

The Evolution of Electronics for tissue converting machines

The ambitious project of electronic standardization of the entire range of OMET's machines is now reality. The digitization of data from the machines and the remote control of their functions, through the acquisition and interpretation of data and images remotely, and the standardization of the electronic equipment on board, are the first stages of a program for the total control of the tissue production process that is already bringing huge benefits to the efficiency of the lines.

That the machines do not have secrets for OMET is a fact. Whether in the tissue or the printing sector, the in-depth knowledge of the processes and applications and the extreme attention in making every machine operation autonomous in its accomplishment and analysable during the operational phase, result in the physical separation of the man from the machine and in a control independent from the operator's will and skills. This achievement is the fulfilment of a long process accelerated by the introduction in the 1980s of the first electronic controls and the advent of computers as tools managing the machine functions and, later, interpreting the operational data.

We analyse here the steps of OMET project and what developments are expected in the future. First of all, the Research and Development of the Tissue Business Unit of OMET is concluding the operation of unification of the operator interface for all machines in the tissue segment. Begun in 2013 with the last born, the FV Line, the homogenization of the so-called HMI (Human Machine Interface) continued on this first line and then in the TV 840 Line and AS Line, this latter the machine for production of paper towels. At the same time, it was introduced the possibility of total machine control performed by independent servo motors placed on each axis. The project began with the FV Line, later extended to the TV 840 Line and AS Line (TV 503 is currently under preparation at the time of writing this article). The complete control of the motors is offered also in remote, through tele service. It is possible, for example, to verify the operating parameters of the motor of a TV 840 Line installed on the other side of the world directly from OMET's headquarters in Lecco, Italy. Following the standardization of the electronic equipment, all the machines of the series TV 503, TV 840, FV Line and AS Line, share the same type of operator panel and the same console. It must be said, however, that the HMI is similar in the main controls for the whole range, but at the same time, specific on the basis of the different functions of each line. The operator panel becomes the control point from which, through the independent servo drives, all machine adjustments are performed in a simple and automatic way.

The use of cameras mounted at strategic points of the machine helps the operator, allowing instant and total control of what happens. The same images can also be viewed remotely at any time. This becomes extremely important when malfunctions or failures occur because, even via remote assistance, you can understand the problem quickly and intervene in a more timely and immediately decisive manner. The control consoles on the machine units are equipped with touchscreen panels and/ or membrane keypads for the management of local settings; on the membrane keyboards, each button can take up to five different colors which guide the operator in the operations to be performed, making the use of the machine simple and intuitive. The digitization of the electronic data coming from the machine has a dual function: on the one hand you can collect production data and, through the fast adaptation to the best production parameters, you can achieve a reduction of waste, in addition to the obvious savings of time, thanks to the certainty of a greater operating precision. On the other hand, the increasingly intensive automation of the machine functions through digital adjustments allows easier handling of the machine in its basic activities (speed increase / decrease, start / stop, etc..), and in the more complex (register, change of product size, etc.).

100 percent of safety for the operator

Create a safe working environment for the operator is an essential aspect that involves a strict observance of the safety rules. The continuous evolution of machines and systems implies a consequent and rapid change of the working conditions and the need, therefore, to adapt these new solutions to the standards in use. The latest machine lines produced by OMET implement several new solutions which increase the level of safety for the operator, however already very high. For example, the presence of a casing (partly transparent) that 'envelops' completely the structure of the machine and the application in all the critical points of hand guard protection. The real change, however, is once again 'digital'. A communication bus and certificate has been introduced on the AS Line so that the transmission of the safety signals is not performed through traditional wiring but in a digital way. The use of this system has brought considerable benefits: the machines are more secure and efficient, wiring is reduced and thus the possible sources of failure, the diagnosis is simpler and more detailed. OMET applies a system of quality control according to ISO 9001 standards and is

always careful to ensure maximum operating safety and to provide only certified products, requirement more than binding, for example, in the case of sale to large groups and multinational companies operating in multiple territories.

Tele service via the Internet

The technological development of electronics on board of the machine leads to an increase in the possibility of exploitation of the web for remote maintenance, in addition to more traditional systems that use the phone or the wireless connection. There are two types of remote support on the machines, one that uses the telephone network, for machines of older installation, and another one that uses the web for machines of new installations. OMET is testing a router similar to the one used for internet connection, but more versatile, accessible via 3G mobile network or over Wi-Fi to connect to both new and old lines via the fieldbus present in the machine (Profibus/ MPI or Profinet). A multi-router connection will be shortly available at each OMET Service point in the world to be sent to customers in case of need.

Development of the system of supervision and data collection

To meet the demand of customers that need to monitor and improve the efficiency of their tissue converting machines, OMET has created a point of collection of the machine production data, storage and subsequent analysis for the implementation of corrective measures. The main data whose download is strategic for assessing the productivity and profitability of the machine are the indices of productivity, the amount and types of materials used and the alarms occurred in the operational phase. This system is optional on every line; you can interface with machines installed both recently and in the past, and integrate multiple lines of the same production unit:

CONNECTIVITY

Being an architecture based on standard Ethernet, the system structure can be implemented with the same characteristics and potential of an intranet/internet network and, therefore, easily accessible from both the production facility or, through the web, from any other place.

SCALABILITY

The system can be scaled and adapted to suit all OMET machines, new and existing, in order to offer a wider range of sizes and configurations to meet the different demands of cost and performance.

MULTIPLE INTERFACES CONNECTABLE

With the new system, you can manage a high number of connected interfaces including:

1) File transfer

It is possible to automatically transfer on corporate servers, or simply through a USB stick, all the data stored including recipes for pre-set line during job changeovers, or production data after each job shift.

2) Printers

Connecting to printers for printing, for example, reports of the end of turn.

3) Barcode/other codes readers

The use of scan reader allows, for example, the recording of the data concerning paper coils and inks used for the tracking of materials.

4) Smart card readers

By recording data from smart card readers you can monitor the activities of operators and maintainers.

5) Energy measurement

The energy consumption can be constantly monitored during operation for a proper and timely control of the operating costs.

Consumption analysis and activities for energy saving

The adoption of appropriate measures to reduce energy consumption without increasing the cost of the equipment is an essential factor today. While, it is obvious, the energy consumption of the machines has increased proportionally to the increase in performance, the introduction of independent motors has already led to a large consumption optimization as it is possible to select, and operate, only the engines needed to each specific production phase of the machine. In addition, solutions with common power supply like the one used in the AS Line permit, through the sharing of energy between drives, a further reduction of the absorption. OMET is sensitive to topics like energy saving and environmental impact of the machines that, quite rightly, will increase their importance in the future in the battle for the protection of the environment through the reduction of emissions and fuel consumption. The R & D of OMET is at work in this regard and there are considerable opportunities offered by digitization in this sense.

Nov, 2014

OMET R&D

Tissue Converting Machines
tissue.omet.com