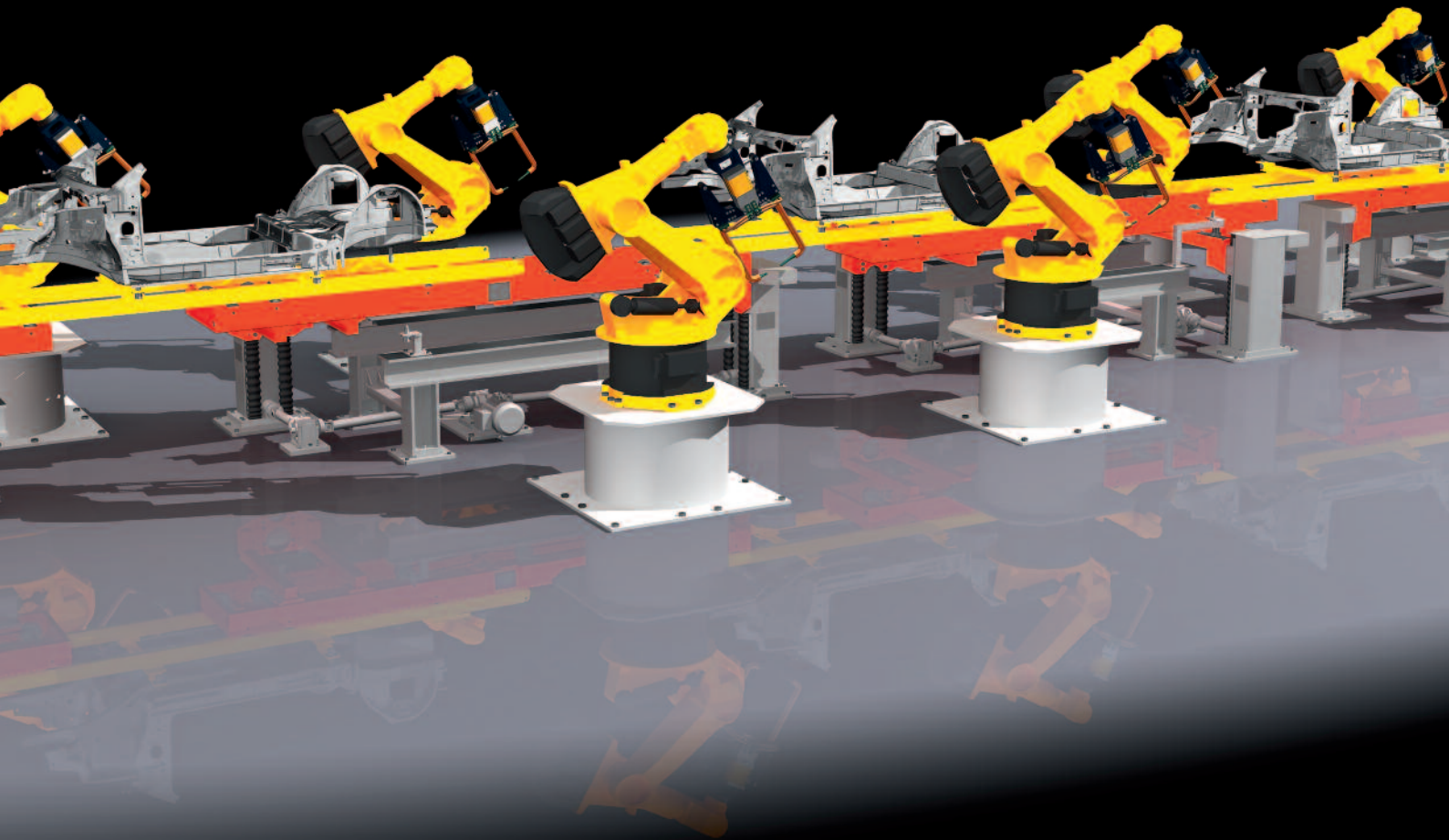


TRANSPORTING

Transportieren



Transporting



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Transporting

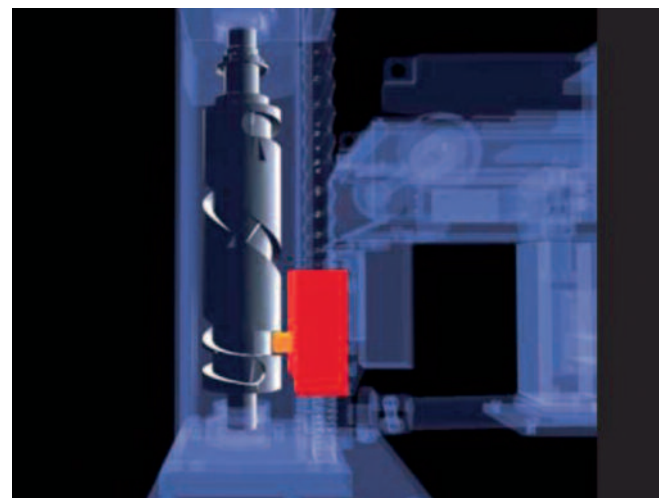


Lift Powered Rollerbed Line (LPRB)

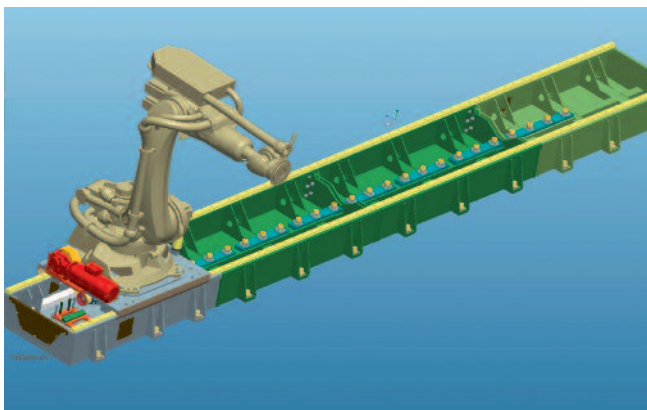
The transportation module comprises electromechanical systems suitable to transport complex assemblies such as doors, side panels or the complete chassis in BIW workshops. The transport sections installed in production lines are designed as lifting beam systems, also called as shuttle systems, with a central drive. These systems have two central drives which take care of the lifting motion and the horizontal transfer. A further development of the L+S systems are the Lift Powered Rollerbeds, featuring decentralized drive mechanism and offering a higher efficiency and more flexibility with regards to space availability and performance.

Cam lifter for optimum lifting profile

An essential feature of the LPRB systems used in body shops is the requirement for a gentle component pick-up in order to reduce the impact noise as well as the wear on the lifter and the component itself. This lifting profile is achieved with zero speed at the transfer point and with high acceleration and deceleration processes by means of the EXPERT TUNKERS indexing cam, which has a correspondingly milled motion profile. In the case of cams with a constant pitch, so-called flex cams, the desired lifting profile is achieved via the servo control.



Soft touch pick-up



7th axis for robots

Buffer / Cross Transfer and Alternative Transport Solutions

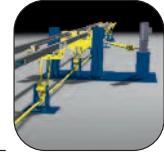
The transport lines are supplemented by appropriate components such as buffer / storage system, cross transfer conveyor, ring accumulating conveyor, lifting and rotating units and level elevator, which feeds the component into the upper level conveyor system. This technology is also used in the heavy duty applications such as transportation of complete tooling or robotic systems (7th axis).

Lift Powered Rollerbed



9-4

Lift and Shift System



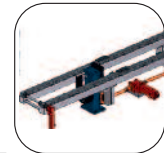
9-7

Dual Box Lifter



9-8

Mono- / Duorail Shuttle



9-9

Lift and Rotate Unit



9-10

Skid Conveyor



9-11

Level Lifter



9-12

7th Axis



9-13

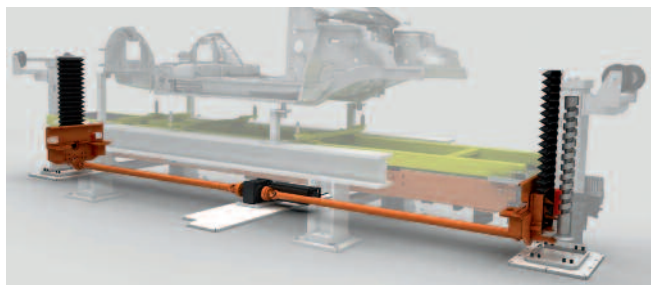
Tool Changing System



9-14



Lift Powered Rollerbed



Customer Load (Skid and Body)	200-2.000 kg
Horizontal stroke	4.000-10.000 mm
Vertical stroke	300-1.200 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 7 s

Lift Powered Rollerbed

Conveying system for automotive body plants for the safe and precise positioning of skids with car bodies or body parts in independent station design.

- Safe and fast transport
- Smooth component transfer
- Flexible determination of the pick-up position
- Compact design
- Extremely low maintenance
- Long life span
- Flexible positioning of the lifting columns for optimum accessibility of the robot to the component

Lift column with cam and cam follower technology

The cam shaft and the robust linear rails are the core elements of the Expert Tünkers Lifter columns. The lifting station is formed by two lifting columns which are driven by a central gear motor and synchronized by means of a cardan shafts.

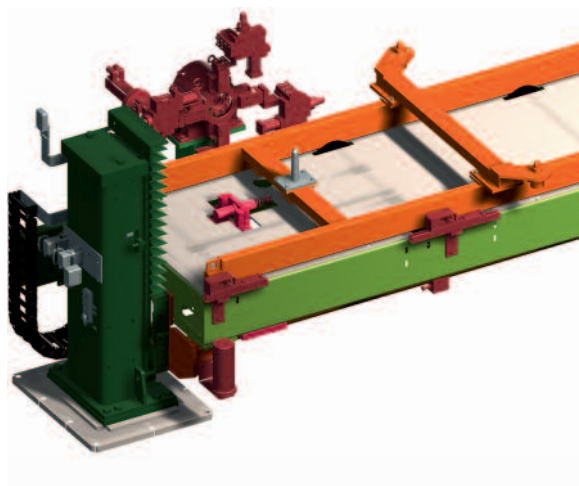


All-Electric Lift Powered Rollerbed

All Electric Lift Powered Rollerbed with laser positioning of the skid and flexible underbody clamping technology

- Time saving approx. 1 second
- Cycle time less than 7.5 seconds possible
- Accurate skid positioning via laser distance measurement
- Variable skid positioning on the rollerbed possible
- Electric stopper to prevent overrun
- Electrically operated skid locator
- No pneumatics, i.e. no valve unit

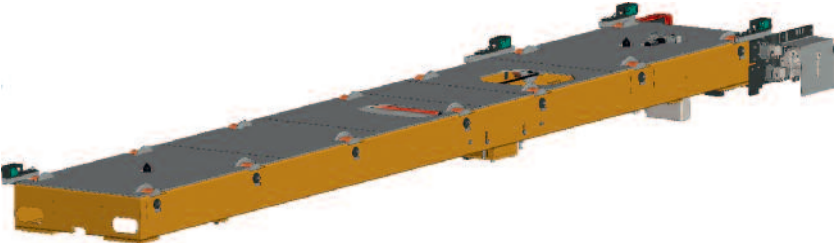
Customer Load (Skid + Body)	200-2.000 kg
Horizontal stroke	4.000-10.000 mm
Vertical stroke	300-1.200 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 7 s



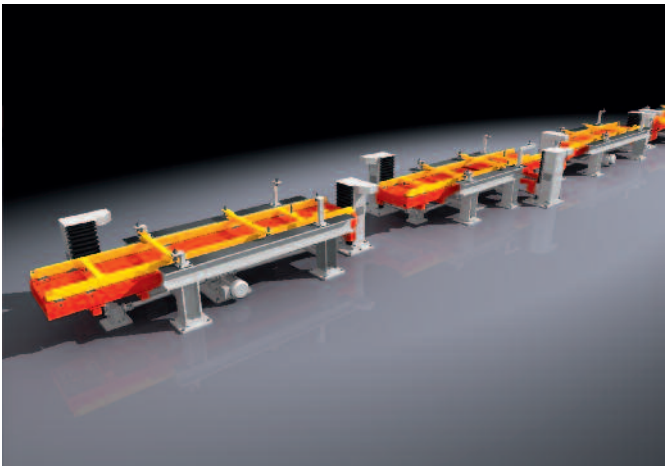
Rollerbeds

Frame made of metal sheet, incorporating the mechanically synchronized driven rollers, gear motor, skid locator and positioning devices. Optional with cover plates. Designed according to customer specification.

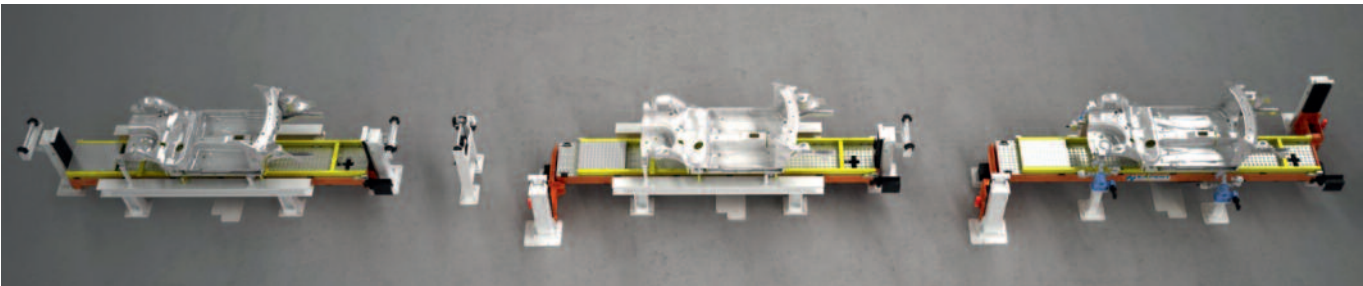
Customer Load (Skid + Body)	up to 1.500 kg
Length of rollerbed	up to 7.500 mm
Width of rollerbed	1.200 mm
Travel speed of the skid	max. 2,5 m/s



Lift powered rollerbed in upperbody line



Example of a complete welding line



EGV Flexible underbody clamping technology

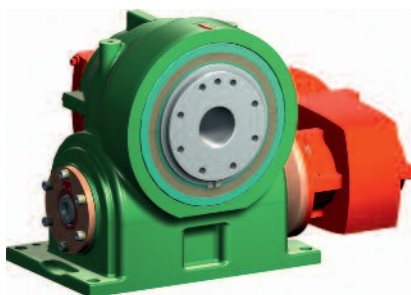
Index drive units EGV 90 / 125 with an integrated precision interlock for the flexible production of up to four different types of vehicles in one production line.

This extremely compact unit features a drive flange which is mechanically locked in the dwell position by means of an individually mounted latch. This design helps to absorb the high forces during the transfer of the body.

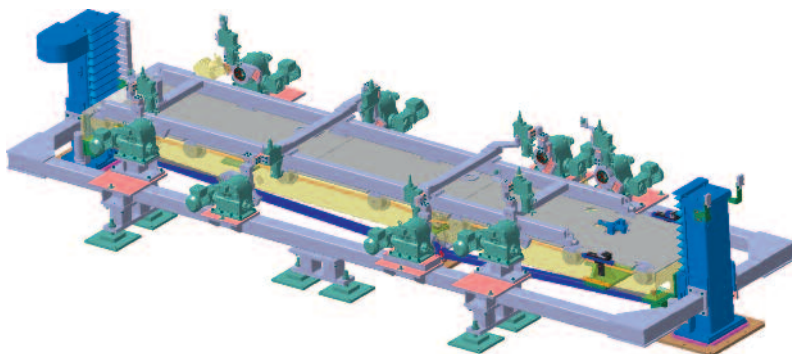
- Flexible production with up to four different types of vehicles
- High static load bearing capacity in the working position
- No additional locking device required

Type	EGV 090	EGV 125
Max. permissible static tangential moment	800 Nm	2680 Nm
Max. permissible tilting moment	1000 Nm	3400 Nm
Rotating time for 90°	2 s	2 s
Repeatability at $r = 400 \text{ mm}$	$\pm 0,1 \text{ mm}$	$\pm 0,05 \text{ mm}$

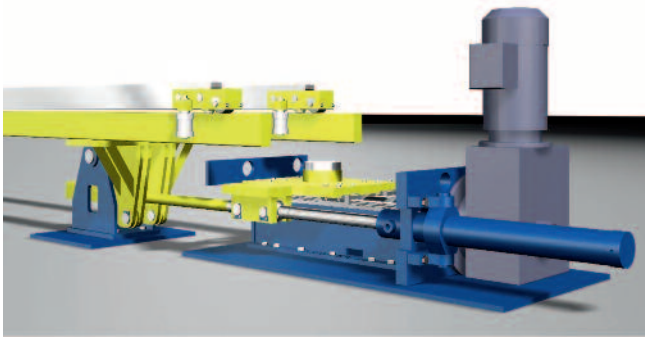
EXPERT TÜNKERS Lift-Powered Rollerbed with integrated underbody clamping technology



EGVTool Changing Device / "Windmill"



Application: LPRB with flexible underbody clamping technology



Customer load	50-500 kg/Station
Number of stations	3-15
Horizontal stroke	3.000-8.000 mm
Vertical stroke	300-1.200 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 10 s

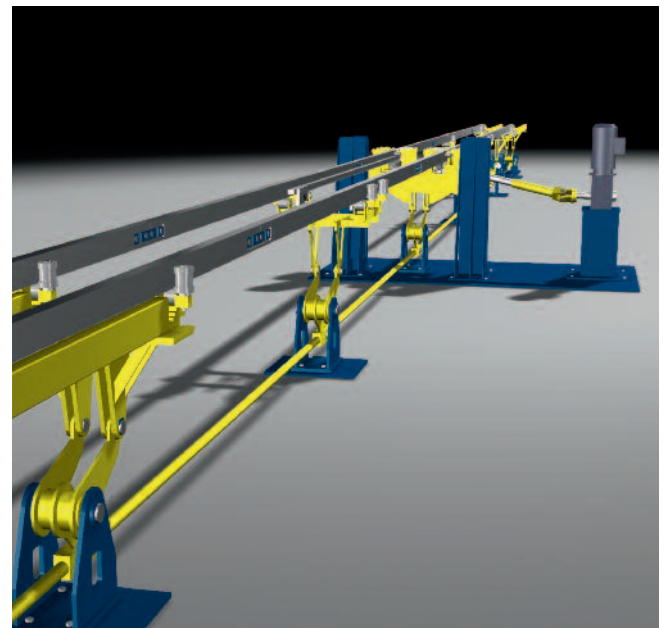
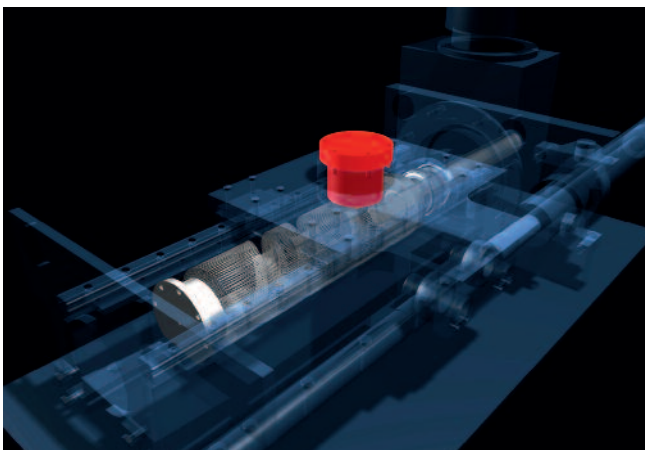
BIW conveying system for the safe and precise positioning of car bodies or body parts in interlinks operation.

- Safe, accurate and fast transport system with lifting and traversing axis for large components
- Synchronous component transport across all stations
- Simple design, only one central drive for lifting and conveying each component
- Expert crank drive with mechanical locking-in at end position
- Overrun of the end position is not possible

Lift & Shift drive unit

The Indexing cam of the longitudinal drive unit is the core element of the shuttle system.

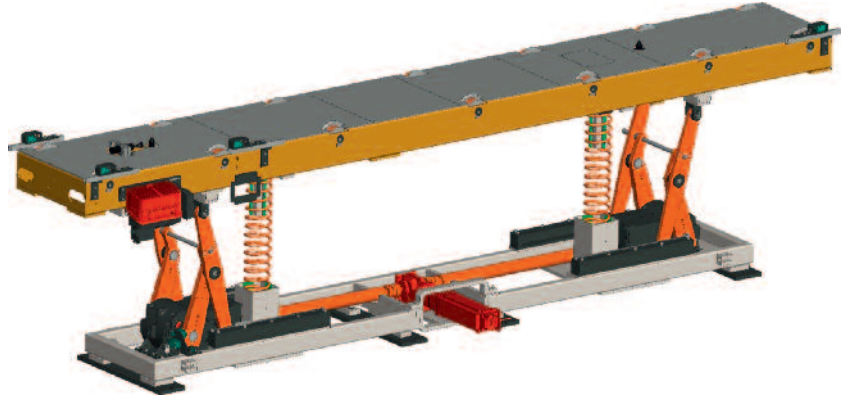
The high-performance cam follower transmits the power to the linear carriage. The mechanically synchronized connection to the lever mechanism of the lifting shuttle is effected via the pull rod.



Dual Box Lifter

Low profile rollerbed lifter with integrated spring suspension system

- 30% less energy consumption by using the potential spring energy
- Minimum space requirement
- No interfering edges for robotic welding guns
- Smooth component transfer
- Flexible determination of the takeover position



In retracted position - extremely flat design for optimum accessibility.

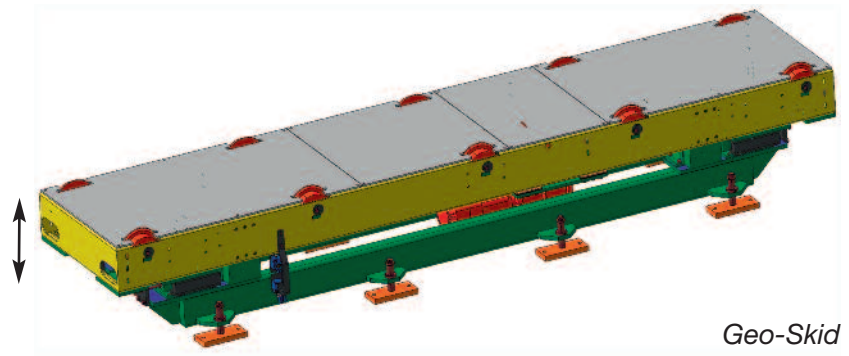


Customer load (Skid + Part)	200-1.000 kg
Horizontal stroke	4.000-10.000 mm
Vertical stroke	200-800 mm
Cycle time (Lifting-Transporting-Lowering)	≤ 6 s

Eccentric Lifter

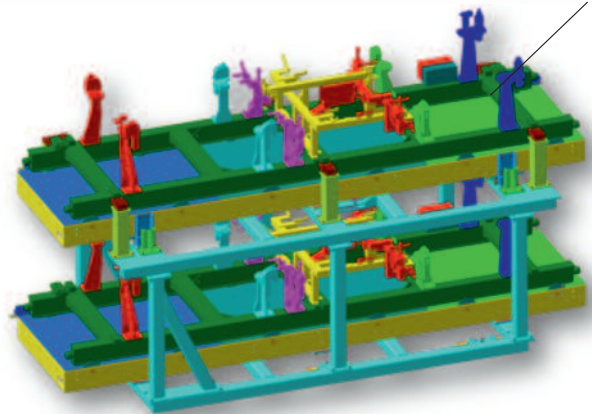
- Lifting system for short strokes at normal transport times

Customer load (Skid + Part)	200-2.000 kg
Vertical stroke	50-200 mm
Lifting time	≤ 2 s

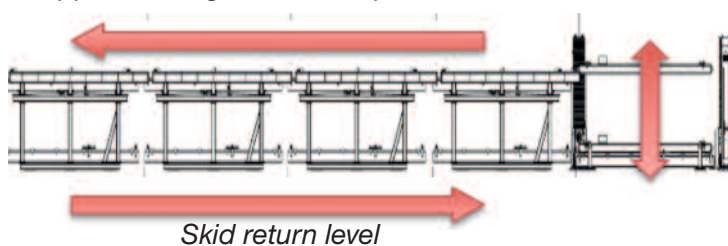


Geo-Skid

Skid conveyor system with eccentric lifters at the working level and rollerbeds at the skid return level



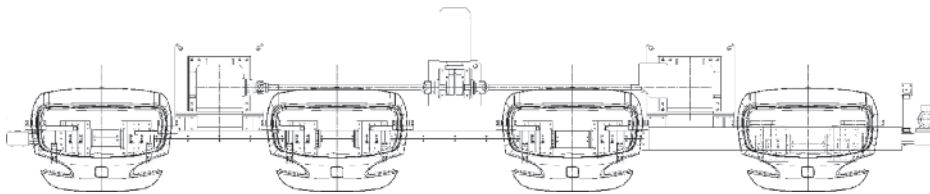
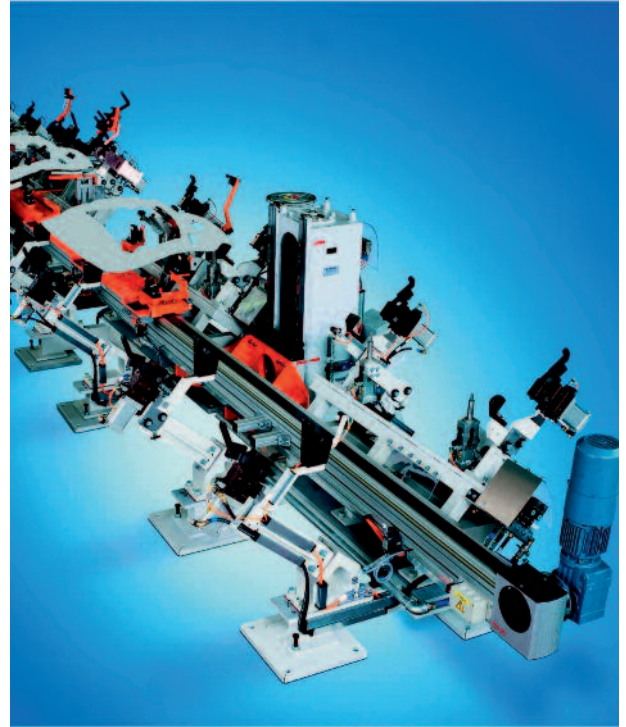
Upper working level – Transport direction Lift station



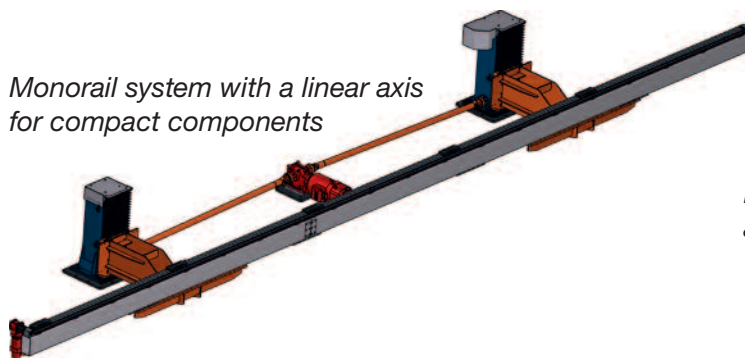
Conveyor line consisting of a horizontal linear axis and two synchronized lifting columns. Particularly suitable for transporting small components at low loads.

- Transport system for add-on components (e.g., doors and closures)
- Application: Gluing, clinching
- Modular and flexible construction
- Economical solution for the transport of small components

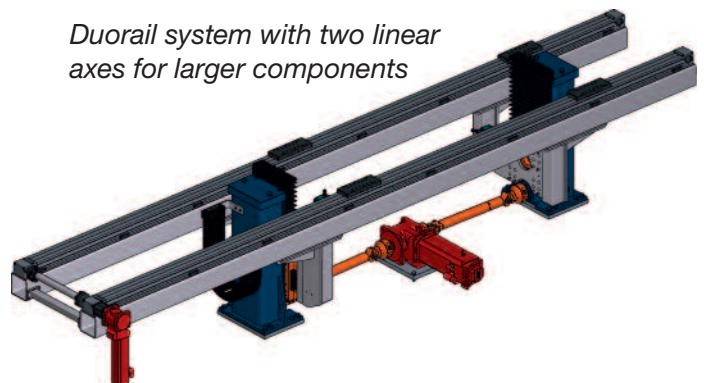
Customer load	10-250 kg
Horizontal stroke	1.000-5.000 mm
Vertical stroke	300-1.500 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 5 s



Monorail Shuttle for bonnets



Monorail system with a linear axis for compact components

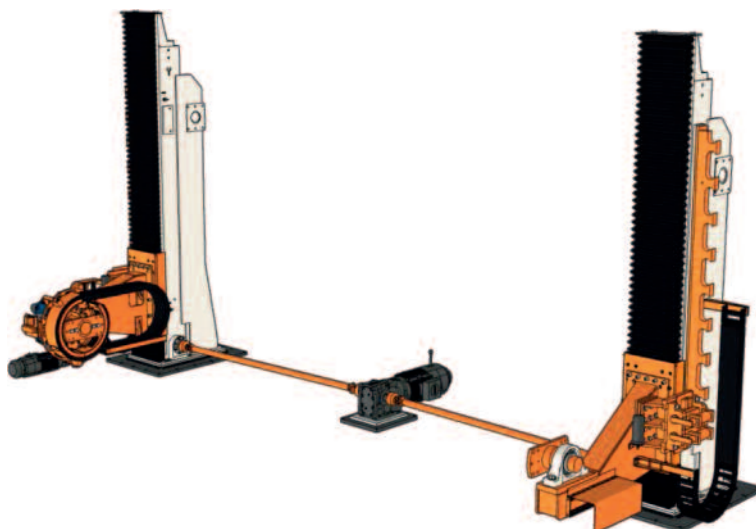


Duorail system with two linear axes for larger components

Lift and rotate unit for manipulating car bodies

- Applications: Testing stations, rework stations, stud welding stations
- Modular design consisting of EXPERT standard components using cam lifters and trunnion system.
- Minimum space requirement

Customer load (body and frame)	50-3.000 kg
Vertical stroke	1.200-2.800 mm
Lifting time	3-10 s
Indexing angle	flexible



Example of a lift/rotate unit incorporated into a roller conveyor section

Skid Cross Transfer Conveyor

Cross transfer conveyor system for skid storage and separation.

- Modular horizontal storage unit for skids with car body
- Component storage for separation from production lines
- Flexible layout design



Customer load (skid + body)	200-2.000 kg
Horizontal stroke	2.000-10.000 mm
Vertical stroke	50-200 mm

Ring Buffer

Modular skid storage system based on the cross transfer conveyor system. Optimized to make the best use of available space on two levels.

- Modular horizontal/vertical storage for skid with car body
- Maximum storage capacity with minimum space requirements
- Component buffer for separation from production lines
- Flexible layout design

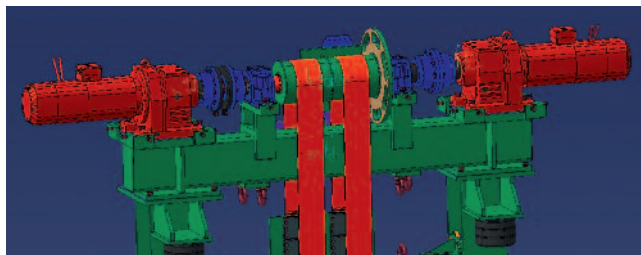


Customer load (skid + body)	200-2.000 kg
Horizontal stroke	2.000-10.000 mm
Vertical stroke	1.500-2.800 mm

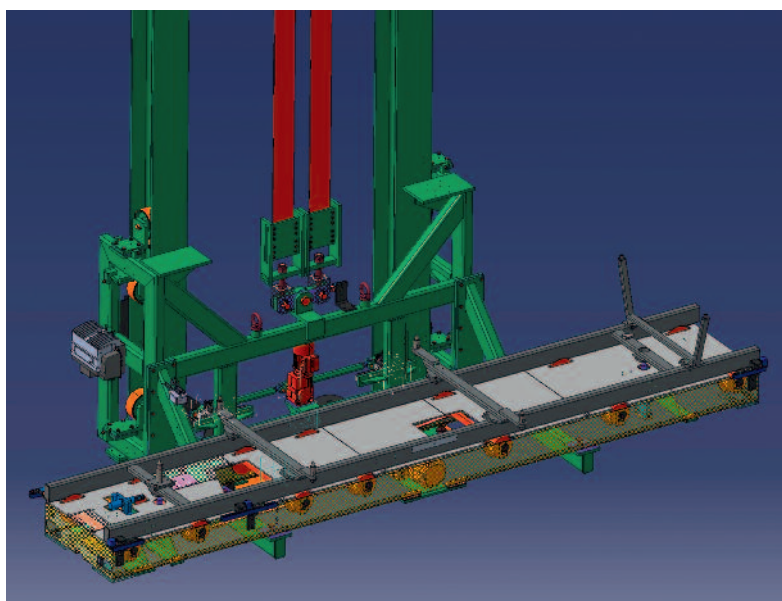
Lifting device for the transport of complete bodies from the welding plane to the second level of the conveyor system.

- Lifting device for loads up to max. 1500 kg
- Frame construction with I - Profiles
- Extremely narrow configuration due to the integration of roller guide and counter weights in profile frame.
- Safety technology according to the current OEM regulations
- Typical application: Lifting complete car body to the upper level of the conveyor system.

Customer load (skid + body)	150-1.500 kg
Vertical stroke	4.000-8.000 mm



*Drive unit with safety feature
Two gearmotors and two lifting belts*

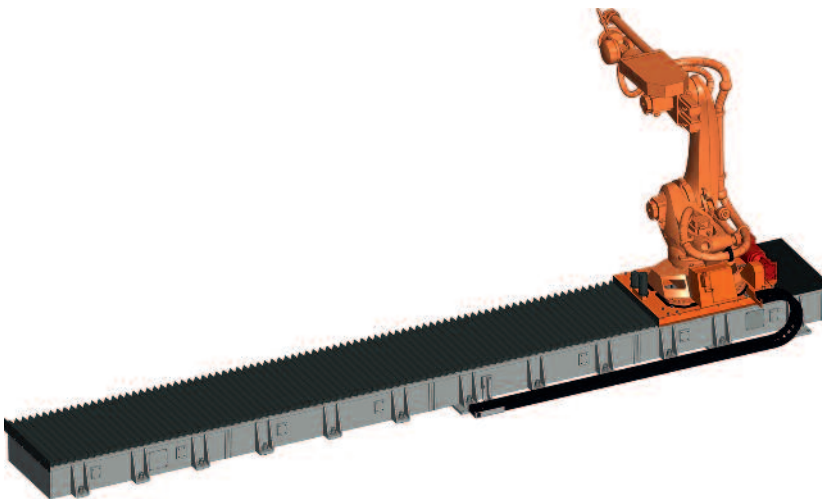


Lifting Carriage with rollerbed and skid

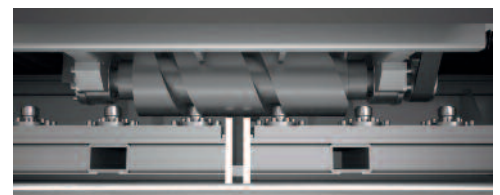
7th axis for robot redefined

- Linear transfer unit for robots
- Proven carriage drive by means of EXPERT-TÜNKERS cam and follower principle
- Precise cam engagement with the floor mounted cam followers
- Higher precision and performance than conventional rack & pinion systems
- Modular system
- Several robots on a single transverse axis possible

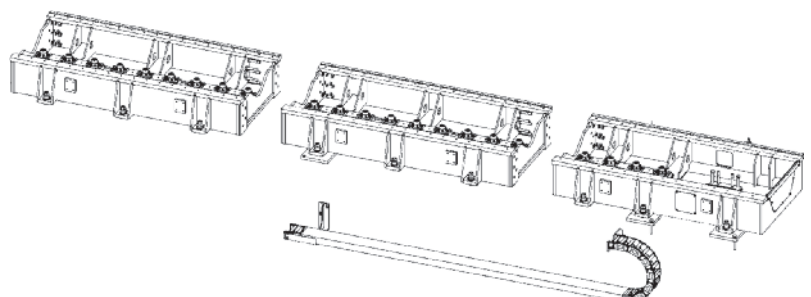
Robot and Customer Load	max. 4000 kg
Length of axis	up to 30 m
Travelling Speed	1-2 m/s



Floor mounted cam followers engaged in the drive cam



Evenly arranged cam followers





Tool changing system

Tool changing system based on Expert-Tünkers standard components such as rotary table, heavy duty rollerbeds and eccentric lifter.

- Workstation with eccentric lifter and tool locking system in work station
- EDH series rotary table as tool storage zone
- Compact design, optimum flexibility, reduced cycle times
- Individual customization possible

Customer load (skid and tooling)	up to 2.000 kg
Rotation speed	120° in 15 s
Total tool changing cycle	70 s



Tool storage zone on rotary table

[illegible]

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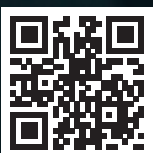
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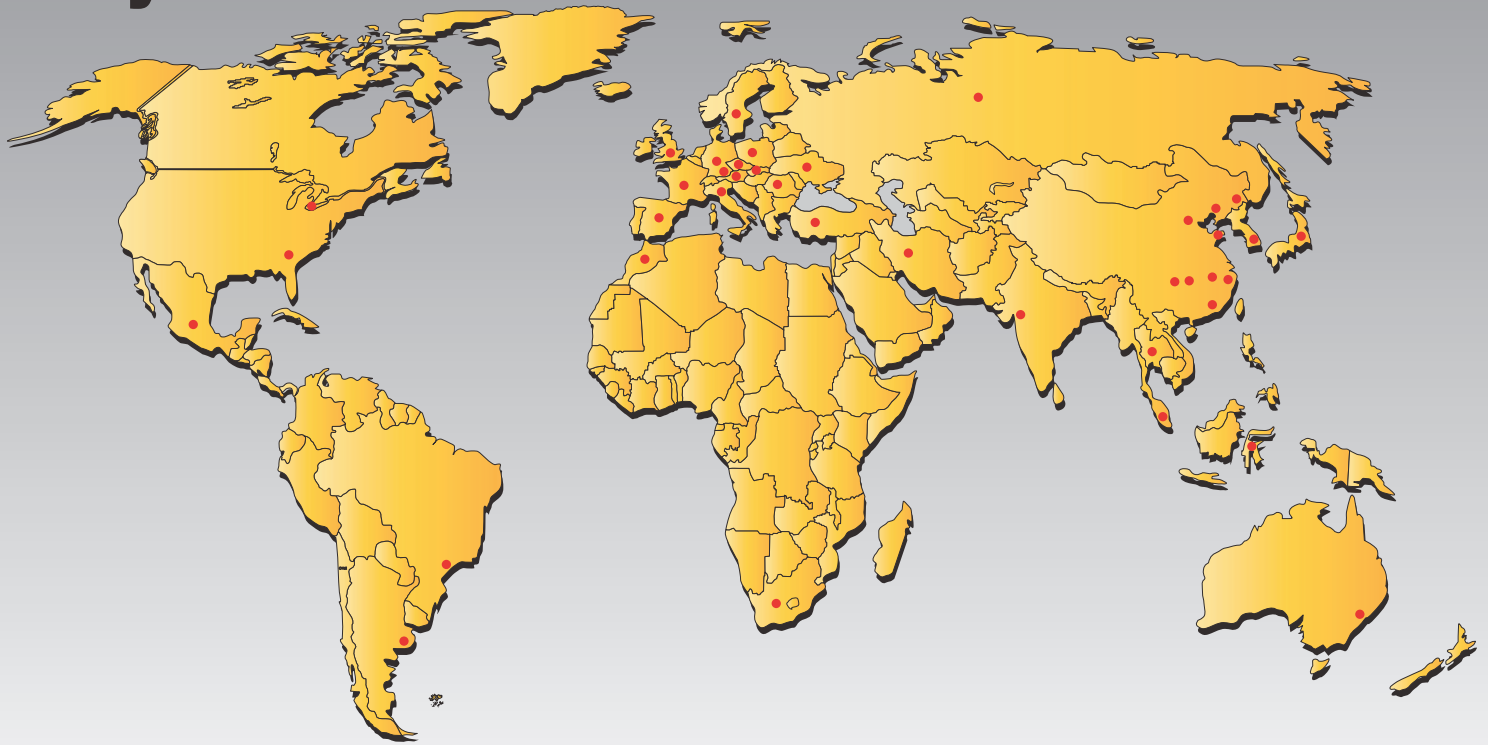


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TÜNKERS Maschinenbau GmbH
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Tel.: +49 2102 4517-0
info@tuenkers.de
www.tuenkers.de



EXPERT-TÜNKERS GmbH
Seehofstraße 56-58
64653 Lorsch
Germany
Tel.: +49 6251 592-0
info@expert-tuenkers.de
www.expert-tuenkers.de



HELU GmbH
Seehofstraße 56-58
64653 Lorsch
Germany
Tel.: +49 6251 592-280
info@helu.de



SOPAP Automation SAS
P. A. Ardennes Emeraude
Rue Henri Faure
BP 11 09, 08090 TOURNES
France
Tel.: +33 3 24 52 94 64
sopap@sopap.com

ARGENTINA – TÜNKERS DE ARGENTINA S.A.
Velez Sarsfield 1516 – Quilmes (1879)
Provincia de Buenos Aires
Tel.: +54 11 2100-2900
info@tuenkers.com.ar

AUSTRALIA – Romheld Australia Pty. Ltd.
30/115 Woodpark Rd
Smithfield N.S.W 2164
Tel.: +61 2 97211799
sales@romheld.com.au

AUSTRIA – B-S-D Spanntechnik GmbH
Sportplatzstrasse 31
3385 Markersdorf
Tel.: +43 2749 72870-0
office@bsdustria.com

BALTIC STATES – Vertriebsbüro Ost
Markt 11
D-07426 Königsee
Tel.: +49 36738 42432
dieter.rauschenbach@tuenkers.de

BELGIUM – SOPAP Automation SAS
P. A. Ardennes Emeraude
Rue Henri Faure
F-BP 11 09, 08090 TOURNES
Tel.: +33 3 24 52 94 64
sopap@sopap.com

BRAZIL – TüNKers do Brasil Ltda.
Avenida Casa Grande, 850 – Galpão 6, 11 e 13
Bairro: Casa grande
09961-350 – Diadema – São Paulo
Tel.: +55 11 4056-3100
comercial@tuenkers.com.br

CANADA – TUNKERS-Mastech
36200 Mound Road
Sterling Heights, MI 48312
Tel.: +1 734 744 5990
christian.heyer@tuenkers.com

CHINA – TÜNKERS China
Tuenkers Machinery & Automation
Technology Co., Ltd. Shanghai
Building 4, No. 768 Chenxiang Road,
Jiading District, Shanghai P.R.
China, 201802
Tel.: +86 21 39171070
info@tuenkers.com.cn
Other Offices: Changchun, Nanjing, Chengdu,
Beijing, Wuhan, Guangzhou, Yantai, Shenyang

CZECH REPUBLIC – Vertriebsbüro Ost
Markt 11
D-07426 Königsee
Tel.: +49 36738 42432
petr.cejka@tuenkers.sk

CZECH REPUBLIC – Kopta s. r. o.
Vážní 891 / areál PSN I
CZ-500 03 Hradec Králové
Tel.: +420 495 53 1210
kopta@kopta.cz

DENMARK – Berga Maskin
64693 Gnesta
Tel.: +46 158 31112
info@berga-maskin.se

FINLAND – Berga Maskin
64693 Gnesta
Tel.: +46 158 31112
info@berga-maskin.se

FRANCE – SOPAP Automation SAS
P. A. Ardennes Emeraude
Rue Henri Faure
BP 11 09, 08090 TOURNES
Tel.: +33 3 24 52 94 64
sopap@sopap.com

HUNGARY – TÜNKERS Slovakia s.r.o.
Roentgenova 26
SK85101 Bratislava
Tel.: +421 905 564 691
juraj.rampasek@tuenkers.sk

INDIA – TÜNKERS Automation India Private Ltd.
402 Supreme Head Quarters 36
Mumbai-Pune Bypass
411008 Baner-Pune
Tel.: +91 98 60 699190
jayesh.keskar@tuenkers.com

INDONESIA – DAB Technology Pte. Ltd.
21 Woodlands Industrial Park E1, #03-04
Singapore 757720
Tel.: +65 6891 3286
sales@dabtechnet.net

ITALY – TÜNKERS Italia
Strada TORINO, 43 EUROPLACE sub. 06
10043 ORBASSANO-TORINO
Tel.: +39 011 6471556
s.tosco@tuenkers.it

JAPAN – TÜNKERS Japan Ltd.
Daimyo Create Bldg. 6F
Daimyo 1-8-20
Chuo-ku, Fukuoka 810-0041 JAPAN
Tel.: +81 80 83544786
tomoo.kaku@tuenkers.de

MALAYSIA – DAB Technology Sdn.Bhd.
No 9-2B Jalan Bandar 10, Pusat Bandar Puchong
47100 Selangor
Tel.: +603 8060 9448
sales@dabtechnet.net

MOROCCO – SOPAP Automation SAS
P. A. Ardennes Emeraude
Rue Henri Faure
F-BP 11 09, 08090 TOURNES
Tel.: +33 3 24 52 94 64
michel.andre@tuenkers.de

MEXICO – TUNKERS DE MÉXICO, S.A. DE C.V.
Calle Emiliano Zapata No.17-2
Col. Emiliano Zapata
72810 San Andrés Cholula Puebla
Tel.: +52 222 393 5547
christian.volkman@tuenkers.mx

NETHERLANDS – TÜNKERS Maschinenbau GmbH
Am Rosenkoth 4-12
D-40880 Ratingen
Tel.: +49 2102 4517-0
peter.czajkowski@tuenkers.de

POLAND – TÜNKERS Slovakia s.r.o.
Roentgenova 26
SK85101 Bratislava
Tel.: +48 660 055 225
jaroslav.rozmiarek@tuenkers.sk
www.tuenkers.sk

ROMANIA – TÜNKERS Maschinenbau GmbH
55068 Sibiu, Romania
Tel.: +40-752 184 548
traian.moga@tuenkers.sk

RUSSIA – WEST-RU
Novikova-Priboya Str. 4 office 407
603058 Nizhny Novgorod
Tel.: +7 831 253 01 65

RUSSIA – Cont Group
Office 315, Sibirskij Proezd 2-27
Moscow 109316
Tel.: +7 495 775 - 0377

SERBIA – TÜNKERS Maschinenbau GmbH
55068 Sibiu, Romania
Tel.: +40-752 184 548
traian.moga@tuenkers.sk

SINGAPORE – DAB Technology Pte. Ltd.
21 Woodlands Industrial Park E1
#03-04
Singapore 757720
Tel.: +65 68913286
enquiry@dabtech.net

SLOVAKIA – TÜNKERS Slovakia s.r.o.
Twin City C
Mlynské nivy 16
SK82109 Bratislava
Tel.: +421 905 564 691
juraj.rampasek@tuenkers.sk
www.tuenkers.sk

SLOVENIA – TÜNKERS Maschinenbau GmbH
55068 Sibiu, Romania
Tel.: +40-752 184 548
traian.moga@tuenkers.sk

SOUTH AFRICA – Demcon (Cape) cc
PO Box 15237
ZA-60110 Emerald Hill/Port Elizabeth
Tel.: +27 41 4847411
demcon@demcon.co.za

SOUTH KOREA – JC Systems Co. Ltd.
#405 Ace Highend 9Cha, 233,
Gasam digital 1-ro, Geumcheon-gu, Seoul
Tel.: +82 70 7012089
j3cho@chol.com

SPAIN – TÜNKERS IBÉRICA, S.L.
c/ Enric Prat de la Riba, 14b
08830 Sant Boi de Llobregat (Barcelona)
Tel.: +34 93 3952827
tuenkers@tuenkersiberica.com

SWEDEN – BERGA MASKIN
SE-646 93 GNESTA
Tel.: +46 158 311 12
info@berga-maskin.se

THAILAND – DAB Technology Co., Ltd.
H20 424/15 Kanchanapisek Rd.
Dokmai, Pravat,
Bangkok 10250
Tel.: +66 97 072 8972
rodchaya.jaranyanont@tuenkers.de

TURKEY – Cava Makina
Imes Sanayi Sitesi E 503
34776 Umraniye / Istanbul
Tel.: +90 216 3809280
alp.varna@cava.com.tr

UK – TÜNKERS-EXPERT UK Ltd.
Unit 5, Ham Lane,
Kingswinford,
West Midlands.
DY6 7JR
Tel.: +44 (0) 1384 287690
neal.judge@tuenkers.de

USA – TUNKERS-Mastech
36200 Mound Road
Sterling Heights, MI 48312
Tel.: +1 734 744 5990
christian.heyer@tuenkers.com

VIETNAM – DAB Technology Pte. Ltd.
21 Woodlands Industrial Park E1
#03-04
Singapore 757720
Tel.: +65 68913286
enquiry@dabtech.net