



# UMF Precision5

The UMF Precision5 units are suitable for assembly and joining applications with force-distance monitoring requiring small forces and high precision.

For more efficiency.

**PROMESS**

Assembly and Sensor Technology

## Your partner in the field of assembly and testing technology

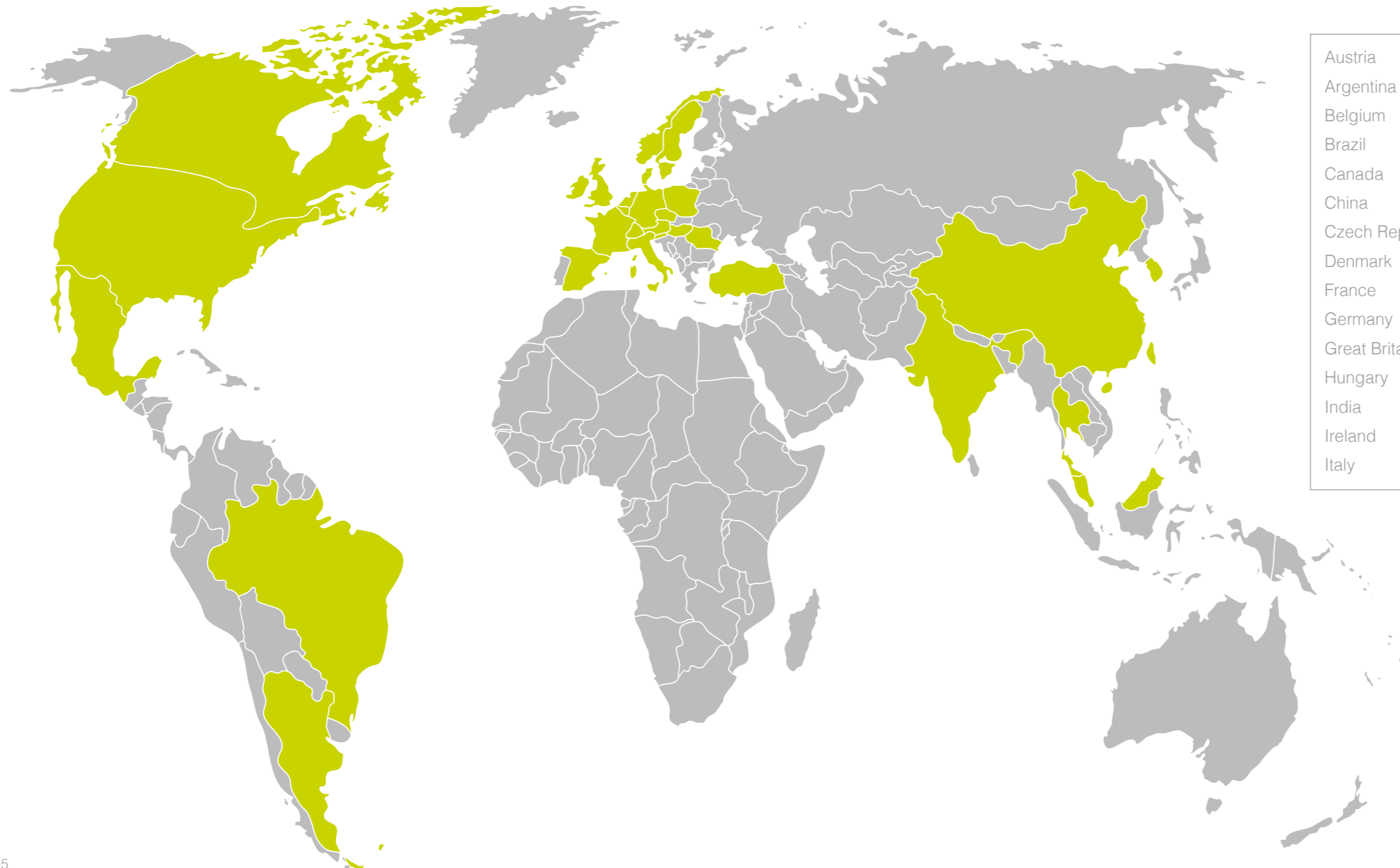
Gerhard Lechler founded the company PROMESS in 1977 as an engineering office in the field of technical measurement in Berlin. Initially, the company distributed handmade patented measuring bearings for tool condition monitoring before the electro-mechanical assembly press (UFM) with integrated NC control 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 elec-

tro-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 Precision5

Because of its high accuracy, the press series UFM Precision5 is well suited for applications in the lower load range, requiring the highest precision. The whole press concept is adapted to increase the accuracy of the units. For many years, the UFM Precision5 has been used successfully in the field of medical technology, the watch industry, the electronic industry and other industrial sectors.

## Overview of Press Types

Type	Force (kN)	Stroke (mm)	Speed (mm/s)
1	0.2	60	250
2	1	100	400
3	1	200	300
4	3	200	250

The units of the series UFM Precision5 can be configured differently: with or without holding brake and with piezo or strain gauge force transducer, except the 200 N unit which is equipped with a piezo force transducer by default. Additionally the following types are available:

## Advantages

- Standard model includes absolute encoder that eliminates the need for referencing (except 200 N unit)
- Digital force measurement with 24 Bit resolution
- Multi range calibration for force input optional
- High repeatability
- High guiding accuracy of the press ram
- No rotation backlash of the press ram
- Sensor system can be easily extended using versatile PROMESS-Bus
- Utilization of window and envelope technology
- No PLC knowledge required
- Movement and monitoring as an integrated solution
- PLe for STO by default



## Mechanics

The UFM Precision5 series features a high precision design. The non-rotating press ram runs in a precision guidance without any rotation backlash.

The radial offset of the press ram is extremely small over the full stroke. Also the force transducer is mounted non-rotating at the press ram.

The linear design of the press allows for high speeds due to the spindle, that is directly driven by the aligned servomotor. The integrated absolute encoder (except 200 N unit) ensures precise positioning and eliminates the need for referencing at the start of a cycle. The robust design makes it well suited for long periods of use.

**Design basis for all mechanical parts:**

$$F_{\text{Nominal}} = 2.5 \times C_{\text{Dyn}}$$

This guarantees an extremely long life cycle (min. 12 million strokes on average for standard assembly processes)

### Mechanical design:

1. AC servomotor with absolute encoder (except 200 N unit)
2. Direct drive
3. Steel housing
4. Non-rotating press ram with precision guidance
5. Piezo- or strain gauge force transducer
6. Tool holder

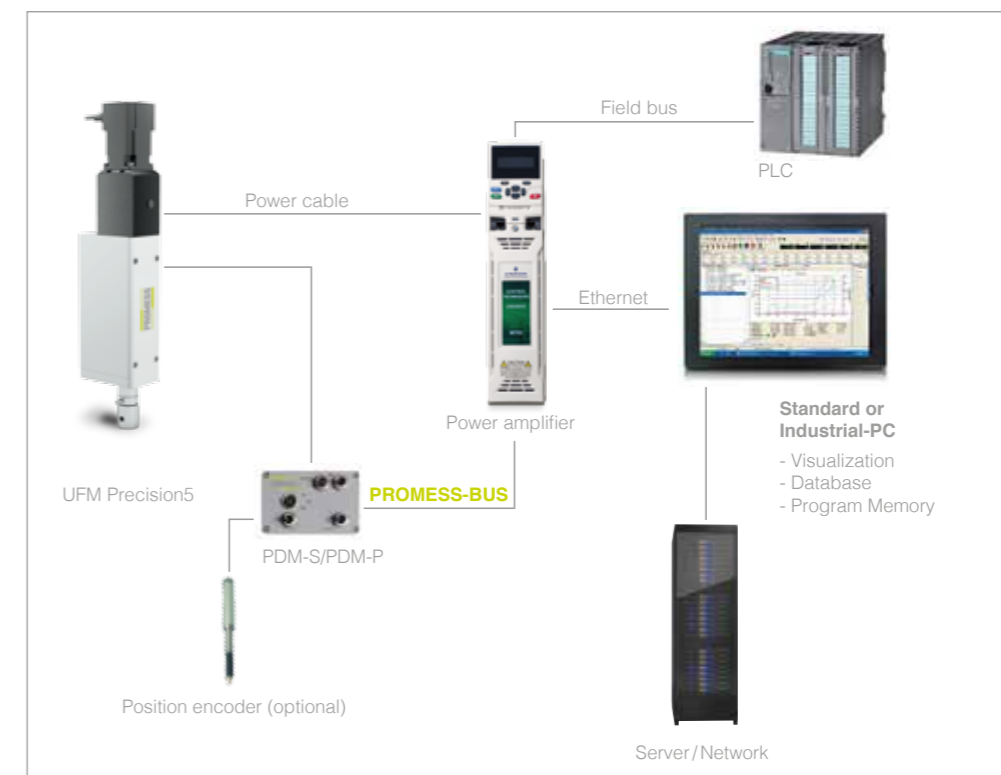


## System Design

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

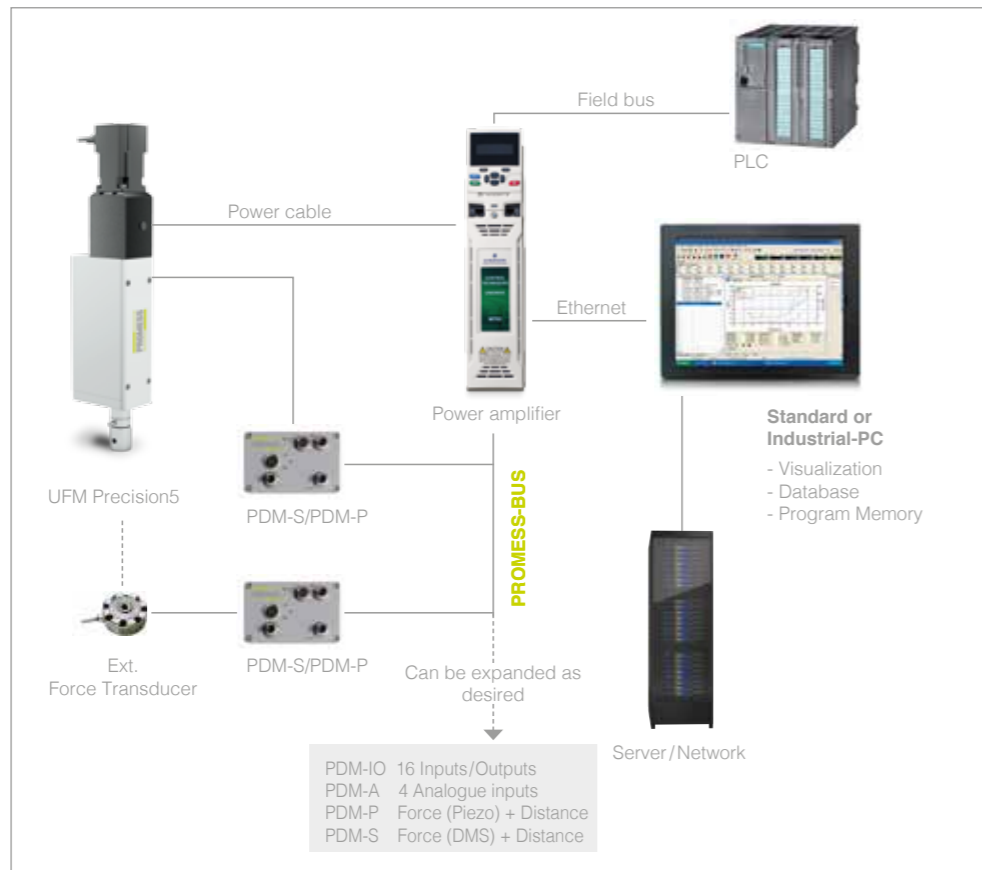
numerically and graphically so that each individual process can be easily monitored. The automatic learning function allows customers to eliminate the need for custom programming and simply learn the processing limits using a good part. Quality assurance data is stored using the database plugin and can be re-used at any time.



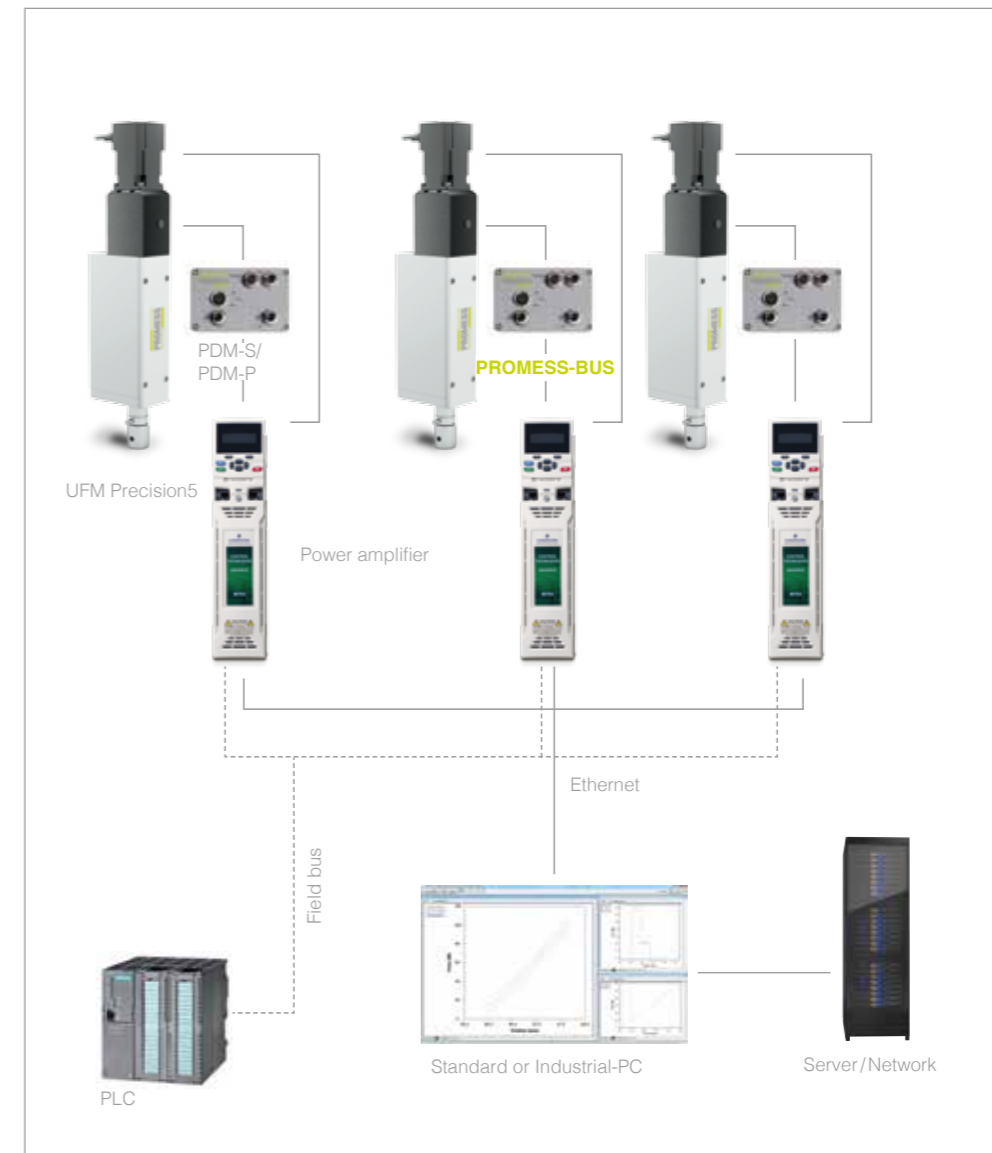
Basic version

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.



Extension/Options



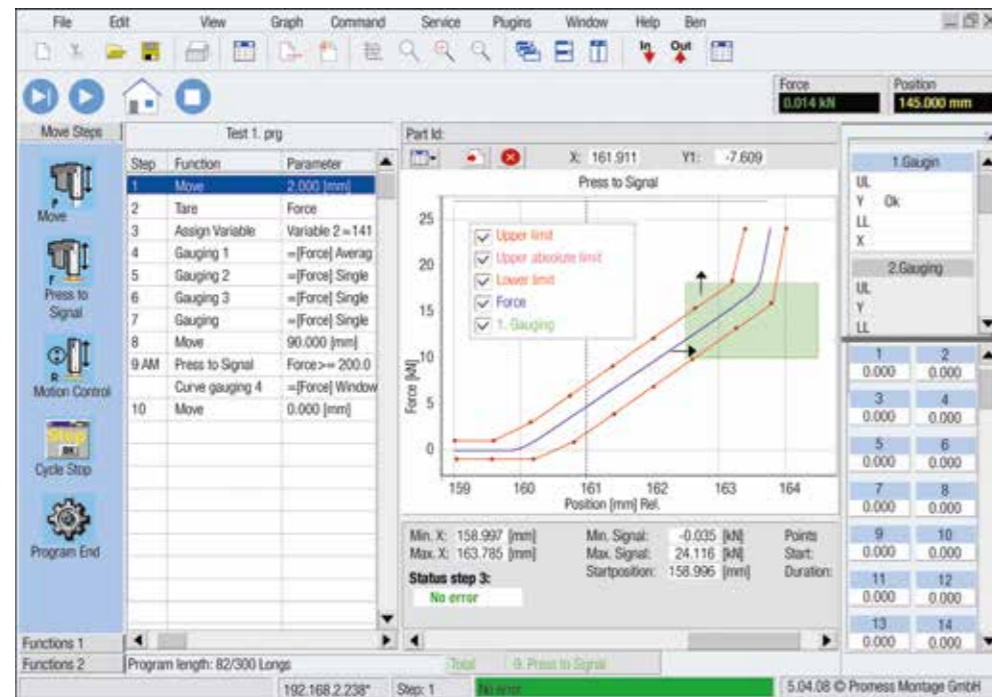
Line configuration

# Software

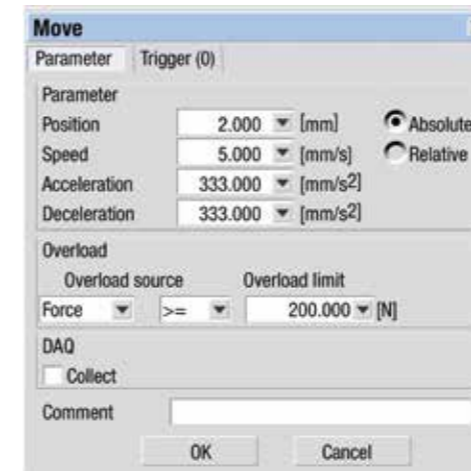
As standard, the UFM Precision5 range of presses comes with the UFM V5.xx programming software. This software is intuitive to operate and does not require any PLC expertise. It can be used to create simple or advanced joining processes.

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).

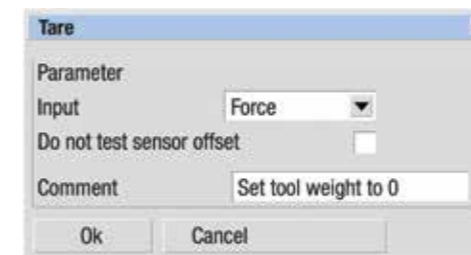
The transparent and concise program surface allows users to quickly create programs. The main window lists all programming steps together with their functions. The function screens can be opened successively to enter the process values. Thus the force, displacement, time, speed, acceleration and braking 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:

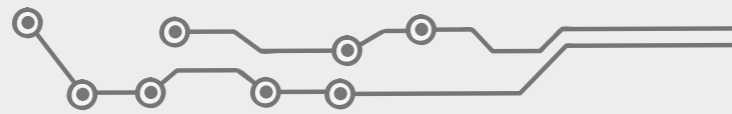
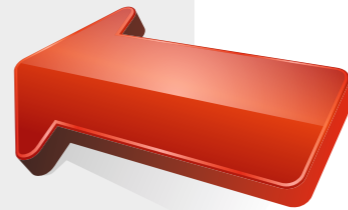
Not only customizable for separate systems, also for specific processes and components.

ONLY WITH  
**US**

## 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 common 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 querying 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 database 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:

- Universal Assembly press UFM Precision5
- Power amplifier incl. application module and UFM V5 firmware
- Digital preamplifier PDM-S respectively PDM-P
- Cable, field bus and more accessories on demand



## Accessories/Options:

PROMESS has developed extensive accessories for the UFM Precision5 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.

## Sensors (Displacement Transducers)

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



Precision sensor

## 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.



## Safety Box PSB

As an option to our assembly presses UFM Precision5 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.



PSB010G2

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.

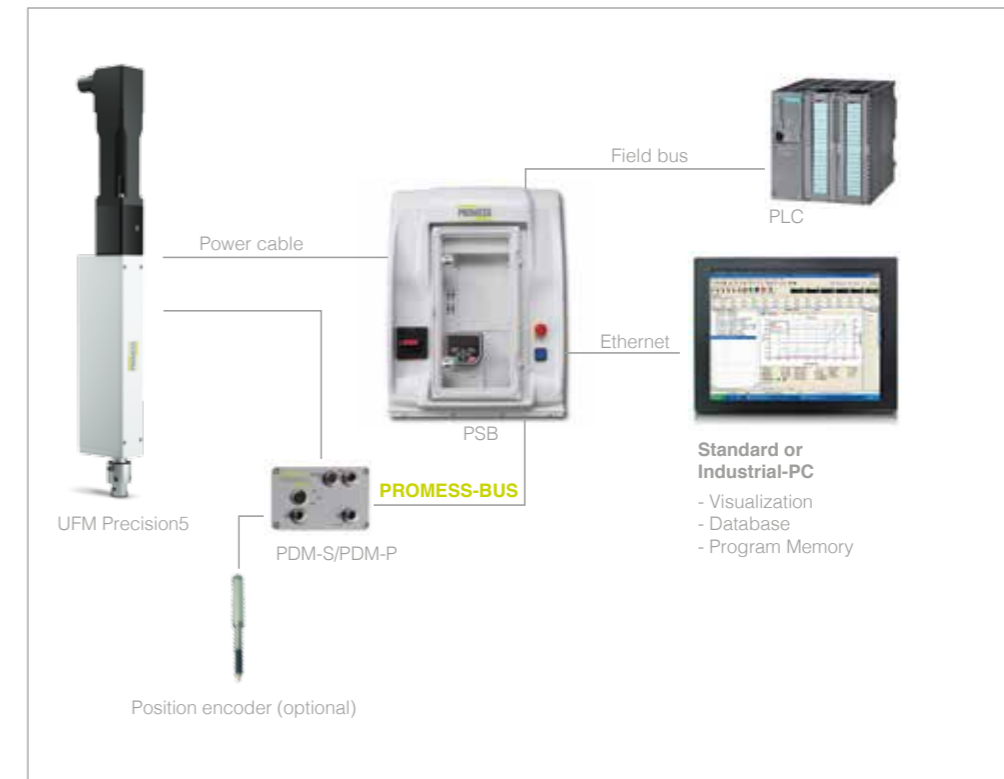
### Advantages

- 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
- Extension on SLS, SS1, SS2 possible
- IP Code 54
- Extremely compact design

### Technical Data

UFM Precision5	1 kN	3 kN
Item no.	PSB010G2	
Connection voltage	3 AC 380 V - 480 V, +/- 10 %, 48-65 Hz	
Connected load at 400 V	8.7 kVA	
Protection class	IP 54	
Weight	17 kg	
Recommended protection	IEC 20 A class gG	
Temperature range	0 °C ... +40 °C	
Power loss	368 W	
PC Interface	Ethernet	
Option PLC, fieldbus interface	Profibus, Profinet, EtherCAT (add. on request)	

## System Design



System Design

## Overview connections



## Safety Module PSD

The PSD safety module is delivered tested and ready to install. It contains the power electronics and safety controller for the assembly press. 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 Precision5 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

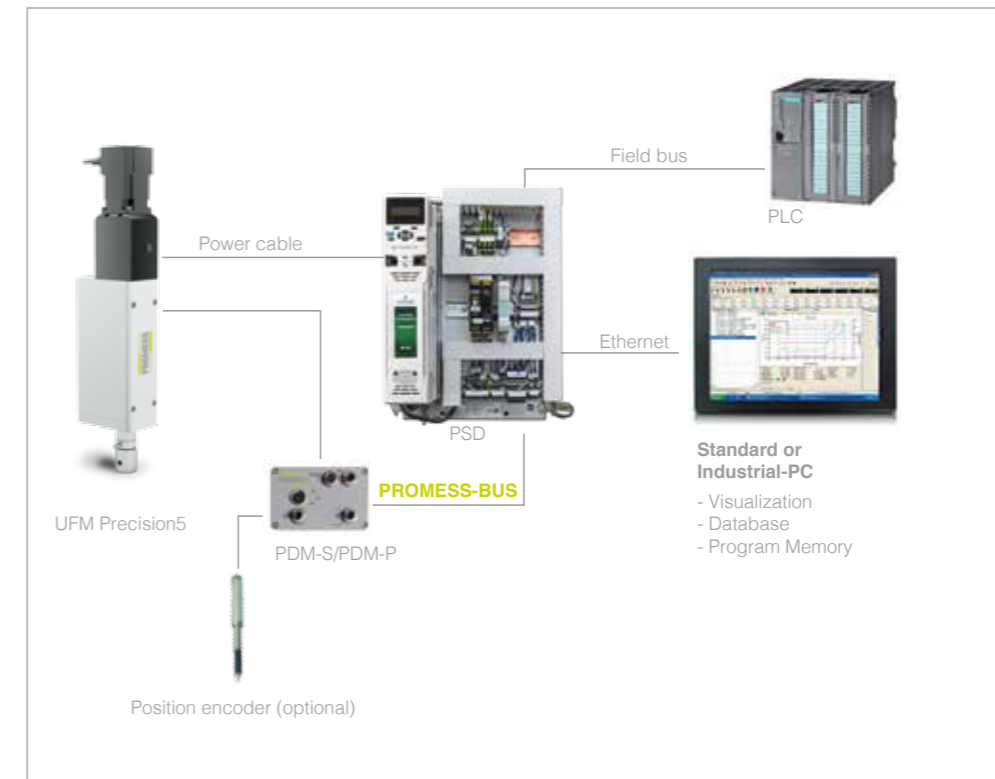
### Mounted Components

- AC servo amplifier with NC module
- 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 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



System Design

## Technical Data

UFM Precision5	Item no.	WxHxD (mm)	Supply - voltage	Fre- quency	Operating tem- perature range	Control voltage
200 N	23200500G2	354x475x300	230 VAC +/- 10 %, 1ph	50-60	5-40 °C	24 V +/- 10 %
1 kN	23400250G2		380-480 VAC +/- 10 %, 3ph			
3 kN						

# 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 characteristics:



## 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 bandwidth	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-P

Item no. 14655 / 56

Digital preamplifier for piezo force transducer, multi range calibration optional

Input Force Transducer	
Accuracy class	0.1 %
Analogue bandwidth	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 bandwidth	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-IO

Item no. 14700

16 digital in- and outputs

Inputs	
Input protection	Electrically isolated
Output protection	Electrically isolated
Eingangsspannung	24 VDC
Ausgangsstrom	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 Precision5	Item no.
200 N	750200PR
1 kN	753000PR
3 kN	

## Cable Sets

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

UFM Precision5	Item no.
200 N	750205PR*
1 kN	753005PR*
3 kN	

## Field Busses:

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

UFM Precision5	Item no.
Profibus	3302005550
Profinet	3302005585
EtherCAT	3302005595
Ethernet IP	3302005590

Additional field busses on request.



EtherCAT

EtherNet/IP

## 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.



### 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

### Panel PC 15"

Item no. 2601080230

- 15" Display
- Resistive touchscreen for production use
- Frontcase IP 65 rated
- Silent fanless operation – no mobile parts
- Consumer and industrial interfaces
- 2x10/100/1000 mbps network-ports, integrated Wi-Fi (Intel 533AN)
- Flexible DC connection
- Audio amplifier with 2x2w speakers
- VESA 100 bracket for mounting



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

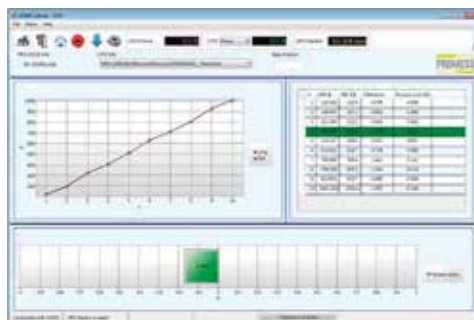
## Plugin

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:

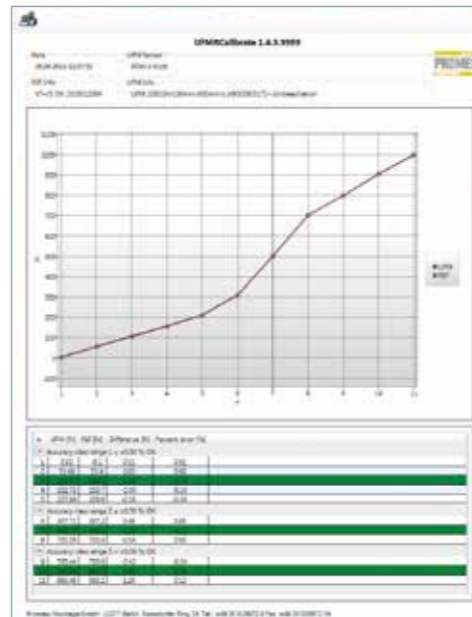
#### ■ UFM Calibrate

The UFM Calibrate plugin was developed for calibrating force transducers in the joining modules. The integrated range calibration of the digital PROMESS preamplifier PDM supports 2-point calibration as well as characteristic diagram calibration.



Calibration plugin

Calibration can be performed most simply using the PROMESS calibration set that contains a reference force transducer and the KT-V5 evaluation unit with display.



Calibration protocol

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.



#### ■ UFM Barcode

The UFM 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.

#### ■ UFM QDE

The UFM 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.



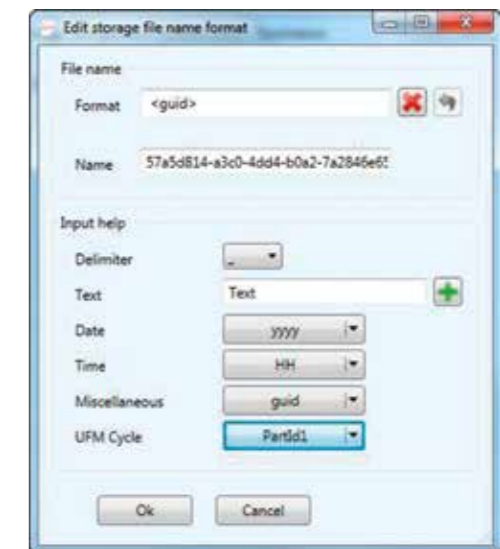
#### ■ UFM IPM

The UFM 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.

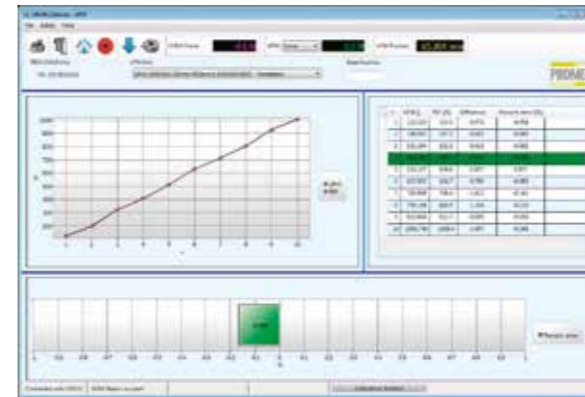
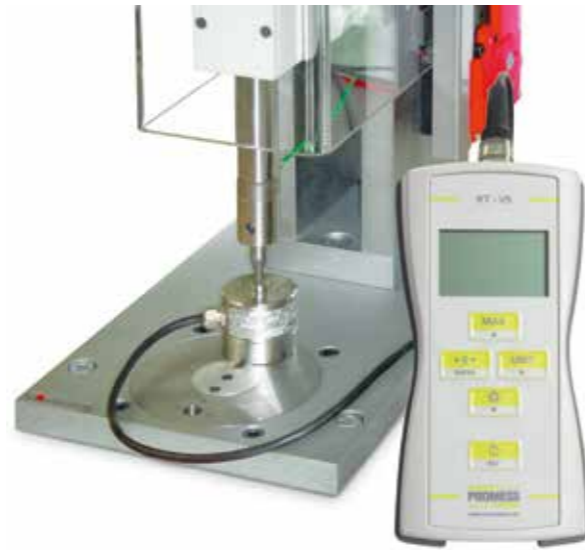


URMR XML-Writer

## 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.



Calibration plugin

### 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 UFM Calibrate (optional)
- Suitcase



## 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.

### Special Features:

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

### 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 Set	1 kN	5 kN
Item no.	5106	5107
Force transducer	KAM/1kN/0.2	KAM/5kN/0.2
Base plate	XKM 096	XKM 096
Diameter/height	Ø40 / 12	Ø40 / 12
Plug	XKC 041	XKC 041
Display	KT-V5	KT-V5
Factory calibration	XKW 221	XKW 221

## 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.



### 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



## Range of Services

## Training

PROMESS has developed various training modules to simplify, as much as possible, the installation, operation, maintenance and handling of our joining

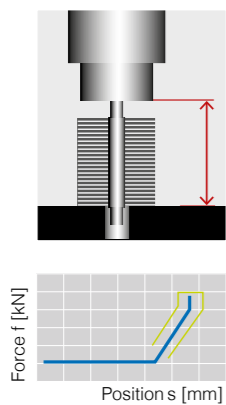
modules. The modules are based on core knowledge for introducing NC joining technologies that, after consultation, can be individually modified or adapted. Training can be held on site or at our premises and are performed by experienced and qualified training personnel.





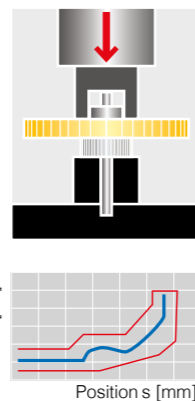
# Application Examples

Our assembly presses UFM Precision5 are used in the medical sector, the electronic production, the watchmaking industry and other sectors of the micro technology since many years.



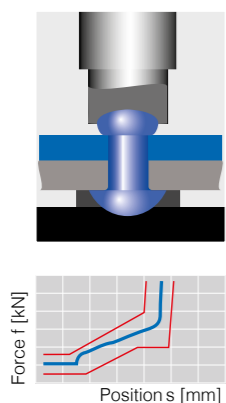
## Precision Joining

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



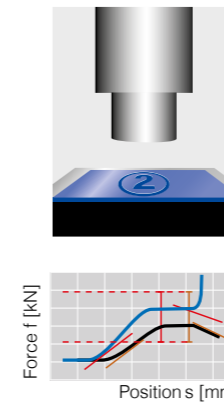
## Join on Contact

- Joining on contact with precise shut-down once absolute shoulder position has been reached.



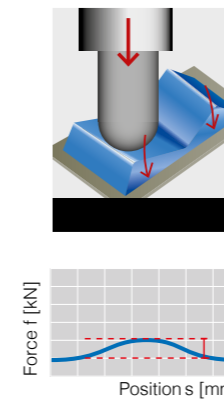
## Riveting

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



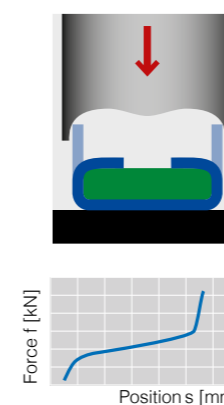
## Stamping/Forming

- Stamping and forming with detection of part height and relative forming distance.



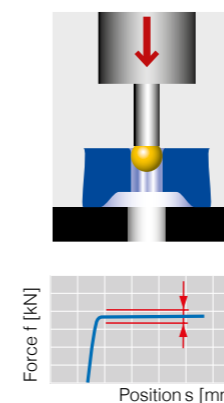
## Surface Checks

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



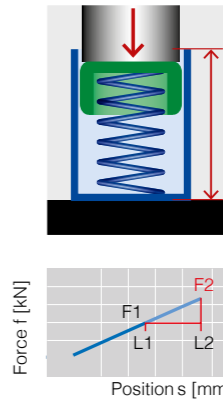
## Bending

- Monitored bending of straps, brackets etc. on safety components.



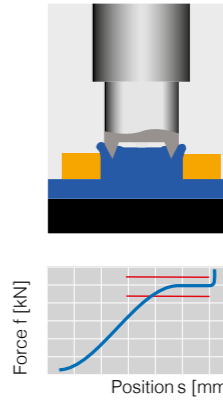
## Calibrating

- Calibration with quality assurance through monitored force.



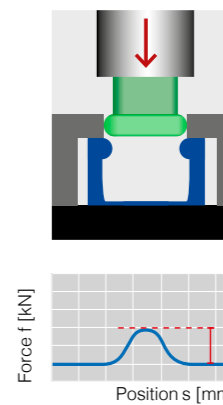
## Testing/Measuring

- 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.



**PROMESS.** For more efficiency.

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**PROMESS**

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