INSTRUCTION MANUAL

MEMBRANE AIR DRYER

IDG60, IDG60H
IDG75, IDG75H
IDG100, IDG100H

MEMBRANE AIR DRYER UNIT (TYPE M2)

IDG60M2, IDG60HM2
IDG75M2, IDG75HM2
IDG100M2, IDG100HM2

MEMBRANE AIR DRYER UNIT (TYPE V2)

IDG60V2, IDG60HV2
IDG75V2, IDG75HV2
IDG100V2, IDG100HV2

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.
⚠ Warning	Ignoring of emphasized notification could cause mis-handle of product which may lead to the lost of lives or severely injured.

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. 10.)

The material of module is resin. Therefore, operating under unspecified conditions (high temperature and high pressure) is absolutely not allowed, because module would be damaged.

·Any of substances in table 1 should not be contained in compressed air and surrounding.

[Damage to product could result from their use.]

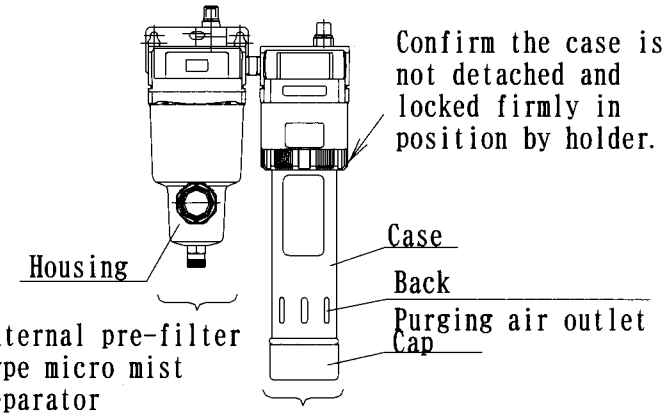
Table 1. Harmful Substances

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.
- Before permitting the flow of compressed air, confirm membrane air dryer and internal pre-filter micro mist separator housing (in unit condition) is not removable. (Refer to drawing of next page.)
- Do not cover outlet portion of purging air. (Refer to drawing of next page.) [If this portion is covered, it could lowers performance.]
- Whenever high quality of air is required (for example, for the used of air bearing and air blow in semi-conductor industries, etc.), install micro mist separator at the secondary (before the pipe end) of membrane air dryer (unit). For V type membrane air dryer unit, regulator with grease applied internally is in use. Therefore, it is necessary to install micro mist separator at its secondary or to change it to micro mist separator cum regulator, AWD, which is considered as special order.
- There is time lag to achieve required rated dew point when compressed air starts to flow. Take below stated time span as a guide to let the compressed air to flow through before operating required machine.

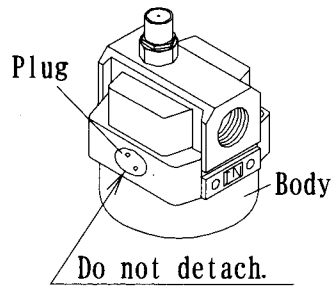
  Rated dew point at -20℃, -15℃: about 10 minutes
- Rubber cap (gray) attached at the bottom of membrane air dryer strictly should not be detached.

Before flowing of compressed air, ones must always confirm housing is secured firmly by bolts.



⚠ Warning

During pressurized situation, plug which is mounted at body is not allowed to be detached. If may jump out form space and lead to injured of people. (Refer to drawing.)

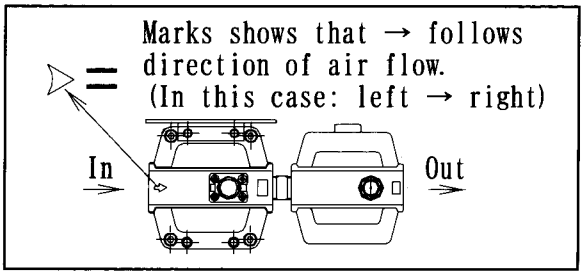


⚠ Caution 1－2 Installation

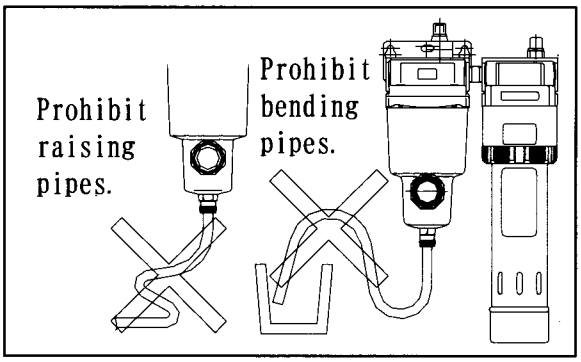
- Flush pipes before installation.
- Keep minimum clearance of 100 mm under this equipment. (Refer to P. 7～9.)
- There is no fixed installation position for IDG. However, IDG (unit) should be installed in vertical direction.
- Do not confuse inlet and outlet of compressed air. (Refer to drawing.)
- On inlet side of membrane air dryer, install mist separator and micro mist separator or internal pre-filter micro mist separator. [Without them, it does not perform well because water and oil flow in.]

Table 2. Recommendable Separator

Description	Model No.	Applicable Model
Mist separator	AM350C-□□D	IDG60*
	AM450C-□□D	IDG75*, 100*
Micro mist separator	AMD350C-□□D	IDG60*
	AMD450C-□□D	IDG75*, 100*
Internal pre-filter micro mist separator	AMH350C-□□D	IDG60*
	AMH450C-□□D	IDG75*, 100*



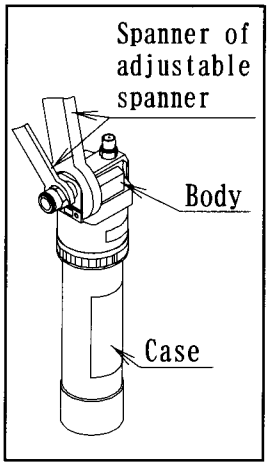
- Do not raise or bend drain pipes of each separators. [Do not raise or bend drain pipes, otherwise drain do not exhaust out and performance of the IDG.]
- Drain piping of each separators should be O.D. 10 mm (Thread type: NPT: O.D. 3/8 inch) I.D. min. 6.5 mm (1/4 inch) and max. 5 m in length.
- Install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

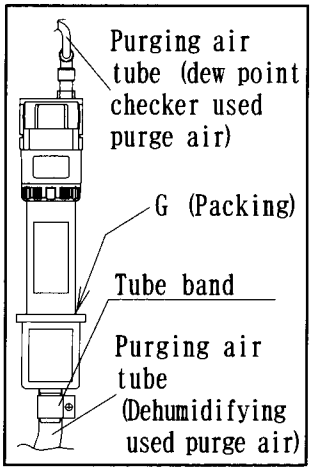


- Tighten pipes fixing body (die cast part) with spanner or adjustable spanner.
- Must not tighten while holding case by hands. [It could cause damage to case.]

Table 3. Tightening Torque

Port Size	Tightening Torque N·m (lb-ft)
3／8	22～24 {16.2～17.7}
1／2	28～30 {20.7～22.1}





- 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 5m and above, please do not install valve if tube is bend or constructed. (Refer to drawing.) If the sealing of the packing refer to G broken, the dehumidifying performance will lower.
- The piping for dew point checker used purge air and dehumidifying used purge air could be connected together. However, compressed air and drain piping must be separately installed.

2. Maintenance

⚠ Caution

Make sure that equipment is depressurized to zero before maintenance.

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

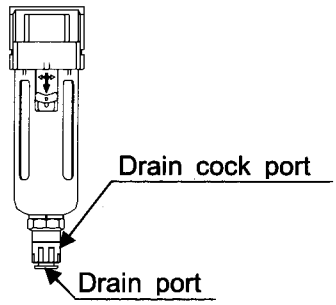
2－1 Dairy maintenance

a. Ensure that drain, which gather in internal pre-filter 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. 11)

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 Maintenance : Once in 2 years

・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.

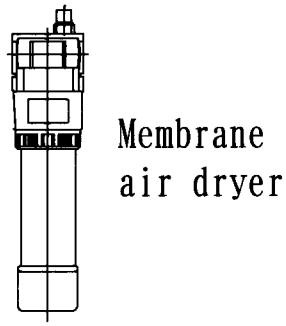
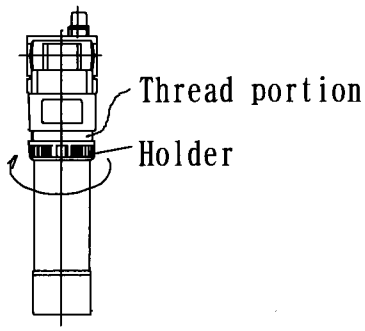
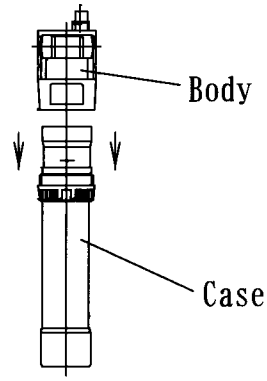
3. Spare parts

⚠ 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.
②Unscrew by turning the holder.
③Lower the case vertically, then remove it from body.
④Remove used module set from case.
⑤Check to ensure there is o-ring on the new module set.
⑥Insert the (new) module set vertically into the end of case.
⑦Confirm whether module set is fully inserted in the case by checking the dimension in between the top of case and module set.
⑧Re-install the case vertically to body.
⑨Turn to tighten holder onto the body. (The purging air hole position is not fixed.)

<table>
<tr>
<td>1) Depressurize to zero!
 
</td>
<td>2) Unscrew the holder.
 
</td>
<td>3) Unscrew the case.
 
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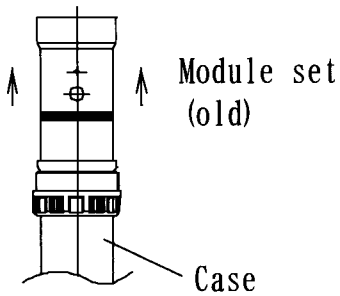
<td>4) Remove the module set.
 
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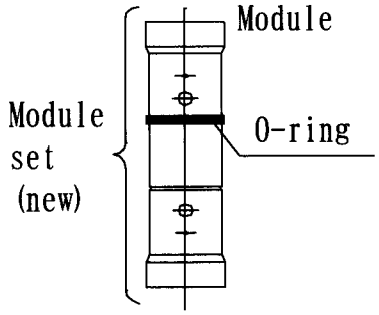
<td>5) Ensure there is o-ring.
 
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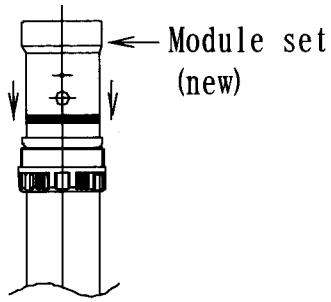
<td>6) Replace with new module set.
 
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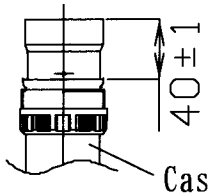
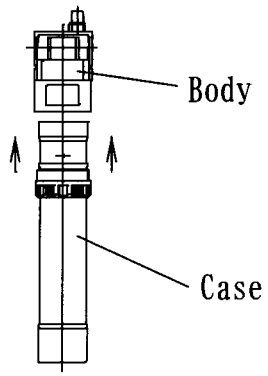
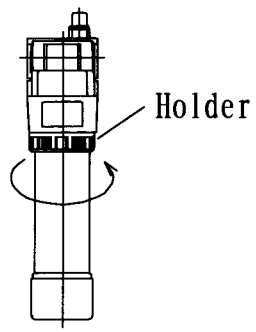
<td>7) Check and confirm the dimension in between the top of case and the top of module set.
 
</td>
<td>8) Install the case.
 
</td>
<td>9) Tighten the holder.
 
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3－2 Replacement of element

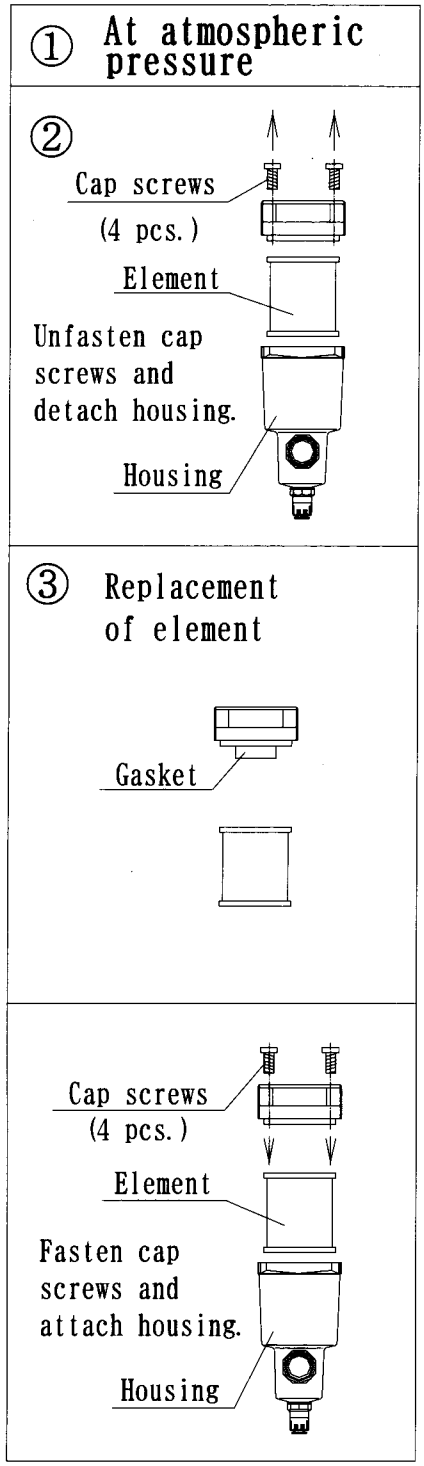
・The reference of the replacement interval for the element of each separator in the membrane air dryer unit is 2 years of operation.
The replacement should follow the following procedure.
However, if the pressure drop of each filter reaches 0.1 MPa within 2 years, replace it.

Table 5. Part number for spare element

Model of internal pre-filter micro mist separator	Part number for element	Qty.
AMH350C	AMH－EL350	1
AMH450C	AMH－EL450	1

Replacing procedure

①Release internal pre-filter micro mist separator air pressure to "0".
②Unfasten socket screws (4 pcs.). Subsequently, detach housing.
③Disassemble used element and gasket. Assemble new element and gasket to internal pre-filter micro mist separator.
④Attach housing to body by fastening socket screws (4 pcs.).



3－3 List of components

Table 6. Spare parts

No.	Part No.	Description	Qty.	Remarks	Replacement interval
A	AMH-EL350	Element assembly	1	For AMH350C (With O-ring, gasket)	Every 2 years or when pressure of each separator drops to 0.1 MPa, whichever is first
	AMH-EL450		1	For AMH450C (With O-ring, gasket)	
E	IDG-EL60	Module set (Module, O-ring)	1	For IDG60, 60H	10 years (10 hours per day)
	IDG-EL75		1	For IDG75, 75H	
	IDG-EL100		1	For IDG100, 100H	
F	IDG-DP01	Dew point checker set	1	With O-ring	Every 2 years or when color changes to brown, whichever is first
G	IDG-DP01-X001	Dew point checker set With one touch fitting	1	With O-ring	

Table 7. Part numbers of components

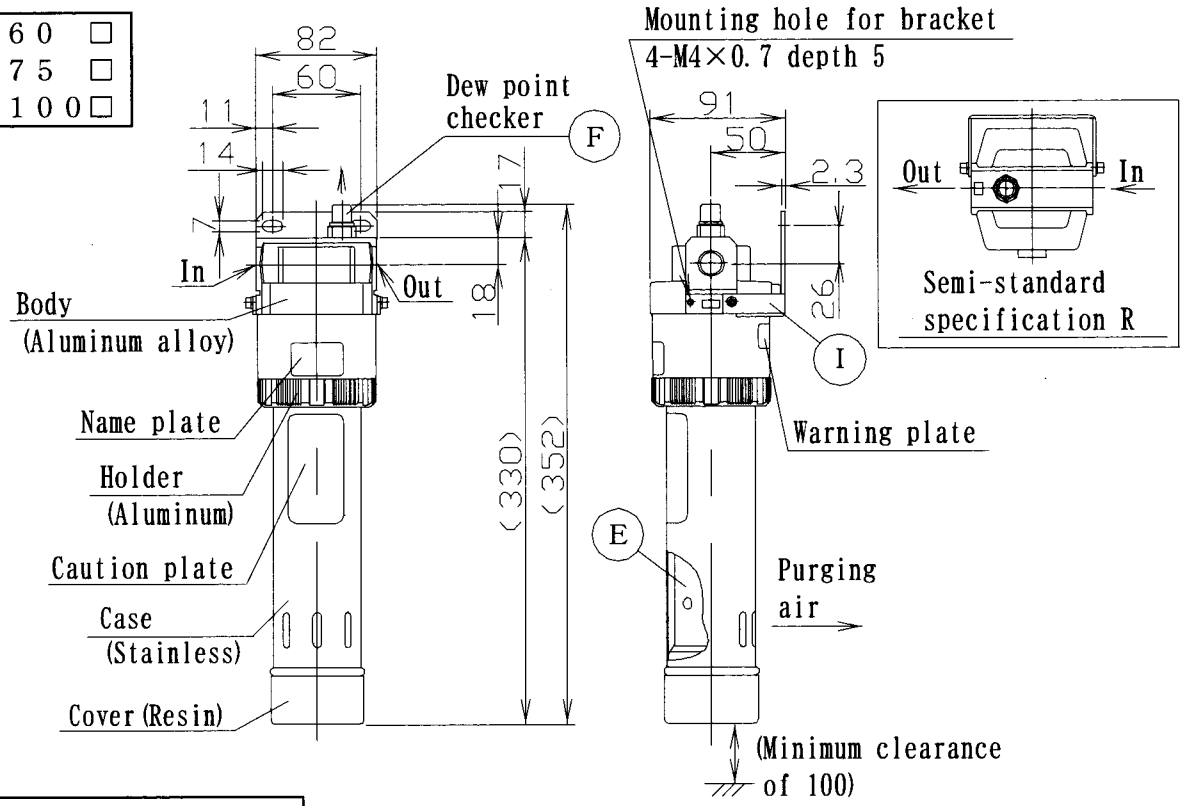
No.	Part No.	Description	Qty.	Remarks
B	AM-CA350C-A	Case assembly (Drain cock)	1	For IDG60 □M2 (V2) － □
	AM-CA450C-A		1	For IDG75 □M2 (V2) － □ For IDG100□M2 (V2) － □
C	AM-CA350C-D	Case assembly (N.O. auto drain)	1	For IDG60 □M2 (V2) － □D For IDG60 □M2 (V2) －F□D
	AM-CA350C-DN		1	For IDG60 □M2 (V2) －N□D
	AM-CA450C-D		1	For IDG75 □M2 (V2) － □D For IDG100□M2 (V2) － □D For IDG75 □M2 (V2) －F□D For IDG100□M2 (V2) －F□D
	AM-CA450C-DN		1	For IDG75 □M2 (V2) －N□D For IDG100□M2 (V2) －N□D
D	AM-CA350C-J	Case assembly (Drain guide)	1	For IDG60 □M2 (V2) － □J
	AM-CA350C-JN		1	For IDG60 □M2 (V2) －N□J
	AM-CA350C-JF		1	For IDG60 □M2 (V2) －F□J
	AM-CA450C-J		1	For IDG75 □M2 (V2) － □J For IDG100□M2 (V2) － □J
	AM-CA450C-JN		1	For IDG75 □M2 (V2) －N□J For IDG100□M2 (V2) －N□J
	AM-CA450C-JF		1	For IDG75 □M2 (V2) －F□J For IDG100□M2 (V2) －F□J
H	GC3-10AS	Pressure gauge	1	For AR40－□□E□
I	BM65	Bracket assembly (2-M4 Cap Screws)	1	Option

※Part No. A～I corresponds with part no. specified in drawing at P. 7. 8. 9.

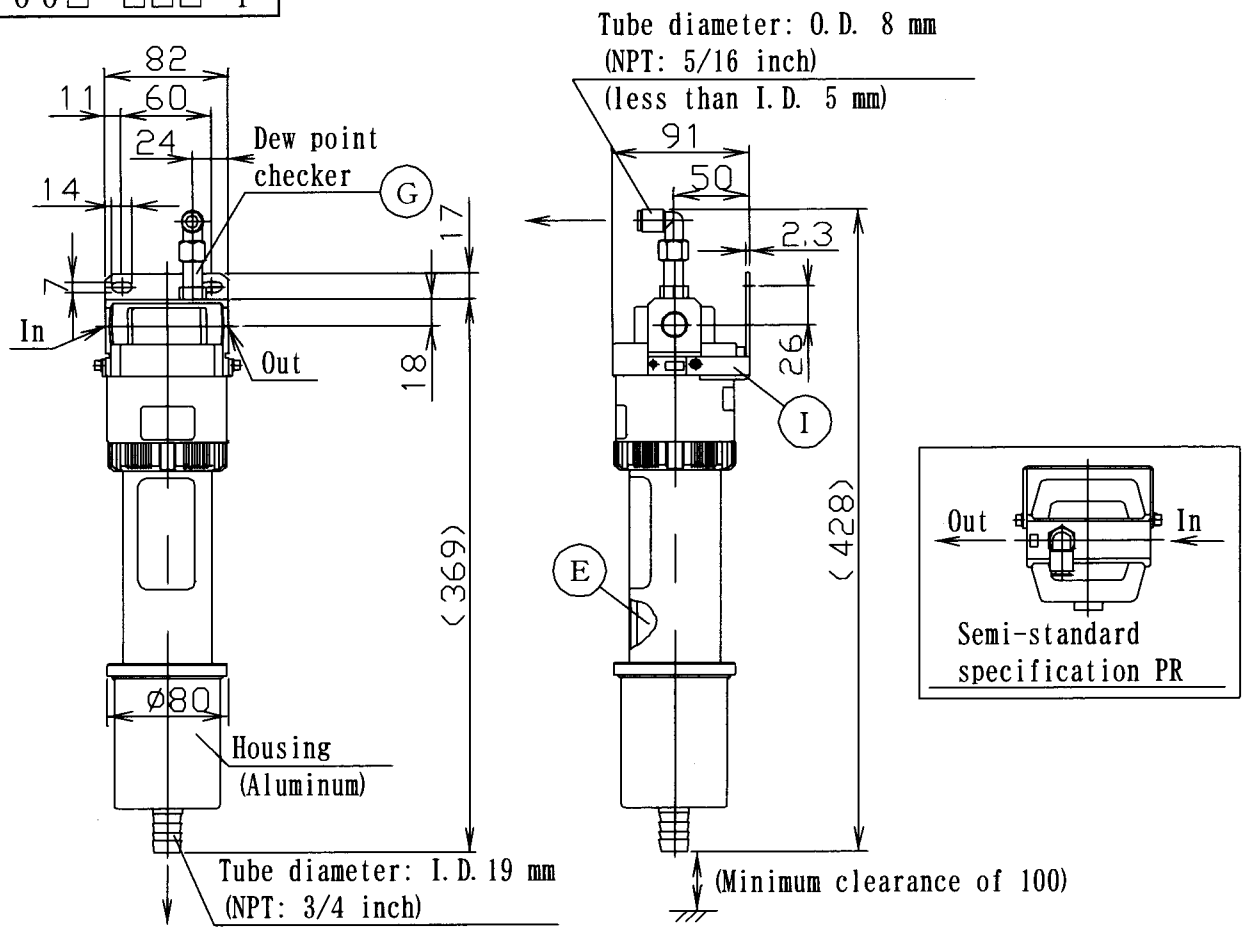
※Please refer to catalogue (modular type regulator pressure gauge) on replacement method for pressure gauge (GC3-10AS).

4. Dimensions

IDG60 □
IDG75 □
IDG100□

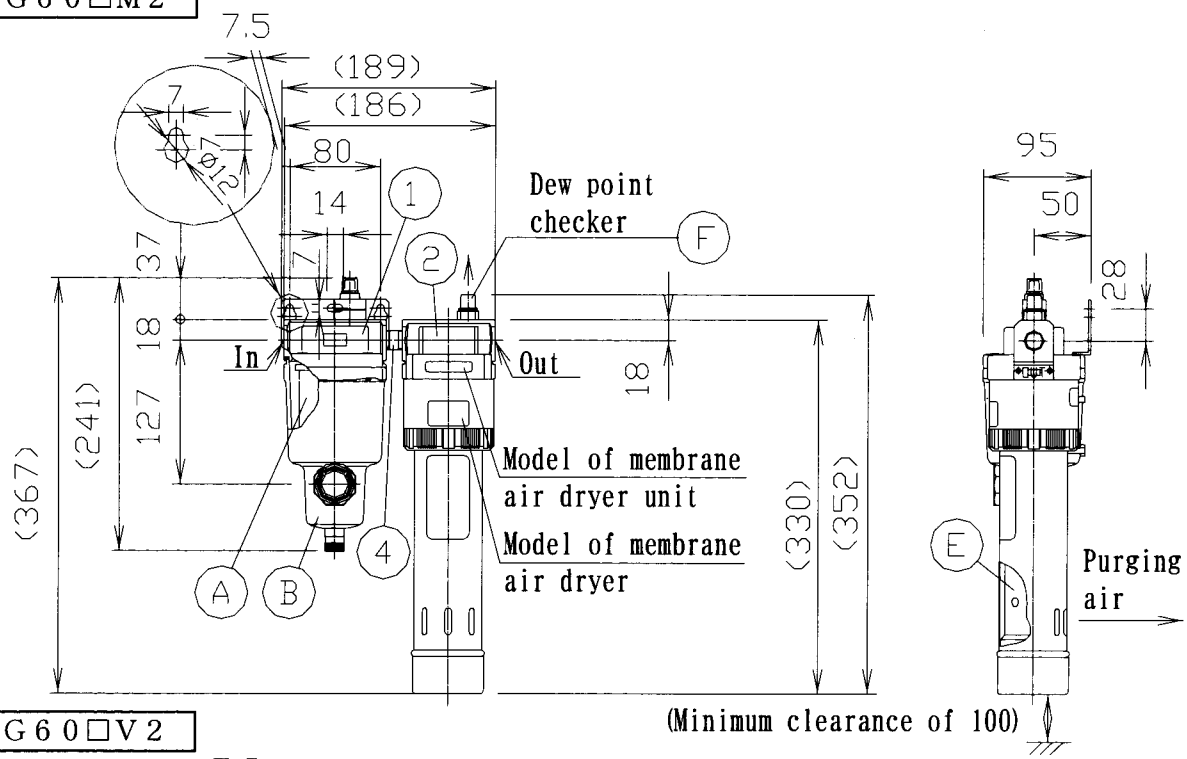


IDG60 □-□□□-P
IDG75 □-□□□-P
IDG100□-□□□-P



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

IDG60□M2



IDG60□V2

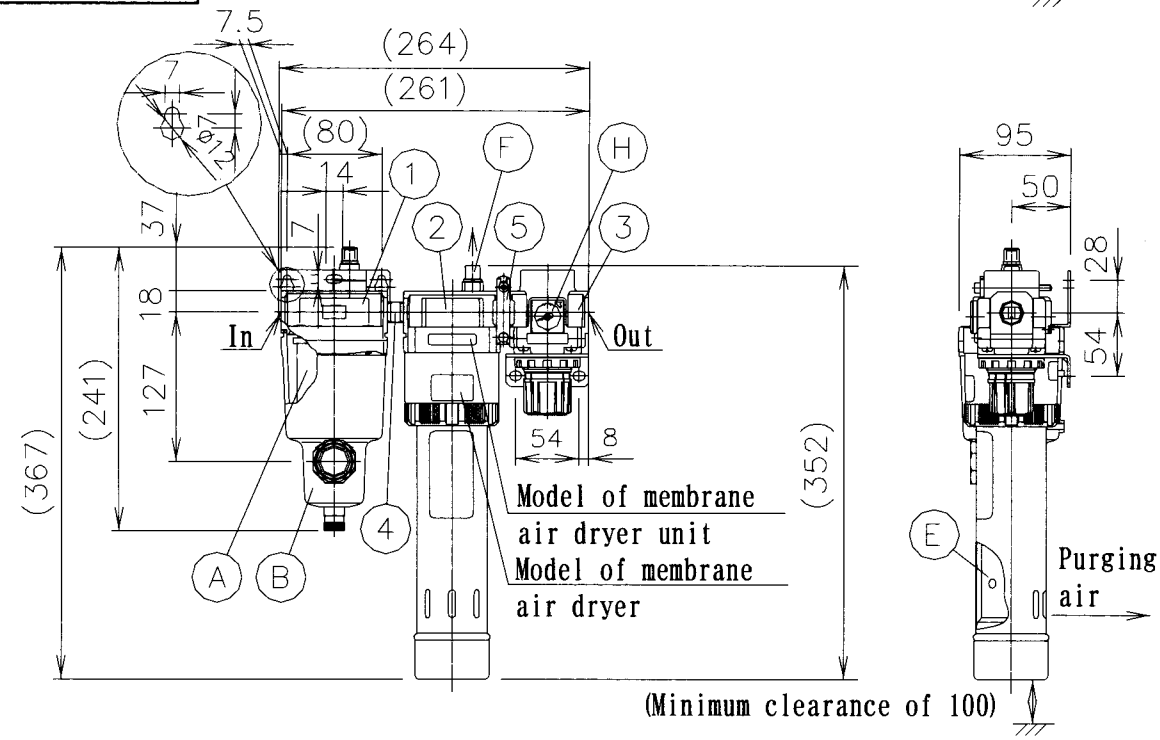
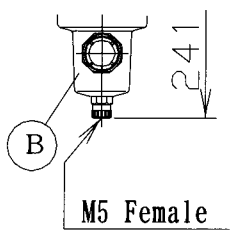
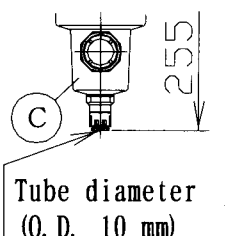
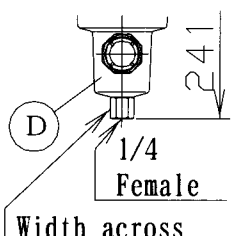


Table 8. Component equipment

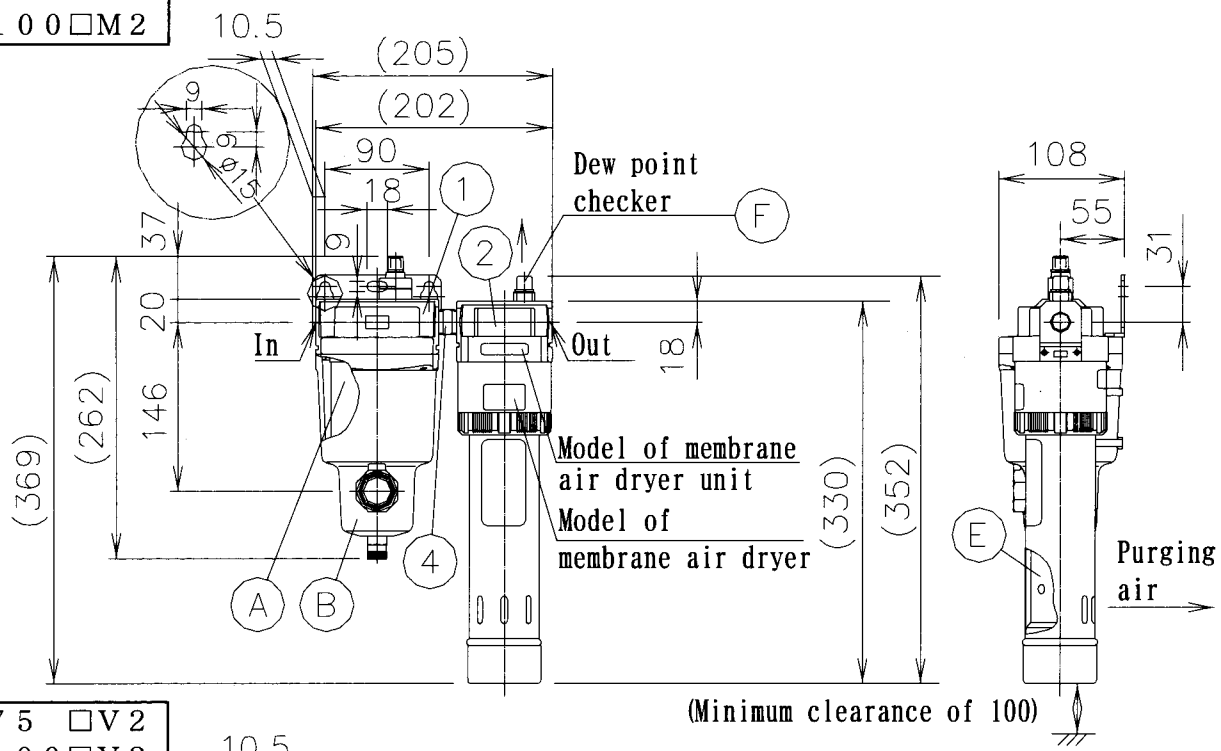
No	Model	Description	Qty
1	AMH350C	Internal pre-filter type micro mist separator	1
2	IDG60	Membrane air dryer	1
	IDG60H		1
3	AR40	Regulator	1
4	3/8, 1/2	Barrel nipple	1
5	Y400	Spacer	1

Exhausting method of drain

Manual valve (Sym: Nil)	Auto drain (N.O.) (Sym: D)	Drain guide (Sym: J)
		

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

IDG75 □M2
IDG100□M2



IDG75 □V2
IDG100□V2

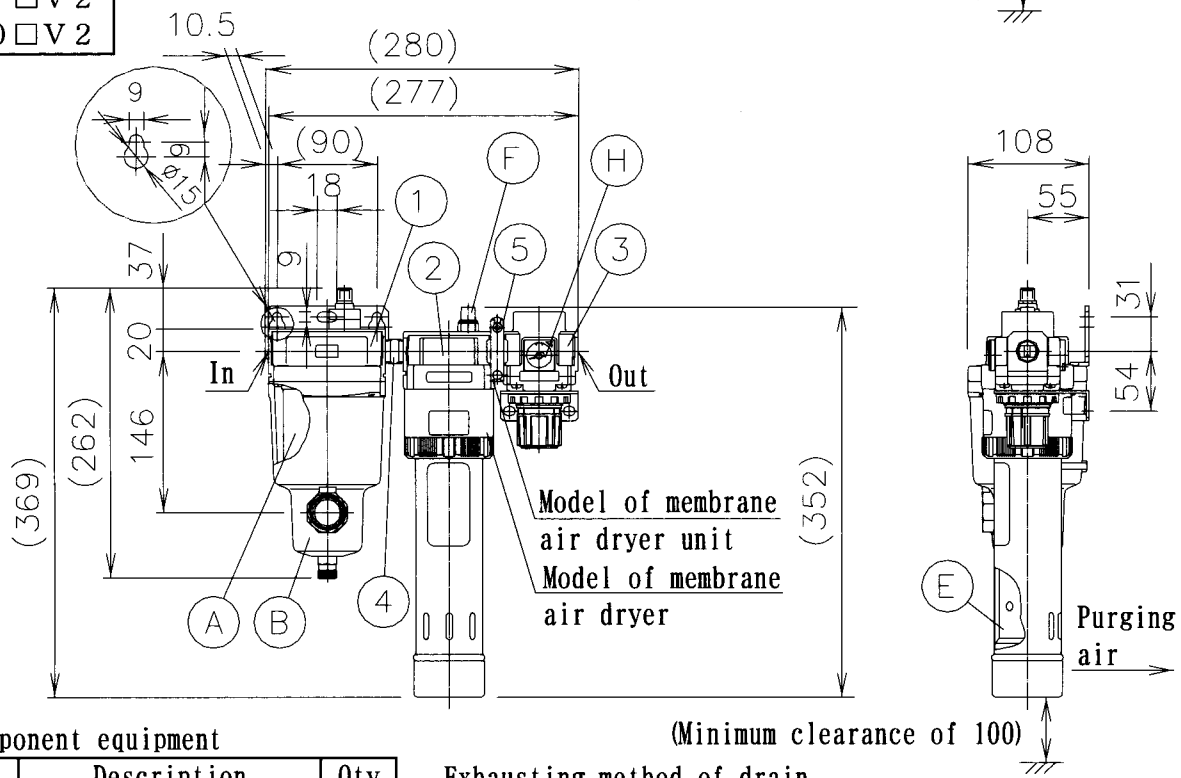
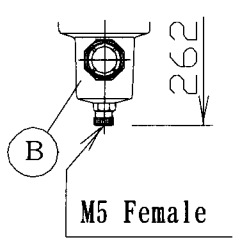
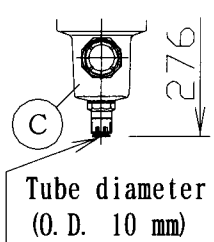
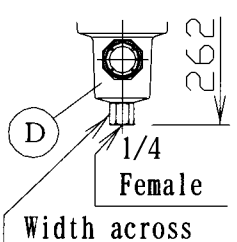


Table 8. Component equipment

No	Model	Description	Qty
1	AMH450C	Internal pre-filter type micro mist separator	1
2	IDG75	Membrane air dryer	1
	IDG75H		1
	IDG100		1
	IDG100H		1
3	AR40	Regulator	1
4	1/2	Barrel nipple	1
5	Y400	Spacer	1

Exhausting method of drain

Manual valve (Sym: Nil)	Auto drain (N.O.) (Sym: D)	Drain guide (Sym: J)
		

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

5. Specifications

Standard dew point		-20℃			-15℃		
Model		IDG60 IDG60M2 IDG60V2	IDG75 IDG75M2 IDG75V2	IDG100 IDG100M2 IDG100V2	IDG60H IDG60HM2 IDG60HV2	IDG75H IDG75HM2 IDG75HV2	IDG100H IDG100HM2 IDG100HV2
Condition	Working Fluid	Compressed Air					
	Inlet Air Pressure MPa {psi}	0.3～1.0 {44～145}					
	Inlet Air Temperature ℃ {° F}	-5～50 {23～122} (※1)					
	Ambient Temperature ℃	-5～50 {23～122° F}					
Performances	Outlet Air Dew point ℃ {° F}	-20 {-4}			-15 {5}		
	Inlet Air Flow rate L/min (ANR) (※2)	725	900	1190	665	830	1110
	Outlet Air Flow rate L/min (ANR)	600	750	1000	600	750	1000
	Purging Air Flow rate L/min (ANR) (※3)	125	150	190	65	80	110
	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 ※4		1 L/min (ANR) {Inlet Air Pressure : 0.7MPa (101psi)}					
Filtration degree of internal pre-filter micro mist separator ※5		0.01μm (Filtration efficiency 99.9%)					
Regulator structure		Type Relief					
Port size (keys Nominal B)		3/8 (IDG60M2, V2) ・1/2					

※1 : Type M2, V2 : 5～50℃

※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 M2, V2 ※5 : Type V2

Model	IDG60 IDG60H	IDG75 IDG75H	IDG100 IDG100H	IDG60M2 IDG60HM2	IDG75M2 IDG75HM2	IDG100M2 IDG100HM2
Mass kg	1.50 (With bracket : 1.65)		1.55 (With bracket 1.70)	2.55 (With auto drain 2.65)	3.10 (With auto drain 3.20)	3.15 (With auto drain 3.25)

Model	IDG60V2 IDG60HV2	IDG75V2 IDG75HV2	IDG100V2 IDG100HV2
Mass kg	3.74 (With auto drain 3.84)	4.29 (With auto drain 4.39)	4.34 (With auto drain 4.44)

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 internal pre-filter micro-mist separator. If they rise or bend, remove rising parts and straighten drain piping. ・If element of internal pre-filter micro mist separator is 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 press. 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.
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%).
- ·Internal Pre-filter 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

SMC Corporation

Akihabara UDX 15F,
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Phone: 03-5207-8249 Fax: 03-5298-5362

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