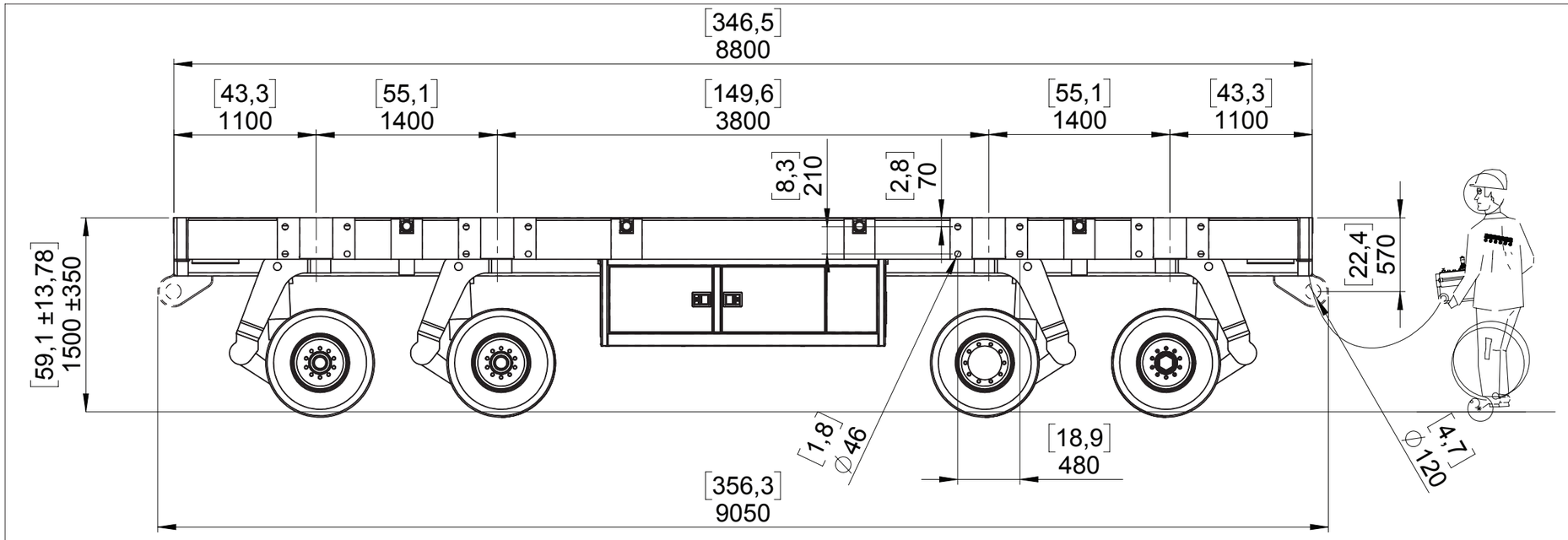
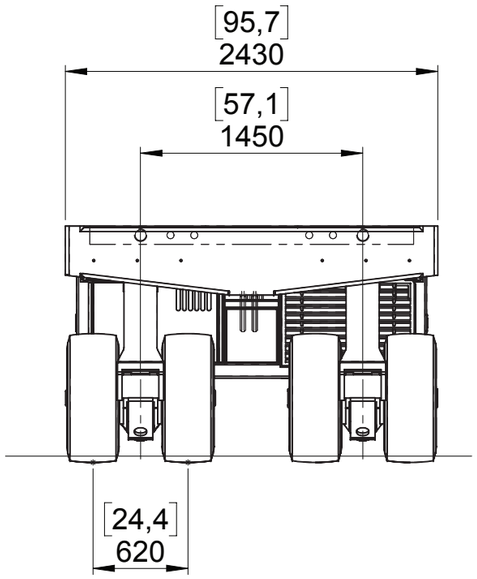
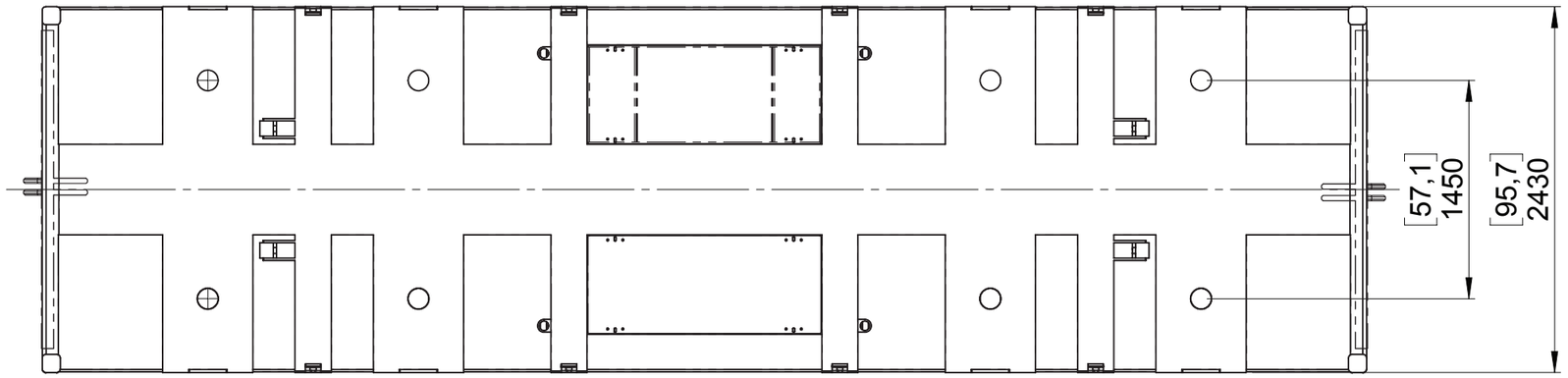
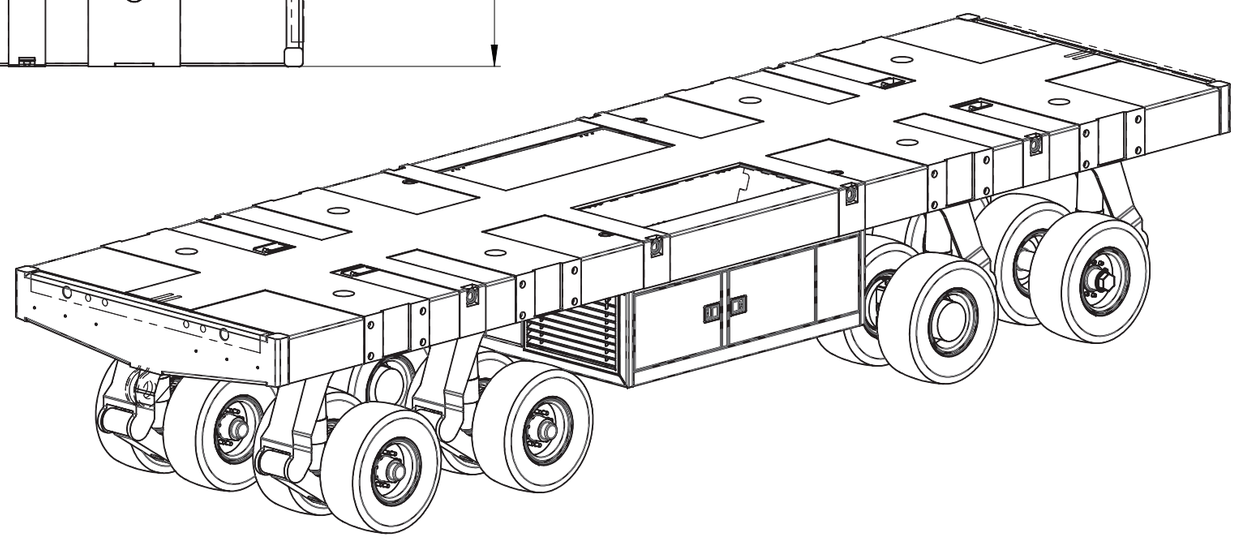








Alterations to design and dimensions reserved!
Drawing can include options!

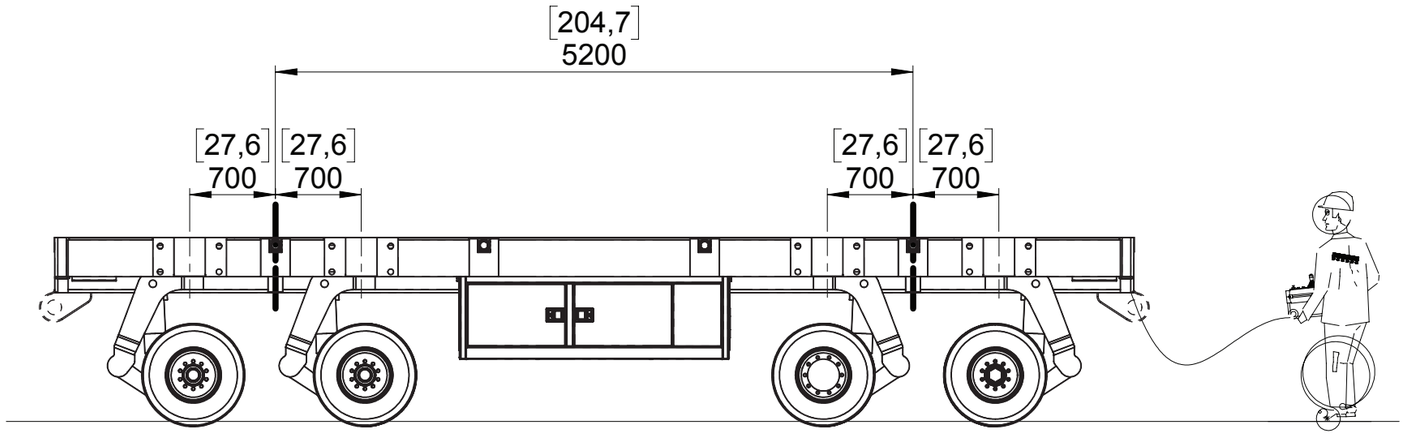
scale 1:40		
	date	name
desig.	01.04.2020	Förnzler
inspe.	01.04.2020	Storz

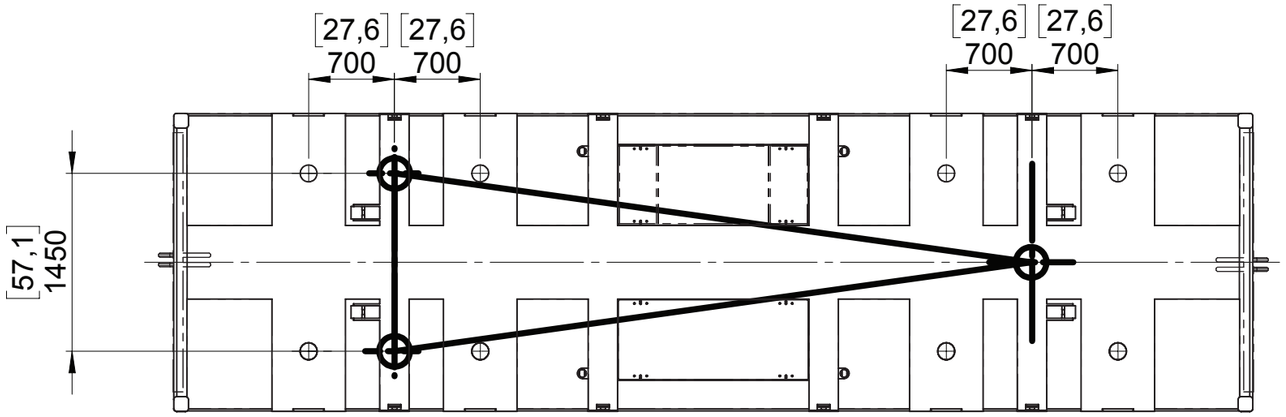
SCHEUERLE
FAHRZEUGFABRIK GmbH
Postfach 20
D-74627 Pfedelbach

MV SPMT PowerHoss MPEK 170.8.2-PH-K Basi
MV SPMT PowerHoss MPEK 170.8.2-PH-K Basi
MV SPMT PowerHoss MPEK 170.8.2-PH-K Base

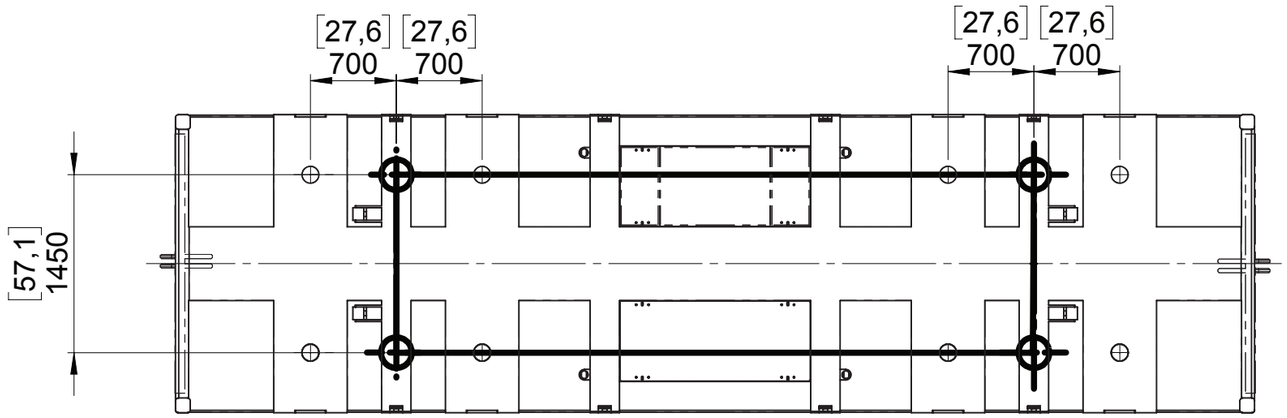
64337800-P | version 0 | sh. 1 | 2 sh.

source:





3-point suspension



4-point suspension

Alterations to design and dimensions reserved!
Drawing can include options!

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inspe.	01.04.2020	Storz

SCHEUERLE
FAHRZEUGFABRIK GmbH
Postfach 20
D-74627 Pfedelbach

MV SPMT PowerHoss MPEK 170.8.2-PH-K Basi
MV SPMT PowerHoss MPEK 170.8.2-PH-K Basi
MV SPMT PowerHoss MPEK 170.8.2-PH-K Base

64337800-P	version 0	sh. 2
		2 sh.

source:

SPMT PowerHoss

64337800_S02 Version 0 **Technical Specification**

3 Technical Data SPMT PowerHoss 170.8.2

Drawing N°:	**64337800**
Platform Trailer Type	MPEK 170.8.2-PH-K
Payload max. approx.	174.300 kg
Tare weight approx.	17.700 kg
Gross weight	192.000 kg
Bogie load max. *)	8 x 24.000 kg
Tires	16 x 355/65-15 IC 40 Polyfill
Platform dimensions, L X W	8800 x 2438 mm
Platformheight lowered (unladen)	1150 mm laden, 1180 mm unladen
Platformheight in driving position (laden)	1.500 +/ - 350 mm
Total lifting stroke	700 mm
Diesel engine **Emission class**	Deutz TD 3,6 L4, 55,4 kW at 2200 1/min EPA TIR IV / EU StageV
Fuel tank filling- / useable volume	100 l / 85 l
Hydraulic oil tank filling / useable volume	130 l / 75 l
Number of driven bogies	2 x
Number of braked bogies	2 x
Number of bogies without brake	4 x
Steering system/ steering angle	+130° / -100°
Brake force approx.	120 kN
Traction force at delta p=370bar approx.	120 kN
Max. inclination at payload 140.000 kg approx.	5 %
Max. speed unladen with rolling resistance f=0,025 **) approx.	5 km/h
Ambient temperature	-20°C up to +40°C

	Max. possible load depending on admissible tire load capacity		
Admissible speed Only valid for tires, not for the combination	**5 km/h**	**3 km/h**	**1 km/h**
Max. Payload	126.300 kg	142.300 kg	174.300 kg
Max. Gross weight	144.000 kg	160.000 kg	192.000 kg
Dead weight of combination approx.	17.700 kg	17.700 kg	17.700 kg
Admissible load of pendulum axle	18.000 kg	20.000 kg	24.000 kg *)

*) drive speed limited to 1 km/h at drive distance 5000 m max. (due tu admissible tire load) !

*)) limited to 6 km/h (walker operation) !

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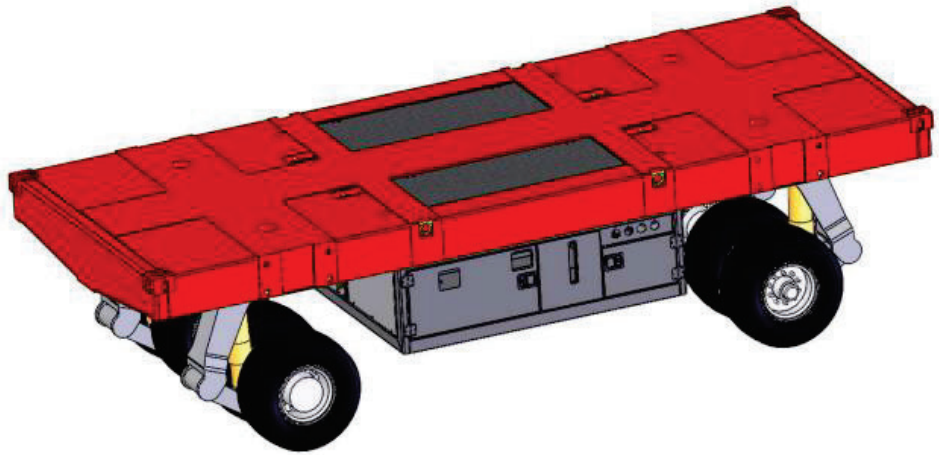
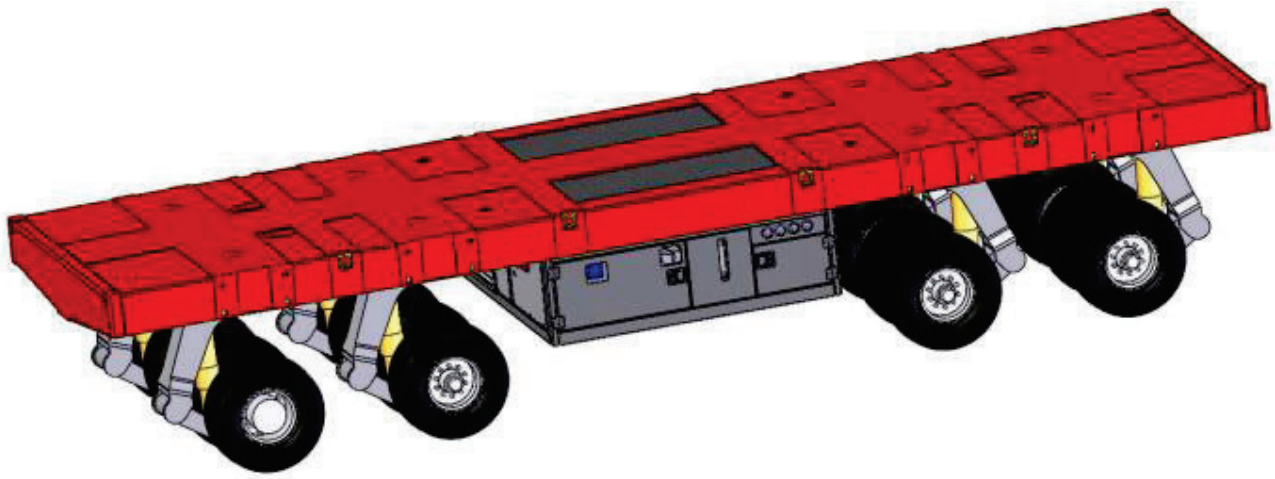
SPMT SPMT PowerHoss

64337655_S03 Version 0 **Technical Specification**



The graphic shows a 3D model of a similar SPMT PowerHoss 2 axle module with up to 85 ton capacity



The graphic shows a 3D model of a similar SPMT PowerHoss 4-axle module with up to 176 ton capacity

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SPMT SPMT PowerHoss

64337655_S03 Version 0 Technical Specification

SCOPE OF SUPPLY

Scheuerle Fahrzeugfabrik GmbH · Otto-Rettenmaier-Straße 15 · D-74629 Pfedelbach · Telefon 07941/691-0 · www.scheuerle.com

1 SPMT PowerHoss Standard Version with Diesel- or electric engine

1.1 The SPMT PowerHoss includes the following features:

- Bogies with driven, braked or idle pendulum axles and adequate tires
- Electronic multi-way steering system
- Diesel engine, water-cooled type or alternatively with water-cooled DC synchronous – electric engine and 400 V battery pack
- Hydraulic fluid and fuel tank (only diesel propulsion) for in stained steel
- HVLP 32 hydraulic oil is used in the hydraulic systems
- Integrated hydraulic return line filters (lifting and steering)
- Hydrostatic drive system
- Hydraulic support respective suspension system
- Manual emergency operation of the lifting/lowering and steering system
- Line fracture safety system in the support system
- Hydraulic brake system
- 24 V DC electric system
- Open compound and mechanical side-by-side coupling system
- Storage possibility for the remote control in the SPMT PowerHoss unit

1.2 Controls

The controls are situated easily accessible on the transporter side (near the main switch box). Several vehicle functions are monitored and operated from this place.

- Pressure of the hydraulic suspension system
- Manual resp. emergency lifting / lowering operation
- Manual resp. emergency steering operation

The diesel engine / electric motor data are displayed on a separate display.

1.3 Vehicle Frame resp. Platform

The shield gas welded platform has a load carrying structure consisting of a longitudinal and two transversal box beams. The interface surfaces for side-by-side mechanical coupling are situated on front sides of the transversal beams.

Twist-lock pockets for straddle carrier transportation (only 2 axle SPMT PowerHoss), in 20` version, are integrated in the four platform corners. Four tie-down lashes on the vehicle side and four lift lugs in the center provide lashing and lifting possibility of the SPMT PowerHoss unit.

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The diesel/electric engine with the hydraulic propulsion system, hydraulic oil tank, diesel fuel tank as well as other aggregates (Power Pack Unit) is attached, on a separate frame, beneath the vehicle platform between the axle lines.

1.4 Bogies and Axle Suspension

The bogies consist of: a bogie frame, a swing arm, a support cylinder and a pendulum axle. All bogies are connected with the platform via taper roller bearings.

The bogie frame is connected with the swing arm by the hydraulic support cylinder. The pendulum axle is attached to the pivot pin of the swing arm.

For the pivot bearing on the pendulum axles, a maintenance free super-elastic rubber element (ultra bushing) is used. The swing arm bearings are grease lubricated radial joint bearings, long lasting and low in maintenance.

The hydraulic support cylinder, with hard-chromed piston rod, has articulated type, grease lubricated bearings at both cylinder ends. This type of bearing prevents the negative impact of lateral forces on seals resp. collars.

1.5 Steering System

An engine mounted hydraulic pump supplies pressurized oil to the whole steering system. Each bogie is equipped with an independent steering drive consisting of tooth rods with two hydraulic cylinders.

These act simultaneously on the tooth gear which is attached to the top side of the bogie frame. Such way a steering angle of + 130° /- 100° degrees (a steering range of 260°!) is available.

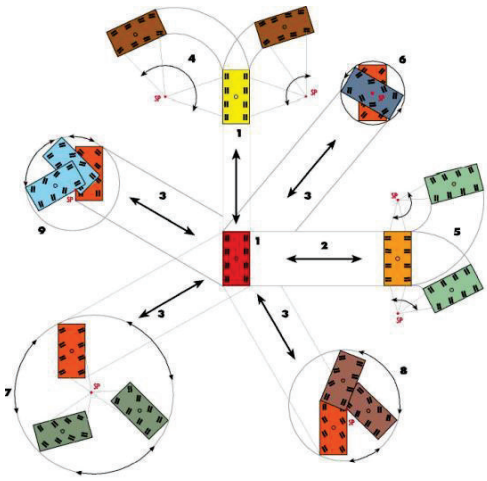
This concept employs an electronically joy stick which, through the steering computer, activates the infinitely controlled proportional valves for each bogie steering system powering the hydraulic cylinders.

The modular transporters type SPMT PowerHoss include a computer-controlled **S**cheuerle **A**ll **D**irectional **E**lectronic **S**teering **S**ystem **(SADESS)** lending it extraordinary maneuverability as a single vehicle and in compound operation.

In compound operation, the great steering range of 230° allows the compound increased flexibility and maneuverability.

The steering programs include:

- All-wheel steering lengthwise
- All- wheel steering transverse
- Diagonal steering lengthwise
- Diagonal steering transverse
- Truck steering front
- Truck steering rear
- Carousel steering



Sample of Steering principle of a single vehicle

The steering system layout guarantees steering functions even if the laden transporter is in stand still. A manual emergency operation of the individual bogies is possible by hand levers on the steering block.

Steering geometry errors are indicated. A deviation of more than 5° degrees is signaled, errors exceeding 7°degrees cause the drive system shut down.

1.6 Hydrostatic Drive System

The drive respective propulsion system consists of a diesel/electric engine, a coupling and the corresponding hydraulic pumps mounted. The variable volume axial piston pump are acting hydraulically on variable volume axial piston motors, which are mounted to the driven pendulum axle.

The hydrostatic drive system works in a closed circuit. The characteristics and the operating comfort are the same as for an automatic power transmission.

The electronic control system provides an efficient and safe operation. Therefore it is not possible to overload or stall the diesel engine when putting the vehicle into motion.

The operator only has to actuate the switch for forward/reverse direction and move the accelerator and the joy stick for driving and braking. The achievable speed is the same for both directions.

All hydraulic pressure circuits are equipped with 10-micron fine-grade filters. The filter contamination is optically indicated. All important hydraulic lines are equipped with test connections.

1.7 Hydraulic Support respective Suspension System

The hydraulic support system connects the bogie support cylinders into adequate support groups. 3- or 4-point support system can be engaged (subject to the safety regulations in the operation manual). A 3-point support is only possible for the single SPMT PowerHoss without problems. For 3-point support at hydraulically connected vehicle combinations please mind tank levelling (see operating manual).

The single support points can also be manually controlled in two modes:

- In normal operation mode by joystick on the remote control
- In emergency mode by hand levers on the main lifting/lowering hydraulic valve block

Hydraulic axle suspension and therefore hydraulic lift and compensation system with a total lift respective stroke of 700 mm.

The configuration of support points of the compound is determined by engaging the adequate ball valves in the single modules.

1.8 Hose break Safety System (Dual circuit)

Hose break safety valves are installed in the hydraulic support system. These valves are situated: directly on each axle support cylinder and on the end of each hydraulic distribution line towards the hydraulic cylinder for lifting/lowering.

In case of fracture in the hose line between the valve and cylinder both valves, in the damaged line, close immediately.

The support cylinder can´t retract because the oil exhaust is shut-off by the closed valve on the cylinder itself. An uncontrolled, unilateral tilting of the load is therefore prevented.On the other side the hydraulic support system is still functioning because the valve in the line closes the fractured end.

1.9 Hose break Safety System (One circuit for SPMT PowerHoss 170.8.2)

A hose break safety valve (one-circuit design) is placed next to each support cylinder of the bogies. It is installed between each axle support cylinder and main distribution line of the hydraulic system for lifting/lowering. In case of a defective line between valve and cylinder, the valve closes the line immediately. The vacant load is taken over by other functioning cylinders in the same support group.

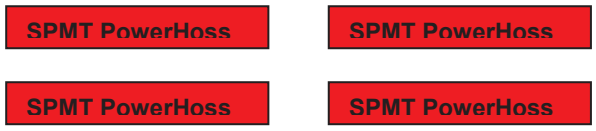
These break safety valves react in case of pressure differences. The installation of these valves prevents the unilateral lowering of the vehicle and therefore dangerous load tilting.

1.10 Service- and Parking Brake System

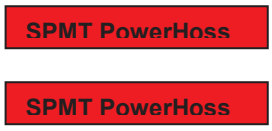
A hydraulic brake system is installed in the vehicle. The system acts on the relevant number of braked pendulum axles equipped with drum brakes. In case of pressure loss the vehicle is braked independently by the installed spring.

1.11 Open compound and mechanical Side-by-Side & End to End coupling

The compound operation of maximum four (4) single SPMT PowerHoss modules is provided. The sockets for adequate electrical cable connection lines (optional) are to be installed on the vehicle.



Sample of 4-unit open compound



Sample of 2-unit open compound

Sample of 2-unit open compound longitudinal

The side-by-side coupling blocks (optional) can be mounted to the two coupling interface surfaces on the vehicle sides.

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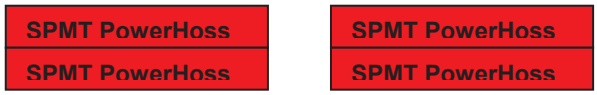
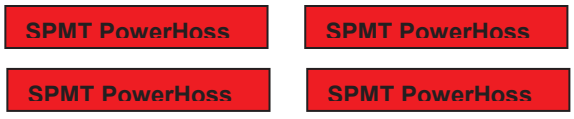
2-unit side-to-side coupling



two 2-unit side-to-side coupling /open compound

The end-to-end bolt coupling set with mechanical connection parts and manual operated coupling bolt connects two SPMT PowerHoss units on the front resp. rear side.

2-unit end-to-end compound



Sample of two 2-unit end-to-end compounds
In open compound

Sample of 4-unit end-to-end and
and side-by-side compound

The operation of the compound is performed by the remote control only. The module, at which the remote control is plugged-in, automatically is the master unit. The rest of modules in the compound are slave units and have to be referenced to this master unit.

In a compound combination of up to four (4) single units a 3/4-point support system is possible.
For the 3-point support there are hydraulic connections on the sides of the vehicle at hand (please mind the operating manual)

1.12 Electric System

The electric system consists of a 24V DC power system, (two 12 V electric batteries), provided by an alternator attached to the diesel engine or a voltage convertor 400 V DC (HV battery voltage) 24 V DC, 100 A for electric drive. The electric installation of the vehicle is perfectly located for easy maintenance and repair.

The system includes (amongst others):

- Three (3) emergency stop buttons; two on vehicle sides and one nearby the raise/lower valve bloc
- One permanent acoustic warning signal for moving and one warning siren
- 400V AC 50 Hz connection for battery charger (only for electric PPU)
- Battery 400V with CAN connection and heating
- Battery charger integrated to the PPU
- Safety shut-down of the 400V DC batteries (in case of error for opening a 400 V DC device, and for emergency-stop
- Safety connector for safe disconnecting of the battery during maintenance and inspection
- Insulation monitors at the battery

1.13 Emergency Stop System

The vehicles are equipped with an emergency stop system according protection level d (PL d).

This kind of system offers a maximum emergency stop capability for the single vehicle as well as for the vehicle compound.

1.14 CAN-Bus System

Several electronic sensors, controlling and regulation components of the Scheuerle transporters are connected by a **C**ontroller **A**rea **N**etwork System.

The system offers following advantages:
- Very efficient and high rate of data exchange
- High reliability by recognition and automatic adjustment of faults
- Very helpful for central diagnostic
- Easy handling by small cable dimensions (very important for coupling operation)

1.15 Coating

- Surface preparation: Steel structure shot blasted SA 2,5 SIS (DIN 55928-4)
- First coat: 2-component zinc-rich primer, approx. 50 µm **D**ry **F**ilm **T**hickness
- Second coat: 2-component intermediate coat, approx. 50 µm DFT
- Top coat: 2-component coat, approx. 50 µm DFT
- Total coat thickness: approx. 150 µm DFT
- Upper side of vehicle color: RAL 3020 (red)
- Lower side of vehicle: RAL 7016 (grey)
- Rims: RAL 9006 (silver)

1.16 Operation Environment

The Scheuerle module transporters are designed to operate in a temperature range of –20°C up to +40°C (4°F up to +104°F) and a relative air humidity of up to 100%. The operation fluids in the vehicle have to be adapted accordingly.

1.17 Standard accessories / Documentation

- Operating manual including maintenance and troubleshooting instructions in duplicate in paper and in English or German language
- Spare parts documentation with drawings in English; in duplicate in paper and in English or German language

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2 Options / Features at additional costs:

2.1 Radio Remote Control

50002406	Radio / Cable Remote Control for SPMT PowerHoss

For optimized operating conditions and high transportation safety the SPMT PowerHoss module respective vehicle compound is equipped with a radio remote control unit. This gives the operator a very high operating flexibility. This control system can be used for single modules as well as for coupled units in compound.

This control system can be used for single vehicles and for coupled vehicles. For the operation of a single vehicle or vehicle compound, at least one remote control is necessary!

If the radio link fails to work or if the radio link is not allowed, there is the possibility for an additional cable connection as backup system. (Length of cable 10 m).

The following functions are activated by the remote control:

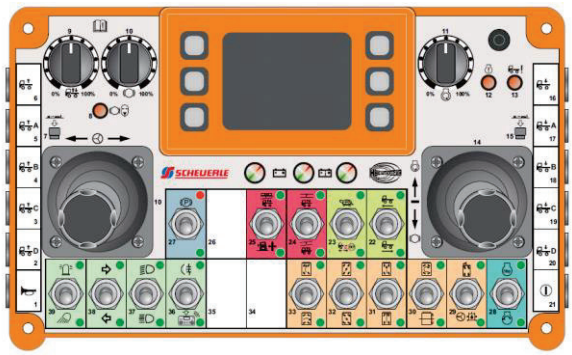
- Single engine and all engines in compound start/stop
- Drive direction; forward / backward
- Steering programmes
- Inching function for lift/lower, brake and drive system
- Lighting system
- Emergency stop (PL d)

The following functions are operated respectively programmed by the remote control:

- Steering
- Acceleration
- Brake / deceleration
- Lifting / lowering
- Programming of compound coordinates

The following functions are monitored by warning signals and error indication:

- Hydraulic oil and diesel fuel level
- Steering angle
- Supporting pressure indication
- Warning and error message



The graphic shows the top down view of a similar radio remote control

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2.2 One (1) set working lights 24V LED-type with magnetic holder; four (4) pieces;

49500303	Working light set with magnetic holder, 24V, LED

2.3 One (1) set working lights 24V LED-type fixed to the frame; four (4) pieces;

50003099	Working light set fixed mounted, 24V, LED

2.4 Winter package for SPMT PowerHoss

50003383	Winter package for SPMT PowerHoss Diesel operation

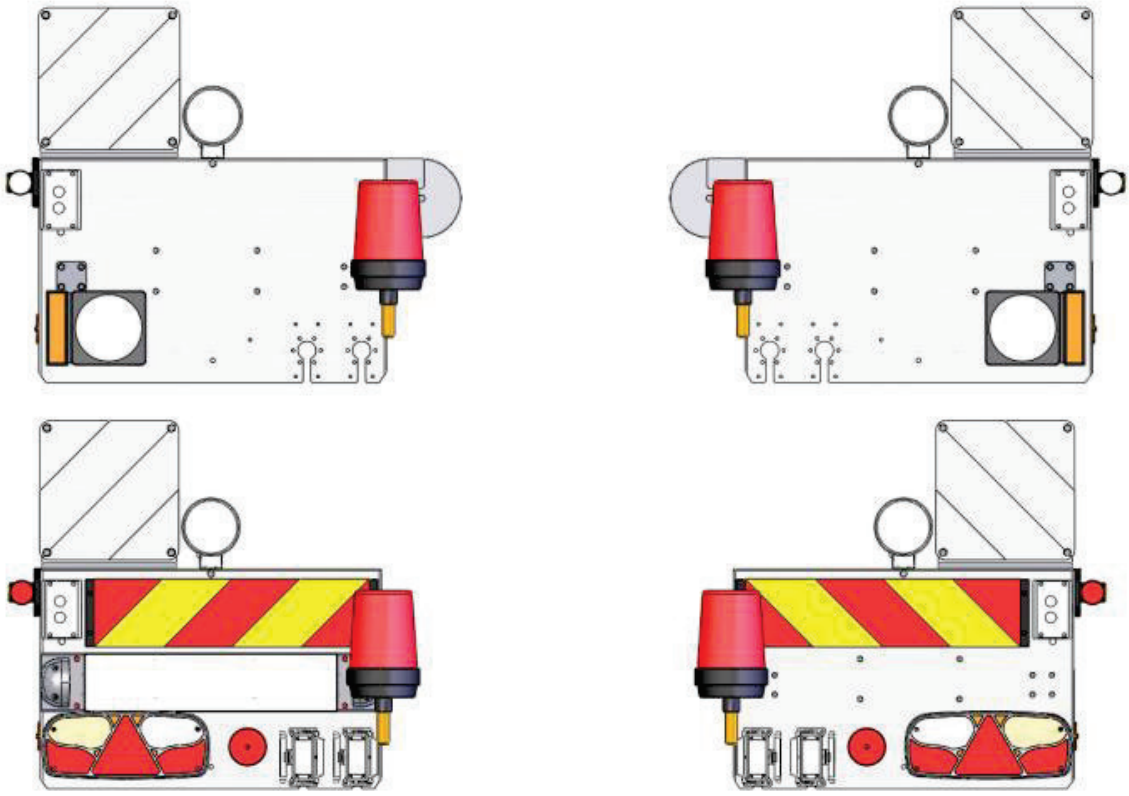
The winter package is helpful, when the SPMT PowerHoss is working in deep temperature areas. This package helps to increase the lifetime of the diesel engine and the hydraulic components
The arctic package consists of:

- Socket for external power supply …400 V / 50 Hz, 3 ph +N +PE, 16 A,

Alternative:
- Socket for external power supply …208 V / 60 Hz, 3 ph +N +PE, 16 A,
- Cooling water heating
- Hydraulic oil heating
- Diesel fuel filter heating
- Integrated battery charger
- Switch box heating

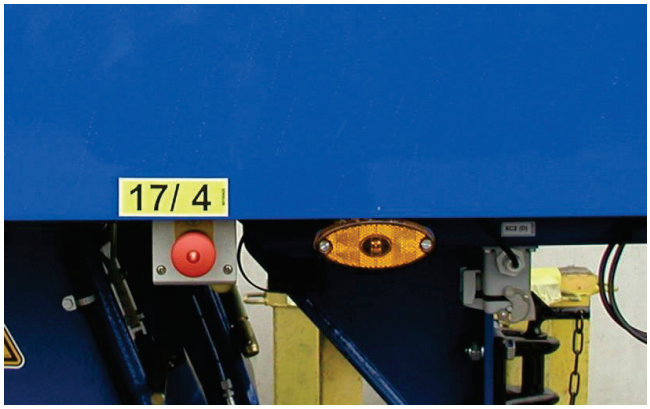
2.5 One (1) set Lighting system front & rear

50001291	Lighting device set front / rear



2.6 One (1) set side marking lights;

50002408	Side Marker Light set



2.7 Diagnostic System via remote maintenance

50002627	Diagnostic system via remote maintenance for SPMT PowerHoss

The Diagnostic system via remote maintenance supplies the following functions:

- Supervising operating data from the control room, indicate error messages
- Information concerning service intervals and disturbances by e-mail
- The SCHEUERLE service technician can set up to the vehicle control system

For the diagnostic system the customer has to provide a GSM card (with data plan).

2.8 Electronic Levelling and Equal Lift System

50002628	Electronic Levelling and Equal Lift System for SPMT PowerHoss as single vehicle and for compound operation

The software program “equal lift system” equally lifts/lowers the bogie corner knees during standstill. Cylinder stroke at the four bogie corner knees remain nearly equally.

“Parallel lift system” is used during standstill when the vehicle is inclined, the platform has to be levelled manually and a parallel lifting/levelling of the platform is required.

After activation of the software “parallel lift system”, the platform equally lifts/lowers at the bogie corner knees.

The system consists of:

- Four (4) precision potentiometers – at the bogies of the first and last axle lines
- Equal- and parallel levelling electronics
- Activation of the electronic equal and parallel levelling software

2.9 Electronic Levelling System

50002625	Electronic leveling system for SPMT PowerHoss (Condition is the option electronic levelling and equal lift system # 50002628)

The electronic levelling system permits a horizontal lifting of the platform during standstill.
The electronic leveling system is only available for single vehicles; it cannot be activated for compound operation.

The electronic leveling system consists of:

- Leveling sensor (XY direction)
- Levelling electronics
- Activation of the electronic leveling software

2.10 Installation for external pressure supply SPMT PowerHoss (only for one SPMT PowerHoss.)

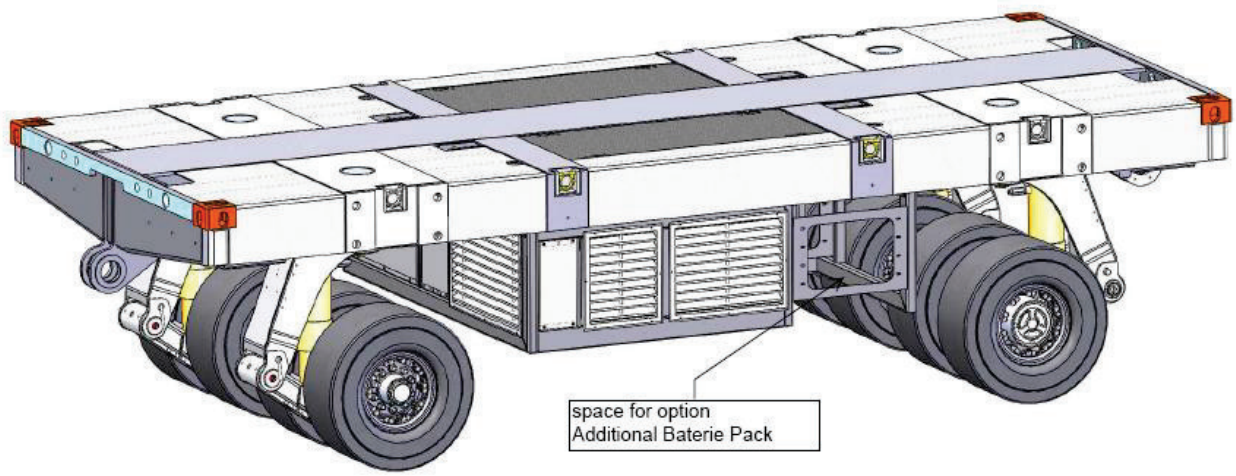
50003252	Installation for external pressure supply SPMT PowerHoss

In case of engine breakdown the pressure supply can be taken over by another SPMT PowerHoss.
This other SPMT PowerHoss also needs the installation for external pressure supply!
Both SPMT PowerHoss need this option!
Functions: Driving, Braking, Steering, Lifting / Lowering

2.11 Additional battery pack for SPMT PowerHoss E-propulsion

64242137	Additional battery pack 400V DC, 40,6 kWh, unit weight 430kg

The charging times will be doubled when an additional battery back is used!
900 x 655 x 630 mm (length x width x height)



2.12 SPMT PowerHoss Side-by-Side Coupling Set

64211944	2 axle lines SPMT PowerHoss, side by side coupling set (2 x coupling block),
64216011	4 axle lines SPMT PowerHoss, side by side coupling set (4 x coupling block)
49500228	Coupling element side by side 470mm, RAL 7016 grey for electric operation (for 2 / 4 axle lines 2 / 4 coupling elements are necessary)

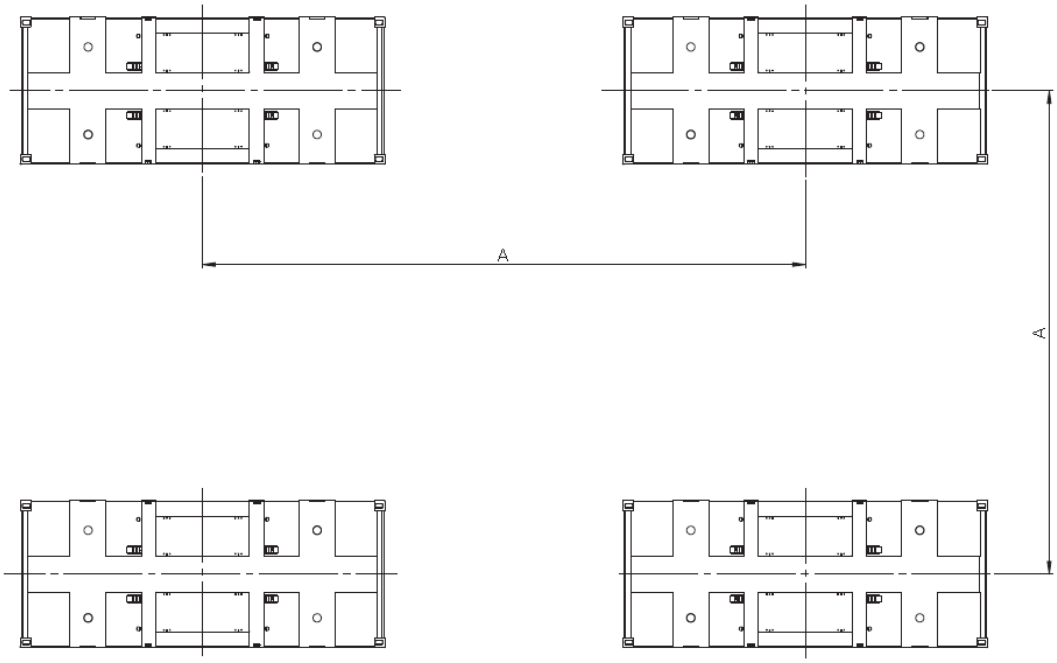
For side-by-side coupling it is indispensable that the SPMT PowerHoss is placed in a way that the terminal boxes are easily operated and accessible. The exhaust of the SPMT PowerHoss has to be routed by means of the exhaust pipes provided.

The SPMT POWERHOSS Side by Side coupling Set consists of:

- 470 mm side coupling blocks (2/4 axle lines, scope of supply 2/4 coupling blocks)
- 2 x exhaust pipe prolongation (the exhaust will be routed on the other vehicle side)

2.13 SPMT POWERHOSS Connection components electrics / hydraulic

64242079	Hydraulic connection for 3-point support A = 2,9 m (see operating instructions)
64242080	Hydraulic connection for 3-point support A = 5 m (see operating instructions)
64242081	Hydraulic connection for 3-point support A = 10 m (see operating instructions)
64242082	Hydraulic connection for 3-point support A = 20 m (see operating instructions)
64242076	Data cable A = 5 m
64242077	Data cable A = 10 m
64242078	Data cable A = 20 m
64212493	Data cable A = 30 m



2.14 SPMT PowerHoss Tools

64216012	Complete set of tools for SPMT PowerHoss

The set of tools for SPMT PowerHoss includes:

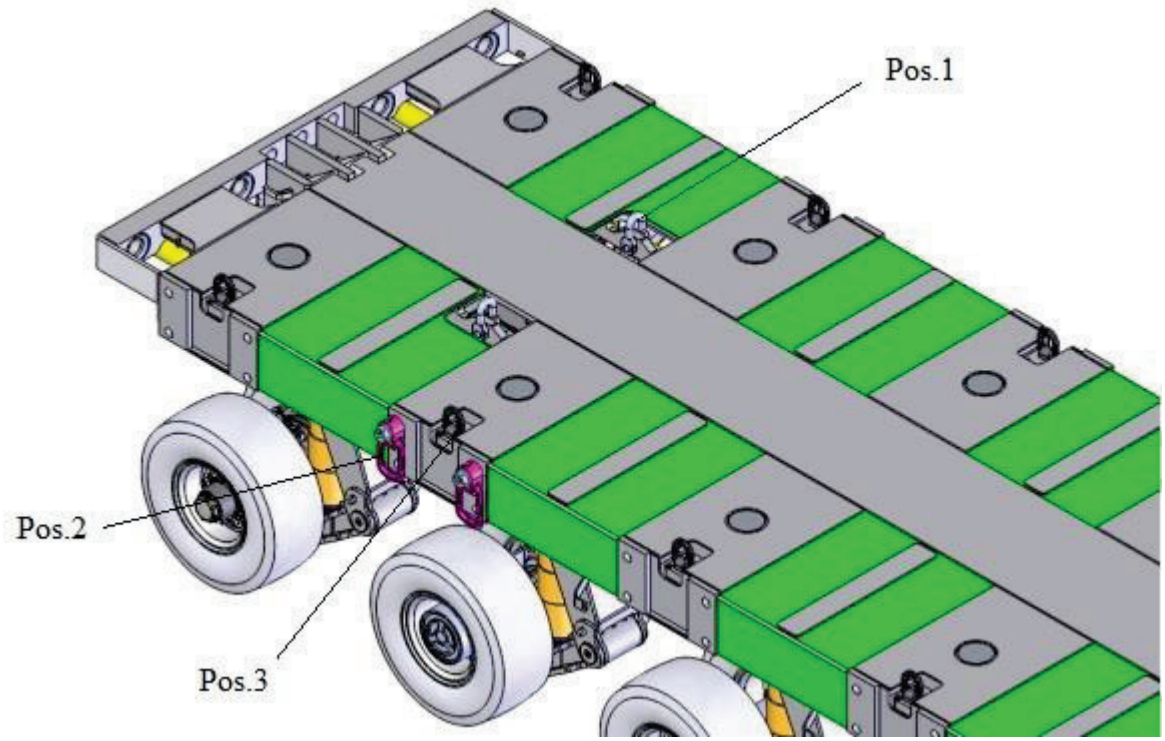
- Toolbox 71 parts
- diverse additional tools
- Axle tools Sauer
- Electrics vehicle tool kit

**We reserve the right for technical modification (without prior notice)
in order to keep up with technical progress!**

SPMT / Module - Transporter

64348423 Cargo securing – Lashing Part

SCHEUERLE SPMT / Module – Transporters are a modular transportation system for heaviest and oversized loads (cargo). According to the general EC-Directives, the general safety thinking and labor protection (EC-Directive 98/37/EC respectively 2006/42/EC – Directive for Machinery), it will be necessary to secure loads (cargo) on the transportation vehicles in such a way that a shift of cargo under all operation conditions is avoided. Therefore at the platform trailers of the series SPMT / Module – Transporters bores a provided at relevant positions which are able to be applied, whether directly or by means of standard lashing points, with lashing equipment as there are chains, steel ropes or straps with hooks or shackles.



Lashing position		Lashing Capacity (lashing force)	Direction of force
Pos. 1	Platform interior Ø 50 mm	200 kN (20000 daN)	vertical to horizontal parallel to main beam (The 15to. Shackle **50002684** is optional available)
Pos. 2	Platform exterior, all upper bores Ø 46 mm	150 kN (15000 daN)	all directions (VLBG-Lashing point M42) Part. No. 50002152
Pos. 3	Lashing point in the steering beam	134 kN (13400 daN)	all directions Part. No. 64348423

For load securing a max. of two lashings points may be used for each steering beam!

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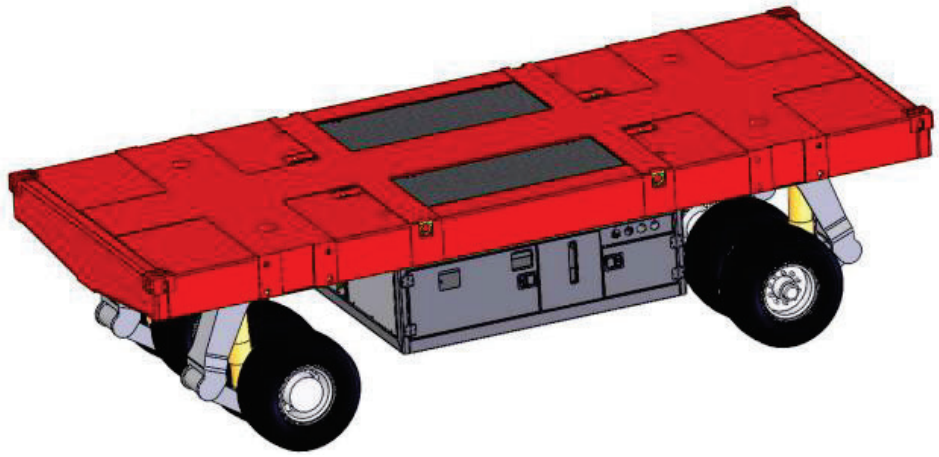
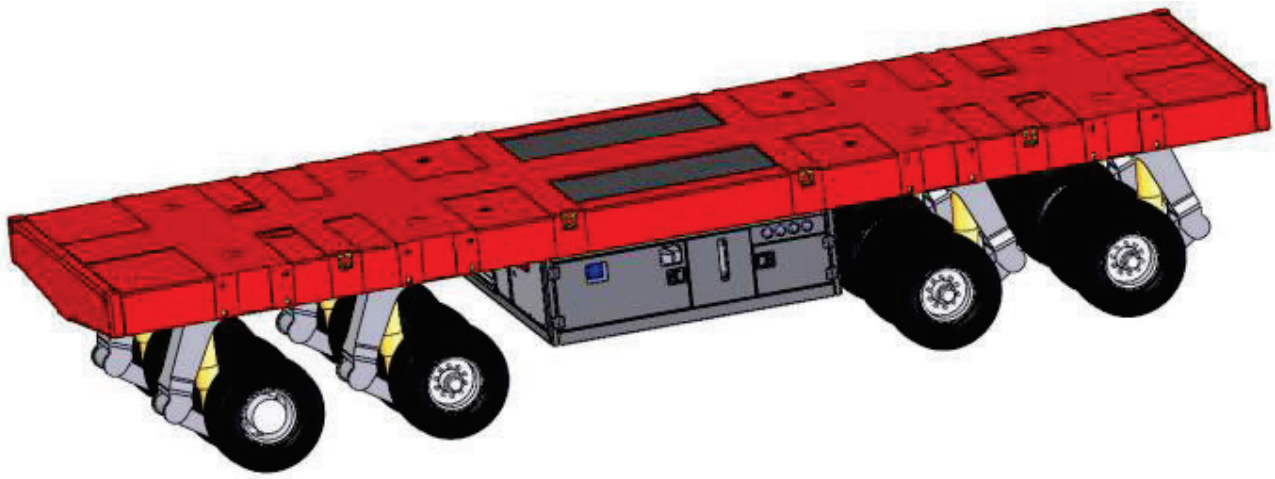
SPMT PowerHoss

50353439_S03 Version E Technical Specification



The graphic shows a 3D model of a similar SPMT PowerHoss 2 axle module with up to 85 ton capacity



The graphic shows a 3D model of a similar SPMT PowerHoss 4-axle module with up to 176 ton capacity

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SPMT PowerHoss

50353439_S03 Version E Technical Specification

SCOPE OF SUPPLY

Scheuerle Fahrzeugfabrik GmbH · Otto-Rettenmaier-Straße 15 · D-74629 Pfedelbach · Telefon 07941/691-0 · www.scheuerle.com

1 SPMT PowerHoss Standard Version with Diesel- or electric engine

1.1 The SPMT PowerHoss includes the following features:

- Bogies with driven, braked or idle pendulum axles and adequate tires
- Electronic multi-way steering system
- Diesel engine, water-cooled type or alternatively with water-cooled DC synchronous – electric engine and 400 V battery pack
- Hydraulic fluid and fuel tank (only diesel propulsion) for in stained steel
- HVLP 32 hydraulic oil is used in the hydraulic systems
- Integrated hydraulic return line filters (lifting and steering)
- Hydrostatic drive system
- Hydraulic support respective suspension system
- Manual emergency operation of the lifting/lowering and steering system
- Line fracture safety system in the support system
- Hydraulic brake system
- 24 V DC electric system
- Open compound and mechanical side-by-side coupling system
- Storage possibility for the remote control in the SPMT PowerHoss unit

1.2 Controls

The controls are situated easily accessible on the transporter side (near the main switch box). Several vehicle functions are monitored and operated from this place.

- Pressure of the hydraulic suspension system
- Manual resp. emergency lifting / lowering operation
- Manual resp. emergency steering operation

The diesel engine / electric motor data are displayed on a separate display.

1.3 Vehicle Frame resp. Platform

The shield gas welded platform has a load carrying structure consisting of a longitudinal and two transversal box beams. The interface surfaces for side-by-side mechanical coupling are situated on front sides of the transversal beams.

Twist-lock pockets for straddle carrier transportation (only 2 axle SPMT PowerHoss), in 20` version, are integrated in the four platform corners. Four tie-down lashes on the vehicle side and four lift lugs in the center provide lashing and lifting possibility of the SPMT PowerHoss unit.

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The diesel/electric engine with the hydraulic propulsion system, hydraulic oil tank, diesel fuel tank as well as other aggregates (Power Pack Unit) is attached, on a separate frame, beneath the vehicle platform between the axle lines.

1.4 Bogies and Axle Suspension

The bogies consist of: a bogie frame, a swing arm, a support cylinder and a pendulum axle. All bogies are connected with the platform via taper roller bearings.

The bogie frame is connected with the swing arm by the hydraulic support cylinder. The pendulum axle is attached to the pivot pin of the swing arm.

For the pivot bearing on the pendulum axles, a maintenance free super-elastic rubber element (ultra bushing) is used. The swing arm bearings are grease lubricated radial joint bearings, long lasting and low in maintenance.

The hydraulic support cylinder, with hard-chromed piston rod, has articulated type, grease lubricated bearings at both cylinder ends. This type of bearing prevents the negative impact of lateral forces on seals resp. collars.

1.5 Steering System

An engine mounted hydraulic pump supplies pressurized oil to the whole steering system. Each bogie is equipped with an independent steering drive consisting of tooth rods with two hydraulic cylinders.

These act simultaneously on the tooth gear which is attached to the top side of the bogie frame. Such way a steering angle of + 130° /- 100° degrees (a steering range of 260°!) is available.

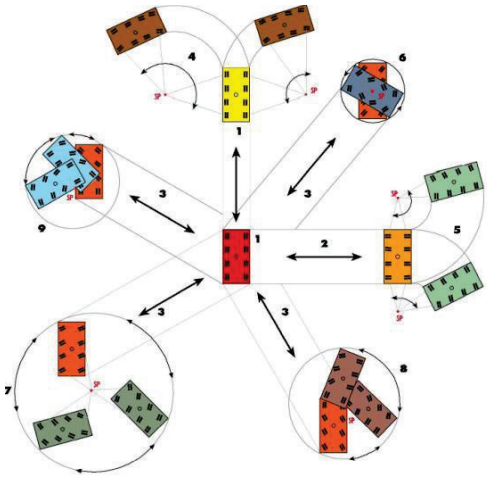
This concept employs an electronically joy stick which, through the steering computer, activates the infinitely controlled proportional valves for each bogie steering system powering the hydraulic cylinders.

The modular transporters type SPMT PowerHoss include a computer-controlled **S**cheuerle **A**ll **D**irectional **E**lectronic **S**teering **S**ystem **(SADESS)** lending it extraordinary maneuverability as a single vehicle and in compound operation.

In compound operation, the great steering range of 230° allows the compound increased flexibility and maneuverability.

The steering programs include:

- All-wheel steering lengthwise
- All- wheel steering transverse
- Diagonal steering lengthwise
- Diagonal steering transverse
- Truck steering front
- Truck steering rear
- Carousel steering



Sample of Steering principle of a single vehicle

The steering system layout guarantees steering functions even if the laden transporter is in stand still. A manual emergency operation of the individual bogies is possible by hand levers on the steering block.

Steering geometry errors are indicated. A deviation of more than 5° degrees is signaled, errors exceeding 7°degrees cause the drive system shut down.

1.6 Hydrostatic Drive System

The drive respective propulsion system consists of a diesel/electric engine, a coupling and the corresponding hydraulic pumps mounted. The variable volume axial piston pump are acting hydraulically on variable volume axial piston motors, which are mounted to the driven pendulum axle.

The hydrostatic drive system works in a closed circuit. The characteristics and the operating comfort are the same as for an automatic power transmission.

The electronic control system provides an efficient and safe operation. Therefore it is not possible to overload or stall the diesel engine when putting the vehicle into motion.

The operator only has to actuate the switch for forward/reverse direction and move the accelerator and the joy stick for driving and braking. The achievable speed is the same for both directions.

All hydraulic pressure circuits are equipped with 10-micron fine-grade filters. The filter contamination is optically indicated. All important hydraulic lines are equipped with test connections.

1.7 Hydraulic Support respective Suspension System

The hydraulic support system connects the bogie support cylinders into adequate support groups. 3- or 4-point support system can be engaged (subject to the safety regulations in the operation manual). A 3-point support is only possible for the single SPMT PowerHoss without problems. For 3-point support at hydraulically connected vehicle combinations please mind tank levelling (see operating manual).

The single support points can also be manually controlled in two modes:

- In normal operation mode by joystick on the remote control
- In emergency mode by hand levers on the main lifting/lowering hydraulic valve block

Hydraulic axle suspension and therefore hydraulic lift and compensation system with a total lift respective stroke of 700 mm.

The configuration of support points of the compound is determined by engaging the adequate ball valves in the single modules.

1.8 Hose break Safety System (Dual circuit)

Hose break safety valves are installed in the hydraulic support system. These valves are situated: directly on each axle support cylinder and on the end of each hydraulic distribution line towards the hydraulic cylinder for lifting/lowering.

In case of fracture in the hose line between the valve and cylinder both valves, in the damaged line, close immediately.

The support cylinder can´t retract because the oil exhaust is shut-off by the closed valve on the cylinder itself. An uncontrolled, unilateral tilting of the load is therefore prevented.On the other side the hydraulic support system is still functioning because the valve in the line closes the fractured end.

1.9 Hose break Safety System (One circuit for SPMT PowerHoss 170.8.2)

A hose break safety valve (one-circuit design) is placed next to each support cylinder of the bogies. It is installed between each axle support cylinder and main distribution line of the hydraulic system for lifting/lowering. In case of a defective line between valve and cylinder, the valve closes the line immediately. The vacant load is taken over by other functioning cylinders in the same support group.

These break safety valves react in case of pressure differences. The installation of these valves prevents the unilateral lowering of the vehicle and therefore dangerous load tilting.

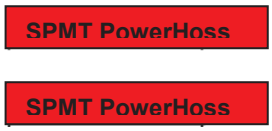
1.10 Service- and Parking Brake System

A hydraulic brake system is installed in the vehicle. The system acts on the relevant number of braked pendulum axles equipped with drum brakes. In case of pressure loss the vehicle is braked independently by the installed spring.

1.11 Open compound and mechanical Side-by-Side & End to End coupling

The compound operation of maximum four (4) single SPMT PowerHoss modules is provided. The sockets for adequate electrical cable connection lines (optional) are to be installed on the vehicle.

Sample of 4-unit open compound



Sample of 2-unit open compound

Sample of 2-unit open compound longitudinal

The side-by-side coupling blocks (optional) can be mounted to the two coupling interface surfaces on the vehicle sides.

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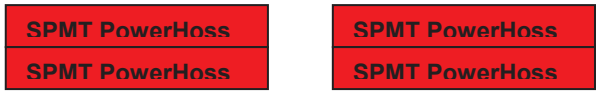
2-unit side-to-side coupling

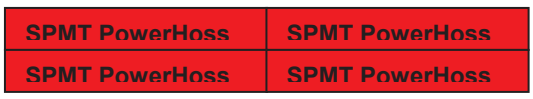


two 2-unit side-to-side coupling /open compound

The end-to-end bolt coupling set with mechanical connection parts and manual operated coupling bolt connects two SPMT PowerHoss units on the front resp. rear side.

2-unit end-to-end compound

Sample of two 2-unit end-to-end compounds
In open compound



Sample of 4-unit end-to-end and
and side-by-side compound

The operation of the compound is performed by the remote control only. The module, at which the remote control is plugged-in, automatically is the master unit. The rest of modules in the compound are slave units and have to be referenced to this master unit.

In a compound combination of up to four (4) single units a 3/4-point support system is possible.
For the 3-point support there are hydraulic connections on the sides of the vehicle at hand (please mind the operating manual)

1.12 Electric System

The electric system consists of a 24V DC power system, (two 12 V electric batteries), provided by an alternator attached to the diesel engine or a voltage convertor 400 V DC (HV battery voltage) 24 V DC, 100 A for electric drive. The electric installation of the vehicle is perfectly located for easy maintenance and repair.

The system includes (amongst others):

- Three (3) emergency stop buttons; two on vehicle sides and one nearby the raise/lower valve bloc
- One permanent acoustic warning signal for moving and one warning siren
- 400V AC 50 Hz connection for battery charger (only for electric PPU)
- Battery 400V with CAN connection and heating
- Battery charger integrated to the PPU
- Safety shut-down of the 400V DC batteries (in case of error for opening a 400 V DC device, and for emergency-stop
- Safety connector for safe disconnecting of the battery during maintenance and inspection
- Insulation monitors at the battery

1.13 Emergency Stop System

The vehicles are equipped with an emergency stop system according protection level d (PL d).

This kind of system offers a maximum emergency stop capability for the single vehicle as well as for the vehicle compound.

1.14 CAN-Bus System

Several electronic sensors, controlling and regulation components of the Scheuerle transporters are connected by a **C**ontroller **A**rea **N**etwork System.

The system offers following advantages:
- Very efficient and high rate of data exchange
- High reliability by recognition and automatic adjustment of faults
- Very helpful for central diagnostic
- Easy handling by small cable dimensions (very important for coupling operation)

1.15 Coating

- Surface preparation: Steel structure shot blasted SA 2,5 SIS (DIN 55928-4)
- First coat: 2-component zinc-rich primer, approx. 50 µm **D**ry **F**ilm **T**hickness
- Second coat: 2-component intermediate coat, approx. 50 µm DFT
- Top coat: 2-component coat, approx. 50 µm DFT
- Total coat thickness: approx. 150 µm DFT
- Upper side of vehicle color: RAL 3020 (red)
- Lower side of vehicle: RAL 7016 (grey)
- Rims: RAL 9006 (silver)

1.16 Operation Environment

The Scheuerle module transporters are designed to operate in a temperature range of –20°C up to +40°C (4°F up to +104°F) and a relative air humidity of up to 100%. The operation fluids in the vehicle have to be adapted accordingly.

1.17 Standard accessories / Documentation

- Operating manual including maintenance and troubleshooting instructions in duplicate in paper and in English or German language
- Spare parts documentation with drawings in English; in duplicate in paper and in English or German language

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2 Options / Features at additional costs:

2.1 Radio Remote Control

50002406	Radio / Cable Remote Control for SPMT PowerHoss

For optimized operating conditions and high transportation safety the SPMT PowerHoss module respective vehicle compound is equipped with a radio remote control unit. This gives the operator a very high operating flexibility. This control system can be used for single modules as well as for coupled units in compound.

This control system can be used for single vehicles and for coupled vehicles. For the operation of a single vehicle or vehicle compound, at least one remote control is necessary!

If the radio link fails to work or if the radio link is not allowed, there is the possibility for an additional cable connection as backup system. (Length of cable 10 m).

The following functions are activated by the remote control:

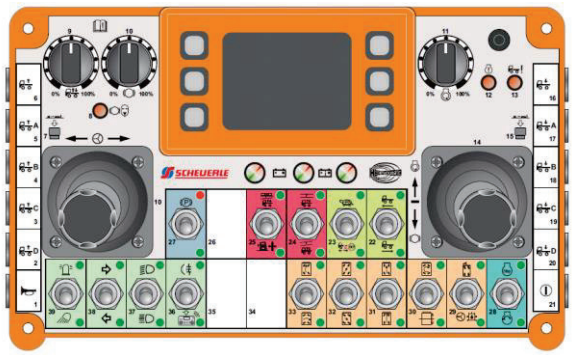
- Single engine and all engines in compound start/stop
- Drive direction; forward / backward
- Steering programmes
- Inching function for lift/lower, brake and drive system
- Lighting system
- Emergency stop (PL d)

The following functions are operated respectively programmed by the remote control:

- Steering
- Acceleration
- Brake / deceleration
- Lifting / lowering
- Programming of compound coordinates

The following functions are monitored by warning signals and error indication:

- Hydraulic oil and diesel fuel level
- Steering angle
- Supporting pressure indication
- Warning and error message



The graphic shows the top down view of a similar radio remote control

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2.2 One (1) set working lights 24V LED-type with magnetic holder; four (4) pieces;

49500303	Working light set with magnetic holder, 24V, LED

2.3 One (1) set working lights 24V LED-type fixed to the frame; four (4) pieces;

50003099	Working light set fixed mounted, 24V, LED

2.4 Winter package for SPMT PowerHoss

50003383	Winter package for SPMT PowerHoss Diesel operation

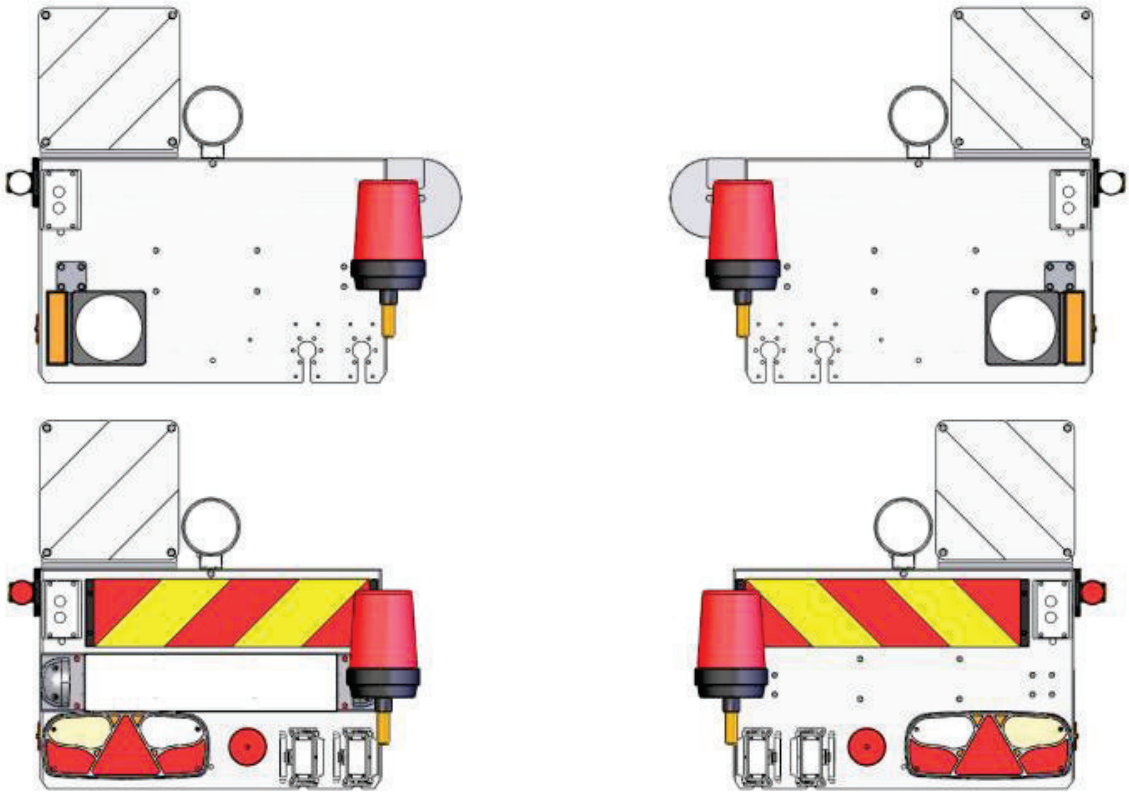
The winter package is helpful, when the SPMT PowerHoss is working in deep temperature areas. This package helps to increase the lifetime of the diesel engine and the hydraulic components
The arctic package consists of:

- Socket for external power supply …400 V / 50 Hz, 3 ph +N +PE, 16 A,

Alternative:
- Socket for external power supply …208 V / 60 Hz, 3 ph +N +PE, 16 A,
- Cooling water heating
- Hydraulic oil heating
- Diesel fuel filter heating
- Integrated battery charger
- Switch box heating

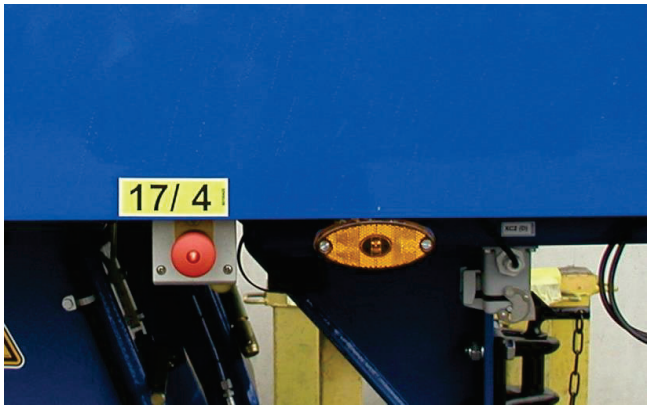
2.5 One (1) set Lighting system front & rear

50001291	Lighting device set front / rear



2.6 One (1) set side marking lights;

50002408	Side Marker Light set



2.7 Diagnostic System via remote maintenance

50002627	Diagnostic system via remote maintenance for SPMT PowerHoss

The Diagnostic system via remote maintenance supplies the following functions:

- Supervising operating data from the control room, indicate error messages
- Information concerning service intervals and disturbances by e-mail
- The SCHEUERLE service technician can set up to the vehicle control system

For the diagnostic system the customer has to provide a GSM card (with data plan).

2.8 Electronic Levelling and Equal Lift System

50002628	Electronic Levelling and Equal Lift System for SPMT PowerHoss as single vehicle and for compound operation

The software program “equal lift system” equally lifts/lowers the bogie corner knees during standstill. Cylinder stroke at the four bogie corner knees remain nearly equally.

“Parallel lift system” is used during standstill when the vehicle is inclined, the platform has to be levelled manually and a parallel lifting/levelling of the platform is required.

After activation of the software “parallel lift system”, the platform equally lifts/lowers at the bogie corner knees.

The system consists of:

- Four (4) precision potentiometers – at the bogies of the first and last axle lines
- Equal- and parallel levelling electronics
- Activation of the electronic equal and parallel levelling software

2.9 Electronic Levelling System

50002625	Electronic leveling system for SPMT PowerHoss (Condition is the option electronic levelling and equal lift system # 50002628)

The electronic levelling system permits a horizontal lifting of the platform during standstill.
The electronic leveling system is only available for single vehicles; it cannot be activated for compound operation.

The electronic leveling system consists of:

- Leveling sensor (XY direction)
- Levelling electronics
- Activation of the electronic leveling software

2.10 Particulate filter system (only for diesel operated PPU)

50002409	Auto regenerating particulate filter system HUSS MK75, integrated in the engine aggregate

2.11 Installation for external pressure supply SPMT PowerHoss (only for one SPMT PowerHoss.)

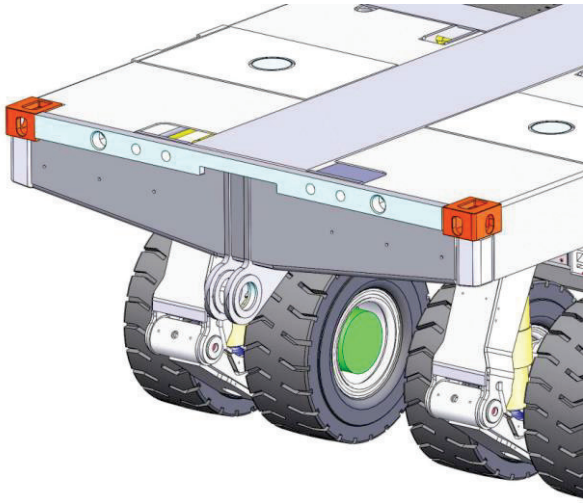
50003252	Installation for external pressure supply SPMT PowerHoss

In case of engine breakdown the pressure supply can be taken over by another SPMT PowerHoss.
This other SPMT PowerHoss also needs the installation for external pressure supply!
Both SPMT PowerHoss need this option!
Functions: Driving, Braking, Steering, Lifting / Lowering

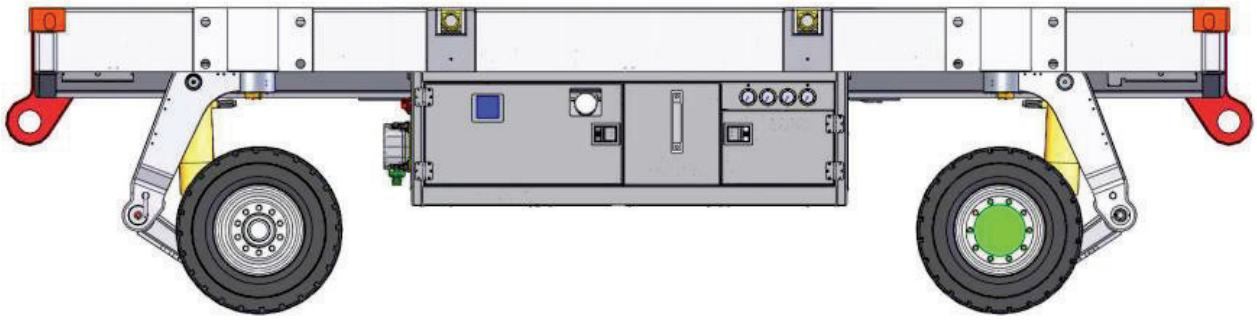
2.12 SPMT PowerHoss End-to-End Bolt Coupling Set

50003069	End to End Bolt Coupling Set

For option bolt coupling, at both vehicle ends a lamellar bolt coupling has to be welded.
The coupling set consists of mechanical connection parts, coupling tools and one manually operated coupling bolt.
The admissible bending moment is 895 kNm.



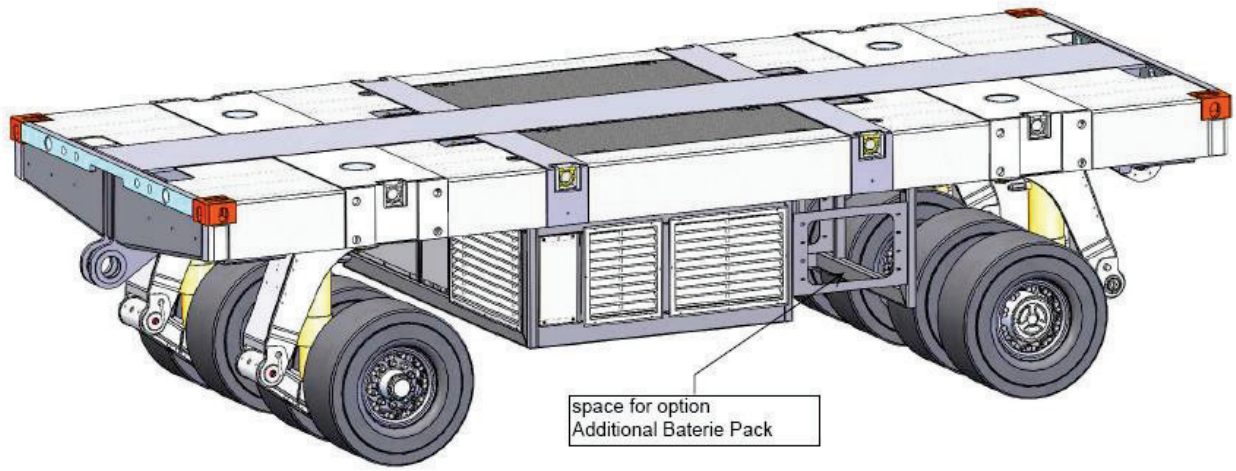
Please note that the lamellar bolt coupling increases the dead weight of the vehicle approx. 400 kg, so the payload capacity has to be deducted accordingly!



2.13 Additional battery pack for SPMT PowerHoss E-propulsion

64242137	Additional battery pack 400V DC, 40,6 kWh, unit weight 430kg

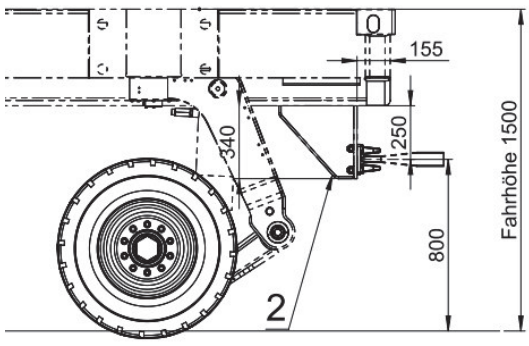
The charging times will be doubled when an additional battery back is used!
900 x 655 x 630 mm (length x width x height)

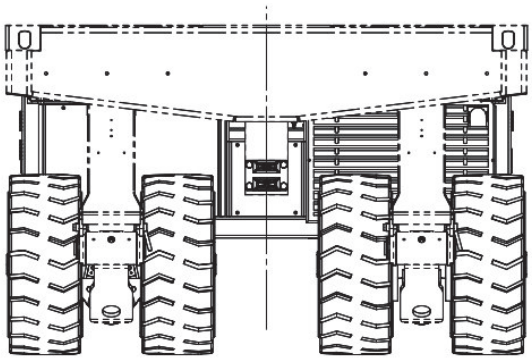


2.14 SPMT PowerHoss Tow coupling

50003382	Tow coupling - max. admissible speed for shunting operation 3 km/h - max. admissible tensile load < 10 t at 1,5 % inclination Shunting coupling can only be positioned, when the bolt coupling set was not chosen

SPMT PowerHoss tow coupling is only suitable for shunting operation up to max. 3km/h.
Trailers can be towed up to a trailer weight of 10.000 kg at a max. inclination of approx.1.5%.





max. zulässige Geschwindigkeit im Rangierbetrieb: 3km/h
max. zulässige Anhängelast voll/leer: <10to bei max. Steigung von ± 1,5%
bei Anhängelast >10to bis max. 30to muss zusätzlich die gleiche Masse des Anhängergesamtgewichts
als Zusatzballast mittig auf das leere Fahrzeug aufgelegt werden, max. Steigung von ± 1,5%

Max. admissible speed at shunting operation: 3 km/h
Max. admissible towed load full/empty <10 to at max gradient of +- 1.5 %
At towed load >10 to up to max 30 to. additionally the same mass of the trailer total weight has to be put as ballast in the middle of the empty vehicle, max. gradient +- 1.5 %

2.15 SPMT PowerHoss Side-by-Side Coupling Set

64211944	2 axle lines SPMT PowerHoss, side by side coupling set (2 x coupling block),
64216011	4 axle lines SPMT PowerHoss, side by side coupling set (4 x coupling block)
49500228	Coupling element side by side 470mm, RAL 7016 grey for electric operation (for 2 / 4 axle lines 2 / 4 coupling elements are necessary)

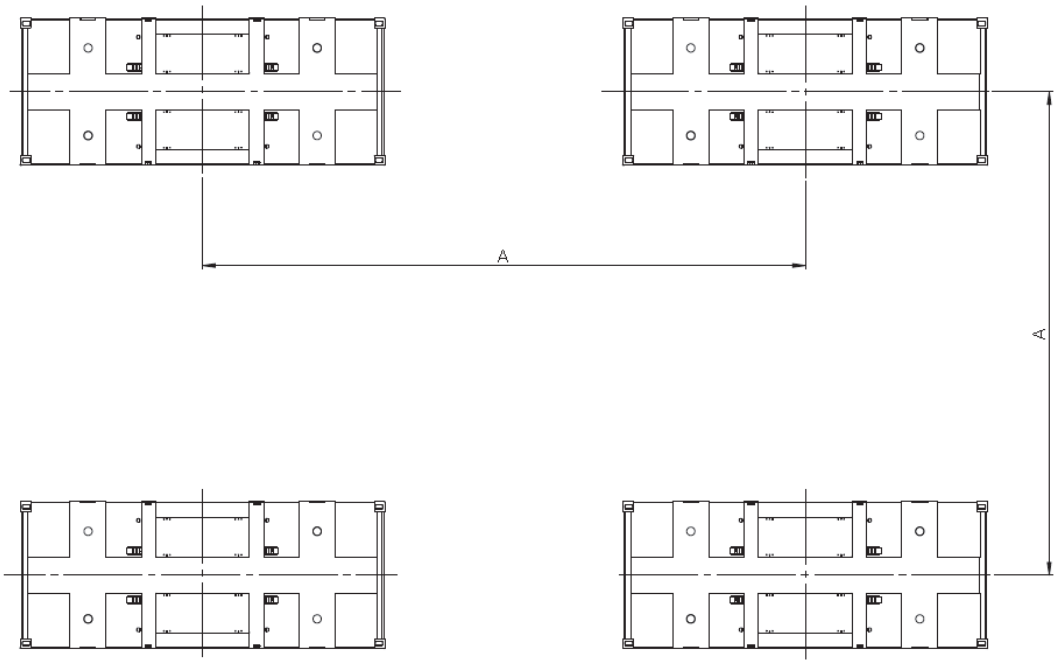
For side-by-side coupling it is indispensable that the SPMT PowerHoss is placed in a way that the terminal boxes are easily operated and accessible. The exhaust of the SPMT PowerHoss has to be routed by means of the exhaust pipes provided.

The SPMT PowerHoss Side by Side coupling Set consists of:

- 470 mm side coupling blocks (2/4 axle lines, scope of supply 2/4 coupling blocks)
- 2 x exhaust pipe prolongation (the exhaust will be routed on the other vehicle side)

2.16 SPMT PowerHoss Connection components electrics / hydraulic

64242079	Hydraulic connection for 3-point support A = 2,9 m (see operating instructions)
64242080	Hydraulic connection for 3-point support A = 5 m (see operating instructions)
64242081	Hydraulic connection for 3-point support A = 10 m (see operating instructions)
64242082	Hydraulic connection for 3-point support A = 20 m (see operating instructions)
64242076	Data cable A = 5 m
64242077	Data cable A = 10 m
64242078	Data cable A = 20 m
64212493	Data cable A = 30 m



2.17 SPMT PowerHoss Tools

64216012	Complete set of tools for SPMT PowerHoss

The set of tools for SPMT PowerHoss includes:

- Toolbox 71 parts
- diverse additional tools
- Axle tools Sauer
- Electrics vehicle tool kit

**We reserve the right for technical modification (without prior notice)
in order to keep up with technical progress!**

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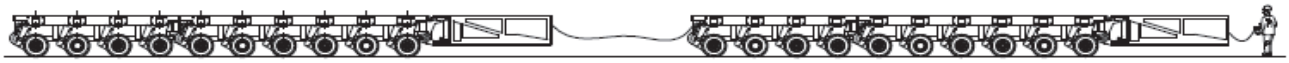
50000393-2

General description
Electric connection set SPMT, IC SPE

The electric connection set consists of three separate set of cables, the power supply cable, the data line cable of the lighting cable.



The connection sets have the following plug in connections:

- Power supply with 2- terminal plug in connection.
- Data line with 17- terminal plug in connection.
- Lighting with 16- terminal plug in connection.

SPMT IC SPE	K 25 SPE		Power supply			Data line (Global / Local Data)			Lighting			Adapter power supply	Adapter data line	Adapter Lighting
			8m	13m	23m	8m	13m	23m	8m	13m	23m			
64212544	**64212789**	Electric connection set vehicle distance "A" approx. 5m	1			1			1					
49500203	**64212790**	Electric connection set vehicle distance "A" approx. 10m		1			1			1				
49500503	**64212791**	Electric connection set vehicle distance "A" approx. 20m			1			1			1			
64212548	**64212792**	Electric connection set vehicle distance "A" approx. 30m		1	1		1	1		1	1	1	1	1
49500205	**64212793**	Electric connection set vehicle distance "A" approx. 40m			2			2			2	1	1	1
49500204	**64212794**	Electric connection set vehicle distance "A" approx. 50m		1	2		1	2		1	2	2	2	2
64212550	**64212795**	Electric connection set vehicle distance "A" approx. 60m			3			3			3	2	2	2
64212551	**64212796**	Electric connection set vehicle distance "A" approx. 80m			4			4			4	3	3	3
64212552	**64212797**	Electric connection set vehicle distance "A" approx. 100m		1	4		1	4		1	4	4	4	4

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