Rotary Monobloc Cooler RM3

Compatible to main applications

Having an electronic digital driver integrated in the RM3 cooler brings out many advantages for functionality, performance and ergonomics aspects. Initially RM3 cooler driver has been developed and designed by a supplier and both hardware and firmware designs were proprietary to this subcontractor. Although behavior of the cooler has been proved remarkably reliable and efficient at both lab and field level some improvements were expected. Thales took then the opportunity to fund development of its own proprietary driver, keeping control on the product and facilitating future improvements. The new driver has been designed with the goal to improve power efficiency and reduce cooler electrical consumption. This is fully successful as new versions of the RM3 cooler show substantial reduction of input power compared to previous configuration.

On board safety logics have also been modified. Some routines were judged inappropriate with a risk of ill-timed triggering and have been cancelled. Safety remains effective thanks to specific functions available at component level. The board is then secured against prohibitive power draw that may be induced by short circuit or motor seizing.

Those resident safety functionalities exist at two distinct levels:
- Current limitation
- Overheating protection

Current limitation is done through a control loop measuring voltage drop across MOSFET component. This voltage is a good representation of current variation. Detection of a voltage drop exceeding a fixed limit value entails a momentary supply stoppage. The measured voltage drop depends on MOSFET component internal resistance and on operating conditions (current level, temperature ...). It is then not possible to report the limit value for current corresponding to component threshold for voltage limit. It is anyway stated that in worst case scenario maximum admissible current value will not exceed 3A.
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The voltage drop limit value is set at component level and can be addressed and adjusted through cooler communication port. By defect the limit is set to the second level of a 10 grade scale. It is therefore possible, if required by specific operating conditions, to strengthen safety function by lowering setting to the first level of the scale, reducing trigger value for a more reactive safety stoppage. It has to be noticed that this option can alter cooling capacity and lead to failure to keep cold temperature set point in harsh operation conditions. This option should only be considered when required by specific circumstances.

Overheating protection permits through temperature measurement at component level to activate a speed reduction control, hence current drop, if temperature exceeds 135°C. If speed control is not sufficient to manage overheating, reaching 200°C will lead to complete stop of the cooler.

As a conclusion this new version of cooler driver stands as a quite appreciable level of improvement in performance, functionality, ergonomics and reliability of the RM3 cooler. Safety functions are still effective to guarantee integrity of the cooler and associated equipment.

The new driver is identified as Amendment C of the motor casing Sub Assembly of the RM3 cooler.

Thales Customer Service and technical staff remain available for any additional information on this topic.