Desiccant air dryer (heatless dryer)

SHD Series

JIS symbol 

CAD

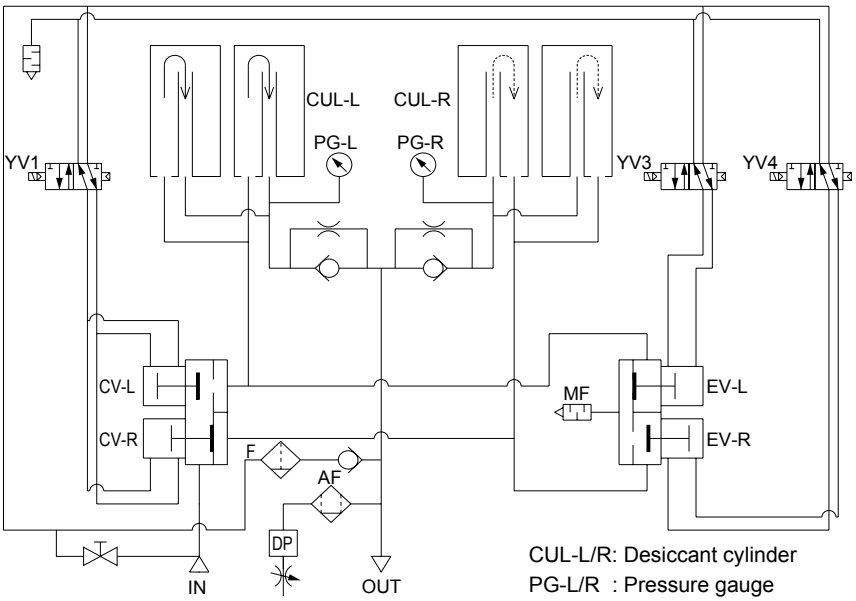
Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		SHD3025	SHD3045	SHD3075	SHD3100	SHD3125	SHD3150	SHD3200	SHD3240
Working fluid		Compressed air							
Inlet air pressure range MPa		0.4 (≈58 psi, 4 bar) to 1.0 (≈145 psi, 10 bar)							
Inlet air temperature range °C		5 (41°F) to 50 (122°F)							
Ambient temperature °C		0 (32°F) to 40 (104°F)							
Rated conditions	Inlet air temperature °C	35 (95°F) (no water drops)							
	Ambient temperature °C	25 (77°F)							
	Inlet air pressure MPa	0.7 (≈101 psi, 7 bar)							
	Inlet air flow rate m^3/min (ANR)	2.5	4.5	7.5	10	12.5	15	20	24
	Outlet pressure dew point °C	-20 (-4°F), -40 (-40°F), -60 (-76°F)							
	Average purge rate %	-20°C(-4°F): 14 / -40°C (-40°F): 16.5 / -60°C (-76°F): 23							
Desiccant cylinder module quantity		1	2	3	4	5	6	8	10
Regenerating method		Self-regeneration non-heating system							
Desiccant		Activated alumina, synthetic zeolite							
Dew point sensor		G type: Electrostatic capacitance temperature and humidity sensor / M type: Dew point meter (electrostatic capacitance polymer sensor)							
Power supply		Single-phase 100/200 VAC 50/60 Hz							
Power consumption		15 W							
Port size	Rc	1	1	1 1/2	1 1/2	2	2	2 1/2	2 1/2
Weight	kg	120	180	240	300	370	430	550	670
Accessory filter (for inlet side) standard		AF2-05M25A	AF2-08M40A	AF2-11M40A	AF2-13M50A	AF2-13M50A	AF2-20M50A	AF2-24M65A	AF2-24M65A
Accessory filter (for outlet side) standard		AF2-05P25A	AF2-08P40A	AF2-11P40A	AF2-13P50A	AF2-13P50A	AF2-20P50A	AF2-24P65A	AF2-24P65A
Accessory filter (for inlet side) option E2		AF4004M-25	AF4007M-40	AF4010M-40	AF4010M-40	AF4013M-50	AF4020M-50	AF5032M-80	AF5032M-80
Accessory filter (for outlet side) option E2		AF4004P-25	AF4007P-40	AF4010P-40	AF4010P-40	AF4013P-50	AF4020S-50	AF5032P-80	AF5032P-80

*1: The standard paint color is Quality Cool White (Munsell No. 5 GY 7.5/0.5).
*2: Attach the included accessory filters on the inlet side and the outlet side. Filters may be required for the sake of the system.In this case, prepare them separately.
*3: ANR shows conditions of 20°C atmospheric pressure and relative humidity 65%.
*4: "S type" for the outlet of option E2 of SHD3150 only.
*5:AF5032 is used only for option E2 of SHD3200 and SHD3240.
*6:Refer to pages 1845 and 1855 of the catalog for details regarding the accessory filters.
*7:The G type sensor requires regular replacement and the M type dew point meter requires regular calibration. (For details, refer to page 1808.)

Functions



CUL-L/R: Desiccant cylinder
PG-L/R : Pressure gauge
CV-L/R : Inlet switching valve
EV-L/R : Exhaust switching valve
(L/R indicates the left and right sides.)

Moist compressed air coming in from IN goes through valve CV and enters desiccant cylinder CUL-L.The moist compressed air evenly flows within the desiccant cylinder, the water vapor within the compressed air is suctioned by the desiccant, and, once transformed into ultra dry air, comes out of the OUTlet via the check valve. Part of the ultra dry air that has been reduced in pressure via the orifice enters the desiccant cylinder CUL-R, is used for the regeneration drying of the desiccant of CUL-R, and is then released into the atmosphere.
Part of the air exiting the OUTlet is guided to the dew point sensor DP for its dew point to be measured. Depending on the dew point, it will be in energy-saving mode in which the switching time is extended.
(After the removal process ends, both cylinders are kept in an increased state of pressure and the switching time is extended.)

MF : Silencer
AF : Dew point sensor protection filter
DP : Dew point sensor
YV1 : Valve for inlet switching valve
YV3/4 : Valve for exhaust switching

How to order

SHD3 045 - G 07 - 40 - E3 - AC100V

Model No.

Ⓐ Flow rate classification

Code	Description
Ⓐ Flow rate classification	
025	2.5 m^3/min (ANR)
045	4.5 m^3/min (ANR)
075	7.5 m^3/min (ANR)
100	10 m^3/min (ANR)
125	12.5 m^3/min (ANR)
150	15 m^3/min (ANR)
200	20 m^3/min (ANR)
240	24 m^3/min (ANR)

Ⓑ Sensor *1

Ⓑ Sensor	
G	Temperature and humidity sensor
M	Dew point meter

Ⓒ Inlet air pressure

Ⓒ Inlet air pressure	
04	0.4 MPa
05	0.5 MPa
06	0.6 MPa
07	0.7 MPa
08	0.8 MPa
09	0.9 MPa
10	1 MPa

Ⓓ Outlet pressure dew point

Ⓓ Outlet pressure dew point	
20	-20°C
40	-40°C
60	-60°C

Ⓔ Option *3

Ⓔ Option	
E1	Without accessory filter
E2	AF4000 Series included
E3	Standard (AF2 included)
F	Color specification
G	Voltage specification
H	English text
L	Foundation bolt nut (SS400)
L1	Foundation bolt nut (SUS304)

Ⓕ Voltage

Ⓕ Voltage	
100 VAC	
200 VAC	

⚠ Precautions for model No. selection

*1: With "G" type sensor, it is not possible to select the "-60°C" specification for the outlet pressure dew point. In addition, the dew point display value of the "G" type is of an accuracy to serve as a guide, as accuracy will be lowered in particular in the low dew point range. When prioritizing dew point management, use of the "M" type is recommended.

*2: Unit performance may not be attained if used at less than the selected pressure. Always select the model No. for the working pressure.

*3: When ordering several options, indicate the required options in alphabetical order.

[Example of model No.]

SHD3045-G07-40-E3L-AC100V

Model: Super heatless dryer
- Ⓐ Flow rate classification: 4.5 m^3/min (ANR)
- Ⓑ Sensor: Temperature and humidity sensor
- Ⓒ Inlet air pressure: 0.7 MPa
- Ⓓ Outlet pressure dew point: -40°C
- Ⓔ Option: Foundation bolts and nuts
- Ⓕ Voltage: 100 VAC

	Dew point sensor	Rated dew point °C (*1)	Energy-saving/setting dew point °C (*2)	
SHD3000 Series	-G	-20	-10	3-step switching
		-40	-20	
			-40	
	-M	-20	-20	3-step switching
		-40	-40	
		-60	-60	

*1: Default setting (Setting purge rate)

*2: Configured by the user
Arbitrary configuration at 3 steps is possible depending on the applications or conditions of use

When the load is smaller than the rating, the unit will enter the energy conservation operating mode at this configured temperature.

Selection guide

Max. flow rate table

Values are with an inlet temperature of 35°C.

Model No.	SHD3025	SHD3045	SHD3075	SHD3100	SHD3125	SHD3150	SHD3200	SHD3240
Inlet air flow rate	2.5	4.5	7.5	10	12.5	15	20	24

*1: The -20, -40, and -60°C specifications will be of the same air flow rate.

Unit: m^3/min (ANR)

● Selection method

The above flow rate table lists values for when the inlet pressure is 0.7 MPa and the inlet air temperature is 35°C. When conditions differ, determine the specifications by using the coefficient table and curve listed below.

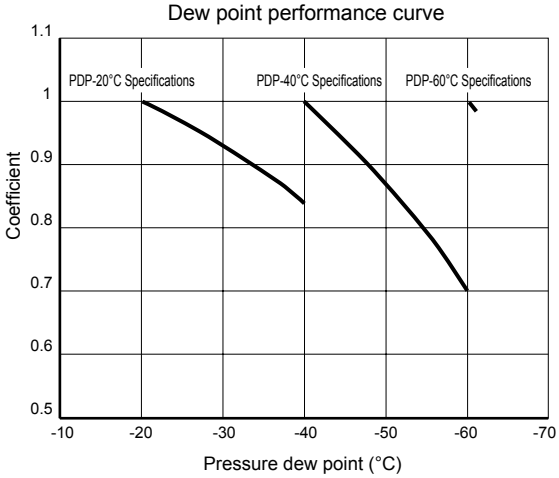
Inlet air flow rate = (Inlet flow rate of max. flow rate table (*2)) x (Pressure coefficient) x (Temperature coefficient)
Purge flow rate (*3) = (Inlet flow rate of max. flow rate table (*2)) x (Purge rate for each dew point (*4))
Outlet air flow rate = (Inlet air flow rate) - (Purge flow rate)

*2: These are values from the above table and are values decided based on the model No.
*3: The average value is listed.
*4: 14% for -20°C specifications, 16.5% for -40°C specifications,23% for -60°C specifications.
*5: Abbreviation for PDP (pressure dew point).

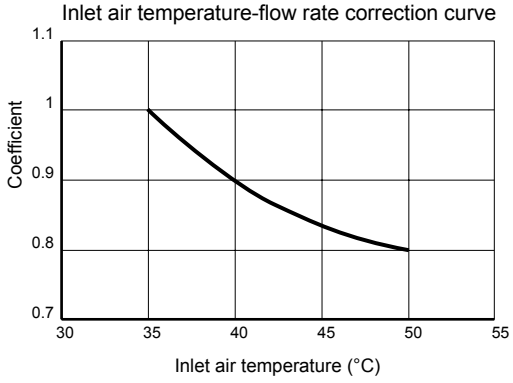
Pressure coefficient table (be sure to make a selection with the pressure that will be used)

Inlet air pressure (MPa)	0.4	0.5	0.6	0.7	0.8	0.9	1
Coefficient	0.63	0.75	0.88	1.00	1.13	1.25	1.38

Dew point performance curve



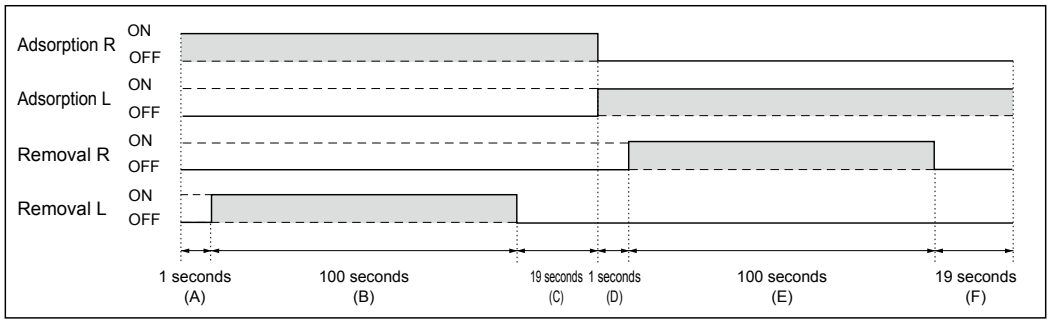
Inlet air temperature-flow rate correction curve



(Example)
Air flow rate of SHD3045 when pressure is 0.6 MPa, pressure dew point is -40°C, and inlet air temperature is 50°C

Inlet air flow rate = 4.5 x 0.88 x 0.8 = 3.168 m^3/min
Purge flow rate = 4.5 x 0.165 = 0.743 m^3/min
Outlet air flow rate = 3.168 - 0.743 = 2.425 m^3/min

Time chart



The normal processes are listed on the left. During energy conservation, the state (C, F) after the removal has been completed will be retained. After this, as soon as the dew point degrades, switching will resume to return to the normal processes.

B and E indicate removal (regeneration) time; C and F indicate rising pressure time.

When a heatless dryer is installed

● Model numbers SHD3075 through SHD3240 come provided with a class-2 pressure vessel certificate.
Keep this while using the components. (Applications to the Labor Standards Supervision Office are no longer required in Japan.)

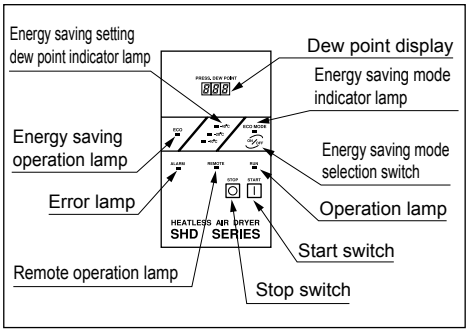
● When starting a test after the installation of this unit, operate the unit for the period of time designated below with a flow rate that is approximately 10 to 20% of the flow rate that will be used.

Pressure dew point (°C) (*6)	-20	-30	-40	-60
(Reference) Atmospheric dew point (°C)	-40	-48	-57	-74
Time (h)	6	12	24	72

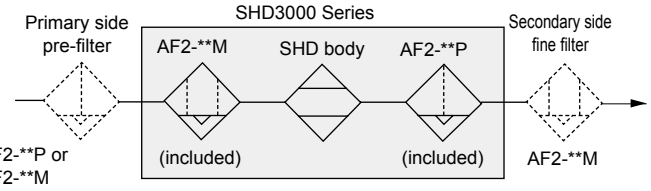
*6: The pressure dew point is for when the pressure is 0.7 MPa.

Dimensions

Operation panel



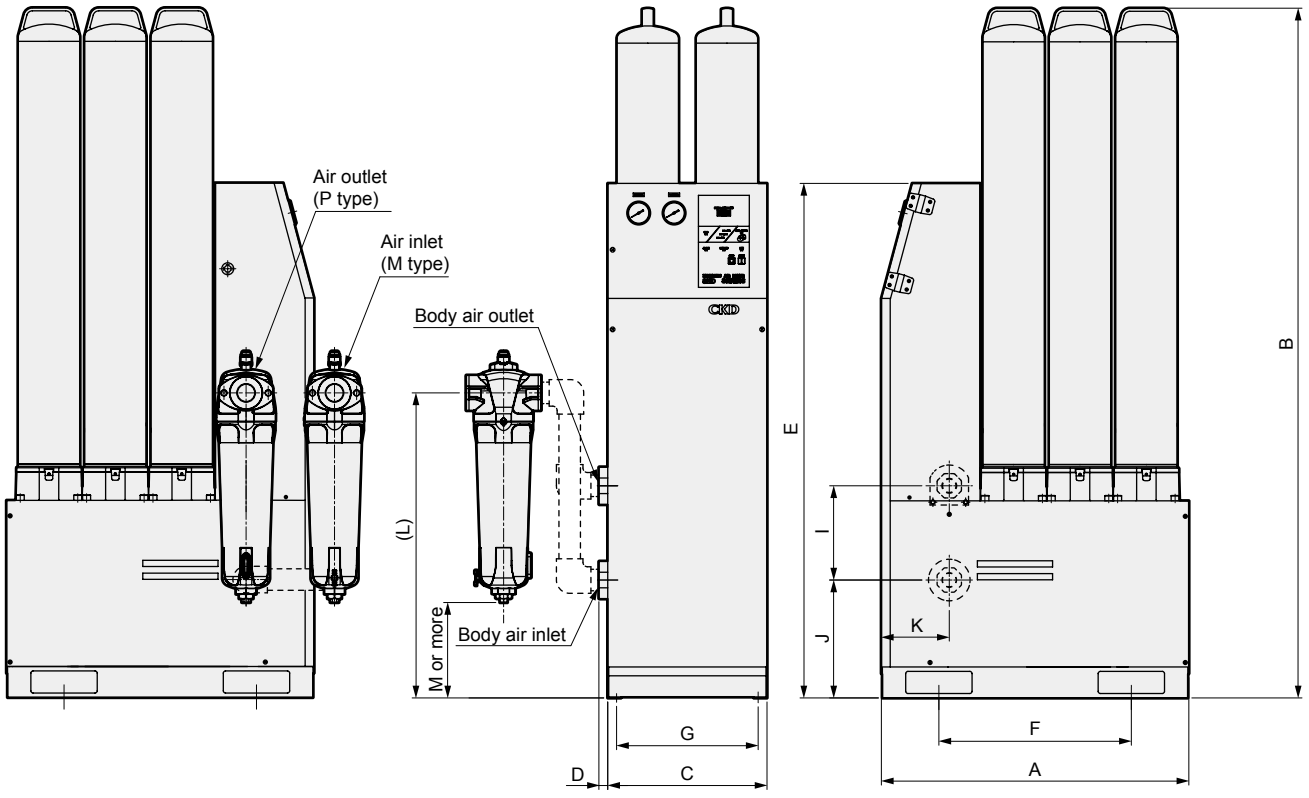
■ Piping system



Assuming use with a line of a lubrication air compressor, although the SHD3000 Series is included with the AF2-**M type for the primary side of the heatless dryer and the AF2-**P type for the secondary side, as needed, separately install a primary side pre-filter or a secondary side fine filtration filter. Furthermore, in cases when the AF4000 or 5000 Series has been selected with the options, select the AF4000 or 5000 Series for the filter to install separately as well.

● Filter performance

	AF2-**P	AF2-**M	AF4000P AF5000P	AF4000S	AF4000M AF5000M
Filtration (μm)	1	0.01	5	1	0.01
Secondary side oil concentration (mg/m³)	0.6	0.01	–	–	0.01



* The figure shows AF2.

Model No.	Port size	A	B	C	D	E	F	G	H	I	J	K	L	M	L (Option E2)	M (Option E2)
SHD3025	Rc1	545	1559	360	20	1163	285	320	ø12	213	266.5	153.5	410	70	570	126
SHD3045	Rc1	545	1559	360	20	1163	285	320	ø12	213	266.5	153.5	500	70	730	212
SHD3075	Rc1 1/2	695	1559	360	20	1163	435	320	ø12	213	266.5	153.5	591	100	940	314
SHD3100	Rc1 1/2	845	1559	360	20	1163	585	320	ø12	213	266.5	153.5	683	100	940	314
SHD3125	Rc2	995	1589	360	20	1193	590	330	ø15	213	296.5	153.5	683	100	1100	387
SHD3150	Rc2	1145	1589	360	20	1193	700	330	ø15	213	296.5	153.5	683	100	1420	550
SHD3200	Rc2 1/2	1445	1589	360	20	1193	780	330	ø15	213	296.5	153.5	810	120	1255	–
SHD3240	Rc2 1/2	1745	1589	360	20	1193	780	330	ø15	213	296.5	153.5	810	120	1255	–

The piping illustrated with the broken lines in the figure is not included with the product. Customers are asked to prepare as necessary.
The filters are included with the product.
Install the M type on the inlet side and the P type on the outlet side. Filters may be required for the sake of the system. In this case, prepare them separately.
The M dimension shows the min. dimension required to remove the element. Allow for the auto-drain piping dimensions when actually laying the pipe.