1-2 Heatless Air Dryer (QSQ)

Adsorption technology compressed air drying equipment

☐ CFC-free, Low Purge, Low Dew Point Air Supply

1. CFC-free Air Dryer

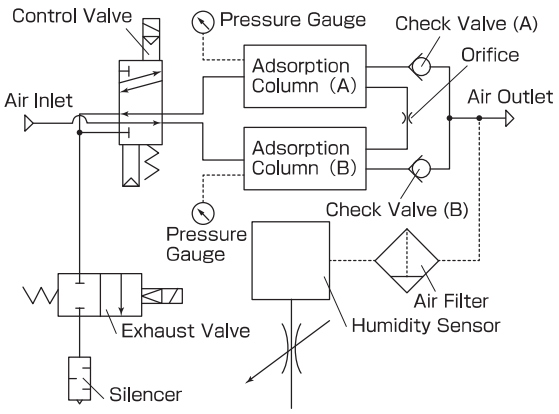
The QSQ Series of Heatless Air Dryers use desiccant to adsorb and remove water vapor contained in compressed air. They differ from refrigerated air dryers because they don't rely on CFCs for operation, and can provide a low dew point air supply. Desiccant regeneration works by passing some of the dried air (purge air) through the desiccant to be regenerated. Medium to heavy duty models have an energy saving dew point sensor built in. When the set dew point is reached, the purge cycle is lengthened, thus reducing the amount of air loss.

■ Function Diagram

● Operation on QSQ080B-E ~ QSQ270B-E Models

—— Main Air

--------- Pilot Air



※ Installation of the included inlet and outlet filters is required.

■ Working Principles

1. Adsorption Column (A): Pressure Path; Adsorption Column (B): Adsorption Path
   - Humid compressed air travels through the air inlet, through the control valve, into adsorption column (B), and the compressed air is dried through adsorption.
   - The dried compressed air travels through check valve (B), and exits through the air outlet port.
   - Some of the dry air that has passed through adsorption column (B) passes through the orifice, flows into adsorption column (A), and since the exhaust valve is closed, adsorption column (A) is pressurized to operating pressure.
2. Adsorption Column (A): Adsorption Path; Adsorption Column (B): Regeneration Path
   - The controller switches the control valve and the exhaust valve is opened.
   - Wet compressed air travels through the control valve, into adsorption column (A), and the compressed air is dried through adsorption.
   - The dried compressed air travels through check valve, and exits through the air outlet port.
   - Some of the dry air that has passed through adsorption column (A) passes through the orifice, and flows into adsorption column (B), thus regenerating the desiccant column.
   - The desiccant in adsorption column (B) is regenerated, and the air containing water vapor passes through the control valve, exhaust valve, and the silencer, and is then released into the atmosphere.
3. Adsorption Column (A): Adsorption Path; Adsorption Column (B): Pressure Path
   - Adsorption Column (A) will continuously work in the Adsorption Path.
   - The controller will close the exhaust valve and adsorption column (B) will pressurize until it reaches the operating pressure. (During this time, the control valve will not switch over.)
4. Adsorption Column (A): Regeneration Path; Adsorption Column (B): Adsorption Path
   - The controller switches the control valve and the exhaust valve is opened.
   - Wet compressed air travels through the control valve, into adsorption column (B), on which regeneration had just completed, and the compressed air is dried through adsorption.
   - The dried compressed air travels through check valve (B), and exits through the air outlet port.
   - Some of the dry air that has passed through adsorption column (B) passes through the orifice, and flows into adsorption column (A), thus regenerating the desiccant column.
   - The desiccant in adsorption column (A) is regenerated, and the air containing water vapor passes through the control valve, exhaust valve, and the silencer, and is then released into the atmosphere.
5. Repeat the 4 steps above.

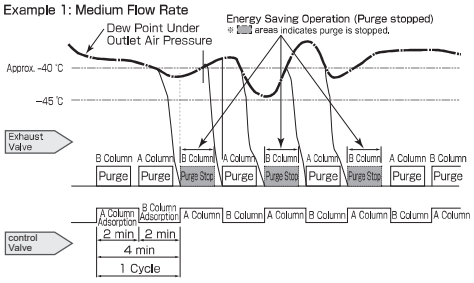
2. The energy saving dew point sensor reduces air losses by ensuring suitable purge cycles.

Energy saving can be realized by stopping the release of regeneration (purge) air, corresponding to the outlet dew point and inlet air flow.

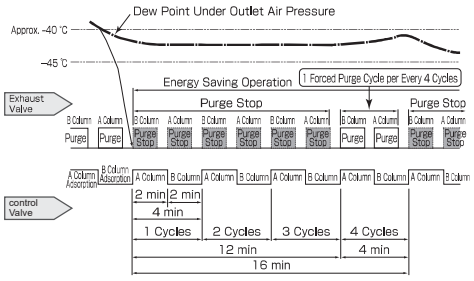
Energy Saving Dew Point Sensor

Comes Standard Built Into QSQ Medium and Heavy Duty Models

Example 1: Medium Flow Rate



Example 2: Low Flow Rate



Visualize your dew point and set your dew point (under pressure) with this post-installation add-on.

See page 81 for details.

EDC60A (QSQ080B-E ~ 2500C-E)

Energy Saving Control Unit for "Super Pack"

Features

- ☐ Install after existing Super Pack units to achieve "Eco Pack" functionality.
- ☐ Energy saving control at desired PDP of -60 ℃ to 0 ℃.
- ☐ Remote tracking of compressed air dew point possible on standard equipment equipped with dew point warning or analog outputs.

Energy Saving Control Unit

EDC60A

CFC-FREE, Low Purge Heatless Air Dryer (Adsorption technology compressed air dehumidifying equipment)

QSQ Compact Duty / Medium Duty Series "Super Pack"

Patented

QSQ010A ~ 270B-E (Compact and Medium Duty Series)
Inlet air flow capacity (Dew Point − 20 ℃)
0.1 ~ 2.7 m^3/min
Outlet air flow capacity
0.086 ~ 2.3 m^3/min
Regeneration air purge
0.014 ~ 0.4 m^3/min

Features

1. Comes with energy saving dew point sensor as standard equipment (Medium Duty Series models)
2. All models equipped with indicator lamps.
3. Compact · Light weight · Easy maintenance

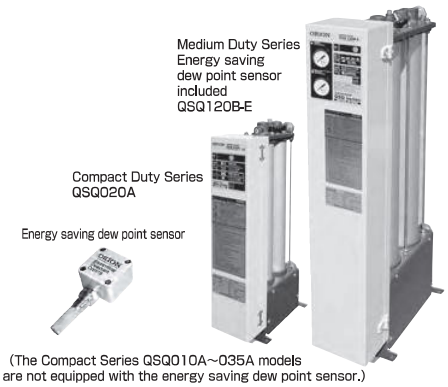
Control Panel Detail

●Compact Duty Model ●Medium Duty models

Controller functions

Energy saving dew point controller functions

※ Compact Model: Please inquire if a column switch-over alarm is required.



(The Compact Series QSQ010A~035A models are not equipped with the energy saving dew point sensor.)

CFC-FREE, Low Purge Heatless Air Dryer (Adsorption technology compressed air dehumidifying equipment)

QSQ Heavy Duty Series "Super Pack"

Patented

QSQ420C-E ~ 2500C-E (heavy Duty Series) (Dew Point −40 ℃)
Inlet air flow capacity 4.2 ~ 25.0 m^3/min
Outlet air flow capacity 3.6 ~ 21.5 m^3/min
Regeneration air purge 0.6 ~ 3.5 m^3/min

Energy saving dew point sensor

Heavy Duty Series
Energy saving
dew point sensor
included
QSQ1000C-E

Features

1. Comes with energy saving dew point sensor as standard equipment (Medium and Heavy Duty Series models)
2. All models equipped with indicator lamps.
3. Compact · Light weight · Easy maintenance

Control Panel Detail

●Heavy Duty Models

Energy saving dew point controller functions

Running cost comparison

Regenerative air flow (purge) was 20 % of the inlet flow rate on previous models. The QSQ series has reduced this to just 14 %. Even assuming max. load conditions, converting compressor electricity costs yields the following:

Item		Purge rate	Purge air cost	Energy savings
Previous models (No energy savings) QAX-370A		20 %	¥311,000	— (0 %)
QSQ420C-E with EDC	Under max.load	14 %	¥218,000	¥93,000 (30 % reduction)
	With energy saving control	3.5 % ※	Minimum ¥54,000	¥257,000 (Max. 80 % reduction)

Conditions: 1. Processing air flow: 3.7 m^3/min (22 kW compressor equiv.) ※ Per-hour-average (maximum).
2. Req. dew point temp.: PDP − 20 ℃ (ADP − 40 ℃)
3. Operating pressure: 0.69 MPa
4. Purge air flow: fixed
5. Compressed air cost (electricity cost): ¥2/m^3
6. Running time: 3,500 h/year

Heatless Air Dryer with Built-in Digital Dew Point Monitor (Adsorption technology compressed air drying equipment)

QSQ-EDC Series "Eco Pack®"

Patented

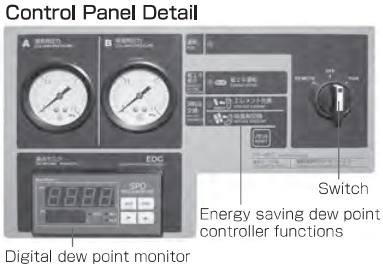
QSQ420C-EDC ~ 2500C-EDC
Inlet air flow capacity 4.2 ~ 25.0 m^3/min
Outlet air flow capacity 3.6 ~ 21.5 m^3/min
Regeneration air purge 0.6 ~ 3.5 m^3/min

Heavy Duty Series
Built-in digital
dew point monitor
QSQ420C-EDC

Features

1. Greatly reduced energy requirements thanks to our energy saving dew point sensor.
2. Built-in digital dew point monitor to help you achieve even further energy savings.
3. Dew point setting from −60 to 0 ℃ (PDP) means more energy saving control. [Dew point display precision: −60 ℃~ +20 ℃±3 ℃]
4. Includes digital dew point monitor.
5. Dew point warning output [includes 2 sets of nonvoltage contacts, standby sequence], and analog output [DC 1 ~ 5 V (− 80 ~ + 20 ℃)] as standard equipped.
6. Remote monitoring of compressed air quality and dew point.

Control Panel Detail



Switch

Energy saving dew point controller functions

Digital dew point monitor

Digital dew point monitor	
Dew point display	−80 ~ 20 ℃
Alarm output	No-voltage, normally-open contact (switch rating: 250 V 2 A)
Analog output	DC1 ~ 5 V (Dew point −80 ~ 20 ℃)
Dew point measurement accuracy (Fluid/air temperature 20 ℃)	±3 ℃ (Dew point −60 ~ 20 ℃)

1-2 QSQ Series "Super Pack" and "Eco Pack®" Patented

CFC-FREE, Low Purge Heatless Air Dryer (Adsorption technology compressed air dehumidifying equipment)

□ Specifications

● 「Super Pack」

Item		Model QSQ	Compact Duty Series						Medium Duty Series							
			010A		020A		035A		080B-E		120B-E		180B-E		270B-E	
Capacity	Pressure dew point	℃	−20	−40	−20	−40	−20	−40	−20	−40	−20	−40	−20	−40	−20	−40
	Inlet air capacity	m³/min	0.1	0.085	0.2	0.17	0.35	0.297	0.8	0.68	1.2	1.02	1.8	1.53	2.7	2.3
	Outlet air capacity	m³/min	0.086	0.071	0.172	0.142	0.3	0.247	0.68	0.56	1.03	0.85	1.54	1.27	2.3	1.9
	Purge air flow	m³/min	0.014		0.028		0.05		0.12		0.17		0.26		0.4	
Range	Allowable Medium		Compressed air													
	Max. air pressure (G)	MPa	0.39 ～ 0.98													
	Ambient Temp.	℃	2 ～ 40													
	Inlet air condition	℃ /%	5 ～ 50/Less than saturated humidity (no water droplets)													
Dimensions	Height	mm	470		560		810		680		930		1130		1480	
	Depth	mm	260						430							
	Width	mm	113						163							
Mass		kg	7.5		8.5		11		26.5		34		43		53	
Air pipe connection	Air inlet/outlet		Rc3/8						Rc3/4						Rc1	
	Purge air outlet		—						Rc1/2							
Power Source (50/60 Hz)		V	Single phase 100/200/220/230													
Included filter (Part number)	Inlet element	EMS	02083564010						02083564020				02083564030		02083564070	
	Outlet element	ELS	02083563010						02083563020				02083563030		02083563070	

※ Processing air capacity is calculated based on compressor intake conditions (atmospheric pressure, 32 ℃, 75 %.) ※ Processing conditions: Inlet air temperature and humidity 35 ℃ less than saturated humidity (no water droplets), Inlet air pressure (gauge pressure) 0.69 MPa. Ambient temperature: 32 ℃. ※ For 24h continuous operation, a refrigerated dryer should be used just before this equipment or at an earlier stage. ※ For 24h continuous operation, a backup dryer should be made available. ※ Please contact ORION regarding custom built models of specifications outside the ranges listed above.

Item		Model QSQ	Heavy Duty Series											
			420C-E		700C-E		1000C-E		1400C-E		2000C-E		2500C-E	
Capacity	Pressure dew point	℃	−40	−60	−40	−60	−40	−60	−40	−60	−40	−60	−40	−60
	Inlet air capacity	m³/min	4.20	2.94	7.00	4.90	10.00	7.00	14.00	9.80	20.00	14.00	25.00	17.50
	Outlet air capacity	m³/min	3.60	2.10	6.00	3.50	8.60	5.00	12.00	7.00	17.20	10.00	21.50	12.50
	Purge air flow	m³/min	0.60	0.84	1.00	1.40	1.40	2.00	2.00	2.80	2.80	4.00	3.50	5.00
Range	Allowable Medium		Compressed air											
	Max. air pressure (G)	MPa	0.39 ～ 0.98											
	Ambient Temp.	℃	2 ～ 40											
	Inlet air condition	℃ /%	5 ～ 50/Less than saturated humidity (no water droplets)											
Dimensions	Height	mm	1475											
	Depth	mm	589		763		937		1111		1296		1470	
	Width	mm	335											
Mass		kg	110		156		202		246		307		340	
Air pipe connection	Air inlet/outlet		Rc1 1/2						Rc2				Rc2 1/2	
	Purge air outlet		Rc1											
Power Source (50/60 Hz)		V	Single phase 100/200/220/230											
Included filter (Part number)	Inlet element	EMS	EMS700		EMS1000				02083005050				EMS1300×2	
	Outlet element	ELS	ELS700		ELS1000				03083004050				ELS1300×2	

※ Processing air capacity is calculated based on compressor intake conditions (atmospheric pressure, 32 ℃, 75 %.) ※ Processing conditions: Inlet air temperature and humidity 35 ℃ less than saturated humidity (no water droplets), Inlet air pressure (gauge pressure) 0.69 MPa. Ambient temperature: 32 ℃. ※ For 24h continuous operation, a refrigerated dryer should be used just before this equipment or at an earlier stage. ※ For 24h continuous operation, a backup dryer should be made available. ※ Please contact ORION regarding custom built models of specifications outside the ranges listed above. ※ A dew point of −60 ℃ requires a special orifice and is therefore a special-order item.

● 「Eco Pack」

Item		Model QSQ	Heavy Duty Series											
			420C-EDC		700C-EDC		1000C-EDC		1400C-EDC		2000C-EDC		2500C-EDC	
Capacity	Pressure dew point	℃	−40	−60	−40	−60	−40	−60	−40	−60	−40	−60	−40	−60
	Inlet air capacity	m³/min	4.20	2.94	7.00	4.90	10.00	7.00	14.00	9.80	20.00	14.00	25.00	17.50
	Outlet air capacity	m³/min	3.60	2.10	6.00	3.50	8.60	5.00	12.00	7.00	17.20	10.00	21.50	12.50
	Purge air flow	m³/min	0.60	0.84	1.00	1.40	1.40	2.00	2.00	2.80	2.80	4.00	3.50	5.00
Range	Allowable Medium		Compressed air											
	Max. air pressure (G)	MPa	0.39 ～ 0.98											
	Ambient Temp.	℃	2 ～ 40											
	Inlet air condition	℃ /%	5 ～ 50/Less than saturated humidity (no water droplets)											
Dew point display range		℃	−80 ～+20											
Dew point control range		℃	−60 ～ 0											
Dew point accuracy		℃	−60 ～+20±3											
Dimensions	Height	mm	1475											
	Depth	mm	589		763		937		1111		1296		1470	
	Width	mm	335											
Mass		kg	110		156		202		246		307		340	
Air pipe connection	Air inlet/outlet		Rc1 1/2						Rc2				Rc2 1/2	
	Purge air outlet		Rc1											
Power Source (50/60 Hz)		V	Single phase 100/200/220/230											
Included filter (Part number)	Inlet element	EMS	EMS700		EMS1000				02083005050				EMS1300×2	
	Outlet element	ELS	ELS700		ELS1000				03083004050				ELS1300×2	

※ Processing air capacity is calculated based on compressor intake conditions (atmospheric pressure, 32 ℃, 75 %.) ※ Processing conditions: Inlet air temperature and humidity 35 ℃ less than saturated humidity (no water droplets), Inlet air pressure (gauge pressure) 0.69 MPa. Ambient temperature: 32 ℃. ※ For 24h continuous operation, a refrigerated dryer should be used just before this equipment or at an earlier stage. ※ For 24h continuous operation, a backup dryer should be made available. ※ Please contact ORION regarding custom built models of specifications outside the ranges listed above. ※ A dew point of −60 ℃ requires a special orifice and is therefore a special-order item.

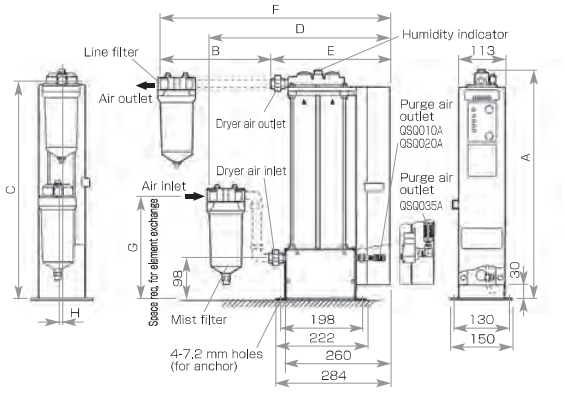
When the dryer is connected directly to the air compressor

※ Before installation, be sure to confirm the piping system design standards outlined in the product specifications. ※ If the inlet air pressure is more than 5 ℃ higher than the ambient temperature, be sure to install an after cooler (sold separately) or a refrigerated air dryer. ※ In case the compressor emits water mist, always install a Super Filter (for water droplet removal) (sold separately.) ※ Always use an air tank and install it before the dryer. ※ When installing a Super Filter (for water droplet removal) make piping as short as possible to help avoid further condensation. ※ Refer to pages 11 ～ 12 regarding system configuration. Please consult your ORION dealer for further details.

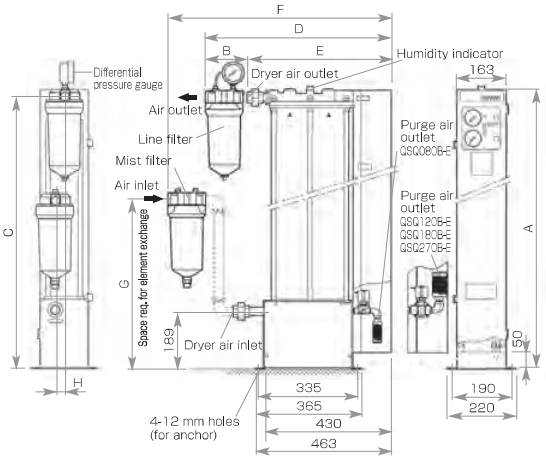
□ External Dimensions

When installing dryer, ensure there is enough space to allow for filter removal and replacement.

● QSQ010A/020A/035A
(Super Pack Compact duty model)



● QSQ080B-E/120B-E/180B-E-/270B-E
(Super Pack Medium duty model)



※ Piping indicated by dotted lines ⋯⋯ is not included and must be provided by end user.
※ Ensure there is a maintenance space of 600 mm to the front and 600 mm to both sides of the dryer.
※ Install on a level surface.

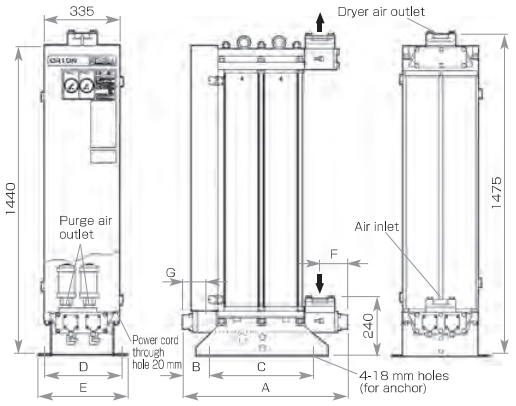
External Dimensions (Units:mm)

Model QSQ	Compact Duty Series			Medium Duty Series			
	010A	020A	035A	080B-E	120B-E	180B-E	270B-E
A	470	560	810	680	930	1130	1480
B	(277)		(102)	(108)		(148)	(147)
C	440	530	780	645	895	1095	1445
D	(450)			(590)		(630)	(625)
E	(298)			(482)		(482)	(478)
F	(575)		(400)	(645)	(650)	(690)	(710)
G	250 min.			300 min.		370 min.	400 min.
H	9			30			

□ External Dimensions

● QSQ420C-E/700C-E/1000C-E
QSQ1400C-E/2000C-E/2500C-E
(Super Pack Heavy Duty model)

● QSQ420C-EDC/700C-EDC/1000C-EDC
QSQ1400C-EDC/2000C-EDC/2500C-EDC
(Eco Pack)



※ Diagram shows Super Pack model
※ Please install the included filter.
※ Dryer bases for QSQ420C-E, 700C-E and 1000C-E ～ 2500C-E models are different.
※ Ensure there is a maintenance space of 600 mm to the front and 600 mm to both sides of the dryer.
※ Install on a level surface.

External Dimensions (Units:mm)

Model QSQ	Heavy Duty Series					
	420C-E/EDC	700C-E/EDC	1000C-E/EDC	1400C-E/EDC	2000C-E/EDC	2500C-E/EDC
A	589	763	937	1111	1296	1470
B	130	127	260		265	
C	300	480	388	562	736	910
D	366		385			
E	406		424			
F	121				126	
G	106				111	

※ Please refer to Page 47 and 48 for installation dimension.

1-2 Heatless Air Dryer (Adsorption technology compressed air dehumidifying equipment)

QSQ Series "Super Pack" and "Eco Pack®"

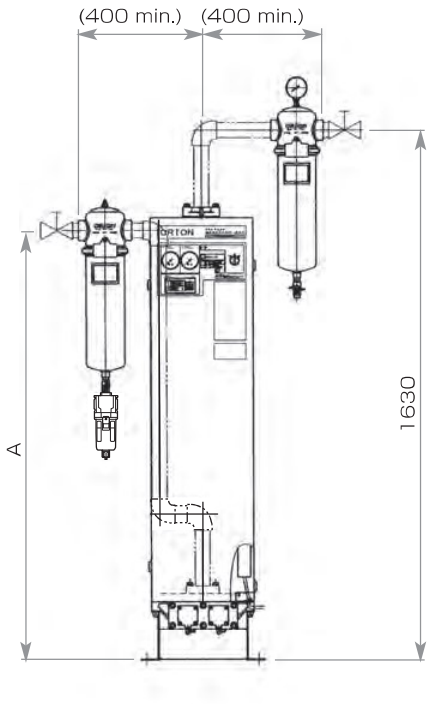
Patented

External Dimensions

When installing dryer, ensure there is enough space to allow for filter removal and replacement.

- QSQ420C-E/700C-E/1000C-E
  QSQ1400C-E/2000C-E
  (Super Pack Heavy Duty model)
- QSQ420C-EDC/700C-EDC/1000C-EDC
  QSQ1400C-EDC/2000C-EDC
  (Eco Pack®)

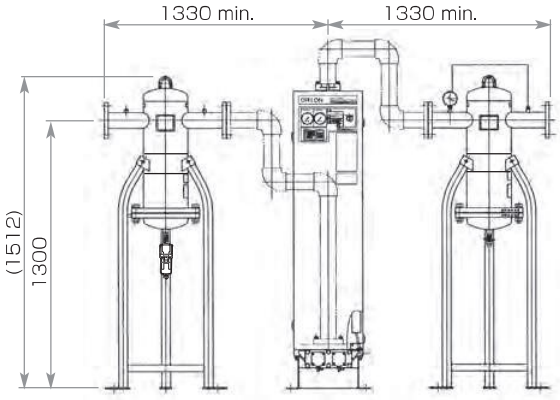
※ Piping indicated by dotted lines is not included and must be provided by end user.
※ Diagram shows Eco-Pack model
※ Please install the included filter.
※ Install on a level surface.
※ When running dryers in parallel, arrange piping so that the back pressure from piping in each feed is the same.
※ Set up dryer such that set up and maintenance space is like the hatched area in the diagram below.



External Dimensions (Units:mm)

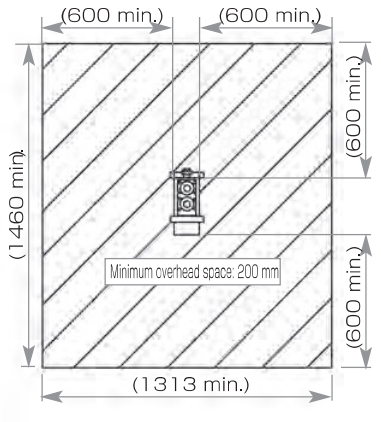
Model	Super Pack Heavy Duty model				
QSQ	420C-E	700C-E	1000C-E	1400C-E	2000C-E
Model	Eco Pack®				
QSQ	420C-EDC	700C-EDC	1000C-EDC	1400C-EDC	2000C-EDC
A	710	920	920	1400	1400
B	(1749 min.)	(1923 min.)	(2097 min.)	(2271 min.)	(2456 min.)

- QSQ2500C-E
  (Super Pack Heavy Duty model)
- QSQ2500C-EDC
  (Eco Pack®)



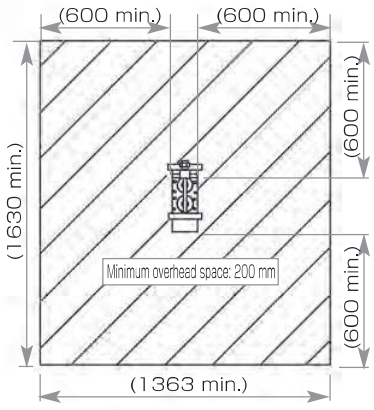
□ Installation and Maintenance Space

● QSQ010A/020A/035A
(Super Pack Compact duty model)



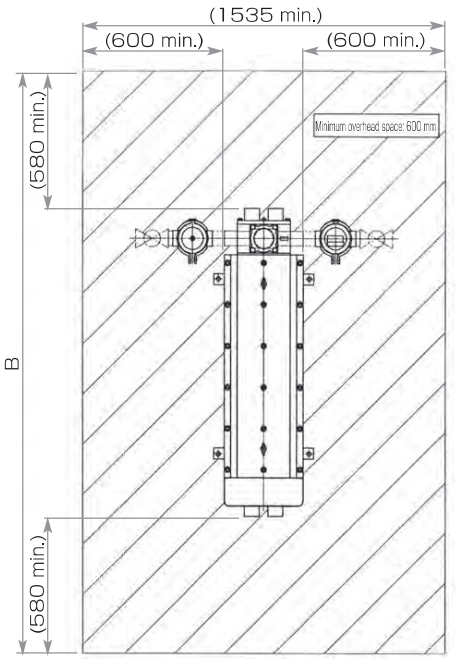
Installation and Maintenance Space

● QSQ080B-E/120B-E/180B-E-/270B-E
(Super Pack Medium duty model)



Installation and Maintenance Space

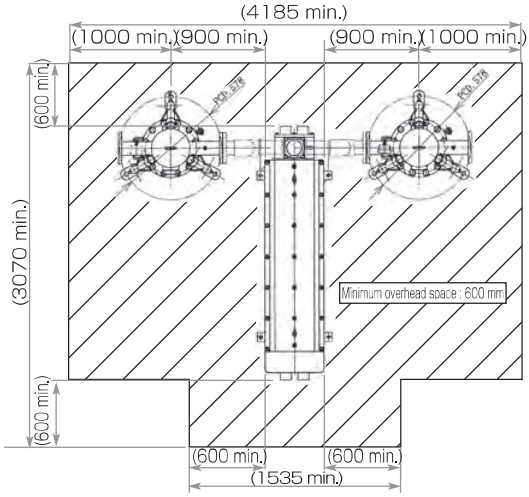
● QSQ420C-E/700C-E/1000C-E
QSQ1400C-E/2000C-E
(Super Pack Heavy Duty model)
● QSQ420C-EDC/700C-EDC/1000C-EDC
QSQ1400C-EDC/2000C-EDC
(Eco Pack®)



Installation and Maintenance Space

● QSQ2500C-E
(Super Pack Heavy Duty model)
● QSQ2500C-EDC
(Eco Pack®)

※ Piping indicated by dotted lines is not included and must be provided by end user.
※ Diagram shows Eco-Pack model
※ Please install the included filter.
※ Install on a level surface.
※ When running dryers in parallel, arrange piping so that the back pressure from piping in each feed is the same.
※ Set up dryer such that set up and maintenance space is like the hatched area in the diagram below.



Installation and Maintenance Space