



Liquid Cooling Drives with Film Capacitors inside ...

That's SAEL

After having equipped the inverters with film capacitors and ONE Card, now we go for the liquid cooling solution. The advantages: reduced spaces, elimination of drive and cabinet fans, no more rooms and air-conditioned

electrical panels, absence of dust contamination-humidity in acid environment, preserving the internal components guaranteeing through time an important energy saving.

SAELsrl. BORN for Papermills

by: **Paolo Andrighetti, BU paper, SAEL**

SAEL AND INNOVATION: PLATFORM ONE DRIVE LIQUID COOLED

Fulfilling our mission voted to the "Spirit of Improving", we applied the know-how achieved along the Tunnel Boring Machines technology experience, to our massive production drives. The working environment in which our inverters work in those heavy applications, are among the most severe that can be encountered: very small spaces, strong vibrations and high temperatures due to the fact that they are placed in the vicinity of the eight 400Kw engines that carry out the rotation of the main drill, have driven our research and development team to create a water-cooled drive, extremely reliable, compact and strongly immune to thermal and mechanical shocks.

Applied the Drives in well-protected environments, such as the paper mill, it allowed us to be very confident and to encourage massively the paper mills to be led towards this technology.

THE TECHNOLOGICAL GAP: Fact Based !

A recent Equipment made for a Paper Mill, showed that our liquid cooled drives, practically without tangential fans (one each inverter), allowed us to remove all the ventilation normally

mounted on every door of the electrical cabinet. The new electrical cabinets, where our panels are installed, previously mandatory and abundantly conditioned, today become normal rooms, since the system is independently cooled. The double-sided electrical panels, where the inverters are

VW WATER COOLED SERIES with Safety Torque Off



The inverters of series "PLATFORM ONE DRIVE WATER" equipped with ONE card (same card for all the types of motors DC-AC and REBORN) and film capacitors, guaranteeing an infinite life for the inverter.

mounted, have closed air recirculation ensuring no contamination of dust, humidity and air acidity; they preserve over time, and in a perfect manner electronic, electromechanical and other various component. The experience gained on the subject by the Tunnel Boring Machines and the excellent performance monitored over the years due above all to energy saving, allowed the Paper Mill to **save money every year**, eliminating the need for maintenance of the air conditioners and fans. For this reason and for the significant reduction of the dimensions that the system has obtained, driven by the continuous research of innovation of the Customer in the search for products and systems with high technology and energy saving, we have made the first WATER-COOLED plant in the paper mill sector. This specific Paper Machine Sectional Control Drive system deals with the management of 46 AC motors of about 2MW of installed power;



the realization, unique in its kind and coordinated with our DCS in Drive, was strongly desired to equip the paper mill with all the qualities that our PLATFORM ONE offers today in the market.

In April 2021, we started the **third Paper Machine Sectional Control liquid cooled.**



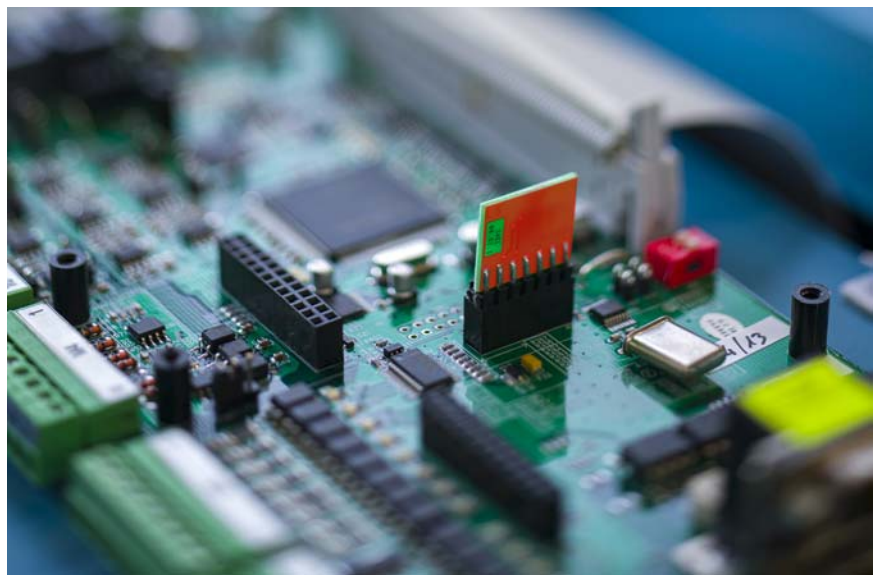
Electrical cabinet with inverters cabled in double side and with water cooling.

PLATFORM “ONE DRIVE” - SAEL - 4.0 INDUSTRY-

The “ONE drive” platform, born for the paper industry entered in the market in 2011, and in 2018 is enriched with the solution “liquid cooling” is immediately proven to be innovative and highly performing. All our drives (AC, DC, BRUSHLESS, CHOPPER and REBORN) of paper machine, winder, calander, wrapping machine and stock preparation, is always managed with “ONE” hardware card identical to the others. The “ONE” card is supported with by one ductile memory that contains the data, extractable and easily replaceable by anyone even without experience. In practice no programming, parametrization and operation like normally in the technical world with a connected PC is necessary to restart with our drive, in case of failure. A simple system dedicated to the auto diagnosis for helping the paper mill to conduct unparallel trouble shooting. The platform “ONE drive” foresees the use of the latest generation drives LONG LIFE, practically with an infinite life. The drives are equipped with components that are not in fear of aging (for example all the electrolytical capacitors with which every inverter is equipped with a

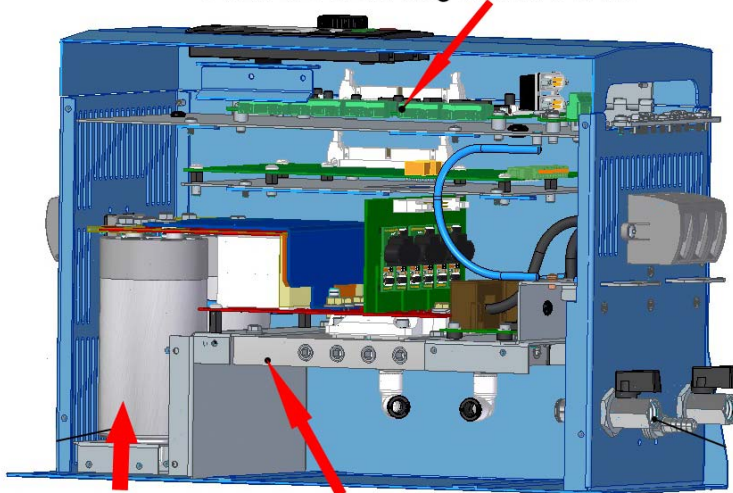


During assembling and test: “PLATFORM ONE DRIVE WATER”



ONE card and the memory, no more mistake and time for substitution

ONE PLUS Main Regulation BOARD



FILM CAPACITORS LIQUID COOLED HEATSINK
Exploded view of liquid-cooled inverter with films capacitor

60.000-90.000 hours lifetime, our drives are substituted with film capacitors) and are easily repairable in contrast to our competitors who are constructing drives in a more consumeristic model as all appliances are build. In the presence of a fault they prefer to replace them. Also, the changing of models very frequently is always lurking; another nice idea to confuse the end customer that they must upgrade or get expensive spare parts. Remote assistance and the possibility to understand every single problem that happens in the drive system through the “DCS in Drive ONE”, completes our platform that except from saving of spare parts, guarantees their fast replacement and a long-life lasting system; This is the philosophy with which SAEL has responded to the drives market for paper mills since 2011.