FUSHENG

FR SERIES

HIGH EFFICIENCY
REFRIGERATION DRYERS

FUSHENG INDUSTRIAL CO., LTD

HEAD OFFICE

No.172, Sec. 2, Nanjing E. Rd., Zhongshan Dist.,
Taipei City 104, Taiwan (R.O.C.)
+886-2-2507-2211 FAX：+886-2-2504-7870

FACTORY(SALES OFFICE)

No.60, Sec. 2, Guangfu Rd., Sanchong Dist.,New Taipei City 241,
Taiwan (R.O.C.)
+886-2-2995-1411 FAX：+886-2-2995-7925

FUSHENG (VIETNAM) INDUSTRIAL CO., LTD

No. 6, Street 3A, Bien Hoa Industrial Zone II,
Bien Hoa, Dong Nai Province. Vietnam.
TEL:+84-61-3834566 FAX:+84-61-3834599

Airate Co.Ltd

140/1-2 Moo.12 Soi 9/1, Kingkaew RD., T.Rachataywa A.
Bangplee Samutprakarn 10540, Thailand
TEL:+66-2-3124547 FAX:+66-2-3124530

FUSHENG COMPRESSOR (MALAYSIA) SDN BHD

NO. 8 JALAN PARA U8/103 METROPOLITAN BUSINESS PARK
40150 SHAH ALAM SELANGOR MALAYSIA
TEL :+60-3-7845-3948 FAX :+60-3-7845-3951

Web site：www.fusheng.com
E-Mail：info@fusheng.com

Distributor/Sales Representative

FR-10404-112A000-E7

FR SERIES

HIGH EFFICIENCY
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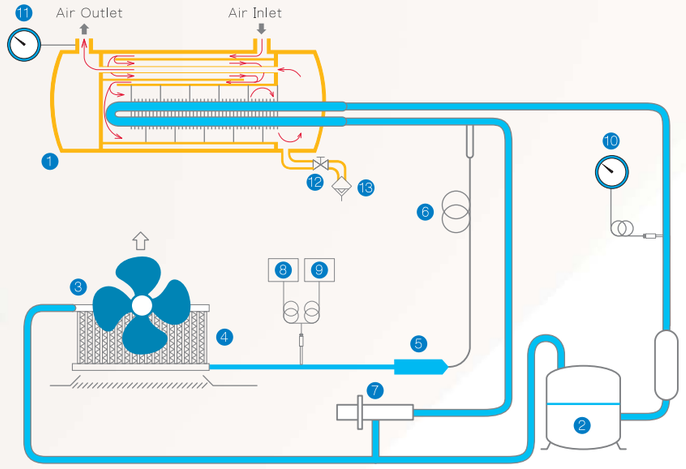
Air-cooled refrigeration dryer



System Flow Chart

1	Heat exchanger
2	Compressor
3	Fan motor
4	Air-cooled condenser
5	Line filter
6	Capillary tube
7	Modulation valve
8	High pressure protection switch
9	Pressure switch (fan)
10	Pressure gauge (evaporating pressure)
11	Pressure gauge (air outlet)
12	Ball valve
13	Condensate drain valve

Technical Data

Model		FR(II)														
Type		005A	010A	020A	030A	050A	075A	100A	150A	005AP	010AP	020AP	030AP	050AP	075AP	100AP
50Hz/60Hz max. capacity(m^3/min)		0.6	1.2	2.4	4.4	7.0	11	14	23.5	0.6	1.2	2.4	4.4	7.0	11	14
Air inlet temp.		35℃								55℃						
Ambient temp.		32℃														
Dew point		2~10℃														
Operating pressure		0.69 Mpa														
Refrigerant		R134a		R407C		R410A		R407C		R134a		R407C	R410A		R407C	
Power consumption 50/60 (Kw)		0.3/0.4	0.4/0.5	0.4/0.5	0.8/0.9	1.6/1.7	1.6/1.7	2.0/2.2	3.4/4.1	0.4/0.5	0.4/0.5	0.8/0.9	1.6/1.7	1.6/1.7	3.4/2.6	3.4/4.1
Power supply		Single phase 220V 50/60Hz				3-phase 220V 50/60HZ				Single phase 220V 50/60HZ			3-phase 220V 50/60HZ			
Air piping size		1/2"	3/4"	1"	1"	1 1/2"	1 1/2"	2"	2 1/2"	1/2"	3/4"	1"	1 1/2"	1 1/2"	2"	2 1/2"
Dimensions (mm)	H	478	543	705	705	984	988	1220	1260	478	543	705	984	988	1220	1260
	W	377	722	797	797	944	944	670	792	377	722	797	944	944	670	792
	D	490	423	423	440	490	490	973	1022	490	423	440	490	490	973	1022
Net weight (Kg)		22	34	42	42	70	88	105	180	22	35	42	70	88	105	180

* Maximum air inlet temperarure limit: A type 50℃, AP type 80℃
* ambient temperature:2~40℃
* Maximum operation pressure:0.98Mpa

Air-cooled refrigeration dryer product selection

A type Correction factor(cf1)

Maximum inlet temperature(℃)		35	40	45	50
temperature (℃)	32	1	0.82	0.7	0.45
	35	0.96	0.78	0.65	0.43
	40	0.9	0.7	0.55	0.37

AP type Correction factor(cf1)

Maximum inlet temperature(℃)		55	65	75	80
temperature (℃)	32	1	0.9	0.82	0.79
	35	0.96	0.8	0.73	0.52
	40	0.7	0.65	0.59	0.37

Pressure corretion factor(cf2)

Minimum inlet pressure	2	3	4	5	6	7	8	9	10
Correction factor	0.67	0.73	0.8	0.87	0.93	1	1.07	1.13	1.2

Dryer capacity varies with operating pressure, inlet temperature and ambient temperature. Using drying capacity requirement, select dryer model from table, ensuring the dryer model selsected is equal to or greater than your dring capacity requirement.

Calculate drying capacity required following the example below
Minimum drying capacity requirements =
Inlet flow requirement ÷ cf1 ÷ cf2

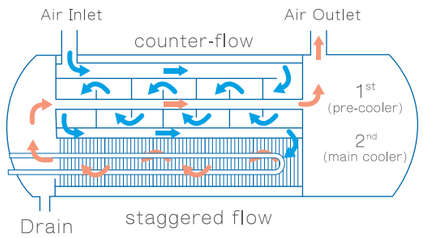
For example：
Inlet flow requirement is 3.5m^3/min
Operating pressure is 0.78Mpa, inlet temperature is 55℃ and ambient temperature is 35℃
Minimum drying capacity requirements =

3.5m^3/min÷0.96÷1.07=3.4m^3/min

The correct dryer model is FR030AP

Stainless steel heat exchanger shell

- Rust free interior.
- Diminishes drainer corrosion and filter clogging.
- Compact design of integrated 1st and 2nd heat exchangers.



Ozone-friendly refrigerant

R134a or R407C refrigerant.

Low pressure loss

Saving energy by reducing clogging and pressure drop (under 0.2 kg/cm^2).

High efficiency

- Counter-flow design extends heat exchange time, increases efficiency and leads to lowest dew point.
- Cross stream flow delivery method has no large orifice obstructions and air pressure loss is reduced to minimum, while the most effectivemoisture extraction is achieved.

Nickel-plated brass pipe

Anti-corrosion and long service life properties.

Air-cooled refrigeration dryer

Independent power distribution and high quality accessories
Safe operation guaranteed.

Flange connection for evaporators in power range of 300HP and above
Easy and convenient maintenance.

State of the art application of secondary condenser on the air outlet
Perfectly utilizing outlet cooled air to ensure normal operation even in harsh operational conditions.

Unique air heat exchanger with brass pipe and fin design
Reduces air inlet temperature and increases outlet temperature, preventing piping condensation.

Motor with extruded aluminum alloy casing + 120℃ thermostat
superb heat exchange for prolong operating interval.

Stainless oil-filled type instrumentation
Eliminate shock errors caused by vibrations during long distance or rough transportation.

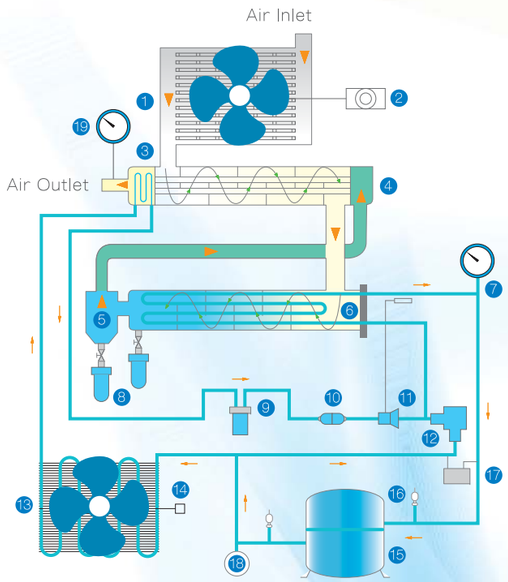
Technical Data

Model	FR (II)												
Type	200A	250A	300A	350A	400A	500A	600A	150AP	200AP	250AP	300AP	400AP	500AP
50Hz/60Hz max. capacity(m3/min)	28.5	34.2	42.7	52.0	59.5	70.8	79.3	21.4	28.5	34.2	42.7	59.5	70.8
Air inlet temp.	35℃							50℃					
Ambient temp.	45℃												
Dew point	2~10℃												
Operating pressure	0.98 Mpa												
Refrigerant	R407C												
Power consumption (Kw) 50Hz/60Hz	5/6.1	6.3/7.7	7.6/9.3	9.5/11.6	9.9/12.1	11.4/13.9	13/15.8	4.2/5.2	5.5/6.8	6.8/8.4	8.2/10.1	10.1/12.4	12.1/14.6
Power supply	3-phase 220V 50/60Hz							3-phase 380V 50/60Hz					
Air piping size	DN100	DN100	DN125	DN125	DN125	DN150	DN150	DN80	DN100	DN100	DN125	DN125	DN150
Dimensions (mm) H	1290	1290	1580	1580	1580	1700	1700	1290	1290	1290	1760	1760	2100
Dimensions (mm) W	1070	1070	1350	1350	1350	1500	1500	1070	1070	1070	1350	1350	1500
Dimensions (mm) D	1900	1900	2200	2200	2200	2200	2500	1900	2200	2200	2200	2200	2350
Net weight (kg)	500	510	800	850	900	1000	1100	460	590	600	900	1000	1200

* Maximum air inlet temperarure limit: A type 45℃, AP type 80℃
* ambient temperature:2~40℃
* Maximum operation pressure:0.98Mpa

System Flow Chart

1	Pre-cooler (AP type only)
2	"Economizer" switch
3	Secondary condenser
4	Air heat exchanger
5	Water separator
6	Evaporator
7	Pressure gauge (dew point)
8	Condensate drain valve
9	Refrigerant receiver
10	Line filter
11	Expansion valve
12	Hot gas bypass valve
13	Air-cooled condenser
14	Anti-freezing protection switch
15	Compressor
16	Service/Inflow valve
17	High-low pressure protection switch
18	Pressure gauge (refrigerant)
19	Pressure gauge (air)



Air-cooled refrigeration dryer product selection

A / AP type Correction factor(cf1)

Maximum inlet temperature (℃) / Minimum inlet pressure (Mpa)	A	30	35	38	40	42	45
	AP	45	50	55	60	70	80
0.4		1.06	0.87	0.77	0.71	0.67	0.61
0.5		1.12	0.92	0.82	0.75	0.71	0.64
0.6		1.17	0.96	0.85	0.79	0.74	0.67
0.7		1.22	1	0.89	0.82	0.77	0.7
0.8		1.24	1.02	0.9	0.84	0.79	0.71
0.95		1.29	1.06	0.94	0.87	0.82	0.74

Ambient temperature correction factor(cf2)

Ambient temperatur(℃)	A/AP	30	32	35	40
Correction factor		1.03	1	0.96	0.9

Dryer capacity varies with operating pressure, inlet temperature and ambient temperature. Using drying capacity requirement, select dryer model from table, ensuring the dryer model selsected is equal to or greater than your dring capacity requirement.

Calculate drying capacity required following the example below
Minimum drying capacity requirements =
Inlet flow requirement ÷ cf1 ÷ cf2

For example :
Inlet flow requirement is 50m³/min Operating pressure is 0.8Mpa, inlet temperature is 55℃ and ambient temperature is 32℃
Minimum drying capacity requirements =
$50m^3/min \div 0.9 \div 1 = 55.56m^3/min$
The correct dryer model is FR400AP

Water-cooled refrigeration dryer

Unique air heat exchanger with brass pipe and fin design

Reduces air inlet temperature and increases outlet temperature, preventing piping condensation.

State of the art application of secondary condenser on the air outlet

Perfectly utilizing outlet cooled air to ensure normal operation even in harsh operational conditions.

Cyclone type water separator + moisture isolator

Absolutely free of water.

Stainless oil-filled type instrumentation

Eliminate shock errors caused by vibrations during long distance or rough transportation.

Computerized control panel

Pursuing optimal operation with intelligent functions including simple flow chart display and easiest operating.

Evaporator with flange connection

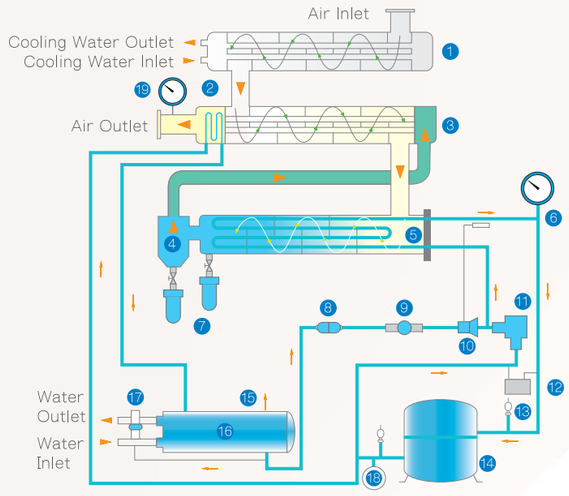
Easy and convenient maintenance.

Additional condenser bypass valve

Convenient on-site cleaning.

Model		FR														
Type		075W	100W	150W	200W	250W	300W	400W	500W	600W	750W	1000W	1200W	1500W	2000W	2500W	3000W
50Hz/60Hz max. capacity(m3/min)		10.7	14.4	21.4	28.5	34.2	42.7	59.5	70.8	79.3	106.2	141.4	169.7	212	282.7	340	425
Air inlet temp.		35℃															
Ambient temp.		2~34℃															
Dew point		2~10℃															
Operating pressure		0.69MPa															
Refrigerant		R407C															
Power consumption (Kw) 50Hz/60Hz		2.1/2.5	2.8/3.4	2.8/3.4	4.1/4.9	5.3/6.4	6.1/7.3	7.8/9.4	8.9/10.7	10.3/12.4	13.5/16.2	16.3/19.6	20.2/24.3	27.6/33.1	27.6/33.1	34.83/41.8	43.17/51.8
Power supply		3-phase 220V/380V/440V 50/60Hz															
Air piping size		DN80	DN80	DN80	DN100	DN100	DN125	DN125	DN150	DN150	DN200	DN200	DN200	DN250	DN300	DN400	DN400
Condenser piping size		G3/4"	G3/4"	G1"	G1"	G1 1/4"	G1 1/2"	G1 1/2"	G1 1/2"	G1 1/2"	DN50	DN65	DN65	DN65	DN80	DN100	DN100
Cooling water flow rate (m³/hr)		3	3	3.8	4.5	5.6	6.7	9	10.8	13.5	18	22.5	27	31.5	45	54	63
Condenser (RT)		4	4	5	6	7.5	9	12	15	17	24	30	34	37	52	64	74
Cooling tower (RT)		5	5	5	8	8	10	15	15	20	25	30	40	40	60	70	80
Dimensions (mm)	H	1130	1130	1130	1290	1290	1580	1580	1700	1700	1870	1870	1900	2150	2210	2280	2380
	W	740	740	940	1070	1070	1200	1200	1250	1250	1400	1400	1500	1700	1800	1800	1850
	D	1500	1500	1700	1900	1900	2000	2200	2200	2500	2500	3000	3200	3600	4200	4250	4800
Net weight (kg)		360	300	350	500	550	800	900	1000	1100	1400	1600	1800	2400	3000	3500	4000

* G "indicates thread size in imperial unit., DN indicates flange size in metric unit.



System Flow Chart

1	Pre-cooler (WP type only)	11	Hot gas bypass valve
2	Secondary condenser	12	Pressure head switch
3	Air heat exchanger	13	Service/Inflow valve
4	Water separator	14	Compressor
5	Evaporator	15	Relief valve
6	Pressure gauge (dew point)	16	Water-cooled condenser
7	Condensate drain valve	17	Water flow regulating valve
8	Line filter	18	Pressure gauge (refrigerant)
9	Sight glass	19	Pressure gauge (air)
10	Expansion valve		

Technical Data

Model		FR										
Type		075WP	100WP	150WP	200WP	250WP	300WP	400WP	500WP	600WP	750WP	1000WP
50Hz/60Hz max. capacity(m³/min)		10.7	14.4	21.4	28.5	34.2	42.7	59.5	70.8	79.3	106.2	141.4
Air inlet temp.		50℃										
Ambient temp.		2~34℃										
Dew point		2~10℃										
Operating pressure		0.7 Mpa										
Refrigerant		R407C										
Power consumption (Kw) 50Hz/60Hz		2.1/2.5	2.8/3.4	2.8/3.4	4.1/4.9	5.3/6.4	6.1/7.3	7.8/9.4	8.9/10.7	10.3/12.4	13.5/16.2	16.3/19.6
Power supply		3-phase 220V/380V/440V 50/60Hz										
Air piping size		DN80	DN80	DN80	DN100	DN100	DN125	DN125	DN150	DN150	DN200	DN200
Condenser piping size		G3/4"	G3/4"	G1"	G1	G1 1/4"	G1 1/2"	G1 1/2"	G1 1/2"	G1 1/2"	DN50	DN65
Pre-cooler piping size		G1"	G1"	G1"	G1 1/2"	G1 1/2"	G1 1/2"	G2"	G2"	G2"	G2 1/2"	G2 1/2"
Cooling water flow rate (m³/hr)		6	6	7.6	9	11.3	13.5	18	21.5	27	36	45
Condenser (RT)		4	4	5	6	7.5	9	12	15	17	24	30
Cooling tower (RT)		8	8	10	15	15	20	25	30	40	50	60
Dimensions (mm)	H	1130	1130	1130	1290	1290	1580	1580	1700	1700	1870	1870
	W	740	740	940	1070	1070	1200	1200	1250	1250	1400	1400
	D	1500	1500	1700	1900	1900	2000	2200	2200	2500	2500	3000
Net weight (kg)		260	300	350	500	550	800	900	1000	1100	1400	1600

* Maximum air inlet temperarure limit: W type 45℃, WP type 80℃
* ambient temperature:2~40℃
* Maximum operation pressure:0.98Mpa

Water-cooled refrigeration dryer product selection

W / WP type Correction factor(cf1)

Air inlet temperature (℃) / Minimum inlet pressure (Mpa)	W / WP	30	35	38	40	42	45
	W	45	50	55	60	70	80
0.4		1.06	0.87	0.77	0.71	0.67	0.61
0.5		1.12	0.92	0.82	0.75	0.71	0.64
0.6		1.17	0.96	0.85	0.79	0.74	0.67
0.7		1.22	1	0.89	0.82	0.77	0.7
0.8		1.24	1.02	0.9	0.84	0.79	0.71

Cooling water temperature correction factor(cf2)

Cooling water temperature(℃)	W/WP	30	32	40
Correction factor		1	0.97	0.9

Dryer capacity varies with operating pressure, inlet temperature and cooling water temperature. Using drying capacity requirement, select dryer model from table, ensuring the dryer model selsected is equal to or greater than your dring capacity requirement.

Calculate drying capacity required following the example below
Minimum drying capacity requirements =
Inlet flow requirement ÷ cf1 ÷ cf2

For example：
Inlet flow requirement is 28.5m³/min
Operating pressure is 0.8Mpa, inlet temperature is 55℃ and cooling water temperature is 32℃
Minimum drying capacity requirements =
28.5m³/min÷0.9÷0.97=32.6m³/min

The correct dryer model is FR250WP