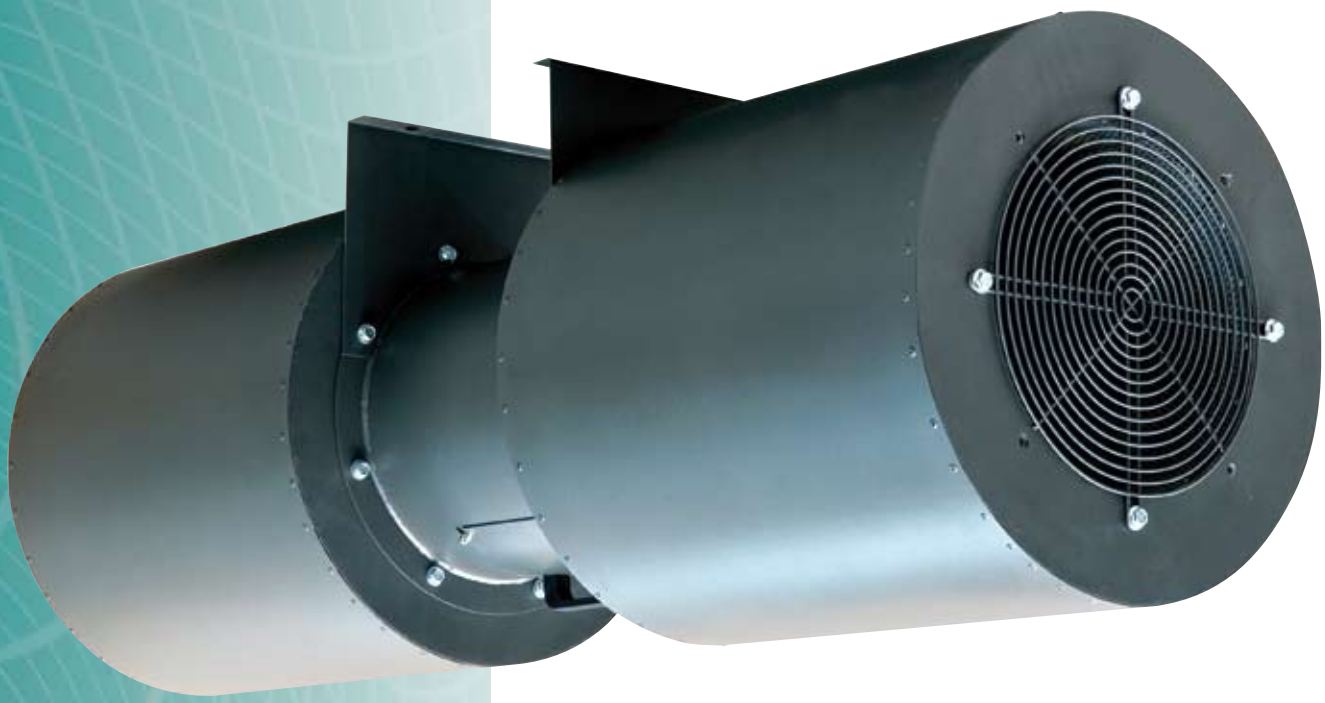
NOVOVENT



JET PIROS

Unidirectional and Truly Reversible versions

Following the requirement of our costumers and the most demanding international standards and regulations we offer competitive solutions with an attractive design and easy installation, together with a wide range of accessories. In order to achieve these objectives, we always try to get the feedback from professional designers and use this information to improve our products. It is a long process where our R&D department develops new prototypes, tests them in our own factory laboratory so that we can finally offer them in our catalogue once we are sure that they guarantee the level of quality that our costumers and the market are expecting.

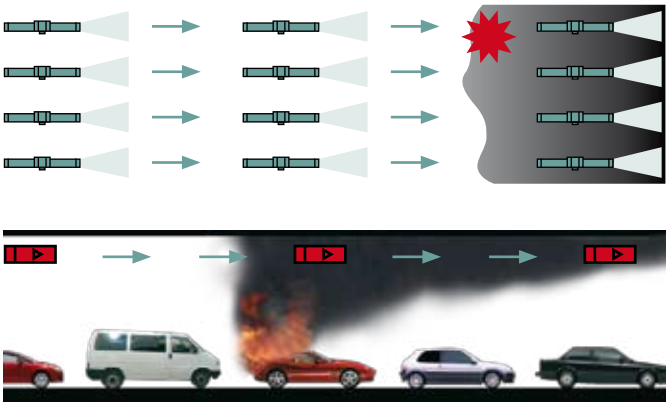
Our commitment is moreover to provide our products in the shortest possible delivery time to our costumers. Although we have more than 10.000 different references we always have the required stock of products and components in our warehouse in order to achieve this. Finally we also offer a complete and comprehensible Selection Software, which allows any user to select the best solution among our wide range of products or even work on the design of the installation.

Basic principles of Jet Fan ventilation

In the conventional car park ventilation systems both, the fresh air supplied and the air discharged, is drawn through fans and ducting. To prevent pressure drop, the system has to work at a low air velocity. However, this means that ducts must be relatively wide, thus requiring considerable space.

In jet ventilation, we use a completely different philosophy. Here, a small quantity of air is sucked into a fan and then ejected at high velocity. When this air hits the air in front of the fan, it thrusts it forwards while at the same time drawing the surrounding air along with it.

In this way, all the surrounding air is set in motion and transported over a distance of 20-40 metres without the use of ducts. The entire car park functions as a duct. The necessary size and number of jet fans depend on the size and layout of the car park and on whether the system is primarily to be used for CO ventilation or also for smoke control.



Benefits

The design of car park ventilation systems with JET PIROS fans offers the following benefits:

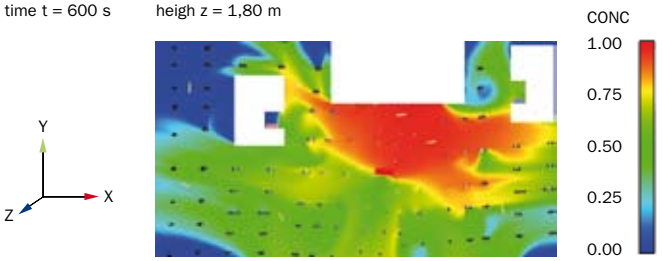
- Elimination of expensive, bulky and complex duct systems within the car park.
- With less ductwork the lower system resistances can result in reduced overall power consumption being achievable.
- When used in conjunction with CO sensors further energy savings can be obtained by selectively operating fans in polluted areas.
- Improved air quality can be achieved by more effectively mixing the air.
- Greater flexibility in installation and operation avoids the problem of stagnant areas.
- Effective smoke control by limiting the spread of smoke and directing the smoke flow.
- Less ductwork means a safer, lighter environment with better security due to increased visibility.
- Reduction of installation and overall construction build costs over traditional ducted systems.

Computational Fluid Dynamics (CFD)

NOVOVENT provides together with the Jet Piros and the CPS or PMS a computational fluid dynamic analysis (CFD) which allows detailed computation of airflow. It is a very useful system to demonstrate to the local authorities, consultants and owners that designs will performance satisfactorily. Once it is defined in the CFD the parking's geometry, air–change rates, volume, air flow direction, the air exhaust/ supply location and the Jet Piros a standard simulation will provide:

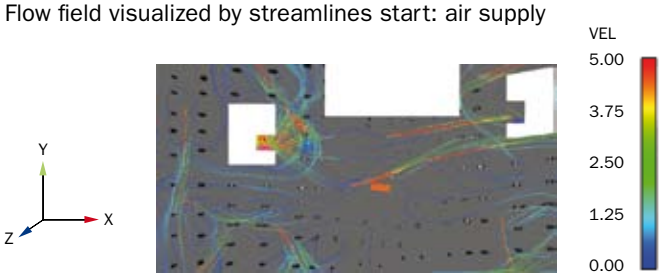
Simulation without ventilation system and jet fans

time t = 600 s heigh z = 1,80 m

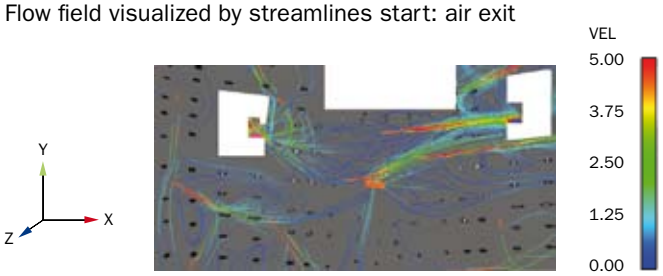


Simulation with ventilation system and jet fans

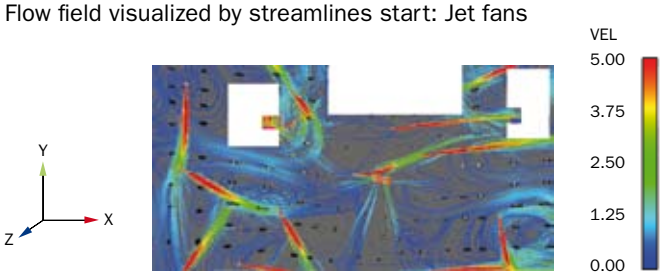
Flow field visualized by streamlines start: air supply



Flow field visualized by streamlines start: air exit

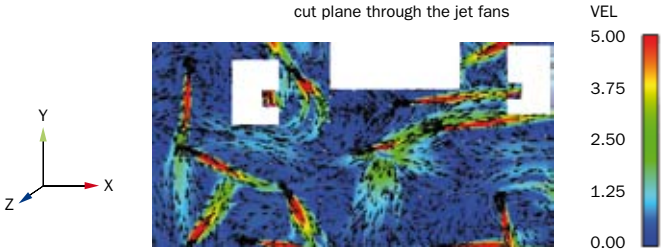


Flow field visualized by streamlines start: Jet fans



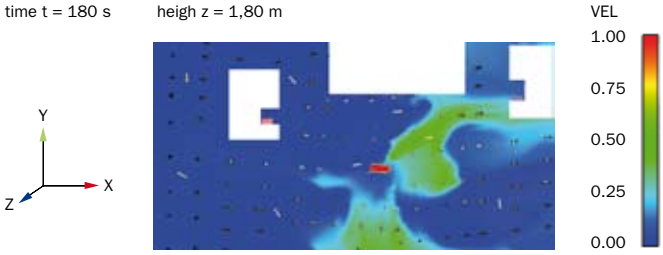
Flow field visualized by vectors Jet fans

cut plane through the jet fans



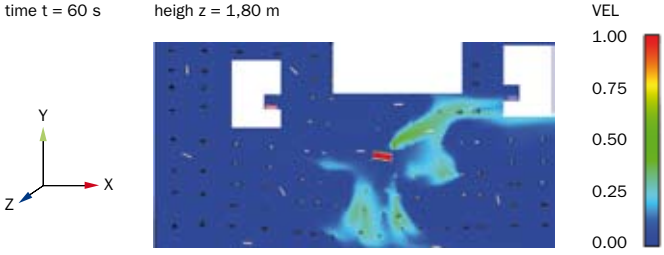
Smoke development

time t = 180 s heigh z = 1,80 m



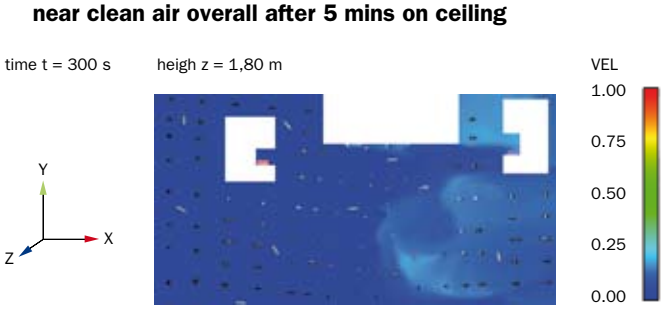
Smoke exhaust no further smoke development

time t = 60 s heigh z = 1,80 m



Smoke exhaust —no further smoke development— near clean air overall after 5 mins on ceiling

time t = 300 s heigh z = 1,80 m



Other options, configurations and simultion will be avaible under request.

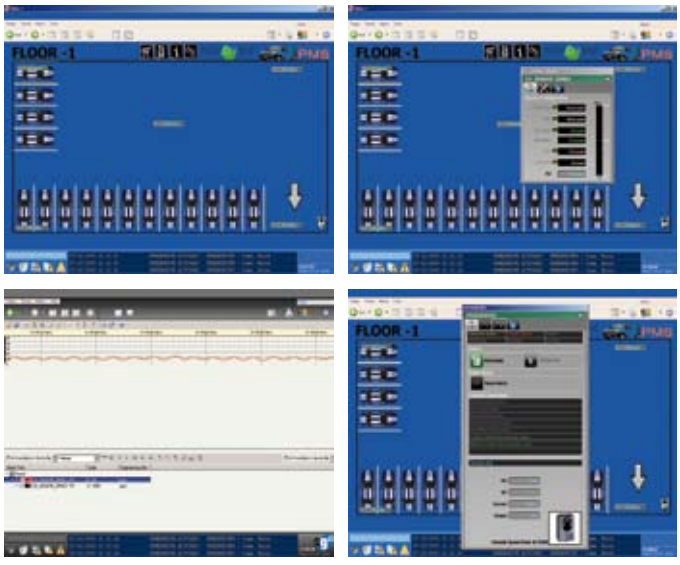
Control Parking System (CPS)

Novovent develops its own CONTROL PARKING SYSTEM (CPS) to integrate and control the Jet fans, CO sensors, Emergency Lights, Horns and Fire Alarm.
The CPS has a modular construction giving it the possibility to be adapted to all types of project requirements. This system controls the inputs as CO sensors and Fire Alarm and based on the technical specifications by the consultants gives the outputs to the Jet Piros, supply/extract fans, emergency lights, horns and any other device to make it safer for the people and the building.

The CPS can control Jet Piros with single or two speed motor and uni-directional or reversible.
With the CPS we supply the electrical wiring and documentation to make it more easily to the installer to connect the control to the Jet Piros, CO sensors and all the other units.
In some occasion the customer wants a total integration control done by NOVOVENT in that case we design and manufacture the control panel for the fans.

Parking Management Systems (PMS)

Upon request, NOVOVENT, S.A. supplies a PARKING MANAGEMENT SYSTEMS (PMS) which ables to control all the parameters of the parking.



Commisioning

NOVOVENT gives the opportunity to their customers to make the commissioning in all their projects in the entire world. In this stage, we check that all the installation is done properly and it is ready to work.
For more details of this contact with your agent.

CO sensor

The CO-concentration is measured by the sensors which should be distributed symmetrically in areas. The CPS or PMS monitors the individual values and averages the results in every zone.
NOVOVENT develops its own CO SENSOR to fit with all the European standards. The main characteristics of this CO sensor are:

- Power supply: 12 - 24 V dc.
- Power: 1.7 W@24 V dc, 0.8 W@12 V dc.
- Output signal: 4 - 20 mA.
- Output signal failure: < 1mA.
- Type of sensor: Electrochemical sensor
- Working temperature: - 10 a 40°C
- Humidity from 0 to 90% HR.

Warning light

When the sensors detect high concentrations of CO then a warning light is actived automatically advising the people to leave the parking. The main characteristics of this warning light are:

- Power supply: 24 V dc.
- Consumption: 600 mA@24 V dc.
- Working temperature:- 10 a 75°C

Acoustic warning

When the sensors detect high concentrations of CO or a fire alarm then an acoustic signal is actived automatically advising the dangerous.
Novovent acoustic signal is certified EN54-3-2001 giving not only the acoustic signal but also a kaleidoscope signal for deaf people.
The main characteristics of this acoustic signal are:

- Power supply: 24 V dc.
- Consumption: 12 mA@24 V dc.
- Type of signal: Acoustic 95 dB@1m and kaleidoscope signal
- Working temperature:- 10 a 50°C
- Humidity from 0 to 95% HR.

Range
JET PIROS range is manufactured in diameter 315, 355 and 400 mm. Unidirectional and Truly Reversible versions are available.

Temperature Rating
Motor temperature rating can be selected between 400°C/2h, 300°C/2h and 200°C/2h on request for smoke-extract applications. Standard rated motors are also available for ventilation applications.

Housing
Fan housing is manufactured in galvanized steel with epoxy paint finish. All fans have inspection door for motor servicing and mounting feet for installing the fan unit to the car park ceiling.

Motor
All motors are 2/4 pole in Dahlander connection, IP 55 standard and have class F or class H insulation. They are designed for 400V / 50 Hz. Isolator switch can be provided and externally connected to motor on request.

Impeller
Impellers with pitch adjustable blades are made of high quality injection moulded aluminium, specially designed for optimum impulsion. Impellers are dynamically balanced in factory.

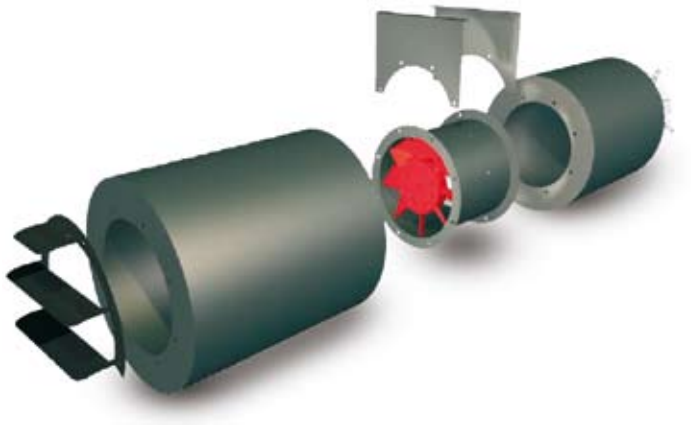
Silencers
Highly effective silencers with thermo-acoustic insulation are installed on both side of the fan to reduce noise level. Silencer length and insulation can be increased on demand in case a certain noise level is required.

Protection guards and deflectors
A protection guard and a deflector (two deflectors in case of truly reversible version) are provided, as and options, on both sides for safety purposes and for optimal air discharge.

Certification
JET PIROS range of fans is tested and certified 400°C/2h, 300°C/2h, 200°C/2h, in official laboratory following European Standards, according to EN-12101-3.

Characteristics

- Circular Jet Fan available in three different sizes (315, 355 and 400 mm).
- Axial fan casing manufactured from galvanized steel with flanges of both ends and inspection door for servicing.
- Two circular silencers, manufactured from galvanized steel, with 50 mm or 100 mm of acoustic isolation.
- Mounting brackets for ceiling suspension.
- Protection guard for inlet and deflector for outlet (unidirectional) or for inlet and outlet (reversible). Optional.
- Two speed 2/4 poles motors, available in 400°C/2h, 300°C/2h, 200°C/2h and standard versions.



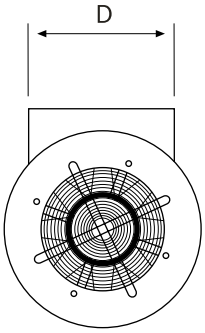
Unidirectional Version (JET PIROS U)

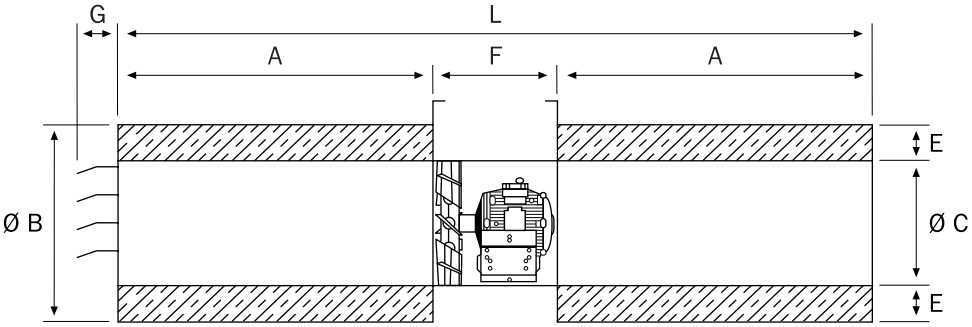
	Installed power [kW]	Nominal current 400 V [A]	Voltage frequency [V / Hz]	Fan speed [rpm]	Airflow [m^3/h]	Air Velocity [m/s]	Thrust [N]	Sound pressure at 3 m. [dB(A)]	Aprox. weight [Kg]
JET PIROS U 2/4 315T 40-8	0,8 / 0,2	1,9 / 0,7	400 / 50	3000 / 1500	4000 / 2000	14,2 / 7,1	19,2 / 5,8	58 / 43	59
JET PIROS U 2/4 355T 40-8	1,1 / 0,25	2,5 / 0,9	400 / 50	3000 / 1500	6600 / 3300	18,4 / 9,2	41,8 / 9,8	64 / 49	76
JET PIROS U 2/4 355T 45-8	2,2 / 0,5	4,6 / 1,8	400 / 50	3000 / 1500	7800 / 3900	21,8 / 10,9	57,8 / 13,2	66 / 51	78
JET PIROS U 2/4 400T 40-8	2,2 / 0,5	4,6 / 1,8	400 / 50	3000 / 1500	10400 / 5200	23,0 / 11,5	80,8 / 19,6	68 / 52	94
JET PIROS U 2/4 400T 45-8	3,1 / 0,8	5,9 / 2,2	400 / 50	3000 / 1500	11700 / 5850	25,8 / 12,9	101,2 / 25,3	70 / 54	96

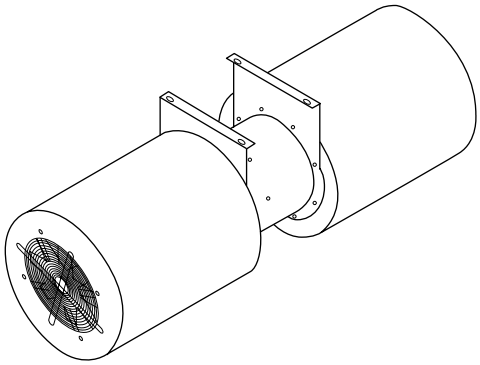
Truly Reversible Version (JET PIROS R)

	Installed power [kW]	Nominal current 400 V [A]	Voltage frequency [V / Hz]	Fan speed [rpm]	Airflow [m^3/h]	Air Velocity [m/s]	Thrust [N]	Sound pressure at 3 m. [dB(A)]	Aprox. weight [Kg]
JET PIROS R 2/4 315T 45-8	1,1 / 0,25	2,5 / 0,9	400 / 50	3000 / 1500	3940 / 1970	14,0 / 7,0	18,6 / 5,3	60 / 45	60
JET PIROS R 2/4 355T 40-8	1,1 / 0,25	2,5 / 0,9	400 / 50	3000 / 1500	5780 / 2890	16,2 / 8,1	32,2 / 7,5	64 / 49	76
JET PIROS R 2/4 355T 45-8	2,2 / 0,5	4,6 / 1,8	400 / 50	3000 / 1500	6830 / 3415	19,2 / 9,6	44,5 / 10,2	66 / 51	78
JET PIROS R 2/4 400T 40-8	2,2 / 0,5	4,6 / 1,8	400 / 50	3000 / 1500	9100 / 4550	20,1 / 10,1	62,2 / 15,1	68 / 52	94
JET PIROS R 2/4 400T 45-8	3,1 / 0,8	5,9 / 2,2	400 / 50	3000 / 1500	10240 / 5120	22,6 / 11,3	77,9 / 19,5	70 / 54	96

Unidirectional Version (JET PIROS U)

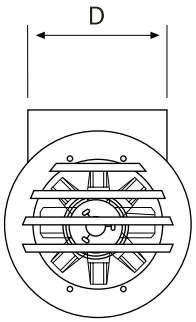


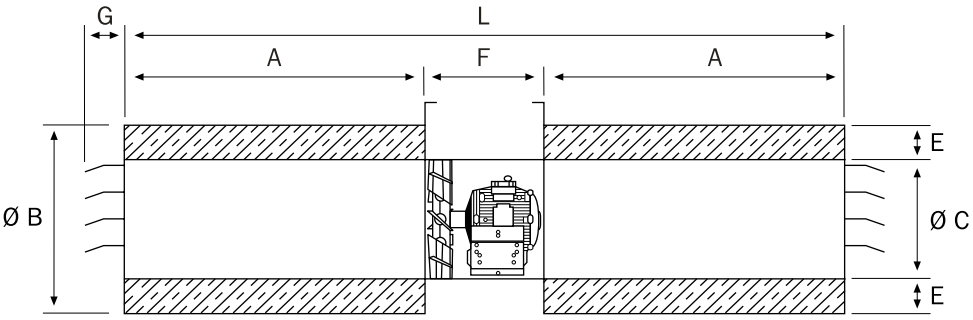


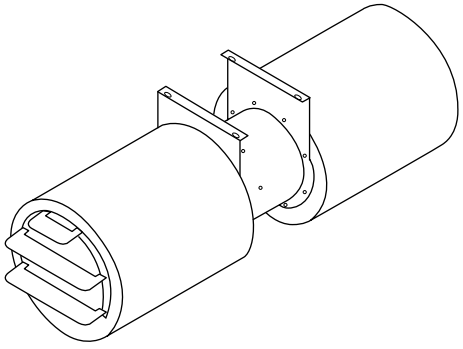


	A	Ø B	Ø C	D	E	F	G	L
315	800	415	315	358	50	320	100	1.920
355	800	455	355	395	50	320	100	1.920
400	800	510	410	447	50	320	101	1.920
450	900	516	450	380	50	350	100	1.950
500	900	500	500	420	50	400	100	2.200
560	900	648	560	470	50	400	100	2.200
630	900	720	630	515	50	400	100	2.200
710	1.200	800	710	595	50	500	100	2.900
800	1.200	900	800	725	50	600	100	3.000
900	1.200	1.010	900	775	50	700	100	3.100
1000	1.200	1.110	1.000	855	50	700	100	3.100
1250	1.200	1.360	1.250	1.000	50	900	100	3.300

Truly Reversible Version (JET PIROS R)







	A	Ø B	Ø C	D	E	F	G	L
315	800	415	315	358	50	320	100	1.920
355	800	455	355	395	50	320	100	1.920
400	800	510	410	447	50	320	101	1.920
450	900	516	450	380	50	350	100	1.950
500	900	500	500	420	50	400	100	2.200
560	900	648	560	470	50	400	100	2.200
630	900	720	630	515	50	400	100	2.200
710	1.200	800	710	595	50	500	100	2.900
800	1.200	900	800	725	50	600	100	3.000
900	1.200	1.010	900	775	50	700	100	3.100
1000	1.200	1.110	1.000	855	50	700	100	3.100
1250	1.200	1.360	1.250	1.000	50	900	100	3.300

NOVOVENT

INNOVATIVE VENTILATION SYSTEMS

Josep Finestres, 9 · 08030 BARCELONA · Spain · Tel. +34 93 278 82 77 · Fax +34 93 278 82 67
www.novovent.com · e-mail: novovent@novovent.com