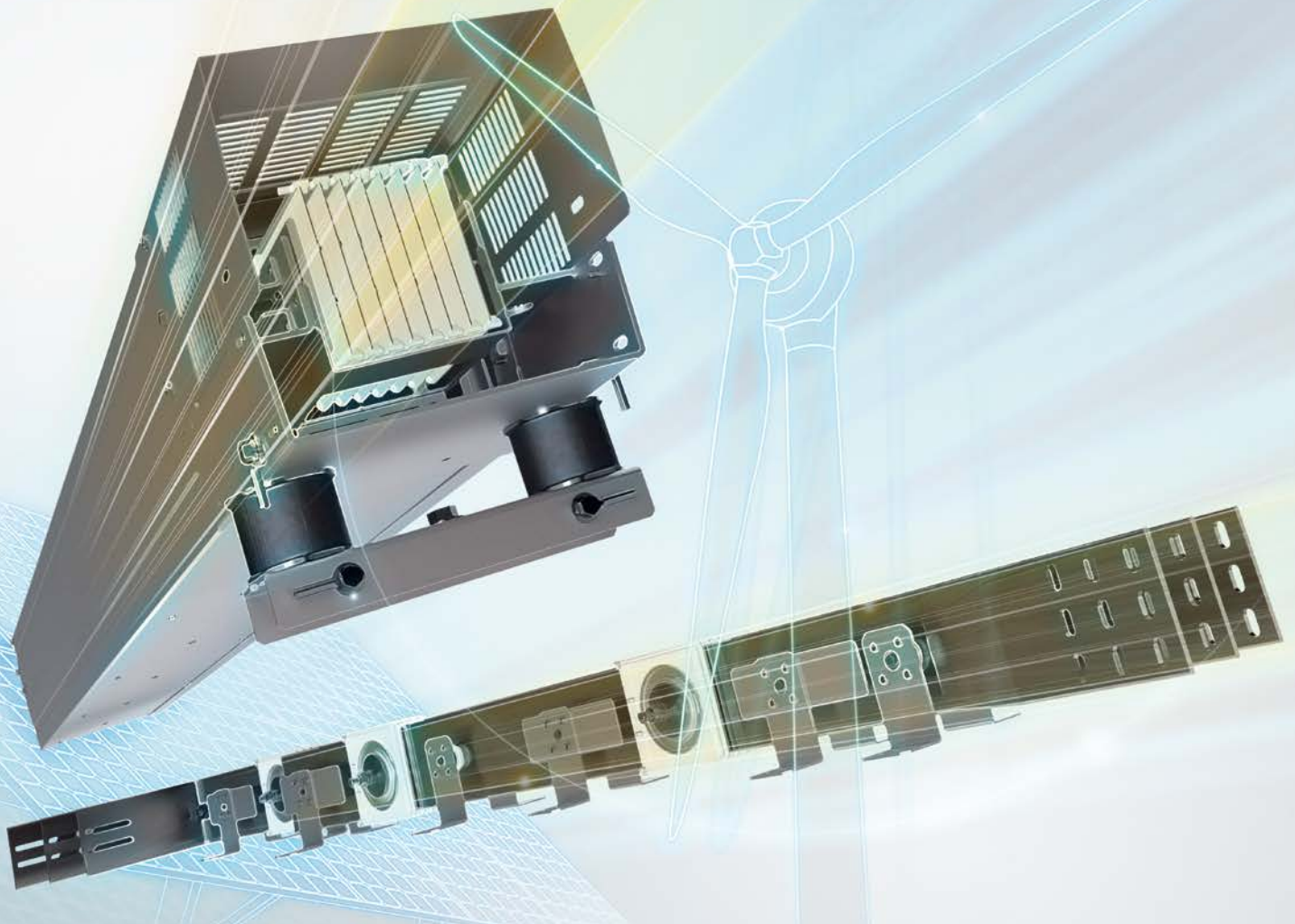




**SIEMENS**

*Ingenuity for life*



## Safe and efficient power transmission in wind turbines and PV plants

SIVACON 8PS

LDM and LDM-P busbar trunking systems

[siemens.com/LDM-system](https://www.siemens.com/LDM-system)



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## SIVACON 8PS busbar trunking systems LDM and LDM-P

### For wind turbines and PV plants

The way to a new, better energy world leads through high reliability and availability of the power supply. Apart from economy, however, ecological aspects also need to be considered and renewable energies integrated. SIVACON 8PS busbar trunking systems LDM and LDM-P have been developed for safe and efficient power transmission in wind turbines and photovoltaic stations.

## SIVACON 8PS – LDM system for wind turbines

Whether you are an investor or a wind farm operator, a wind turbine planner or a tower builder: The LDM system offers you design-related benefits without extra costs. For example, the improved availability of your plant and higher safety during installation and operation. With the reliably and efficient power transmission for currents up to 8,200 A, the LDM system is the innovative alternative to cables.

## SIVACON 8PS – LDM-P system for PV and container stations

In photovoltaic and container stations, the benefits of busbar trunking systems as against cables become particularly apparent: current ratings up to 7,000 A, faster planning and installation, and the exact coordination with other components such as inverters and transformers, supported by the comprehensive expertise of Siemens in the planning phase of your power distribution.

## Customer-specific solutions

The modular LDM system, especially developed for wind turbines and OEM customers, convinces by customer-specific solutions for every task. The LDM-P applications are always adjusted individually to best solve the manifold connection options of the busbar to transformers and inverters or switchboards.

## High efficiency

The LDM and LDM-P busbar trunking systems conform to the latest standard IEC 61439-1/-6, and are therefore particularly reliable and safe. As design verified systems, they offer – compared with cables – defined electrical and mechanical properties; they are halogen-free and convince by a low fire load. The compact design, low-loss connection technology, as well as an optimised use of materials and their recyclability make planning, installation, commissioning, and removal especially cost-efficient.

## Your benefits at a glance:

### Convincing cost-efficiency

- Modular, scalable system
- Efficient installation
- Compact and maintenance-free
- Improved efficiency
- Halogen-free, recyclable

### High system and operational safety

- Design verified in accordance with IEC 61439-1/-6
- Approved for wind turbines in accordance with UL 6141
- Low fire load

### High reliability

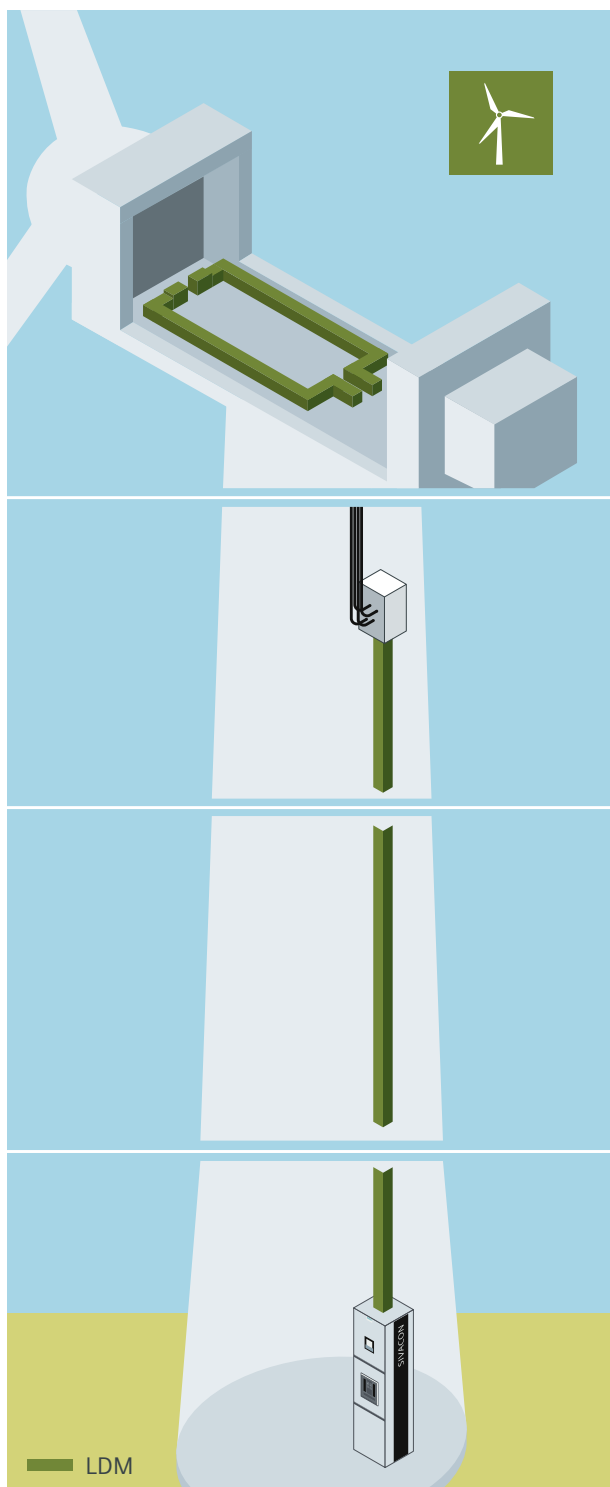
- Further developed of the proven LD system
- Pre-defined impedances and stipulated technical features

### One-stop shop

- Competent support for consulting, planning, and commissioning



# LDM system



## Safe and efficient power transmission in wind turbines

LDM, the modular and efficient busbar trunking system takes care that the power generated by the wind turbine is transmitted safely and with as low losses as possible – for currents up to 8,200 A.

## Cost-efficient planning

The LDM system can meet the requirements of every wind turbine precisely, offering all necessary components – with a compact design to simplify configuration. In the case of double-fed asynchronous generators, for example, the rotor and stator circuits can be laid in one housing, and a PE conductor can optionally be routed as well. An additional advantage: qualified support by the expert Siemens wind power team to give you perfect advice and support you during planning and commissioning of future-oriented technologies.

Joint bracket for easy connection of trunking elements



## Efficient installation

Busbar elements and customer-specific cable infeed units can already be pre-assembled in tower segments lying in horizontal position, saving both time and costs. When the tower is erected, it will just be necessary for the busbar trunking system to establish the connections between the tower segments. This is done through a design verified single-bolt connection, i.e., all phases of the busbar trunking system including the protective conductor are tightened with only one bolt and with a standard torque wrench – without special tools.

Special segment connectors can compensate any manufacturing tolerances at the segment transitions of the tower, and can be easily installed after erection.

Thereby, fixing brackets with damper elements protect the system in case of tower movements.

With busbar trunking systems, significantly less and simpler connections have to be established in the erected tower than with cables. Thanks to wider fixing distances in comparison with cable systems, the installation of busbar trunking systems is much faster and saves both space and material.

The transitions to other equipment and the loop cable are implemented by means of a customer-specific cable infeed unit and/or direct connections to the switchboard in the tower base.



Compact trunking element with a length of up to 3,200 mm



Segment connector for easy connection of the pre-assembled busbars in the wind tower



Infeed unit for cable connection at the tower base and nacelle

## Safe and reliable operation

Power transmission between the nacelle and the tower base is the point more prone to failures, and thus to longer interruptions of power generation.

The LDM busbar trunking system faces this with a design verification according to IEC 61439-1/-6: It ensures the permanent fulfilment of the confirmed technical parameters and also excludes an overload of the system effectively, thus reducing the associated consequential damages.

Further parameters beyond the requirements of the standard can be set by the manufacturer's dimensioning and configuration of the busbar trunking system. Siemens develops and delivers a design verified LDM system in accordance with the electrical characteristics determined and required by the wind turbine manufacturer. Thus, for example, possibly arising short circuits have no influence on the product features of the LDM busbar trunking system, and they do not endanger further operation of the wind turbine. Further, the impedance values of the busbar are determined, which simplifies the commissioning of the wind turbine and contributes to a high reliability in operation.

As the IEC 61439-1/-6 has become an integral part of the UL 6141, the LDM busbar trunking system can also be used on the US-American market.

The minimum use of plastics results in a very low fire load, thus increasing the security of operation drastically in comparison with cable systems. In this context, the halogen-free design of a busbar trunking system also has positive effects.

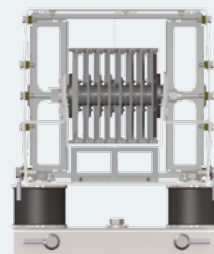


## Sustainable working

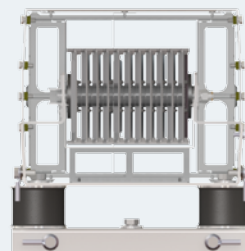
The improvement of energy efficiency in conventional power plants, already widely discussed today, is also becoming more and more important for wind turbines. This also requires wind turbine manufacturers to design equipment with the minimum possible losses. In the LDM platform, Siemens has already taken account of this aspect by minimising power losses and significantly improving the efficiency by means of optimised conductor cross-sections. Of course, this is reflected in additional infeed compensations for the plant operator throughout the entire service life of the wind turbine. Besides that, the halogen-free and energy-efficient LDM busbar trunking system particularly stands for the topics of sustainability and responsible treatment of the environment. In addition, it can be recycled almost completely at the end of the service life.



Mono	
Voltage level	1,000 V
Current carrying capacity at 35 °C	800 A – 4,100 A <sup>1)</sup>
Short-circuit rating	Scalable max. 116 kA
Degree of protection	IP21



Twin	
Voltage level	1,000 V
Current carrying capacity at 35 °C	Rotor: 800 A – 1,000 A Stator: 800 A – 3,050 A
Short-circuit rating	Scalable max. 116 kA
Degree of protection	IP21



## Technical data

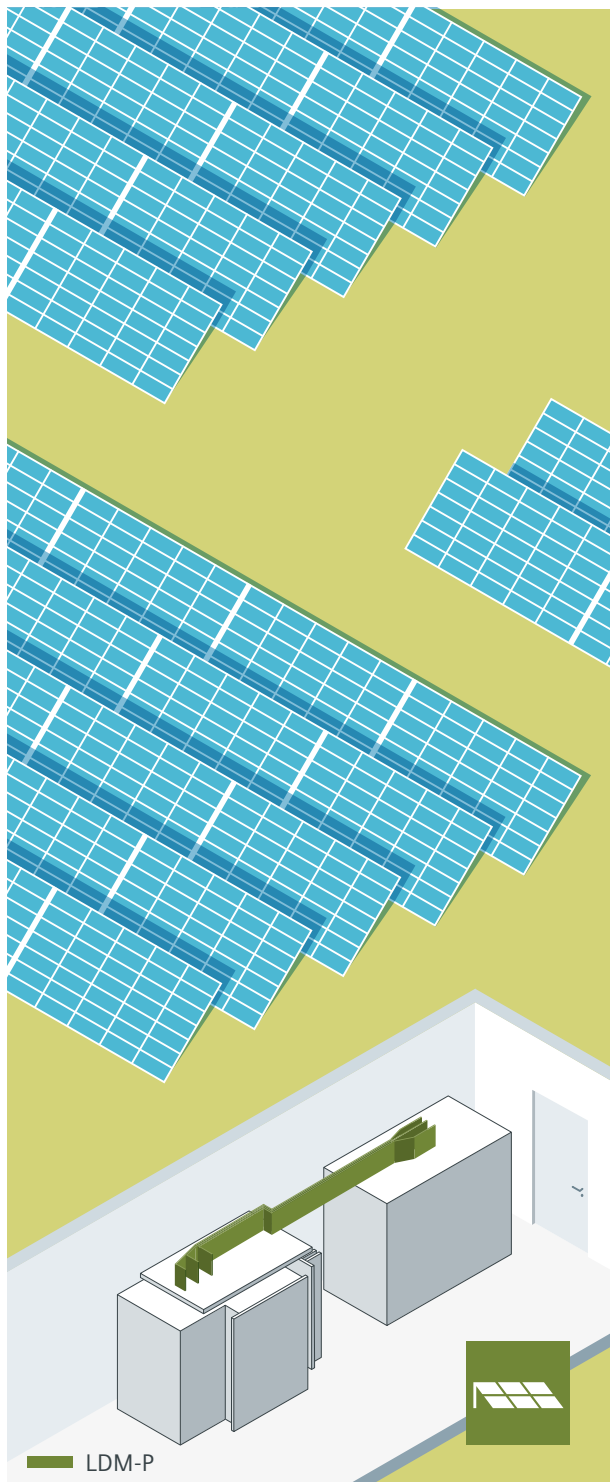
Rated insulation voltage $U_i$	1,000 V AC
Rated operational voltage $U_e$	1,000 V AC
Degree of protection	IP21 with salty spray and condensation test
Rated current $I_{nA}$	800 A to 8,200 A
Rated peak withstand current $I_{pk}$	Up to 255 kA
Rated short-time withstand current $I_{cw}$ (1 s)	Up to 116 kA
Number of conductors	3 to 10 conductors per trunking unit (2 circuits possible per trunking unit)
Fire load	Depending on the application
Connection technology	Separate single-bolt joint block with hook system
Conductor material	Aluminium
Housing material	Galvanised sheet steel (optional coating in RAL colour)
Standards	IEC 61439-1/-6, USA: conforming to UL6141
Mounting position	Vertical, horizontal
Insulation	Air-insulated
Busbar coating	Epoxy

## Highlights

- Modular system for individual customer requirements
- Pre-defined impedances and stipulated technical features
- Efficient installation
- Compact, maintenance-free busbar trunking systems

1) Up to 8,200 A for two parallel systems

# LDM-P system



## Optimised for PV stations and containers

Safe power transmission in a narrow space, quickly and easily planned and implemented – the idea behind the LDM-P system.

## The economic power distribution in solar applications

Photovoltaic stations (PV stations) are characterised by a high power volume in a narrow space. Furthermore, they must ensure a high availability and operational safety while at the same time ensuring maintenance-free operation. And, not the least, the corresponding modules shall be produced in large quantities in a standardised way optimised for production.

In such PV stations and containers, the benefits of the LDM-P system as against cable solutions become particularly apparent. It convinces by fast planning and installation, current ratings up to 7,000 A, as well as by the exact coordination with other components such as inverters and transformers.



## Proven solution, further developed

The LDM system – originally designed for wind turbines – was developed further for specific applications. One innovation of the LDM-P version for use in closed stations lies in the fact that this system can do without housings if the application area is protected accordingly. As a customer-specific solution, it can be designed for current ratings up to 7,000 A. In this context, Siemens offers comprehensive support in the planning phase, providing a consistent and thus very efficient power distribution for the customer.

## Advantages for efficient use

Especially for high current ratings, busbar trunking systems have prevailed as an efficient, safe, and standard-compliant alternative to classical cables in many areas of application.

Three advantages predestine busbar trunking systems for use in photovoltaic stations or other container applications: efficient power transmission at high current ratings, low fire load, and the high safety standards of a design verified low-voltage switchgear and controlgear assembly in accordance with IEC 61439. With the LDM-P system, these applications benefit from the proven advantages of the SIVACON 8PS busbar trunking systems.



Cost-efficient and safe link  
between transformers and  
inverters in photovoltaic  
stations



## Cost-efficient and sustainable power distribution

The connection of the transformer and the inverter with the LDM-P system and its aluminium conductors offers further advantages. Among others, material costs for aluminium are below those for copper cables. OEMs benefit from this in their solar projects or in container solutions in which the busbar trunking system is built up in a protected manner.



Different geometries,  
easily done: LDM-P system

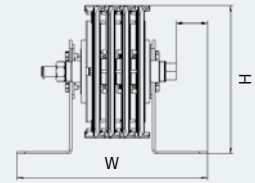


Connection piece, on the transformer side

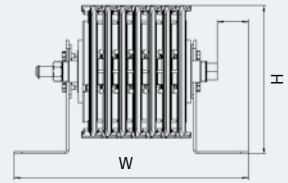


Straight length between inverter  
and transformer

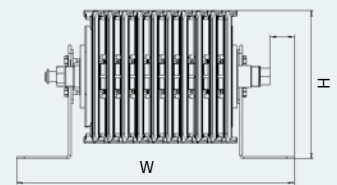
System	LDM-P13	LDM-P14	LDM-P16	LDM-P24	LDM-P36	
Regulations and standards	IEC/EN 61439-1/-6					
Rated operational voltage $U_e$	1,000 V					
Rated current $I_{nc}$	@35°	1,800 A	2,500 A	2,900 A	4,200 A	7,000 A
	@50°	1,600 A	2,300 A	2,700 A	3,900 A	6,600 A
PE conductor	no					
Degree of protection	IP00					
Housing	Without housing (protection of persons must be ensured on site)					
Short-circuit rating	$I_{pk}$	105 kA				
	$I_{cw}$ (1 s)	50 kA				
Cross-section per phase	698 mm <sup>2</sup>	1,014 mm <sup>2</sup>	1,203 mm <sup>2</sup>	2,028 mm <sup>2</sup>	3,609 mm <sup>2</sup>	
Weight	~8.5 kg/m	~11.5 kg/m	~13 kg/m	~20 kg/m	~33 kg/m	
Dimensions (incl. supports)	W	244 mm		301 mm	358 mm	
	H	191 mm		191 mm	191 mm	
Drawing (schematic sketch)	Size 1			Size 2	Size 3	



Size 1



Size 2



Size 3

## Technical data

Rated insulation voltage $U_i$	1,000 V AC
Rated operational voltage $U_e$	1,000 V AC
Degree of protection	IP00
Rated current $I_{nA}$	1,800 A bis 7,000 A
Rated peak withstand current $I_{pk}$	105 kA
Rated short-time withstand current $I_{cw}$ (1 s)	50 kA
Number of conductors	3 to 9 conductors
Fire load	Depending on the application
Connection technology	Single-bolt clamped connection with hook and bolt connection
Conductor material	Aluminium
Standards	IEC 61439-1/-6
Mounting position	Vertical, horizontal
Insulation	Air-insulated
Busbar coating	Epoxy

## Highlights

- Compact system for photovoltaic and container stations
- Individual connections on the inverter and transformer side
- Maintenance-free busbar trunking systems
- Efficient power transmission



## SIVACON 8PS busbar trunking systems on the Internet

Our website offers you a broad range of information as well as helpful tools for the SIVACON 8PS busbar trunking systems. Just click and have a look!

[siemens.com/sivacon-8PS](https://www.siemens.com/sivacon-8PS)



## Technical documentation on the Internet

You will find an overview of the latest technical documentation available for SIVACON 8PS busbar trunking systems on our website (updated daily) at

[siemens.com/lowvoltage/product-support](https://www.siemens.com/lowvoltage/product-support)



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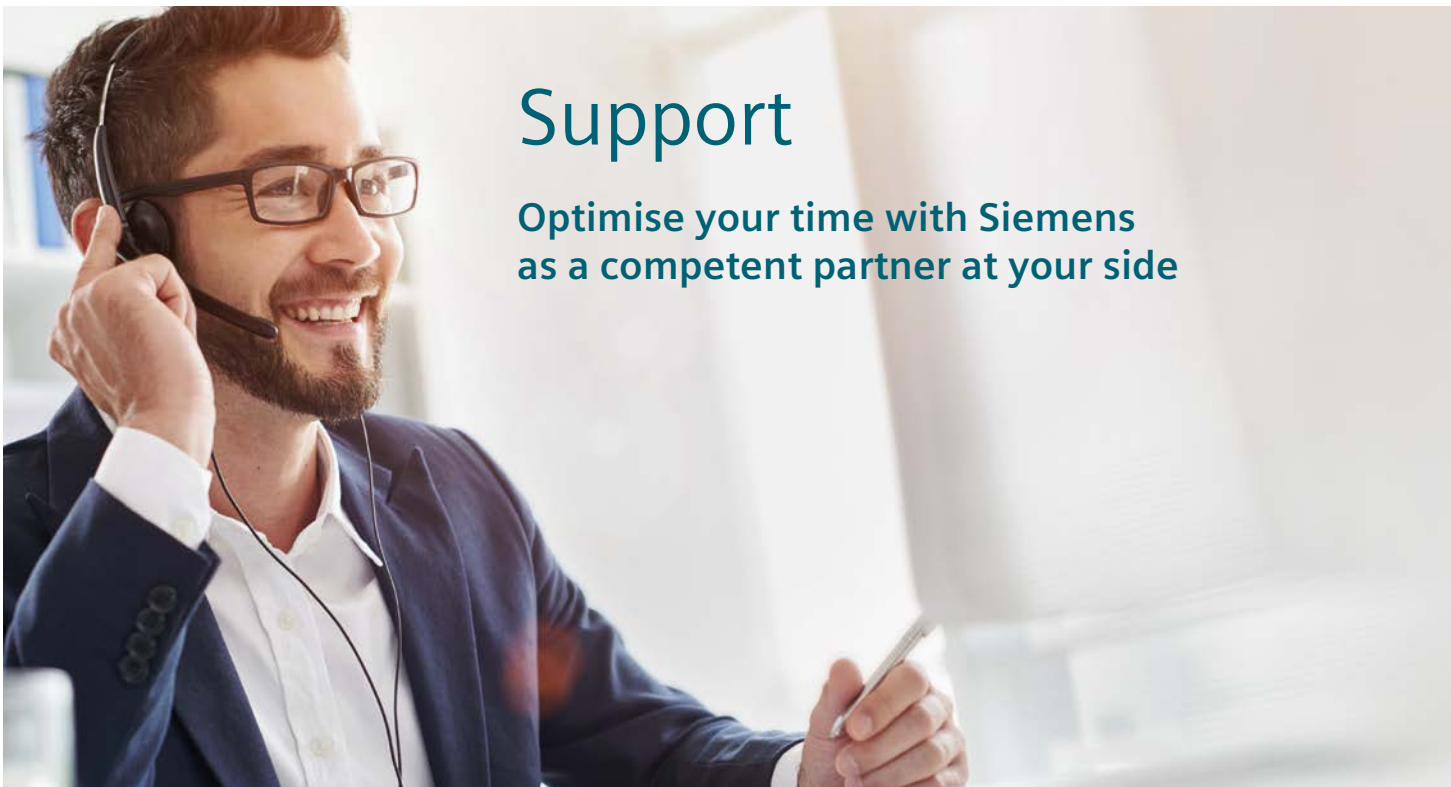


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