



PennEngineering®

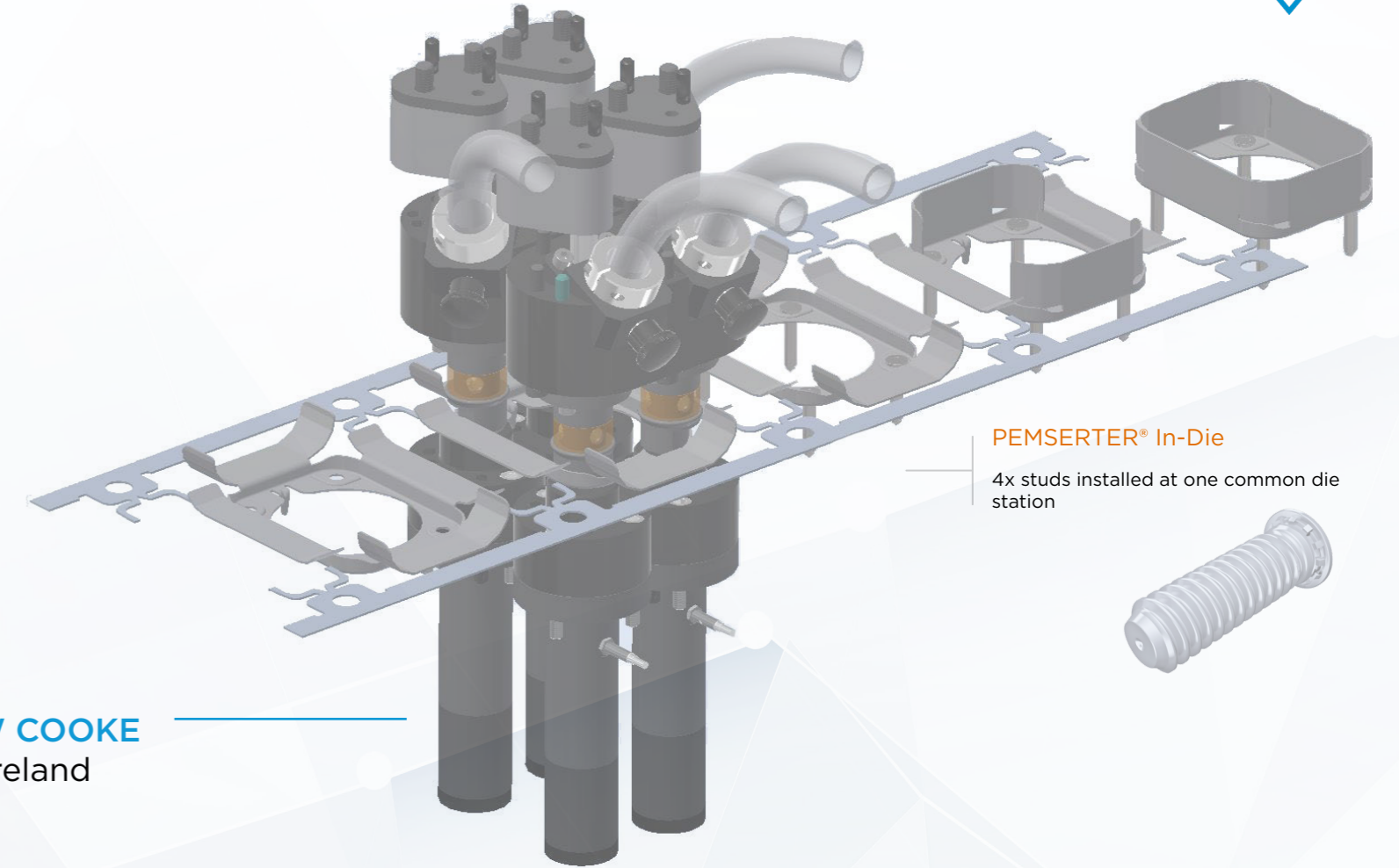
NextGen
UNIVERSAL IN-DIE FEED CART

IN-DIE TECHNOLOGY

NextGen system incorporated into a press shop stamping operation to facilitate the feeding and installation of PEM® self-clinching fasteners.



NextGen Universal In-Die Feed Cart



ANDREW COOKE
Galway, Ireland

I have had the opportunity to be involved in many projects where, through the application of PEMSERTER® In-Die technology, we were able to successfully eliminate secondary operations such as those required to install self-clinching fasteners into sheet metal stampings. Our technology and solutions reduce overall labour costs, optimise part quality, dramatically improve throughput and minimise WIP.

NextGen Universal In-Die Feed Cart

Developed to serve dynamic sheet metal fabrication, including the following applications:

- Automotive:
 - Automotive Electronics – busbars, connectors, and power distribution systems.
 - Electronic Vehicle – battery tray and covers.
 - Automotive brackets – airbag retainers, seats brackets, fuel tank/brake line straps, crash boxes and support brackets.
- Home Appliances – central heating systems and white goods.
- Industrial – renewable energy busbars, industrial busbars and connectors.

MODULAR

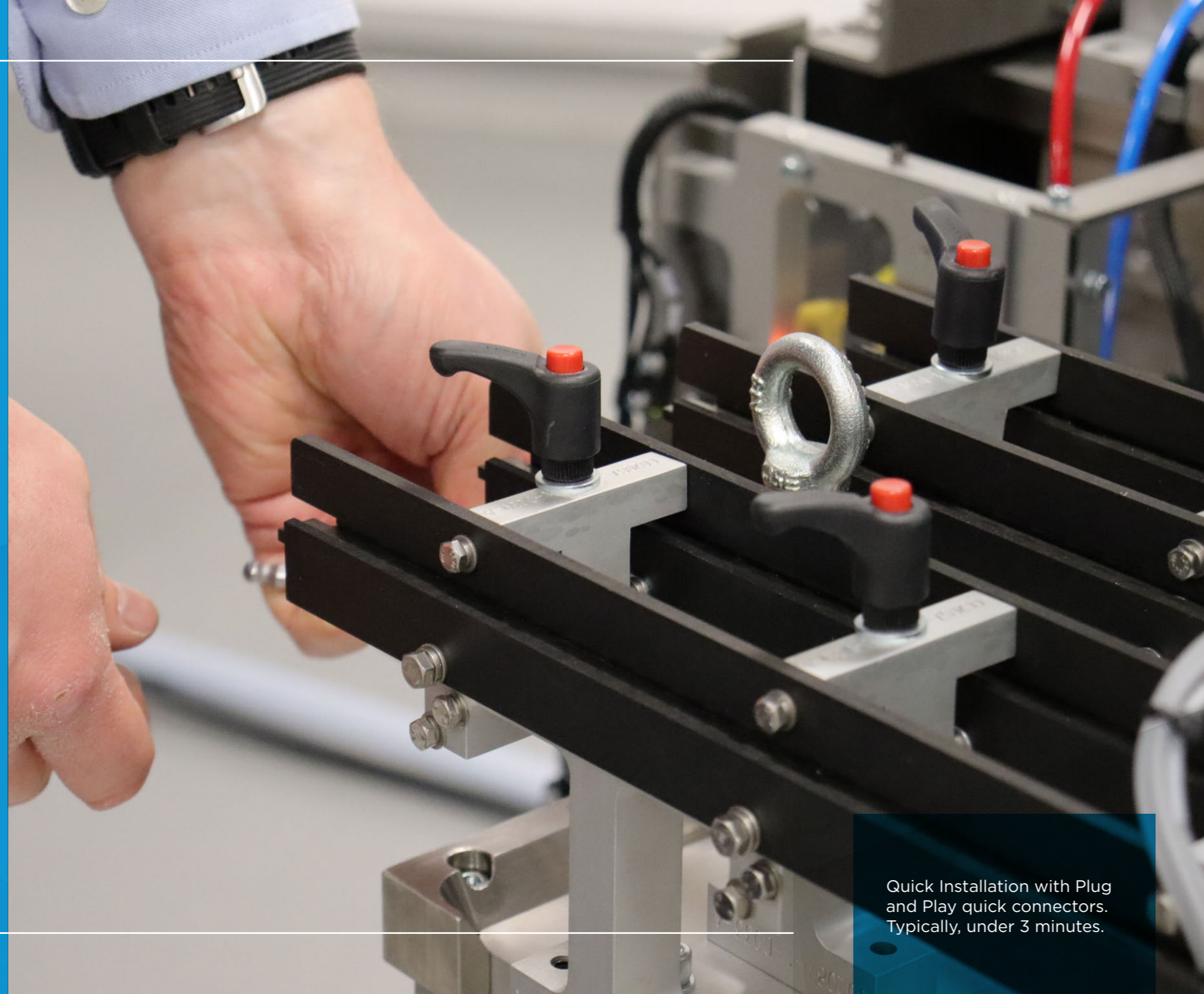
NextGen Universal In-Die Feed Cart enables users to efficiently and accurately feed PEM® self-clinching nut, stud or standoff fasteners to a stamping press for single or multiple insertions.

PLUG AND PLAY

Fast and repeatable changeovers.

OPERATOR FRIENDLY

The automated and operator-friendly system interfaces with the die and press with ease to quickly diagnose and address reasons for stoppages, thereby reducing downtime and increasing throughput.



Quick Installation with Plug and Play quick connectors. Typically, under 3 minutes.



NextGen Universal In-Die Feed Cart will bring new dimensions to your stamping capabilities. It incorporates the latest technologies to deliver the performance needed to compete in the highly competitive stamping industry. It will facilitate the elimination of the secondary operations typically associated with fastener insertion, thus reducing your overall labour costs, enhancing part quality and dramatically improving the throughput of your product.

Recognising the need for flexibility, the feed system can be configured to feed PEM® nuts, studs or standoffs for multiple or single insertions, generally matching the rate of your stamping press. As designed the system interfaces with the die and the press with ease. Through the use of quick connectors it is virtually Plug and Play. All that is needed to operate the cart is a single phase power supply and shop air.

NextGen Universal In-Die Feed Cart

Modular design enables rapid and repeatable changeover offering unique flexibility. The system can be configured to feed many PEM® fastener styles limiting the need to invest in multiple feed systems.



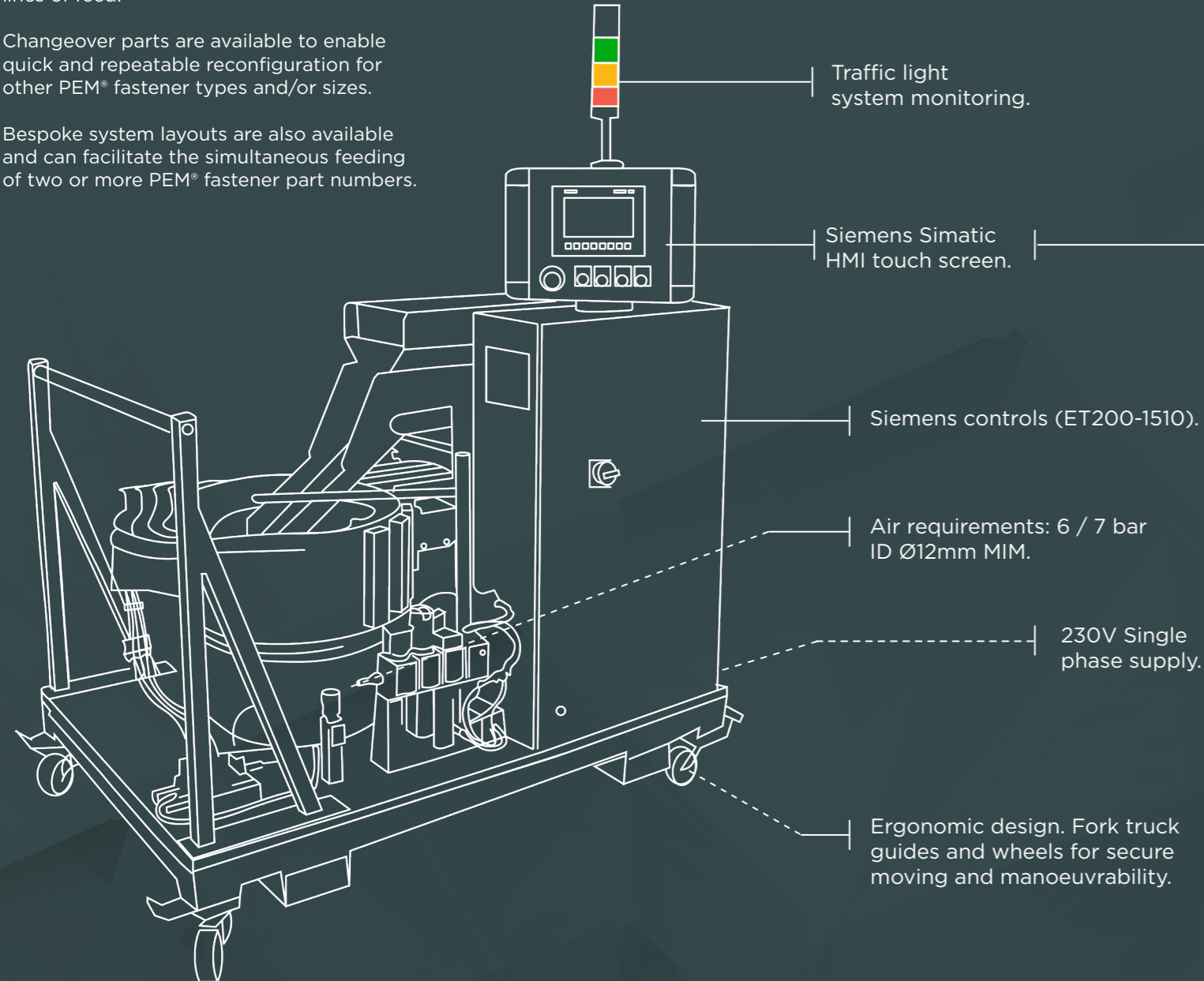
OVERVIEW OF THE KEY FEATURES



Standard units are equipped to suit a specific PEM® fastener type/size and 4x lines of feed.

Changeover parts are available to enable quick and repeatable reconfiguration for other PEM® fastener types and/or sizes.

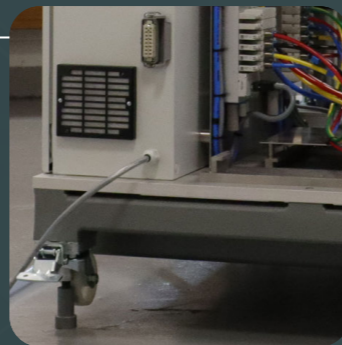
Bespoke system layouts are also available and can facilitate the simultaneous feeding of two or more PEM® fastener part numbers.



Traffic light system monitoring.



25 Litre belt feed hopper.

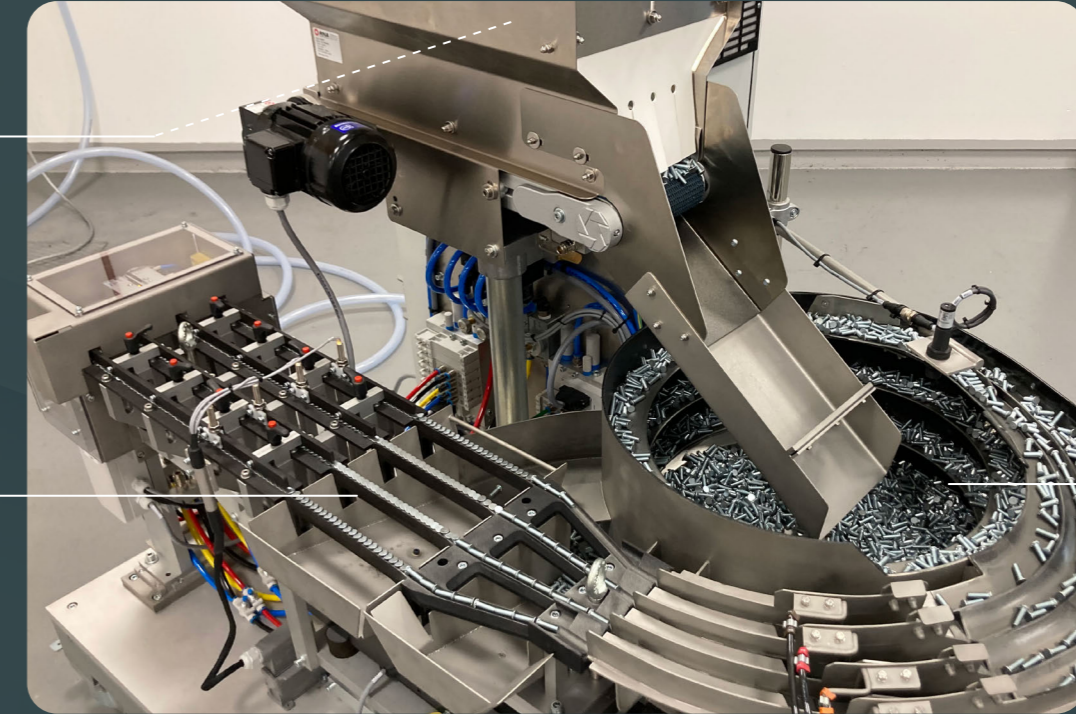


4x Lines of feed (up to 3 lines can be deactivated).

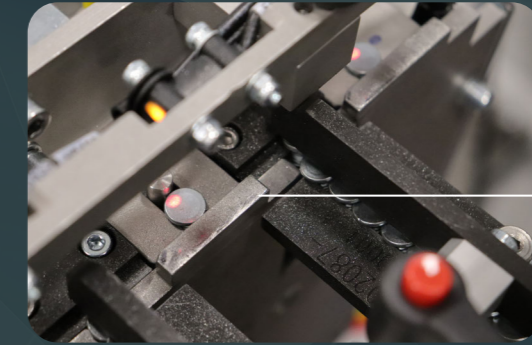
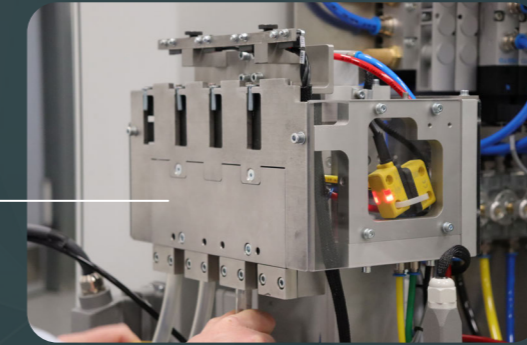
Modular system offers quick and repeatable changeovers.

Shuttle assembly.

Changeover parts available to suit many PEM® fastener types and sizes.



Vibratory bowl. Common unit suits PEM® nuts and studs (others by review). Press speeds up to 65 SPM.



In-line tracks and shuttle mechanism are equipped with sensors. Fastener presence is verified at various check points during the feed/installation cycle.

KEY ADVANTAGES & BENEFITS

KEY ADVANTAGES:

- Fasteners take up less area on work piece
- Fasteners can be fed and installed from the top, bottom, horizontal or at compound angles
- Fastener installation can take place in the final stations of the progressive die
- True positional tolerance on fastener
- Excellent perpendicularity for studs & standoffs
- Fasteners are always in a captured state
- Fastener presence at the workpiece is verified at each location

BENEFITS:

- Increased productivity
- Increased quality
- Cost effective
- Reduced inventory/WIP
- Reduced manufacturing lead times



NextGen Universal In-Die Feed Cart

SYSTEM ELEMENTS

CONTROL PANEL

Operator friendly, intuitive interface.
Activate/deactivate tracks, regulate hopper, bowl, and linear operation via the Siemens HMI.

HOPPER

The fastener journey starts in the hopper, which is used for bulk fastener storage.

BOWL

Fasteners are orientated and pre-lined up.

IN-LINE TRACKS

Fasteners are separated and transitioned towards the shuttle mechanism in the in-line tracks.

SHUTTLE

A shuttle mechanism feeds fasteners individually to the In-Die tooling that is located in the die.

SENSORS

Bowl, in-line tracks, shuttle, and in-die tools are equipped with sensors. Fastener presence is verified at various checkpoints.

IN-DIE TOOLING

Standard format PEMSERTER® In-Die tooling designs are available to satisfy requirements of most applications.

Custom designed tooling is also offered to meet the needs of specific applications.



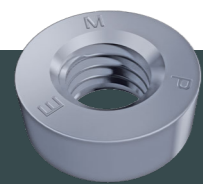
SYSTEM CAPABILITIES

	PEM® Self-Clinch Nuts						PEM® Self-Clinch Studs											
	S™/SS™			FH™/HFH™						HFE™/THFE™								
	-0	-1	-2	-12	-15	-18	-20	-25	-30	-35	-40	-12	-15	-20	-25	-30	-35	-40
M4	⌀	✓	✓	✓	✓	✓	✓	⌀	⌀	⌀	⌀	⌀	⌀	⌀	⌀	⌀	⌀	⌀
M5	⌀	✓	✓	✓	✓	✓	✓	✓	⌀	⌀	⌀	⌀	✓	✓	✓	⌀	⌀	⌀
M6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⌀	⌀	✓	✓	✓	✓	✓	⌀
M8	✓	✓	✓	⌀	✓	✓	✓	✓	✓	✓	⌀	⌀	⌀	✓	✓	✓	✓	⌀
X5	X	X	X	✓	✓	✓	✓	✓	✓	✓	⌀	⌀	✓	✓	✓	✓	✓	⌀
X6	X	X	X	✓	✓	✓	✓	✓	✓	✓	⌀	⌀	✓	✓	✓	✓	✓	⌀

✓ Feedable
 ⌀ Review Required
 X Not Applicable

*Other PEM® fastener types and sizes by review

PEM® SELF-CLINCHING NUTS (S™/SS™/SP™)



PEM® brand self-clinching nuts install permanently in aluminium, steel, stainless or copper sheets.

Self-clinching nuts are installed by placing them in properly sized holes in sheets and applying a parallel squeezing force to the head of the nut. The sheet metal surrounding the head cold flows into an undercut, thereby making the fastener an integral part of the sheet. A serrated clinching ring prevents the fastener from rotating after installation.

PEM® self-clinching nuts provide load-bearing threads in thin sheets with high pushout and torque-out resistance.

Download technical data sheet [here](#).

PEM® BRAND SELF-CLINCHING STUDS (FH™/FHP™/FHS™/FH4™/HFH™/HFHS™/HFHB™)

PEM® brand self-clinching flush head and heavy head style studs and pins install permanently in aluminium, steel, stainless or copper sheets.

PEM® self-clinching studs are installed by placing them in properly sized holes in the sheets and squeezing into place with any standard press. The squeezing action embeds the head of the stud into the sheet. The metal displaced by the head flows smoothly and evenly around the ribs and into the annular groove, securely locking the stud into the sheet with high torque-out and pushout resistances.

Download technical sheet [here](#).



PEM® BRAND SELF-CLINCHING STUDS (HFE™/THFE™/HFLH™)

HFE™ (heavy-duty) Studs are designed with an enlarged head diameter which projects above the sheet material and provides maximum pull through in sheets as thin as 1.00 mm.

Enlarged THFE™ head diameter reduces stress on panel. Thicker head allows for larger hole in attached panels. Clinch design provides high-strength in sheets as thin as 0.8 mm. Recommended for use in steel or aluminium sheets HRB (Rockwell "B" Scale) 85 or less and HB (Hardness Brinell) 165 or less.

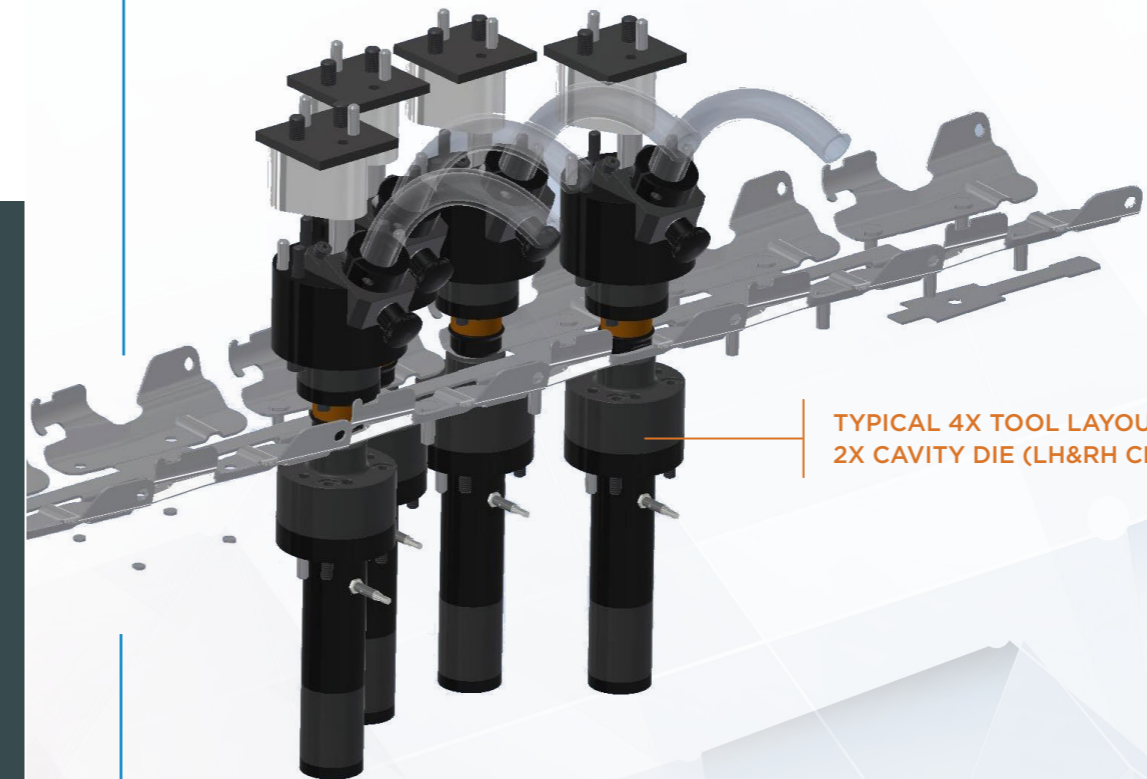
HFLH™ Hard Panel Studs install into thin, hard, high strength steel sheet (up to 700 MPa maximum tensile). Hardened stud material provides enhanced thread strength.

Download technical data sheet [here](#).

PEMSERTER® IN-DIE TOOLING

MAIN CHARACTERISTICS

- Optimum die design and limited footprint
- In press removable tooling design
- Limited moving parts, lower maintenance costs
- Fasteners can be fed and installed from the top, bottom, horizontally or at compound angles



TYPICAL 4X TOOL LAYOUT (STUDS) 2X CAVITY DIE (LH&RH CHASSIS')

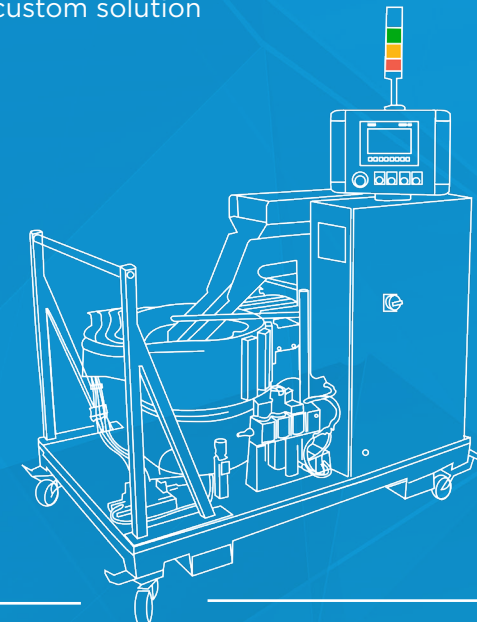
Standard format nut tools
Ø 60 mm footprint

Tooling die-set, single stud tool includes toolstack, splice block, flag post,
IO Junction box, sensors, and umbilical cable.

Standard format stud tools
Ø 70 mm footprint

NextGen Universal In-Die Feed Cart - FEATURES OVERVIEW

Footprint (LxWxH)	1.5m x 1m x 2m
Weight	745kg
Electrical requirements	230V single phase supply
Air requirements	6 / 7 bar ID Ø12mm MIM
Press speeds	up to 65 strokes per minute
Control system	Siemens ET200-1510
Operator interface	Siemens HMI touch screen
Hopper capacity	25 litre
Number of feed lines	4x (other configurations by review)
Manoeuvrability	Easy roll/swivel wheels
Supplied configured to suit a PEM® nut type	S™/SS™ M5 thru M8
Supplied configured to suit a PEM® stud type	FH™/HFH™/HFE™/THFE™ M5-12 thru M8-35
PEM® fastener size Interchangeability	Yes
PEM® fastener type Interchangeability	Yes
Multiple bowls per cart	Yes - custom solution



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