

The TRI-Line is an all-round talent

Experience Doppelmayr's
most innovative 3S technology

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Best of both worlds

The TRI-Line represents our latest and most innovative 3S technology. We developed it to close the gap between the applications for the 10-MGD and the 3S. With the interests of our customers as the benchmark, the TRI-Line meets top requirements for performance, quality and safety in equal measure. For us, it was clear that this could only be achieved with a tricable system. The result builds a revolutionary bridge between our highly successful D-Line and 3S technologies.

The Doppelmayr Team

System



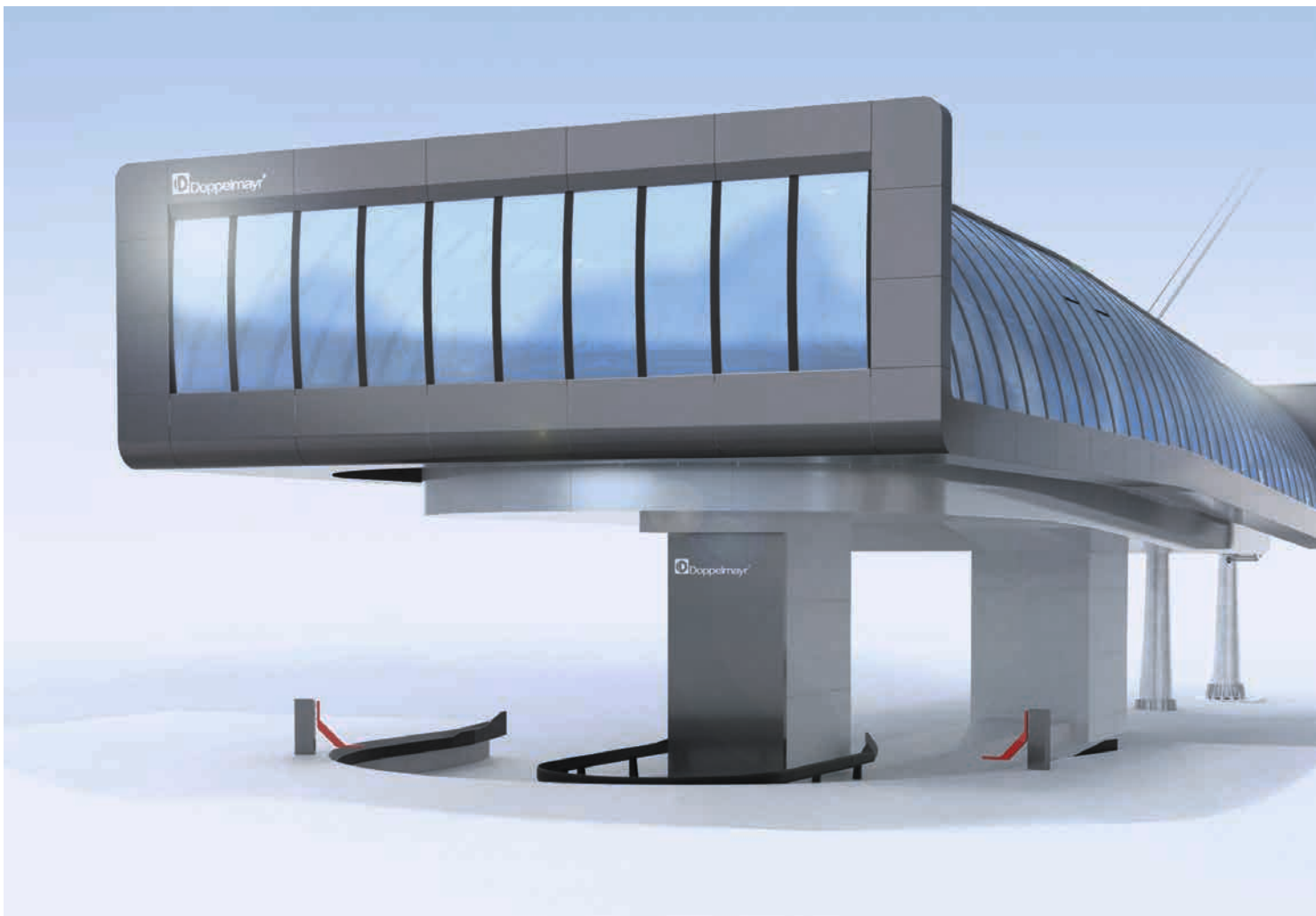
Record
performance
for customers
and
passengers





The simplicity of a monocable gondola and the performance of a tricable system: With the TRI-Line, Doppelmayr is providing a powerful answer to the question of rope-propelled mobility for the future.

“Records are there to be broken.”
That could well be the motto for the
TRI-Line, if there was not much
more to it than that. In the city, on the
mountain or at the point of interest,
the TRI-Line inspires new paths.





The TRI-Line stands for
Doppelmayr's most innovative
tricable technology.

Power and performance

In a class of its own

Transport capacity

With a transport capacity of 8,000 passengers per hour and direction, the TRI-Line revolutionizes rope-propelled mobility.

Two track ropes and one haul rope ensure power, wind stability, and reliability – as in the case of a 3S system – and therefore maximum availability. The TRI-Line's repertoire includes, among other things, grades of 100 percent and wind speeds of up to 110 km/h. And at the same time, it's as comfortable, simple and smart as a D-Line. Using tried-and-tested D-Line components from the successful monocable gondola series has also made it possible to benefit from the efficiency of the Doppelmayr Direct Drive.

Carriage wheel generator

Sufficient energy where it is needed: During the trip, up to eight carriage wheel generators deliver the electricity to power the integrated information and communications technology as well as the air-conditioning systems. The advantage: Heavy and expensive battery modules to supply energy on the line can be dispensed with.

8,000

passengers per hour and direction

Carriage

The innovative carriage, which takes the proven detachable grip technology a logical step further, paves the way for new spheres of possibility in ropeway engineering. Two D5000 grips that attach to the rope from above secure the necessary connection; eight carriage wheels – four on each track rope – ensure smooth, low-friction motion. The result: a simple rope guidance configuration that permits the use of many D-Line and 3S components and reduces maintenance requirements by minimizing the forces exerted when the cabin passes over the towers.

Cabin

A key contributor to the TRI-Line's superlatives is the newly developed STELLA cabin. It provides continuity and consistency in the design language of the CWA product line and blends in perfectly between the OMEGA V and the ATRIA. Its generously dimensioned interior provides room for up to 20 passengers. In addition, the option of doors on both sides enables exciting solutions for the flexible management of passenger flows.





TRI-Line stations feature very low concrete volumes for a 3S system.

Compact – well-conceived

Small structural footprint, huge leap



Stations

Classically rounded or elegantly cubic: Modern architecture goes hand in hand with maximum functionality in TRI-Line stations. Small concrete volumes are a feature of these stations and save costs. Their design is based on the structure and size of a D-Line station and places the emphasis on the latest technical developments as well as on the ergonomic use of space and the needs of ropeway personnel. With the integrated photovoltaics option in the rounded R1 roof, the station becomes an electricity producer that sustainably reduces the ropeway's energy costs. The all-round glass elements of the cubic R2 roof, on the other hand, can, if required, be transformed into a highly visible media space.

Towers

The option of using tubular towers also helps to ensure a small structural footprint and permits time-saving helicopter installation. This means a reduction in construction time compared with a conventional 3S system.

Rope spans

Long rope spans are one of the key strengths of the TRI-Line. No matter whether it's at points of interest or in alpine or urban environments, the TRI-Line effortlessly crosses any obstacle with just a small number of towers. With rope span lengths comparable with the 3S, this system can leverage its full potential in terms of transport capacity.

Cabin



No limits –
no barriers

Pure ropeway mobility

The STELLA

The newly developed STELLA cabin is visionary. By providing room for 20 passengers, it is an essential factor in achieving the TRI-Line's record transport capacity of 8,000 passengers per hour and direction. With up to 12 comfortable seats, generously proportioned glazing and the customizable interior, this cabin offers comfort and flexibility. The different material options available enable the STELLA to provide the right solution for every environment and climate zone.



Passenger flows

The STELLA crosses boundaries. That becomes visible – at the latest – with the option of doors on both sides. Enabling passengers to board or disembark on either side opens up new possibilities for passenger flow management. In urban environments in particular, this version can literally lead the way when it comes to proactively shaping the individual mobility of the future.

Seating concepts

Modular seating concepts ensure a perfect match for the application, while the emphasis is always on barrier-free access and comfort for the passengers. People with impaired mobility and passengers with strollers can enjoy a trip in the STELLA without any restrictions. And for freight transport, the seats simply flip up to make space.



SMART Ropeway

Digital – where it makes sense

With intelligent network technology



The Connect control system

Future-oriented rope-propelled transport is becoming increasingly complex. That's why Doppelmayr developed the smart, high-performance Connect control system. It enables ropeway personnel to control operations effectively and to maintain an overview at all times.

Connect is intuitive to operate, reduced to the essential, and provides the user with targeted assistance in the daily routine with the Notification and Solution Center. The result: enhanced accuracy and monitoring. That includes sophisticated information and communications technology (ICT).

With cutting-edge ropeway technology, Doppelmayr is laying the foundation for the continuous evolution of transport systems. The focus is always on optimally addressing customer needs. Vital displays, such as rope speed, drive torque, wind data or currently active warnings and other information remain constantly in view on the first level irrespective of user navigation. In addition, radio remote controls for station, parking system and line give operatives freedom of movement.



Connect incorporates an intuitive and coherent operating concept.



The TRI-Line impresses with cutting-edge ICT.

Safe, comfortable, informative – a perfectly matched trio

The integration of products and services, in line with the philosophy of the SMART Ropeway, creates a host of benefits for operating companies and passengers.

Connect gives operating personnel precise and fast control of ICT functions (Information and Communications Technology) in the cabin, such as lighting, CCTV monitoring, ventilation or the PA and intercom system, from the control room.

Both ropeway operatives and passengers benefit from safety features as well as from comfort and infotainment functions. A rich and varied ride experience is guaranteed.

ICT safety

Cameras can be used to monitor the ropes, the line, the station and the towers. And also for the on-board safety check. CCTV images from the cabin interior can be used in Connect, for instance, in combination with the intercom system. Electric doors can be individually controlled and monitored.

ICT comfort

Cabin lighting, ventilation and air-conditioning, or seat and window heating are all key elements for passenger comfort and can be controlled for individual cabins, groups of cabins or for all cabins.

ICT infotainment

Wi-Fi, cabin sound and displays can be used interactively by passengers and fed individually by the operator. These features enable passengers to put waiting times to good use and, for instance, find out about ski lift, subway, train or bus connections.

ICT Functions



Safety

- CCTV monitoring of line and stations
- CCTV monitoring inside cabin
- PA and intercom system
- Electric doors



Comfort

- Lighting
- Ventilation and air-conditioning
- Seating and window heating



Infotainment

- Public Wi-Fi
- RGB lighting
- Cabin display
- Digital signage, cabin sound system
- Charging station (wireless and USB)

Groundbreaking – less is more

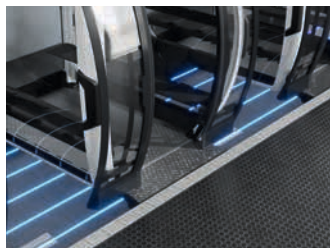
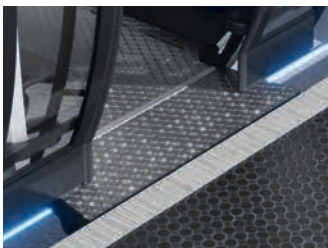
Reliable and efficient



AURO

With the AURO concept (Autonomous Ropeway Operation), Doppelmayr holds a trump card when it comes to the mobility of the future. Modern sensor technology, a sophisticated video management system and full integration of the operating concept into the Connect control system already enable safe and reliable autonomous ropeway operations today. The system independently identifies situations, for instance during passenger loading and unloading, that deviate from normal

operation and stops the ropeway if necessary. One or more AURO installations can be run by one operative in the Ropeway Operation Center (ROC). AURO is providing an answer to the growing shortage of skilled personnel by offering a personnel-efficient operating concept.



Cameras and sensors positioned all around the loading and unloading area on AURO installations ensure the required safety.

Direct Drive

The Doppelmayr Direct Drive (DDD) saves energy and is low on vibrations and noise. The hermetically sealed synchronous motor does not require a gear unit and the associated oil, which makes it particularly maintenance-

friendly. The water cooling also enables sustainable heat recovery – another factor adding to the cost efficiency of this drive system.

No gear unit, lower noise emissions, less vibration, less maintenance. The DDD is efficient and sustainable.





Optimal performance for
customers and passengers.



The TRI-Line in Figures

8,000 PPHD

Maximum transport capacity

7 m/s

Maximum speed

110 km/h

Maximum wind stability
(project-dependent)

9 s

Minimum carrier interval

2 track ropes and 1 haul rope

System

20 passengers

12 seated

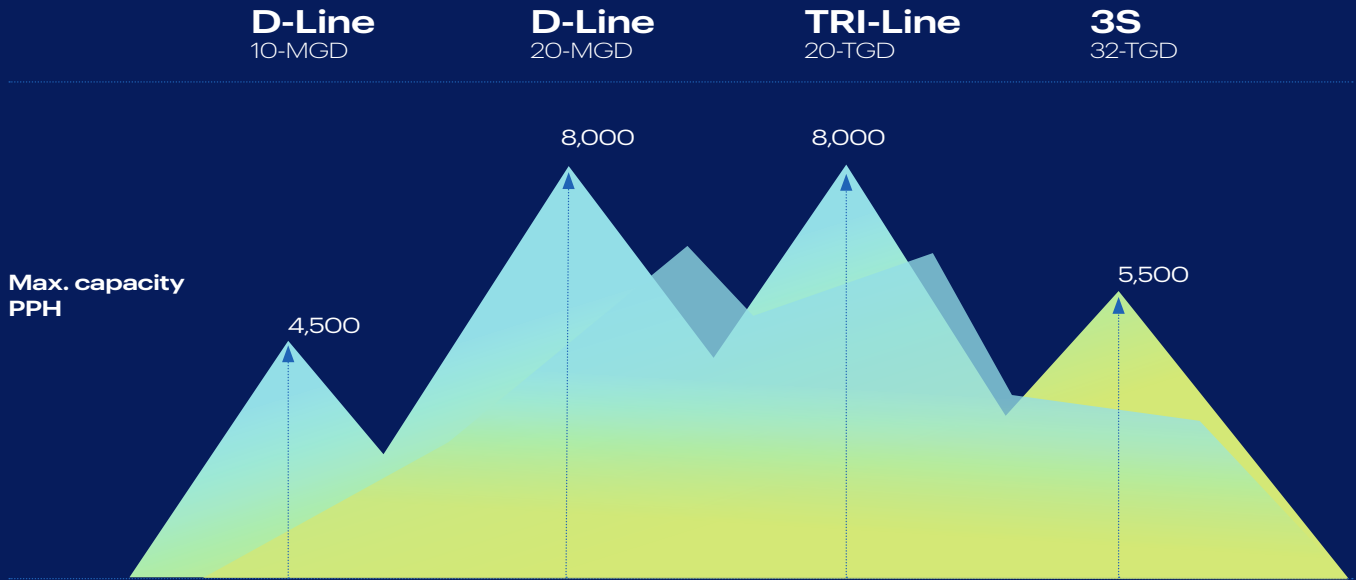
8 standing

Cabin capacity

2 Euro pallets

Freight capacity

System Overview



Main applications	Alpine POI Urban	Urban	Alpine POI Urban	Alpine POI Urban
Speed	up to 7 m/s	up to 7 m/s	up to 7 m/s	up to 8.5 m/s
Rope spans	medium	short	long	long
Vertical rise capability	●●●	●	●●	●●●
Wind stability (project-dependent)	up to approx. 80 km/h	up to approx. 80 km/h	up to approx. 110 km/h	up to approx. 110 km/h
Structural footprint	●	●●	●●	●●
On-board power	Battery module	Battery module	Carriage wheel generator	Carriage wheel generator
Doors on both sides	⊖	✓	✓	⊖
Comfort	●●●	●●●	●●●	●●●
Barrier-free access	✓	✓	✓	✓
AURO	✓	✓	✓	✓

