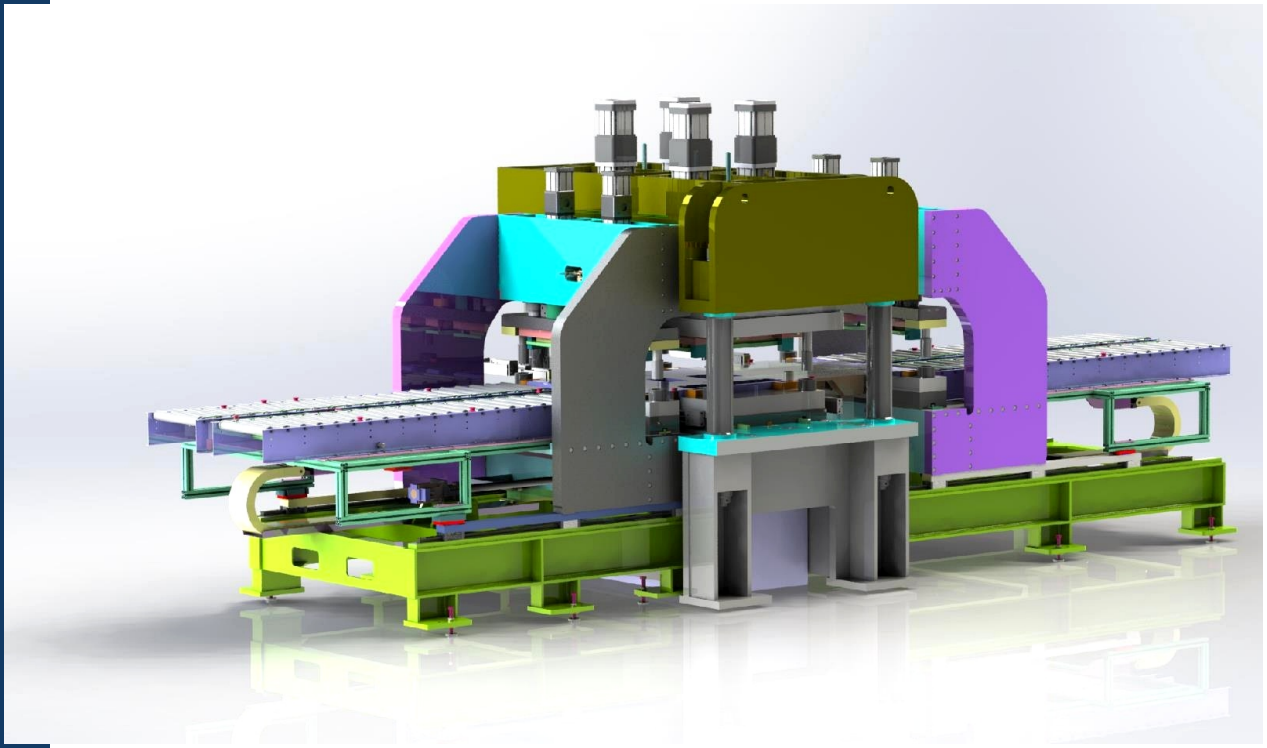
Industrial Automation & Machine Design

Selected Project Portfolio



Istvan Heffner

Senior Mechanical Design Engineer

Autodesk Inventor + Vault | SolidWorks + PDM

Professional Profile

21+ years in mechanical design, manufacturing equipment, maintenance engineering and automation

Engineering focus

Senior mechanical engineer with extensive experience in high-volume manufacturing environments, industrial automation, production equipment, tooling, machine frames, test stations and assembly-line support.

CAD / PDM systems

- Autodesk Inventor + Vault Professional
- SolidWorks + SolidWorks PDM
- 2D manufacturing drawings and assembly drawings
- Sheet metal works, fabricated structures and machined parts

Core capabilities

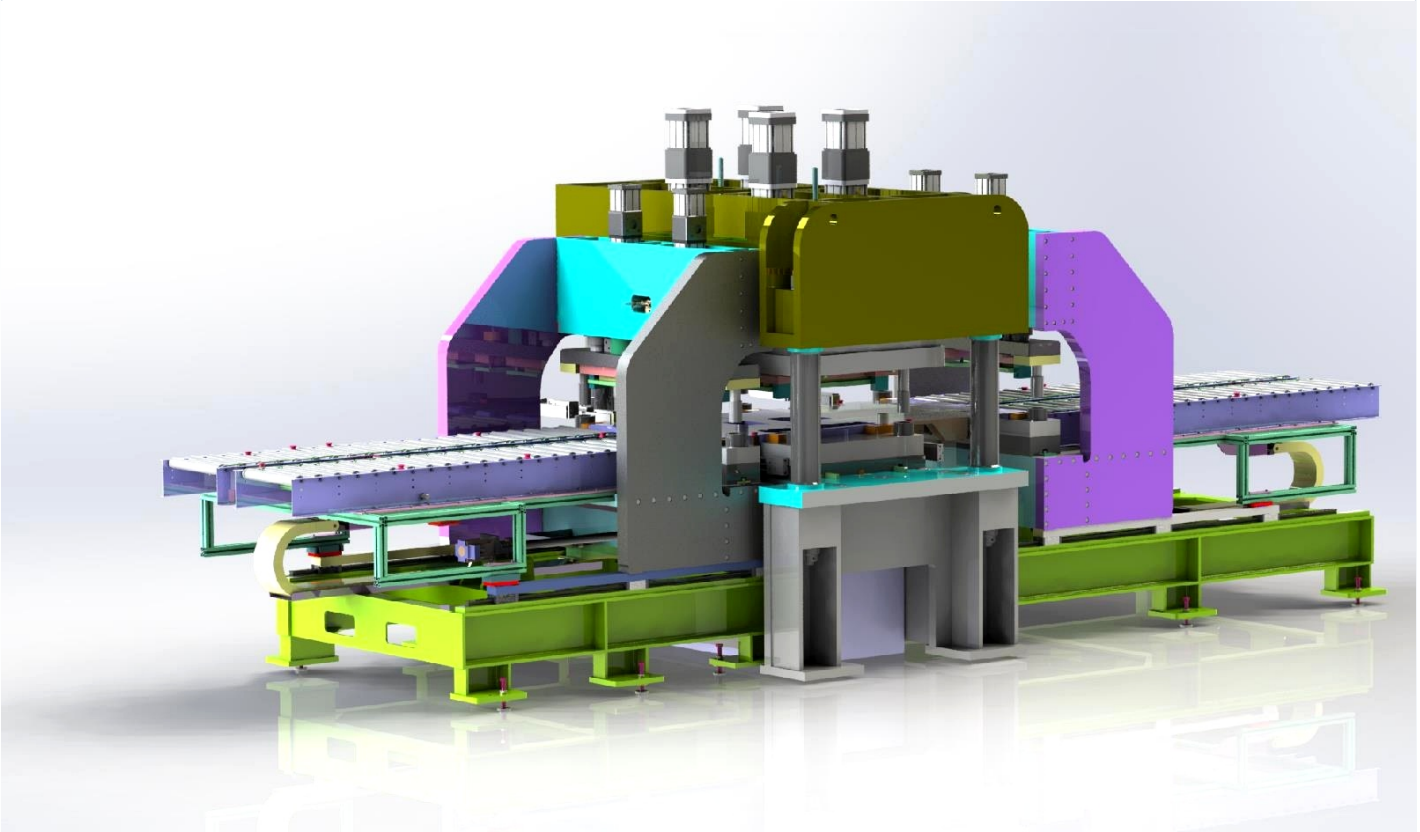
- Industrial machine and production equipment design
- Automated and semi-automated assembly stations
- Servo press systems, frames, guards and integration parts
- Sheet metal works, fabricated structures and machined parts
- Pneumatic/mechanical mechanisms and low-cost fixtures
- Manufacturing drawings, BOMs and technical documentation
- Design for manufacturing, assembly and maintenance

Relevant companies and project background

- Bosch - production lines, manual and semi-automatic assembly equipment
- SEG Automotive - robotization, testers, presses and automated screwdriving stations
- Facteon Intelligent Technology, New Zealand - appliance manufacturing automation and servo press systems

Facteon - 200-ton Servo Press Frame

Refrigerator door panel manufacturing line | New Zealand | 2024 | SolidWorks + PDM



Central 200-ton servo press frame - full assembly CAD render

Project overview

Company: Facteon Intelligent Technology
Year: 2024
Role: Mechanical Design Engineer
Software: SolidWorks + PDM

Design of the central press frame for a fully automated refrigerator door sheet-metal component manufacturing line. Scope: press frame and support structure; tooling excluded.

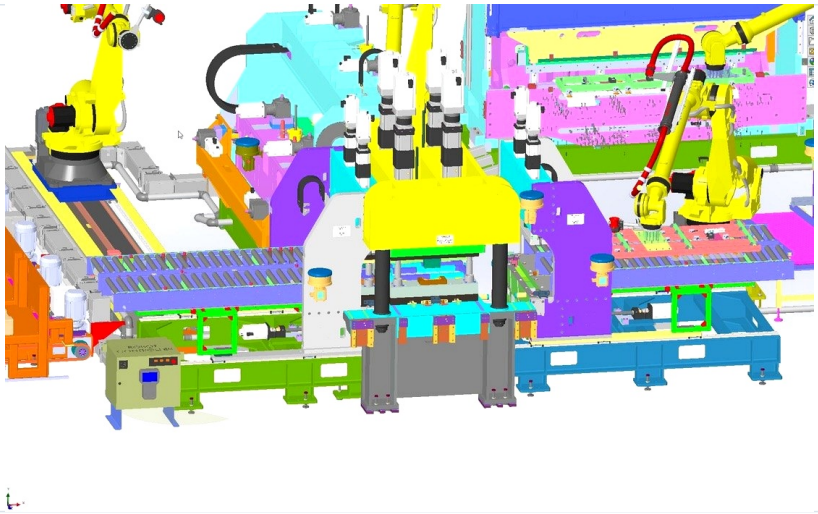
- 200-ton fully servo-driven press
- High-rigidity welded frame and support structure
- Integrated into a robot-assisted production line
- Pneumatic design and manufacturing drawings
- Production-ready documentation for fabrication and assembly

Facteon - Production Line Integration

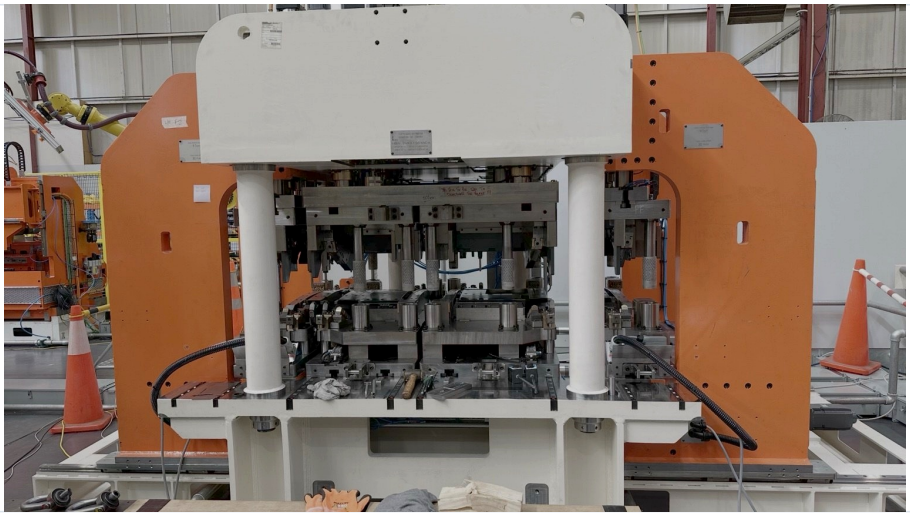
Concept to manufacture to commissioning



Commissioning and production-line integration phase



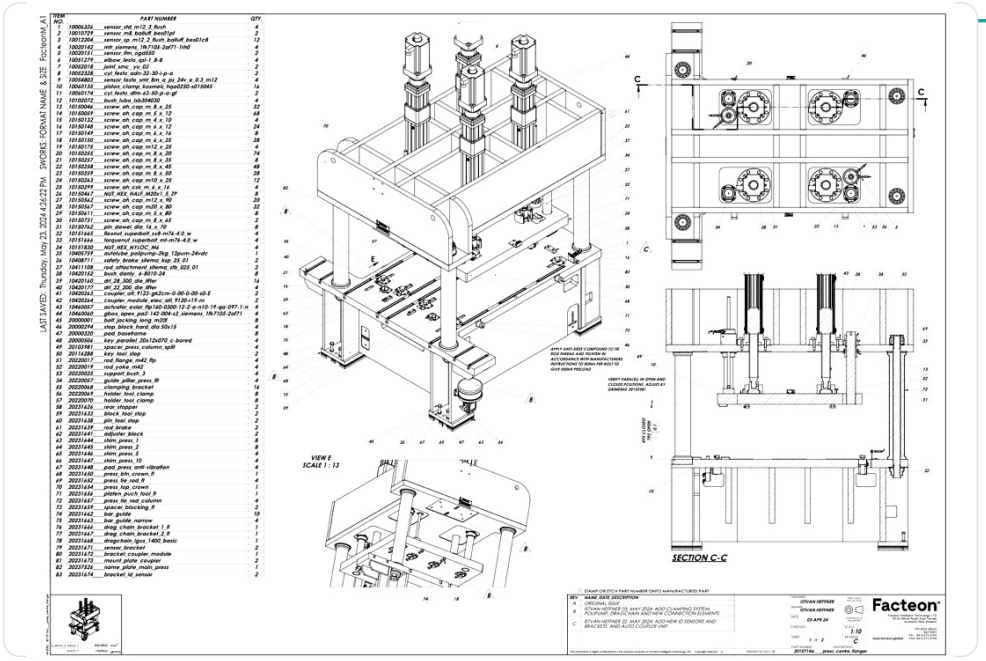
Full automated line CAD overview



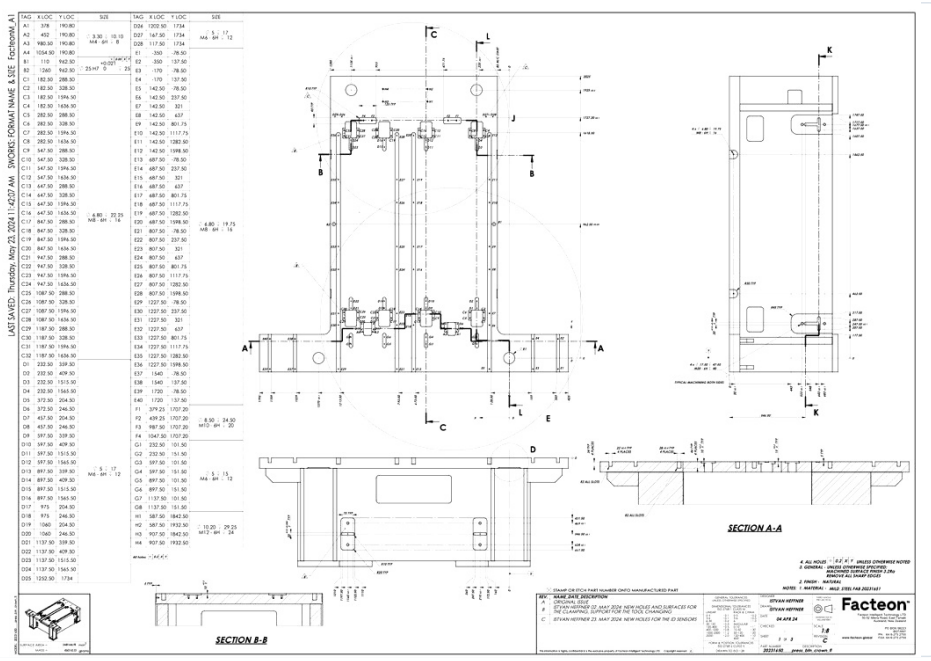
Manufactured press frame installed in the line

Facteon - Manufacturing Documentation

Assembly and detail drawings prepared for fabrication and build support



Assembly drawing / BOM / section views



Manufacturing drawing with hole pattern and section details



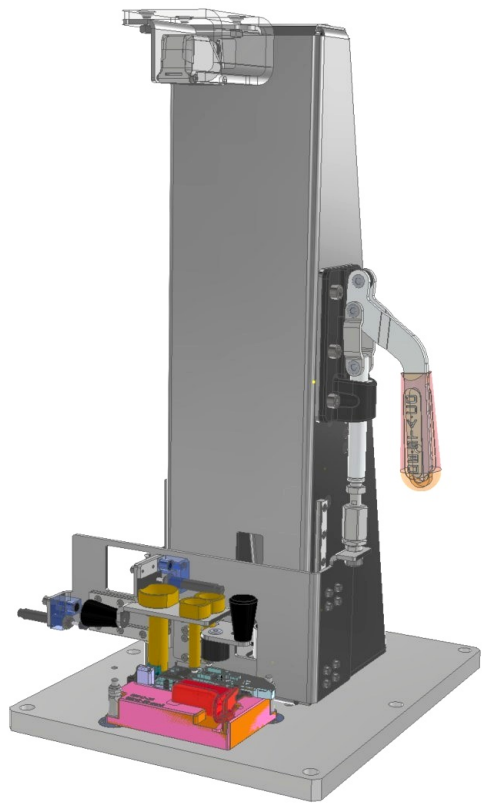
Press frame during build

Engineering value

- Large fabricated structure with demanding stiffness requirements
- Practical manufacturability and assembly access considered from the beginning
- Design documentation created for real workshop fabrication
- Close cooperation with manufacturing and commissioning teams

Bosch - Manual Screwdriving & Quality Check Station

Low-cost poka-yoke station with reject-retention function | 2025/2026 | Autodesk Inventor + Vault



Complete station CAD model

Project overview

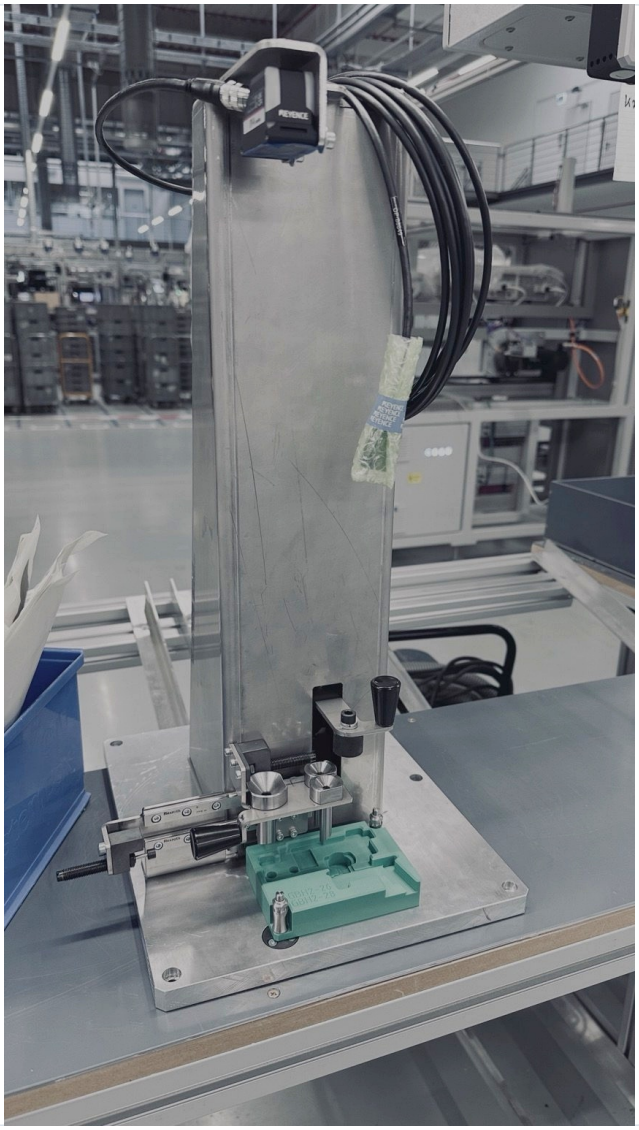
Company: Bosch
Year: 2025/2026
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Development of a manual screwdriving and inspection station for assembly of a 230 V cable into a switch. The key requirement was that after incorrect screwdriving or cable-position error, the operator must not be able to remove the product from the station before a precise quality check.

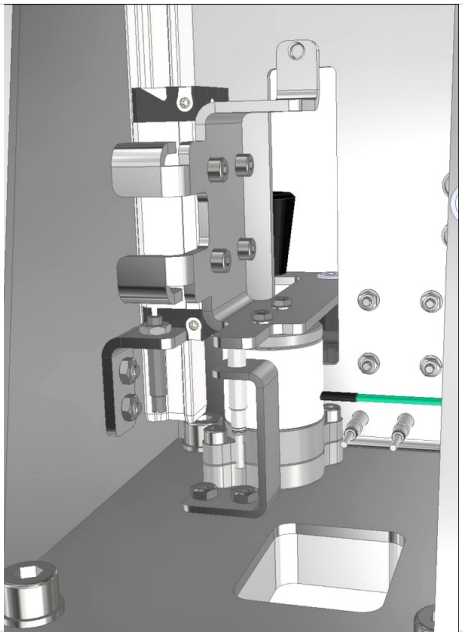
- No pneumatic components due to cost and safety-category considerations
- Mechanical reject-retention function after failed screwdriving or position check
- Product can only be released after a precise quality check
- Low-cost solution using sheet-metal frame and support parts

Bosch - Manual Screwdriving & Quality Check Station

Detailed mechanism, sheet-metal structure and built equipment



Manufactured station



CAD view - mechanical retention / inspection area



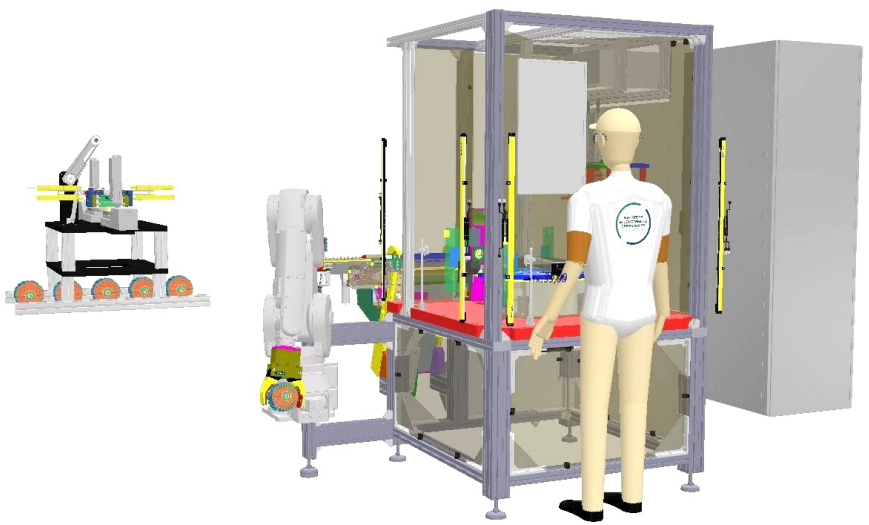
Built mechanical retention / inspection area

Design approach

- Mechanical poka-yoke instead of pneumatic actuation
- Sheet-metal parts used to reduce cost and simplify manufacturing
- Retention function protects the process after failed screwdriving or cable-position error
- Designed for workshop fabrication and quick implementation

SEG - EOL Tester Robotization

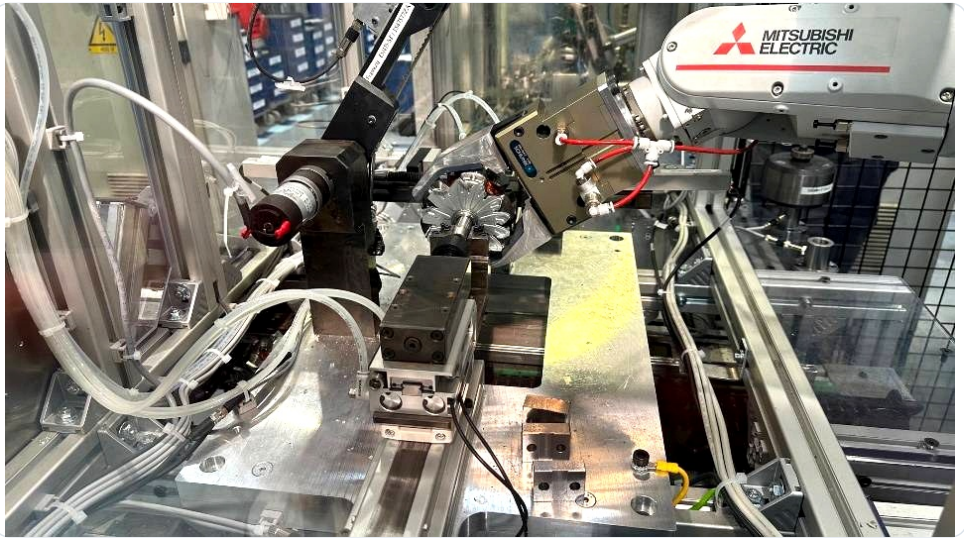
Generator production line | 2022 | Autodesk Inventor + Vault



CAD model of the robotized tester station



Built station during implementation



Robot integration and test area

Project overview

Company: SEG Automotive
Year: 2022
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Automation and robotization of the last three workstations of the production line, including diameter check, fan-ring position check, dust-protection press, high-voltage test and subjective test.

- Mitsubishi robot integration
- Production line automation and safety guarding
- Mechanical design of station and integration parts
- Approx. project value: 160,000 USD

SEG - PCA Robotization Projects

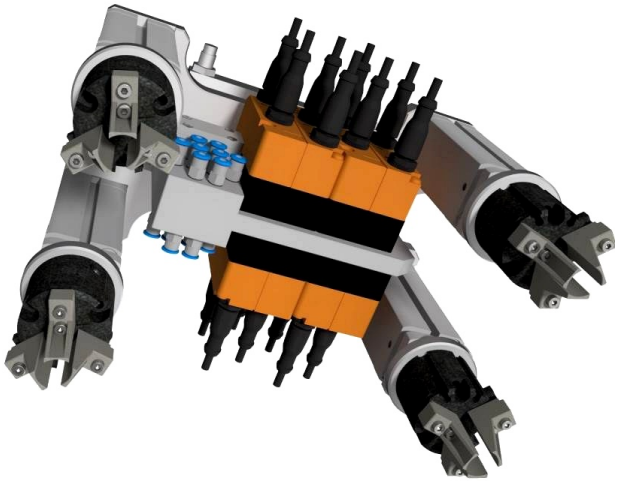
Motor production line | 2021 | Autodesk Inventor + Vault



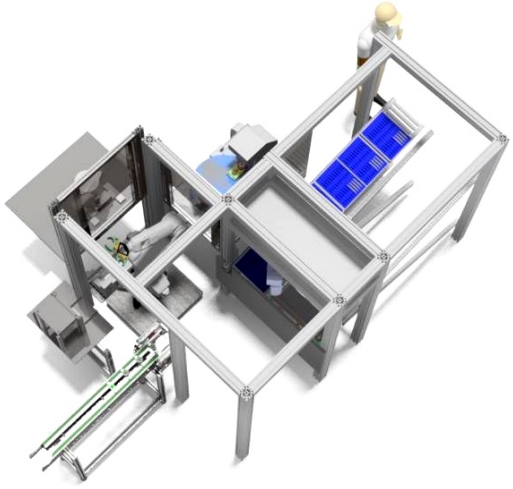
Robotized material-flow concept



Built robot cell in production



Custom robot gripper concept



Second robotization concept

Project overview

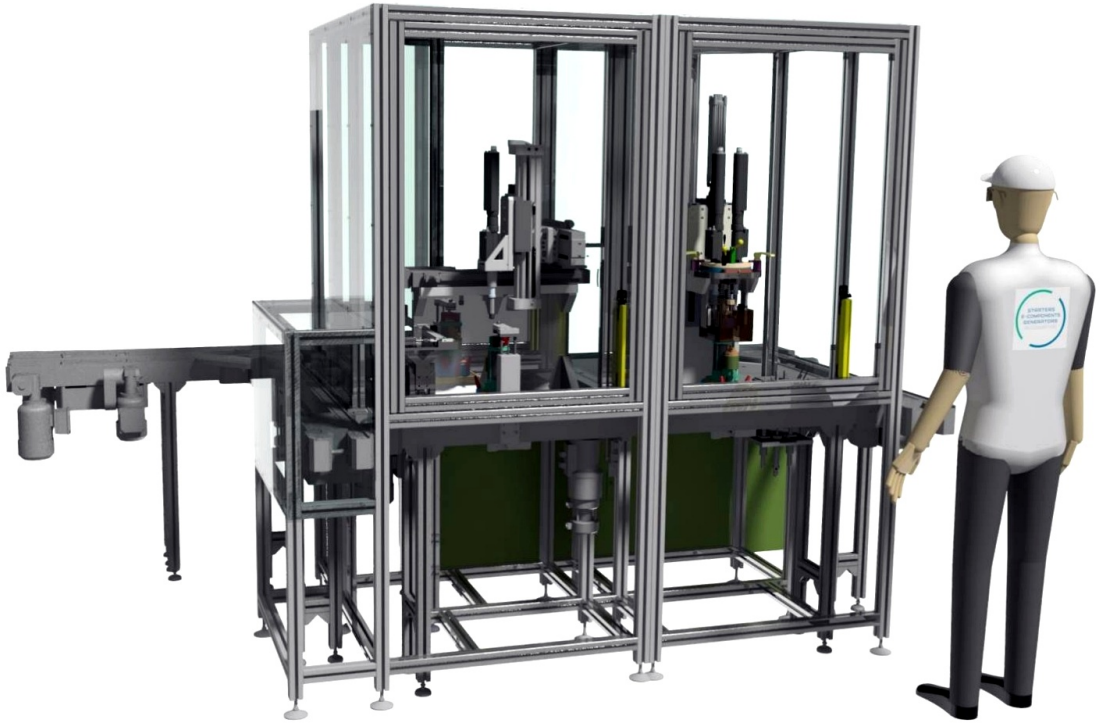
Company: SEG Automotive
Year: 2021
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Connecting the material flow of multiple workstations so that one operator could perform the operation instead of three, using Mitsubishi robots and custom manipulators.

- Operator reduction and material-flow improvement
- Custom robot gripper and manipulator design
- Mechanical design of guarding and support structures

SEG - D4 Automatic Screwing Station

Starter production assembly line | 2019 | Autodesk Inventor + Vault



Full station render - automatic screwdriving and nut-screwing station with conveyor and feeder



Manufactured station



Automatic screwdriving area

Project overview

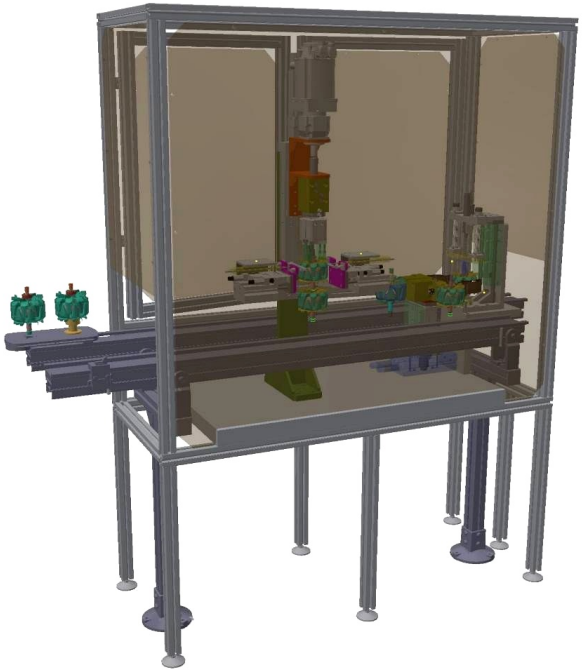
Company: SEG Automotive
Year: 2019
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Automation of the screwdriving process and replacement of manual operation. The equipment included a conveyor system, automatic screwdriving station, automatic nut-screwing station and feeder.

- Conveyor and station integration
- Automatic screwdriving / nut-screwing functions

SEG - Tester and Press Stations

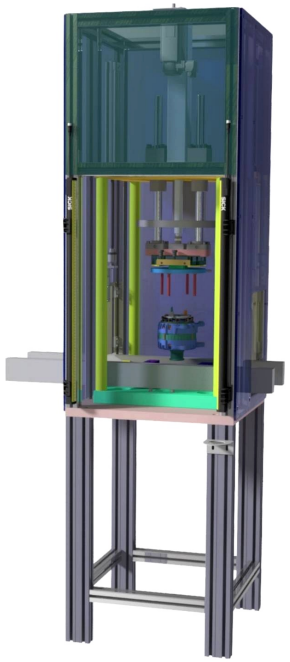
Selected production equipment projects | Autodesk Inventor + Vault



RO1 Tester - CAD model



RO1 Tester - manufactured station detail



FA1 House Press - full CAD model

Project overview

Company: SEG Automotive
Year: 2017
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

This page includes two selected production equipment projects. RO1 Tester automated diameter testing and bearing-position measurement for generator production.

- Precision measuring station

Project overview

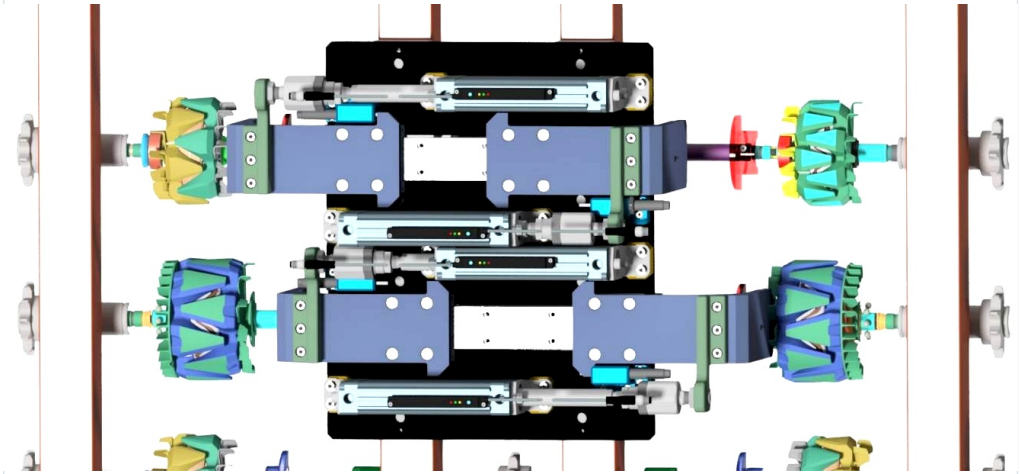
Company: SEG Automotive
Year: 2021
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Automation of a manual pre-pressing operation in a generator assembly line.

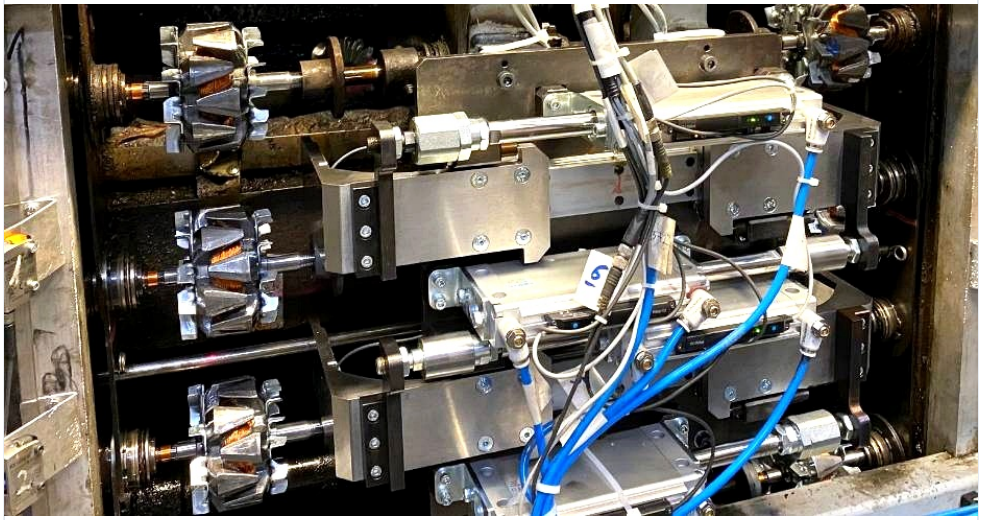
- Mechanical design of press station and support structure
- Approx. project value: 70,000 USD

SEG - RO1 Trickling Machine Modification

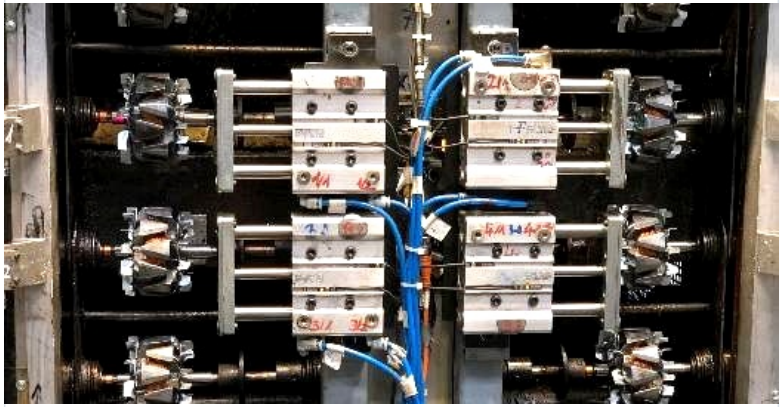
Generator production line | 2018 | Autodesk Inventor + Vault



CAD concept - product loading and dosing monitoring modification



Built modification inside the trickling machine



Previous version - unreliable loading/dosing arrangement

Project overview

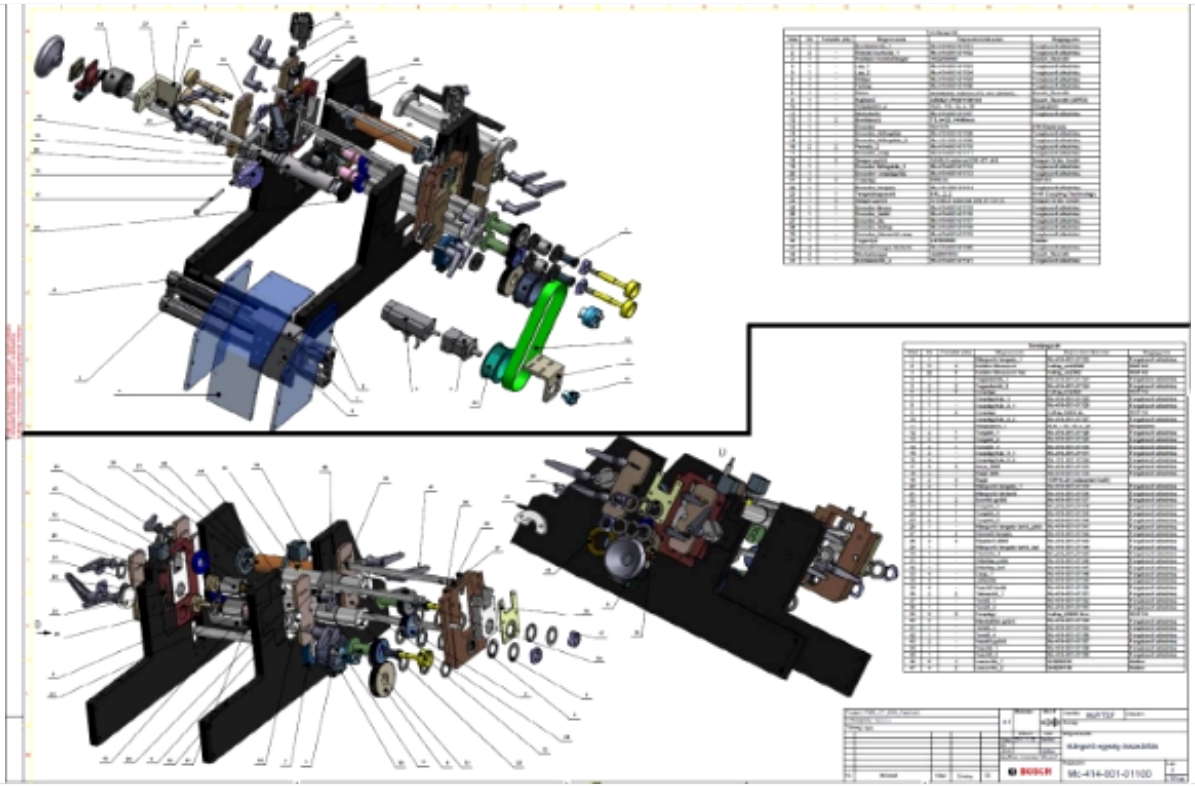
Company: SEG Automotive
Year: 2018
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

The original dosing and loading process was unstable, causing dropped products and a high internal defect cost. The new construction replaced unreliable optical inspection with a displacement-sensor-based loading check, mounted on the loading cylinder.

- Mechanical modification of loading mechanism
- Sensor integration in a harsh / steamy environment
- Scrap reduction by reliable loading confirmation
- Approx. project value: 10,000 USD

Bosch - P6 Paper Forming Station

Motor production line | 2014 | Autodesk Inventor + Vault



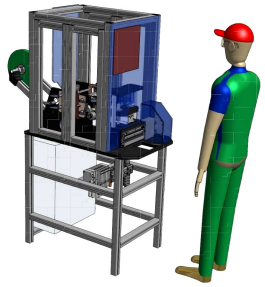
Exploded assembly drawing, detailed views and BOM

Project overview

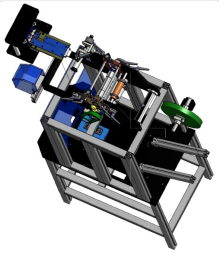
Company: Bosch
Year: 2014
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Automatic cutting and shaping of stator insulation paper to size for motor production. The machine included dedicated forming mechanisms, custom tooling and production-line integration.

- Custom mechanical forming mechanism
- Sheet metal and machined components
- Manufacturing documentation and assembly support
- Approx. project value: 90,000 USD



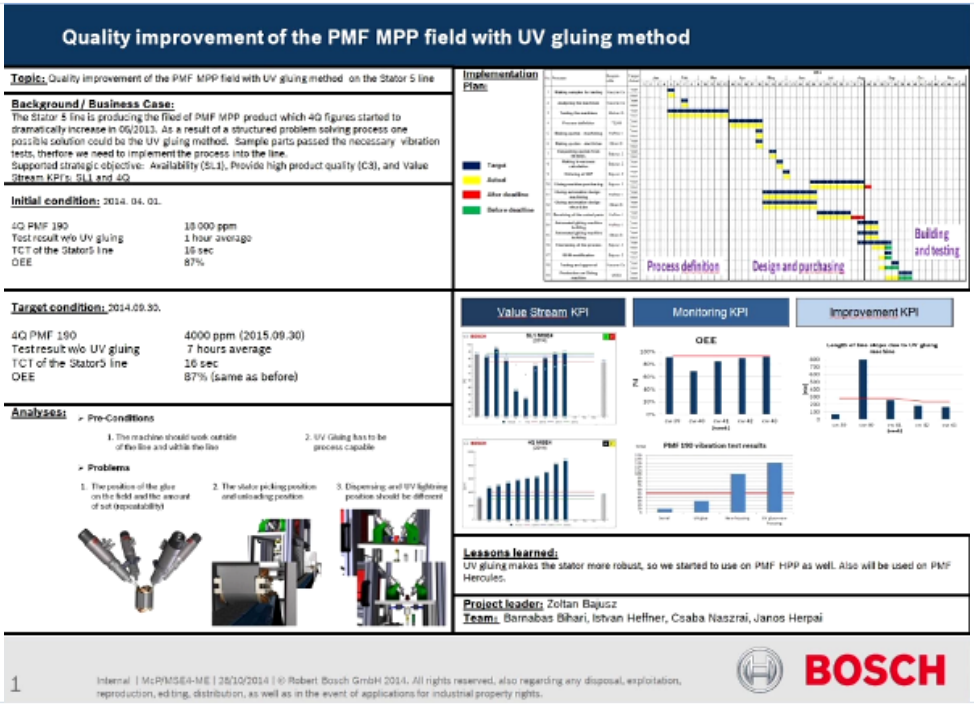
Full station render with operator scale



Machine render - forming and cutting mechanism

Bosch - P5 UV Gluing Station

Motor production line | 2014 | Autodesk Inventor + Vault



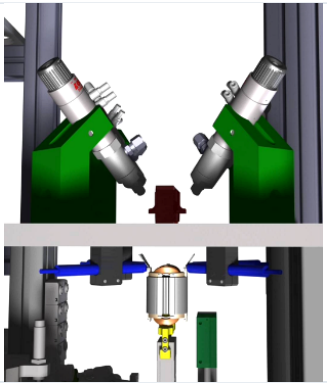
Process validation and implementation summary

Project overview

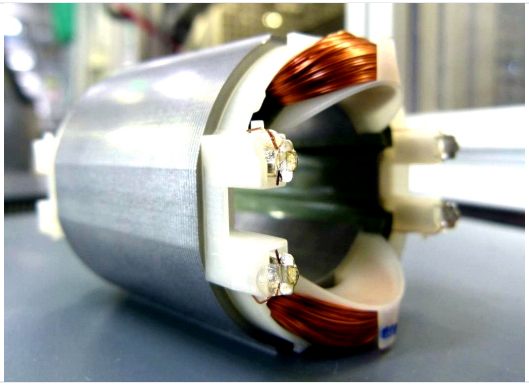
Company: Bosch
Year: 2014
Role: Mechanical Design Engineer
Software: Autodesk Inventor + Vault

Automatic UV gluing station to reinforce all four plug-wire connection points of the product without increasing the production-line cycle time.

- Automatic UV glue application process
- Improved vibration resistance of plug-wire contacts
- Cycle-time neutral integration into the production line
- Mechanical design, station layout and documentation
- Approx. project value: 70,000 USD



UV gluing heads and product positioning - CAD detail



Stator with UV glue on connection points

Engineering Summary

Selected examples from production-equipment and assembly-line development

Software and project background

- Bosch and SEG projects: Autodesk Inventor + Vault
- Facteon projects: SolidWorks + SolidWorks PDM
- Mechanical design responsibility across all projects shown
- Manufacturing drawings, assembly documentation and build support

Typical deliverables

- 3D machine and station design
- 2D manufacturing and assembly drawings
- Sheet metal, machined and fabricated parts
- Pneumatic and mechanical mechanisms
- Production equipment design reviews and practical problem solving

Portfolio note

This portfolio contains selected project examples only. It focuses on production-ready mechanical design, industrial automation, manufacturing equipment and practical factory support. The strongest value is the combination of design engineering, maintenance background, manufacturing knowledge and hands-on implementation experience.

- Industrial automation and machine design
- Production equipment, testers, press systems and screwdriving stations
- Sheet metal works, machined parts, fabricated structures and pneumatic/mechanical mechanisms
- Clear documentation and hands-on support through build and commissioning