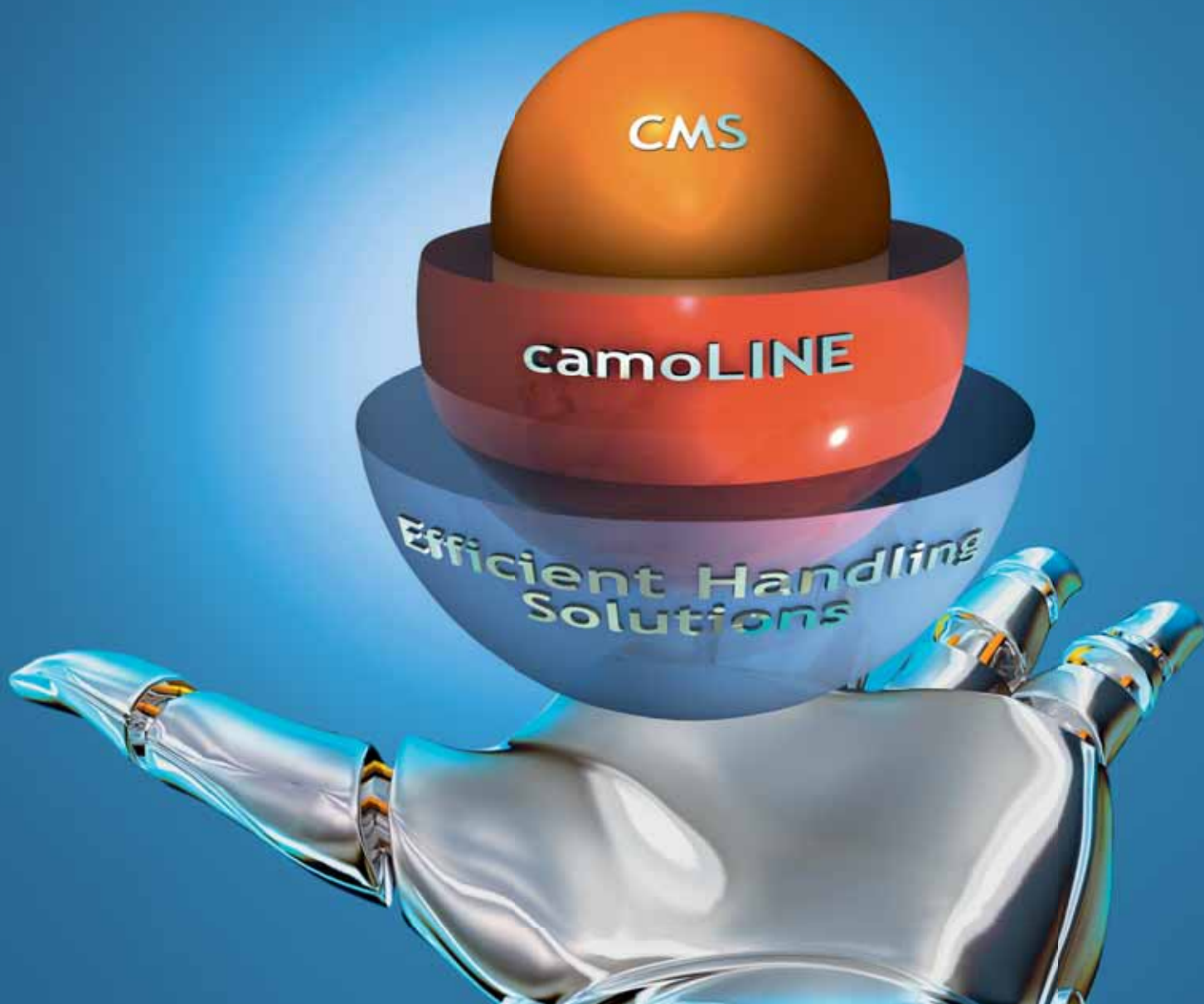


Efficient Handling Solutions

Solutions for handling applications from Rexroth



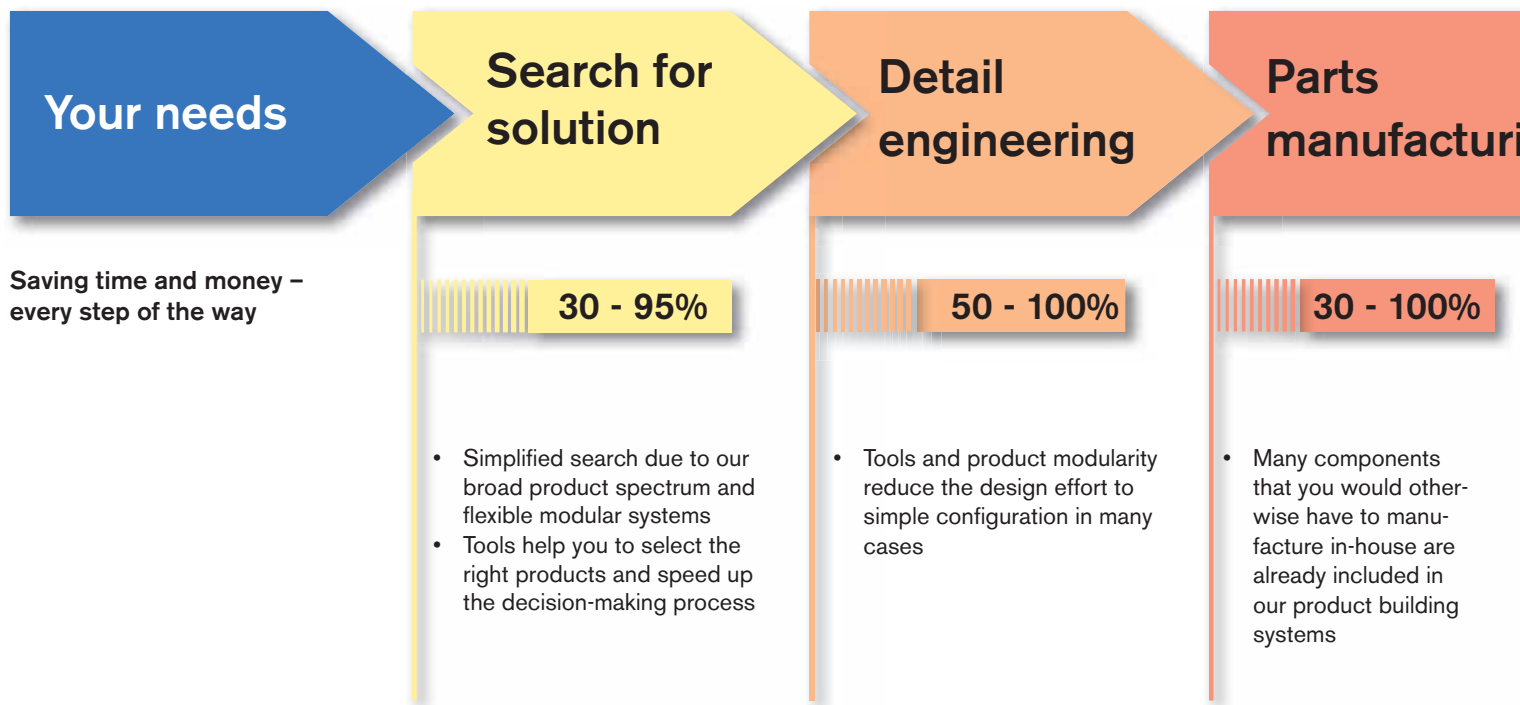
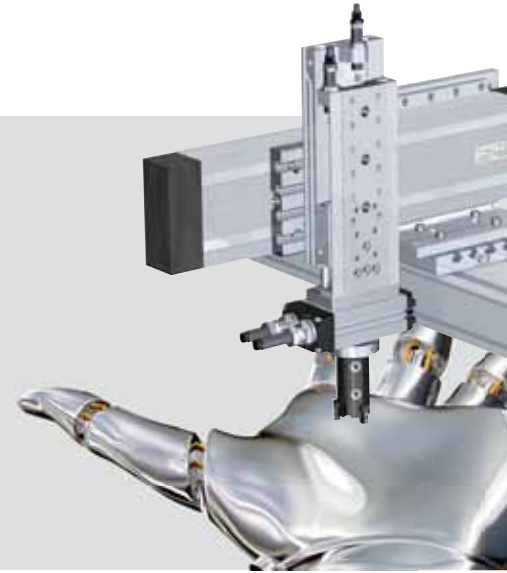
The efficient route to best results

Whatever you want to automate, we will find the most appropriate solution for each specific application. Our experiences in many different industries help us – and you – to achieve best results.

Our entire product portfolio of electric drives and controls, linear motion and assembly technologies, and pneumatics has been designed with this goal in mind.

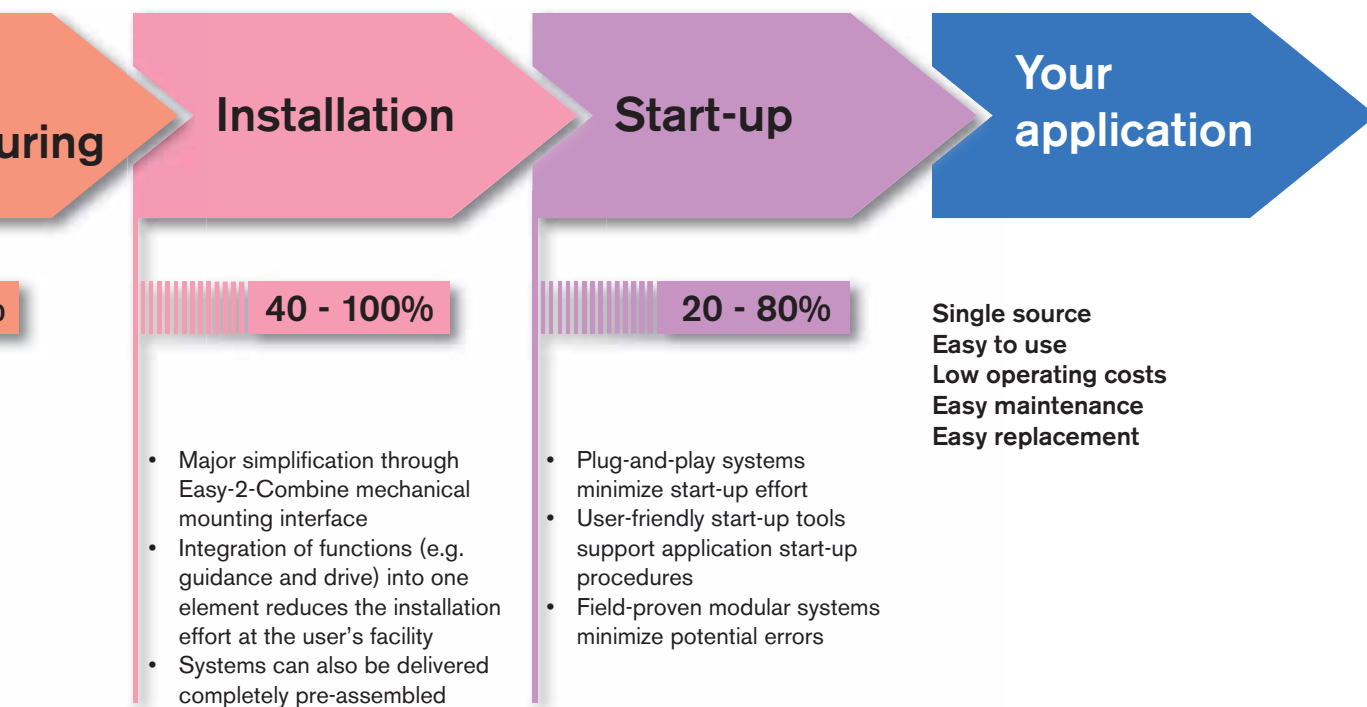
In addition to areas like factory automation, machine automation and assembly and transport technologies, **here we show you how our pre-configured products can help you to achieve significant time and costs savings in handling applications.**

Special requirements can also be accommodated, as you will see from the examples on the following pages.





Bosch Rexroth – global partner and specialist for your handling applications



Modularity for best effectiveness

Efficient Handling Solutions – more than just a system

Our innovative product system comprises three different standardization levels, all in high quality to meet the rising scale of requirements across the applications spectrum.

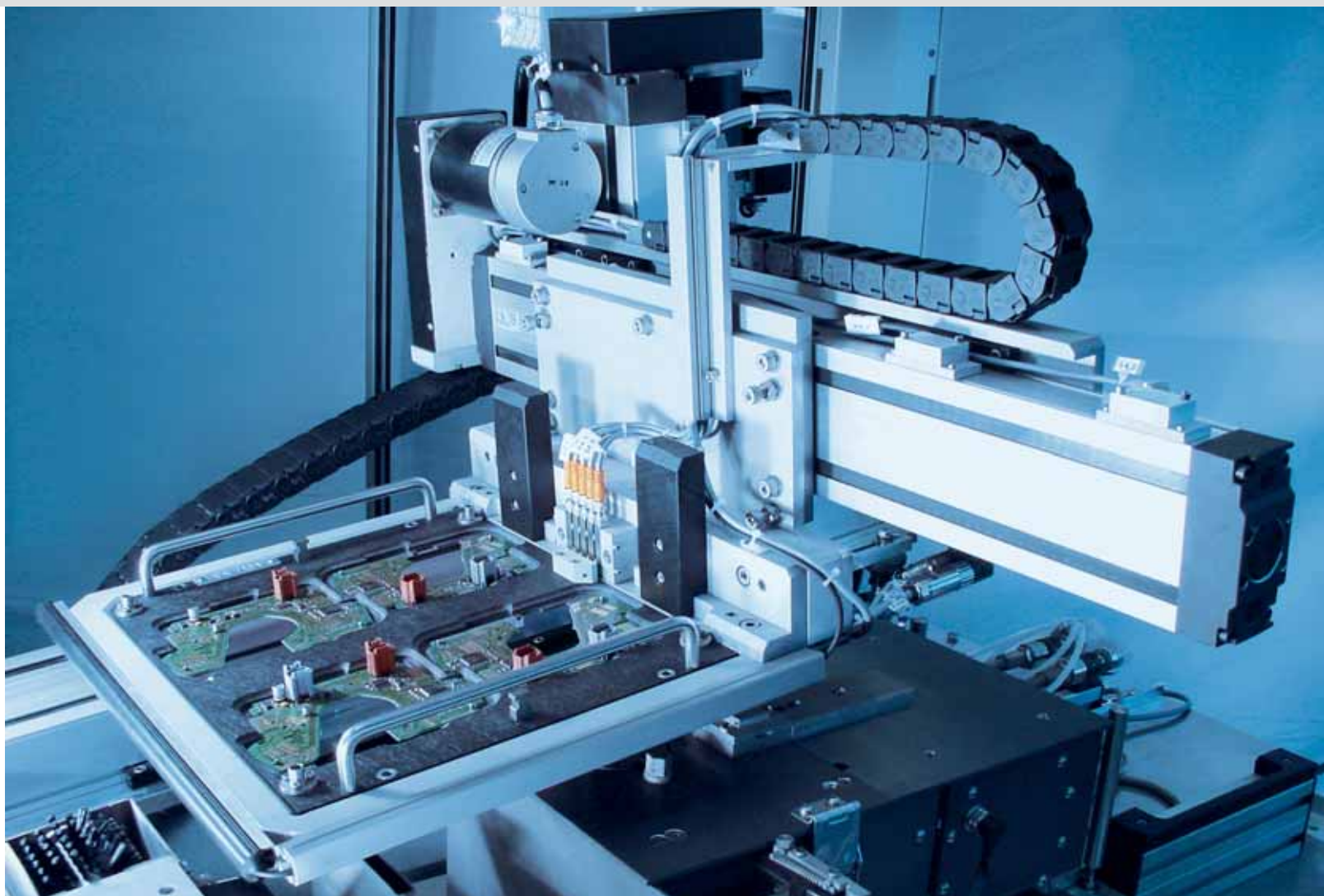
Our proven 3-level system is optimally designed to span the extremes between full standardization and customization in handling applications.

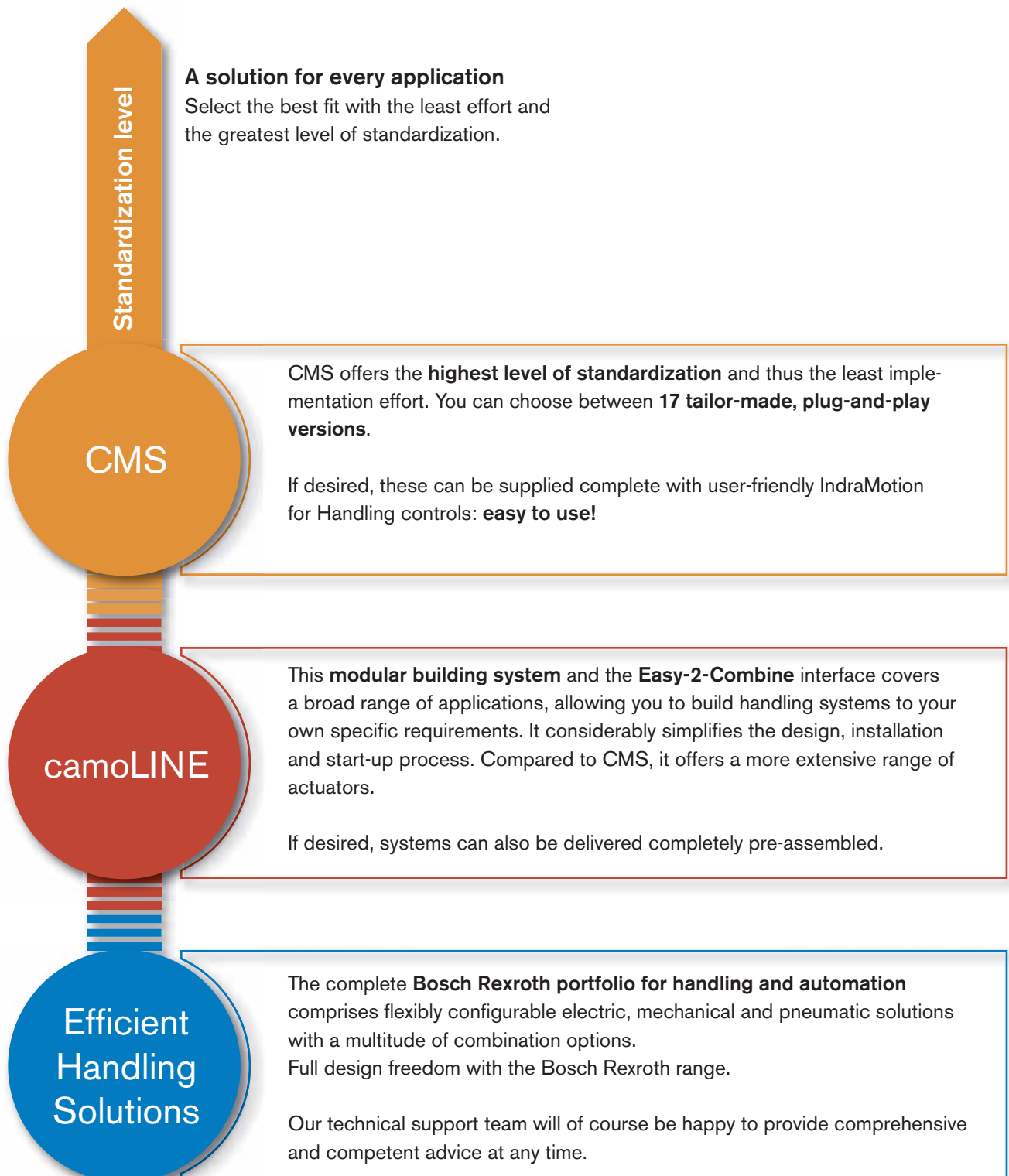
You decide the best fit for you: as **standardized as possible** – as **customized as necessary**.

Our flexible CMS and camoLINE product systems, based on the extensive Efficient Handling Solutions range, offer you an outstanding variety of modular opportunities.

camoLINE and CMS are also ideal for individual auxiliary applications.

If you wish, we can also provide expert assistance in planning and designing the automation solution for your specific application.





Efficient Handling Solutions – A 360° program covering many applications

The product spectrum at a glance

Tools

- LinSize
- Easy-2-Combine
- CAD Configurator
- CMS Selection System

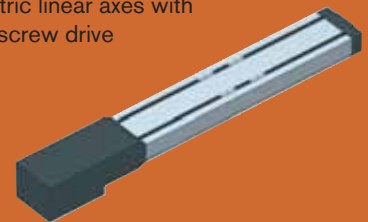


Your needs



Motion

Electric linear axes with ball screw drive



Pneumatic slides

Electric linear axes with toothed belt drive



Feed Module with ball screw drive



Electric linear axes



Drive

Communication

Operator controls / Control system

Drive unit and servo motor for the lower power range



Interfaces



Motion Control system



HMI



Gripper



Drive unit and servo motor

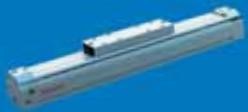
Rotary Compact Module



Pneumatic cylinder



Rodless cylinder



Valve block
Wired interface

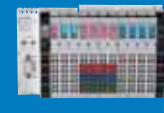


Valve block
Field bus interface



Drive Diagnostic Link

I/O technology in control cabinet



I/O technology at the machine



System

Programming

CMS

Standardization level

camoLINE

Efficient Handling Solutions



Your application

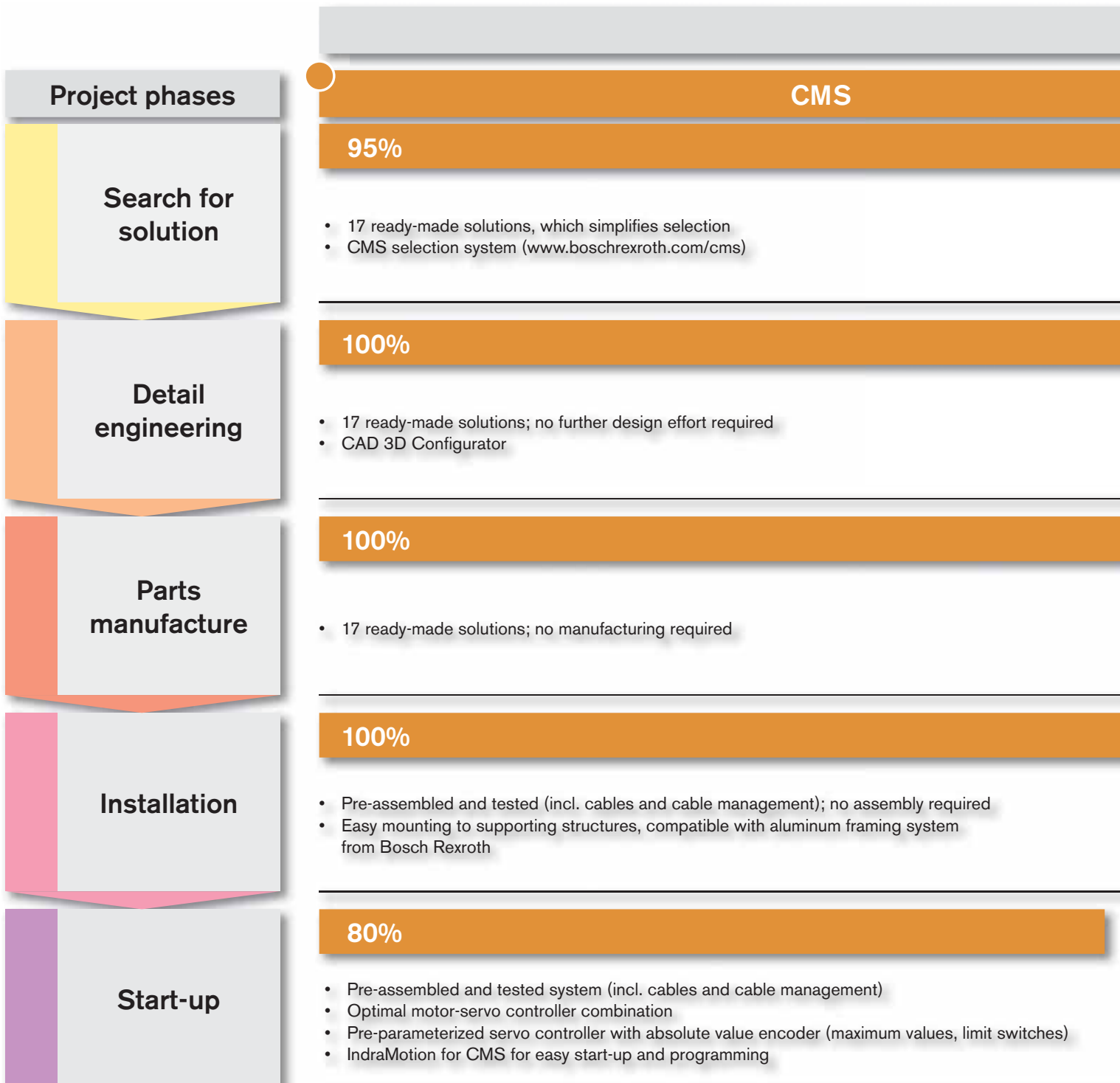
```
OVR 100% MANUAL
JOG MODE: CONTINUOUS
Pick&Place PICK_POS
X: 150.00 X: 150.00
Y: 254.90 Y: 254.90
Z: 578.93 Z: 578.93
A: 90.00 A: 90.00
```

```
Pick&Place 1
> NOP
MOVE HOME
MOVE PICK_POS
GRIPPER=1
WAIT GR_CLOSE=1
MOVE VIA OVER_PICK
```

EDIT	INS	DEL	SAVE
PG-DWN	TEACH	DEF	PG-UP



Systematic approach for optimal solutions



Cost reduction / time saving: up to .. (%)

camoLINE

50%

- Flexible building system with mechanics, pneumatics and electric drives all configurable from one catalog, thus simplifying the search for a solution

90%

- Flexible building system with mechanics, pneumatics and electric drives, thus simplifying the design effort
- Grippers and Rotary Compact Modules included in the building system
- Extensive accessories for connection technology, cable management and base frame, all included in the building system
- CAD 3D Configurator (www.boschrexroth.com/camoline)

70%

- Pre-assembled mechanical and pneumatic linear motion systems
- Extensive accessories for connection technology, cable management and base frame, all included in the building system

100%

- Easy-2-Combine mechanical interface
- Available as components, assembly kit, or pre-assembled

40%

- Bosch Rexroth start-up support
- Easy mechanical start-up thanks to proven building system concept

Efficient Handling Solutions – without CMS and camoLINE

30%

- Bosch Rexroth range of flexibly configurable electric, mechanical and pneumatic solutions
- Bosch Rexroth applications support

50%

- Bosch Rexroth range of flexibly configurable electric, mechanical and pneumatic solutions
- 3D CAD files as downloads
- Bosch Rexroth applications support
- Pre-matched drive and guidance components
- Extensive accessories for connection technology

30%

- Pre-assembled mechanical and pneumatic linear motion systems
- No need to machine the various components

40%

- Range of flexibly configurable mechanical and pneumatic linear axes
- Drive and guidance components pre-assembled

20%

- Bosch Rexroth start-up support
- Start-up supported by tools (e.g. IndraWorks)

Product highlights

CMS

www.boschrexroth.com/cms

Pre-assembled and pre-configured solutions

- CMS is supplied **only** as a pre-assembled system

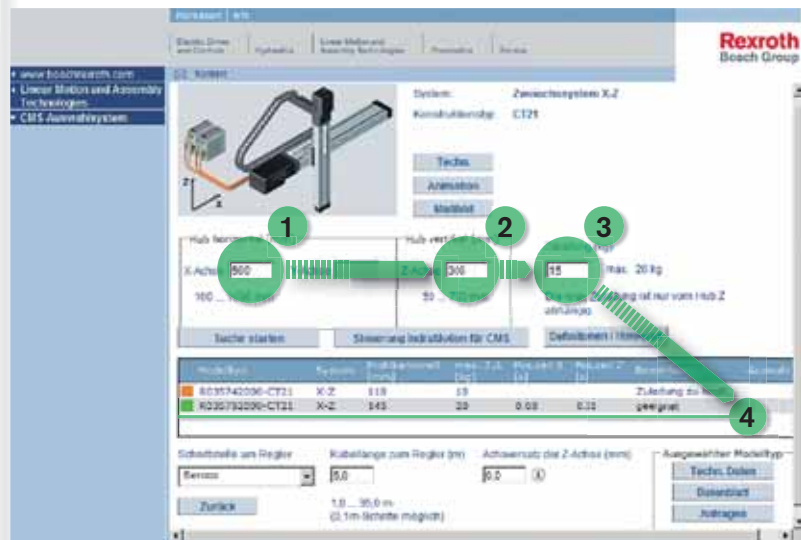
Tools

- CMS Selection System
- CMS CAD Configurator



Easy click solutions

Quick and easy system finder



- 1 Select the number of axes
- 2 Enter the desired strokes
- 3 Enter the desired weight

- 4 Download CAD data
- Suitable systems are indicated by traffic lights:

Benefits of preconfigured systems

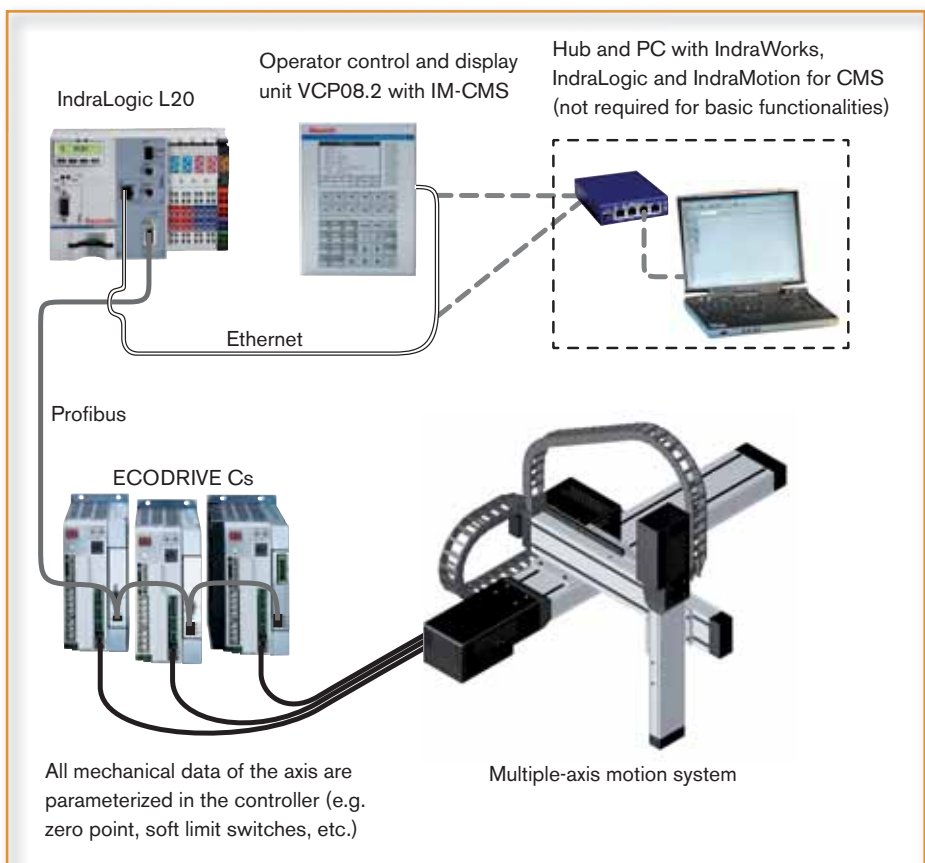
Choose any of 17 pre-configured system solutions that already meet users' specific requirements.

- One single order number for a complete and optimally matched motion system with 1, 2 or 3 axes
- Saves considerable time during planning, installation and start-up
- Delivered as a plug-and-play system with motor and controller



Pre-parameterization / programming

Pre-parameterized control and operating unit with pre-installed IndraMotion for CMS software. Ready to use, easy to program, with optional add-ons: **easy to use**



Product highlights

camoLINE

www.boschrexroth.com/camoline

Perfectly matched building system

- camoLINE can be supplied **either** pre-assembled **or** as an assembly kit (with all components)

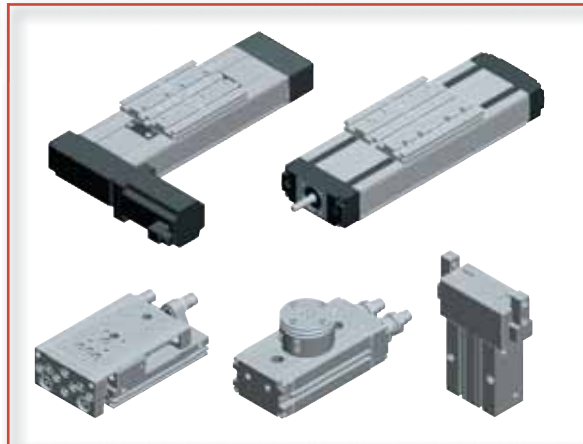
Tools

- Easy-2-Combine sizing and calculation tool
- camoLINE CAD Configurator



Mechanical system

- Linear axes in several sizes
- Different types of drive units for the same size (e.g. ball screw, toothed belt, pneumatic)
- Optimally matched rotary and gripper components
- Proverbial "Rexroth Quality"



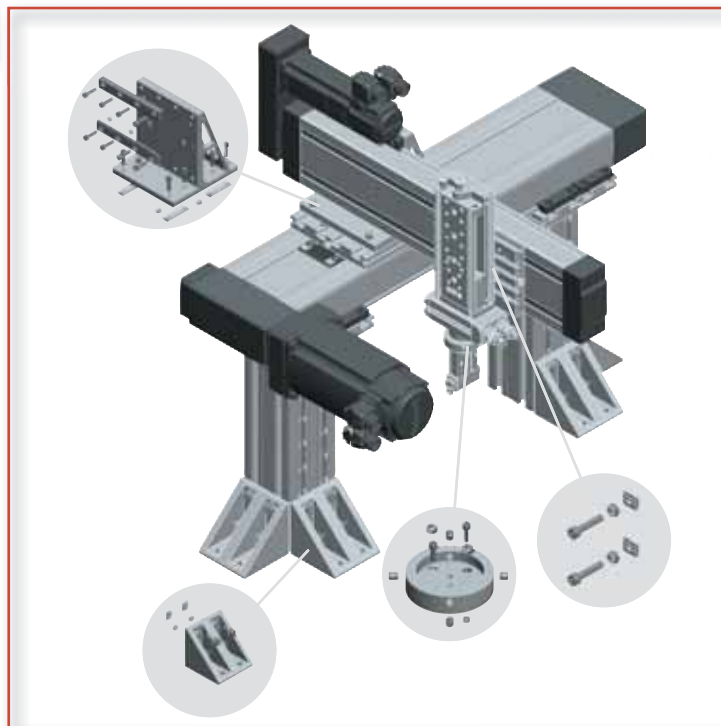
Drives

- Selection of matching motors (servo or stepping motor designs)
- Matching controllers and commonly used interface modules



Connection technology

- Direct connection without adapter plates results in high structural integrity, minimal space requirement, minimal weight and high dynamics
- Standardized, positive-locking connection elements allow a variety of axis combinations
- Easy assembly
- Easy reproducibility
- Standardization through fixed dimensional increments
- Reduced parts complexity thanks to multiple combination options using the same connection kit



Accessories

- Strut profiles in two sizes for constructing frames
- Cable management chains available in six different sizes including guide channels and all necessary fastening elements
- Virtually limitless attachment options for designers



Product highlights

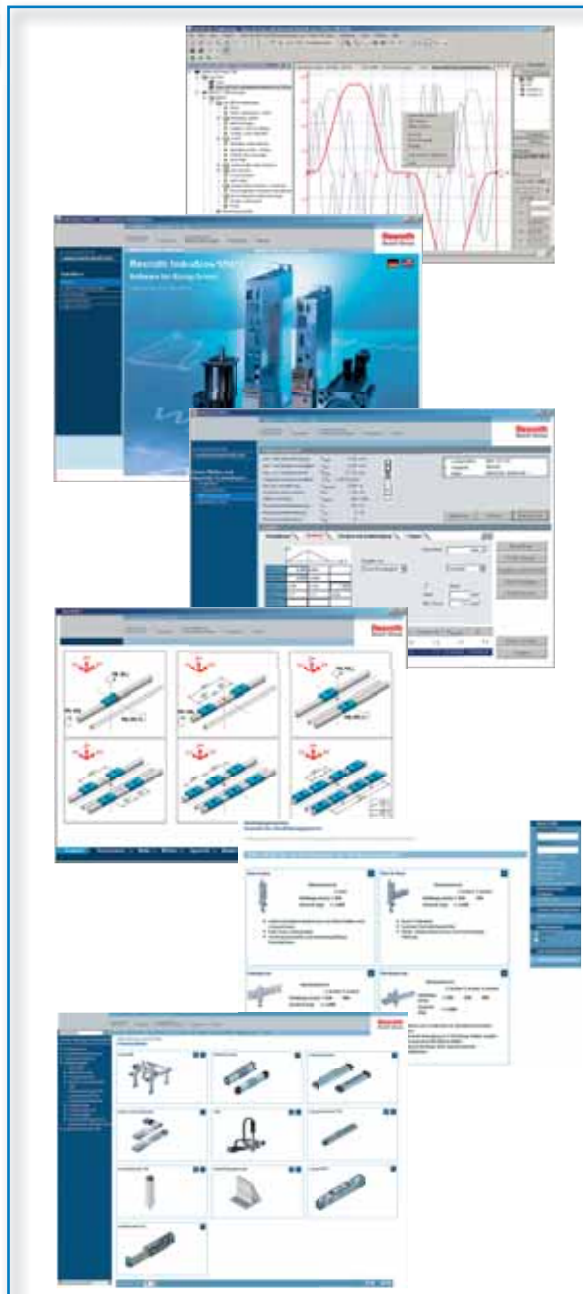
Efficient Handling Solutions

Complete range of automation products from Bosch Rexroth

- Broad product spectrum covers *all* requirements

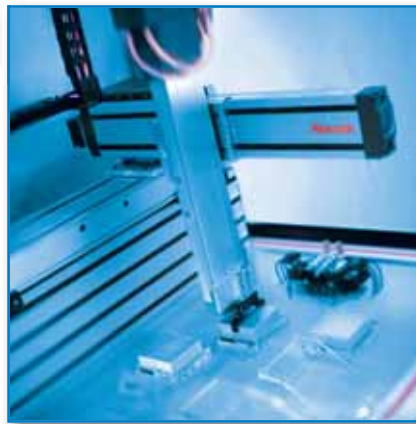
Tools

- IndraWorks
for starting up electric control units and drives
- IndraSize
for sizing servo motors
- LinSize
for sizing and calculation of linear axes and multiple-axis systems
- Linear Motion Designer
for sizing profiled rail systems
- Easy-2-Combine
for sizing pneumatic components
- CAD Configurator
for easy 3D configuration of components



Product range

Linear Motion and Assembly Technologies



- Ball Rail Systems
- Roller Rail Systems
- Cam Roller Guides
- Linear Bushings and Shafts
- Ball Screw Drives
- Ready-to-install Linear Motion Systems
- Multiple-Axis Motion Systems
- Aluminum Profile Framing System

Electric Drives and Controls



- Drive Technology
- Drive Systems
- Motor-Integrated Drive Systems
- Motors and Gearboxes
- Frequency Converters
- Automation Systems
- Control Technology
- Tightening & Press-Fit Systems
- Resistance Welding

Pneumatics



- Piston Rod Cylinders
- Rodless Cylinders
- Gripper and Vacuum Technology
- Cylinder-Valve Units
- Valve Terminal Systems
- Single Valves
- Pressure regulators
- Preparation of compressed air
- Mountings and Accessories
- Tooth Chains

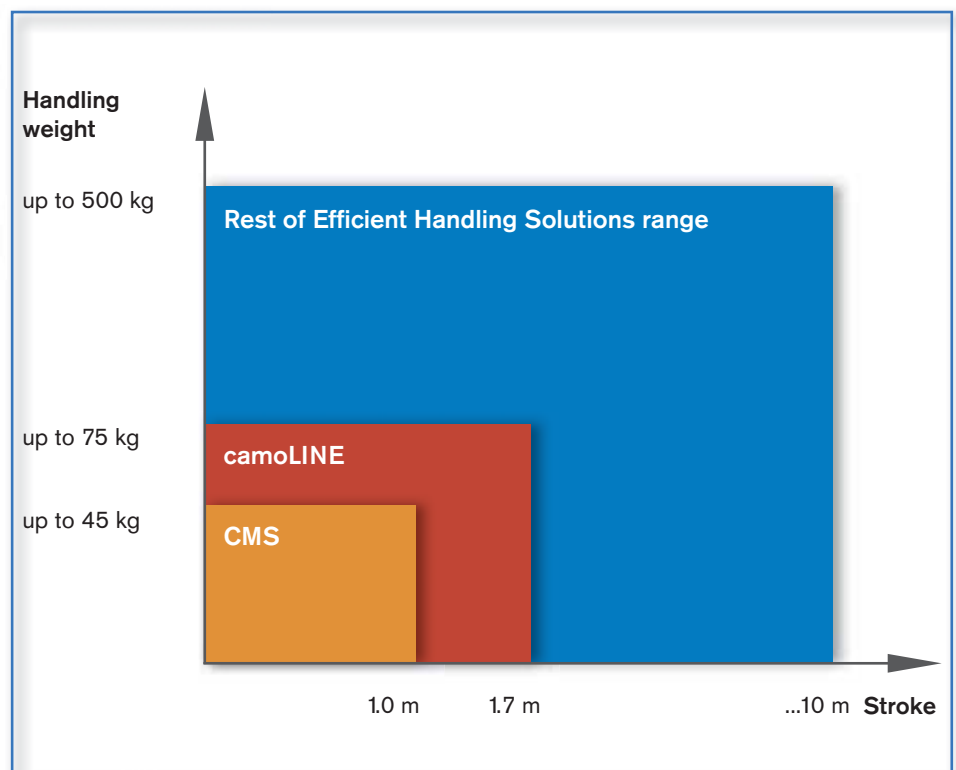
Selection criteria

Linear speeds

- Screw-driven axes up to 2.5 m/s
- Belt-driven and direct-drive axes up to 10 m/s

Repeatability

- Screw-driven and direct-drive axes up to 0.005 mm
- Belt-driven axes up to 0.1 mm



It pays to compare!

The cost comparison calculator

Save costs with **standardized product systems**.

What looks more expensive at first sight ultimately puts cash back in your pocket.

What you save:

Even without CMS and camoLINE, the Efficient Handling Solutions range already offers great savings potential over custom designs, through products like pre-assembled linear axes.

Let's take a look at the additional savings you can achieve by using the more highly standardized camoLINE and CMS systems rather than designing and building your own constructions from individual components. The cost of materials may be higher, but the labor costs drop to a fraction of what they were.

In the example shown here we have listed the costs per resource at every stage in the process.

Calculate your benefit with the cost comparison calculator or ask your Bosch Rexroth sales partner to work out the difference for your specific application.

Non-standard Design versus CMS or camoLINE					
Project description:	Replacement of an existing pick & place system with a completely assembled and tested CMS or camoLINE configuration				
Notes	The current Pick & Place system consists of a large number of individual components. This solution generates considerable costs for purchasing, installation and start-up. The CMS system is proposed as an alternative. This is available with up to three axes and can be delivered completely assembled, pre-configured and tested. It comes complete with all necessary cables and documentation. The performance is guaranteed.				
Labor Costs					
Resource	Hourly rate	Non-standard design		CMS/camoLINE	
		Hours	Costs	Hours	Costs
Mechanical design	100	24	2400	1	100
Pneumatics design	100	3	300	0	0
Electrical design	100	3	300	1	100
Software design	120		0	0	0
Procurement	70	3	210	1	70
Shipment	40	1	40	0,5	20
Goods receipt / storage	40	1	40	0,5	20
Paint shop	0		0	0	0
Mechanical assembly	40	2	80	0,5	20
Pneumatics assembly	40	0,75	30	0,25	10
Electrical assembly	45	4	180	2	90
Mechanical start-up	40	1	40	0,5	20
Electrical start-up	80	1	80	0,5	40
Quality assurance	80	1,5	120	0,5	40
Project management	90	3	270	0,5	45
Software start-up	120		0	0	0
Total		48,25	4.090 €	8,75	575 €
Procurement Costs					
Item	Non-standard design		CMS/camoLINE		Costs
	Comment	Costs	Comment	Costs	
Mechanical components		2600			6358
Pneumatic components		500		incl.	
Electrical components				incl.	
Drives/controllers		2400		incl.	
Small parts	Brackets	200			
Miscellaneous					
Total		5.700,00 €			6.358,00 €
Savings at a glance					
Item	Non-standardized	CMS/camoLINE	Savings		
Labor costs	4.090,00 €	575,00 €	3.515,00 €		
Material costs	5.700,00 €	6.358,00 €	-658,00 €		
Total savings			2.857,00 €		41%

Project-oriented support

Competent support throughout, from project planning to system start-up

Seminar program

- Linear Motion and Assembly Technologies
- Pneumatics
- Electric Drives and Controls

Applications support

- Product selection
- Complete sizing service
- Sizing assistance
- Quotation

Remote assistance by phone

- Start-up support

On-site assistance

- Start-up and tuning of axes

Rexroth Bosch Group


TOP-CLASS TRAINING


PRECISE PLANNING


PERSONALIZED ADVICE

HANDS-ON HELP

System and application examples


One-axis systems X  Page 22

Two-axis systems X/Y  Page 24

Three-axis systems X/Y/Z  Page 27

The number of dots indicates the number of axes

 CMS

 camoLINE

 Efficient Handling Solutions

The color of the dot indicates the product system

Inquiry

Form

Page 32

Examples – One-axis systems

CMS	
Part number	R035770041
Technology	Pre-assembled one-axis system with motor, drive unit, control system, servo controller, operator control unit (IndraMotion and Profibus DP), and cable set
Axes	(X) CKK 15-110
Advantages	System pre-configured for immediate start-up. Fast selection on the internet or by your sales partner. One-axis system selectable in three sizes with three configuration variants each

Application example:	Handling, Dispensing
Payload	max. 20 kg
Linear speed	max. 0.8 m/s
Stroke	max. 800 mm
Repeatability	high



camoLINE	
Part number	R115950041
Technology	One-axis system, completely pre-assembled, with motor attachment via planetary gear for servo motor (reduction $i = 5$)
Axes	(X) CKR 15-110
Advantages	Flexibility thanks to modular building system principle. Standardized modular dimensions and spacing minimize installation effort. Easy-2-Combine interface for combining electric axes and pneumatic components

Application example:	Handling
Payload	2 kg
Linear speed	max. 5 m/s
Stroke	max. 1720 mm
Repeatability	medium

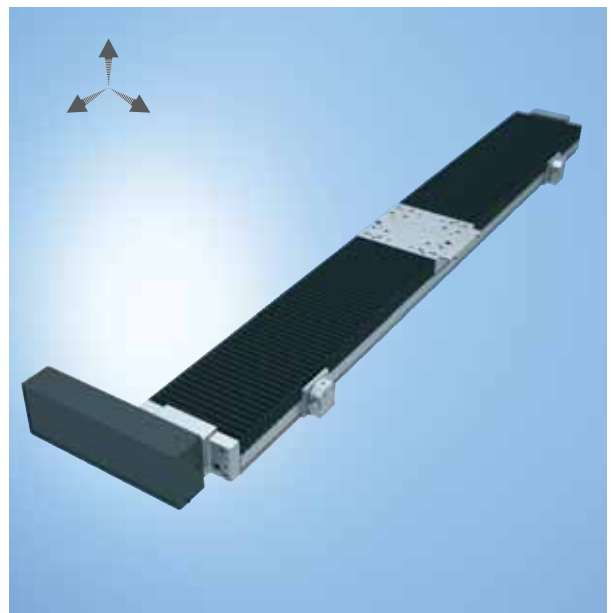


Efficient Handling Solutions

Part number	R146020500
Technology	One-axis system with timing belt side drive ($i = 1$) for servo motor (MSK040)
Axes	(X) TKK 15-155 AI
Advantages	Rigidity of module results in very high moment load capacity. Precise travel even at high linear speeds

Application example: Solar cell production line

Payload	15 kg
Linear speed	0.5 m/s
Stroke	2860 mm
Repeatability	high
Special feature	Available in aluminum or steel



Efficient Handling Solutions


Part number	R145070600
Technology	One-axis system with linear motors and integrated linear position measuring system with distance coded reference marks
Axes	(X) TKL 25-275
Advantages	Zero-maintenance, backlash-free linear motors combined with integrated position measuring system permit highly precise travel at very high speeds and accelerations

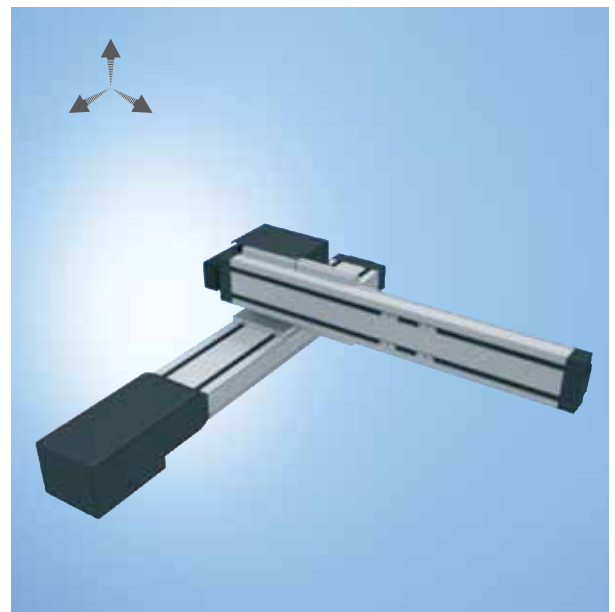
Application example: Joining system in the automotive industry

Payload	130 kg
Linear speed	2 m/s
Stroke	3450 mm
Repeatability	very high
Special feature	Module with two carriages




Examples – Two-axis systems

CMS 	
Part number	R035770020
Technology	Pre-assembled two-axis system with motor, drive unit, control system, servo controller, operator control unit, and cable set
Axes	(X) CKK 20-145 / (Y) CKK 15-110
Advantages	System pre-configured for immediate start-up. Fast selection on the internet or by your sales partner. Two-axis system selectable in two sizes with three configuration variants each




Application example: Handling for medical technology	
Payload	max. 20 kg
Linear speed	max. 1.0 m/s
Stroke	max. 1000 mm
Repeatability	high

camoLINE 	
Part number	R115950024
Technology	Two-axis system, completely pre-assembled, with motors attached
Axes	(X) CKK 15-110 / (Y) CKR 15-110
Advantages	Flexibility thanks to modular building system principle. Standardized modular dimensions and spacing minimize installation effort. Easy-2-Combine interface for combining electric axes and pneumatic components




Application example: ABS valve housing production	
Payload	10 kg
Linear speed	0.75 m/s - max. 0.77 m/s
Stroke	max. 1720 mm
Repeatability	medium

camoLINE 	
Part number	R115950032
Technology	Two-axis system, completely pre-assembled, with belt side drive for servo motor. Pneumatic component Mini Slide MSC attached via connection plate
Axes	(X) CKK 12-90 / (Y) Mini Slide MSC
Advantages	Flexibility thanks to building system principle, allowing easy mounting with centering rings and clamping fixtures

Application example: Pick & Place	
Payload	up to 2.8 kg at the gripper
Linear speed	0.77 m/s
Stroke CKK	330 mm
Stroke MSC	30 mm
Repeatability	high



Efficient Handling Solutions 	
Part number	R115800196
Technology	Two-axis system (X-Y table) with glass scale, cable management chains and timing belt side drive
Axes	(X) PSK 90 / (Y) PSK 90
Advantages	Highest precision due to robust modules with high rigidity and straightness. High travel speeds and accelerations even with heavy loads

Application example: Precision laser machining	
Payload	20 kg
Linear speed	0.5 m/s
Stroke	up to 800 mm
Repeatability	very high
Special feature	Combination with glass scale for highest precision



Examples – Two-axis systems

Efficient Handling Solutions

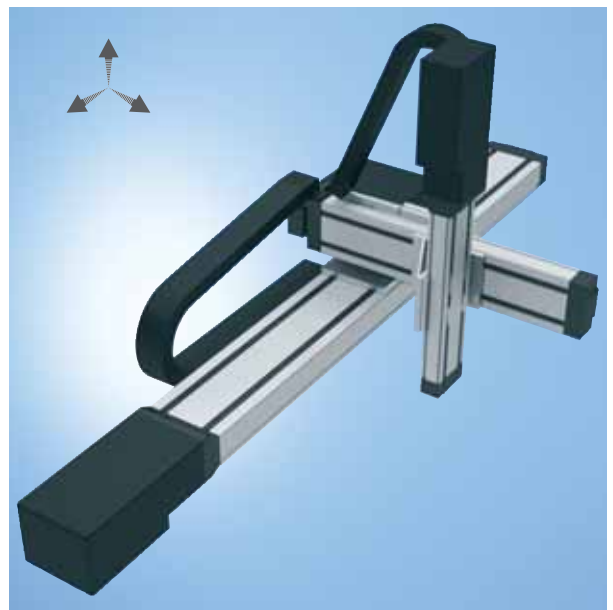
Part number	R115800186
Technology	Two-axis system with connecting shaft, cable management chain and servo motor
Axes	(X) 2 x MKR 15-65 / (Y) MKK 15-65
Advantages	High travel speeds with heavy loads thanks to toothed belt drive

Application example:	Automotive assembly line
Payload	28 kg
Linear speed	0.5 m/s
Stroke	up to 10000 mm
Repeatability	medium



Examples – Three-axis systems

CMS	
Part number	R035770019
Technology	Completely pre-assembled three-axis system with motor, drive unit, cable management chains, control system, servo controller (Sercos controller / IndraMotion), operator control unit, and cable set
Axes	(X) CKK 20-145 / (Y) CKK 15-110 / (Z) CKK 12-90
Advantages	System pre-configured for immediate start-up. Fast selection on the internet or by your sales partner. Three-axis system selectable in two configuration variants



Application example:	Handling
Payload	max. 12 kg
Linear speed	max. 1.0 m/s
Stroke	max. 1000 mm
Repeatability	medium / high

camoLINE	
Part number	R115950016
Technology	Three-axis system, completely assembled, including profiled support and connection elements
Axes	(X) 2 x CKR 20-145 / (Y) CKK 15-110 / (Z) pneumatic gripper
Advantages	Flexibility thanks to modular building system principle. Easy-2-Combine interface for combining electric axes and pneumatic components. Standardized modular dimensions and spacing minimize installation effort



Application example:	Handling
Payload	1.2 kg at the gripper
Linear speed	0.3 m/s
Stroke CKR	up to 1720 mm
Stroke pneumatic gripper	6 mm
Repeatability	medium

Examples – Three-axis systems

camoLINE	
Part number	R115950007
Technology	Three-axis system, completely assembled, cable management chain, connecting shaft, and piston rod cylinder
Axes	(X) 2 x CKR 12-90 / (Y) CKR 12-90 / (Z) MSC
Advantages	Flexibility thanks to modular building system principle. Easy-2-Combine interface for combining electric axes and pneumatic components. Standardized modular dimensions and spacing minimize installation effort. Includes profiled support and connection elements

Application example:	Automotive assembly line
Payload	2 kg
Linear speed	0.6 m/s
Stroke	up to 1720 mm
Repeatability	medium



camoLINE	
Part number	R115950004
Technology	Three-axis system, completely assembled, with connection elements
Axes	(X) 2 x CKR 20-145 / (Y) CKR 20-145 / (Z) piston rod cylinder (MSC)
Advantages	Flexibility thanks to modular building system principle. Easy-2-Combine interface for combining electric axes and pneumatic components. Standardized modular dimensions and spacing minimize installation effort. Includes profiled support and connection elements

Application example:	Automotive assembly line
Payload	5 kg
Linear speed	0.5 m/s
Stroke	1720 mm
Repeatability	medium



Efficient Handling Solutions



Part number	R115800167
Technology	Three-axis system (portal), with connection elements and special motors attached
Axes	(X) 2 x MKK 20-80 / (Y) BKK 20-135 / (Z) CKK 15-110
Advantages	Load-optimized BKK with angled carriage for highest rigidity. X-axes synchronized electrically via controller

Application example:	Dispensing
Payload	48 kg
Linear speed	0.6 m/s
Stroke	1285 mm
Repeatability	high
Special feature	Use of screw supports possible to achieve higher travel speeds



Efficient Handling Solutions



Part number	R115800168
Technology	Three-axis system (portal), with connecting shaft, angular gears, and connection brackets
Axes	(X) 2 x MKR 25-110 / (Y) CKR 25-200 / (Z) CKK 20-145
Advantages	Angular gears to exploit the full dynamic potential in restricted spaces

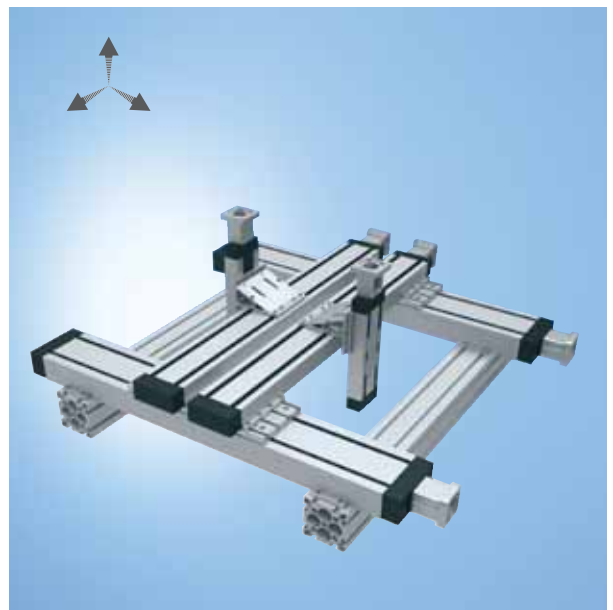
Application example:	Beverage filling plant
Payload	30 kg
Linear speed	2.0 m/s
Stroke	1890 mm
Repeatability	medium



Examples – Three-axis systems

Efficient Handling Solutions	
Part number	R115920158
Technology	Three-axis system (combination) with special motor attached via motor mount and coupling
Axes	(X) 2 x CKK 20-145 / (Y) 2 x CKK 15-110 / (Z) 2 x CKK 12-90
Advantages	Compact system with ball screw drives enables precise motion and positioning

Application example: PCB assembly	
Payload	0.2 kg
Linear speed	0.5 m/s
Stroke	920 mm
Repeatability	high



Efficient Handling Solutions	
Part number	R115800189
Technology	Three-axis system (combination) with cable management chain and integrated gearbox for servo motor
Axes	(X) CKR 25-200 / (Y) CKK 20-145 / (Z) CKK 15-110
Advantages	Integrated gearbox reduces space requirement. Fast travel over long distances due to toothed belt drive saves time

Application example: Pick & Place	
Payload	2 kg
Linear speed	1.1 m/s
Stroke	6445 mm
Repeatability	medium
Special feature	Ceiling-mounted module



Efficient Handling Solutions

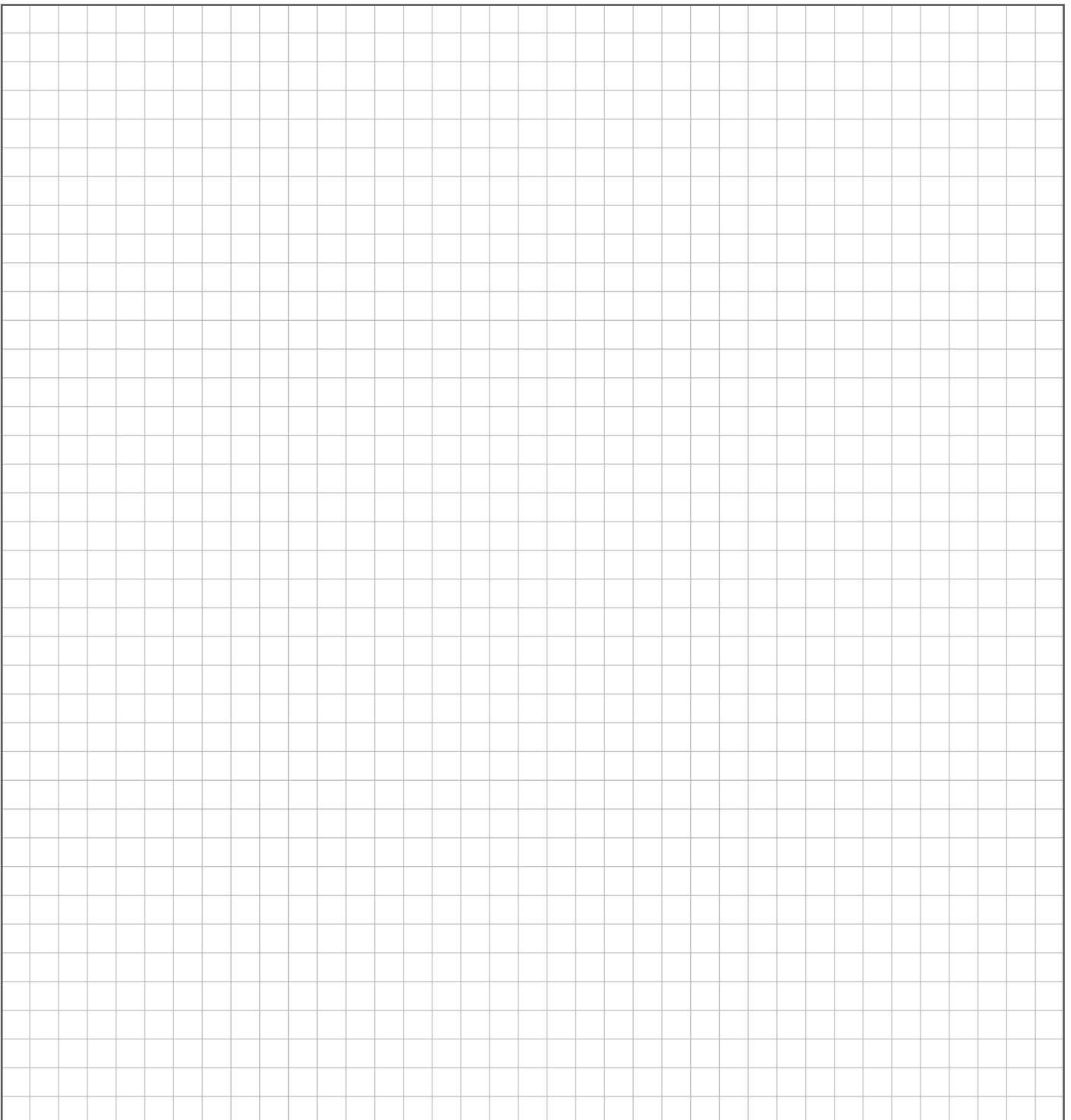
Part number	R115800108
Technology	3-axis Ball Rail Table with cable management chain. TKL with integrated position measuring system and distance coded reference marks
Axes	(X) TKL 30-325 / (Y) TKL 25-275 / (Z) TKK 20-225
Advantages	Integrated position measuring system combined with high-dynamic linear motor enables highly precise travel at high speeds and accelerations. Different systems can be combined with each other for optimal tuning. TKK also available with glass scale

Application example: Attaching magnets to large rotors

Payload	42 kg
Linear speed	1.4 m/s
Stroke	1434 mm
Repeatability	high
Special feature	Y-axis supported by steel base



Notes



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