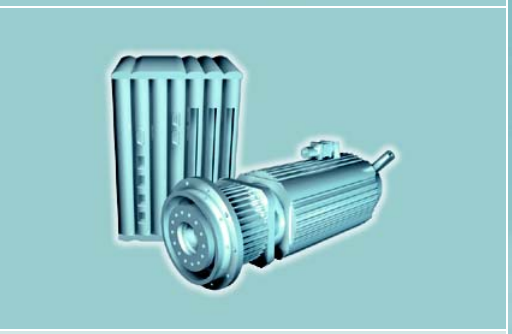
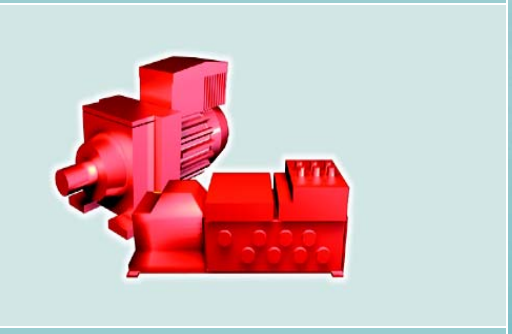
SEW EURODRIVE





Contactless Energy Transfer MOVITRANS®

Edition 06/2007

11626216 / EN

System Description

SEW EURODRIVE

Contents

1 Introduction

1.1 What is MOVITRANS®?

MOVITRANS® is a system consisting of stationary and mobile components that contactlessly supplies energy to mobile electrical consumers.

The required energy is transferred inductively (without contact) from an insulated stationary conductor to the mobile consumers (vehicles) via an air gap.

1.2 System benefits

Major advantages of the MOVITRANS® contactless technology compared to the traditional method of energy transfer:

- **Wear-free energy transfer**
  - Components are not subject to wear and do not require maintenance
- **Isolated cables**
  - Cables are not impaired by contamination, moisture or temperature.
- **High mechanical tolerances**
  - More flexible design with curves and points.
  - High speeds due to contactless energy supply.
  - Simple track segmentation

1.3 Areas of application

1.3.1 Requirements

Contactless supply systems are preferably used instead of the traditional methods of energy transfer

- when the mobile equipment has to cover long distances,
- when a variable, extendable track layout is required
- when energy has to be transmitted at high speeds
- when the energy transfer has to be maintenance-free
- when the operation takes place in wet and humid areas
- when additional environmental contaminants are not permitted in sensitive areas

1.3.2 Areas of application today

The MOVITRANS® system is preferably used in materials handling technology in following sectors:

- Automotive industry
- Transportation and storage logistics
- Sorting technology

1.3.3 Typical applications

The MOVITRANS® system is preferably used in following applications:

- Conveyor trolleys
- Push-skid conveyor systems
- Guided floor conveyor systems
- Automated guided vehicle systems
- Storage and retrieval units
- Overhead trolley systems
- Pallet transportation systems
- Baggage handling systems
- Panel gantries
- Elevator technology (construction elevators, electrical supply for elevators)
- Rides in amusement parks
- Battery charging stations

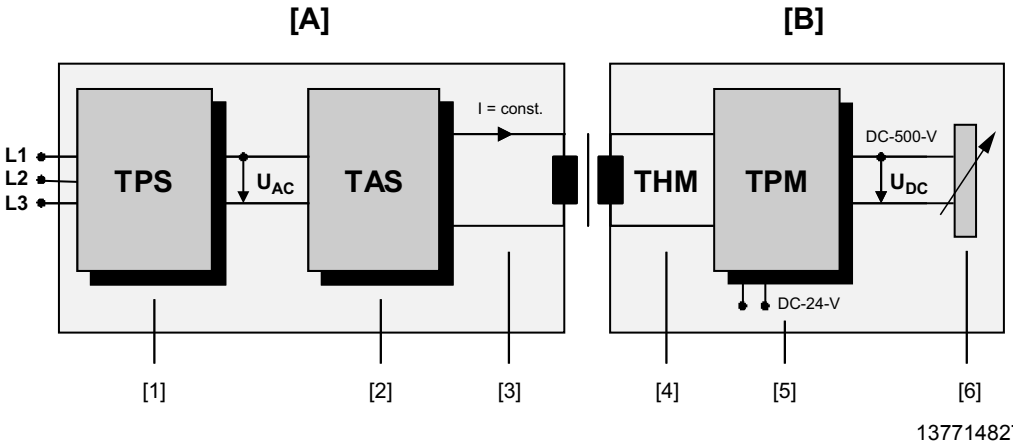
1.4 Theory of operation

1.4.1 Energy transfer

Electrical energy is transferred without contact from a fixed conductor to one or more mobile consumers. The principle of inductive energy transfer is used in the process. The electromagnetic connection is made via an air gap and is not subject to wear, making it maintenance-free.

1.4.2 System overview

The MOVITRANS® system is divided into **stationary** and **mobile** components:



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[A] Stationary components
[B] Mobile components

[1] MOVITRANS® TPS stationary converter
[2] MOVITRANS® TAS transformer module
[3] MOVITRANS® TCS, TIS, TLS, TVS installation equipment (transmission line)
[4] MOVITRANS® THM pick-up
[5] MOVITRANS® TPM mobile converter
[6] Mobile consumer

1.4.3 Stationary Components [A]

- **MOVITRANS® TPS stationary converter [1]**

  The TPS converter, which is based on the MOVIDRIVE® series, converts the incoming low frequency alternating voltage (50/60 Hz) from the three-phase system into an alternating voltage with a constant frequency of 25 kHz.

- **MOVITRANS® TAS transformer module [2]**

  The TAS transformer module converts the output voltage from the TPS stationary converter into a constant sinusoidal alternating current. The output current is isolated from the AC power supply via a matching transformer. An adjustment of the transmission line takes place via compensation components.

- **MOVITRANS® TLS, TIS, TCS, TVS installation equipment [3] (transmission line)**

  The TLS supply cable is used in 60-A systems between transformer module and transmission line as well as for the interconnection of several transmission lines.

  The line TLS conductor conducts the impressed alternating current from the TAS transformer module. It forms a conductor loop with supply and return cable.

  The line cable is supported by the TIS profile system when U-shaped pick-ups are used for energy transfer. When flat THM pick-ups are used, the line cables are cast in the floor, installed on the floor with TIS installation plates, or installed in the floor with the TIS rubber profile (in preparation).

  The TCS compensation box is used for compensating the inductive reactance of the TLS line cable. Each TCS compensation box compensates a particular track section.

  The TVS connection distributor can be used to connect individual track parts and to connect the TLS supply cable to the track.

1.4.4 Mobile Components [B]

- **MOVITRANS® THM pick-up [4]**

  The THM pick-ups transfer the energy contactlessly from the line cable to the TPM mobile converter. Different mechanical designs and electrical performance ratings are available for the different transmission concepts. The TPM mobile converters must match the THM pick-ups.

  The power that can be transmitted per THM pick-up depends on the size of the TLS line cable current and the electromagnetic connection between the TLS line cable and the THM pick-up.

- **MOVITRANS® TPM mobile converter [5]**

  The TPM mobile converter converts the current impressed from the pick-up into DC voltage. The system is optimized for use of inverters from SEW-EURODRIVE such as MOVIDRIVE, MOVITRAC 07 and MOVIMOT.

2 Technical Description of the MOVITRANS® Components

2.1 MOVITRANS® TPS stationary converter

2.1.1 Sizes

The Figure shows the TPS10A stationary converter in the available sizes 2 (4 kW) and 4 (16 kW):

462047499

2.1.2 Description

The TPS10A stationary converter is available in **two sizes with 4 kW or 16 kW** rated output power.

The TPS10A stationary converter has following technical characteristics:

- The compact unit design requires only a minimum of control cabinet space and makes optimum use of the existing control cabinet size.
- Wide input voltage range: 3 x AC 380 ... 500 V ± 10 %
- Line filters are required for compliance with limit class A according to EN 55011.
- The stationary converter has one analog input, 5 isolated binary inputs and 2 binary outputs for control.
- Operating statuses, setpoint modes and error messages are indicated by three LEDs.
- The units have removable electronics terminals (removable connection unit).
- Fault diagnostics is possible using the MOVITOOLS® MotionStudio software.
- The units are equipped with a measuring device to determine the compensation value.

2.2 MOVITRANS® TAS transformer module

2.2.1 Sizes

The following figure shows the TPS10A transformer module in the available sizes 2 (4 kW) and 4 (16 kW):

462024843

2.2.2 Description

The TAS10A transformer module is available in **two sizes with 4 kW or 16 kW** rated output power. The units form an ideal combination with the matching TPS10A stationary converter.

The TAS10A transformer module is supplied as a complete unit and comprises the following components:

- Voltage / current converter (gyrator)
- Matching transformer
- Compensation components

The TAS10A transformer module has following technical characteristics:

- A conductor loop can be connected to each of the TAS10A transformer modules with 4 kW and 16 kW rated output power.
- Both units are available in a design with 60 A or 85 A line cable current.

2.3 MOVITRANS® TLS line cable

2.3.1 Version

The following figure shows the TLS10E line cable:

441285131

2.3.2 Description

The TLS10E lines cables are laid along the transmission line.

The TLS10E line cable has the following technical characteristics:

- All line cable types are designed as fine, medium-frequency litz wires and are used for energy transfer.

  The core of the cable is made up of several thin wires isolated against one another by a coating. They are protected against contact with a double cable jacket.
- The supply and return cables must be routed in parallel as a current loop.
- The line cables are available with cross sections of 8 mm^2, 16 mm^2, 25 mm^2 and 41 mm^2.

  Large cross sections are suitable for long distances. The transmission efficiency is lower for cables with small cross sections.
- Fore a line cable current of 60 A, SEW-EURODRIVE recommends cross sections of 16 mm^2 and 25 mm^2 and for a line cable current of 85 A cross sections of 25 mm^2 and 41 mm^2.

2.4 MOVITRANS® TLS supply cable

2.4.1 Version

The following figure shows the TLS10E supply cable:

138634123

2.4.2 Description

The TLS10E power supply cable connects the supply cabinet to the energy transmission line.

The TLS10E supply cable has the following technical characteristics:

- This cable type is designed as six-core fine litz wires.
- Two installation types are available: Fixed installation, for example in the cable duct, or flexible installation in a cable carrier.
- The cable cross section is 2 × 3 × 6 mm^2.
- At present, a version for 60 A line cable current is available.

2.5 MOVITRANS® TIS installation plate

2.5.1 Version

The following figure shows the TIS10A installation plate with inserted TLS line cable:

441307915

2.5.2 Description

The TIS10A installation plates are mounted to the floor along the transmission line. The TLS line cable is inserted into the TIS installation plate.

The TIS10A installation plate has the following technical characteristics:

- The installation plate is suitable for TLS line cables with a cross section of 25 mm^2 and for line cable currents of 60 A and 85 A.
- The installation plate is suitable for the use with the flat THM10E pick-ups.
- Straight tracks can be implemented.
- The installation plates are very easy to mount.
- The installation plates can be crossed by forklifts.

2.6 MOVITRANS® TIS profile section system

2.6.1 Version

The following figure shows the TIS10A profile section system:

142784267

2.6.2 Description

The TIS10A profile section system is a fixture for the TLS10E line cable and is mounted along the transmission line.

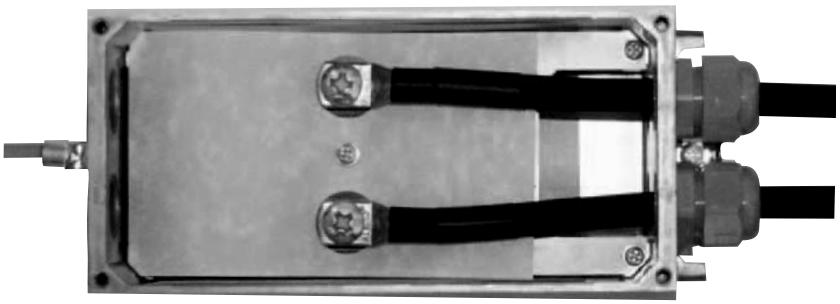
The TIS10A profile section system has the following technical characteristics:

- The profile section system is suitable for MOVITRANS® systems with 60 A line cable current for use with U-shaped pick-ups.
- 2 x 8 mm^2 line cables have to be installed for both, supply and return lines.
- Straight tracks and curves can be implemented.
- Holding fixtures for OTS profiles by AFT, Cinetic and Dürr are available.
- Universal holding fixtures for the installation on machines are available.
- Cable bushings are available at track ends.

2.7 MOVITRANS® TCS compensation box

2.7.1 Version

The following figure shows the connected TCS10A compensation box:



138651531

2.7.2 Description

The TCS10A stationary connection components (compensation box) is used to compensate the track inductance.

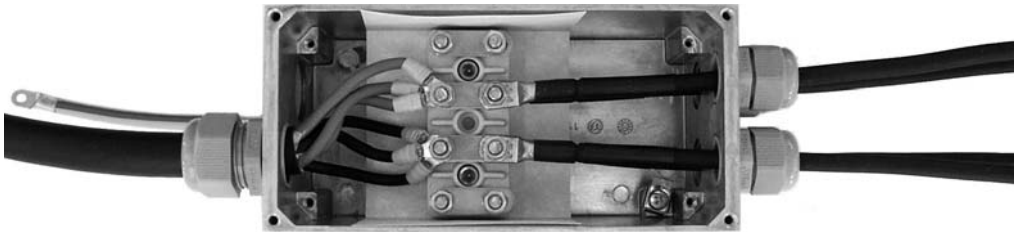
The TCS10A compensation box has the following technical characteristics:

- The housing has compact dimensions.
- Optimally dimensioned compensation capacitors are integrated.
- There are versions available for 60 A and/or 85 A line cable current.
- Different assembly options are available.

2.8 MOVITRANS® TVS connection distributor

2.8.1 Version

The following figure shows the connected TVS10A connection distributor for a 60 A line cable current:



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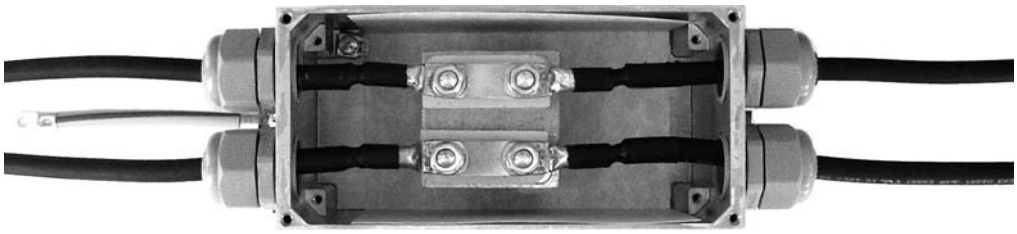
The following figure shows the connected TVS10A connection distributor for a 85 A line cable current:



441168267

2.8.2 Description

The TVS10A stationary connection components (wiring boxes) are used to connect the medium-frequency cable to the track.

The TVS10A connection distributor has the following technical characteristics:

- The housing has compact dimensions.
- Delivered with terminal board and jumpers.
- There are versions available for 60 A and 85 A line cable current.
- Different assembly options are available.

2.9 MOVITRANS® THM pick-ups

2.9.1 THM10C pick-up

Version

The following figure shows the U-shaped THM10C pick-up:

138656779

Description

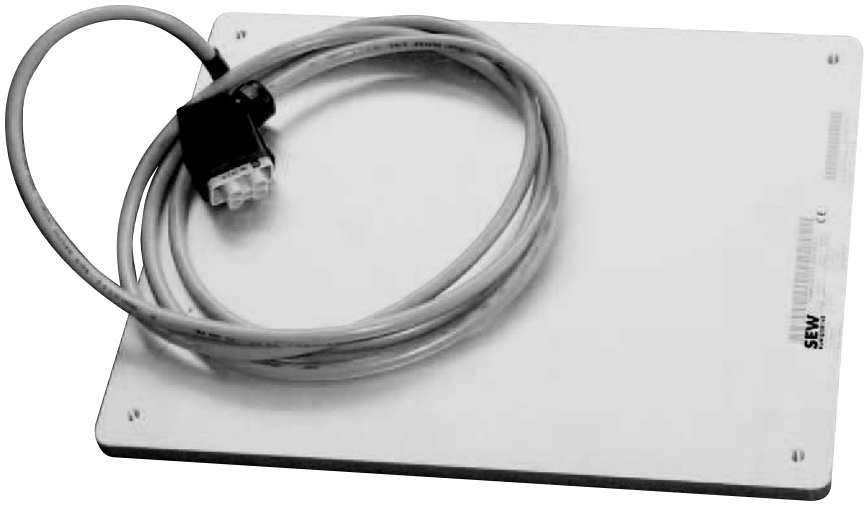
The U-shaped THM10C pick-up has following technical characteristics:

- The connection cable (max. length 6 m) with HAN Q4/2M connector is installed.
- The pick-up can be mounted using the 4 M6 threaded holes.
- The rated output power is 800 W.

2.9.2 THM10E pick-up

Version

The following figure shows the flat THM10E pick-up:



138658315

Description

The flat pick-ups in the THM10E series are passive components that are available in two designs:

- With UL approval
- Without UL approval

The flat THM10E pick-up has the following technical characteristics:

- The connection cable (max. length 6 m) with HAN® Q4/2M connector is installed.
- The pick-up can be mounted using the 4 M8 threaded holes.
- The rated output power is 1500 W (for a 85 A line cable current) or 950 W (for a 60 A line cable current).

2.10 MOVITRANS® TPM mobile converter

2.10.1 Version

The following figure shows the TPM12B mobile converter with four connections:

138718859

2.10.2 Description

The TPM12B mobile converter converts the energy taken from the pick-ups into DC 500 V and DC 24 V.

Following connection variants are possible at the input:

- 1 or two flat THM pick-ups
- 1 or 2 U-shaped THM pick-ups
- 2 or 4 U-shaped THM pick-ups

The output power differs depending on the variant.

The TPM10B mobile converter has the following technical characteristics:

- A direct voltage output of 500 Vis used to supply power to the load.
- Class limit A to EN 55011 is met as standard.
- Two isolated binary inputs and one binary output are available to control the mobile converter.
- LEDs are used to indicate operating states and fault conditions.
- A DC 24 V auxiliary voltage output with a maximum current carrying capacity of 2 A is used to supply the control and communication components.

The DC 24 V auxiliary voltage is **not** suitable to supply a DC 24 V motor brake. If a motor brake is to be controlled, you require an additional DC 500 V/DC 24 V converter or a MOVIMOT to connect an electric motor connection.

3 Overview and Functions of the MOVITRANS® Components

3.1 Stationary components

The following table gives an overview of the MOVITRANS® stationary components:

Unit type	Unit designation	Power	Description of functions
Stationary converter	**TPS10A040-NF0-503-1**	4 kW	Built-in unit, IP20, 4 kW cdf 100%, integrated fan, connection 380 - 500 V AC +/-10%
	TPS10A160-NF0-503-1	16 kW	Built-in unit, IP20, 16 kW cdf 100%, integrated fan, connection 380 - 500 V AC +/-10%
Transformer module	**TAS10A040-N06-4x1-1**	4 kW	Built-in unit, IP20, 4 kW cdf 100%, output 60 A/25 kHz, incl. gyrator, transformer, without compensation capacitors
	TAS10A040-N08-4x1-1	4 kW	Built-in unit, IP20, 4 kW cdf 100%, output 85 A/25 kHz, incl. gyrator, transformer, without compensation capacitors
	TAS10A160-N06-4x1-1	16 kW	Built-in unit, IP20, 16 kW cdf 100%, output 60 A/25 kHz, incl. gyrator, transformer, without compensation capacitors
	TAS10A160-N08-4x1-1	16 kW	Built-in unit, IP20, 16 kW cdf 100%, output 85 A/25 kHz, incl. gyrator, transformer, without compensation capacitors
Line filter	**NF014-503**	4 kW	Built-in unit, IP20, 14 A, used for TPS10A040
	NF035-503	16 kW	Built-in unit, IP20, 35 A, used for TPS10A160

Unit type	Unit designation	Line cable current	Description of functions
Compensation capacitor, (for TAS10A transformer module)	**TCS10A-008-XXX-0**	60 A or 85 A	Complete set of compensation capacitors for TAS10A, for adjustment of all possible track lengths up to first compensation box, complete set consists of: 1 item TCS10A -008-020-0, 1 item TCS10A -008-040-0, 1 item TCS10A -008-080-0, 1 item TCS10A -008-160-0, 1 item TCS10A -008-320-0
	TCS10A -008-020-0	60 A or 85 A	Compensation capacitor, capacity 2 µF, with setscrew for installation in TAS10A, reactance at 25 kHz = 3.2 ohm
	TCS10A -008-040-0	60 A or 85 A	Compensation capacitor, capacity 4 µF, with setscrew for installation in TAS10A, reactance at 25 kHz = 1.6 ohm
	TCS10A -008-080-0	60 A or 85 A	Compensation capacitor, capacity 8 µF, with setscrew for installation in TAS10A, reactance at 25 kHz = 0.8 ohm
	TCS10A -008-160-0	60 A or 85 A	Compensation capacitor, capacity 16 µF, with setscrew for installation in TAS10A, reactance at 25 kHz = 0.4 ohm
	TCS10A -008-320-0	60 A or 85 A	Compensation capacitor, capacity 32 µF, with setscrew for installation in TAS10A, reactance at 25 kHz = 0.2 ohm

3.2 Mobile components

The following table shows the mobile MOVITRANS® components for the use with flat pick-ups:

Unit type	Unit designation	Power	Description of functions
flat Pick-up	**THM10E015-009-000-1**	1.5 kW (at 85 A) 0.9 kW (at 60 A)	Flat pick-up without UL approval (standard), IP65, 1.5 kW/cdf 100 %, T (periphery) 40 °C, up to 6 m cable (Ölflex-Classic) and Han®Q4/2 plug connector (please specify when placing your order)
	THM10E015-009-000-2	1.5 kW (at 85 A) 0.9 kW (at 60 A)	Flat pick-up with UL approval, IP65, 1.5 kW/cdf 100 %, T (periphery) 40 °C, up to 6 m cable (Ölflex-Classic) and Han®Q4/2 plug connector (please specify when placing your order)
Mobile converter	**TPM12B030-ENE-5A2-2**	to 3 kW	Connection of 1 or 2 THM10E flat pick-ups, IP65, 3 kW/ED 100 %, output DC 500 V + DC 24 V up to 2 A
Mobile converter connection cable	**-**	-	Hybrid cable with T1 plug connector, for the connection to the TPM12B mobile converter output, cable open at one end with wire end sleeves, (specify cable length in m when placing an order)

The following table shows the mobile MOVITRANS® components for the use with U-shaped pick-ups:

Unit type	Unit designation	Power	Description of functions
U-shaped pick-up	**THM10C008-022-076-1**	800 W (at 60 A) (900 W peak power)	U-shaped pick-up with UL approval, IP65, 800 W/cdf 100%, 900 W peak power, line cable current 60 A T (periphery) 50 °C, up to 6 m cable (Ölflex-Classic) and Han®Q4/2 plug connector (please specify when placing your order)
Mobile converter	**TPM12B018-ENC-5A2-2**	to 1.8 kW	Connection of 1 or 2 THM10C U-shaped, IP65, 1.8 kW/cdf 100 %, output DC 500 V + DC 24 V up to 2 A
	TPM12B036-ENC-5A2-2	to 3.6 kW	Connection of 2 or 4 THM10C U-shaped, IP65, 3.6 kW/cdf 100 %, output DC 500 V + DC 24 V up to 2 A
Mobile converter connection cable	**-**	-	Hybrid cable with T1 plug connector, to connect to TPM12B output, cable open at one end with wire end sleeves, (specify cable length in m when placing an order)

3.3 Installation equipment

The following table gives an overview of the MOVITRANS® installation equipment for floor routing:

Unit type	Unit designation	Line cable current	Description of functions
Line cable	**TLS10E-016-01-1**	60 A	Conductor loop for flat pick-ups, MF litz wires, floor routing, cable cross section 16 mm^2 Outer diameter 10.9 mm, reduced transmission power
	TLS10E-025-01-1	85 A	Conductor loop for flat pick-ups, MF litz wires, floor routing, cable cross section 25 mm^2 outer diameter 12.5 mm,
	TLS10E-025-01-2	85 A	Conductor loop for flat pick-ups, MF litz wires, floor routing, cable cross section 25 mm^2 outer diameter 12.5 mm, comes pre-fabricated on one end and with 1 cable lug
	TLS10E-041-01-1	85 A	Conductor loop for flat pick-ups, MF litz wires, floor routing for longer track distances, cable cross section 41 mm^2 outer diameter 15 mm,
	TLS10E-041-01-2	85 A	Conductor loop for flat pick-ups, MF litz wires, floor routing for longer track distances, cable cross section 41 mm^2 outer diameter 15 mm, comes pre-fabricated on one end and with 1 cable lug
Supply cable	**TLS10E-006-06-1**	60 A	Power supply cable from supply cabinet to energy transmission line, fine litz wires, routing in cable duct, cable cross section 2 × 3 × 6 mm^2, outer diameter 20.5 mm,
Connection distributor	**TVS10A-E08-000-1**	60 A	Stationary connection components (wiring box), to connect MF cables, flange plate 2 x M32 / 4 x M25
	TVS10A-E08-000-1	60 A and 85 A	Stationary connection components (wiring box), to connect MF cables, flange plate 2 x M32 / 4 x M25
	TVS10A-E08-000-2	60 A and 80 A	Stationary connection components (wiring box), to connect MF cables, flange plate 2 x M32 / 2 x M32

Unit type	Unit designation	Line cable current	Description of functions
Compensation box	TCS10A-E06-090-1	60 A	Stationary connection components, to connect MF cables, capacitive reactance at 25 kHz = 7.1 ohm flange plate 4 x M25 / 4 x M25
	TCS10A -E08-120-1	60 A or 85 A	Stationary connection components, to connect MF cables, capacitive reactance at 25 kHz = 5.3 ohm flange plate 4 x M25 / 4 x M25
	TCS10A -E08-120-2	60 A or 85 A	Stationary connection components, to connect MF cables, capacitive reactance at 25 kHz = 5.3 ohm flange plate 2 x M32 / 2 x M32
Installation plate	TIS10A025-V00-0	–	installation plate with cover and 6 rubber studs, for flat pick-ups, cable cross section 25 mm^2

The following table gives an overview of the MOVITRANS® installation equipment for the installation of the profile section system:

Unit type	Unit designation	Line cable current	Description of functions
Line cable	TLS10E-008-01-1	30 A (60 A for double installation)	Conductor loop for U-shaped pick-ups, MF litz wires, installation in TIS10A-008 profile sections, cable cross section 8 mm^2 outer diameter 8.6 mm, reduced transmission power
Supply cable	TLS10E-006-06-1	60 A	Power supply cable from supply cabinet to energy transmission line, fine litz wires, routing in cable duct, cable cross section 2 × 3 × 6 mm^2, outer diameter 20.5 mm,
Compensation box	TCS10A-E06-090-1	60 A	Stationary connection components, to connect MF cables, capacitive reactance at 25 kHz = 7.1 ohm flange plate 4 x M25 / 4 x M25
Connection distributor	TVS10A-E08-000-1	60 A	Stationary connection components (wiring box), to connect MF cables, flange plate 2 x M32 / 4 x M25

Unit type	Unit designation	Packaging unit	Description of functions
Fixture	TIS10A008-H00-0	1 item	Holding fixture with 2 rotary supports, matching AFT profile 180 conductor loop for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
	TIS10A008-H01-0	1 item	Holding fixture with 2 rotary supports, matching Cinetic profile 180 for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
	TIS10A008-H02-0	1 item	Holding fixture with 2 rotary supports, matching Dürr profile 180 for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2

Unit type	Unit designation	Packaging unit	Description of functions
Profile section	**TIS10A008-P33-0**	1 item, 3 m	Fixed profile section, installation dimension 33 mm, 3 m long for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
	TIS10A008-P74-0	1 item, 3 m	Fixed profile section, installation dimension 74 mm, 3 m long for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
	TIS10A008-F33-0	1 item, 2.2 m	Flexible profile section, installation dimension 33 mm, 2.2 m long for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
	TIS10A008-F74-0	1 item, 2.2 m	Flexible profile section, installation dimension 74 mm, 2.2 m long for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
Cable opening:	**TIS10A008-A00-0**	1 item	Cable bushing grommet, for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
	TIS10A008-A74-0	1 item	Cable entry frame for U-shaped pick-ups, MF litz wire, laid in plastic profile, cable cross section 8 mm^2
Retaining plate	**TIS10A-008-X00-0**	1 item	retaining plate with 2 M6x25 socket head screws, matching AFT profile 180 for mounting the TVS connection distributor and the TCS compensation box
	TIS10A008-X01-0	1 item	retaining plate with 2 M6x25 socket head screws, matching Cinetic profile 180 for mounting the TVS connection distributor and the TCS compensation box
	TIS10A008-X02-0	1 item	retaining plate with 2 M6x25 socket head screws, matching Dürr profile 180 for mounting the TVS connection distributor and the TCS compensation box
Universal retaining plate	**TIS10A008-XH2-0**	1 item	Universal retaining plate for mounting the TIS10A008-H02-0 holding fixture

4 Regulations, Certifications and Standards

4.1 CE marking

MOVITRANS® components comply with the regulations of the low voltage directive 2006/95/EC.

The CE mark on the nameplate indicates conformity with the Low Voltage Directive 2006/95/EC and the EMC Directive 89/336/EEC.

We can provide a declaration of conformity on request.

4.2 UL certification

UL and cUL certification has been granted for all MOVITRANS® components. cUL is equivalent to CSA certification.

4.3 Electromagnetic compatibility (EMC)

4.3.1 Introduction

The MOVITRANS® system allows for contactless energy transfer to mobile consumers.

With respect to electromagnetic compatibility, SEW-EURODRIVE applies the EMC product standard EN 61800-3 for the MOVITRANS® system. This standard specifies the requirements for interference immunity and interference emission for electrical drive technology units. A large number of tests ensures that the MOVITRANS® components meet these requirements.

During installation, make sure that the regulations and recommendations for EMC-compliant installation described in this documentation are observed in order to ensure smooth operation of the system.

This section details the level of electromagnetic compatibility (EMC) for MOVITRANS® systems in control cabinet installation.

4.3.2 TPS stationary converter and TAS transformer module

The MOVITRANS® TPS stationary converter and TAS transformer module are power electronics components that operate with switching frequencies that are also common in the switched-mode power supply and inverter technology.

The magnetic fields that occur on the TAS transformer module are sufficiently shielded by the control cabinet.

Limit value class A in accordance with EN 55011 is achieved by using an upstream line filter.

4.4 Electromagnetic fields (EMF)

4.4.1 Introduction

SEW-EURODRIVE had measurements taken for systems with MOVITRANS® components for contactless energy transmission. The goal of the measurements was to check that the systems comply with the permitted values.

Topologies with THM10E flat pick-up and THM10C U-shaped pick-up had been checked.

4.4.2 Flat THM10E pick-up

Standards and guidelines

The standards and directives in force are:

- BGV B11 06/2001 (VBG 25)
- DIN VDE 0848 part 1 08/2000
- ICNIRP 1998
- IEEE Std. C95.1, Edition 1999

Field of application

Systems comprising a TPS stationary converter, a TAS transformer module, transmission lines with TLS line cables, a THM pick-up, a TPM mobile converter and mobile consumers were checked.

The following transmission line designs were tested:

- Line cable
- Distance between line cables = 140 mm

The line cable was operated with 85 A in order to measure and evaluate the permitted limit values (magnetic medium-frequency fields at 25 kHz sinusoidal current).

International an professional association limit values

The measured values were compared with the values permitted according to BGV B11 (06/01). The comparison showed, that the measured values (200 mm distance to the line cable) were significantly below the permitted values.

The permitted values in the ICNIRP standard are complied with a distance of 0.3 m from the line cables.

For the US-American market, the measured values were significantly below the permitted distance values of the "IEEE standard C95.1 Edition 1999" in the systems tested.

A risk to health is ruled out.

Exposure situation

The system sections examined can be assigned exposure area 1. Permanent exposure was assumed during the tests.

Protective measures

Comply with the following instructions and take any measures necessary:

Special protective measures are not required for persons without medical devices.

Persons with medical devices, e.g. pacemakers must keep at least 60 cm away from the line cables.

This information must be documented in the operating instructions and suitable signs must be attached to the system as described in BGV A8 (VBG 125).

4.4.3 U-shaped THM10C pick-up

Standards and guidelines

The standards and directives in force are:

- BGV B11 exposure area 1 and 2

Field of application

Systems comprising a TPS stationary converter, a TAS transformer module, transmission lines with TLS line cables, a THM pick-up, a TPM mobile converter and mobile consumers were checked.

The following transmission line designs were tested:

- TLS10E008-01-1 line cable
- Line cable routing in TIS profile section system
- Profile section system mounted on aluminum carrier plate

The line cable was operated with 60 A in order to measure and evaluate the permitted limit values (magnetic medium-frequency fields at 25 kHz sinusoidal current).

Professional association limit values

The measured values were compared with the values permitted according to BGV B11. The comparison showed, that the measured values (100 mm distance to the line cable) were below the permitted values.

A risk to health is ruled out.

Exposure situation

The system sections examined can be assigned exposure area 1. Permanent exposure was assumed during the tests.

Protective measures

Comply with the following instructions and take any measures necessary:

Special protective measures are not required for persons without medical devices.

Persons with medical devices, e.g. pacemakers must keep at least 32 cm away from the line cables.

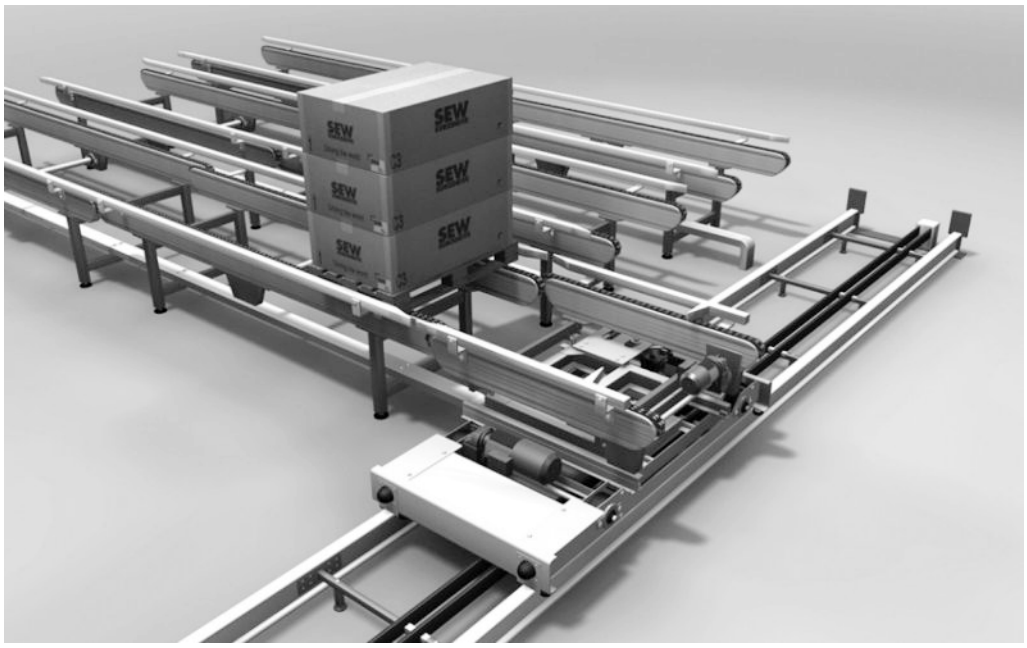
This information must be documented in the operating instructions and suitable signs must be attached to the system as described in BGV A8 (VBG 125).

5 Application Examples

5.1 Conveyor trolleys

5.1.1 Use

The following figure shows the pallet transportation and distribution with a conveyor trolley in transportation logistics and the MOVITRANS® energy supply for travel and chain drives:



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5.1.2 Requirements

- Moving pallets transversely over longer distances
- Replacing cable carriers with contactless energy transfer
- Reducing downtimes by eliminating repairs (cable breaks)
- Extending travel distance without having to use complicated holders for drag-chains

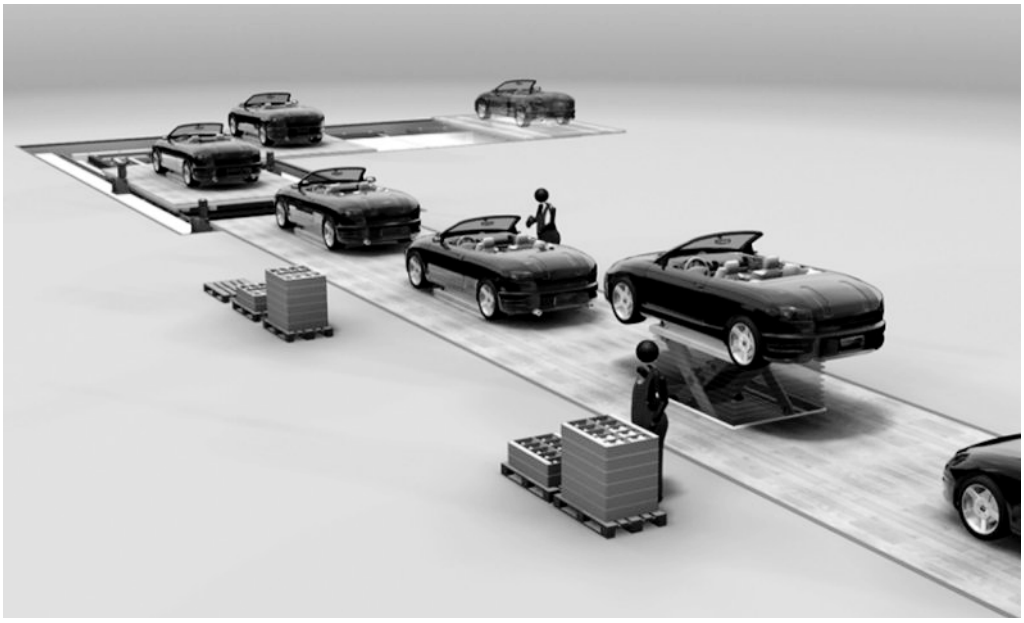
5.1.3 Benefits of MOVITRANS®

- Permanently high level of availability
- Long travel distances
- Simple installation
- High mechanical tolerances
- Easy to extend (e.g. extending / changing the travel distance)
- Simple to integrate in existing systems
- Wear-free system (no wear from bending or torsion)
- High travel speeds
- Compact dimensions in transfer area

5.2 Push-skid conveyor system

5.2.1 Use

The following figure shows a push-skid conveyor system with elevating table in the automotive industry and the MOVITRANS® energy supply for the elevating table:



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5.2.2 Requirements

- Wear-free power supply system for the elevating table mounted on the push-skid conveyor
- High mechanical tolerances (air gap) between the line cable and pick-up ensure that the individual conveyor platforms can be integrated smoothly into the conveyor system

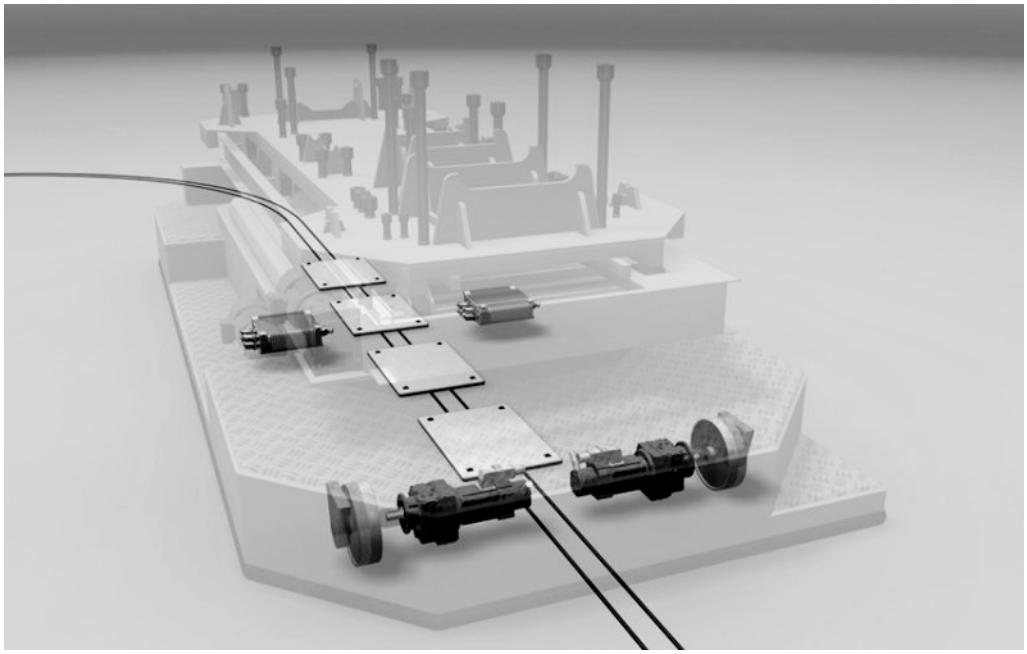
5.2.3 Benefits of MOVITRANS®

- Wear-free system (slide line does not have to be opened for maintenance work)
- Compact unit (all MOVITRANS® components can be installed in the intermediate space of the push-skid conveyor platform. This means that the entire surface of the push-skid conveyor is accessible)
- The compact dimensions of the pick-ups make it possible to convert existing systems with conductor rails

5.3 Floor conveyor system (FCS) / automated guide vehicle system (AGV)

5.3.1 Use

The following figure shows a floor conveyor system (FCS)/automated guide vehicle system (AGV) in final assembly and the application and installation of the MOVITRANS® components in FCS/AGV systems:



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5.3.2 Requirements

- Provide energy without a battery (short cycle times) or contact wires/trailing cables (no channels under the vehicle)
- Flat accessible areas (due to transverse traffic) without grooves for track guidance
- Flexible track layout (with points if required)

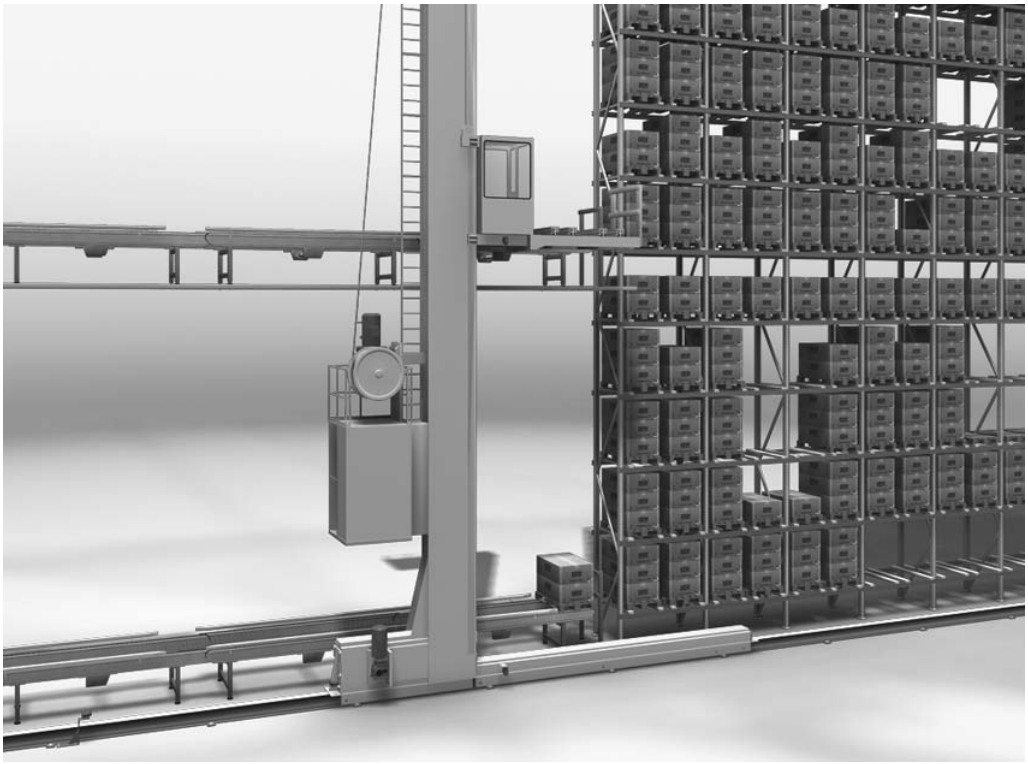
5.3.3 Benefits of MOVITRANS®

- Wear-free and maintenance-free energy transfer
- Line cables are laid in the floor (up to 15 mm effective air gap) allows other transport systems to cross (e.g. forklifts)
- The individual power supply of the vehicles allows for a separation of rigging station and assembly line
- The electromagnetic field emitted from the line cables can be used to guide the vehicle along the track
- Easy to change the track layout by relaying the line cable

5.4 Storage and retrieval unit (SRU)

5.4.1 Use

The following figure shows a storage and retrieval unit (SRU) in a high-bay warehouse in warehouse logistics and the MOVITRANS® energy supply for travel and hoist drive up to max. 12 kW (total dynamic power) and the telescopic drive:



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5.4.2 Requirements

- Resistant to dirt caused by leakages of the means of transport
- Permanent access to warehouse system
- Contactless energy supply of telescopic drive on the load platform (no need for drag chain)

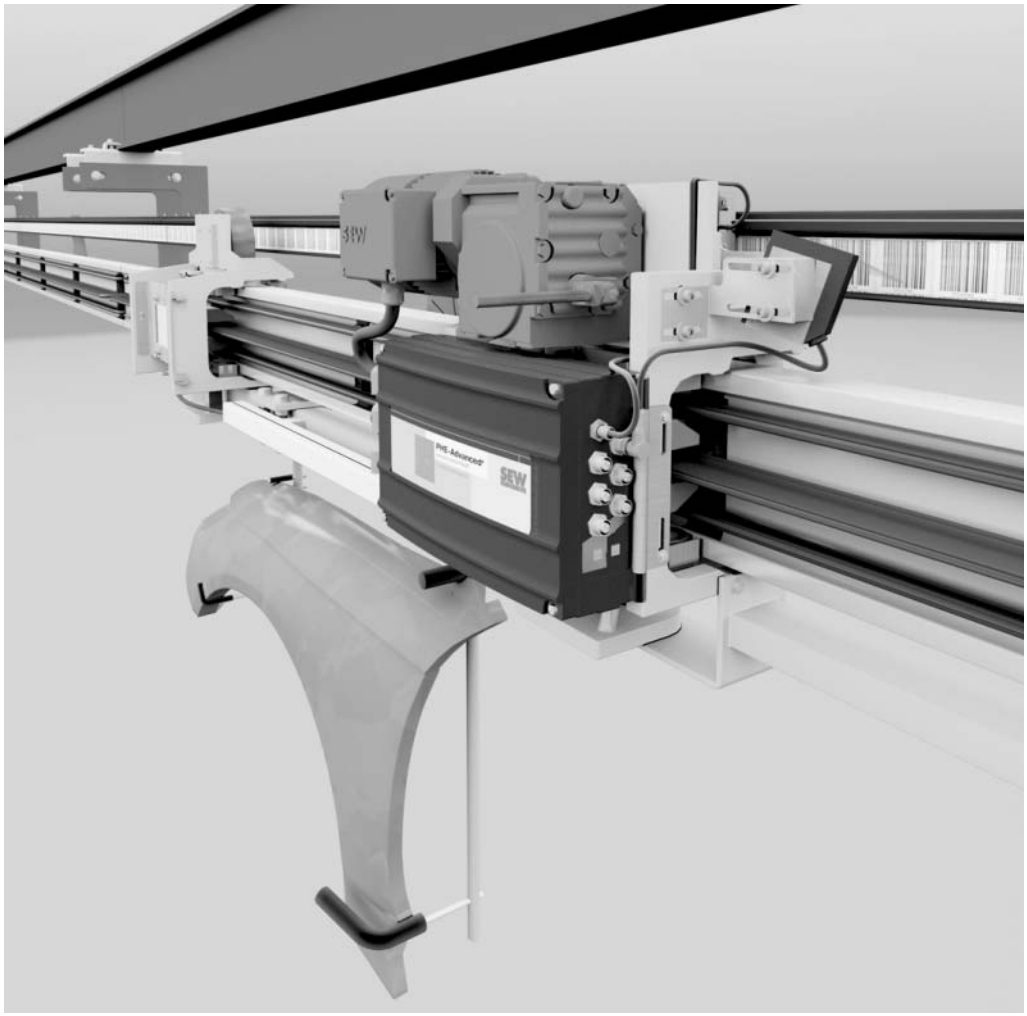
5.4.3 Benefits of MOVITRANS®

- Wear-free and maintenance-free system
- Resistance to dirt
- High availability

5.5 Overhead trolley system

5.5.1 Use

The following figure shows the material feed with a Overhead trolley system (OTS) for light loads in the automotive industry and the contactless MOVITRANS® energy transfer to mobile OTS vehicles:



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5.5.2 Requirements

- Reduce downtimes caused by maintenance or malfunctions such as a short circuit due to contamination or moisture
- Flexible system due to simple modification or extension
- Lower operating noise of the OTS

5.5.3 Benefits of MOVITRANS®

- Trolleys are integrated smoothly into the conveyor system
- High mechanical tolerances due to large airgap
- High availability (particularly important when used in assembly lines)
- Flexible system due to modular system
- Wear-free system
- No rail sections required. Line cables are laid continuously
- System is completely insulated

6 External Communication

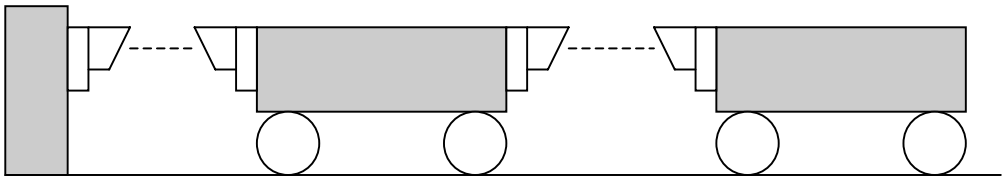
6.1 Data light barriers

6.1.1 Introduction

Photoelectric data beams are used for communication on straight track sections. They are available for all common fieldbus systems. A cascading function is available with some photoelectric data beam types. This function can be used to address several stations.

6.1.2 Cascading

Cascading is when several transmission lines are connection in series. The following figure gives an example of cascading photoelectric data beams for two trolleys:



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6.1.3 Systems

The following table gives an overview of the suppliers and their systems:

Manufacturers	Lase	Leuze	Leuze	Pepperl+Fuchs
Type	DDLS200	DDLS200	DDLS78	LS610
Operational range	up to 500 m	up to 500 m	up to 200 m	up to 240 m
Light source	IR LED	IR LED	red light / IR LED	not specified
Max. transmission rate	up to 2 MBit/s	up to 2 MBit/s	up to 38.4 kBit/s	up to 2 MBit/s
Fieldbus systems	Profibus, Interbus (Cu), Interbus (FO)	Profibus, Interbus (Cu), Interbus (FO), DeviceNet / CANopen	Profibus	Profibus, Interbus (Cu)
Voltage supply	DC 18 - 30 V	DC 18 - 30 V	DC 12 - 30 V	DC 18 - 30 V
Operating temperature (with heating)	-5...+50 °C (-30 ... +50 °C)	-5...+50 °C (-30 ... +50 °C)	-10...+50 °C (-35 ... +50 °C)	-10...+50 °C
Other	-	cascading possible	cascading possible	-

Manufacturers	Sick	Sick	Sick	Sick
Type	ISD300	ISD230	ISD260	ISD280
Operational range	up to 300 m	up to 200 m	up to 180 m	up to 150 m
Light source	IR	IR LED	IR LED	IR LED
Max. transmission rate	up to 2 MBit/s	up to 38.4 kBit/s	up to 0.5 MBit/s	up to 1.5 MBit/s
Fieldbus systems	Profibus, Interbus (Cu), Interbus (FO), DeviceNet, CANopen	Profibus, Interbus (Cu)	Profibus, Interbus (Cu)	Profibus, Interbus (Cu)
Voltage supply	DC 18 - 30 V	DC 20 - 28 V	DC 20 - 28 V	DC 20 - 28 V
Operating temperature (with heating)	+5...+50 °C (-30 ... +50 °C)	0...+55 °C (-38 ... +55 °C)	0...+40 °C (-38 ... +40 °C)	0...+40 °C (-38 ... +40 °C)
Other	cascading possible	-	-	-

The information given in the manufacturers' data sheets must be used for project planning. The list of systems is not exhaustive. It is simply an extract of the systems currently available on the market.

6.2 Radio systems

6.2.1 Introduction

Radio systems are another alternative for communication in systems that use contactless energy transfer.

A wide variety of radio systems is available on the market. The performance ranges from point-to-point transfer of individual inputs/outputs through to Profibus radio networks.

6.2.2 Systems

The following table gives an overview of the suppliers and their systems:

Manufacturers	Götting	Götting	Phoenix	Phoenix
Type	G 76300-A	HG 76330	ILB BT ADIO MUX-OMNI	PSI-WL-RS232-RS485/BT
Operational range	not specified	not specified	up to 100 m	up to 150 m
frequency	400 MHz	400 MHz	2.4 GHz	2.4 GHz
Max. transmission rate	up to 9.6 kBit/s	up to 9.6 kBit/s	not specified	up to 187.5 kBit/s
Fieldbus systems	RS485	Profibus	2 x analog I/Os 16 x digital I/Os	RS485
Voltage supply	DC 9 - 36 V	DC 9 - 36 V	DC 19.2 - 30 V	DC 10 - 30 V
Operating temperature	0..+50 °C	Not specified	-25...+60 °C	-20...+60 °C
Number of stations	up to 127	up to 127	bidirectional 2	up to 7

Manufacturers	Phoenix	Westermo	Westermo
Type	FLM BT ...	RM 805 U	RM 240
Operational range	up to 50 m	up to 5 km	up to 1 km
frequency	2.4 GHz	868 MHz	2.4 GHz
Max. transmission rate	not specified	up to 76.8.5 kBit/s	up to 115.5 kBit/s
Fieldbus systems	8 x digital I/Os	RS485	RS485
Voltage supply	DC 19.2 - 30 V	DC 7 - 30 V	DC 9 - 30 V
Operating temperature	Not specified	-30...+60 °C	-30...+65 °C
Number of stations	up to 3	up to 255	not specified

Manufacturers	SATEL	Schildknecht	Schildknecht
Type	3AS	DE3000	DE1000
Operational range	up to 5 km	up to 100 m	up to 100 m
frequency	380 - 470 MHz	1.9 / 2.4 GHz	2.4 GHz
Max. transmission rate	up to 19.2.5 kBit/s	up to 1 MBit/s	up to 1 MBit/s
Fieldbus systems	RS485 (Profibus)	Profibus	RS485
Voltage supply	DC 9 - 30 V	DC 9 - 33 V	DC 9 - 33 V
Operating temperature	-25...+55 °C	not specified	not specified
Number of stations	not specified	not specified	not specified

The information given in the manufacturers' data sheets must be used for project planning. The list of systems is not exhaustive. It is simply an extract of the systems currently available on the market.

7 Documentation

7.1 Available documentation

The following publications are available for contactless energy transfer with MOVITRANS®:

Publications	Number	
	German	English
System Description MOVITRANS®	11626208 Edition 06/2007	11626216 Edition 06/2007
Operating Instructions MOVITRANS® TPS10A Stationary Converter	11304804 Edition 09/2004	11304812 Edition 09/2004
Operating Instructions MOVITRANS® TAS10A Transformer Module	11306904 Edition 09/2004	11306912 Edition 09/2004
Operating Instructions MOVITRANS® THM10C / THM10E Pick-ups	11445009 Edition 07/2006	11445017 Edition 072006
Operating Instructions MOVITRANS® TPM12B Mobile Converter	11445408 Edition 07/2006	11445416 Edition 072006
Operating Instructions MOVITRANS® TCS, TVS, TLS, TIS Installation Equipment	11516208 Edition 06/2007	11516216 Edition 06/2007
Manual MOVITRANS® Project Planning	11493801 Edition 06/2007	11493828 Edition 06/2007
Manual MOVITRANS® Installation Transmission Lines for THM10E Pick-ups	11472618 Edition 06/2007	11472626 Edition 06/2007
Manual MOVITRANS® SHELL TPS Startup Software	11272708 Edition 10/2004	11272716 Edition 10/2004

A folder containing all the publications above is available on request:

Compilation of publications	Number	
	German	English
System Manual MOVITRANS®	11637803 Edition 09/2007	11637811 Edition 09/2007

7.2 Additional documentation

In addition to the instructions listed above, SEW-EURODRIVE offers extensive documentation covering the entire topic of electrical drive engineering. These are mainly the publications of the "Drive Engineering - Practical Implementation" series as well as the manuals and catalogs for electronically controlled drives.

A wide selection of our documentation is available in many languages for download on our website (**www.sew-eurodrive.de**). If required, you can also order printed and bound copies of the documentation from SEW-EURODRIVE.

8 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 gm-tianjin@sew-eurodrive.cn http://www.sew-eurodrive.com.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi • Baroda - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com mdoffice@seweurodriveindia.com
Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 dipar@yubc.net

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-83554 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 sew@sew-eurodrive.sk http://sk.sew-eurodrive.com
	Žilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za

South Africa			
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za
Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se
Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn
Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Sales	**Kiev**	SEW-EURODRIVE GmbH S. Oleynika str. 21 02068 Kiev	Tel. +380 44 503 95 77 Fax +380 44 503 95 78 kso@sew-eurodrive.ua
USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com

USA			
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve sewventas@cantv.net sewfinanzas@cantv.net

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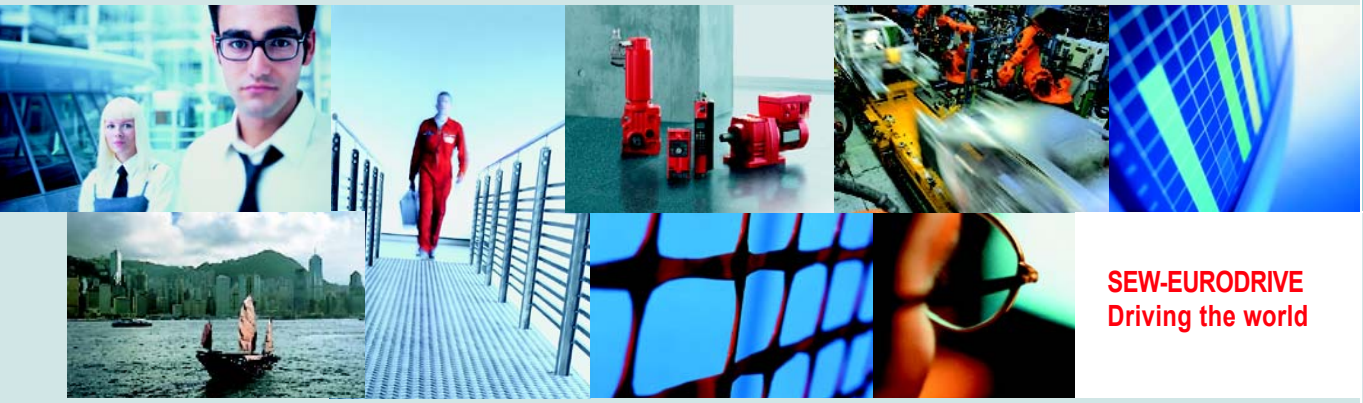

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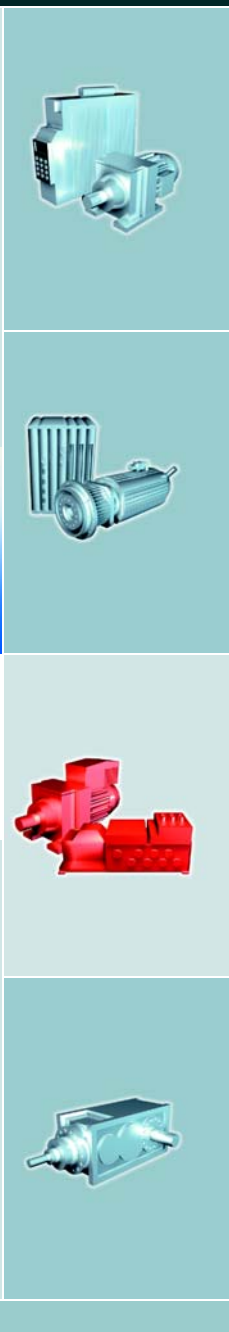

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