Air Filters

Air Filter Solution for Compressors

Ingersoll Rand

F-series General Filters

Excellent Performance Integrated in Design and Manufacturing

The advanced Ingersoll Rand F-series compressed air filters protect critical processes and valuable equipment by effectively reducing contaminants in the air system. F-series filters have been rigorously tested and integrated with superior components for consistent, high-quality compressed air.

Better quality

Without effective filtration, higher scrap rate, product deterioration, extra maintenance cost and other problems may arise in compressed air-dependent manufacturing and processes. The new Ingersoll Rand F-series filters aim to solve these problems and ensure the compressed air system provides clean, high quality compressed air for your equipment.

Higher efficiency

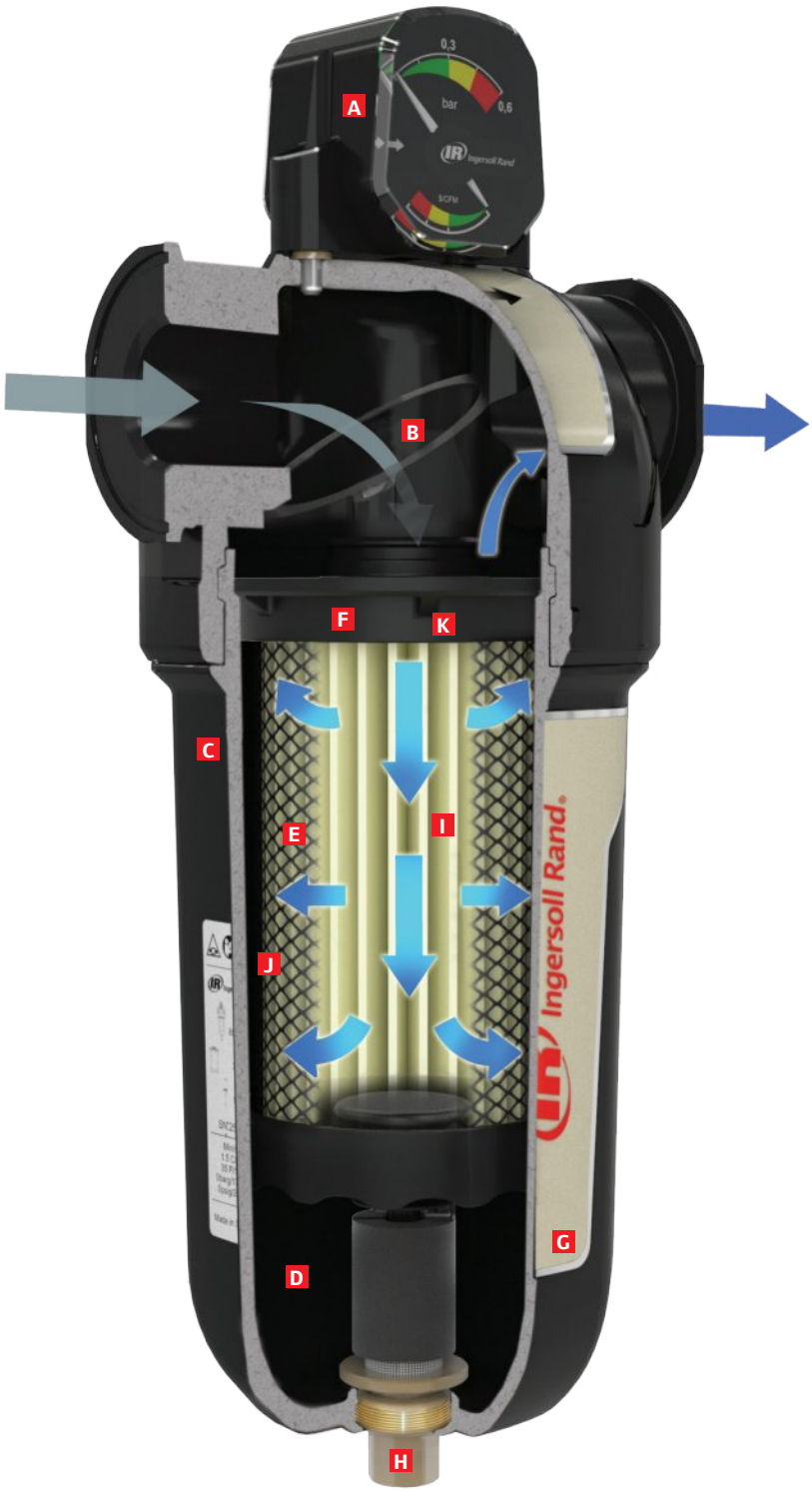
It is crucial to maintain low pressure difference in all compressed air components of a high efficiency energy system. The new Ingersoll Rand F-series filters are well engineered to guarantee low pressure difference throughout the life cycle of the filter element, and also equipped with a special double pointer pressure differential indicator which can directly display the costs consumed by system pressure difference.

Optimal choice

As the compressed air systems vary in their requirements for filtration, the new Ingersoll Rand F-series filters are available in four grades to provide a comprehensive filtration solution for compressed air in all critical processes.

Excellent Filtration Technology

- **A** **Standard double pointer pressure differential indicator** displaying pressure drop and economic operation efficiency, respectively
- **B** **Smooth deflector insert hole a unique design** directing air into the filter element to reduce turbulent flow and pressure loss
- **C** **Precision die-cast aluminum housing** for temperature up to 80°C (176°F) and maximum working pressure of 17 barg (250 psig)
- **D** **Special coating** on internal and external surfaces of the filter for effective corrosion protection even in harsh industrial environment
- **E** **Filter element with stainless steel mesh** reducing impact of throttling on the element under large pressure difference conditions
- **F** **Ergonomic filter cup design** facilitating contactless replacement of filter element
- **G** **Strippable time limit label** reminding the required replacement time (only for Grade A filters)
- **H** **Industrial brass drain trap** (used as no-loss, floating ball and manual drain trap) for more reliable and efficient condensate and oil dirt drainage than its inferior plastic counterpart
- **I** **Deep-pleat filtration medium** lowering airflow velocity for higher filtration efficiency and less pressure loss
- **J** **High efficiency drainage layer** for better drainage performance and good chemical compatibility
- **K** **Simple visual matching** for an exact match between cup and top end of the filter for higher safety



Comprehensive Filtration Solution

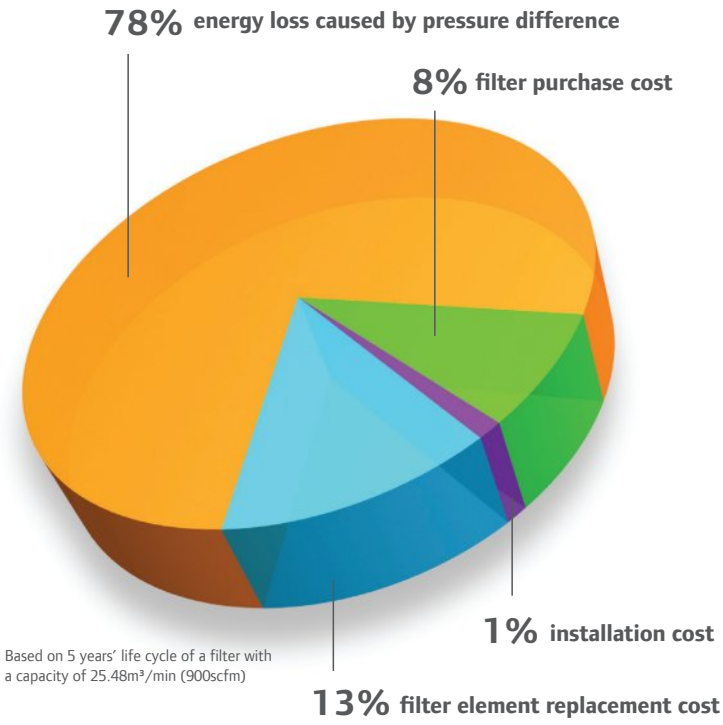
The new F-series filters are integrated into a comprehensive filtration solution which improves air quality, enhances energy efficiency and simplifies maintenance & operation.

High standard for air quality

The new F-series filters provide clean air which fulfills ISO 8573:1:2010 air quality standard requirements and is certified by a third-party organization for ISO 12500-1 compliance. The comprehensive filtration solution comprising filters of different grades can meet special air quality requirements.

Genuine high efficiency & energy saving

Loss caused by pressure difference accounts for about 3/4 of the total cost of a compressed air filter. A filter may suffer system pressure loss even with clean and dry element, resulting in an increase in air compressor load and cost. With the new F-series filters, the air passage is designed to effectively reduce turbulent airflow and improve efficiency while the deep-pleat design decreases the pressure difference.



Based on 5 years' life cycle of a filter with a capacity of 25.48m³/min (900scfm)

Design for Ease of Maintenance

F-series filters featured by contactless replacement of filter element and visual body match indication can be maintained more easily, and, unlike other products, even be installed in limited space due to its "zero gap" design. The long-lasting filter element can be replaced only once a year to enhance production efficiency and reduce total cost.*

*The filter element replacement period varies in specific air system working conditions of different customers.

Ingersoll Rand Quality Assurance

Ingersoll Rand has 20+ years' experience in air filtration industry. Production facilities offer a reliable guarantee for product quality, reliability and excellent performance. The new series filters have been rigorously tested and adopted unique production process as a perfect match with the full portfolio of Ingersoll Rand products.

F-IU Absolute Filters

"Absolutely" Clean Air Use Experience

Pure air goes beyond stringent control over solid particles, moisture and oil as the bacterial and viruses contained in compressed air may also have a direct impact on subsequent applications in a variety of industries. To this end, F-IU series absolute filters with bacteria and virus removal capability come into being.

Stainless steel filter housing

The housing is designed to be superior in quality and aesthetically pleasing by combining the specialized experience of Ingersoll Rand in air compression and advanced computer simulation fluid design system.

Features:

- CAD designed air filter housing has low pressure drop, and can collect the condensate in the lower bowl.
- The inside is polished to a sanitary grade, and the outside can be mirror, electro or sandblasting polished as required by the users.
- No condensate is accumulated in the suspended filter element tray.

Technical parameters:

- Housing material: standard 304SS and non-standard 316L SS
- Operating temperature: ≤142°C
- Max. working pressure: 10.0barg (for standard configuration), 16.0barg (for non-standard option)
- Basis of design: GB150 (products can also be customized as per other design codes)

High efficiency sterilization filter element

The element uses new single-layer PTFE membrane for super large airflow & low pressure drop, and is equipped with two-layer external pre-filter. It uses rugged 316L SS central column to leave 3 times room for airflow and heat-resistant PP external sheath, and goes through gas & liquid integrity test and multiple stringent validation tests.

Features:

- Hydrophobic PTFE filter material which is 100% efficient at 0.01μ for absolute sterilization and phage grade (qualified for MS2 challenge). 85% dust-holding space and sanitary grade design enables outstanding large airflow, low pressure drop and long service life.
- Unique heat-resistant PP external sheath and 316L SS central column, withstanding repeated steam sterilization up to 142°C and with the porosity being 300% of competitors, is rugged in structure and further reduces airflow resistance.

Technical parameters:

- Filtration area: 0.8m² per 25 cm filter element, and so on.
- Operating temperature: ≤70°C
- Permissible pressure drop: 3.5bar@70°C
- Steam sterilization conditions: 142°C for 225 times, 30 minutes each time
- Biosafety: USP Class VI plastics, BS5736

ISO8573 Compressed Air Quality Grade Standard

ISO8573.1:2010 is the basic document of ISO8573 series standards updated in 2010, which can be used as a basis for users to specify the quality grade requirements in all critical use points of their compressed air system. The removal of main contaminants is individually listed in the table below. For easy use and understanding, all of the three contaminants are listed together.

ISO 8573-1:2010 CLASS	Solid particles				Water		Oil
	Max. number of solid parties per m^3 air			Concentration mg/m^3	Steam	Liquid g/m^3	Total content (oil mist, oil drop and vapor) mg/m^3
	0.1-0.5micron	0.5-1micron	1-micron		Pressure dew point		
0	To be determined by user or supplier						
1	≤20,000	≤400	≤10	-	≤-70°C	-	0.01
2	≤400,000	≤6,000	≤100	-	≤-40°C	-	0.1
3	-	≤90,000	≤1,000	-	≤-20°C	-	1
4	-	-	≤10,000	-	≤+3°C	-	5
5	-	-	≤100,000	-	≤+7°C	-	-
6	-	-	-	≤5	≤+10°C	-	-
7	-	-	-	5-10	-	≤0.5	-
8	-	-	-	-	-	0.5-5	-
9	-	-	-	-	-	5-10	-

ISO8573-compliant Configuration Schemes

The recommended configuration schemes of IR filters and dryers required for various compressed air grades in conformity with ISO8573.1:2010 are listed below.

ISO 8573-1:2010 CLASS	Solid particles		Water	Oil
	Wet solid particles	Dry solid particles	Steam	Oil mist and oil vapor
0	To be determined by user or supplier			
1	G(GP)+H(HE)+U	D(DP)+H(HE)+U	IR desiccant dryer -70°C PDP	G(GP)+H(HE)+A(AC)
2	G(GP)+H(HE)	D(DP)+H(HE)	IR desiccant dryer -40°C PDP	G(GP)+H(HE)
3	G(GP)	D(DP)	IR desiccant dryer -20°C PDP	G(GP)
4	G(GP)	D(DP)	IR desiccant dryer +3°C PDP	G(GP)
5	G(GP)	D(DP)	IR desiccant dryer +7°C PDP	G(GP)
6	G(GP)	D(DP)	IR desiccant dryer +10°C PDP	G(GP)

Filter Grades and Selection

Ingersoll Rand filters and units correspond to different filter grades to meet the specific air demands of customers.

Required pre-filter grade	Filter grade	Filter type	Solid particle removal precision (including water and oil mist)	Max. oil content @21°C	Recommended element replacement frequency
	G(GP)	Coalescing	0.1μm (1μm)	0.03mg/m^3 (0.6mg/m^3) 0.03ppm(0.5ppm)	6 months
G(GP) +	H(HE)	Coalescing	0.01μm	0.01mg/m^3 0.01ppm	6 months
G(GP) H(HE) +	A(AC)	Oil vapor removal	N/A	0.003mg/m^3 0.003ppm	3 months
	D(DP)	Dry solid particles	1μm	N/A	6 months
D(DP) +	H(HE)	Dry solid particles	0.01μm	N/A	6 months
G(GP) H(HE) A(AC)* +	U	Dry solid particles / sterilization	0.01μm / sterilization	N/A	12 months

Grade G(GP) – conventional protection & filtration
Remove particulates to 0.1μm (1μm), including coolant, water and oil.
Grade D(DP) – regular dust removal & filtration
Remove solid particulates to 1μm.

Grade H(HE) – high efficiency precision filtration
Remove particulates to 0.01μm (1μm), including water and oil mist.
Grade AC –activated carbon filtration
Remove oil vapor and odor of hydrocarbons (excluding methane).

Grade U – absolute filtration class
Remove particulates to 0.01μm for absolute sterilization and phage grade.

*: optional

Remarks: contents in parentheses are corresponding flange filter model and parameters.

General Filter Technical Parameters Table

Filter grade	Connector size	Flow @7barg/100psig		Dimension, mm				Weight	Standard configuration	
		m^3/min	scfm	A	B	C	D	kg	Max. working pressure, barg	Housing material
Screw A, G, H, D										
FA30I(x)	3/8"	0.48	17	76	172	16	53	0.56		
FA40I(x)	1/2"	0.62	22	76	172	16	53	0.55		
FA75I(x)	3/4"	1.27	45	98	227	22	53	1.07		
FA110I(x)	3/4"	1.84	65	98	227	22	53	1.09		
FA150I(x)	1"	2.49	88	129	266	32	53	2.06		
FA190I(x)	1"	3.12	110	129	266	32	53	2.06		
FA230I(x)	1"	3.82	135	129	266	32	53	2.06		
FA400I(x)	1 1/2"	6.66	235	129	356	32	53	2.36		
FA490I(x)	1 1/2"	8.21	290	129	356	32	53	2.36	17	Die-cast aluminum
FA600I(x)	2"	9.91	350	170	465	38	53	5.20		
FA800I(x)	2"	13.31	470	170	465	38	53	5.24		
FA1000I(x)	2"	16.99	600	170	465	38	53	5.26		
FA1200I(x)	3"	20.11	710	205	547	55	53	9.31		
FA1560I(x)	3"	26.05	920	205	647	55	53	10.69		
FA1830I(x)	3"	30.59	1080	205	647	55	53	10.69		
FA2300I(x)	3"	38.23	1350	205	877	55	53	13.70		
FA2700I(x)	3"	45.31	1600	205	877	55	53	13.70		

General Filter Technical Parameters Table

Filter grade	Connector size	Flow @7barg/100psig		Dimension, mm				Weight	Standard configuration (non-standard option)	
		m^3/min	scfm	A	B	C	D	kg	Max. working pressure, barg	Housing material
Flange AC, GP, HE, DP										
(x)424	DN40	12.0	424	304	115	624	350	29		
(x)669	DN50	19.8	669	304	120	934	650	37		
(x)1314	DN80	37.2	1314	390	177	1077	650	64		
(x)1980	DN100	55.8	1980	450	201	1140	650	95		
(x)2119	DN100	60.0	2119	450	201	1140	650	95	15 (18)	Carbon steel (304SS)
(x)2755	DN100	78.0	2755	500	230	1220	650	135		
(x)4132	DN150	116.9	4132	580	273	1294	650	177		
(x)6886	DN200	194.9	6886	750	361	1519	650	368		
(x)11018	DN250	311.8	11018	740	410	1884	800	515		
(x)16527	DN300	467.7	16527	1000	485	1777	850	684		

Absolute Filter Technical Parameters Table

Filter grade	Connector size	Flow @7barg/100psig		Dimension, mm				Weight	Standard configuration (non-standard option)	
		m^3/min	scfm	A	B	C	D	kg	Max. working pressure, barg	Housing material
F150IU	1"BSPT	2.5	88	160	168	282	170	0.5		
F216IU	1"BSPT	3.6	127	220	210	435	220	2.6		
F480IU	2"BSP	8	282	220	335	560	350	3.5		
F810IU	2"BSP	13.5	475	220	585	835	600	5.4		
F1200IU	2"BSP	20	704	220	835	1065	840	7.3		
F1680IU	DN80	28	986	419	405	951	410	45		
F2280IU	DN80	38	1338	419	655	1201	660	49	10 (16)	304SS (316L SS)
F2880IU	DN80	48	1690	419	905	1451	910	54		
F3600IU	DN100	60	2112	473	655	1201	660	61		
F4680IU	DN100	78	2746	473	905	1451	910	66		
F6000IU	DN150	100	3520	565	670	1389	680	85		
F7200IU	DN150	120	4224	565	920	1639	930	95		
F9000IU	DN200	150	5280	720	685	1560	700	145		

*Grade H ** Grade A, G, D
Note: the max. working pressure and housing material of non-standard option is not corresponded.

Operating conditions:

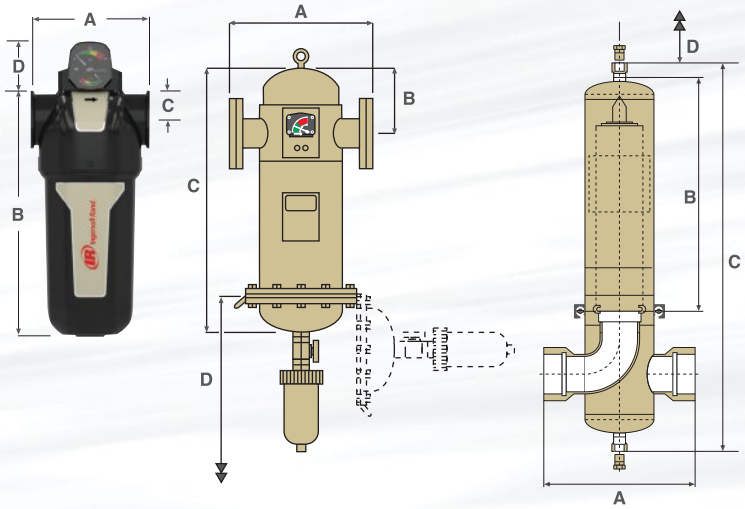
Recommended highest working temperature:

- (Grade G, H and D) 80°C
- (Grade GP, HE and DP) 66°C
- (Grade A, AC and D) 30°C

Recommended lowest working temperature: 1°C

Configuration:

- Standard automatic drain trap for Grade G(GP), H(HE) filters
- Standard manual drain trap for Grade A(AC), D(DP) filters
- Standard double pointer pressure differential indicator for Grade G/H/D filters
- Standard pressure differential indicator for Grade GP/HE/DP flange filters
- No pressure differential indicator for Grade A/AC filters



0.5-45.3m³/min 12-467.7m³/min 2.5-150m³/min

Correction coefficient for selection:

Pipeline pressure	barg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	psig	15	29	44	58	73	87	102	116	131	145	160	174	189	203	218	232	247
Correction coefficient		0.38	0.53	0.65	0.75	0.85	0.92	1.00	1.06	1.13	1.15	1.25	1.31	1.36	1.40	1.46	1.51	1.56

F-NG Energy Saving Filters

High Efficiency Filtration – Super Low Pressure Drop, Longer Service Life of Filter Element

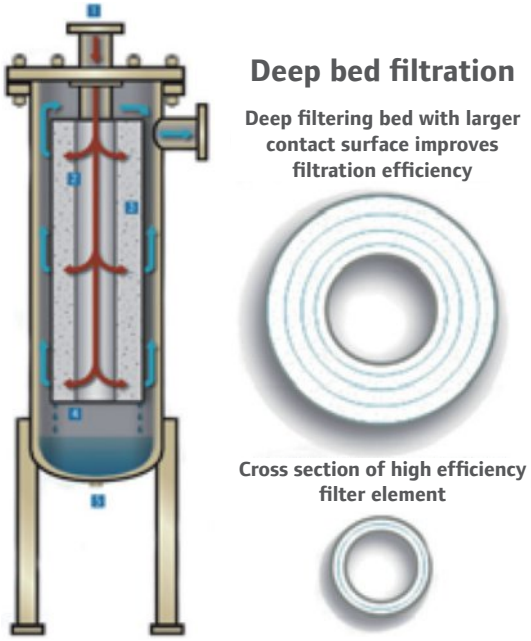
Ingersoll Rand energy saving filters can remove destructive oil mist entrained in the compressed air, and prevent it from entering pipelines, pneumatic valves, tools and process equipment of the system. The energy saving air filters can provide substantially "oil-free" compressed air with a pressure drop of only 0.034barg (0.5psig), vs 0.41barg (6psig) of conventional filters, to reach the same air quality level, and have a service life of over 5 years, longer than conventional bow filters. By right of the capacity and absorption efficiency, the energy saving filters can protect the lubricant from being brought into the discharge pipe in case of sudden failure of the oil / air separator of the air compressor.

Effective Depth Filtration

The air entrained with mineral or synthetic oil and water mist flows into the energy saving filter housing (1) and horizontally through deep filtering bed (2). The tiny particulates cluster on the single-strand fiber of the filtering bed and condensed into small droplets (3), which become larger and larger when they go through the filtering bed along with air flow and finally drop into the housing bottom (4) by gravity. As the slow air flow in the filter element prevents oil re-entrainment, the pressure drop in the filter element with a large surface remains at a very low level area throughout its life cycle. Besides, the retention time of compressed air in the deep filter mesh prolongs for high coalescence efficiency. The lubricant and water clustered at the housing bottom can be drained through automatic or manual drain trap (5). The energy saving filters are integrated into a compressed air system by merely connecting compressed air and installing a drain trap without power supply.

Effective Protection for Compressed Air System

- Low operating cost – pressure drop below 0.07barg (1psig)
- Long service life of filter element – over 5 years for normal use
- High efficiency filtration - dust removal precision to 0.1μm
  - 99.98% removal efficiency for 0.1-3μm particles
  - 100% removal efficiency for above 3μm particles
- Efficient treatment of regular lubricants – including mineral and synthetic oil
- Efficient removal of oil & air particles at 0.015pm
  - 2ppm (intake) =0.01ppm (discharge)
  - 3ppm (intake) =0.015ppm (discharge)
- Few maintenance efforts – long service life of filter element
- Standard differential pressure gauge – for filter element status display



Positioning in the Air system

The installation position of energy saving filters depends on type, age of the air compressors, as well as the type of dryer used in the air system.

- For refrigerated dryer: although the condensate separator of the refrigerated dryer can effectively remove moisture and oil mist in the airflow, some oil dirt still exists in the form of aerosol, while the energy saving filter, installed after the dryer, can remove oil dirt and prevent it from entering the pipelines in the air system. If a large amount of oil is consumed by the compressor in the air system, the energy saving filter should be installed before the dryer to avoid a decrease in performance and efficiency of the dryer due to oil accumulated in it.
- For desiccant dryer: the energy saving filter is installed before the dryer to prevent oil from contaminating the desiccant in the dryer.

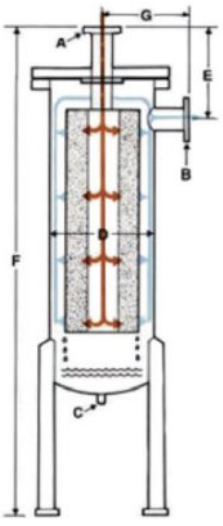
Technical Specification

Model Numbe	Pressure													Conn Size (A) (B)	Drain Size (C)	Weight (Kg)	Dimension (mm)		
	Capacity (m^3/min)																(D)	(E)	(F)
	Psig	20	30	40	50	60	70	80	90	100	110	125	150						
	Barg	1.4	2.1	2.8	3.4	4.1	4.8	5.5	6.2	6.9	7.6	8.6	10.3						
F850NG		4.2	5.5	6.8	7.9	9.2	10.5	11.7	12.9	14.1	15.4	17.2	20.3	3*BSPT	1*FPT	236	355.6	365.3	1748.8
F1360NG		6.8	8.8	10.7	12.7	14.7	16.7	18.6	20.6	22.6	24.6	27.5	32.5	3*BSPT	1*FPT	240	355.6	365.3	1748.8
F1870NG		9.5	12.1	14.8	17.5	20.2	23.0	25.7	28.4	31.1	33.8	37.9	44.6	3*BSPT	1*FPT	299	381.0	393.7	1836.7
F2550NG		12.9	16.5	20.2	23.9	27.7	31.4	35.0	38.7	42.4	46.0	51.7	60.9	DN100FLG	1*FPT	352	609.6	393.7	1890.5
F3220NG		16.2	20.9	25.6	30.2	35.0	39.7	44.4	49.0	53.7	58.3	65.4	77.1	DN100FLG	1*FPT	556	609.6	431.8	1924.1
F4070NG		20.5	26.4	32.3	38.3	44.2	50.0	55.9	61.9	67.8	73.7	82.6	97.3	DN100FLG	1*FPT	565	609.6	431.8	1924.1
F5100NG		25.7	33.1	40.4	47.7	55.2	62.6	69.9	77.4	84.7	92.1	103.2	121.8	DN100FLG	1*FPT	628	609.6	431.8	1924.1
F7600NG		38.4	49.6	60.6	71.8	82.8	93.9	104.9	116.1	127.1	138.1	154.8	182.5	DN150FLG	11/2*FPT	803	609.6	457.2	3886.2
F10200NG		51.3	66.1	80.8	95.6	110.5	125.1	140.0	154.8	169.5	184.3	206.5	243.4	DN200FLG	2*FPT	1116	762.0	457.2	3937.0
F13600NG		68.4	88.1	107.8	127.5	147.2	166.9	186.6	206.4	226.0	245.8	275.3	324.4	DN200FLG	2*FPT	1294	762.0	482.6	4597.4

Energy-saving Effect

The long-term accumulated costs arising from pressure drop are considerable. Using energy saving filters, instead of conventional filters, in the air system can generally reduce 0.38barg (5.5psig) pressure drop.

0.38barg (5.5psig) less pressure drop / year, equivalent to cost saving at different power (¥)			
Cost ¥/kWh	**37kW**	**75kW**	**150kW**
0.6	2,491	5,049	10,098
0.8	3,321	6,732	13,464
1.0	4,151	8,415	16,830
(Energy saving is calculated as per 8 hours per shift, 2 shift per day. 5 days/week, 51 weeks/year = 4,080 hours)			



Ingersoll Rand Inc. (NYSE:IR), driven by an entrepreneurial spirit and ownership mindset, is dedicated to helping make life better for our employees, customers and communities. Customers lean on us for our technology-driven excellence in mission-critical flow creation and industrial solutions across 50+ respected brands where our products and services excel in the most complex and harsh conditions. Our portfolio of products consists of air compressors, pumps, blowers, and systems for fluid management, loading and material handling as well as power tools. With over 18,000 employees globally, our team develops customers for life through their daily commitment to expertise, productivity and efficiency. For more information, visit www.IRCO.com.

Contact Ingersoll Rand

Add.: F11, L'Avenue, 99 Xianxia Road, Shanghai
Tel.: 021-22216000
Website: www.IngersollRand.com

24h National Toll-free Service Hotline:
800 820 2128
400 820 2128