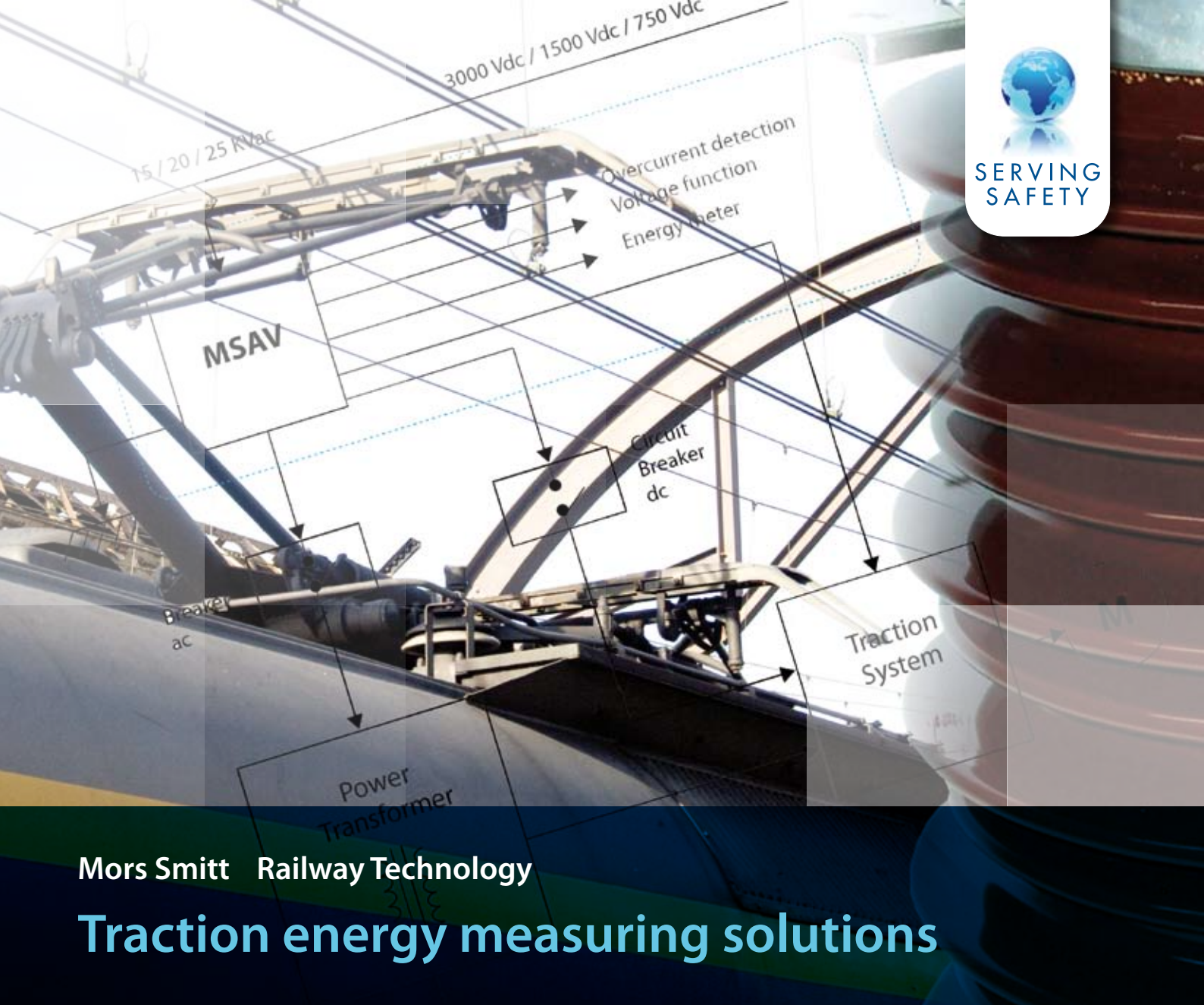




SERVING
SAFETY



Mors Smitt Railway Technology

Traction energy measuring solutions

Energy measurement starts with accurate sensor technology





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No compromises

Energy efficiency



The international railway markets demand focus on minimizing carbon footprints. Diminishing natural resources, rising energy costs and protection of the environment require responsible developments in the railway business in the near future.

Priority is the search for sustainable energy sources, the focus on efficient energy consumption and the awareness of energy consumption.

Train operators and railway car builders are, for example, optimizing the shape of trains (wind resistance), using more efficient HVAC systems, creating lighter car and bogie constructions and developing on board energy recuperation storage, etc.

'Energy measurement starts with accurate sensor technology.'

Mors Smitt invests in the development of high accurate energy measurement systems, offering railway car builders and operators unprecedented technology and flexibility in retrieving energy consumption data of rolling stock material and infrastructural use.

The highly accurate energy measuring devices of Mors Smitt are placed direct on board of trains and the measured data is transferred to the train management system. Offering detailed data about the railway car and its operators performance and Key Performance Indicators to energy managers.

Not just our products and services but also our production sites are focused on environmental performance improvements by certifications according to the IRIS, ISO9001:2008 and ISO14001 standards.

Mors Smitt offers customizable energy efficiency systems, enhancing the energy efficiency performance of rail transportation.

Energy measurement. Accuracy. Mors Smitt.



MSAV features

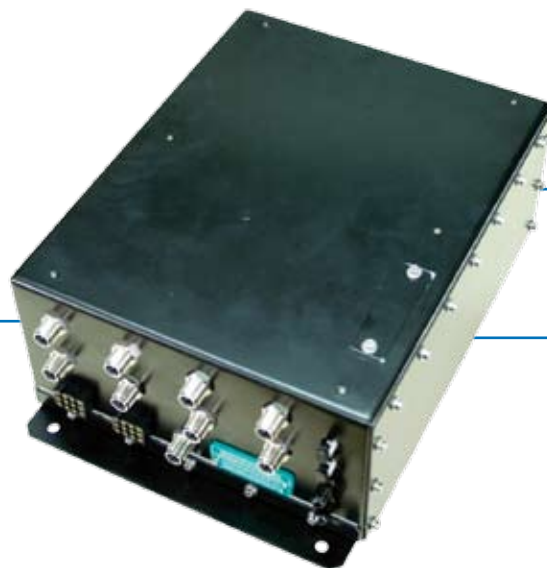
MSAV25000

Rooftop mounting



Remote box

Onboard mounting



Interoperability

MSAV25000 offers interoperability with its multiple voltage and current input measuring in one unit. The following ranges are covered:

- Voltage DC: 750 – 3000 V
- Voltage AC: 15 – 25 kV
- Current AC: up to 900 A

EN 50463 compliant

MSAV25000 complies to the new European EN 50463 standard for energy measurement onboard trains, offering a measuring accuracy of < 0.5% for voltage and <1% for current across the wide railway temperature range.

Compact

Due to the state of the art combined measuring of U & I in one device the MSAV25000 eliminates the need of a bulky potential transformer and an auxiliary supply isolation transformer on the primary side.

This new simplified solution results in:

- Integrated complementary remote monitoring functionalities
- Minimal space required
- Less weight
- Easier and quicker calibration-free installation

Fiber optic

Complete isolated separation between rooftop and onboard mounting due to patented power supply over fibre optic. The fibre optic technology between MSAV25000 and the remote box offers two main advantages:

- Higher insulation: MSAV25000 offers dielectric strength of 75 kV.
- Higher compatibility: High galvanic isolation between remote box and MSAV25000, and therefore electro magnetic compatibility, according to EN50121

High flexibility

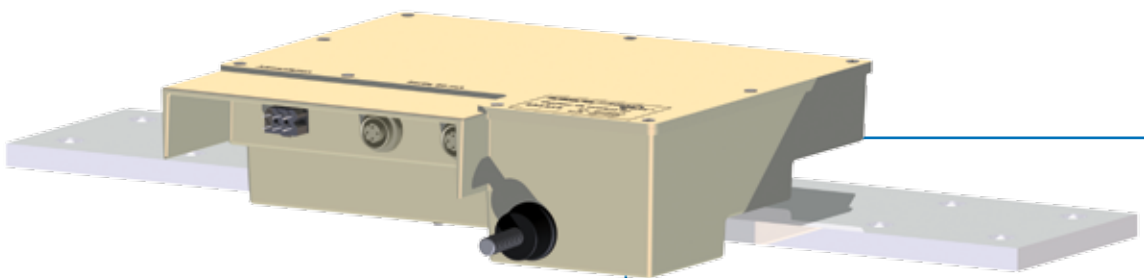
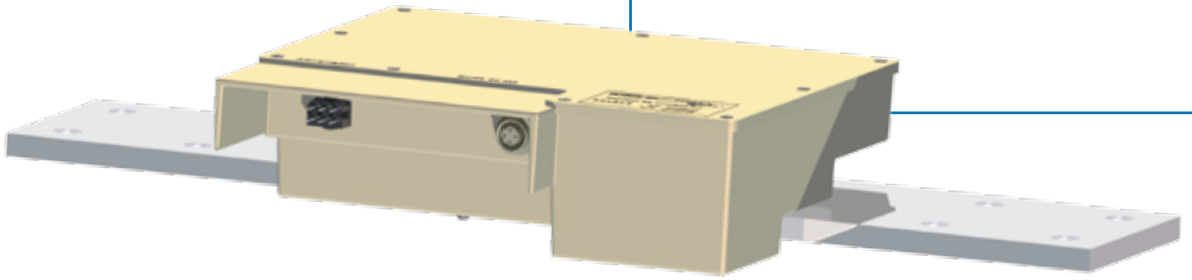
The remote box offers analogue, digital and logic outputs that can be adapted to any specific customer requirement. For new build and/or retrofit projects this offers the demanded flexibility to create customized solutions.

MSAV25000 is compatible with all approved energy meters. MSAV25000 and remote box can be replaced individually to guarantee flexible maintenance.

MSA features

MSA-DC

Rooftop or control cabinet mounting
(2 versions)



MSAV-DC

Rooftop or control cabinet mounting
(2 versions)

Universal DC current measuring

MSA-DC offers direct current measuring from catenary supply up to 3000 VDC:

- Current DC: 10 - 16000 A
- 12 kV dielectric strength

EN50463 compliant

MSA-DC and MSAV-DC comply to the new European EN50463 standard for energy measurement onboard trains, offering a measuring accuracy of < 0.5% for voltage and <1% for current across the wide railway temperature range.

Compactness

The MSA-DC and MSAV-DC are mounted directly on the catenary supply copper busbar resulting in:

- Minimal space required
- Easy and quick calibration-free installation

Universal DC current and voltage measuring

MSAV-DC offers direct current and voltage measuring from catenary supply:

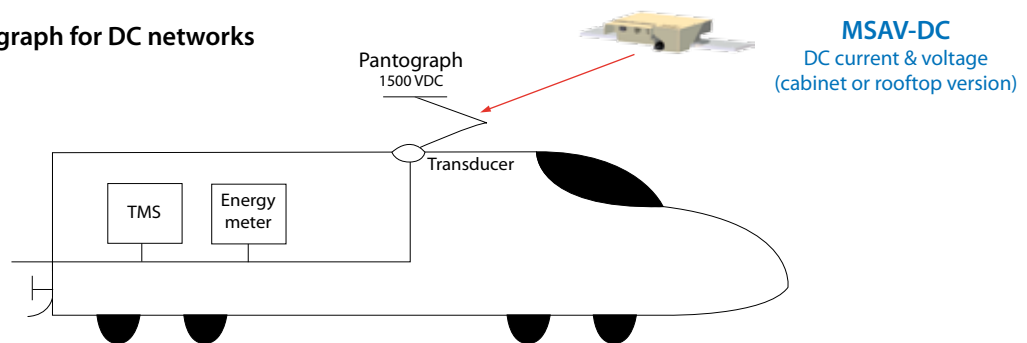
- Current DC: 10 - 16000 A
- Voltage DC: 750 - 3000 V
- 12 kV dielectric strength
- Universal battery supply

Application area

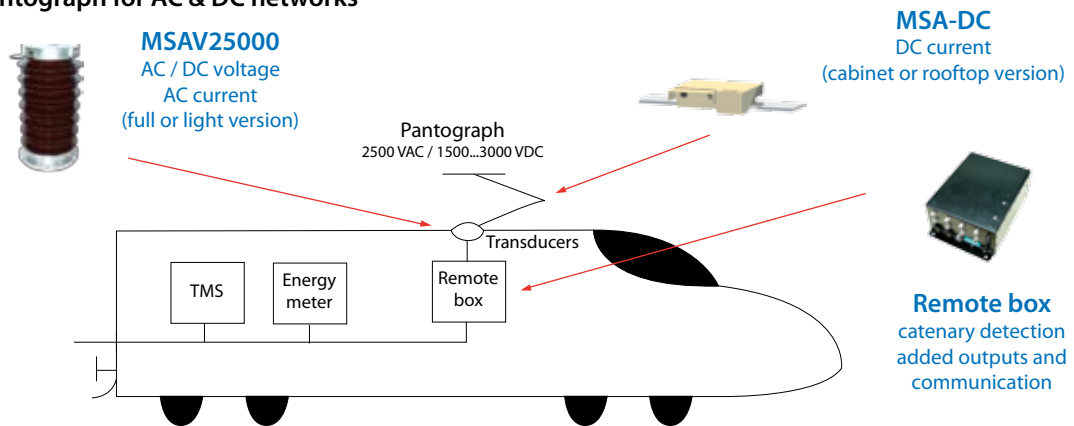
The MSAV25000 and MSA-DC / MSAV-DC offer solutions for many different applications. Some examples of main train configurations for our accurate catenary sensors are explained below. Our engineering department is fully qualified to provide the best solutions to meet EN 50463 energy measurement on board of trains.

Examples:

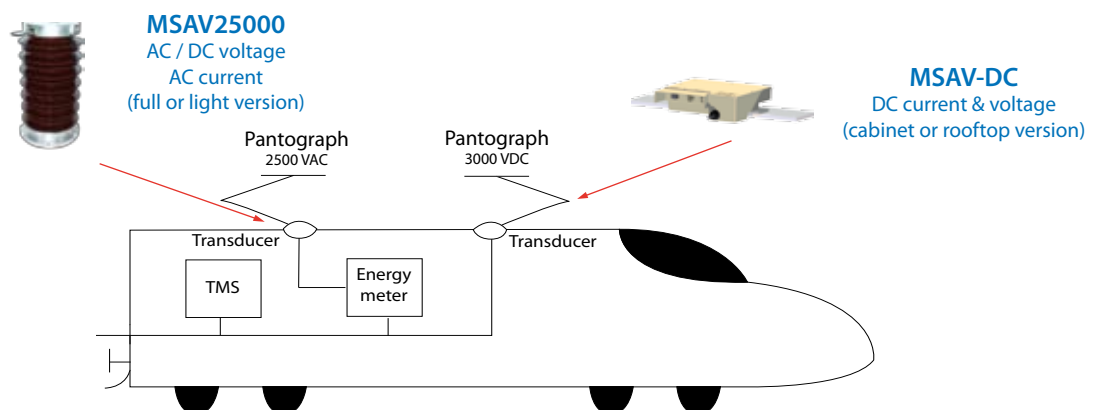
1 Pantograph for DC networks



1 Pantograph for AC & DC networks



2 Pantographs for AC & DC network



Models overview *

	 MSAV25000 light	 MSAV25000 +remote box	 MSA-DC	 MSAV-DC
Accuracy class according to EN 50463	< 0,5% up to 75 kV dielectric	< 0,5% up to 75 kV dielectric	< 1% up to 12 kV dielectric for current	< 1% up to 12 kV dielectric for current
Voltage AC 15 - 25 kV	✓	✓		
Voltage DC 750 - 3000 V	✓	✓		✓
Current AC 600 - 900 A	✓	✓		
Current DC 10 - 16k A			✓	✓
Catenary detection		✓		
Analog output	3	up to 8	1	2
Digital output	option	up to 8	option	option
Logic output	option	up to 8	option	option

* Solutions can be adapted to specific customer needs

Your benefits

Reliability

High isolation level:

- Fully optical separation between primary and secondary circuit by fibre optic data and power transmission
- Analogue outputs are galvanically isolated and independent from each other. Each out put has its own M12 connector for improved accuracy

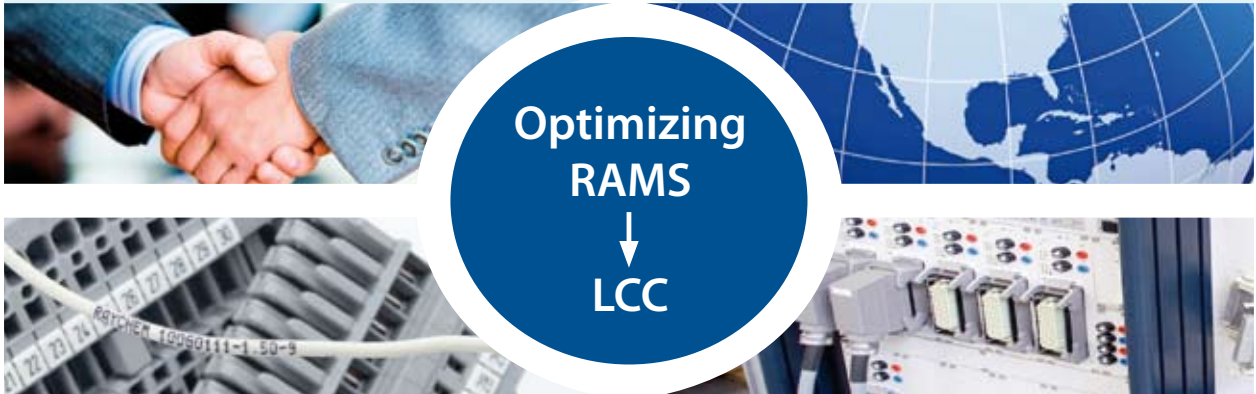
Accuracy <0.5% for voltage and <1% for current, according to EN 50463.

Availability

Proven availability due to extended testing procedures like:

- Shock and vibration according to IEC 61373
- Fire and smoke behaviour according to NF F16-101/102
- IP66 protection according to EN 60529
- Extended acceleration life test by HALT

30 years availability guaranteed.



Maintainability

Easy installation and maintenance:

- State of the art power supply over fibre optic provided from the remote box
- No bulky weight, due to state of the art design used in transformer
- Installation in 2 - 3 hours
- Calibration free

MSAV25000 and remote box make individual replacement possible without re-calibration.

Safety

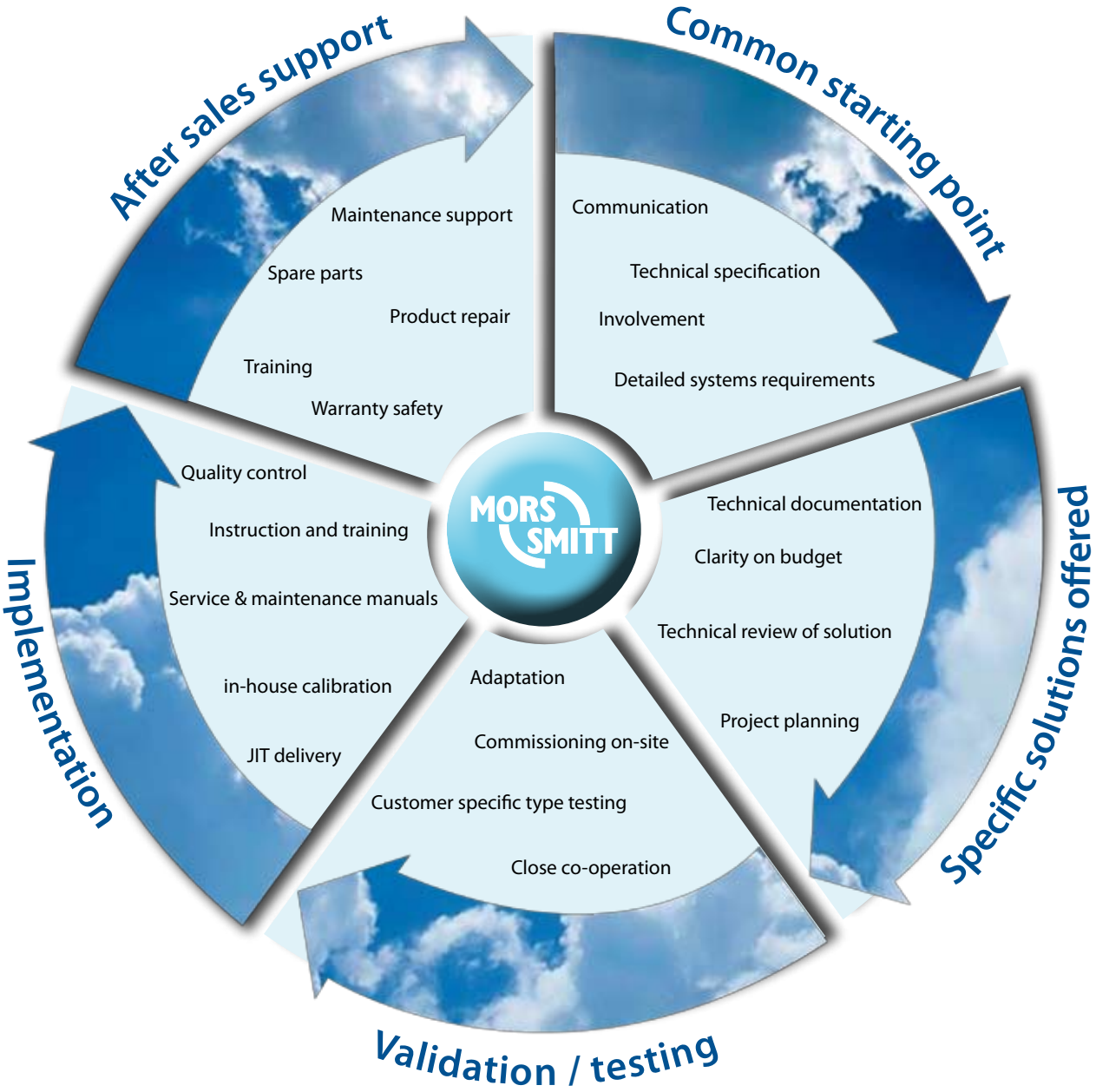
High galvanic separation between primary and secondary circuits by fibre optic:

- 75 kV dielectric strength
- 170 kV peak transient voltage
- 12 kV for MSA-DC or MSAV-DC

100% functional tested.

Pre-calibration from factory minimizes rooftop set-up process.

Your peace of mind



..... together we exceed your expectations!





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