

No.1 Share in Japan

**ORION**<sup>®</sup>  
冷熱と真空でイノベーション  
Innovating with Thermal Control and Vacuum

# ICE

ISO Quality Policy  
HAS strives to offer products that delight its customers.

## Clean Air System

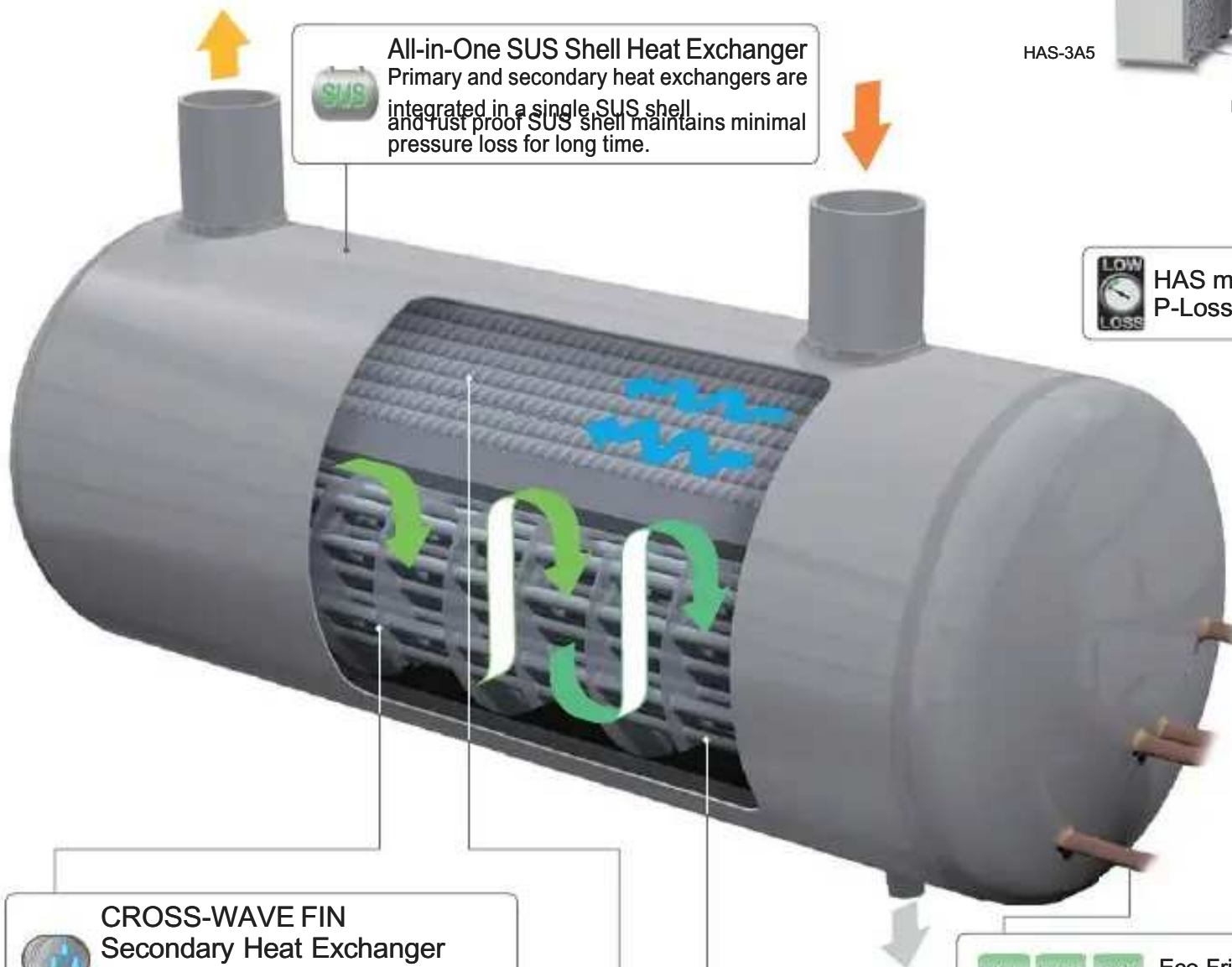
Low Pressure Loss &amp; Energy Saving

Eco-Friendly Refrigerant Applied

Powerful performance in Asia  
with heavy duty specification**ICE**  
AIR DRYER / AIR FILTER  
**NEW****Best Proven For All Air Compressor**

# ICE Refrigerated Air Dryer

Feature-Packed Air Dryer for Energy Saving and Stable Productivity,  
ICE HAS series



**LOW LOSS** HAS model  
P-Loss under 0.015MPa

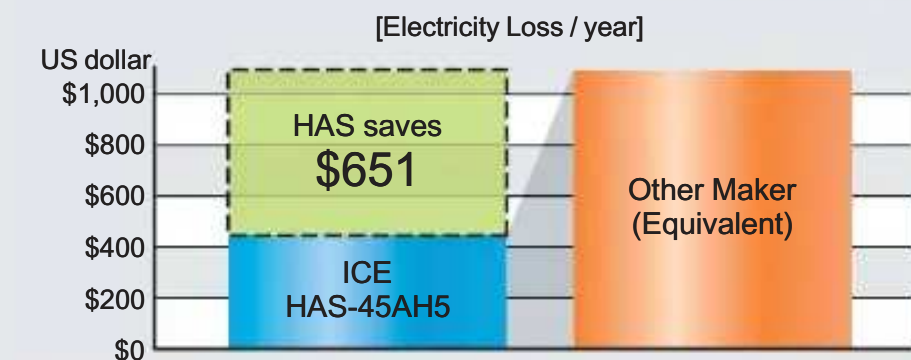
**R134a R407C R410A** Eco-Friendly  
refrigerant applied

**43°C** Heavy Duty Refrigerant Circuit  
Durable performance in severe condition  
at ambient temp. of 43°C

**CROSS-WAVE FIN**  
Secondary Heat Exchanger  
Drastically separate drain water  
from compressed air without pressure loss

**TURBO TUBE** Primary Heat Exchanger  
Efficient pre-cooling and re-heating without pressure loss

## HAS Pressure Loss Advantage



	HAS-45AH5	Other Maker (Equivalent)	Difference
Pressure Loss	0.013MPa	0.032MPa	0.019MPa
Electricity Loss/year	\$446	\$1,097	\$651

Compressor	Air Pressure Source	Capacity	Electricity Charge	Running Hour
37kW(50HP)	0.69MPa	7m³/min	US\$0.15/kWh	8000h

\*Comparison at 50Hz

**Ni** NICKEL-PLATED Copper Pipe  
Anti-corrosion and prevention gas leakage  
NICKEL-PLATED Copper Pipe



Copper pipe not plated


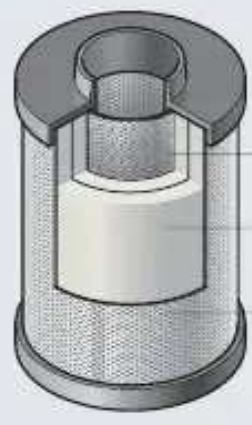
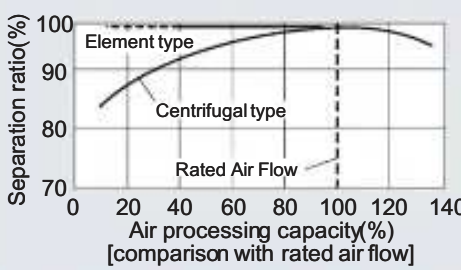


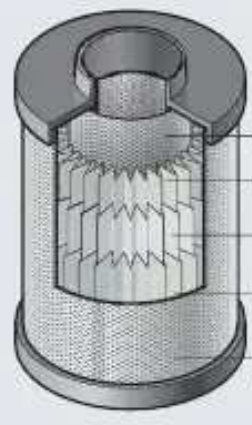



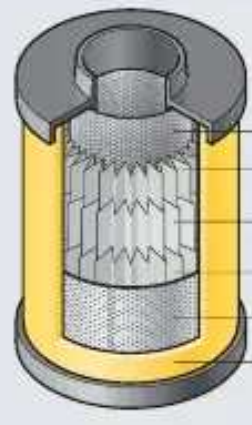

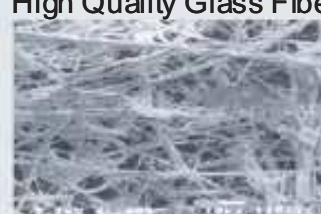


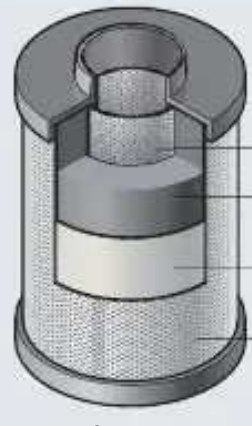


**Condenser Filter**  
Protection against dust  
and easy maintenance





## ICE Clean Air Filter

Advanced Technology Packed "ICE" Clean Air Filter

Drain Filter HAS-D_ALF / SF		Location※1 Before Air Dryer	
	 <p>Inner Screen Water-Resistant Nonwoven Fabric Cloth Outer Screen</p> <p>Sectioned Drawing of Element</p>	<p>Element : <b>HAS-DS_E</b></p> <p>Water droplet and solid particulate (5μm) removal No water drop in filtration performance Low pressure loss (0.005MPa or less) as pre-Filter Float operated auto drain trap installed</p> <p>Performance Curve</p> 	 P-loss 0.005MPa
Line Filter HAS-L_ALF / SF		Location※1 After Air Dryer	
	 <p>Inner Screen Nonwoven Fabric Cloth High Quality Glass Fiber Nonwoven Fabric Cloth Outer Screen</p> <p>Sectioned Drawing of Element</p>	<p>Element : <b>HAS-LS_E</b></p> <p>Solid particulate (1μm, 99.999%) removal High quality glass fiber element installed(HAS-LS_E) Float operated auto drain trap installed Precision different pressure gauge "DG-50(A)" installed (HAS-L39ALF and bigger model)</p> <p>High Quality Glass Fiber</p> 	 P-loss 0.005MPa
Mist Filter HAS-M_ALF / SF		Location※1 After Line Filter	
	 <p>Inner Screen Nonwoven Fabric Cloth High Quality Glass Fiber Nonwoven Fabric Cloth Outer Screen Oil-Resistant Plastic Form</p> <p>Sectioned Drawing of Element</p>	<p>Element : <b>HAS-MS_E</b></p> <p>Oil mist (0.01wt ppm) and fine solid particulate (0.01μm, 99.999%) removal Newly developed element installed(HAS-MS-E) Float operated auto drain trap installed Precision different pressure gauge "DG-50(A)" installed (HAS-M39ALF and bigger model)</p> <p>Oil-Resistant Plastic Form      High Quality Glass Fiber</p>  	 P-loss 0.01MPa
Carbon Filter HAS-K_ALF / SF		Location※1 After Mist Filter	
	 <p>Inner Screen Fibrous Activated Carbon (ICE Original) Nonwoven Fabric Cloth Outer Screen</p> <p>Sectioned Drawing of Element</p>	<p>Element : <b>HAS-KS_E</b></p> <p>Removes Odor (0.003wt ppm) . Newly developed element "Fibrous Activated Carbon" installed(HAS-KS_E) Great reduction in amount of loose carbon as compared with previous filters</p> <p>Output Oil Concentration(wt ppm)</p> 	 P-loss 0.009MPa

All ALF-Filter are alumite-treated on the inside surface.

※1 : Please refer to Basic System Example catalog on page 5

ICE Refrigerated Air Dryer

# HAS Series

Specifications



Standard inlet air temp. model

Descriptions		Type	HAS									
			3A5	8A5	15A5	22A5	37A5	55A5	75A5	80A5	90A5	132A5
Air Processing Capacity		m³/min	0.54	1.0	2.3	4.0	6.4	9.0	12.0	13.0	19.0	26.0
Applicable compressor size		kw	3	7.5	15	22	37	55	75	80	90	132
Inlet Air Temperature		℃	10~50									
Dew Point Temperature		℃	3~15									
Ambient Temperature		℃	2~43									
Operating Pressure		MPa	0.2~0.98									
Dimensions	Height	mm	480	510	610		900	990	1050	1054	1229	1275
	Depth	mm	450	600	820		960	980	1010	1022	1023	1291
	Width	mm	180	240	240		300		380	470	592	702
Mass		kg	18	26	35	44	83	94	106	140	167	233
Pipe Connections		B	R1/2	R3/4	R1		R1·1/2		R2			R2·1/2
Power Source			1ph 220V ±10% (50Hz)							3ph 380V ±10% (50Hz)		
Power Consumption		kW	0.26	0.27	0.36	0.68	1.7			3.3	3.4	5.0
Refrigerant			R134a			R410A						

Refrigerant: R134a R410A  
※ Rated condition: Compressed air inlet pressure (gauge pressure): 0.69MPa, Pressure dew point: 10°C, Inlet air temperature: 35°C, Ambient temperature: 30°C  
※ Air Processing Capacity is converted to the suction air condition (atmospheric, 32°C, 75%RH). ※ Refer to the specifications sheet for further details.

High inlet air temp. model

Descriptions		Type	HAS									
			3AH5	6AH5	8AH5	15AH5	30AH5	45AH5	55AH5	65AH5	75AH5	90AH5
Air Processing Capacity		m³/min	0.32	0.7	1.1	2.8	4.6	7.6	8.8	10.7	14.9	18.4
Applicable compressor size		kw	3	6	8	15	30	45	55	65	75	90
Inlet Air Temperature		℃	10~80									
Dew Point Temperature		℃	3~15									
Ambient Temperature		℃	2~43									
Operating Pressure		MPa	0.2~0.98									
Dimensions	Height	mm	480	510	610		900	990	1050	1054	1229	1275
	Depth	mm	450	600	820		960	980	1010	1022	1023	1291
	Width	mm	180	240	240		300		380	470	592	702
Mass		kg	18	26	35	44	83	94	106	140	167	233
Pipe Connections		B	R1/2	R3/4	R1		R1·1/2		R2			R2·1/2
Power Source			1ph 220V ±10% (50Hz)							3ph 380V ±10% (50Hz)		
Power Consumption		kW	0.27	0.28	0.37	0.74	1.9	2.0		3.7	3.8	4.8

Refrigerant: R134a R410A  
※ Rated condition: Compressed air inlet pressure (gauge pressure): 0.69MPa, Pressure dew point: 10°C, Inlet air temperature: 50°C, Ambient temperature: 35°C  
※ Air Processing Capacity is converted to the suction air condition (atmospheric, 32°C, 75%RH). ※ Refer to the specifications sheet for further details.

Heavy Duty model

Descriptions		Type	HAS						
			120A5	150A5	190A5	145AW5	240AW5	350AW5	400AW5
			Air Cooled Models			Water Cooled Models			
Air Prossessing capacity	m³/min	23	31	35	29	41	53	74	
Applicable compressor size	kW	120	150	190	145	240	350	400	
Inlet Air Temperature	℃	10~60			10~60				
Dew Point Temperature	℃	3~15			3~15				
Ambient Temperature	℃	2~45			2~45				
Operation Pressure	MPa	0.29~0.98			0.29~0.98				
Dimensions	Height	mm	1500			1500	1500	1500	1620
	Depth	mm	1500			1000	1000	1199	1654
	Width	mm	802			802	802	850	877
Mass	kg	323	385	380	278	350	395	495	
Pipe Connections	FLG	2·1/2B (65A)	3B (80A)		2·1/2B (65A)	3B (80A)	4B (100A)		
Dual-Drive Eco System		—	○		—	○			
Power Source		3ph 380V±10% (50Hz)			3ph 380V±10% (50Hz)				
Power Consumption	kW	5.6	10		4.2	6.8	9.5	12.5	
Recommended Pre-Filter (Option)		D290SF	D350SF		D290SF	D410SF	D530SF	D610SF	
Refrigerant		R407C			R407C			R410A	

※ Rated condition: Compressed air inlet pressure (gauge pressure): 0.69MPa, Pressure dew point: 10°C, Inlet air temperature for air cooled model: 50°C, Ambient temperature for air cooled model: 35°C, Inlet air temperature for water cooled model: 45°C, Cooling water temperature for water cooled model: 32°C at specified water flow rate. ※ Special-order models available with an air pressure specification of 1.0 MPa. ※ Air processing capacity figures are based on ANR and adjusted to atmospheric pressure, 32°C, 75% RH. ※ Refer to the specification sheet for further details  
※ Please install Drain Filter (HAS-D\_ALF /SF) before air dryer to guarantee its performance. ※ Air connection flange : JIS 10K FF, No companion flange is attached.



## ICE Clean Air Filter HAS-D / L / M / K\_ALF / SF Series



HAS-L39ALF



HAS-M39ALF



HAS-D290SF



HAS-D410SF

### \* Specifications

Descriptions			Type HAS-D / L / M / K_ALF	※1 04ALF	12ALF	18ALF	27ALF	39ALF	66ALF	106ALF	138ALF	200ALF	
Air processing capacity※2			0.69MPa	m³/min	0.35	1.2	1.8	2.7	3.9	6.6	10.6	13.8	20.0
Casing Material				Aluminum Die Casting (All AL-Filter are alumite-treated on the inside surface. )									
Operating Range	Fluid			Compressed Air									
	Inlet Air Pressure		MPa	0.05~0.98 (D / L / M138ALF, 200ALF : 0.1~0.98)									
	Inlet Air Temperature		℃	5~60									
	Ambient Temperature		℃	2~60									
Performance ※3	Filtration			D_SF : 5µm (Liquid water separation efficiency: 99%)    L_SF : 1µm (Filtration efficiency: 99.999%) M_SF : 0.01µm (Filtration efficiency: 99.999%)    K_SF : Adsorption by activated carbon fiber									
	Outlet Oil Contamination		wt ppm	M_ALF : 0.01 / K_ALF : 0.003									
Filter Element Replacement	Usual			1 year									
	Pressure Loss		MPa	D_ALF : 0.02 / L・M_ALF : 0.035 <div>whichever comes first</div>									
Connection				Rc3/8	Rc1/2	Rc3/4	Rc1		Rc1 1/2		Rc2		
Mass			kg	1.0		2.0	2.1	2.6	5.0	6.0	6.5	9.0	
Accessories	Filter Element	Type	D/L/M/ KS_E	04	12	18	27	39	66	106	138	200	
		Q'ty		1 each									
	Auto Drain Trap		D/L/M _ALF	NH-503MR built-in, none with K_ALF								FD2, none with K_ALF	
	Differential Pressure Gauge			Option					DG-50(A)(L & M_ALF Equipped) / D & K_ALF Option				

※1. K\_ALF available from 12ALF to 200ALF. ※2. Air Processing Capacity is converted to the suction air condition (atmospheric, 32°C, 75%RH). ※3. All Performance are tested at standard Air Processing Capacity (0.69MPa), inlet oil contamination 3wt ppm(L/M\_ALF/SF), 0.01wt ppm(K\_ALF/SF). ※4. Oil concentration is measured in conformity with ISO8573-2 "Compressed air - Part 2 : Test methods for oil aerosol content", not including oil-vapor. ※5. Special-order models available with an air pressure specification of 1.0 MPa. ※6. Refer to the specification sheet for further details.

Descriptions			Type HAS-D / L / M / K_SF	290 SF	350 SF	410 SF	530 SF	610 SF	800 SF
Air processing capacity		0.69 MPa	m³/min	29	35	41	53	61	80
Body and housing				Stainless steel					
Operating Ranges	Fluid			Compressed Air					
	Inlet Air Pressure		MPa	0.1 - 0.98 (D_SF: 0.2 - 0.98, K_SF: 0.05 - 0.98)					
	Inlet Air Temperature		°C	5 - 60					
	Ambient Temperature		°C	2 - 60					
Performance	Filtration			D_SF : 5µm (Liquid water separation efficiency: 99%)    L_SF : 1µm (Filtration efficiency: 99.999%) M_SF : 0.01µm (Filtration efficiency: 99.999%)    K_SF : Adsorption by activated carbon fiber					
	Outlet Oil Concentration		wt ppm	M_SF : 0.01    K_SF : 0.003    ※ Subject to inlet air conditions of the system piping.					
Filter Element	Usual			1 year					
Replacement	Pressure Loss		MPa	D_SF : 0.02 / L • M_SF : 0.035 <div>whichever comes first</div>					
Connection				2 1/2B (65A), JIS 10K FF	3B (80A), JIS 10K FF		4B(100A), JIS 10K FF		
Mass			kg	26	28		D / L / M_SF : 48    K_SF : 46		95
Accessories	Filter Element	Type	D/L/M/ KS_E	138	200		200		
		Q'ty		2	2		3		4
	Auto Drain Trap			FD-10-A (D_SF)    FD2 (L/M_SF)    None with K_SF					
	Pressure Differential Gauge			DG-50(A) (Comes standard only with the M_SF. Available as an option on other models.)					

※1. Air Processing Capacity is converted to the suction air condition (atmospheric, 32°C, 75%RH). ※2. All Performance are tested at standard Air Processing Capacity (0.69MPa), inlet oil contamination 3wt ppm(L/M\_ALF/SF), 0.01wt ppm(K\_ALF/SF). ※3. Oil concentration is measured in conformity with ISO8573-2 "Compressed air - Part 2 : Test methods for oil aerosol content", not including oil-vapor. ※4. Air connection flange : JIS 10K FF, No companion flange is attached. ※5. Special-order models available with an air pressure specification of 1.0 MPa. ※6. Refer to the specification sheet for further details.

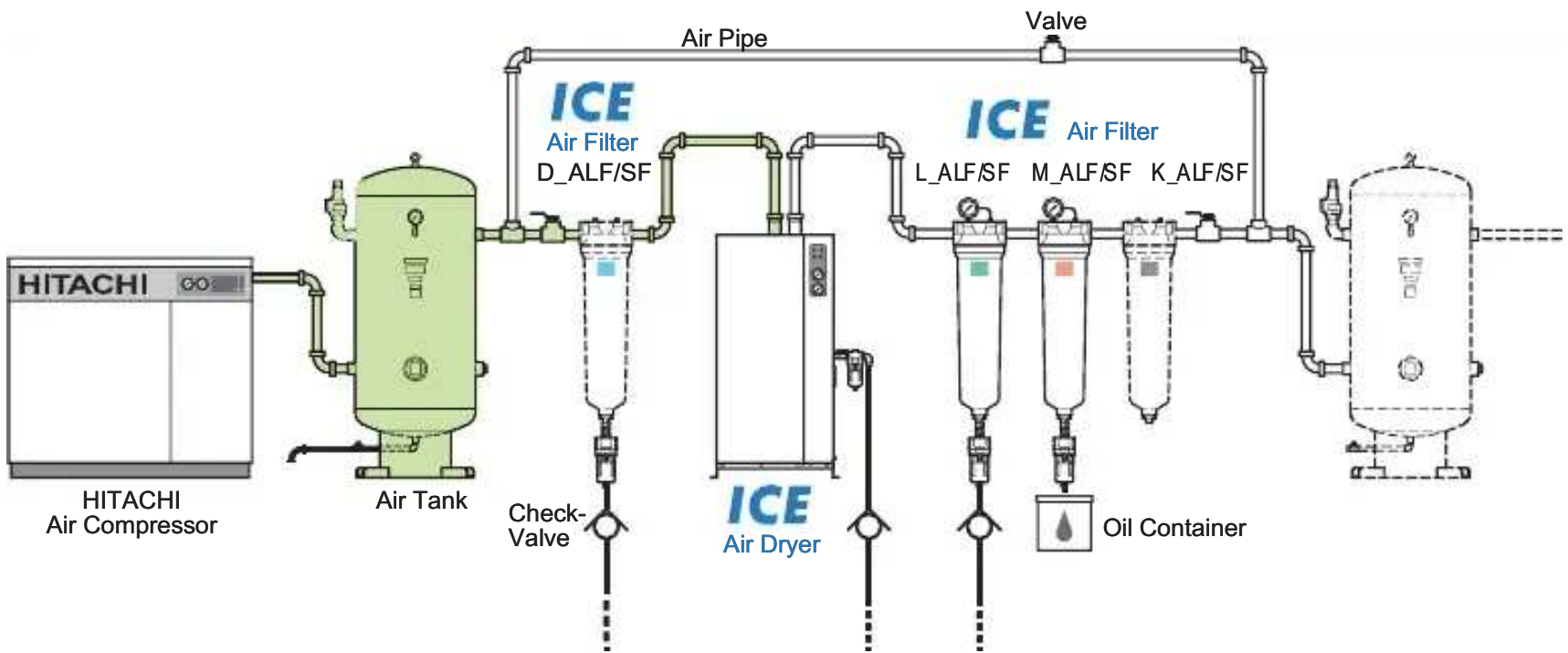
## Basic System Examples

### Air Quality Notes

Please install genuine Clean Air Filters ‘before and after dryer’ for the best performance.

### Safety Notes

Before operating equipment, please read the operating manual carefully, and only use as indicated. For installation of equipment and required wiring, employ a qualified person or consult with your dealer. Be sure to select equipment which suits your needs. Do not use equipment for purposes other than intended. Doing so can lead to accidents or equipment breakdown.



System	Applications
★ ☆ Drain Filter Air Dryer Line Filter Oil Mist Filter Carbon Filter	General Painting, Precision Machinery Industry, etc
☆ Drain Filter Air Dryer Line Filter Oil Mist Filter	Standard Pneumatic
Air Dryer Line Filter Oil Mist Filter	Standard Pneumatic
⚠ Line Filter Air Dryer Oil Mist Filter	⚠ Not recommended

- 1) Please consult with us for further information when compressed air is supplied for medical, food, or clean room use.
- 2) Please install a Super Drain Filter (D\_ALF/SF) before air dryer to guarantee its performance.
- 3) Please set up above ☆system when Oil-Free compressor is installed.
- 4) Please set up above ★system when intake air of an air compressor includes large amount of oil droplets.
- 5) ⚠ L\_ALF/SF is not recommended to be installed before dryers because it will increase differential pressure and drain water will be accumulated in the differential pressure gauge.
- 6) SUS pipe and SUS air tank are recommended when Oil-Free compressor is installed (as indicated in Green).
- 7) Please install a check valve on exhaust pipe of filter.
- 8) Please consult with us when you are not certain of air tank location (before or after air dryer).

## Model Selection

### 1. For Air Dryer

- Temperature conditions**  
 Table A : High Inlet Air Temp. Models  
 Table B : Standard Air Temp. Models  
 Table C : Water Cooled Models  
 Table D : Air Cooled Models  
 Table E : Air Pressure Coefficient
- Calculate the necessary air capacity for the model selection.  
**Air capacity required =**  
 Intake air volume / ( A or B or C or D × E )
- Please select the suitable model from the specification which has bigger Air Processing Capacity (P3) than the air capacity required.

#### Model selection Example

Inlet Air Temp.	60°C	Ambient Temp.	35°C	Air Flow	6m³/min
PDP	10°C	Air Pressure	0.59MPa	Frequency	50Hz

- From charts, Inlet temp. coefficient → 0.70  
 Air Pressure coefficient → 0.93
- Air capacity required for ICE Dryer,  
 $6 / (0.70 \times 0.93) = 9.2 \text{m}^3/\text{min}$
- The suitable model to process 9.2m³/min is HAS-65AH5, as its capacity exceeds the required value.

#### A: Inlet Air Temperature Coefficient ( High Inlet Air Temp. Models)

Inlet air temperature(°C)		50			60			70			80		
Outlet dew point (°C)		5	10	15	5	10	15	5	10	15	5	10	15
Ambient temperature(°C)	30	0.78	1.06	1.27	0.62	0.80	0.92	0.53	0.68	0.82	0.48	0.63	0.79
	35	0.73	1.00	1.21	0.57	0.70	0.86	0.47	0.60	0.74	0.41	0.57	0.71
	40	0.55	0.75	0.91	0.44	0.56	0.66	0.37	0.46	0.55	0.33	0.42	0.51

#### B: Inlet Air Temperature Coefficient ( Standard Inlet Air Temp. Models)

Inlet air temperature(°C)		35			40			45			50		
Outlet dew point (°C)		5	10	15	5	10	15	5	10	15	5	10	15
Ambient temperature(°C)	25	0.87	1.10	1.31	0.72	0.86	1.05	0.60	0.72	0.86	0.55	0.69	0.76
	30	0.80	1.00	1.20	0.66	0.79	0.96	0.55	0.66	0.79	0.50	0.63	0.70
	35	0.78	0.94	1.15	0.63	0.74	0.92	0.51	0.62	0.74	0.46	0.57	0.65
	40	0.73	0.88	1.08	0.58	0.65	0.86	0.47	0.56	0.68	0.40	0.51	0.58

#### C: Inlet Air Temperature Coefficient ( Heavy Duty / Water cooled Models )

Inlet air temperature (°C)		40			45			50			55			60		
Outlet dew point (°C)		5	10	15	5	10	15	5	10	15	5	10	15	5	10	15
Coefficient		0.88	1.14	1.14	0.77	1.00	1.14	0.66	0.91	1.10	0.59	0.83	0.98	0.54	0.75	0.89

#### D: Inlet Air Temperature Coefficient ( Heavy Duty / Air Cooled Models )

Inlet air temperature (°C)		40			45			50			55			60		
Outlet dew point (°C)		5	10	15	5	10	15	5	10	15	5	10	15	5	10	15
Ambient temperature (°C)	30	0.85	1.15	1.37	0.83	1.12	1.35	0.78	1.06	1.27	0.67	0.88	1.04	0.62	0.80	0.92
	32	0.82	1.12	1.34	0.80	1.09	1.31	0.76	1.03	1.24	0.64	0.85	1.01	0.60	0.75	0.89
	35	0.79	1.09	1.30	0.77	1.06	1.28	0.73	1.00	1.21	0.62	0.81	0.98	0.57	0.70	0.86
	40	0.60	0.81	0.98	0.58	0.80	0.96	0.55	0.75	0.91	0.47	0.62	0.75	0.44	0.56	0.66

#### E: Air Pressure Coefficient

Air Pressure (MPa)	0.20	0.29	0.39	0.49	0.59	0.69	0.78	0.88	0.93	0.98
Coefficient	0.67	0.73	0.80	0.87	0.93	1.00	1.07	1.13	1.16	1.20

※Please ask to HAS dealer about coefficient at dew point 3℃ ※The coefficient is only for reference, please ask HAS dealer about its guaranteed performance.

### 2. For Air Filter (Common with HAS-D / L / M / K\_ALF / SF)

Calculate the necessary air capacity for the model selection.

$$\text{Air processing capacity} \geq \frac{\text{Desired capacity}}{\text{Pressure correction coefficient}}$$





#### Pressure Correction Coefficient ( inlet pressure )

Pressure (MPa)	0.2	0.29	0.39	0.49	0.59	0.69	0.78	0.88	0.98
Pressure Correction Coefficient	0.38	0.49	0.62	0.75	0.87	1.0	1.06	1.12	1.17



## Accessories

### Auto Drain Trap

		Float operated			Disc operated
		FD2	FD6	FD-10-A	AD-5
Item					
Maximum drain flow capacity ※1		10 cm³/ cycle	30 cm³/ cycle	80 cm³/ cycle	450 L / h
Operable pressure range		MPa 0.1 ~ 1.0		0.20 ~ 0.98	0.29 ~ 0.98
Operable temperature range		°C 2 ~ 60			
Processed fluid		Compressed air drain			
Drain release method		Float operated			Disc operated
Connections	Inlet	Rc 1/2			1/2
	Drain outlet	ID $\phi$ 5.7 ~ 6.0 OD $\phi$ 8		Rc 3/8	Rc 1/2
Mass	kg	0.3	0.45	1	1.7
Outside dimensions	mm	Outside diameter: 63 × length: 178	Outside diameter: 80 × length: 201	Outside diameter: 96 × length: 193	Outside diameter: 86 × length: 198

※1. Drain conditions: Air pressure (gauge pressure): 0.69MPa.

※Indoor specifications (Operable in environment where it would not be exposed to water splash.)

※When setting up drain piping, to prevent back pressure from other traps, be sure to install a check valve. Also install drain traps at each drain port. (Please refer to detail on page 5)

※Refer to the specification sheet for further details.

### Differential Pressure Gauge



### Remote Control Functions

Optional kit (On-site installation is possible)

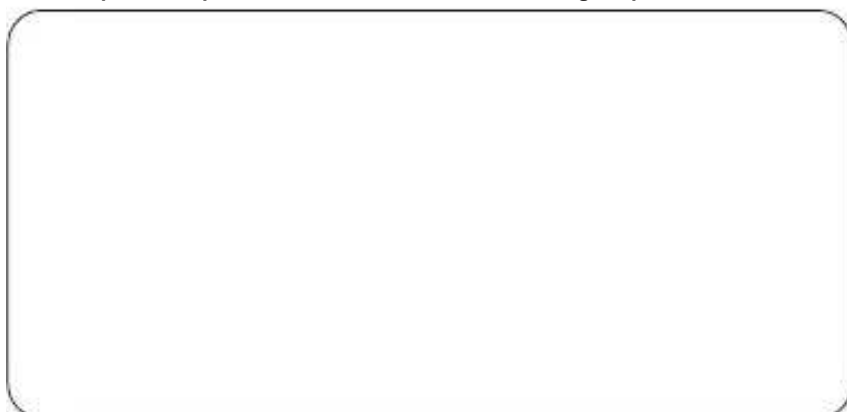
- Remote ON/OFF
- Shutdown alarm
- Operation status

Standard function with Heavy Duty model

- Maintenance alarm
- Dew point indication
- Energy saving operation



For inquiries, please contact the following representative:



**ORION MACHINERY ASIA CO., LTD.**

33 / 3 Moo 5 Sarnbuddid, U-Thai,  
Ayutthaya 13210, Thailand  
TEL : +66-35-246-828 / FAX : +66-35-246-829

#### Important:

This catalog contains product specifications as of Jul., 2018.

- Images in this catalog are printed images and actual product colors may differ from the colors herein.
- Product mechanisms, specifications, etc. listed in this catalog are subject to change without notice.
- Designed by Orion Machinery Japan. Assembled in Thailand.