UFM Compact5

Our press range UFM Compact5 is our specialist press for joining applications in narrow mounting positions like the motor assembly.

For more efficiency.

PROMESS

Assembly and Sensor Technology

Your partner in the field of assembly and testing technology

Gerhard Lechler founded the company PROMESS in 1977 as an engineering office in the field of technical measurement in Berlin. Initially, the company distributed handmade patented measuring bearings for tool condition monitoring before the electro-mechanical assembly press (UFM) with integrated NC control was born at the end of the 1980s. Right from the beginning it was the strength and the passion of Gerhard Lechler to develop technical solutions for his customers. And this has not changed until today. This passion has continued so that the core competence of PROMESS is still the development of complete technological systems for solving the individual and complex assembly and testing tasks and requirements of our customers.

From process development to preliminary testing, from initial installation to daily production, PROMESS offers holistic expertise from a single source. Our specialist teams have comprehensive knowledge of our products and offer prompt and effective advice worldwide.
Today PROMESS is one of the global leaders in the manufacturing of electro-mechanical assembly presses with the widest range of presses in this field. Currently, more than 15,000 presses are operating in heavy industrial applications.

In almost 30 countries all over the world our sales and service partners are looking forward to your enquiries and questions.
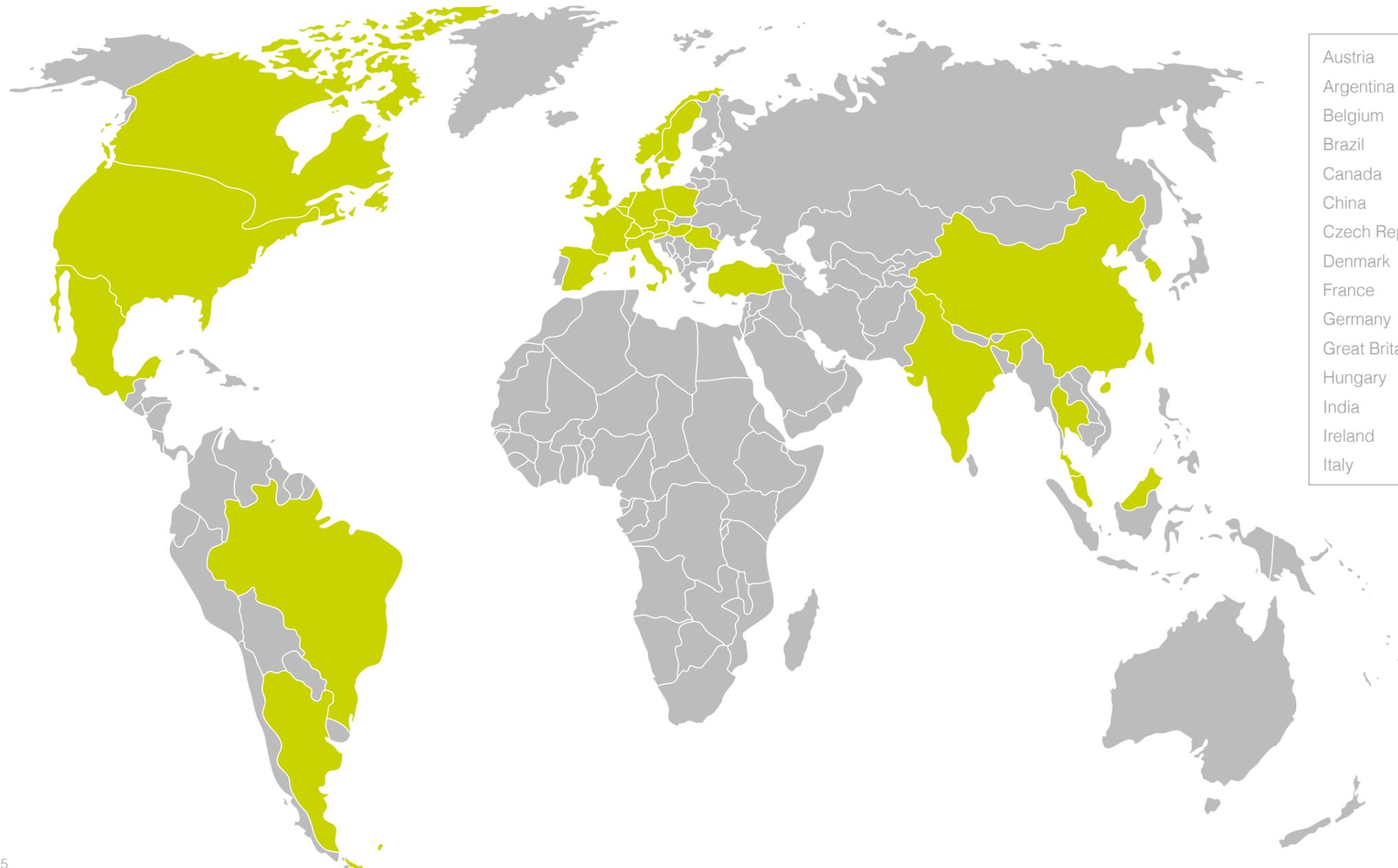
Austria	Korea
Argentina	Malaysia
Belgium	Mexico
Brazil	Netherlands
Canada	Norway
China	Poland
Czech Republic	Romania
Denmark	Singapore
France	Slovakia
Germany	Spain
Great Britain	Sweden
Hungary	Switzerland
India	Thailand
Ireland	Turkey
Italy	USA

UFM Compact5

Our press range UFM Compact5 is our specialist press for joining applications in narrow mounting positions like in the motor assembly. It features a slim and weight reduced design. The servomotor is aligned parallel to the assembly press, this results in a low installation height. Because of this it is possible to join eight valve seat guides and rings into a motor block simultaneously. Also a connection to robots and the use in flexible assembly concepts is possible due to their reduced weight.
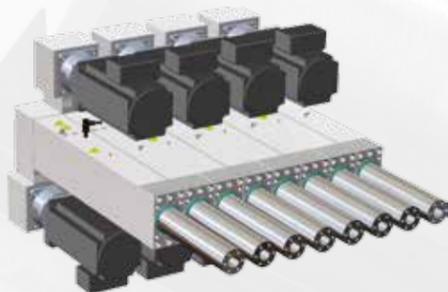
Press Types

The presses in our line UFM Compact5 feature an absolute encoder, a strain gauge force transducer and our digital preamplifier PDM-S by default. The PDM-S allows for a high accuracy in the force measurement. In addition, the following set-ups are available:

Type	Force	Stroke	Speed
1	25	350	250
2	50	350	150
3	50	350	240

Advantages

- Standard model includes absolute encoder that eliminates the need for referencing
- Digital force measurement with 24 bit resolution
- Multi range calibration for force input (optional)
- Small dimensions
- Weight reduced design
- Low installation height
- Sensor system can be easily extended using versatile PROMESS-BUS
- Utilization of window and envelope technologies
- No PLC knowledge required
- PLe for STO by default

Mechanics

The assembly presses UFM Compact5 are robustly designed thus making it well suited for long periods of use. The durable and compact gear drive is ideal for high forces at small dimensions. In order to realize low installation heights and a compact design, the units feature the servomotor aligned parallel to the assembly press. A synchronous belt connects the motor with the roller gear and provides a high positioning accuracy. The integrated absolute encoder eliminates the need for referencing at the start of the cycle.

Mechanical Design

1. **Gear box**

2. **Integrated strain gauge force transducer**

3. **AC servomotor with absolute encoder**
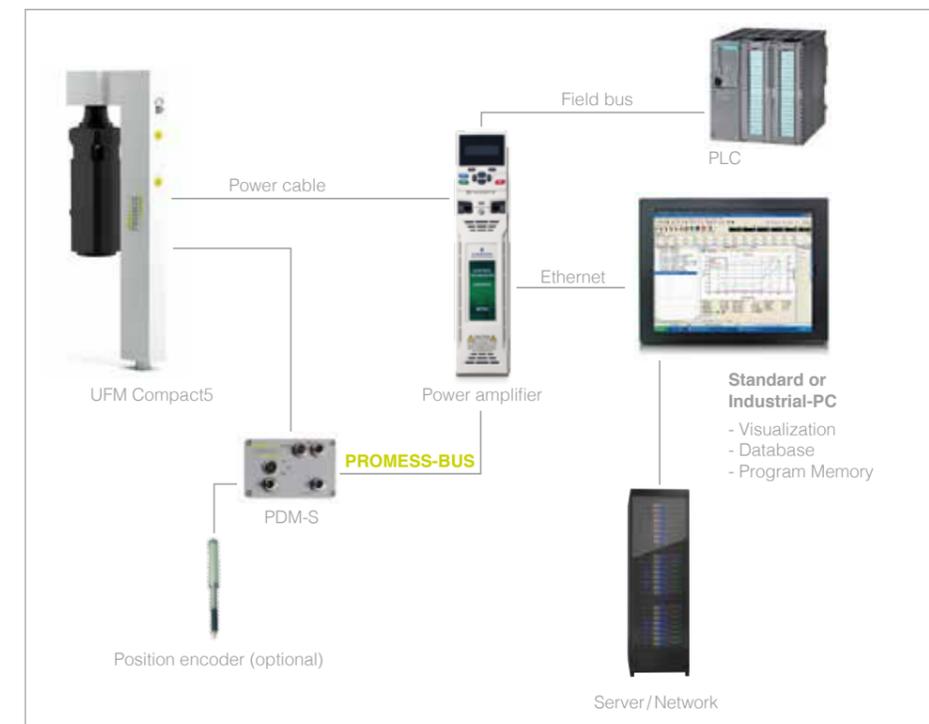
4. **Steel housing**

5. **Anti-twist press ram**
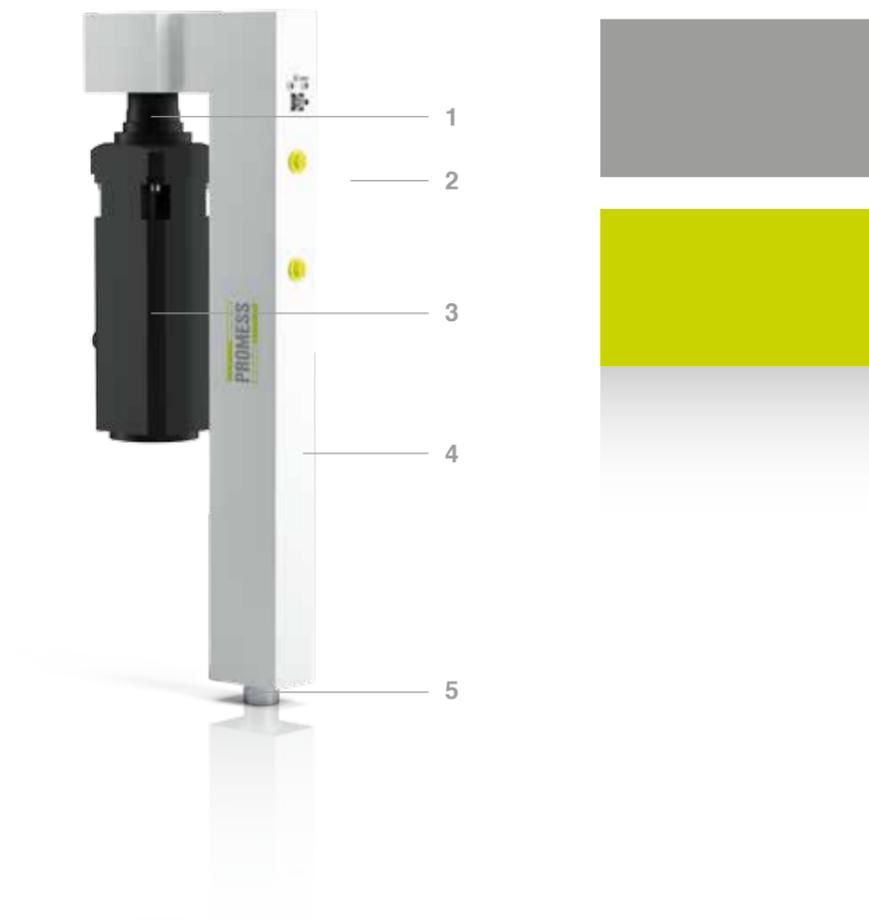
System design

The mechanical system is controlled by a power amplifier with an integrated NC module. The internal RISC processor coordinates the assembly press and can be easily programmed and operated using a conventional PC/display.

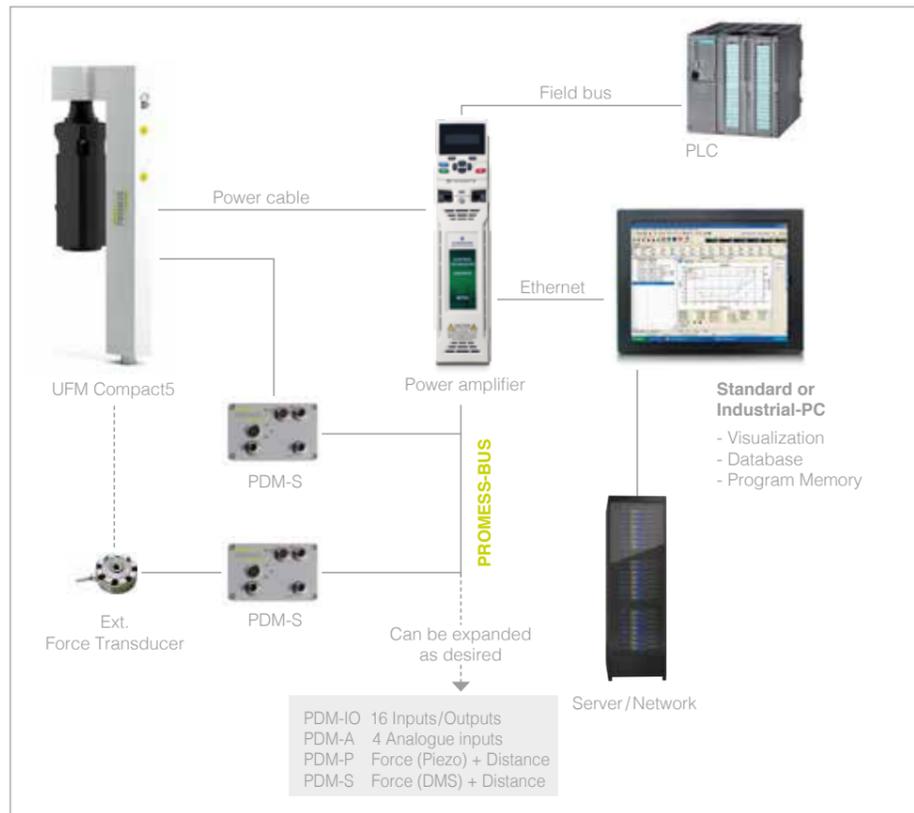The controller coordinates the mechanical motion of the press as well as monitoring the force and distance. The force-distance characteristic can be monitored using envelopes and/or window methods. The data can be edited numerically and graphically so that each individual process can be easily monitored. The automatic learning function allows customers to eliminate the need for custom programming and simply learn the processing limits using a good part. Quality assurance data is stored using the database plugin and can be re-used at any time.

Field bus

PLC

Power cable

Ethernet

UFM Compact5

Power amplifier

Standard or Industrial-PC
- Visualization
- Database
- Program Memory

PROMESS-BUS
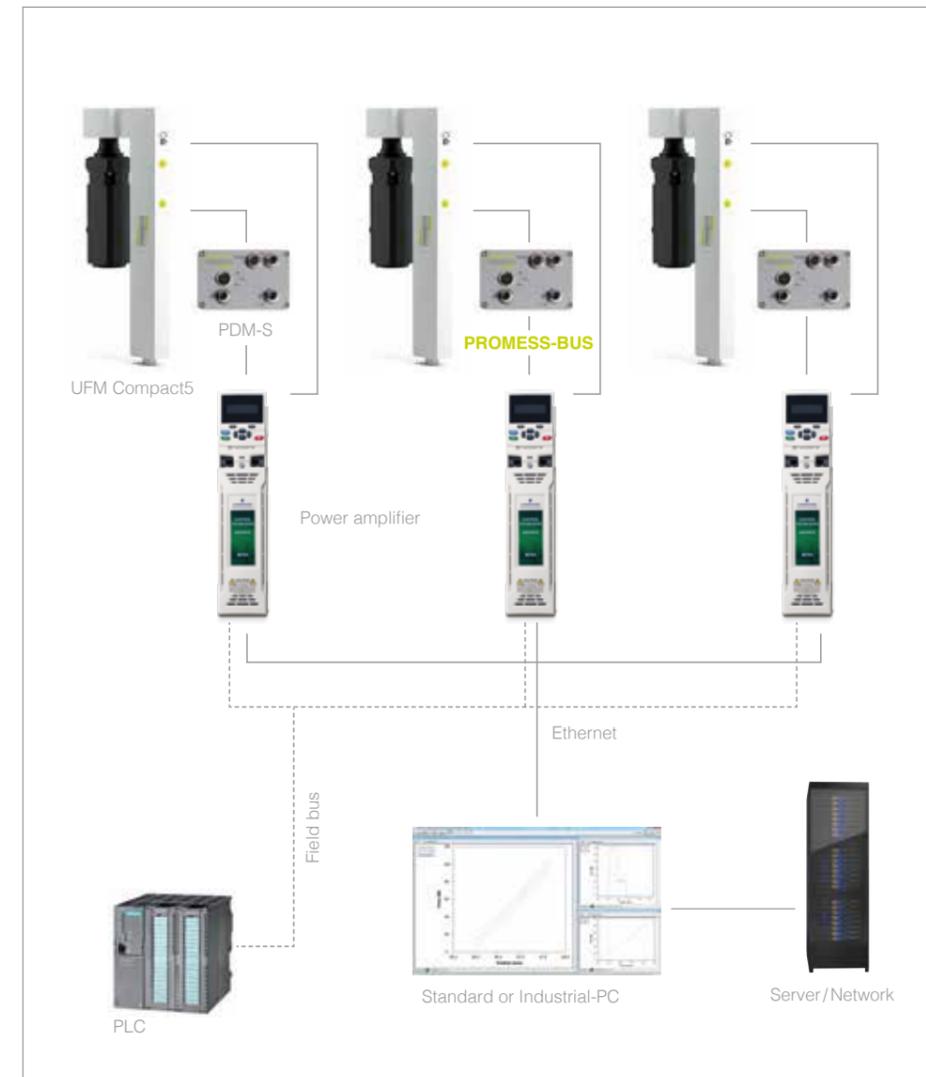
PDM-S

Position encoder (optional)

Server / Network

Basic version

The system utilizes a digital preamplifier. This transfers the force signal at a resolution of 24-bit. When the characteristics are calibrated, the assembly press achieves a system accuracy of 0.3 % from the final value.

The characteristic calibration process is comparable to a multispan calibration for 10 spans. The characteristic map is created automatically using the UFMR Calibrate plugin. The results are stored in a calibration report and can be printed out.

Line configuration

PDM-IO 16 Inputs/Outputs
PDM-A   4 Analogue inputs
PDM-P   Force (Piezo) + Distance
PDM-S   Force (DMS) + Distance

Extension/Options

Software

As standard, the UFM Compact5 range of presses comes with the UFM V5.xx programming software. This software is intuitive to operate and does not require any PLC expertise. It can be used to create simple or advanced joining processes.

The integrated User Administration feature offers multiple permission levels and logging for process safety. The log documents who makes which changes to the program. Each user profile can be exported and then imported to another station. Thus it is possible to integrate a user administration system and also to connect the system to a higher-level permission system using the .Net interface or field bus (e.g., Euchner EKS system).

The transparent and concise program surface allows users to quickly create programs. The main window lists all programming steps together with their functions. The function screens can be opened successively to enter the process values. Thus the force, displacement, time, speed, acceleration and braking rate can be easily programmed for each step. Once the required input screens have been defined, the joining program is completed and the steps are processed automatically.
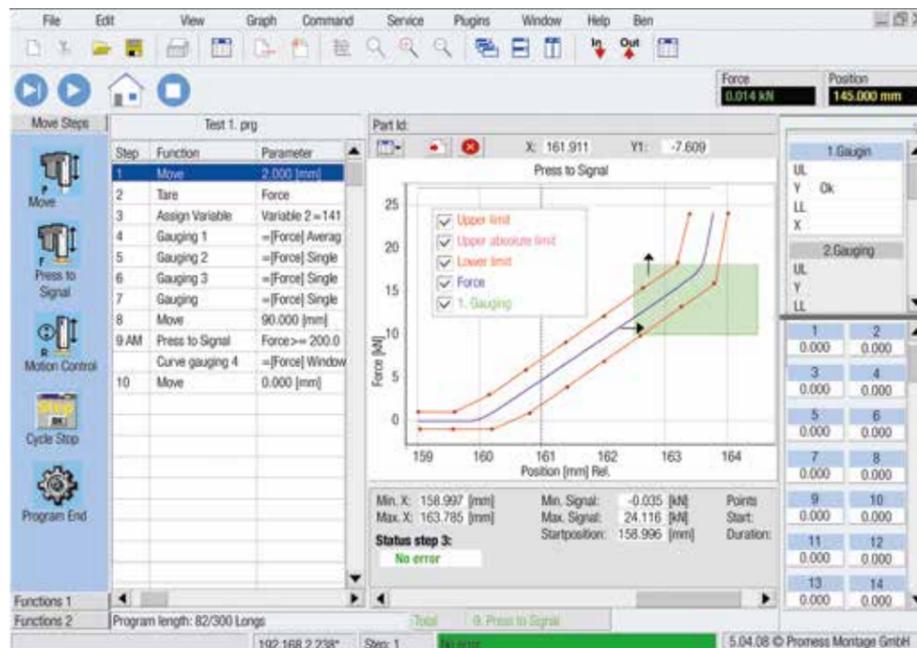
Main window
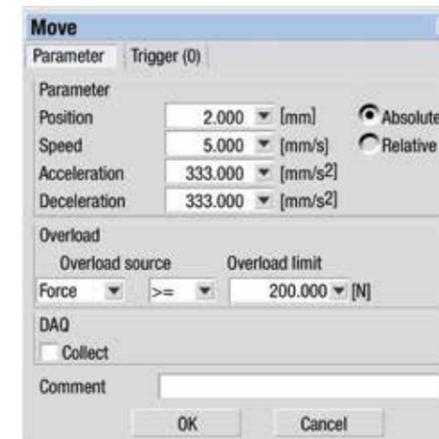
Entry screen Move
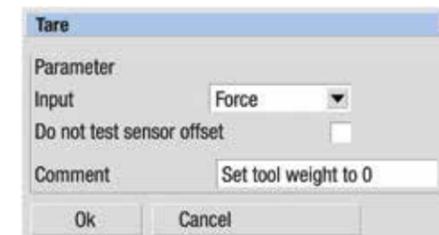
Entry screen Tare

Entry screen Press to Signal

Highlights for demanding applications:

- **Positioning on force slope:**
  Joining components until a definite slope (increasing force) or relatively once a click point has been detected.

- **Controller module:**
  This module allows you to easily solve processes by controlling the process variables and maintaining constant signals, e.g., spinning operations with constant force controlling.

- **Measurement data system:**
  Measurement data can be captured relative to positions and force, but also relative to freely definable reference points (e.g., relative to achieving a specific threshold).

- **Bending compensation:**
  Not only customizable for separate systems, also for specific processes and components.

Trigger Technology by PROMESS

The triggers are "pulse points". Up to seven trigger points can
be defined in order to react to processing events during movement.
These reactions can include:

- Smooth speeds
- Set the outputs in real time
- Change target parameters during movement
- Correct process tolerances during movement

Modern Database Structure

All process data including the curves
can be stored in a database.All com-
mon database formats such as Oracle,
MS SQL and Access are supported. A
separate database is created for each
station. Programs can be stored and
re-used at any time.Since the program
changes can be traced, this provides
100 % traceability throughout the entire
production.
The database can be analyzed using
the DB Viewer with its extensive que-
rying and filtering options. Graphs can
be superimposed on each other for
comparisons and analyses.

Envelopes can be edited and reloaded
into the press. The data can also be
exported in Excel format at any time.
The standard models include the data-
base software package and DB viewer.
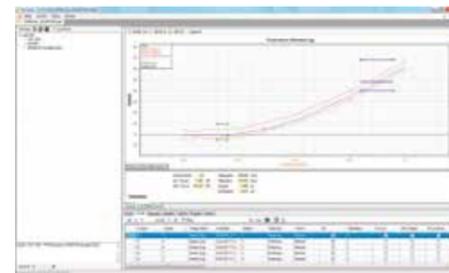
DB Viewer

Software Highlights:

- Press to signal, press to force, press to an external signal
  (e.g., analogue or TTL signals)
- Force and speed can be programmed individually during
  the joining process
- Variables can be used to transmit setpoints, perform
  calculations using PLC and generate counters
- 100 % quality control using window and/or envelope methods
- 100 % process documentation using modern database structure
- 100 % process analysis using standardized interface to QS-STAT
  (optional), alternative to process data management software IPM
  (optional) – can be expanded using .net interface
- Trigger function for demanding applications
- High controller accuracy
  (minimization of overshoot in control processes)
- Display of two graphs in one diagram
- Quick printout of a graph report (screenshot)

Scope of Delivery for Components:

- Assembly press UFM Compact5
- Power amplifier incl. application module and UFM V5 firmware
- Brake resistance
- Digital preamplifier PDM-S
- Cable, field bus and more accessories on request

Accessories/Options:

PROMESS has developed extensive accessories for the UFM Compact5 range of presses that provide them with additional functionality. Together with our many years of expertise, we provide you with complete technologies for solving your own complex assembly and testing tasks.

External Force Transducer

The external force transducers are designed to measure tension and compression forces both statically and dynamically. They feature a high measurement precision and a low installation height.

Sensors (Position encoder)

The PROMESS NC controller allows you to connect various additional sensors for measuring force, distance, temperature or other variables.

Technical Data

Item no.	Sensor / Accessory	Cable	Stroke	Resolution
3647	Precision sensor ST 1278	axial	12 mm, neutral position extended	+/- 0.001 mm
3640	Precision sensor ST 1278	radial	12 mm, neutral position extended	+/- 0.001 mm
4103003080	Precision sensor ST 1277	axial	12 mm, pneumatic retracted	+/- 0.001 mm
4103003078	Precision sensor ST 3078	axial	30 mm, neutral position extended	+/- 0.001 mm

Connecting cables have to be ordered separately.

Frames

PROMESS provides
different frames on request.

PSB010G2

Safety Box PSB

As an option to our assembly presses UFM Compact5 we offer our PROMESS Safety Box PSB as an alternative to the integration in electrical cabinets. The device features all safety and power components for this purpose.

It can easily and quickly be connected by plug & play. All cables are pluggable. Due to the compact design, the PSB can be mounted next to the assembly press so that cable lengths can be reduced and wiring becomes unnecessary. By using the PSB your assembly press will be ready for production instantly.

Advantages

- No integration in electrical cabinets
- Reduction of cable lengths
- No wiring work
- No adaption of electrical diagrams
- Short connection time: plug & play
- PLe for STO by default
- Extention on SLS, SS1, SS2 possible
- IP Code 54
- Extremely compact design

Technical Data

UFM Compact5	25 kN	50 kN
Item no.	PSB030G2	PSB060G2
Connection voltage	3 AC 380 … 480 V, +/- 10 %, 48 … 65 Hz	
Connected load at 400 V	10 kVA	18.5 kVA
Protection class	IP 54	
Weight	18 kg	26 kg
Recommended protection	IEC 20 A class gG	IEC 40 A class gG
Temperature range	0 … +40 °C	
Power loss	493 W	654 W
PC interface	Ethernet	
Option PLC, fieldbus interface	Profibus, Profinet, EtherCAT (add. on request)	

System Design

Field bus

Power cable

Ethernet

UFM Compact5

PSB

Standard or Industrial-PC
- Visualization
- Database
- Program Memory

PROMESS-BUS

PDM-S

Position encoder (optional)
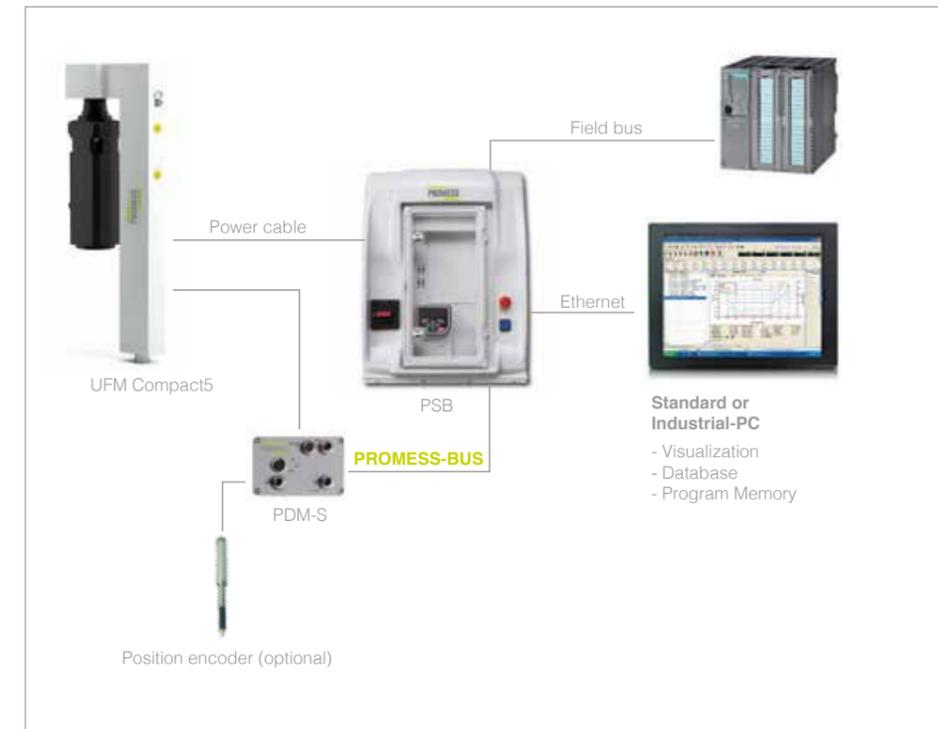
System Design

Overview connections

Power switch

Fieldbus intake

Motor supply

Power supply

Emergency stop button

Reset button

Motor feedbacksystem

Safety break

Ethernet

PC

Safety Module PSD

The PSD safety module is delivered tested and ready to install. It contains the power electronics and safety controller for the joining unit. It offers the following safety functionality: STO in PLe in accordance with DIN ISO 13849-1; optional: SSx and SLS in PLd in accordance with DIN ISO 13849-1. The safety module eases and accelerates the installation procedure for the joining unit.

The PSD is suitable for our UFM Compact5 units with and without brakes. As a prerequisite, it must be controlled using field bus.

Advantages

- Short installation times
- No wiring necessary
- Completely inspected and tested
- EMC tested

Mounted Components

- AC servo amp with NC module
- Brake resister
- EMC components, main power filter
- Safety controller: Safety functionality
- STO in PLe in accordance with DIN ISO 13849-1; optional: SSx and SLS in PLd in accordance with DIN ISO 13849-1
- Field bus interface (must be ordered separately)
- Set of cables (must be ordered separately)
- Required connectors (connected to pins): Power supply
- 24-volt emergency stop circuit

PSD 010G1

System Design

UFM Compact5

Power cable

Field bus

Ethernet

PSD

Standard or Industrial-PC
- Visualization
- Database
- Program Memory

PROMESS-BUS

PDM-S

Position encoder (optional)
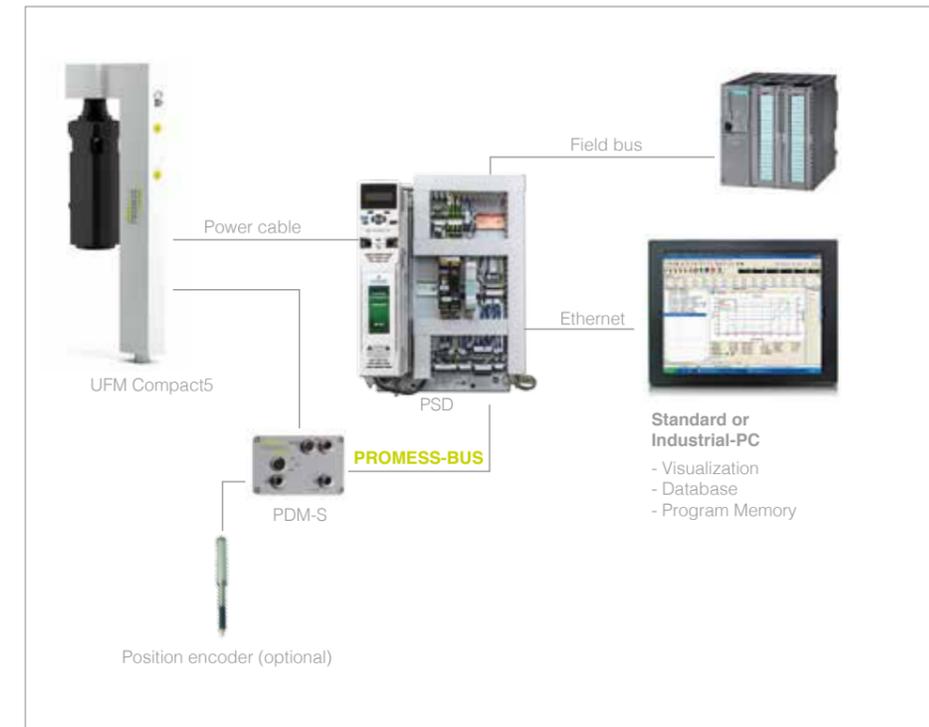
System Design

Technical Data

UFM Compact5	Item no.	WxHxD (mm)	Supply - voltage	Fre- quency	Operating tem- perature range	Control voltage
25 kN	2340100EG2	500x500x300	380 … 480 VAC, +/- 10 %, 3ph	50 … 60 Hz	5 … 40 °C	24 VDC, +/- 10 %
50 kN	2440150EG2	500x500x350				
50 kN	2540270EG2					

PROMESS Digital Modules PDM

PROMESS offers four different multifunction amplifiers PDM. The modules are digitally connected to the UFM control via the PROMESS-BUS. They feature the following charateristics:

PDM-S
Item no. 14650
Digital preamplifier for strain gauge force transducer, multi range calibration optional

Input Force Transducer	
Accuracy class	0.1 %
Sensitivity	0.1 ... 5 mV/V
Analogue bandwith	10 kHz typ. (-3dB)
Resolution A/D converter	24 bit
Housing	Aluminium die-cast
Protection class EN 60529	IP 40
Dimensions LxBxH	125x80x57 mm (height without connectors)
Input Encoder	
Tracks	A+, B+, A-, B-
Level	Rectangle TTL 5V
Counter	16 bit

PDM-A
Item no. 14711
Four analogue inputs
+/- 10 VDC

Analogue Inputs	
Precision class	0.25 %
Analogue bandwith	10 kHz typ. (-3dB)
Resolution A/D converter	24 bit
Housing	Aluminium die-cast
Protection class EN 60529	IP 40
Dimensions LxBxH	125x80x57 mm (height without connectors)
Supply voltage	24 VDC
Input Encoder	
Tracks	A+, B+, A-, B-
Level	Rectangle TTL 5V
Counter	16 bit

PDM-P
Item no. 14655 / 56
Digital preamplifier for piezo force transducer, multi range calibration optional

Input Force Transducer	
Accuracy class	0.1 %
Analogue bandwith	10 kHz typ. (-3dB)
Resolution A/D converter	24 bit
Housing	Aluminium die-cast
Protection class EN 60529	IP 40
Dimensions LxBxH	125x80x57 mm (height without connectors)
Input Encoder	
Tracks	A+, B+, A-, B-
Level	Rectangle TTL 5V
Counter	16 bit

PDM-IO
Item no. 14700
16 digital in- and outputs

Inputs	
Input protection	Electrically isolated
Output protection	Electrically isolated
Input voltage	24 VDC
Output voltage	24 VDC
Case mounting	Cap rail
Protection class EN 60529	IP 40
Dimensions LxBxH	165x109x55 mm

Connector Sets

If a cable set is not ordered,
a connector set will be required.

UFM Compact5	Item no.
25 kN	752500CP
50 kN	755000CP
50 kN	

Cable Sets

The cable sets are available in
lengths of 5*, 10, 15, and 20 m.

UFM Compact5	Item no.
25 kN	752505CP*
50 kN	755005CP*
50 kN	

Field Busses:

PROMESS provides various
field busses for communicating
between the PLC and NC
controller of the press.

UFM Compact5	Item no.
Profibus	3302005550
Profinet	3302005585
EtherCAT	3302005595
Ethernet IP	3302005590

Additional field busses on request.

Display and PC

As a programming unit for editing NC programs and for visualizing signals,
PROMESS offers industrial and panel PCs as well as different displays.

Panel PC 15"
Item no. 2601080853

- 15" Display
- Resistive touchscreen
  for production use
- Frontcase IP 65 rated
- Silent fanless operation –
  no mobile parts
- Consumer and industrial
  interfaces
- 2 x 10/100/1000 mbps
  network-ports, integrated
  Wi-Fi (Intel 533AN)
- Flexible DC connection
- Audio amplifier with
  2 x 2 W speakers
- VESA 100 bracket for mounting

Industrial PC
Item no. 2601002060

- Industrial PC for installation in
  control cabinets – multilingual
- Compact enclosure made of sheet
  steel, W*H*D = 140*230*257mm
- Interfaces: 2 x Ethernet RJ45,
  1 x RS232, 1 x RS-232/422/485
  serial,
- 2 x PS/2 for keyboard and mouse,
  2 x USB, 1xIrDA,
- Hard drive 100GB IDE 2.5" HDD,
  24h7d
- Windows Win7 ultimate MUI

Additional PCs and
displays are available on
request, e.g. PCs with 17"
or 19" display.

Plugin

PROMESS offers a range of custom plugins for its powerful UFM V5.xx programming software. These can be connected to the software through the .net interface. This allows the software to be modified on a case-by-case basis and optimized for specific applications without having to update or change the firmware. The expanded database is also linked to the plugin.

Excerpt from the plugin library:

■ **UFMR Calibrate**

The UFMR Calibrate plugin was developed for calibrating force trans-ducers in the joining modules. The in-tegrated range calibration of the digital PROMESS preamplifier PDM supports 2-point calibration as well as character-istic diagram calibration.

Calibration protocol
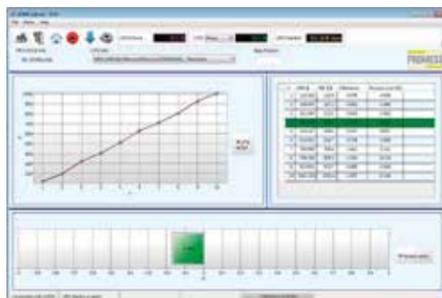
Calibration plugin

Calibration can be performed most simply using the PROMESS calibra-tion set that contains a reference force transducer and the KT-V5 evaluation unit with display.
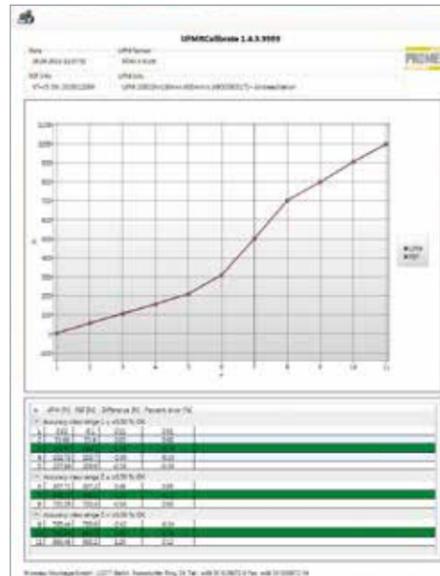
The KT-V5 is connected to the USB port of the computer and operated using the UFM in order to read in the values of the reference force. The characteristics of the reference force transducer are automatically detected by the integrated TED5 and written to a calibration log that can be exported in Excel format.

However, the calibration can also be performed using external calibration equipment. In this case, the base point values of the reference transducer are entered manually.

■ **UFMR Barcode**

The UFMR Barcode plugin can be used to change the program within the UFM software using a barcode scanner. While the program runs, the barcode scanner can be used, for instance, to transfer a Part ID using the UFM dialog function.

■ **UFMR QDE**

The UFMR QDE plugin allows quality assurance data to be exported to the QS-STAT statistics software from Q-DAS and supports process monitoring and optimization. Measurement, auxiliary and description data can be exported from each joining program as characteristic data.

■ **UFMR IPM**

The UFMR IPM plugin makes it possible to export process and measurement data to the IPM process data management from CSP and thus supports process monitoring and optimization.

■ **URMR XML-Writer**

PROMESS developed the XML Writer plugin for exporting process, measurement and graph data as well as other variables. The XML files can be subjected to further processing and analyses.
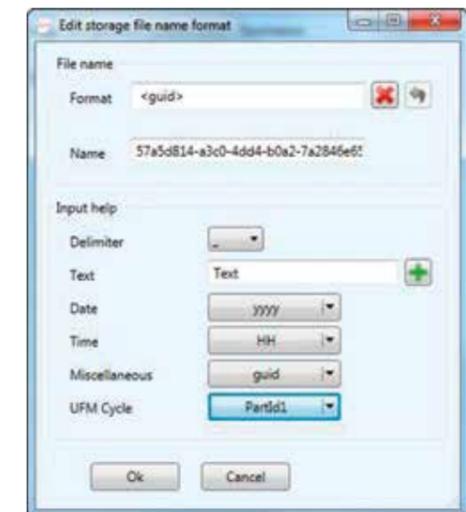
URMR XML-Writer

Calibration & Maintenance

Avoid expensive repairs

Preventative maintenance is the simplest means of reducing costly standstills in production, increasing machine life and boosting productivity. Our services offer flexible maintenance for your plant with minimum downtime.

Our maintenance contract contains:

■ 1 x annual maintenance checkup including following services:

– Re-greasing of all lubricated areas
– Transmission oil change when necessary
– Inspection of mechanical and safety-relevant parts
– Replacement of worn parts when necessary
– Software update
– Creation of machine status report and offer to eliminating any deficiencies or faults
– Calibration of force transducer
– Adjustment work
– Issuing of calibration certification

■ 12-month extension to guarantee following maintenance
■ Express delivery with no additional charges
■ 10 % discount on single parts
■ 10 % discount on additional services and training

Calibration plugin

Calibration Set

Easily perform a quick calibration or test of the UFM joining unit in your machine using the PROMESS calibration set.

The process can be automated using the optionally available software.

On completion, a log file is created that can be exported to Microsoft Excel.

PROMESS Calibration Sets consist of:

■ Reference transducer
■ Evaluation unit for the reference transducer with display and USB port for connecting to a PC
■ Factory calibration log (accreditation by DAKKS on request)
■ PROMESS Software UFMR Calibrate (optional)
■ Suitcase

Special Features:

■ Simple operation
■ Robust battery-driven display
■ Industrial strength suitcase
■ Nominal forces from 500 N to 200 kN
■ With factory calibration certificates

Calibration Set	50 kN
Item no.	5103
Force transducer	KAM/50kN/0.2
Base plate	XKM 094
Diameter/height	Ø90 / 25
Plug	XKC 041
Display	KT-V5
Factory calibration	XKW 221

Range of Services

Our Service Competence

PROMESS universal joining modules have been used for many years in heavy industrial applications. This is made possible through the solid quality of the products as well as our extensive, sustainable worldwide service. From process development to preliminary testing, from initial installation to daily production, PROMESS offers holistic product expertise from a single source and thus provides sustainably rapid service and competent consulting.

PROMESS
CUSTOMER SERVICE

Our services include:

- Process development
- Preliminary testing
- Rental units
- Installation
- Extensive documentation
- Training
- Local and remote maintenance
- Calibration services
- Emergency repairs and spare part delivery
- Consignment warehouse
- Worldwide distribution and service network

Training

PROMESS has developed various training modules to simplify, as much as possible, the installation, operation, maintenance and handling of our joining modules. The modules are based on core knowledge for introducing NC joining technologies that, after consultation, can be individually modified or adapted. Training can be held on site or at our premises and are performed by experienced and qualified training personnel.
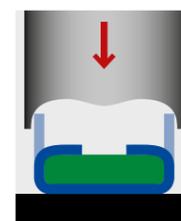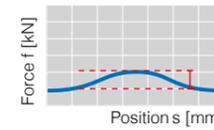
Application Examples

Stamping/Forming

■ Stamping and forming with detection of part height and relative forming distance.
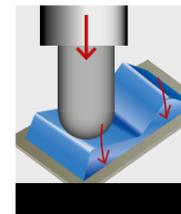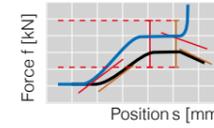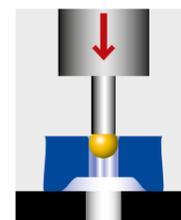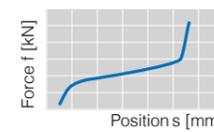
Surface Checks

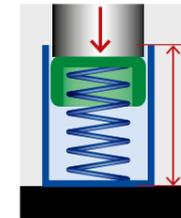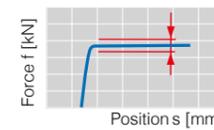■ Logging of force-distance data for multiple switch points.

Bending

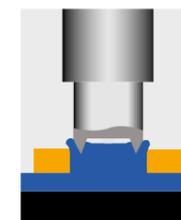■ Monitored bending of straps, brackets etc. on safety components.
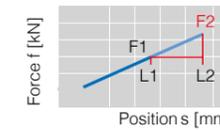
Calibrating

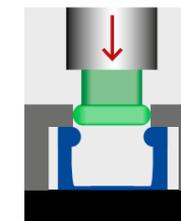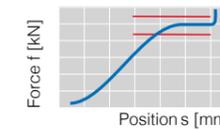■ Calibration with quality assurance through monitored force.

Testing/Measuring

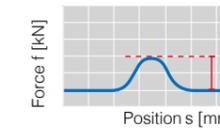■ Logging of force-distance data for multiple positions.

Press-fitting

■ Press-fitting with controlled force for relative displacement.

Clipping

■ Joining of plastic and medtech parts with monitoring of snapping force.

Precision Joining

■ Precision joining < 0.002 mm, collision-free due to electronic bending compensation.

Join on Contact

■ Joining on contact with precise shutdown once absolute shoulder position has been reached.

Riveting

■ Rivet press with programmable press force and control of power press.

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