re-install the 3 o-ring new part.
⑦Check there are orifice in center of the new module set, then attach new module set to body with 6 screws.
NOTE: Ensure round counter sunk on edge of body and protrusion of module set are properly aligned during installation.
⑧Re-install case to body with 4 screws.

<table>
<tr>
<td>1) Depressurize to zero!
 
MEMBRANE AIR DRYER</td>
<td>2) Invent the module set before dismantling.
  </td>
<td>3) Unscrew the case (cover)
  </td>
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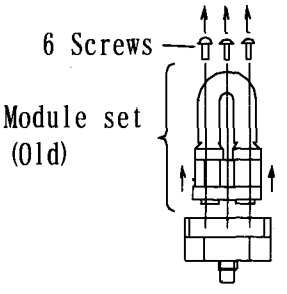
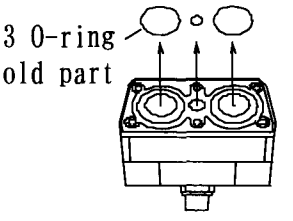
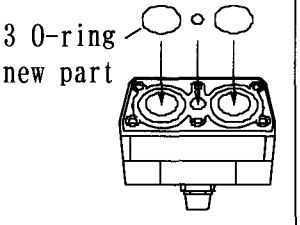
<tr>
<td>4) Remove the module set.
  </td>
<td>5) Dismantle the o-ring and orifice.
  </td>
<td>6) Re-install the o-ring and orifice.
  </td>
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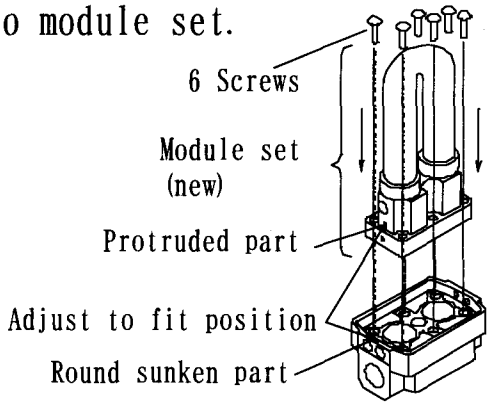
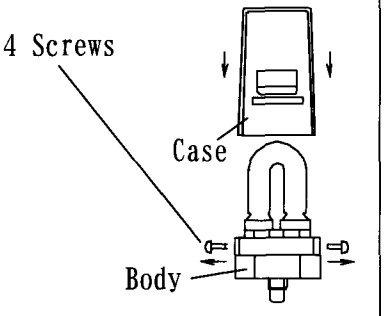
<tr>
<td colspan="2">7) Insert to module set.
  </td>
<td>8) Re-install the case (cover).
  </td>
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3－2 Replacement of element

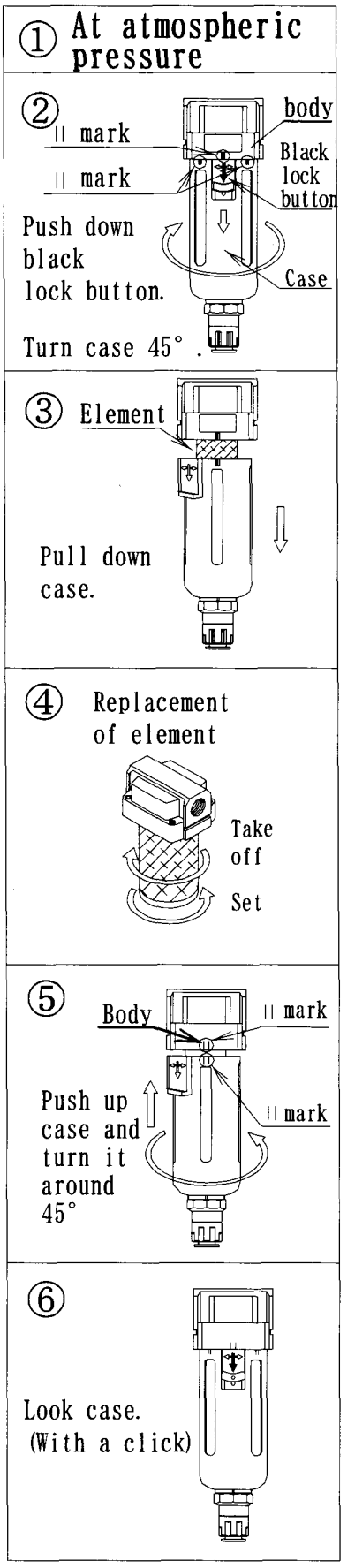
・The reference of the replacement interval for the element of each separator in the membrane air dryer unit is 2 years of operation.
The replacement should follow the following procedure.
However, if the pressure drop of each filter reaches 0.1 MPa within 2 years, replace it.

Table 5. Parts Number for Spare Element

Description & Model of Separators	Part Number for Element	Qty.
Mist separator AFM30	AFM30P-060AS	1
Micro-mist separator AFD30	AFD30P-060AS	1

Replacing procedure

①Make sure that equipment is depressurized before disassembling it for cleaning.
②Push up black lock button on case, and turn the case 45°
(Turn to the position where ‖ marks on body and case meet.)
③elease lock button.
Pull down (vertically) case slowly, and then it comes off.
④Turn used element counterclockwise to take body.
Install new element into body by turning clockwise.
⑤Place ‖ marks on body and case together.
Push up the case, and turn it around.
⑥Case is locked with a click, and then that body and case do not fall apart.



3－3 List of components

Table 6. Spare parts

No.	Part No.	Description	Qty.	Remarks	Replacement interval
A	AFM30P-060AS	Element assembly	1	For AFM30 (With O-ring)	Every 2 years or when pressure of each separator drops to 0.1MPa, whichever is first
B	AFD30P-060AS	Element assembly	1	For AFD30 (With O-ring)	
F	IDG-EL10	Module set (Module, orifice and o-ring)	1	For IDG10	10 years (10 hours per day)
	IDG-EL10H		1	For IDG10H	
	IDG-EL20		1	For IDG20	
	IDG-EL20H		1	For IDG20H	
G	IDG-DP01	Dew point checker set	1	With O-ring	Every 2 years or when color changes to brown, whichever is first
H	IDG-DP01-X001	Dew point checker set with one touch fitting	1	With O-ring	

Table 7. Part number of components

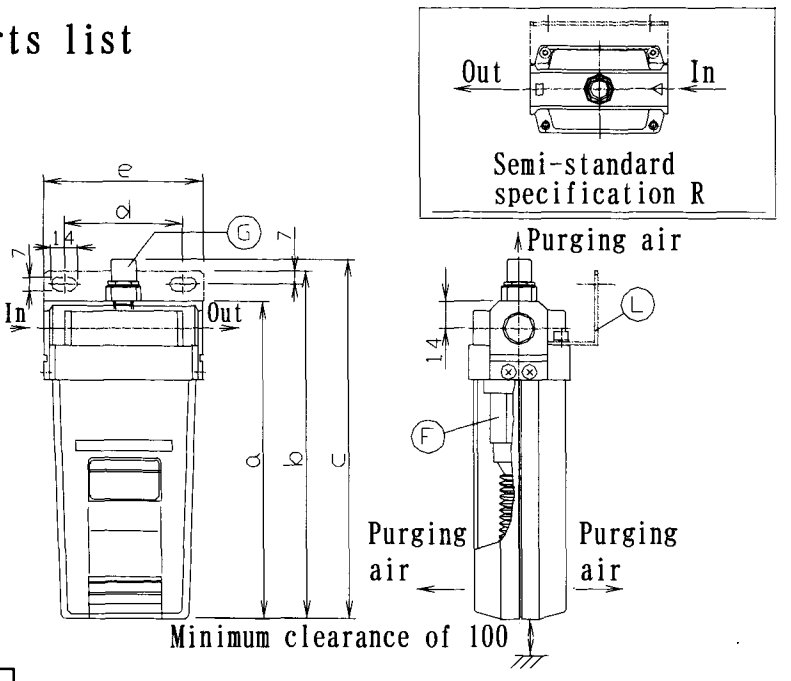
No.	Part No.	Description	Qty.	Remarks	
C	C3SF	Case assembly	2	For IDG□□M3(V3)-□	For AFM30, For AFD30 (With o-ring)
D	AD37	Auto Drain (N.C.)	2	For IDG□□M3(V3)-□C	
	AD37N		2	For IDG□□M3(V3)-N□C	
E	C3SF-J	Case assembly	2	For IDG□□M3(V3)-□J	
	C3SFN-J		2	For IDG□□M3(V3)-N□J	
	C3SFF-J		2	For IDG□□M3(V3)-F□J	
I	GC3-10AS	Pressure gauge	1	For AR25-□□E	
J	BM61	Bracket assembly (2-M4 Cap Screws)	1	For IDG10, IDG10H	
	BM63		1	For IDG20, IDG20H	

※Part no. A～J corresponds with part no. specified in drawing at P.7, 8.

※Please refer to catalogue (modular type regulator pressure gauge) on replacement method for pressure gauge (G3-10AS).

4. Dimensions & Parts list

IDG10□
IDG20□



IDG10□-□□□-P
IDG20□-□□□-P

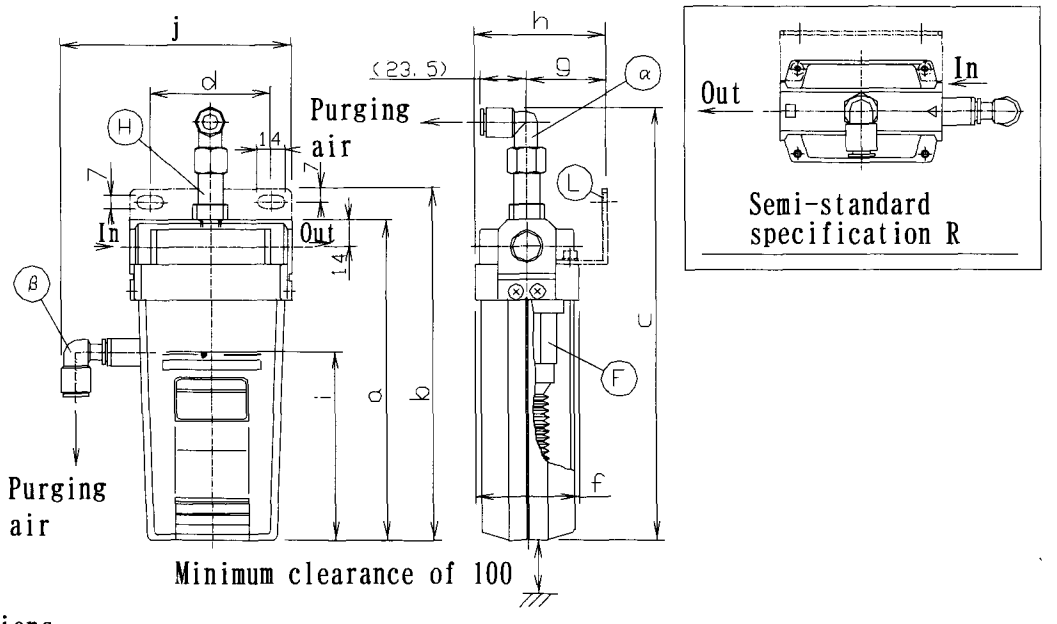


Table 7. Dimensions

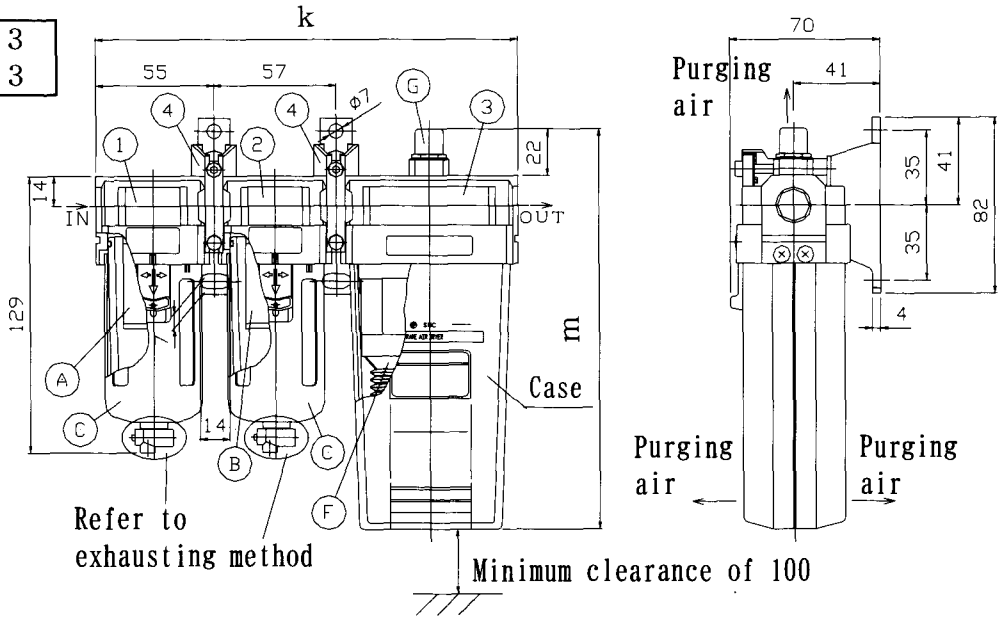
Model	a	b	c	d	e	f	g	h	i	j
IDG10□	165	181	187	62	83	53	41	67.5	—	—
IDG10□-□□□-P			224		—				97	119
IDG20□	190	206	212	82	113	54		68	—	—
IDG20□-□□□-P			249		—				114	147

Table 8. One touch fitting for purge air exhaust

No.	Model of one touch fitting	Tube diameter	Qty.	Remarks	
α	KQLF08-02-X2	O.D. 8 mm (less than I.D. 5 mm)	1	For Dew point Checker	
		O.D. 5/16 inch			
β	KQL08-99-X2	O.D. 8 mm (less than I.D. 5 mm)	1	For IDG10□	For Case
		O.D. 5/16 inch			
	KQL10-99-X2	O.D. 10 mm (less than I.D. 6.5 mm)		For IDG20□	
	IQL6-99-X2	O.D. 3/8 inch			

※Please refer to 「List of components」 (P. 6) for part replacement of part no A～J.

IDG10□M3
IDG20□M3



IDG10□V3
IDG20□V3

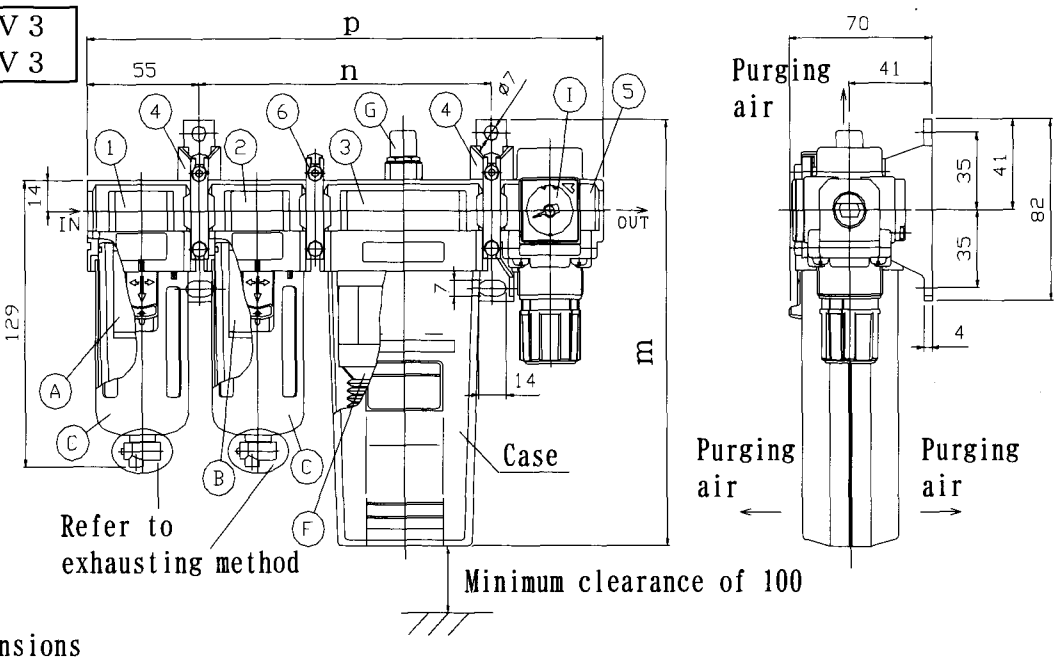


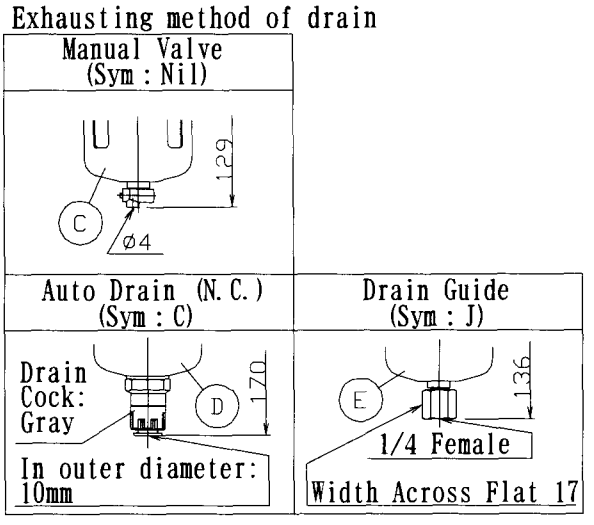
Table 9. Dimensions

Model	k	m	n	p
IDG10□M3	197	187	—	—
IDG10□V3	—	192	144	254
IDG20□M3	227	212	—	—
IDG20□M3	—	217	174	284

Table 10. Component Equipments

No.	Model	Description	Qty.
1	AFM30	Mist separator	1
2	AFD30	Micro-mist separator	1
3	IDG10	Membrane air dryer	1
	IDG10H		
	IDG20		
	IDG20H		
4	Y300T	Spacer with L shaped bracket	2
5	AR25−□□G	Regulator	1
6	Y300	Spacer	1

Exhausting method of drain



※Please refer to 「List of components」 (P. 6) for part replacement of part no A～J.

5. Specifications

Standard dew point		−20℃		−15℃	
Model		IDG10 IDG10M3 IDG10V3	IDG20 IDG20M3 IDG20V3	IDG10H IDG10HM3 IDG10HV3	IDG20H IDG20HM3 IDG20HV3
Condition	Working Fluid	Compressed Air			
	Inlet Air Pressure MPa {psi}	0.3～0.85 {44～123}			
	Inlet Air Temperature ℃ {° F}	-5～55 {23～131} (※1)			
	Ambient Temperature ℃	-5～55 {23～131° F}			
Performances	Outlet Air Dew point ℃ {° F}	−20 {−4}		−15 {5}	
	Inlet Air Flow rate L/min(ANR) (※2)	125	250	111	222
	Outlet Air Flow rate L/min(ANR)	100	200	100	200
	Purging Air Flow rate L/min(ANR) (※3)	25	50	11	22
	Inlet Air Pressure MPa {psi}	0.7 {101}			
	Inlet Air Temperature ℃ {° F}	25 {77}			
	Inlet Air Saturation Temperature ℃ {° F}	25 {77}			
	Ambient Temperature ℃	25 {77° F}			
Purging Air Flow rate of Dew point Checker		1 L/min(ANR) {Inlet Air Pressure : 0.7MPa(101psi)}			
Filtration degree of micro mist separator		0.01μm (Filtration efficiency 99.9%)			
Regulator structure		Type Relief			
Port size (keys Nominal B)		1／4・3／8			

※1 : Not frozen.
※2 : ANR means flow rate converted into values at atmospheric pressure of 20℃ {68° F}.
※3 : Included purging air flow rate for dew point checker.
※4 : Type M3, V3
※5 : Type V3

Model	IDG10 IDG10H	IDG20 IDG20H	IDG10M3 IDG10HM3	IDG20M3 IDG20HM3	IDG10V3 IDG10HV3	IDG20V3 IDG20HV3
Mass kg	0.43 (With bracket 0.51)	0.66 (With bracket 0.76)	1.21 (With auto drain 1.30)	1.44 (With auto drain 1.53)	1.67 (With auto drain 1.76)	1.90 (With auto drain 1.99)

6. Troubleshooting

・If something abnormal has occurred by any possibility, examine it following the table below. And if it still cannot be handled, contact any selling agency or our office located nearest you.

[Make sure that equipment is depressurized to zero before maintenance or repair.]

Situations	Causes	Solutions
Color of grains in dew point checker is turning pink, white, brown or black.	Water and oil flow into membrane air dryer.	・Check the operation condition of the mist separator and micro-mist separator. If any failure is found, repair it. ・Check drain piping of mist separator and micro-mist separator. If they rise or bend, remove rising parts and straighten drain piping. ・If element of mist separator and micro-mist separator are not replaced properly, install again with correct method. (Refer to "REPLACEMENT OF ELEMENT" (P. 5).) Note: If color of grains inside dew point checker is brown or black, the dew point checker and module should be replaced.
Color of grains in dew point checker is turning pink or white.	Inlet air temperature is high.	・Improve ventilation to lower the ambient temperature of where air compressor is installed. (Lower inlet air temperature.) ・Install after cooler or something substituted for on inlet side of membrane air dryer unit to lower air temperature.
	Ambient temperature is high.	・Improve ventilation to lower the ambient temperature.
	Air flow rate is large.	・Check the specifications, reduce the flow rate to lower than rated flow rate.
	Inlet air pressure is low.	・Check the specifications, raise the pressure to more than minimum working pressure.
	Purging air volume is small.	・Check outlet for purging air. ・Check the purging air piping. a. Remove any block on bend on the purging air piping. b. Piping for purging air is reduce or longer than specified length, refer to P. 2, 7 for correction. c. Do not merge purging air line piping flow.
Grains in dew point checker are crushed.	Water flow into membrane air dryer.	・Replace dew point checker.

Glossary

·Membrane air dryer : Dehumidifier applying hollow fiber whose property is that moisture (vapor) is easily transmitted but air is hard to transmit.
·Mist separator : Air filter which performs filtration degree of 0.3μm (Filtration efficiency 99.9%).
·Micro-mist separator : Air filter which performs filtration degree of 0.01μm (Filtration efficiency 99.9%).
·Dew point checker : Instrument to check air dryness by color of grained silica-gel.
·Flushing : To blow off contaminant by supplying air. (Never fail to do before piping.)

Conversion factor

·1 L/min (ANR) = 3.53×10^{-2}cfm
·1 mg = 2.20×10^{-6}lb
·1 m^3 (ANR) = 3.53×10 cu. ft.
·1 mm = 3.94×10^{-2} in.
·1 MPa = 1.45×10^{2}psi
·1 N·m = 7.38×10^{-1} lb-ft
·1 m = 3.28 ft.
·°F = °C× (9/5) +32

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