Doc. No. DOC1074090

Operation Manual

PRODUCT NAME

Membrane Air Dryer

MODEL / Series / Product Number

IDG3(H)V4-(F,N)**(C,J)(-R,S)-X017
IDG5(H)V4-(F,N) **(C,J)(-R,S)-X017
IDG10(H)V4-(F,N) **(C,D,J)(-R)-X017
IDG20(H)V4-(F,N) ** (C,D,J)(-R)-X017
IDG30(H,L)AV4-(F,N) **(C,D,J)(-R)-X017
IDG50(H,L)AV4-(F,N) **(C,D,J)(-R)-X017
IDG60(L,S)AV4-(F,N) **(C,D,J)(-R)-X017
IDG75(L,S)AV4-(F,N) **(C,D,J)(-R)-X017
IDG100(L,S)AV4-(F,N) **(C,D,J)(-R)-X017

F

SMC Corporation

Contents

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Safety Instructions

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

2. Limitations of Use

Design

⚠ Warning

1. Depending on the model and operating conditions, the oxygen ratio of the outlet air may drop.
Do not use standard dew point –40°C (symbol: L) type, standard dew point –60°C (symbol: S) type and IDG30A, 50A, 30HA, 50HA for dehumidifying breathing air. Do not use only outlet air (dry air) in a closed room.

2. Do not exert intermittent pressure on this product.
(Example: Frequently operating solenoid valves installed on the primary side) Intermittent pressure damages the product.

⚠ Caution

1. Install a regulator on the outlet side of the membrane air dryer.
If it is installed on the inlet side, dehumidification performance will be reduced.

2. Devise a layout which considers the position of purge air discharge ports.
Purge air is humid air. Devise a layout in which purge air will not cause trouble such as corrosion or malfunction of peripheral equipment.

3. When highly purified air is required
(Supply to air bearings, blowing of semiconductor parts, etc.)
Install a micro mist separator or super mist separator on the outlet side (end terminal) of the membrane air dryer (unit).
Grease is applied inside a regulator used in the unit (Type V).
When highly purified air is required, please either mount the above separator on the outlet side or use a made-to-order product, which is provided with a micro mist separator (AWD series) instead of a regulator.

4. Time to reach the standard dew point
A certain amount of time is required to achieve the standard dew point after the air begins flowing into the membrane air dryer. Using the times below as a guide, begin operating outlet side equipment after the standard dew point is achieved.

Standard dew point -20ºC, -15ºC : about 10 minutes.
Standard dew point −40°C : about 30 minutes
Standard dew point −60°C : about 60 minutes

Selection

⚠ Caution

1. Consider the purge air flow rate.
Find the purge air flow rate from the charts and calculate the "required outlet air flow rate + purge air flow rate". The air supply capacity must be at least equal to the calculated flow or the required outlet air flow rate cannot be obtained.

2. Auto-drain selection for the unit type
When the compressor in use is for 2.2 kW (300 L/min [ANR]) or less, use an N.C. auto-drain (symbol: C). If an N.O. auto-drain (symbol: D) is used when the compressor is for 2.2 kW or less, pressure inside the mist separator may not increase and remain in the state of blowing off. Auto-drain with differential pressure type can be used in 2.2 kW or less.

Mounting

⚠ Caution

1. Do not obstruct the purge air discharge ports.
The product may be damaged. And if purge air back pressure becomes too high or purge air stops flowing, dehumidification performance will decrease or may become impossible.

2. Be sure to install a mist separator and micro mist separator or a micro mist separator with pre-filter on the inlet side of the membrane air dryer.
If the inlet air contains oil, performance will be reduced. (A mist separator and micro mist separator or a micro mist separator with pre-filter are already installed on the unit types.)

3. Remove water droplets from the inlet air.
Take appropriate measures so that water droplets do not flow into the membrane air dryer. If water droplets flow into the membrane air dryer, the performance may lower, causing malfunction.

4. Large quantities of dust (solid foreign matter) are contained in the supply air.
When there are large quantities of dust (solid foreign matter), install an air filter or main line filter to the inlet side of the mist separator in addition to 2 above.

5. Take sufficient care in handling.
There is a danger of damage if dropped.

6. When using a fixture, fix it on the metal part of the product.
Using a fixture on the resin part may cause damage to the product.

Mounting

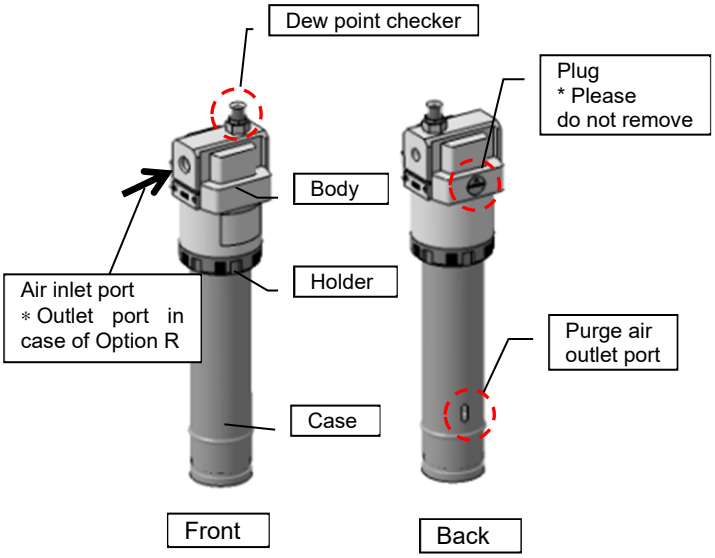

Fig 1. Names of parts
(Example: IDG30☐A)

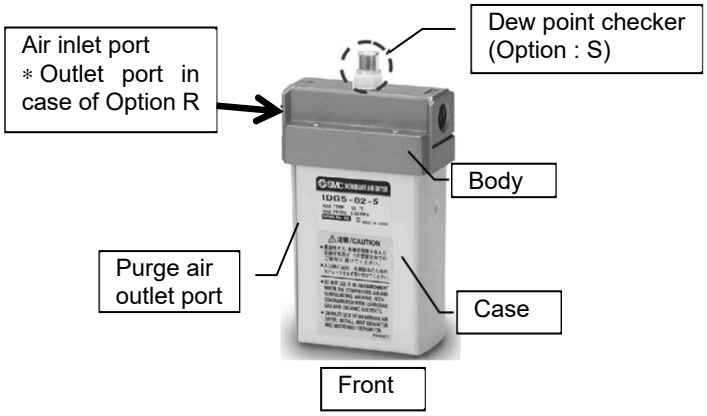

Fig 2. Names of parts
(Example: IDG3/5)

Piping

⚠ Warning

1. Check for locking of case and body.

When using in a unit, be sure to set the air pressure to zero before using a mist separator or micro mist separator with modular connections. Also, confirm that the body and case are locked together with a click before starting the flow of compressed air.

2. Check for tightening of the holder.

(for IDG30A, 30HA, 30LA, 50A, 50HA, 50LA, IDG60LA, 60SA, 100LA, 100SA)

Before starting the flow of compressed air, turn the membrane air dryer's holder in its tightening direction, confirming that it is completely tightened and that the case will not come off.

⚠ Caution

1. Use of tools

Hold the upper portion of the body (aluminum die-casted section) with a wrench or adjustable angle wrench. Do not turn it while holding the case section.

2. Drain piping for separators

When installing drain piping for mist separators or micro mist separators, use a tube of the prescribed size and keep the length within 5 meters. Also, be sure that the tube does not rise up or become folded over.

3. Piping materials for low dew point air

If air of a low dew point (–40°C or less) is required, do not use a nylon tube piping and resin fittings (except fluoropolymer) for the outlet side of the membrane air dryer. Due to the nature of the nylon tube, it could be affected by the ambient air, and it might not be possible to achieve the prescribed low dew point at the end of the tube. Therefore, for low dew point air, use a stainless steel or fluoropolymer piping.

4. Before piping is connected, flush the piping.

Be sure to remove chips, cutting oil and other debris. If they get into the product, unexpected malfunction or damage to the product may occur.

Air Supply

⚠ Caution

1. Compressed air supply capacity

An air source that has a supply capacity that is larger than the “required outlet air flow rate (dry air flow rate) + purge air flow rate” is required. Verify the purge air flow rate in “Purge Air Flow Rate Characteristics.”

2. Chemicals with a negative effect on this product

Chemicals listed in the table below in the compressed air can lower performance and damage the element. Do not use the product in environments including these chemicals.

Category	Chemicals not to be included
Solvents	Acetone, benzene, phenol, toluene, trichloroethylene, xylene, cresol, thinner, aniline, chloroform, chlorobenzene, trichloroethane, ethylbenzene, ethyl alcohol, methyl alcohol, isopropyl alcohol, dioxin, tetrahydrofuran, methylene chloride, cyclohexane, carbon tetrachloride, methyl ketone, ethyl ketone, hexafluoroisopropanol, and others
Acids	Sulfuric acid, nitric acid, hydrochloric acid, acetic acid, lactic acid, chromic acid, and others
Gases	Chlorine gas, sulfurous acid gas, hydrogen chloride, bromine, ozone, ammonia, and others
Oils	Phosphoric-ester hydraulic oil, fuel oil, water soluble cutting oil (alkaline), kerosene, and others
Strong bases	Lithium hydroxide, sodium hydroxide, potassium hydroxide, calcium hydroxide, and others.
Others	Anaerobic adhesive, anaerobic sealant, and others

Operating Environment

⚠ Caution

1. Do not use at temperatures (fluid or ambient temperatures) higher than the prescribed operating conditions.

Resin is used in the membrane module, and it can be damaged by operation at high temperatures. Especially when installed immediately after a reciprocating type air compressor, confirm that the fluid temperature does not exceed the range of operating conditions during use.

2. Keep the inlet air temperature lower than the ambient temperature.

If the membrane air dryer body is cooled by the surrounding air, water drops may accumulate inside and reduce its dehumidification capacity.

3. Do not use in the following environments, as this can cause failure.

1) In locations having corrosive gases, organic solvents, and chemicals, or in locations where these elements are likely to adhere to the equipment.
2) In locations where salt water, water, or water vapor could come in contact with the equipment.
3) In locations that is exposed to shocks and vibrations.

3. Maintenance

⚠ Caution

1. Confirm that the equipment's pressure is at zero and no longer in a pressurized state before removing any parts or piping. Performing any work while pressure remains in the equipment may lead to injury or product damage.

2. When replacing the membrane module
For modular connections, be sure to remove the membrane air dryer before attempting any replacement work.

3. About the dew point indicator
The color of the dew point indicator shows the condition of the outlet air from the membrane air dryer.

[Dew point indicator is green] ····· Dry state
[Dew point indicator is yellow] ····· Wet state

It takes time for the dew point indicator's color to change.
Absorbent is used in the dew point indicator. When it absorbs vaporized oil content or other gaseous components in the compressed air, it may turn a color other than blue (green) or pink (yellow).

Service Parts

Table. Membrane module kit and Dew point indicator kit

Name / Model	Membrane module kit	Dew point indicator kit
IDG3 (Option: S)	IDG-EL3	IDG-DP01
IDG3H (Option: S)	IDG-EL3H	
IDG5 (Option: S)	IDG-EL5	
IDG5H (Option: S)	IDG-EL5H	
IDG10	IDG-EL10	
IDG10H	IDG-EL10H	
IDG20	IDG-EL20	
IDG20H	IDG-EL20H	
IDG30□A	IDG-EL30A	
IDG50□A	IDG-EL50A	
IDG60LA, 60SA	IDG-EL60LA	
IDG75LA, 75SA	IDG-EL75LA	
IDG100LA, 100SA	IDG-EL100LA	

4. Specifications

1) Standard dew point: -20ºC, -15ºC

Model		Specifications											
		IDG3V4	IDG5V4	IDG10V4	IDG20V4	IDG30AV4	IDG50AV4	IDG3HV4	IDG5HV4	IDG10HV4	IDG20HV4	IDG30HAV4	IDG50HAV4
Components	Mist separator	AFM20-A		AFM30-A		AFM40-A		AFM20-A		AFM30-A		AFM40-A	
	Micro mist separator	AFD20-A		AFD30-A		AFD40-A		AFD20-A		AFD30-A		AFD40-A	
	Micro mist separator regulator	AWD20		AWD30		AWD40		AWD20		AWD30		AWD40	
	Spacer	Y200(T)-A		Y300(T)-A		Y400(T)-A		Y200(T)-A		Y300(T)-A		Y400(T)-A	
Range of operating conditions	Fluid Note1)	Compressed Air											
	Inlet air pressure (Mpa)	0.3 to 0.85				0.3 to 1.0		0.3 to 0.85				0.3 to 1.0	
	Inlet air temperature (ºC)	-5 to 55 (No freezing)				-5 to 50 (No freezing)		-5 to 55 (No freezing)				-5 to 50 (No freezing)	
	Ambient temperature (ºC)	-5 to 55 (No freezing)				-5 to 50 (No freezing)		-5 to 55 (No freezing)				-5 to 50 (No freezing)	
Standard Performance	Outlet air atmospheric pressure dew point (ºC)	-20						-15					
Standard Performance conditions	Inlet air flow rate (L/min[ANR]) Note2)	31	62	125	250	360	586	28	56	111	222	329	550
	Outlet air flow rate (L/min[ANR])	25	50	100	200	300	500	25	50	100	200	300	500
	Purge air flow rate (L/min[ANR]) Note3)	6	12	25	50	60	86	3	6	11	22	29	50
	Inlet air pressure (Mpa)	0.7											
	Inlet air temperature (ºC)	25											
	Inlet air saturation temperature (ºC)	25											
	Ambient temperature (ºC)	25											
Dew point indicator purge air flow rate		1 L/min [ANR] (Inlet air pressure at 0.7 Mpa)											
Regulator construction (about Type V)		Relief type											
Port size		1/8 , 1/4		1/4 , 3/8				1/8 , 1/4		1/4 , 3/8			
Weght (kg)		1.1	1.1	1.7	1.9	3.2	3.3	1.1	1.1	1.7	1.9	3.2	3.3

2) Standard dew point: -40ºC, -60ºC

Model		Specifications							
		IDG30LAV4	IDG50LAV4	IDG60LAV4	IDG75LAV4	IDG100LAV4	IDG60SAV4	IDG75SAV4	IDG100SAV4
Components	Mist separator	AFM40-A							
	Micro mist separator	AFD40-A							
	Micro mist separator regulator	AWD40							
	Spacer	Y400(T)-A							
Range of operating conditions	Fluid Note1)	Compressed Air							
	Inlet air pressure (Mpa)	0.3 to 1.0							
	Inlet air temperature (ºC)	-5 to 50 (No freezing)							
	Ambient temperature (ºC)	-5 to 50 (No freezing)							
Standard Performance	Outlet air atmospheric pressure dew point (ºC)	-40					-60		
Standard Performance conditions	Inlet air flow rate (L/min[ANR]) Note2)	93	135	224	308	400	75	140	230
	Outlet air flow rate (L/min[ANR])	75	110	170	240	300	50	100	150
	Purge air flow rate (L/min[ANR]) Note3)	18	25	54	68	100	25	40	80
	Inlet air pressure (Mpa)	0.7							
	Inlet air temperature (ºC)	25							
	Inlet air saturation temperature (ºC)	25							
	Ambient temperature (ºC)	25							
Dew point indicator purge air flow rate		1 L/min [ANR] (Inlet air pressure at 0.7 MPa)							
Regulator construction (about Type V)		Relief type							
Port size		1/4 , 3/8		3/8 , 1/2					
Weght (kg)		3.2	3.3	4.0	4.1	4.3	4.0	4.1	4.3

∗ Note 1) Prevent water droplets from entering the inlet port.
∗ Note 2) “ANR” indicates the flow rate converted to the value at 20°C, under the atmospheric pressure and the state of relative humidity 65%.
∗ Note 3) Includes 1 L/min [ANR] of purge air flow (Inlet air pressure at 0.7 MPa) for the dew point indicator. (except IDG3,3H, 5,5H).

Revision history
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