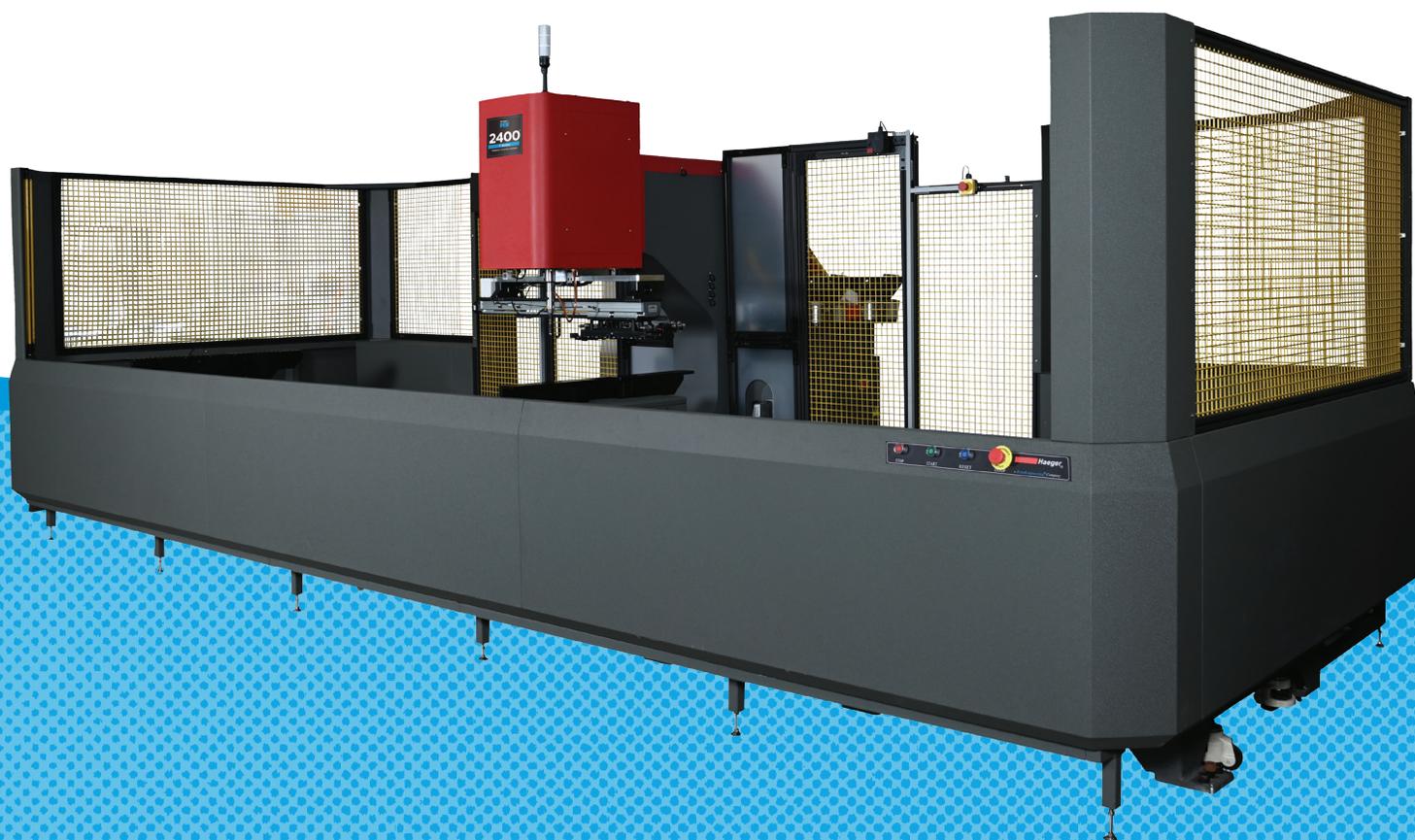


Haeger® By
PEM®

The Haeger T-Series

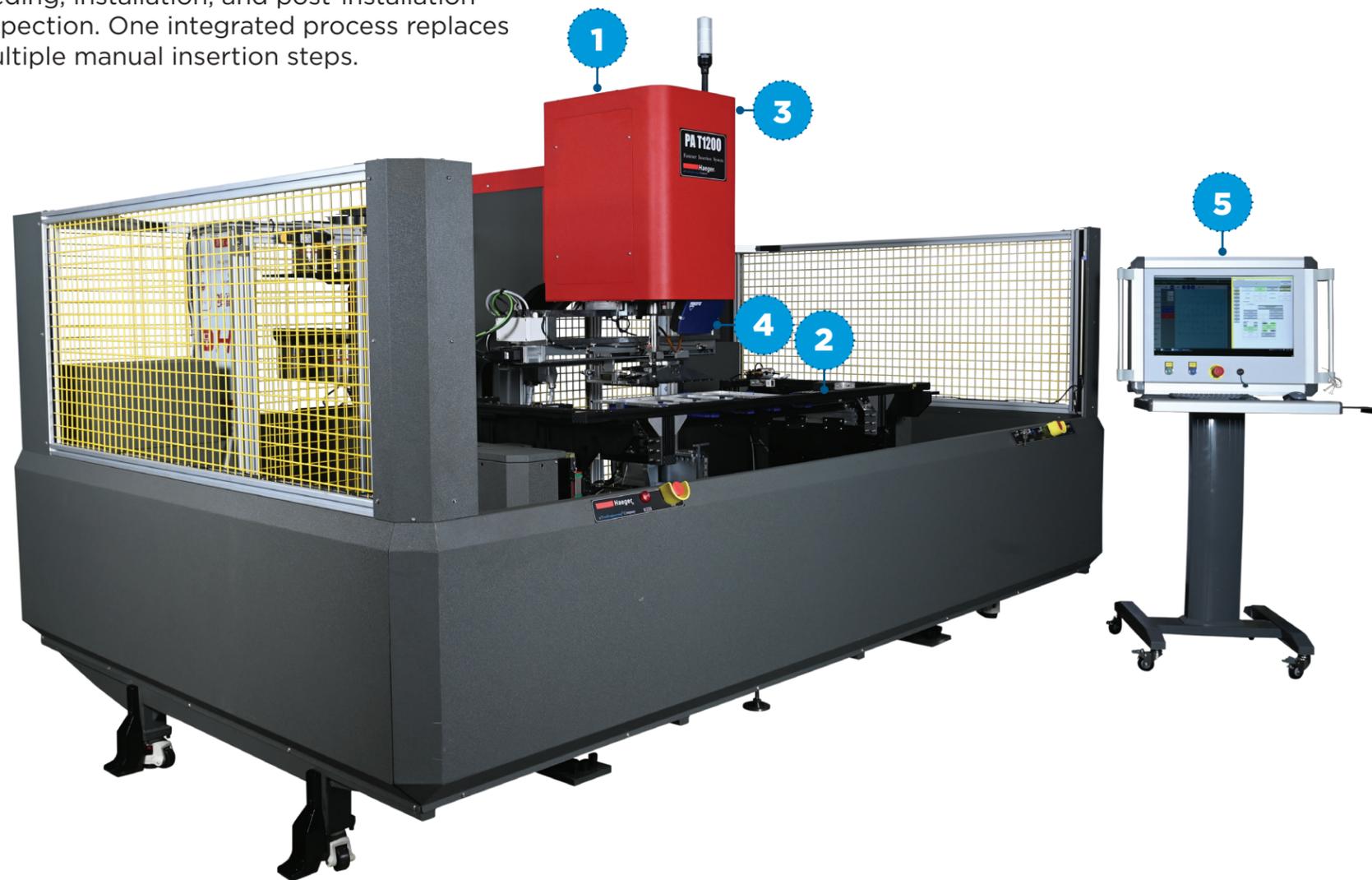
Automated Fastener Installation for High-Mix,
High-Volume Sheet Metal Production



Automate Every Fastener, Eliminate Every Error.

Manual fastener insertion is costing you more than you think. Wrong fastener types, missing installations, and misplaced components create quality defects that ripple through your production floor.

The Haeger T-Series is a fully automated fastener installation system for PEM nuts, studs, and standoffs in sheet metal parts. Load the panel - manually or by automation - and the system handles positioning, tool changes, fastener feeding, installation, and post-installation inspection. One integrated process replaces multiple manual insertion steps.



The Technology Platform

Every T-Series system is built on 5 integrated subsystems:

1 Core T-Series Technology

- Based on proven servo-driven Haeger press technology
- Force range: 8 - 80 kN across all 3 T-Series models
- Advantages
 - Precise force and stroke control
 - Programmable insertion profiles
 - No hydraulic oil - less maintenance, higher energy efficiency
- High repeatability
 - Force repeatability typically $\pm 1\%$
 - Position accuracy approx. ± 0.02 mm
- Stroke/Z-axis
 - T600: 0 - 300mm stroke (for higher flanges, deep boxes)
 - T1200 / T2400: 0 - 200 mm stroke
- Fastener range: standard PEM fasteners approx. M2.5 - M.8
- Material capability: combined material thickness approx. 1 - 6 mm (application dependent)

2 High-Speed XYZ Positioning System

- Integrated XYZ platform for precise positioning of each fastener location
- X, Y, Z movement via servo motors and linear modules on precision rails
- High traverse speeds for short cycle times
- High positioning accuracy and repeatability, even on large panels
- Enables fully automatic processing
 - Panel is clamped and referenced
 - XYZ platform moves each insertion point under the press head
 - No manual re-positioning of the part necessary

3 3D Vision System & Process Monitoring

- Integrated 3D camera system for
 - Part alignment and referencing
 - Measurement of fastener position, height and diameter after insertion
- Each installed fastener can be checked for
 - Missing or tilted fasteners
 - Wrong fastener size
- Intelligent riveting algorithm with pressure-position curve monitoring
- Parameters and curves can be stored per job for documentation and traceability
- Closed-loop process: deviations from tolerance can trigger alarms or stops

4 Fastener Feeding & Automatic Tool Change

- Multi-station vibratory bowl feeding system
- Supports up to 8 different fastener types on one panel in a single program (configuration dependent)
- Automatic feeder control
 - Adjustable amplitude and frequency settings for each feeder station
- Automatic upper & lower tool changers
 - Top and bottom tooling are changed automatically between fastener types
 - No manual re-tooling required during a job
- Typical fastener installation time:
 - Approx. 3-5 seconds per fastener (excluding table/panel movement)
 - Typically 4-5 seconds total cycle time

5 PMCS Control System

- PMCS (PennEngineering Machine Control System) with touchscreen HMI
- Functions
 - Job programming and management (recipes)
 - Tool and fastener selection
 - Adjustment of process parameters: force, stroke, speeds, feeding, vacuum, etc.
 - Diagnostics, alarms, and status display
- Job management
 - Storage and recall of jobs per part
 - Quick reload of last job for repeat orders
- Safety
 - Safety guarding and interlocks
 - Safety limit switches and safety PLC concept
 - Designed to comply with common machinery safety standards (e.g., CE)

T600 Compact Panel Specialist



Designed for small to medium panels and box-type parts such as 19" rack internals. The T600 features an extended Z-axis stroke of 0 - 300 mm, handling flanges up to approximately 140 mm high for nuts or 120 mm for studs - even when flanges are upright. Panel processing range is approximately 600 × 600 mm.

T1200 Flexible All-Rounder



The universal platform for mixed production environments. The T1200 offers the best balance between working range and footprint, handling a wide variety of part types. Panel processing range is approximately 1200 × 800 mm, with a Z-axis stroke of 0 - 200 mm.

T2400 Large Panel Machine



Built for large, flat components like cabinet side panels. The T2400 supports part lengths up to approximately 2400 × 800 mm with a Z-axis stroke of 0 - 200 mm. Flange height capability is typically 50 - 70 mm for nuts and studs, optimized for wide but relatively flat parts.

Specifications	PAT600-E	PAT1200-E	PAT2400-E
Control System Type	Electric actuator, Motion Control, 3D Camera system, PMCS controls system		
Force Range	8 to 80KN	8 to 80KN	8 to 80KN
Repeatability	±1kN (10kN - 60kN) ±1% of force setting / ±0.02mm of position setting		
Stroke Length	0-300mm	0-200mm	0-200mm
Speed	Ram down/retract max. 200mm/s		
Auto Feed / Toolchange	4 station topfeed	up to 8 station topfeed	up to 8 station topfeed
Feeder Bowl	MAS350	MAS350	MAS350
Panel Processing Range	600mm x 600mm	1200mm x 800mm	2400mm x 800mm
Panel Flange Height	Nut 140mm, Stud 120mm	Nut 70mm, Stud 50mm	Nut 70mm, Stud 50mm
Clinching Capability	1mm to 6mm combined thickness		
Panel Weight	40Kg Max	40Kg Max	40Kg Max
Fastener Range	M2.5-M8	M2.5-M8	M2.5-M8
Air Requirement	6-7 Bar	6-7 Bar	6-7 Bar
Electric Requirement	380-400V 3phase 50 or 60Hz		
Power	13kW	13.5kW	13.5kW
Dimensions (Dxwxh)	2700mmx3000mm x2600mm	3000mmx3800mm x2490mm	3100mm x6600mm x2490mm
Weight	4300Kg	4500Kg	6200Kg

What Is Included

- Servo press with 8 - 80 kN force range\
- XYZ high-speed positioning platform
- Integrated 3D vision system for referencing and inspection
- Vibratory bowl feeding system (number of stations configuration-dependent)
- Automatic upper and lower tool changers
- PMCS control system with touchscreen HMI, basic safety enclosure and operator devices.

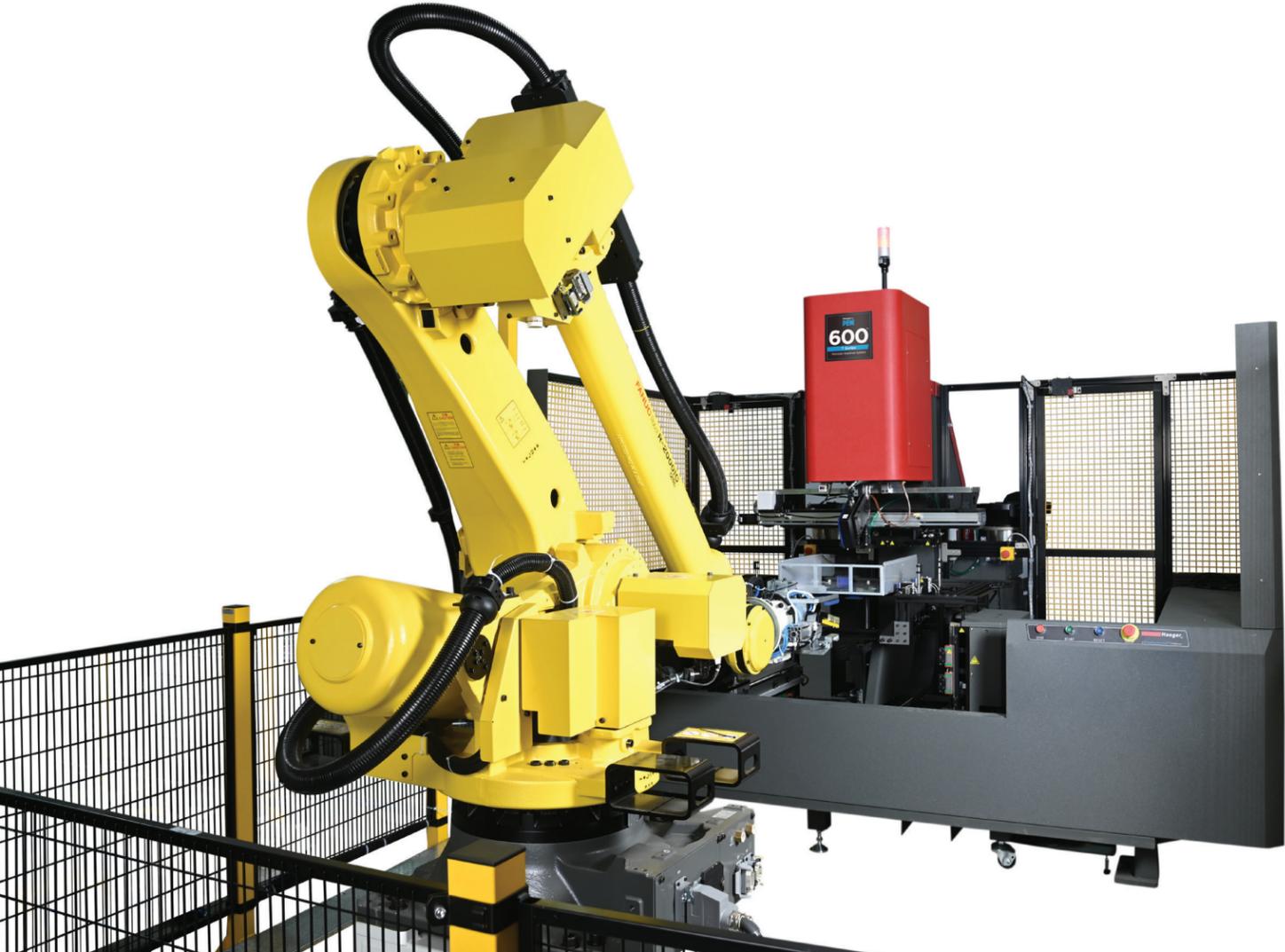
Optional Modules

- Robot or gantry handling system for automatic loading/unloading (gantry with clamps/ grippers, panel positioning device, extended safety fence and access systems)
- Additional bowl feeders beyond the standard configuration
- Customer-specific fixtures, clamping concepts, and panel supports
- Extended interfaces and integration to existing robots, conveyors, or production lines

PRODUCTION IMPACT: MANUAL VS. T-SERIES

This example compares a manual process against a T-Series T2400 configuration for a manufacturer running two programs with 35.6 million fasteners annually.

Manual Setup	T-Series T2400 Setup
16 machines required	10 machines required
16 operators	4 operators
Total annual operating cost: €1,598,190	Total annual operating cost: €776,485
Annual Cost Savings:	ROI Period:
€821,705	2.31 years



BEHIND THE NUMBERS



Labor Reduction
One operator supervises multiple automated cells instead of manually inserting hundreds of fasteners per shift



Reduced Scrap and Rework
The 3D inspection system catches defects at the point of installation before they become downstream quality escapes or scrapped assemblies



Higher Machine Utilization
The T-Series maintains 82-125% machine utilization across mixed part runs, driven by automatic tool changes, multi-fastener feeding, and fast insertion cycles



No Hydraulic Maintenance
The servo-driven press eliminates hydraulic oil, reducing maintenance cycles and improving energy efficiency

NEXT STEPS

To discuss how the T-Series fits your production environment, contact our team for a technical consultation and application review.

Smart Connectivity and Integration

The T-Series is designed to integrate with modern MES environments, robot cells, and full-scale production lines. The system provides production data including quantities, cycle times, process values and curves, and alarm and error histories - allowing remote monitoring and analysis of machine utilization and quality performance across your operation.



Built with the same engineering rigor Haeger is known for, all T-Series models are CE certified and meet international safety standards, ensuring compliance across global operations.

<https://www.haeger.com/products/t-series/>



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