



OPTIMA



Compressed air energy costs



PROTECT THE ENVIRONMENT AND SAVE ENERGY WITH COMPRESSED AIR

Greenhouse effect, ozone layer and the planet's changing climate are just a few of the issues that have interested public opinion in recent years bringing environmental protection and energy saving to light. Companies who rationally produce and use compressed air can contribute to environmental

protection through energy savings, as well as decreasing their operation costs. Many public boards in Europe have established awareness campaigns aimed at compressed air users. Mattei, as a compressor manufacturer, is also fully aware and involved in environmental aspects and has based its research on the improvement of the efficiency of its compressors, reaching a higher energy saving.

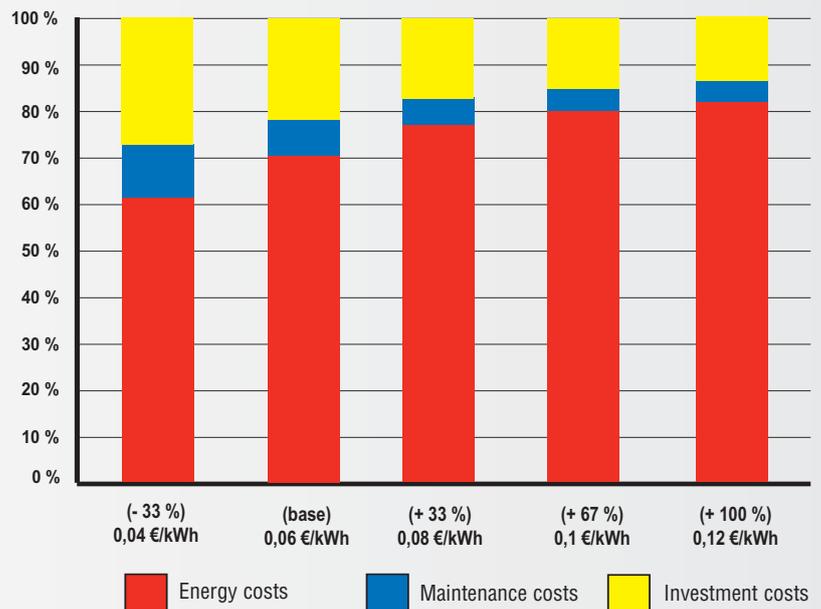
ENVIRONMENTAL IMPACT

The adoption of energy saving measures will produce a decrease of the impact on the environment, due to a reduction of CO₂ emissions, complying with the recent

international agreements. In fact, energy savings allow to reduce fuel consumption and related polluting emissions.

ENERGY COSTS

Compressed air is widely used in many industrial sectors, because its production, handling and use are safe and easy. Producing compressed air involves 10% of industrial consumption of electricity. In spite of this, often the energy efficiency of many compressed air systems is very low, with a consequent increase in running costs. Moreover, researches in the European industries have discovered that the average use of compressors reaches 70% of their full capacity. This means that savings over 30% can be obtained if air systems are suitably sized.



LCC (Life Cycle Costing) of a compressor with variation of electricity prices

ENERGY EFFICIENCY

The energy efficiency and the compressed air cost partly depend on efficiency of the compressors used in the production processes and on their optimal configuration, but they are also influenced by other important factors:

- Quality of the cooling system
- Waste heat recovery
- Reduction of air leaks
- Maintenance quality

	Energy savings (TWh/year)	CO ₂ emission reduction (Mtons/year)
Reducing air leaks	12,8	5,2
Overall system design	3,6	1,5
Recovering waste heat	3,2	1,3
Speed regulators	3,0	1,2
All other measures	7,8	3,2

EVALUATING COMPRESSED AIR

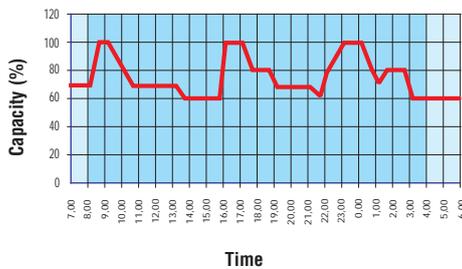
It is very important to know the exact air needs of the user, together with the depreciation period and all other variables that will help to determine the alternative with the lowest energy consumption. Measuring the compressed air and energy consumption are

essential to find out if changes in the servicing or investments in equipment could be cost effective. There is no best compressor in absolute terms, but the best combination between the specific compressed air need and the compressor can always be found.

TYPICAL USER PROFILES

Profile 1

The unit runs 24 hours on 24 for 7 days a week with consumption variability between 70 and 100%.



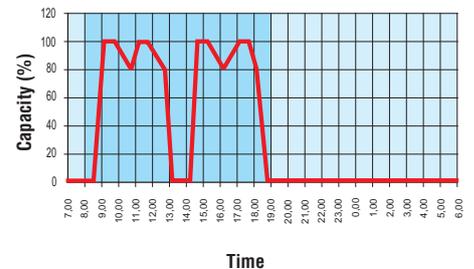
Profile 2

This is represented by a unit running for 16 hours a day and 5 days a week. Air consumption varies from 70 to 100% of maximum air demand.



Profile 3

This profile represents an application with an eight-hour shift at constant consumption for five days a week. Air demand tends to stay around 90% of maximum requirement.



Mattei Intelligent Energy Management

For this reason and respecting the ever-increasing worldwide environmental awareness of energy saving and pollution reduction, Mattei has developed a system to determine which are the compressed air needs of an installation in terms of air delivery, pressure and type of regulation.

A **Mattei Intelligent Energy Management** analysis is like taking an instant picture of the customer's current installation. On the basis of the data recorded an air demand curve and an annual energy cost is calculated and then used as reference to offer a solution which will not only satisfy the needs of the customer in terms of compressed air but also allow for more efficiency and savings in annual energy costs.

The whole M.I.E.M. process is guaranteed by the use of specific recording instruments and an exclusive software developed for Mattei.

The first step in order to execute a correct energy analysis is to gather all useful information on the compressed air plant, like air delivery and pressure, and therefore to record all electrical values for each compressor. Unlike other systems on the market, the recorded values include tension, current, and power factor and are logged thanks to an instrument called "NANOVIP", which records all values simultaneously and relates them to time.

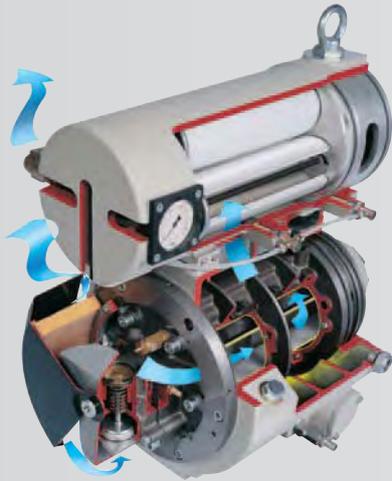
Once the on site data has been recorded, the data is elaborated by the M.I.E.M. software. At this point Mattei will formulate different hypotheses for the substitution of the existing machines and simulate the operation of these proposals respecting the existing operating conditions. The results of the simulation with new machines from the Mattei range are elaborated to produce a report of the performance and economic advantages of the proposal.



Energy efficiency at its best

Technology

Mattei's exclusive high technology air ends have been designed to obtain excellent performances in industrial applications. Reliability and efficiency are enhanced by the extremely reduced rotational speed, by the absence of roller bearings and by an advanced lubrication and cooling system.



THE BEST SOLUTION TO SAVE ENERGY

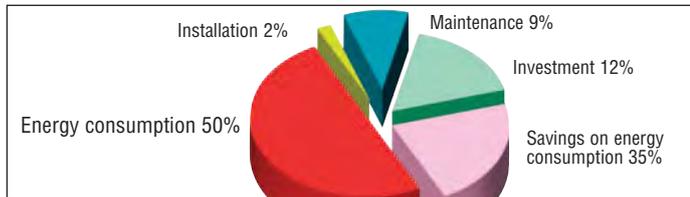
To ensure maximum energy saving OPTIMA series compressors can suit their operation to the load profile required by the compressed air system. The inverter allows to modify the motor rotational speed, adapting the air delivered by the compressor to the real demand. OPTIMA can save up to 35% of the annual operating costs.

Life Cycle Cost comparison (LCC) over a period of 5 years.

Standard compressor



OPTIMA



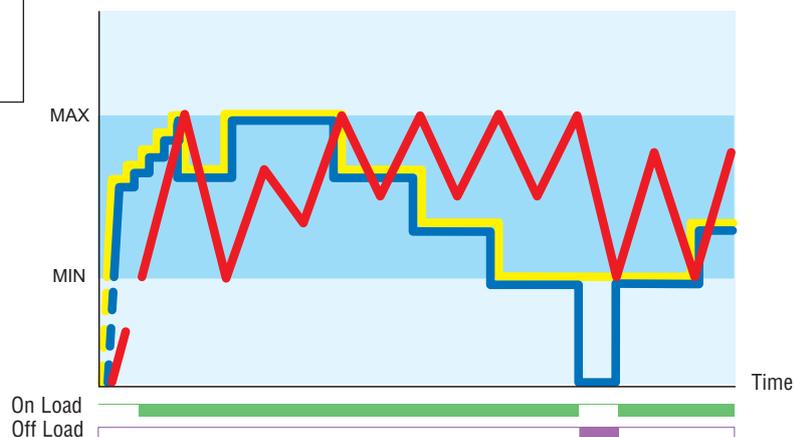
OPERATION PRINCIPLE

Optima operates within a range of pre-set maximum and minimum pressures. When reaching the maximum pressure, at the minimum rotational speed the shutdown of the intake valve occurs, the compressor is set "off load" and decompressed to 1.5 bar, to reduce the energy absorption further. When the line pressure lowers to the



minimum pre-set value it is reset to the "on load" condition and starts delivering air instantly, adapting the rotational speed to the air demand.

■ P = Line pressure ■ v = Speed ■ Q = Air delivery



HIGH EFFICIENCY MOTORS

The range is equipped with energy saving electric motors in premium efficiency.



DIRECT COUPLING

The electric motor and the compressor are coupled directly by means of a flexible coupling. The coupling between motor and compressor guarantee an extremely noiseless operation, vibrationless, with no power absorption. Direct coupling determines a remarkable "energy saving" because there are no energy losses caused by gears or V belts.



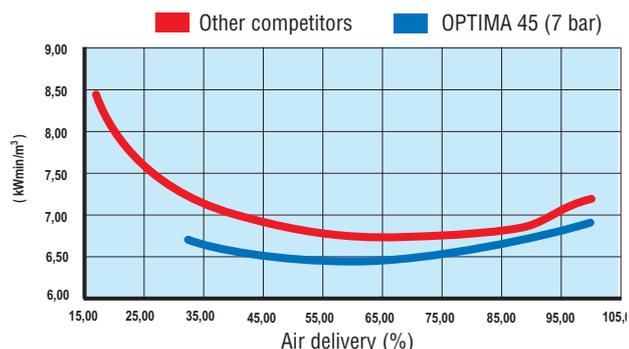
AIR FLOW AND COOLING

A feature of the OPTIMA series, from 11 to 45 kW, is the absence of an independent electrical cooling fan. Cooling of the compressed air system is obtained through a fan fitted directly to the main motor shaft. This is the optimal solution for machines belonging to this range. A real advantage in terms of design and energy.



MATTEI INVERTER REGULATION SYSTEM

The Mattei inverter system always assures the highest energy savings. When the compressed air demand is between 100% and 40%, the compressor rotational speed reaches the highest efficiency, with an energy consumption much lower than traditional inverter systems.



MAESTRO



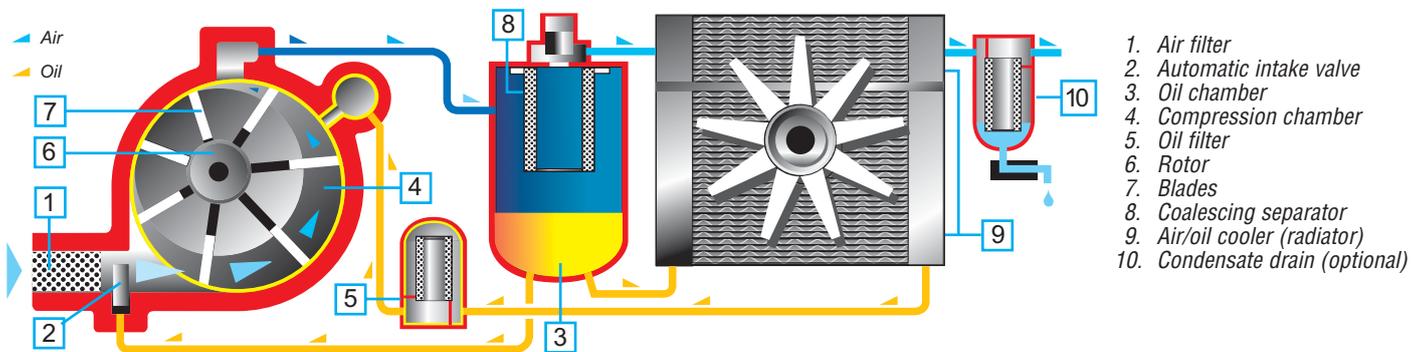
Maestro is a programmable system which controls the compressor and inverter operation and adapts these to the specific requirements of the air distribution system. It has different programming levels and special options for controlling and analysing the operation and faults. In fact, Maestro automatically adjusts the compressor's rotational speed to the preset maximum pressure value. If connected to other compressed air packages equipped with Maestro, the unit can become master of a compressed air plant, thus saving on the installation of a superior controller. Maestro has a "LCD" display, an ergonomic control panel with keys for quick access to the main menu and interfaces to communicate with other "MAESTRO" devices or with supervisor PC. Maestro can be interfaced via web or cellular technology to provide remote service monitoring.

Mattei: the advantages of an exclusive technology

OPERATION PRINCIPLE OF MATTEI COMPRESSORS

The air is sucked through a filter and passes through a modulating proportional valve which regulates air delivery according to air requirement. This valve allows to maintain a constant working pressure. The air goes into the compression chamber where the stator, rotor and blades create a series of vanes (or volumes). The rotor rotates eccentrically to the stator and is characterised by vertical slots in which the blades are placed and are pushed against the stator's wall by centrifugal force.

Lubrication and cooling are guaranteed by an efficient injection system which allows perfect hold and a lower lubricant consumption. A thin film of oil on the stator's wall avoids direct contact of the metal parts giving no wear. During the rotation the compression occurs with the volume reduction of the spaces between the rotor-blades and the stator. The compressed air and oil mixture passes through various separating phases mechanical and coalescent, leaving less than 3 ppm (parts per million) of oil in the air. The purified air leaves the compressor and is cooled in the radiator. The condensate which is produced is eliminated by a separator with an electronic condensate drain.



RELIABILITY

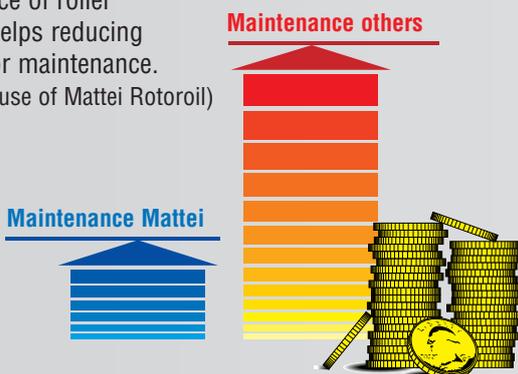
These compressors are designed for industrial continuous operation 24 hours a day, 12 months a year. The life of Mattei compressors often exceeds 100,000 working hours.

SIMPLE AND ECONOMIC MAINTENANCE *

Maintenance operations only include changing the oil at predetermined intervals, cleaning or replacing the air filter and cleaning the radiator. The separator filters can reach up to 10,000 working hours, with remarkable savings.

The absence of roller bearings helps reducing the cost for maintenance.

*(with the use of Mattei Rotoroil)



BLADES DESIGNED FOR OVER 50,000 HOURS LIFE*



An oil film on the stator is inside surface and prevents wearing of the moving parts, avoiding a direct contact between the stator itself and the blades.

*(with the use of Mattei Rotoroil)

ROTOROIL 8000 F2

Suitable for Mattei compressors, oil Rotoroil 8000 F2 guarantees high performances, long life and low maintenance costs.



The Optima series from 11 to 90 kW

STANDARD Version



- High performances
- Excellent reliability
- Easy operation
- Energy saving compressor
- Low maintenance costs
- Electronic control

PLUS Version

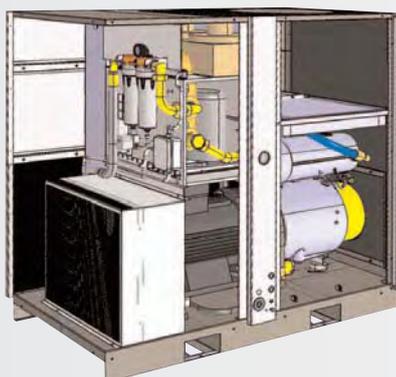
Optima Plus includes an integrated refrigerant dryer, allowing remarkable reduction in installation costs and space requirement.

DRYER WITH ECOLOGICAL GAS

- Efficient refrigerating power partialization
- Constant dewpoint
- Maestro/MicroC control
- High efficiency



Optionals: a valuable choice



ENVIRONMENTALLY FRIENDLY

Oil water separator kit

The compact, efficient separator kit that can be built-in works on the principle of coalescing filtration. This system reduces oil contamination and guarantees a better quality of the condensate.

Heat recovery kit

The heat recovery system can be integrated into the compressor cooling system. Before circulating inside the cooler the oil passes through an oil-water heat exchanger controlled by a thermostatic valve, allowing to heat water for industrial or sanitary purposes.

Condensate separator and drain kit

The condensate separator and drain kit guarantees clean and dry compressed air, maximising overall compressor efficiency and reliability.