

Refrigerant air dryers

Atlas Copco

FD (VSD)+ series (1250-2000 l/s, 2648-4238 cfm)



COMPLETE PROTECTION FOR YOUR APPLICATION

Compressed air entering the air net is always 100% saturated. When it cools, the moisture will condense, causing damage to your air system and finished products. By removing moisture from compressed air with a pressure dewpoint (PDP) as low as +3°C / +37°F, our FD (VSD)⁺ refrigerant dryers significantly reduce system failures, production downtime and costly repairs.

The most efficient dryer for steady and varying air demand applications. A number of new innovative technologies integrated in the new FD (VSD)⁺ dryers' design make them a perfect match for customers looking for reliable equipment with a low cost of ownership. The unique combination of high efficiency components, a smart unit design and an advanced unit control system gives an opportunity to save on average 50% of the consumed energy. Significantly reduced power consumption and low quantities of refrigerant make sure the FD (VSD)⁺ dryers operate at the lowest possible carbon footprint.

The FD (VSD)⁺ range has been designed in order to be fully integrated into an Atlas Copco smart AIR solution.

The Elektronikon[®] controller is also used on the Atlas Copco compressor range and works seamlessly with our advanced ES control system, helping to ensure the compressor and dryer work in complete harmony maximizing energy savings, system air quality, and operational reliability.





FD (VSD)+ key features

- Corrosion resistant components.
- Low sensitivity to solid particle content in the compressed air.
- Smooth unit regulation.
- Advanced control and monitoring system.
- Generously sized high-quality components.
- High ambient temperature design.
- Various options available to adapt the unit to the installation requirements.
- Reduced number of internal connections (compressed air and condensate) thanks to integrated condensate separator and improved drain system.

Superior performance

FD (VSD)+ refrigerant dryers are designed in-house, tested using the most stringent methods (at ambient temperatures up to 46°C / 115°F) and manufactured on a highly advanced, lean production line. They meet or exceed the international standards for compressed air purity and are tested according to ISO 7183:2007.

Maximum energy efficiency

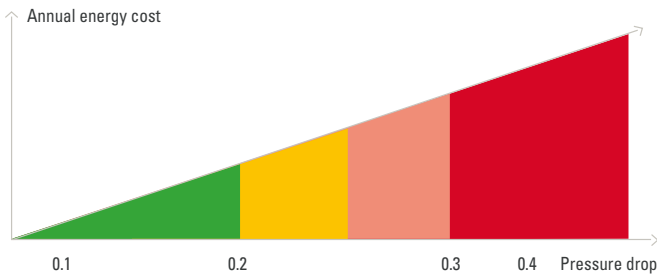
In the case of refrigerant dryers, the energy efficiency is defined by the internal pressure drop (that is the difference between the pressure of the compressed air at the dryer inlet and outlet) and the electrical power consumed by the dryer. The key for designing refrigerant dryers is therefore to keep the pressure drop as low as possible, and to develop technologies that allow the removal of moisture from the compressed air in the most efficient way.

Maximum energy efficiency

Our FD (VSD)+ dryers are designed to have a very low internal pressure drop below 0.2 bar / 2.9 psi, and the lowest power consumption.

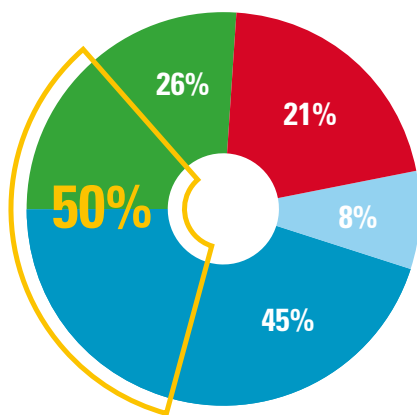
Low pressure drop

The lower the internal pressure drop of the dryer, the lower the pressure that you need to achieve with the air compressor, and the less energy the air compressor consumes. We have therefore put considerable efforts into minimizing pressure drop of the FD (VSD)+ dryer.



Low total cost of ownership

A unique combination of high-efficiency components, smart unit design and an advanced control system enables you to achieve average energy savings of 50%. With an FD (VSD)+ refrigerant dryer you can maximize your energy savings from the first minute of operation.

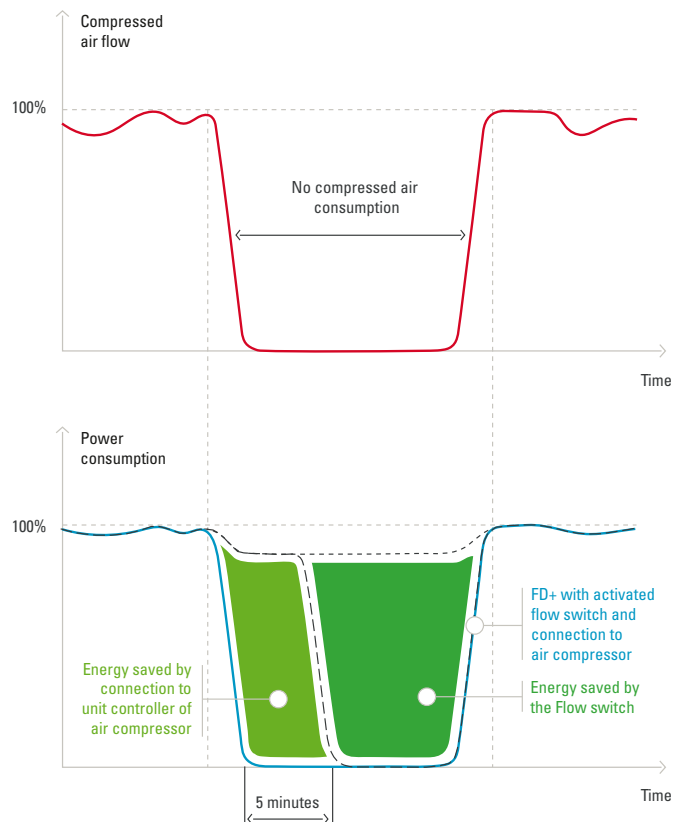


- Energy consumed by the dryer
- Energy consumed by compressor due to pressure drop
- Installation and maintenance
- Investment

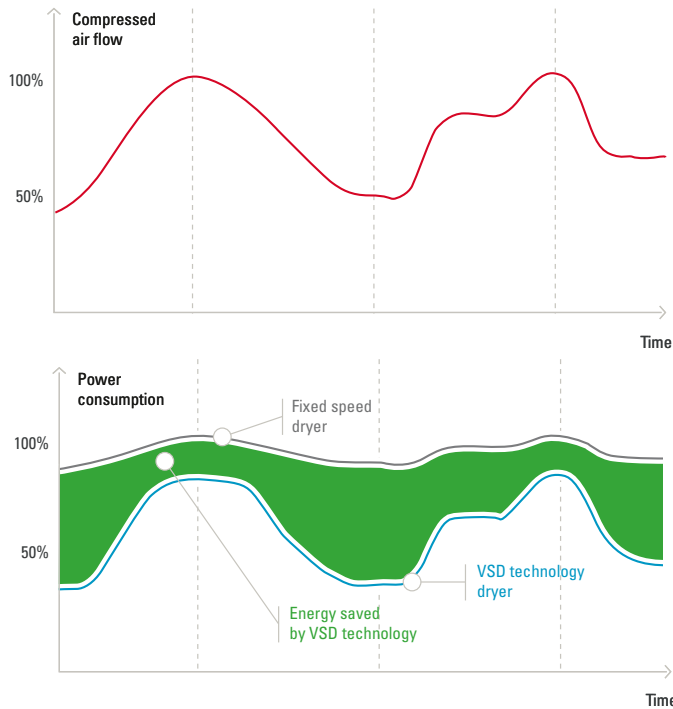
Smart unit regulation

It is not only components using cutting edge technology that define the ultimate energy efficiency of the FD (VSD)+ dryers, it is also how these components are sized and regulated during operation.

FD (VSD)+ dryers are equipped with the Elektronikon® Mk5 unit controller. As this is the same unit controller used for our air compressors, it allows an FD (VSD)+ dryer to communicate with an air compressor and avoid energy losses.



Up to 65% energy saving with the VSD technology!



VSD: driving down your energy cost

Over 35% of the dryer's lifecycle cost is taken up by the energy it consumes. To cut your energy costs, we offer FD (VSD)+ dryers with Variable Speed Drive (VSD) technology. VSD leads to major energy savings, reducing the consumption of energy producing fuels and protecting the environment for future generations.

What is VSD technology?

In almost every production environment, compressed air flow fluctuates depending on different factors (time of the day, week or even months). In addition to fluctuation of compressed air flow, operational temperatures such as ambient and compressed air temperatures may vary.

VSD technology allows the FD VSD+ dryers not only to save energy at full load, but also to save a significant amount of energy at partial load or under lighter working conditions.

How does the FD (VSD)+ dryer work?

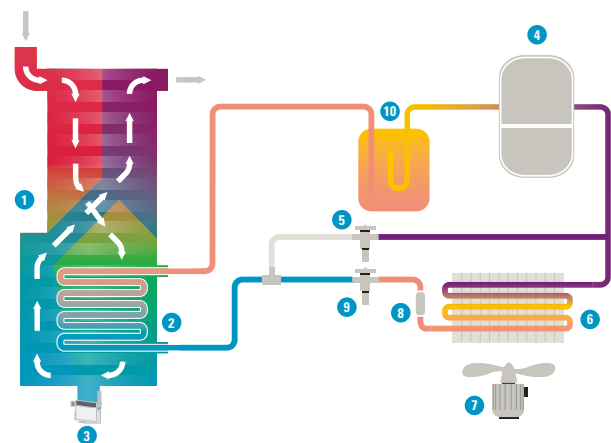
A refrigerant dryer uses a refrigerant circuit and heat exchangers to pre-cool compressed air, refrigerate it to condense the moisture in the air, and then re-heat the compressed air to prevent formation of the condensate on the pipe downstream. Refrigerant dryers can provide a pressure dewpoint (PDP) as low as +3°C / +37.4°F. They can be used at different pressures and consume no processed compressed air.

Air circuit

- 1. Air-to-air part of the heat exchanger:** incoming compressed air is cooled down by the outgoing dry cold compressed air.
- 2. Air-to-refrigerant part of the heat exchanger:** the compressed air is cooled to the required dewpoint by the refrigerant. The water vapor condenses into water droplets.
- 3. Integrated water separator:** the moisture is collected and evacuated by the electronic zero loss drain.

Refrigerant circuit

- 4. Refrigerant compressor:** compresses the gaseous refrigerant to a higher pressure.
- 5. Electronic hot gas bypass valve:** prevents the heat exchanger from freezing at lower load conditions.
- 6. Refrigerant condenser:** cools the refrigerant so that it changes from a gas to a liquid.
- 7. EC fans (air cooled versions):** generate required flow of the cooling air.
- 8. Refrigerant filter:** protects the entire system from water and solid particles.
- 9. Electronic thermostatic expansion valve:** further reduces the pressure which cools the refrigerant.
- 10. Liquid separator:** ensures that only gaseous refrigerant enters the compressor.



- Refrigerant gas/liquid
- Refrigerant gas
- Hot refrigerant gas
- Cold refrigerant liquid
- Expanded refrigerant liquid

Unmatched levels of reliability and energy efficiency

At the heart of the FD (VSD)+ dryer innovative components are combined to make it one of the most reliable and efficient refrigerant dryers on the market.



EC cooling fans

- Standard on all air-cooled versions
- Smooth regulation of the cooling air flow based on the unit's requirements
- Up to 10% less energy consumption



Zero loss automatic drain

- Each of the FD (VSD)+ dryer heat exchangers is equipped with a separate zero air loss automatic drain
- No additional connections or interconnections that could cause leakages or drain system malfunctions



Refrigerant compressor

- A high-efficiency scroll refrigerant compressor consumes on average 30% less power than dryers operating with a reciprocating refrigerant compressor
- The FD (VSD)+ refrigerant compressor is accurately sized for best performance with the lowest energy consumption possible

Refrigerant

- Highly efficient R410a refrigerant
- Zero ozone depletion and low CO₂ emissions





Electronic valves

- Increased reliability and regulation efficiency
- Exceptional robustness due to their operating principle
- Smooth, modular regulation, resulting in a significant increase of valve lifetime and PDP stability



Heat exchanger

- Minimum pressure drop and maximum heat transfer efficiency design
- Removal of nearly 100% condensate by mechanical separator
- No consumables



Frame and canopy

- All internal components of FD (VSD)⁺ dryers are installed on a special frame inside a powder-coated canopy
- Excellent protection of components from damage that might occur during transport, installation or usage
- Easy to transport, install and maintain thanks to the small footprint of the frame



Flow sensor (at the outlet of the FD (VSD)⁺ unit)

- Standard flow switch algorithm to maximize energy savings
- In case a zero compressed air flow is detected, the unit controller stops the refrigerant circle

A step ahead in monitoring and controls

The Elektronikon® unit controller is specially designed to maximize the performance of your FD (VSD)+ refrigerant dryer under a variety of conditions. It provides you with increased energy efficiency, lower energy consumption and reduced maintenance times. In addition, you – and your entire air system – experience less stress!



Intelligence is part of the package

- High resolution color display gives an easy to understand readout of the equipment's running conditions.
- Clear icons and intuitive navigation provide fast access to all key settings and data.
- Data from monitoring the running conditions and maintenance status is brought to your attention when needed.
- Operation of the equipment delivers reliable compressed air according to your needs.
- Built-in remote control and notification functions are provided as standard, including simple to use Ethernet based communication.
- Support for 31 different languages, including character-based languages.

Cooperation for ultimate efficiency

Most of the refrigerant dryers work independently from the air compressor. There is no communication in between them.

When the air compressors stops (due to no or low consumption of the compressed air) the refrigerant dryer either keeps working constantly or stops after

a certain period of time, thus consuming energy. With the Elektronikon® unit controller the refrigerant dryer can efficiently communicate with the air compressor and stop the refrigerant compressor every time there is no consumption of the compressed air.

This feature allows the FD (VSD)+ dryer to save energy.

Optimize your system

Scope of supply

Air treatment

- Inlet and outlet DIN/ANSI flanges
- Heat exchanger with integrated water separator
- Flow switch
- Zero loss condensate drains

Refrigerant circuit

- Scroll compressor (R410a refrigerant)
- Electronic hot gas bypass valve
- Electronic thermostatic expansion valve
- Air/water cooled condenser
- EC fans (air cooled units)
- Water regulation valve (water cooled units)
- Refrigerant filter
- Refrigerant liquid separator
- Refrigerant gas/liquid mixer

Unit control

- Variable Speed Drive
- Elektronikon® control and monitoring system
- Integrated control panel
- IP54 protection
- Voltage-free contacts for remote alarm and warning signals

Framework

- Base frame with forklift slots
- Independent unit canopy

Additional features and options

46°C / 115°F ambient temperature version

Special version of the FD (VSD)⁺ dryer suitable for operation at ambient air temperatures (cooling air) up to 46°C / 115°F with 100% nominal flow of compressed air.

Cooling air pre-filter

Plastic mesh pre-filter protects the unit from pollution that could reduce the dryer's energy efficiency and interrupt its operation. Add-on design of the pre-filter allows it to perform maintenance (cleaning) while the dryer remains in operation.

Compressed air inlet filtration

Reduce installation cost, save space and improve energy efficiency of the overall compressed air installation

with our low pressure drop filters. Filters are sized for the operation with 100% compressed air flow of the refrigerant dryer and can be connected to the unit controller to monitor the pressure drop status.

Anchor pads

Easy solution in case you need to bolt the unit to the surface it is installed on.

Customized solutions

Protection against aggressive environments, sea water cooling circuit, adaptation for outdoor operation, approvals for marine applications... These are just some of the ways we can make the FD (VSD)⁺ refrigerant dryer suit your installation requirement in the most efficient way.

SMARTLINK

Our user-friendly data monitoring system gives you remote insight into your compressed air installation.

It helps to predict possible developing problems and even shows you the potential for optimization and energy saving.



Technical specifications FD⁺

Dryer type	Inlet flow (Referred to 1 bar; 20°C; 0% R.H.)			Power consumption 50 Hz		Pressure drop		Inlet/outlet connections	Filter size (recommended)	Dimensions canopy						Weight	
	l/s	m ³ /h	cfm	kW	hp	bar	psi			DIN PN16 or ANSI 150#	PD+/UD+	mm			inch		
								L	W			H	L	W	H		
50 Hz																	
Air-cooled version																	
FD1250 ⁺	1250	4,500	2,648	6.8	9.1	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	2,295	58	62.2	90.3	835	1,840
FD1500 ⁺	1500	5,400	3,178	8.9	11.9	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	865	1,910
FD1750 ⁺	1750	6,300	3,708	10.2	13.7	0.15	2.2	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	945	2,080
FD2000 ⁺	2000	7,200	4,238	12.2	16.4	0.19	2.8	DN150 / 6"	2200+	1,474	1,579	2,295	58	62.2	90.3	950	2,095
Water-cooled version																	
FD1250 ⁺	1250	4,500	2,648	5.3	7.1	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	1,725	58	62.2	67.9	775	1,710
FD1500 ⁺	1500	5,400	3,178	5.8	7.8	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	1,725	58	62.2	67.9	800	1,765
FD1750 ⁺	1750	6,300	3,708	6.4	8.6	0.15	2.2	DN150 / 6"	1800+	1,474	1,579	1,725	58	62.2	67.9	845	1,865
FD2000 ⁺	2000	7,200	4,238	8.7	11.7	0.19	2.8	DN150 / 6"	2200+	1,474	1,579	1,725	58	62.2	67.9	850	1,875

60 Hz																	
Air-cooled version																	
FD1250 ⁺	1250	4,500	2,648	10.1	13.5	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	2,295	58	62.2	90.3	835	1,840
FD1500 ⁺	1500	5,400	3,178	13.6	18.2	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	865	1,910
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FD1500 ⁺	1500	5,400	3,178	6.6	8.9	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	1,725	58	62.2	67.9	800	1,765
FD1750 ⁺	1750	6,300	3,708	7.5	10.1	0.15	2.2	DN150 / 6"	1800+	1,474	1,579	1,725	58	62.2	67.9	845	1,865
FD2000 ⁺	2000	7,200	4,238	9.6	12.9	0.19	2.8	DN150 / 6"	2200+	1,474	1,579	1,725	58	62.2	67.9	850	1,875

Reference conditions

Performance data per ISO 7183:2007

50 Hz units

- Ambient temperature: 25°C / 77°F
- Cooling water temperature: 25°C / 77°F
- Inlet compressed air temperature: 35°C / 95°F
- Inlet pressure: 7 bar(e) / 102 psig
- Inlet compressed air humidity: 100%

60 Hz units

- Ambient temperature: 38°C / 100°F
- Cooling water temperature: 29°C / 85°F
- Inlet compressed air temperature: 38°C / 100°F
- Inlet pressure: 7 bar(e) / 102 psig
- Inlet compressed air humidity 100%



Refrigerant content

Dryer type	Quantity R410A		CO ₂ equivalent
	kg	ton	
50 Hz			
Air-cooled version (40°C ambient)			
FD1250 ⁺	11	23.0	
FD1500 ⁺	10	20.9	
FD1750 ⁺	11.4	23.8	
FD2000 ⁺	12	25.1	
Water-cooled version (40°C cooling water)			
FD1250 ⁺	12	25.1	
FD1500 ⁺	11.5	24.0	
FD1750 ⁺	13	27.1	
FD2000 ⁺	13	27.1	

Dryer type	Quantity R410A		CO ₂ equivalent
	kg	ton	
60 Hz			
Air-cooled version (40°C ambient)			
FD1250 ⁺	11	23.0	
FD1500 ⁺	11.4	23.8	
FD1750 ⁺	11.4	23.8	
FD2000 ⁺	10.5	21.9	
Water-cooled version (40°C cooling water)			
FD1250 ⁺	11	23.0	
FD1500 ⁺	12	25.1	
FD1750 ⁺	13.5	28.2	
FD2000 ⁺	13	27.1	

Technical specifications FD VSD⁺

Dryer type	Inlet flow (Referred to 1 bar; 20°C; 0% R.H.)			Power consumption 50 Hz		Pressure drop		Inlet/outlet connections	Filter size (recommended)	Dimensions canopy						Weight	
										mm			inch				
	l/s	m ³ /h	cfm	kW	hp	bar	psi	DIN PN16 or ANSI 150#	PD+/UD+	L	W	H	L	W	H	kg	lbs
50 Hz																	
Air-cooled version																	
FD1250VSD ⁺	1250	4,500	2,648	5.5	7.4	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	2,295	58	62.2	90.3	850	1,874
FD1500VSD ⁺	1500	5,400	3,178	7.4	9.9	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	880	1,940
FD1750VSD ⁺	1750	6,300	3,708	8.4	11.3	0.15	2.2	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	920	2,028
FD2000VSD ⁺	2000	7,200	4,238	8.8	11.8	0.19	2.8	DN150 / 6"	2200+	1,474	1,579	2,295	58	62.2	90.3	965	2,127
FD2400VSD ⁺	2400	8,640	5,085	11	14.8	0.27	3.9	DN150 / 6"	3000+	1,474	1,579	2,295	58	62.2	90.3	990	2,183
Water-cooled version																	
FD1250VSD ⁺	1250	4,500	2,648	4.4	5.9	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	1,725	58	62.2	67.9	800	1,764
FD1500VSD ⁺	1500	5,400	3,178	5.1	6.8	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	1,725	58	62.2	67.9	815	1,797
FD1750VSD ⁺	1750	6,300	3,708	6.1	8.2	0.15	2.2	DN150 / 6"	1800+	1,474	1,579	1,725	58	62.2	67.9	855	1,885
FD2000VSD ⁺	2000	7,200	4,238	6.7	9.0	0.19	2.8	DN150 / 6"	2200+	1,474	1,579	1,725	58	62.2	67.9	865	1,907
FD2400VSD ⁺	2400	8,640	5,085	8.2	11	0.27	3.9	DN150 / 6"	3000+	1,474	1,579	1,725	58	62.2	67.9	870	1,918
60 Hz																	
Air-cooled version																	
FD1250VSD ⁺	1250	4,500	2,648	10.8	14.5	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	2,295	58	62.2	90.3	850	1,874
FD1500VSD ⁺	1500	5,400	3,178	12.4	16.6	0.18	2.6	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	880	1,940
FD1750VSD ⁺	1750	6,300	3,708	15.8	21.2	0.15	2.2	DN150 / 6"	1800+	1,474	1,579	2,295	58	62.2	90.3	920	2,028
FD2000VSD ⁺	2000	7,200	4,238	16.3	21.9	0.19	2.8	DN150 / 6"	2200+	1,474	1,579	2,295	58	62.2	90.3	965	2,127
FD2400VSD ⁺	2400	8,640	5,085	19.1	25.6	0.27	3.9	DN150 / 6"	3000+	1,474	1,579	2,295	58	62.2	90.3	990	2,183
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FD1250VSD ⁺	1250	4,500	2,648	6.1	8.2	0.18	2.6	DN150 / 6"	1400+	1,474	1,579	1,725	58	62.2	67.9	800	1,764
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FD2400VSD ⁺	2400	8,640	5,085	12.8	17.2	0.27	3.9	DN150 / 6"	3000+	1,474	1,579	1,725	58	62.2	67.9	870	1,918

Reference conditions

Performance data per ISO 7183:2007

50 Hz units

- Ambient temperature: 25°C / 77°F
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- Cooling water temperature: 29°C / 85°F
- Inlet compressed air temperature: 38°C / 100°F
- Inlet pressure: 7 bar(e) / 102 psig
- Inlet compressed air humidity 100%



Refrigerant content

Dryer type	Quantity R410A	
	kg	CO ₂ equivalent ton
50 Hz / 60 Hz		
Air-cooled version		
FD1250VSD ⁺	9.5	19.8
FD1500VSD ⁺	10	20.9
FD1750VSD ⁺	10.5	21.9
FD2000VSD ⁺	10.5	21.9
FD2400VSD ⁺	13	27.1

Dryer type	Quantity R410A	
	kg	CO ₂ equivalent ton
50 Hz / 60 Hz		
Water-cooled version		
FD1250VSD ⁺	12	25.1
FD1500VSD ⁺	13	27.1
FD1750VSD ⁺	12.5	26.1
FD2000VSD ⁺	13	27.1
FD2400VSD ⁺	13	27.1

Committed to sustainable productivity

We stand by our responsibilities towards our customers,
towards the environment and the people around us.
We make performance stand the test of time.
This is what we call - Sustainable Productivity.



ISO 9001 • ISO 14001
OHSAS 18001
ISO 22000

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