**2020: the Year of Compressed Air Treatment!**

Following the recent release of a range of innovative products for mechatronics engineering, Metal Work S.p.A., the Italian leading company in the design, manufacture and distribution of components for industrial automation components, has decided for 2020 to focus on a fundamental component for pneumatic automation: the Air Treatment Unit.

**Figure 1: for Metal Work, the year 2020 is the year of compressed air treatment**

**Why is compressed air treatment so important?**

As we know, compressed air is a source of energy that is widespread in industrial applications, mainly because it is convenient and easy to use, clean, safe, reliable and easy to transport.

However, compressed air is not immediately available in the form in which it is produced by industrial compressors - first it has to be appropriately 'treated'.

For example, it is advisable to have a pneumatic switch, commonly known as a V3V, at the inlet of every machine or plant. This enables the air flow from the compressor to be manually or electrically interrupted if necessary, and the downstream circuit to be drained simultaneously, removing the presence of pneumatic energy in the system as a result.

Another basic element is the filtration unit that cleans incoming air, as on arriving from the network it can contain solid particles that could damage pneumatic component seals if not filtered properly, or obstruct the micro internal passage of various elements.

For this reason a good filtration system is required upstream of the plant, which is satisfactorily implemented with components known as filters. Well-designed filters can even separate condensation present in compressed air, by channelling it to an outlet valve.

It is also important to reduce the level of humidity in flows of compressed air, as water present tends to oxidise metal surfaces and, in the event of low temperatures, turns to ice which obstructs passages. Dehumidification is carried out by dryers.

Finally, air flows from compressors often contain industrial oils that tend to remove the inert lubricants present in the pneumatic components, and in some cases cause the seals to swell. In these cases the use of a purifier with a coalescing filter is required.

It should be remembered in this regard that standard ISO 8573-1 defines level of air purity by identifying the presence of solid particles, humidity and oil concentration with three separate numbers.

Another standard component in air treatment units is a pressure regulator. In practice, line pressure tends to fluctuate as a function of simultaneity and use factors. Given the same compressor, when several loads are used simultaneously the pressure of each tends to drop. Conversely, when some machines or plants are turned off, the network pressure tends to rise. To obtain a fairly constant pressure across the use scenarios (which means constant forces on mechanical parts), a pressure regulator is required, which ensures constant system pressure downstream regardless of upstream variations.

A regulator is also required for lower pressure values at points in the system where the usual set pressure (approximately 6.3 bar) is excessive. As a result, energy consumption is also reduced by lowering the pressure to the level required. In these cases the regulator is acting as a fully-fledged economiser.

But what would happen if, at the start of the day with all actuators empty, a pressure of 6.3 was supplied to the entire machine?

Many actuators would probably complete the first cycle with excessive speed, risking damage to the mechanical parts they displace.

A soft starter is used for this reason, to supply the actuators with a pressure level in the startup phase that increases gradually until it reaches the operating value.

Finally, the last important component in air treatment units is the lubricator, which introduces small amounts of lubricating oil downstream that are compatible with pneumatic devices. This element is not always used, partly because quality pneumatic actuators contain specially designed grease for specific tasks, and the lubricator oil tends to remove it. For this reason, when a lubricator is present it must operate with continuity.

**The Metal Work units - a comprehensive, unique range**

The air treatment units that Metal Work has developed over the years represent an extensive range of products, with solutions so innovative that they have set the standard and led to various attempts to copy them.

It is difficult to list the entire range in a few lines, therefore please consult our website at [www.metalwork.it](http://www.metalwork.it/) for technical information on individual products, however a brief description of our range is included below.

An obvious starting point is the **Bit Series**, consisting of a compact, cost-effective line of products in engineered polymers for the regulation and delocalised filtration of small devices. Available with 1/8” and ¼” threads for capacities up to 600 Nl/min, the Bit range has the main functions (regulator, filter, filter regulator, purifier, lubricator and air vent). Also available is a specific version for water management made of endorsed materials.

Increasing in size takes us to the **Syntesi®** **Series,** available in sizes 1 and 2 with interchangeable threaded bushes in dimensions between 1/8” and 1” for capacities up to 7,600 Nl/min.

Syntesi® is a complete, modular and flexible range that includes V3Vs, regulators (individual or in a set), filter-regulators, purifiers, activated carbon filters, soft starters, pressure switches, lubricators, air vents and safety valves. This family of components is evolving continually (we recently added pilot-operated regulators and other new features are planned for 2020) and their enthusiasts have increased over the years.

**Figure 2: Syntesi®, the latest-generation continually updating modular unit**

It should be remembered that the **Skillair Series**, an ‘evergreen’ in our product range, with a flow rate of up to 20.000 Nl/min., also acts as a dryer or lubricator with automatic minimum level filling.

Let’s now see the **New Deal Series**, which is mainly made of metal for heavy-duty work. With threads ranging from ¼” to 1” and flow rates of up to 4,500 Nl/min, the ND is designed for use in all heavy-duty applications requiring a particularly sturdy structure.

Not to mention the unique and inimitable **ONE Comprehensive Unit**, which encompasses in one engineering plastic block all the main functions of an Air Treatment Unit: including the V3Vs, filters, lubricators and pressure switches. All functions are accessible from the user side to facilitate the insertion of the product inside a sheet metal panel. ONE is also available in the version with the safety relief function.

**Figure 3: the ONE comprehensive unit encompasses all the main functions in a single module.**

Our overview ends up with a very short presentation of the **High-Relief Regulator**, which is particularly sensitive and normally used for manual precision regulations, and the vast range of electronic pressure regulators in the **Regtronic Series.**

Regtronic regulators ensure highly accurate pressure regulation, either from keypad or remotely, with M5 2” threads and flow rates up to 20,000 Nl/min.

**Figure 4: range of electronic pressure regulators in the REGTRONIC series**

**But 2020 will bring important novelties as well**

Metal Work never stops developing, numerous novelties are in pipeline also in the field of air treatment for 2020.

We have recently presented our new range of electronic pressure regulators, which are available in supply voltages of 12 to 24VDC, and feature new diagnostic functions and enhanced digital precision. The new range can be controlled either via analogue signal (0-10 VDC, 4-20 mA) or IO-Link interface.

The 2020 will also see the release of a new and complete range of electronic flow meters, covering a range of a few tenths to several thousands of Nl/min., designed for precise air flow metering and the monitoring of consumption.

But the novelties for 2020 do not stop here, we will release new ones in the coming months!

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