

System for selective soldering of sensors directly in the protective housing

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Highlights

- Ready-to-install handling system – delivered by Festo for direct mounting on the line with a functional guarantee and documentation
- Fast and precise X, Y, and Z movements
- Cycle times of less than three seconds – in spite of a moving mass of more than 60 kg
- The solder is fed with a precision of 0.1 mm

Customer

IPTE Factory Automation n.v. (Belgium)
Area of business: Development of turnkey automation solutions for the production, testing and further processing of printed circuit board assemblies and end products

Project

High-speed 3D handling system with four degrees of freedom for positioning a heavy selective soldering head

Requirements

- High repetition accuracy and precision
- Short cycle times – high production speed
- High process reliability: an essential requirement for this technique is applying the right soldering force at the right angle.
- Extremely compact solution for installation in a production cell with a working area of 350 x 350 mm
- Flexibility, as the new machine concept was to be used everywhere at IPTE

Solution

- XYZW gantry system with four degrees of freedom:
- The basic axes in the x direction are formed two toothed belt axes EGC-80 with integrated displacement encoder
 - The Y-axis consists of a spindle axis EGC-80
 - The Z-axis is the electric slide EGSL
 - The rotary unit (W-axis) for lifting and rotating the soldering tips is a modified ERMB-32 rotary/lifting module, specially customised for the system

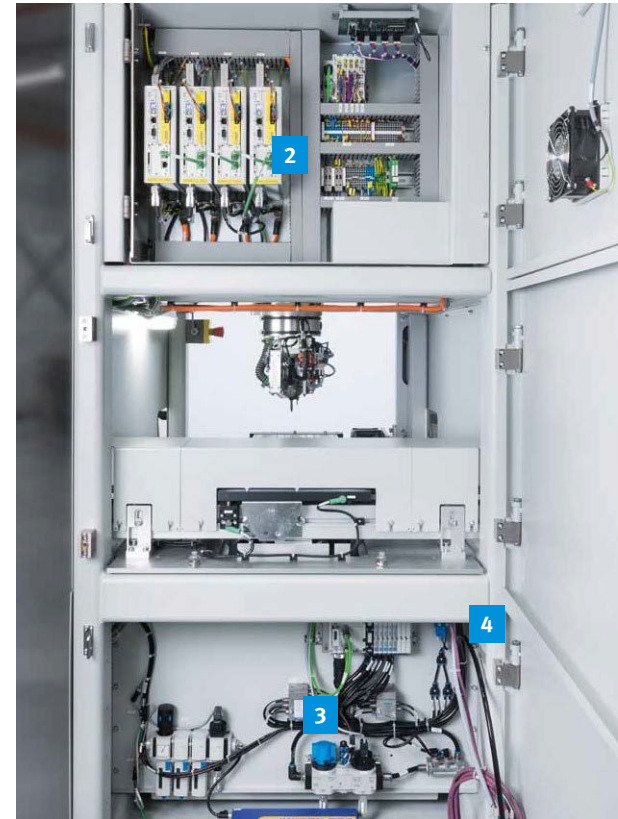
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The Festo solution – all in one



The Festo solution – all in one:

- 1 Mechanical components and servo drive packages for all axes
- 2 Controller
- 3 Air preparation
- 4 Valve terminal

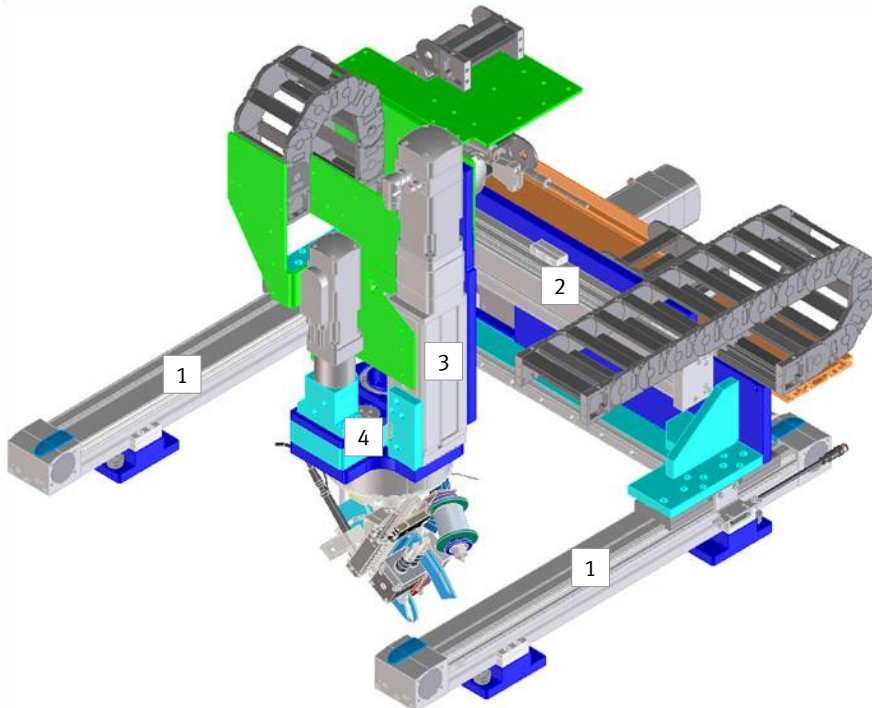


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Festo handling system

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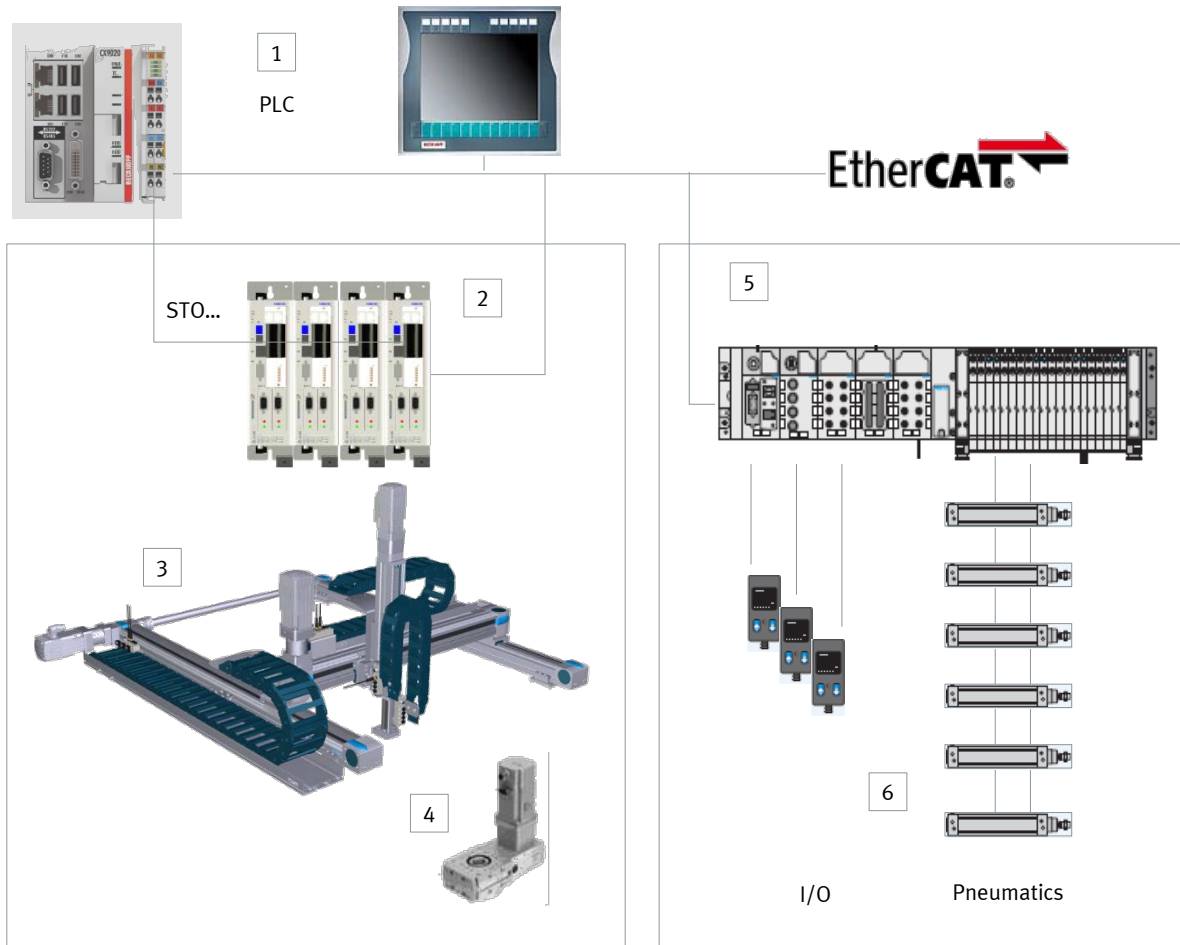


Festo solution:

- 1 X-axis:
 - 2x toothed belt axis EGC-80-450-TB
 - Stepper motor EMMS-AS
 - Motor controller CMMP-AS
 - Safety module CAMC-G-S1
 - Connecting shaft KSK-80-420
 - ATEK gearbox
- 2 Y-axis:
 - Spindle axis EGC-80-450-BS
 - Stepper motor EMMS-AS-70
 - Parallel kit EAMM-U
 - Motor controller CMMP-AS
 - Safety module CAMC-G-S1
- 3 Z-axis:
 - Electric mini slide EGSL-BS-75-100
 - Stepper motor EMMS-AS
 - Axial kit EAMM-A
 - Motor controller CMMP-AS
 - Safety module CAMC-G-S1
- 4 Rotary unit:
 - Specially modified rotary/lifting module ERMB-32

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Automation concept



- 1 Beckhoff PLC + Human Machine Interface
- 2 Servo motor controller CMMS-AS
- 3 3D handling for XYZ movement
EGC + EGSL + EMMS-AS
- 4 W-movement (rotation)
ERMB + EMMS-AS
- 5 Remote I/O with valve terminal CPX-MPA
- 6 Pneumatic drives

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Components in detail



Toothed belt and heavy-duty axes EGC

- Toothed belt or spindle axis
- Size: 50 ... 220
- Stroke lengths: 50 ... 8500 mm
- Force: 50 ... 2500 N
- Optionally with a guide or as a heavy-duty version (EGC-HD) with two guide rails
- Maximum load capacity and rigidity
- Very short cycle times due to maximum dynamics
- Modular product with flexible options



Electric mini slide EGSL

- Sizes: 35, 45, 55, 75
- Stroke length: 50 ... 300 mm
- Force: 75 ... 450 N
- Maximum performance in a compact space
- Precision, load capacity and dynamic response for strokes of up to 300 mm
- Particularly ideal in vertical applications such as pressing or joining
- Safe against falling parts thanks to cover with magnetic sensors
- Efficient solution - outstanding value for money



Servo motors EMMS-AS

- Size: 40, 55, 70, 100, 140, 190
- Eight output classes from 100 to 2,000 W
- Torque: 1 ... 120 Nm
- Voltage: 360 ... 565 V DC
- Nominal current: 0.6 ... 14.4 A
- Always fits thanks to universally compatible interfaces
- Digital absolute displacement encoder for single-turn or multi-turn
- Maintenance-free operation thanks to life-time bearing lubrication
- High degree of protection IP65



Motor controller family CMMx-AS

- Servo motor controller CMMP-AS
Ideal for dynamic movements and electronic cam disc controls
- Servo motor controller CMMS-AS:
Strengths include standard applications and positioning tasks with I/O and fieldbus connection
- Servo motor double controller CMMD-AS: guides two servo motors independently of one another
- The safety function STO is integrated as standard: emergency stop requirements with safe stop SS1 up to category 3

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