



Electronic Control Systems for Special Vehicles  
**WM Evolution Ice Resurfacing Machine by WM-Mulser GmbH**

***TTControl***

“TTControl provided the complete electronic control solution, covering all relevant driving, steering and visualization functions in our WM Evolution. Obtaining all system components from one source helped to considerably accelerate development and integration processes.”

Wolfgang Mulser, Head of Engineering at WM-Mulser GmbH



TTControl provides complete electronic control systems for special vehicles such as agricultural and construction machinery, fork lifts, cranes, and snow groomers. Located in Brixen, Italy, TTControl is cooperating with WM-Mulser in an innovative development project for the next generation of high-tech ice resurfacing machines. The new WM Evolution combines the long term experience of WM-Mulser as a renowned manufacturer of high-capacity ice resurfacing machines with the technological know-how of TTControl. TTControl provided WM Evolution's entire electronic system.



WM Evolution is available with a diesel engine or a gasoline engine, or even with an electric motor. Thanks to its sophisticated technology, WM Evolution is capable of meeting all the requirements for efficient and consistent ice resurfacing. It reduces cost of operation for two reasons: it saves time by operating very efficiently, and it consumes less fuel per hour of operation. The automatic control of engine RPM in all models provides constant RPM under various load conditions.



TTC 200 and Vision<sup>Plus</sup> control units from TTControl constitute the technical core of the electronic system in WM Evolution. TTC 200 controls major functions of the vehicle system, such as vehicle movement, opening and closing of the snow tank cap, the edger, the rotating side brush, the horizontal and vertical augers that collect and convey snow into the tank, and the conditioner. All safety-critical functions in the machine run on TTC 200, which is designed to fulfill the highest safety levels according to the IEC 61508 standard.

“WM Evolution is a new generation of technically complex ice resurfacing machines with a sophisticated communication architecture. It benefits considerably from the great flexibility and extensive safety features of the TTControl solution.”

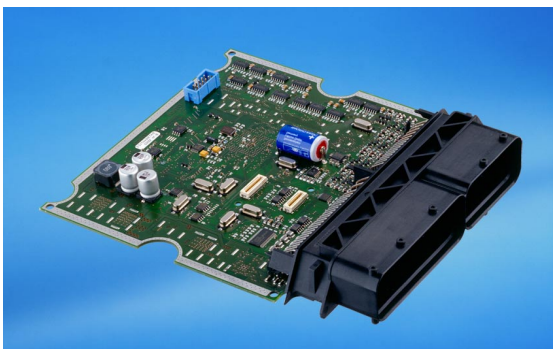
Bernhard Leimegger, WM-Mulser's Consultant for Machine Safety ([www.tbaa.it](http://www.tbaa.it))



A Vision<sup>Plus</sup> control unit is implemented for in-cockpit visualization and for advanced machine functions. A central color display allows monitoring of vehicle parameters such as speed, fuel status, or operating hours. In addition, menu navigation for machine configuration is available via the display. A command keyboard is linked to Vision<sup>Plus</sup> via a LIN bus. It controls, among other things, the automatic water refueling and the washing facilities of the machine.



The complete software package running on Vision<sup>Plus</sup> and TTC 200, including a special remote maintenance, was developed by TTControl. By connecting the vehicle via a network cable to a PC, it becomes easy to adapt, activate, or deactivate certain machine parameters. The maintenance system keeps error logs and records of system operation.



TTControl's electronic control system provides WM Evolution with multiple upgrade capabilities. New functions can be implemented by changing the software. This provides enormous flexibility and time savings to system developers. Even changing control units in an existing system is significantly eased, since all parameters of the TTControl boxes are stored in an external memory device. The system automatically detects the changing of a controller and downloads the logged parameters from the memory device. It is possible to perform remote diagnosis via the internet; this enables maintenance of machines all over the world.

### **About TTControl S.r.l. – TTTech Off-Highway**

TTControl offers electronic control systems for special vehicles, such as agricultural and construction machinery, fork lifts, cranes, snow groomers, and ice resurfacing machines. TTControl's software and hardware platforms enable manufacturers of special vehicles to develop reliable electronic control systems quickly and economically. TTControl is a subsidiary of TTTech Computertechnik AG.

Further information on TTControl is available at **[www.ttcontrol.com](http://www.ttcontrol.com)**

### **About WM-Mulser GmbH**

WM-Mulser GmbH is a leading manufacturer of high-tech ice resurfacing machines. The company operates internationally. Situated near Bolzano, WM-Mulser offers a broad range of machines fulfilling a variety of customer requirements. The company exports most of its products to international markets. WM Mulser has a long and successful tradition, and is committed to the highest standards of engineering.

Further information on WM-Mulser is available at **[www.wm-mulser.com](http://www.wm-mulser.com)**

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