



TECHNICAL DESCRIPTION

M32L-AS SC

GENERAL

The Magirus M32L-AS SmartControl in accordance with EN 1846 and EN 14043 is a new generation of turntable ladders. It is available on all standard chassis from the 16-tonne class upwards. The new SmartControl operating concept offers many pioneering advantages. The operating elements are particularly intuitive and ergonomically arranged. Extended assistance functions and easy availability of all functionalities enable optimum utilization of the turntable ladder during operation. The Magirus M32L-AS has a 4-part ladder set with an articulated arm. The Magirus Vario jacking system ensures maximum stability and the multifunctional cage enables a wide range of applications.

OVERVIEW



SMARTCONTROL TTL OPERATING SYSTEM

While developing SmartControl, we scientifically investigated the ergonomics of aerial ladder controls in order to further improve the control of our aerial ladders. The results, together with our decades of experience and practical feedback, have been incorporated into the SmartControl turntable ladder generation.

- **SmartFunctions for maximum user support**
 - **CageControl:** Move the cage and the ladder does the rest. CageControl coordinates the movement axes for the simplest, fastest and most precise control of the cage so that combined movements are easy to perform.
 - **FacadeFunction:** In addition to CageControl, the FacadeFunction enables the cage to travel parallel to a building facade that is at an angle in the room. The turntable ladder control automatically maintains a constant distance between the cage and the façade during lateral movements.

- New ergonomically optimized controls and displays



- Control devices

All control devices are ruggedized and especially developed for firefighting, e.g. for use also with gloves.



RescuePilot

- Ergonomic and comfortable positioning of the control hand
- Intuitive operation of the ladder set and the articulated arm
- All directions of movement of the turntable ladder are congruent with the movements on the control device



ClassicPilot

- Hand rest for precise and fatigue-free movements
- Buttons easily accessible in any position
- Raising/rotating the ladder set



MenuPilot

- Proven operating elements in combination with the new efficient and intuitive menu navigation make it possible to control more functions and ensure user-friendliness



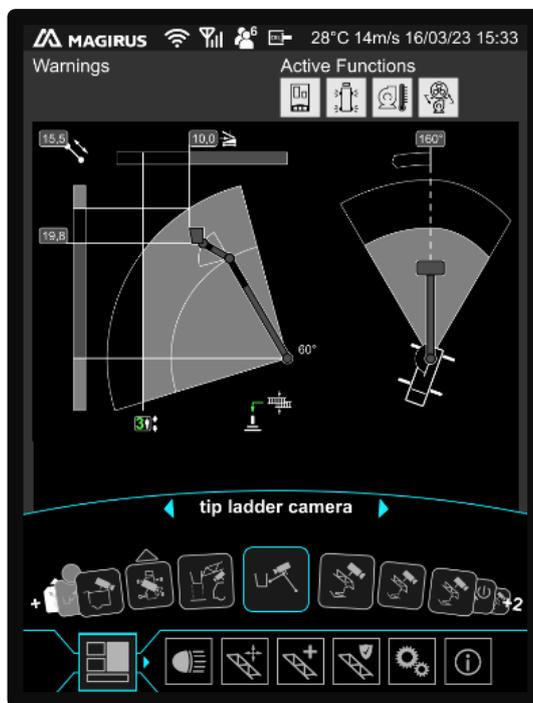
SwitchPilot

- Sometimes even the fastest menu is not fast enough: Mission-critical functions are directly available on the SwitchPilot at the touch of a button, e.g. engine start/stop, lighting on/off, rung alignment
- Highly visible LEDs for constant visual feedback

Newly developed special displays arranged in portrait format at the control stations improve the view on essential information. The displays offer the operating personnel an improved overview and control of the turntable ladder as well as the option of displaying several camera images simultaneously in high resolution, making operation easier, safer and more efficient.



- Clear and easy-to-understand menu layout



On demand messages area: Displays warnings and important activated functions.

Ladder set overview: The current ladder set position and accessible movement ranges of the main ladder set and articulated arm can be recognised at a glance. Coloured bar graphs and plain text display make it easier to quickly understand important information.

Menu area: Ultra-fast selection and overview on availability of functions. The menu in this area can be hidden to use the display space for e.g. more camera views.

Info texts and information texts are integrated in the menu and can be called up at any time. Information texts are displayed by the control system in appropriate situations.

- **Adaptability even after delivery**

As turntable ladders are in use for several decades and operational requirements change over times, SmartControl also ensures that the turntable ladder can be retrofitted with functions developed in future to keep the turntable ladder up to date.

CONTROL SYSTEM ARCHITECTURE AND SAFETY DEVICES

The SmartControl turntable ladder control system combines high-performance control units, intelligent sensors and powerful networks. The safety features of the turntable ladder ensure both operational safety and availability. Safety-relevant parts achieve performance level d in accordance with ISO 13849-1, and the networks are clearly separated from each other.

Up to 6 CAN bus networks enable communication between actuators, sensors and control units. The jacking safety system ensures a secure jacking basis, and the load monitoring system constantly analyses the load status of the turntable ladder. For additional functions, maximum transmission bandwidth is made possible via Ethernet, e.g. for transmitting camera images.

An intercom system ensures direct communication between the cage and the main control station. The safety switch for ladder operations is ergonomically levelled together with the seat. Operation at the main control station has priority over cage control station in order to be able to support the cage crew in an emergency. Hydraulic emergency drive levers and emergency stop buttons are also installed easy to reach. A DIN 14690 socket is fitted on the vehicle for charging the batteries. The electrical system is interference-suppressed according to VDE 879.

CONNECTIVITY AND VIDEOSTREAMING

The Magirus turntable ladder is optimally networked both inside and outside the vehicle so that all information and camera views can be accessed anywhere on the vehicle. In addition, entire displays can be mirrored, e.g. for training purposes. Digital microphone units support voice transmission by filtering out background noises, emit information tones adapted to the environment and, thanks to their high performance, can also be used for announcements on scene.

The turntable ladder can be connected via Magirus FleetConnect, an online web platform that can be used to digitalise processes relating to the vehicle fleet in order to keep an eye on the current vehicle status at all times. Video camera views can be directly streamed to external devices/receivers.

UNDERCARRIAGE

CHASSIS AND DRIVER'S CAB

Standard 4x2 chassis (MAN, Mercedes-Benz, Iveco, Scania, Volvo...) from the 16-tonne class upwards are suitable for an M32L-AS turntable ladder. These can be equipped with many options according to the range offered by the truck manufacturers. Please refer to the relevant Magirus chassis data sheets. The rear wall in the cab of Magirus turntable ladders is clad with aluminum sheet metal for flexible attachments of vehicle components and equipment. The central electric is also installed on the rear wall of the cab for easy access.

MAGIRUS VARIO JACKING – THE FIREFIGHTING JACKING

The turntable ladder can be supported at any width with the Magirus Vario jacking, within the vehicle contour (2500 mm) and up to the maximum support width of 5400 mm. Height differences of up to 800 mm can be compensated for. The fact that the wheels of the turntable ladder remain loaded on the ground even when supported has proved particularly useful, thus effectively securing the turntable ladder against slipping on inclined surfaces. Thanks to their minimal height, the support beams can be easily climbed over and positioned under most cars. The Magirus turntable ladder is levelled at the turret, not via the jacking outriggers. This saves time during the jacking process and also has the advantage that the turntable ladder does not have to be approached in a specific direction of travel in order to be set up, even on steeply sloping surfaces. All equipment compartments and the driver's cab are at the same distance from the ground even when supported and can be accessed and used without problems.



Hydraulically extendable jacking outriggers made from high strength steel tubes and hydraulically actuated cables stiffening the springs of the rear axle ensure a safe basis with perfect and even ground contact. The load situation of the jacking plates and the wheels is permanently monitored.

The jacking system is operated fast, safe and easy via at the improved jacking control stations. Optional displays show the outriggers status and indicate the maximum outreach of the turntable ladder. Optional SwitchPilots on the jacking control stations can be used for various lighting options and support functions.

Thanks to the quick and easy jacking process, the set-up time for Magirus turntable ladders is significantly below the requirements of EN14043.

MAGIRUS BOX-TYPE SUBFRAME AND HYDRAULICS

It is often the invisible components that are particularly decisive for performance: The Magirus box frame enclosed by the turntable ladder bodywork is optimized to offer the superstructure maximum performance and stability and to safely transfer the occurring forces to the ground via the Magirus Vario jacking system. At the same time, it accommodates the hydraulic system and thus maximizes the volume of the equipment lockers.

The robot-welded box frame is manufactured from high-strength laser-cut and CNC-machined fine-grain steels to achieve maximum rigidity with minimum weight. Cathodic electrocoating and a two-component multi-layer coating with 120 µm ensure the best corrosion protection.

The hydraulic energy is provided load-dependently (load-sensing system) by a variable displacement pump, which is driven by the vehicle engine via the power take off. Hydraulic power is then immediately transferred to the actuators by the SmartControl turntable ladder control system according to the operators input. Hydraulic pipework and high quality elements are used to reduce maintenance over lifetime.

BODYWORK AND EQUIPMENT LOCKERS

The Magirus turntable ladder bodywork provides access to the ladder set and main control station. The wide steps on both sides of the vehicle enable safe ascent and descent. In the dark, additional LED lighting is integrated into the step edges, which indicates when the superstructure is moving by means of a green/red colour change. The Magirus EdgeLight is also integrated into the all-round edge profile of the bodywork in addition to the glare-free ambient lighting to make sure that the edge of the bodywork is always clearly visible, even in the dark, together with the surroundings.

For high stability with low weight and maximum flexibility, the bodywork is made of the proven, durable Magirus AluFire profiles, the profile structure is clad with anodised aluminium sheet metal. Aluminium quintet sheet metal ensures high slip resistance (R11) and easy to clean surfaces. Maintenance openings at the appropriate points ensure easy access to the interior. The Magirus AluFire system is maintenance-free and without corrosion damage. Thanks to the screw construction, the interior installation is flexible.

The clearly arranged equipment lockers are closed with robust aluminium profile roller shutters. The lockable roller shutters are particularly smooth-running and quiet and can be operated across the entire width using espagnolette locks. LED light strips are integrated into the roller shutter profiles on both sides for optimum visibility within the equipment lockers. Up to 7 equipment lockers can accommodate extensive equipment. The full-length, high equipment compartment behind the cab in particular offers plenty of storage space and is utilised to the maximum thanks to clever storage concepts. The design panelling creates an appealingly dynamic design and offers space for individual design and labelling.



Ascent to ladder set and main control station



Surrounding lighting integrated in the edge profile



Rear of the vehicle

EQUIPMENT AND EQUIPMENT STORAGE

Storage systems for all types of equipment are manufactured with the utmost care and guarantee safe storage as well as fast and ergonomic access to the equipment. The optimum solution for storing the equipment is selected from an extensive range of storage systems to meet the customer's requirements.

The sophisticated storage systems are designed so that the standard load in accordance with EN 14043 Table NA.1 - Standard load can be stowed. This includes a stretcher, extinguishing equipment, chainsaw with protective clothing and various hand tools. A loading plan is drawn up for each vehicle, closely coordinated with the customer.

UPPERCARRIAGE

LEVELLING SYSTEM

The fully automatic levelling system ensures that the cage floor always remains horizontal. In the working range of -17 to +75 degrees, inclinations of the ground of up to 10 degrees (equivalent to 18%) are automatically compensated. The levelling is done automatically in the turret (also for the main control station and operator's seat), additionally, if necessary, manual levelling is also possible, e.g. for attaching a cage or other attachment on an inclined ground.

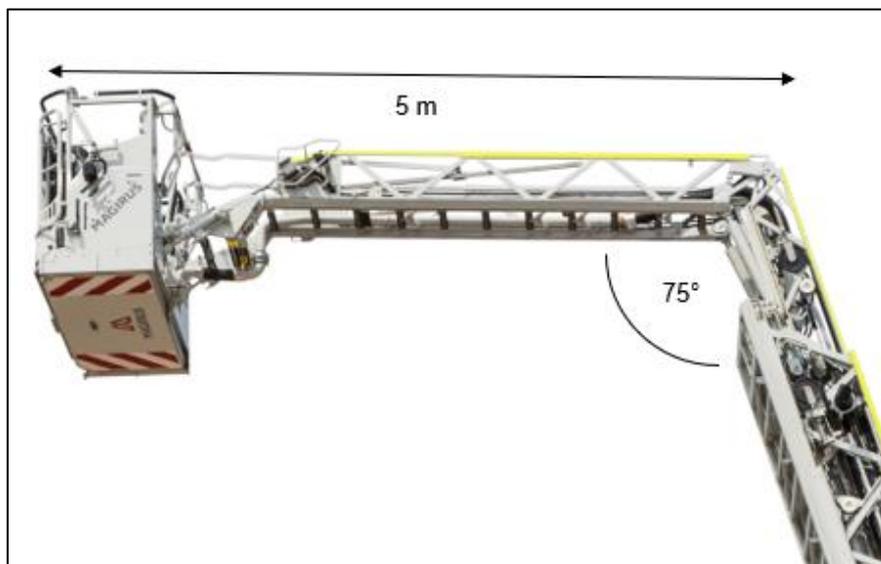
LADDER SET AND ARTICULATION TECHNOLOGY

The cambered ladder set made of high-quality special steel profiles impresses with its strength and load-bearing capacity. The complete seal welding of the ladder set makes it completely corrosion-resistant from the inside. With a height of 380 mm, the side walls of the top ladder section offer a high level of safety. The rungs are coated with a non-slip and temperature-isolating coating. The climbing section is 470 mm wide and can be walked on freely throughout.

To ensure precise guidance of the ladder sections, heavy-duty polymer gliders on non-rusting rails and rollers are used. In accordance with EN 14043, load-bearing elements are redundant to ensure highest safety. Thanks to their robust design, Magirus turntable ladders even exceed this regulation in many requirements.

The ladder is extended using robust cable winches, a proven technology that is durable and precisely controllable. The cable winch is installed at the base of the ladder, which reduces the weight of the ladder set. This means that excellent outreach values can be realised, and no sensitive sensors are required in the climbing area of the ladder set.

The front part of the ladder set is designed as an articulated arm to be able to reach behind and under obstacles (roof edges, galleries, walls, ...). This increases the general flexibility and ability to deal with challenging ladder situations is improved. Another important advantage is the ability to lower the cage in front of the vehicle. This provides quick, safe access to the cage and also works in particularly tight situations.



CAGE AND ATTACHMENTS

Magirus cages are characterised by a high degree of safety, flexibility and robustness. Two cage variants, the compact RC400-C and the spacious RC500 allow a wide range of applications beyond rescuing people. The multifunctional mount offers the option of flexibly attaching cage-mounted equipment such as water monitors or stretchers supports. In addition, the RC500 water monitor can be permanently installed in the front of the cage for instant deployment.



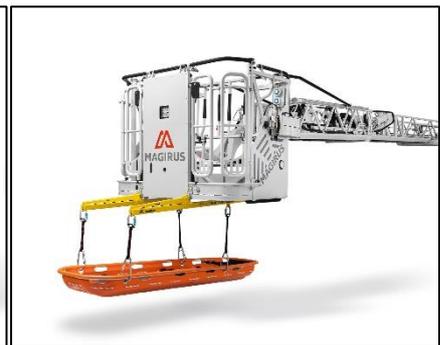
Two large corner entrances with folding sliding doors at the front of the cages and a hatch to the ladder set on the rear wall allow access to the cage. Thanks to the free access and exit points, the cage can also be accessed upright by people to be rescued or wearing a breathing apparatus. The cages also feature the modern SmartControl control system. An 8.4" display is providing all necessary information as well as camera images and the menu. All turntable ladder safety devices are fully effective in cage mode, and maximum speed is also possible from the cage control station.



RC500 with integrated water monitor in the front



RC400-C



RS300 basket stretcher support

PAINTWORK

As standard, the bodywork and the turret are painted in glossy red RAL 3000, the ladder set and cage are painted in light gray RAL 7035 and support frame and jacking are painted in black, all with a layer thickness of $>120 \mu\text{m}$. For best corrosion protection cathodic electrocoating at $180 \text{ }^\circ\text{C}$ and 2-component multi-layer painting is used. The aluminum roller shutters and profiles are anodized. For an individual vehicle design, chassis and bodywork can also be wrapped in foil.

FAULT MODE

In the event of electrical faults, there is a hydraulic emergency drive option located directly next to the main control stand. An electric reserve pump for the hydraulic system is also available for emergency operation in the event of a vehicle engine failure. If the control system is still functional (vehicle engine failure), the turntable ladder can be operated with the standard control devices for “as normal as possible” operation even in case of a failure.

MAGIRUS AS A COMPANY

With 160 years of experience, Magirus manufactures turntable ladders in Ulm to the highest standards. The high level of vertical integration guarantees maximum product quality and reliability.

Compliance with the technical and technological specifications is constantly monitored by a control system in accordance with ISO 9001 and ISO 14001.

Illustrations may contain additional options.

We reserve the right to make technical changes or improvements to the product at any time without prior notification.