

## **Three-dimensional Gantries**



## Three-dimensional gantries

3-dimensional gantries are ideal for universal use, for handling light to heavy workpieces that need to be moved across three axes and long strokes.

### Three-dimensional gantries

#### Stacking

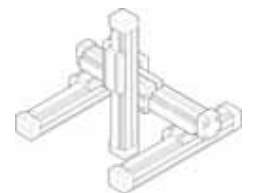
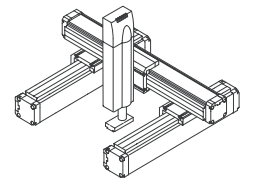
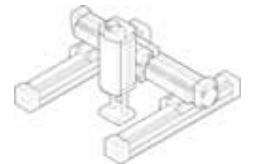
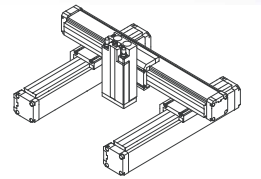
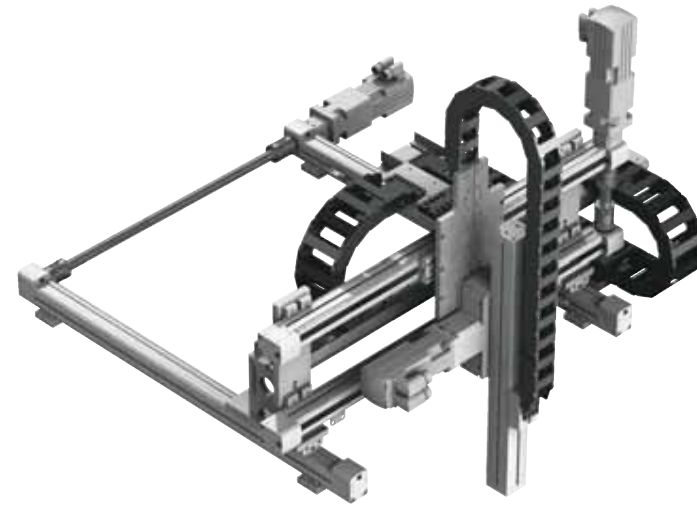
A three dimensional gantry for dynamic, precision stacking.

#### The task:

The application in question is a stacking system with a requirement for high positioning accuracy ( $\pm 0.2$  mm).

#### The solution

The selected DGEA is ideal for this task not only because of its positioning accuracy, but also its highly dynamic response. This dynamic response is facilitated by the consistent lightweight design with stationary drive head. As a result, the DGEA delivers acceleration of  $15 \text{ m/s}^2$  with a speed of  $2 \text{ m/s}$ .



## Three-dimensional gantries – System matrix

### Three-dimensional systems

The system matrix provides you with condensed information regarding the most important parameters for quick selection of your system. Reference to the corresponding page, guides you to standard solutions and individual components.

A standard solution means:

- Complete bill of materials with exploded view
- Quick project planning
- Reliable data, accuracy, travel time

#### Workpiece load

With a standard front end (semi-rotary drive and gripper or gripper only), the workpiece load can serve as a basis for the approximate selection of a handling/positioning system.

#### Working load

The working load is a decisive factor in the precise selection of a standard handling system.

The working load of a handling/positioning system is the sum of the loads of the following parts:

- Function units (semi-rotary drives and grippers)
- Adapter plates
- Gripper fingers
- Workpiece

Three-dimensional gantries								
Drive system	P <sup>1)</sup>	PS	SP	ZR	P <sup>1)</sup>	PS	SP	ZR
Moving loads								
Max. working load	0 ... 6 kg				0 ... 4 kg			
Workpiece load	0 ... 2 kg				0 ... 3 kg			
Stroke range [mm]								
X-direction (horizontal)								
	0 ... 3000	100 ... 1600	100 ... 1000 <sup>2)</sup>	100 ... 2000 <sup>3)</sup>	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>
Y-direction (horizontal)								
	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>
Z-direction (vertical)								
	0 ... 200		0 ... 150		0 ... 200			
Intermediate positions								
X	–	any			– <sup>1)</sup>	any		
Y	–	any			– <sup>1)</sup>	any		
Z	–		any	–	1	–		
Repetition accuracy [mm]								
X	0.02	0.4	±0.02	±0.1	0.02	0.4	±0.02	±0.1
Y	0.02	0.4	±0.02	±0.1	0.02	0.4	±0.02	±0.1
Z	0.02	–			0.02	–		
Standard examples								
Type	DGPL/DGPL/SLT(E)	DGE/DGE/SLT(E)	DGPL/DGPL/HMPL	DGE/DGE/HMPL				
Page								

<sup>1)</sup> Also available with end position controller SPC11 (Soft Stop)

<sup>2)</sup> Stroke of up to 4500 mm

<sup>3)</sup> Stroke of up to 2000 mm with reduced dynamics

Three-dimensional gantries								
Drive system	P <sup>1)</sup>	PS	SP	ZR	P <sup>1)</sup>	PS	SP	ZR
Moving loads								
Max. working load	0 ... 10 kg				0 ... 10 kg			
Workpiece load	0 ... 5 kg				0 ... 5 kg			
Stroke range [mm]								
X-direction (horizontal)								
	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>2)</sup>	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>
Y-direction (horizontal)								
	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>	0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>
Z-direction (vertical)								
	0 ... 400				0 ... 3000	100 ... 1600	100 ... 1000 <sup>3)</sup>	100 ... 2000 <sup>3)</sup>
Intermediate positions								
X	–	any			– <sup>1)</sup>	any		
Y	–	any			– <sup>1)</sup>	any		
Z	1	–			– <sup>1)</sup>	any		
Repetition accuracy [mm]								
X	0.02	0.4	±0.02	±0.1	0.02	0.4	±0.02	±0.1
Y	0.02	0.4	±0.02	±0.1				
Z	0.01	–						
Standard examples								
Type	DGPL/DGPL/HMP	DGE/DGE/HMP	DGPL/DGPL/DGPL	DGE/DGE/DGE				
Page								

#### H Note

- P Pneumatic
- PS Servo-pneumatic
- SP Spindle axis, electrical
- ZR Toothed belt axis, electrical

## Three-dimensional gantries

### Three-dimensional gantry DG.../DG.../SLT(E)

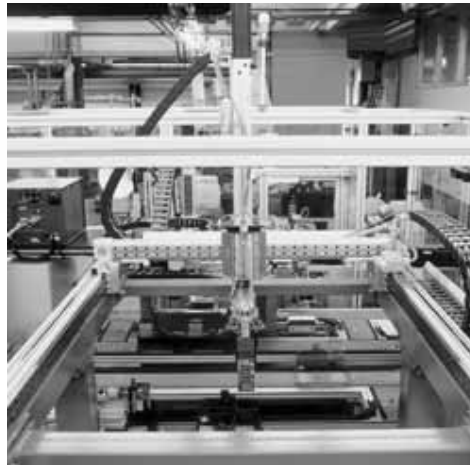
For horizontal strokes up to 3000 mm and vertical Z strokes up to 200 mm with working loads of 6 kg: the combination of two parallel drives DG... and one linear gantry DG.../SLT or DG.../SLTE.

#### Sample application

Handling of very heavy workpieces using very long strokes, for example assembly, equipping and palletising

#### Other attributes of the system

- Reliability and precision through high mechanical rigidity
- DUO system structure for particularly high loads
- Operational and process reliability through routing of tubing and cables in conduits and protective trunking
- Flexibility through the variety of solutions offered by the modular handling system
- User friendliness through easy assembly and installation, even during servicing

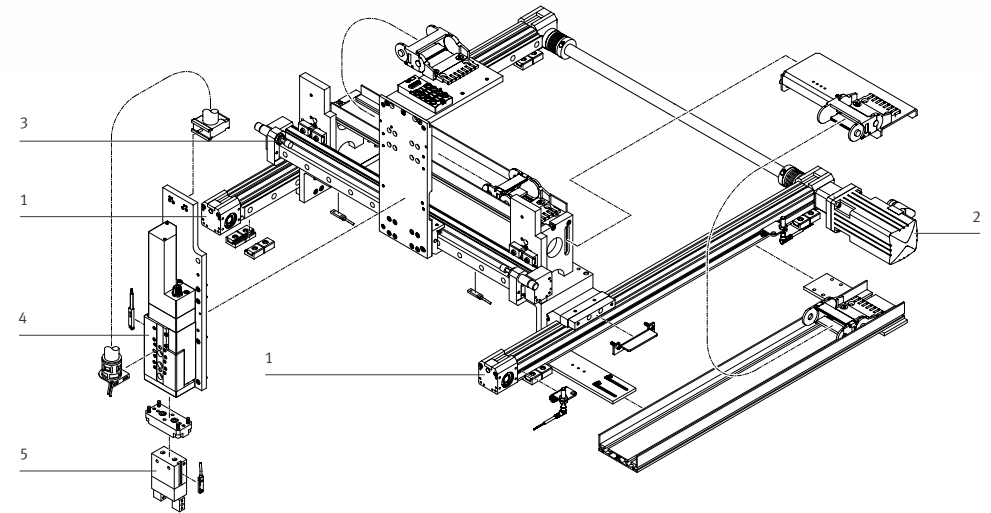
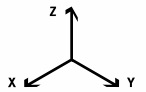


#### Attributes of the handling system

- Choice of pneumatic or electrical drive for all axes
- Any number of intermediate positions along X- and Y-axes with servo-pneumatic or electrical axes
- Pneumatic or electrical drive along Z-axis
- Very high dynamic response thanks to twin piston slide SLT along Z-axis

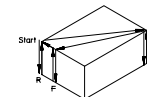
System type	Mono		Duo	
Working load	2 kg	4 kg	4 kg	6 kg
X-axis				
DGE	Size	25	25	40
	Max. stroke	3000		
	Drive system	electrical with toothed belt drive		
	Options	roller guide or ball-bearing guide		
Y-axis				
DGPL/DGC/DGE	Size	25	40	25
	Max. stroke	3000		
	Drive system	pneumatic, electrical		
	Options	electrical: spindle drive or toothed belt drive		
Z-axis				
SLT, SLTE	Size	16	20	20
	Max. stroke	150	200	
	Drive system	pneumat.,electr.	pneumatic	
	Options	shock absorber, adjustable cushioning, fixed cushioning, freely positionable (SLTE)		
Basic and installation components				

- 1 Toothed belt axis DGE-ZR
- 2 Servo motor MTR-AC
- 3 Rodless drive DGPL
- 4 Mini slide SLT
- 5 Parallel gripper HGP



The example provides information regarding cycle times for a standard combination. The workpiece is moved diagonally from one corner to the opposite corner.

2 x DGE-40-1000-ZR-KF (X-axis) Cycle:  
 DGE-40-800-ZR-KF (X-axis)  
 SLT-20-100 (Z-axis)  
 DRQD-16-180 (Semi-rotary drive)  
 2 x HGP-16 (Gripper)



Cycle time: 4,5 s  
 Mean load: 2 x 0.1 kg

## Three-dimensional gantries

### Three-dimensional gantry DG.../DG.../HMPL

For horizontal X and Y strokes up to 3000 mm and vertical Z strokes up to 200 mm as well as working loads up to 4 kg and additional functions such as intermediate position with through travel capability: the combination of two parallel drives DG... and one linear gantry DG.../HMPL.

#### Attributes of the handling system

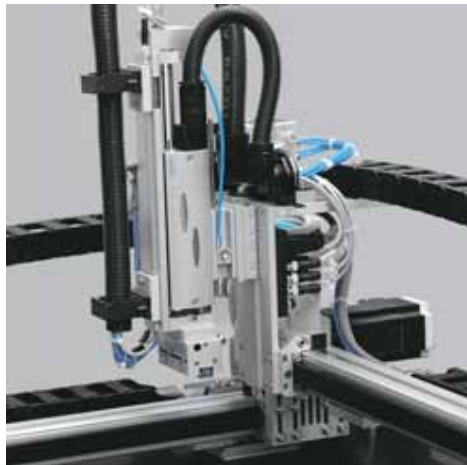
- Choice of pneumatic or electrical drive for horizontal X- and Y-axes
- Any number of intermediate positions along X- and Y-axes with servo-pneumatic or electrical axes
- Additional functions of intermediate position (with through travel capability) and clamping cartridge possible along the Z-axis

#### Sample application

Handling of workpieces using very long X and Y strokes, for example assembly and equipping

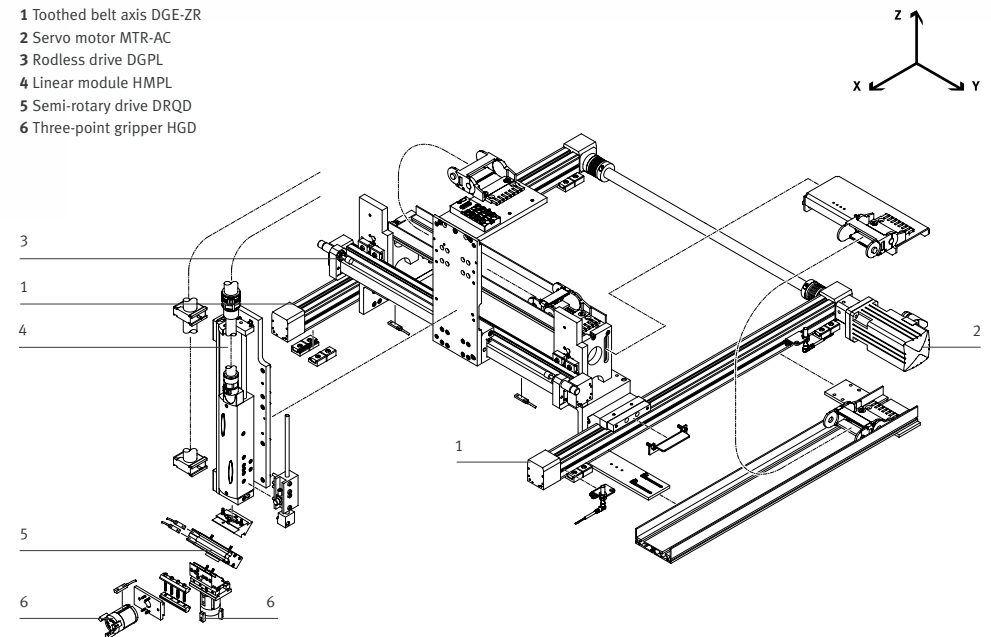
#### Other attributes of the system

- Reliability and precision through high mechanical rigidity
- DUO system structure for particularly high loads
- Operational and process reliability through routing of tubing and cables in conduits and protective trunking
- Flexibility through the variety of solutions offered by the modular handling system
- User friendliness through easy assembly and installation, even during servicing



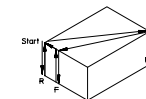
System type		Mono		Duo
Working load		2 kg	4 kg	4 kg
X-axis				
DGE	Size	25		25
	Max. stroke	3000		
	Drive system	electrical with toothed belt drive		
	Options	roller guide or ball-bearing guide		
Y-axis				
DGPL/DGC/DGE	Size	25	40	25
	Max. stroke	3000		
	Drive system	pneumatic, electrical		
	Options	electrical: spindle drive or toothed belt drive		
Z-axis				
HMPL	Size	16	20	20
	Max. stroke	160	200	200
	Drive system	pneumatic		
	Options	intermediate position, clamping cartridge		
Basic and installation components				

- 1 Toothed belt axis DGE-ZR
- 2 Servo motor MTR-AC
- 3 Rodless drive DGPL
- 4 Linear module HMPL
- 5 Semi-rotary drive DRQD
- 6 Three-point gripper HGD



The example provides information regarding cycle times for a standard combination. The workpiece is moved diagonally from one corner to the opposite corner.

2 x DGE-25-1000-ZR-KF (X-axis)  
 DGE-25-500-ZR-KF (X-axis)  
 HMPL-20-160 (Z-axis)  
 DRQD-16-180 (Semi-rotary drive)  
 HGPP-12 (Gripper)



Cycle time: 4,5 s  
 Mean load: 0,05 kg

## Three-dimensional gantries

### Three-dimensional gantry DG.../DG.../HMP

For horizontal X and Y strokes up to 3000 mm and vertical Z strokes up to 400 mm as well as working loads up to 10 kg and additional functions: the combination of two parallel drives DG... and one linear gantry DG.../HMP.

#### Attributes of the handling system

- Choice of pneumatic or electrical drive for horizontal X- and Y-axes
- Any number of intermediate positions along X- and Y-axes with servopneumatic or electrical axes
- Additional functions of intermediate position or clamping cartridge possible along the Z-axis

#### Sample application

Handling of heavy workpieces using long strokes, for example assembly, equipping

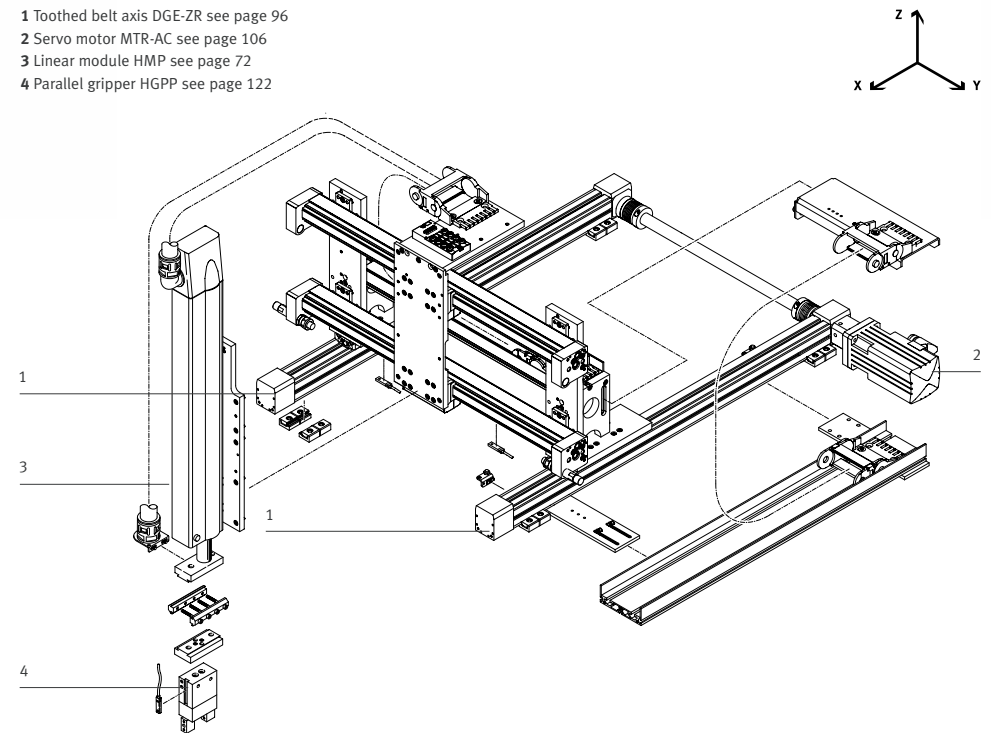
#### Other attributes of the system

- Reliability and precision through high mechanical rigidity
- DUO system structure for particularly high loads
- Operational and process reliability through routing of tubing and cables in conduits and protective trunking
- Flexibility through the variety of solutions offered by the modular handling system
- User friendliness through straightforward assembly and installation, even during servicing



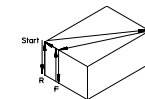
System type		Mono		Duo	
Working load		4 kg	4 kg	6 kg	10 kg
X-axis					
DGE	Size	25	25	40	
	Max. stroke	3000			
	Drive system	electrical with toothed belt drive			
	Options	roller guide or ball-bearing guide			
Y-axis					
DGPL/DGC/DGE	Size	40	25	40	
	Max. stroke	3000			
	Drive system	pneumatic, electrical			
	Options	electrical: spindle drive or toothed belt drive			
Z-axis					
HMP	Size	16	16	20	25
	Max. stroke	320		400	
	Drive system	pneumatic			
	Options	intermediate position, clamping cartridge			
Basic and installation components					

- 1 Toothed belt axis DGE-ZR see page 96
- 2 Servo motor MTR-AC see page 106
- 3 Linear module HMP see page 72
- 4 Parallel gripper HGPP see page 122



The example provides information regarding cycle times for a standard combination. The workpiece is moved diagonally from one corner to the opposite corner.

2 x DGE-40-1000-ZR-KF (X-axis)  
 DGE-25-500-ZR-KF (X-axis)  
 HMP-25-160 (Z-axis)  
 DRQD-20-180 (Semi-rotary drive)  
 HGPP-16 (Gripper)



Cycle time: 6.5 s  
 Workpiece load: 1 kg

## Three-dimensional gantries

### Three-dimensional gantry DG.../DG.../DG...

A three dimensional gantry for working areas exceeding 1 m<sup>2</sup>: for strokes up to 3000 mm and working loads up to 10 kg.

#### Attributes of the handling system

- Choice of pneumatic or electrical drive for all axes
- Any number of intermediate positions along X- and Y-axes with servo-pneumatic or electrical axes
- Choice of alternative guiding qualities and drive concepts

#### Sample application

Handling of very heavy workpieces using very long strokes, for example assembly, equipping and palletising

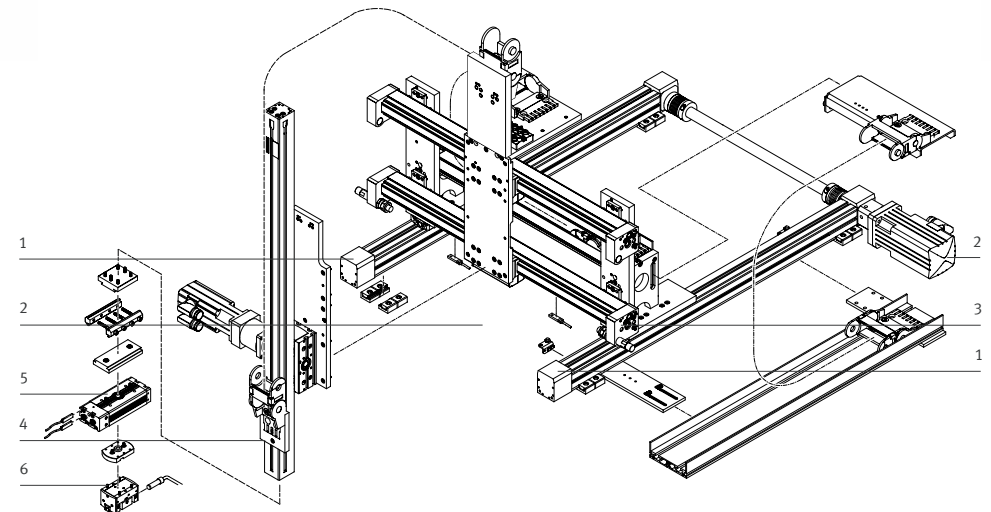
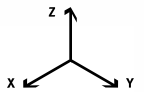
#### Other attributes of the system

- Reliability and precision through high mechanical rigidity
- DUO system structure for particularly high loads
- Operational and process reliability through routing of tubing and cables in conduits and protective trunking
- Flexibility through the variety of solutions offered by the modular handling system
- User friendliness through straightforward assembly and installation, even during servicing



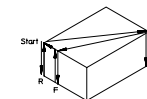
System type		Mono		Duo		
Working load		2 kg	4 kg	4 kg	6 kg	10 kg
X-axis						
DGE	Size	25		25	40	
	Max. stroke	3000				
	Drive system	electrical with toothed belt drive				
	Options	roller guide or ball-bearing guide				
Y-axis						
DGPL/DGC/DGE	Size	25	40	25	40	
	Max. stroke	3000				
	Drive system	pneumatic, pneumatic with Soft Stop SPC11, electrical				
	Options	electrical: spindle drive or toothed belt drive				
Z-axis						
DGEA	Size	18		18	25	
	Max. stroke	800		900		
	Drive system	electrical				
	Options	spindle drive or toothed belt drive				
Basic and installation components						

- 1 Toothed belt axis DGE-ZR
- 2 Servo motor MTR-AC
- 3 Rodless drive DGC
- 4 Electrical axis DGEA
- 5 Semi-rotary drive DRQD
- 6 Precision parallel gripper HGPP



The example provides information regarding cycle times for a standard combination. The workpiece is moved diagonally from one corner to the opposite corner.

- 2 x DGE-40-1000-ZR-KF (X-axis)
- DGE-25-1000-ZR-KF (X-axis)
- DGE-25-600-SP-KF (Z-axis)
- DRQD-20-180 (Semi-rotary drive)
- HGPP-16 (Gripper)

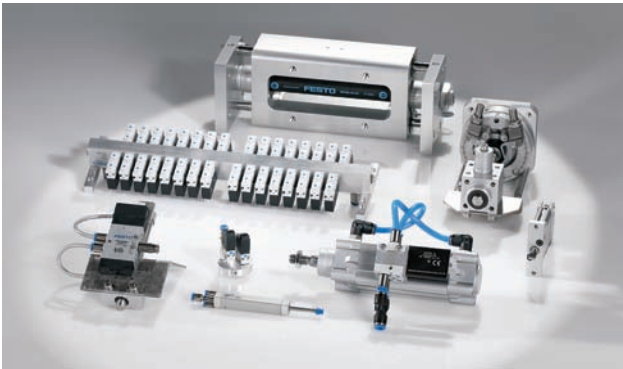


Cycle time: 8 s  
Workpiece load: 1 kg



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4935 Southfront Road, Suite F  
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### Design and Manufacturing Operations



East: 395 Moreland Road, Hauppauge, NY 11788



Central: 1441 East Business Center Drive, Mt. Prospect, IL 60056



West: 4935 Southfront Road, Suite F, Livermore, CA 94550

## Mexico

### Headquarters

Festo Pneumatic, S.A.  
Av. Ceylán 3  
Col. Tequesquahuac  
54020 Tlalnepantla  
Edo. de México  
Call: 011 52 [55] 53 21 66 00  
Fax: 011 52 [55] 53 21 66 65  
Email: festo.mexico@mx.festo.com  
www.festo.com/mx



## Canada

### Headquarters

Festo Inc.  
5300 Explorer Drive  
Mississauga, Ontario L4W 5G4  
Call: 1.905.624.9000  
Fax: 1.905.624.9001  
Email: info\_ca@ca.festo.com  
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