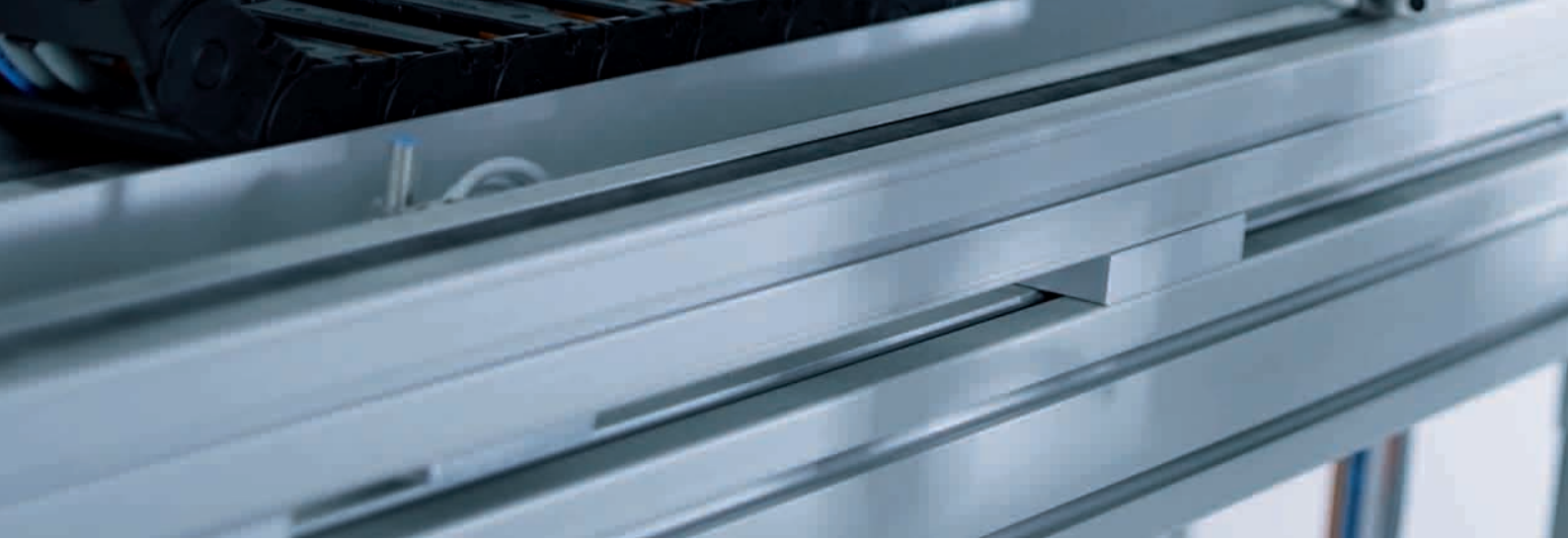
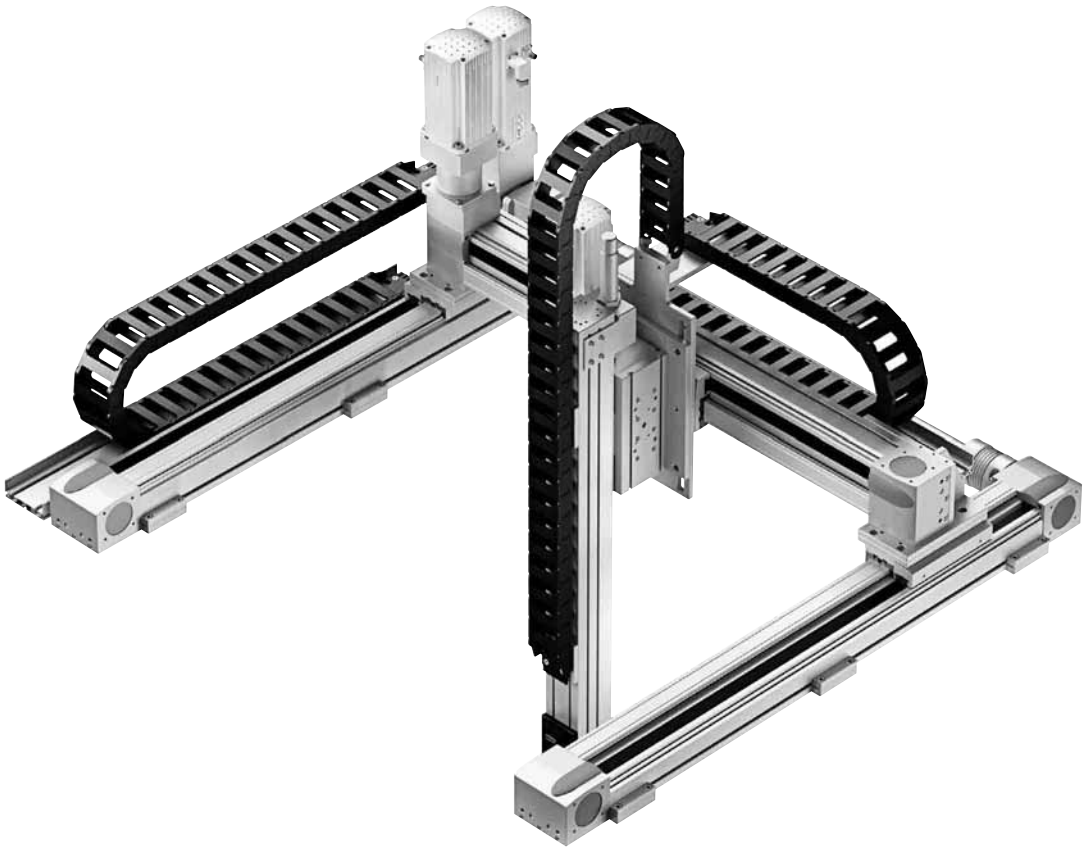


Three-dimensional gantries



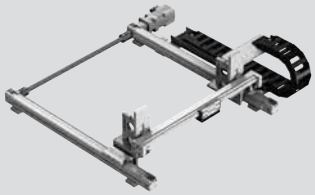
A three-dimensional gantry consists of horizontal gantry axes and a vertical drive.

- Can be used universally for handling light to heavy workpieces or high effective loads
- Ideal for very long strokes
- High mechanical rigidity and sturdy design
- Pneumatic and electrical components – freely combinable
- As electrical solution – variable positioning/any desired intermediate positions

Range of application:

- For any movement in 3D space
- Very high requirements on precision and/or very heavy workpieces, with long strokes at the same time

Planar surface gantry
The planar surface gantry is equivalent to a three-dimensional gantry, but without a Z-axis and allows free movement in the plane.

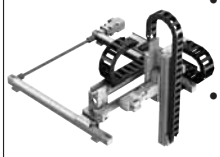


Example: automotive industry
Load handling in assembly system for solenoids

Requirements

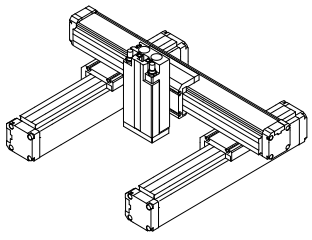
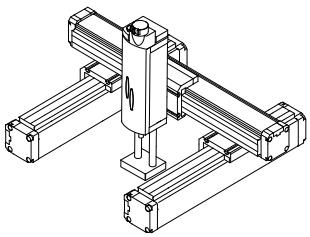
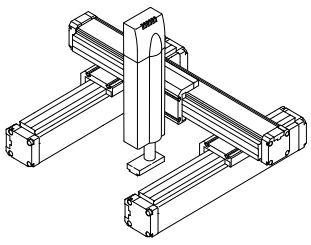
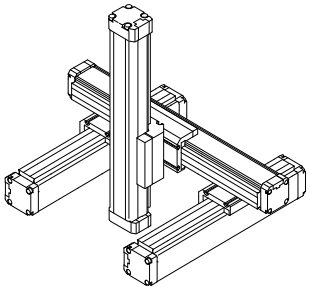
- Flexible positioning
- High speed and long horizontal strokes
- Fast system availability
- Complete documentation of process values

Solution
Three-dimensional gantry with toothed belt axes DGE from the multi-axis modular system

	Type	Important characteristics	Axis design	Effective load	Max. effective strokes	Components
	• Three-dimensional gantry as mono axis • Free movement of Z-axis in the available space (3D)	• Compact design • High process reliability thanks to installation integration • Pneumatic and electric drives • Repetition-accurate, centralised direct axis connections • Pneumatic and electric drives (with freely programmable positions in X and Y) • Very high dynamic response and precision	X: Gantry axes Y: Gantry axes **Z:** **Slides** **Cantilever axis**	Mono: 0 to 6 kg	X: Up to 8500 mm Y: Up to 1500 mm Z: Up to 300 mm	X: DGE/**EGC** Y: DGE/**EGC** DGC/DGPL Z: DGSL EGSA
	• **See above**	• **See above, points 1–5** • Z-axis with optional intermediate position (can be passed through) and clamping unit	X: Gantry axes Y: Gantry axes **Z:** **Cantilever axis**	Mono: 0 to 5 kg	X: Up to 8500 mm Y: Up to 1500 mm Z: Up to 200 mm	X: DGE/**EGC** Y: DGE/**EGC** DGC/DGPL Z: HMPL
	• **See above**	• **See above, points 1–5** • Z-axis with optional intermediate position and clamping unit	X: Gantry axes Y: Gantry axes **Z:** **Cantilever axis**	Mono: 0 to 10 kg*	X: Up to 8500 mm Y: Up to 2000 mm Z: Up to 400 mm	X: DGE/**EGC** Y: DGE/**EGC** DGC/DGPL Z: HMP
	• Three-dimensional gantry as mono or duo axis • Free movement of Z-axis in the available space (3D)	• **See above, points 1–5** • Z-axis alternative guides and drive concepts (motors)	X: Gantry axes Y: Gantry axes **Z:** **Cantilever axis**	Mono: 0 to 15 kg Duo: 0 to 25 kg	X: Up to 8500 mm Y: Up to 2000 mm Z: Up to 900 mm	X: DGE/**EGC** Y: DGE/**EGC** DGC/DGPL Z: DGEA

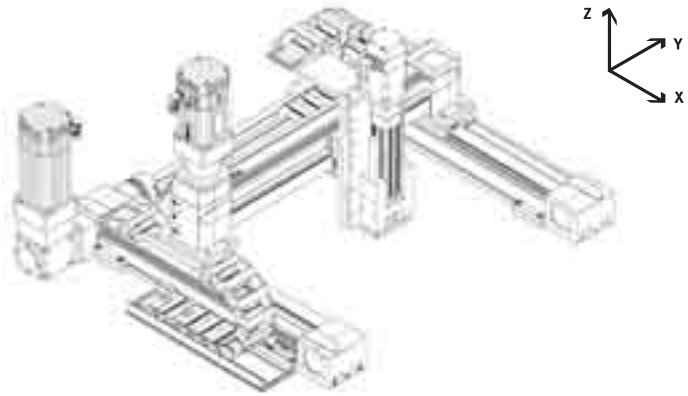
- System solution for standardised three-dimensional gantries with effective load up to 50 kg on request
- Long strokes in X direction up to 10 m on request

* With the pneumatic drive DGC, can be used as duo axis

Standard 3D gantry RP 15

Effective load up to 15 kg



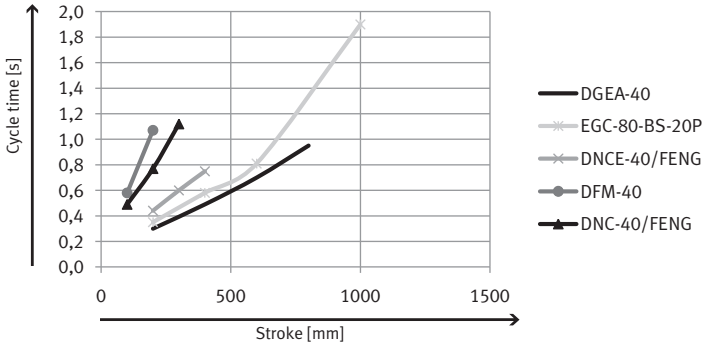
Technical data

		Stroke/mm	Intermed. position	Repetition accuracy/mm	
Z-axis ↕				End position	Intermediate position
ZR	DGEA-40	0 ... 1000	Any	± 0.05	± 0.05
SP	EGC-80-BS-KF	0 ... 1000	Any	± 0.02	± 0.02
SP	DNCE-40 with FENG	0 ... 500	Any	± 0.02	± 0.02
P	DFM-40	0 ... 400	–	Max. 0.05	–
P	DNC-40 with FENG	0 ... 500	2	± 0.2	–
PS	DNCI-40 with FENG	0 ... 500	2/any **	‹± 0.5	‹± 0.5/± 2 **
Y-axis ⟷					
ZR	1 x EGC-120-TB-KF	0 ... 2000	Any	± 0.08	± 0.08
SP	1 x EGC-120-BS-KF	0 ... 2000	Any	± 0.02	± 0.02
ZR	EGC-HD-220-TB-KF	0 ... 2000	Any	± 0.08	± 0.08
SP	EGC-HD-220-BS-KF	0 ... 2000	Any	± 0.02	± 0.02
P	DGC-40 + FA	0 ... 2000	1*	± 0.02	± 0.02/± 0.1
PS	DGCI-40 + FA	0 ... 2000	2/any**	± 0.02/± 0.4	± 1/± 0.4
X-axis ↘					
ZR	EGC-120-TB-KF	0 ... 8500	Any	± 0.08	± 0.08

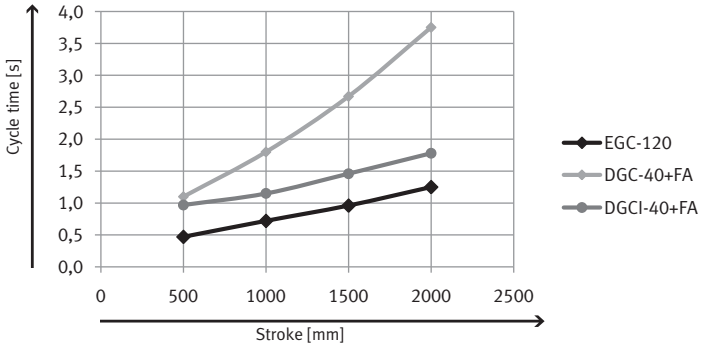
* More than 1 on request
** 2 with SPC11/CMPX, any with SPC200/CMAX; ‹± 0.5 mm with SPC11/CMPX/± 2 mm with SPC200/CMAX
*** With cushioning P1/Y3
**** With shock absorber YSR/YSRW
Grey shading: drive components in the illustration
EGC-HD: available end of 2011

Reference for cycle times

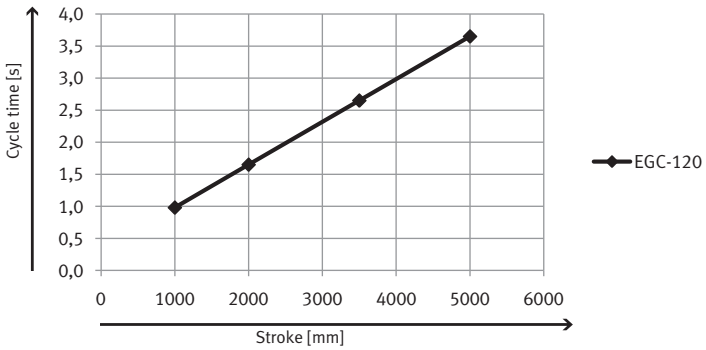
Z-axis



Y-axis



X-axis



Note

Selection matrix
Types of handling units
→ Pages 6 to 9

Handling components
→ Page 95

Gripping/rotating
Adaptation options
→ Page 71

Control cabinets
→ Page 92

Frames
→ Page 78

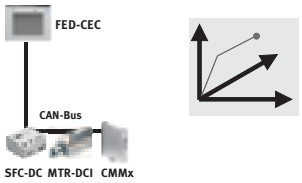
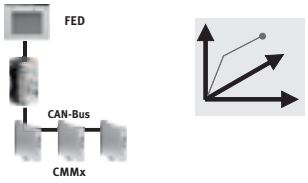
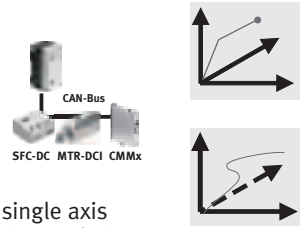
CAD drawings/ CAD hotline
2D and 3D drawings
→
Tel. +49 (0)711 347-4667

Individual project engineering and cycle time calculation
→
Tel. +49 (0)711 347-4381

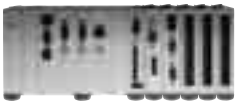
Fax enquiry
Form
→ Page 101

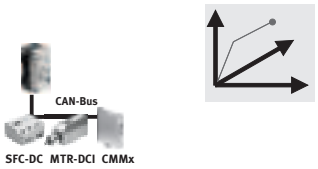
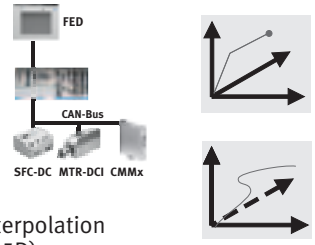
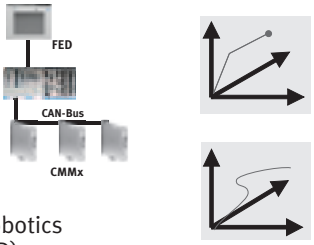
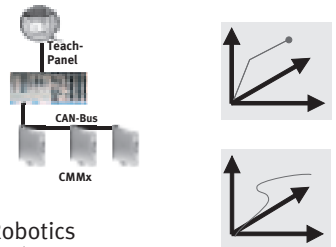
Note
An operating pressure of 6 bar is assumed for all the pneumatic drives shown here.

Overview of Festo control products

	FED-CEC	CPX terminal	
			
	Integrated controller FED-CEC	CoDeSys controller CPX-CEC-C1	Motion controller CPX-CEC-M1
			
	Single axis (point-to-point asynchronous)	C1: single axis M1: interpolation	C1: single axis M1: interpolation
Maximum number of possible axes	Recommended: 8 axes Note: one axis is treated as a CANopen node. 128 nodes are possible (as defined by CANopen specifications).	Recommended: 8 axes Note: one axis is treated as a CANopen node. 128 nodes are possible (as defined by CANopen specifications).	Recommended: 8 axes Note: one axis is treated as a CANopen node. 128 nodes are possible (as defined by CANopen specifications).
Motion	• Point-to-point asynchronous • Every axis moves with its own pre-defined parameter • The axes do not reach their end positions at the same time and the path is not defined		
			• 2.5D interpolation • PLC Open
Special features	Integrated controller in a display screen	Function integration on the CPX valve platform	
			• CNC editor • DXF import • Cam disk editor
Application examples	• Handling systems • Pick & place, palletising		Path control, bonding, cutting, handling, flying saw, cam disk
Programming environment	CoDeSys	CoDeSys	CoDeSys + Softmotion

Modular control



		CMXR robotic controller	
Modular controller CECX-C1	Motion controller CECX-M1	CMXR-C1 (Basic)	CMXR-C2 (Advanced)
 Single axis (point-to-point asynchronous)	 Interpolation (2.5D)	 Robotics (3D)	 Robotics (3D)
Recommended: 8 axes Note: one axis is treated as a CANopen node. 128 nodes are possible (as defined by CANopen specifications).		Max. 6 interpolated axes, of which max. 3 basic axes and 1 orientation axis and max. 3 dependent auxiliary axes that are interpolated together with the kinematics system.	
			Additional single axes (not interpolated together with others) can be controlled via the integrated CoDeSys PLC. Recommended: 16 axes.
		3D contour interpolation with an orientation axis for kinematics systems with up to 4 degrees of freedom. E.g. 3D gantry with an axis of rotation on the front end.	
	• 2.5D interpolation • PLC Open		CoDeSys control: point-to-point asynchronous
• Powerful PLC • Encoder interface • Interrupt function • Fast clock pulse inputs • Profibus master • Two Canbus masters • RS 232/ RS 485-A/422-A		• Economical design and configuration with the Festo Configuration Tool (FCT) • Simple programming of motions with Festo Teach Language (FTL), no specialist expertise required • Optional teach pendant with 2-channel permission button • Reduced speed in manual override mode • Automatic repositioning when continuing interrupted motions • Simple teaching of positions • Definition of tools, allowing easy use of multiple grippers • Real orientation axes on the front end • Integrated kinematics models e.g. for Cartesian systems, tripod, H- and T-gantries	
	• CNC editor • DXF import • Cam disk editor		• Increased flexibility with the integrated CoDeSys PLC, e.g. for the integration of vision systems • Tracking function for applications involving selecting items from a conveyor belt • Speed-independent path switching points with time compensation, e.g. for bonding applications • Complete automation of a cell is possible
• Handling systems • Pick & place, palletising	Path control, bonding, cutting, handling, flying saw, cam disk	Handling, palletising, bonding, metered dispensing, painting, cutting	Tracking applications such as processing of moving parts on a conveyor belt or synchronised kinematics movement with up to 6D
CoDeSys	CoDeSys + Softmotion	Festo Teach Language (FTL)	FTL + CoDeSys