UFM Precision5

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

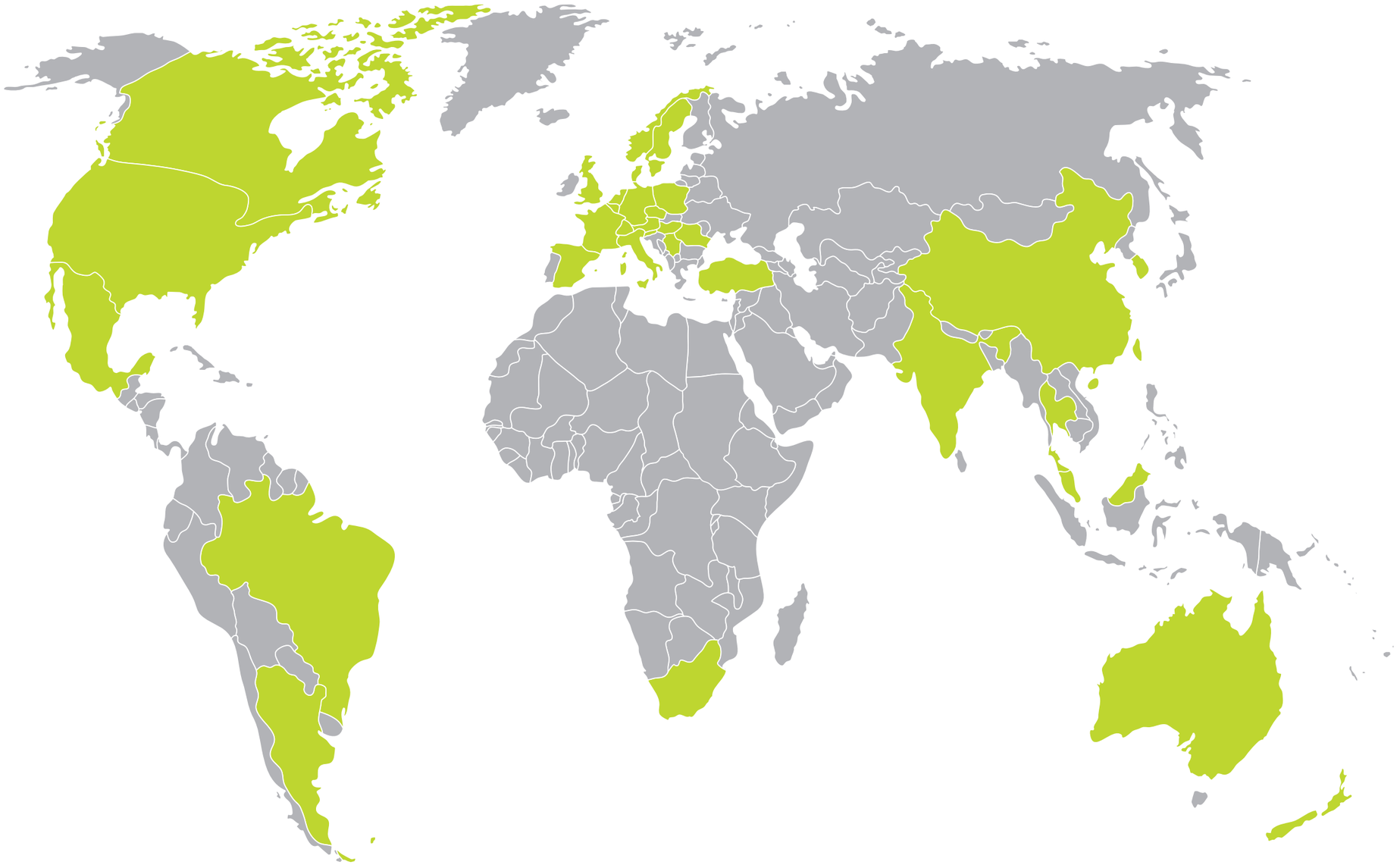
For more efficiency.

PROMESS

ASSEMBLY + 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.



Australia	Malaysia
Austria	Mexico
Argentina	Netherlands
Belgium	Norway
Brazil	Poland
Canada	Romania
China	Serbia
Czech Republic	Singapore
Denmark	Slovakia
France	Slovenia
Germany	South Africa
Great Britain	Spain
Hungary	Sweden
India	Switzerland
Italy	Thailand
Korea	Turkey
New Zealand	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

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:

Type	Force	Stroke	Speed
1	0,2 kN	60 mm	250 mm/s
2	1 kN	100 mm	400 mm/s
3	1 kN	200 mm	300 mm/s
4	3 kN	200 mm	250 mm/s

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

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:

$F_{Nominal} = 2{,}5 \times C_{Dyn}$

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

Mechanical design

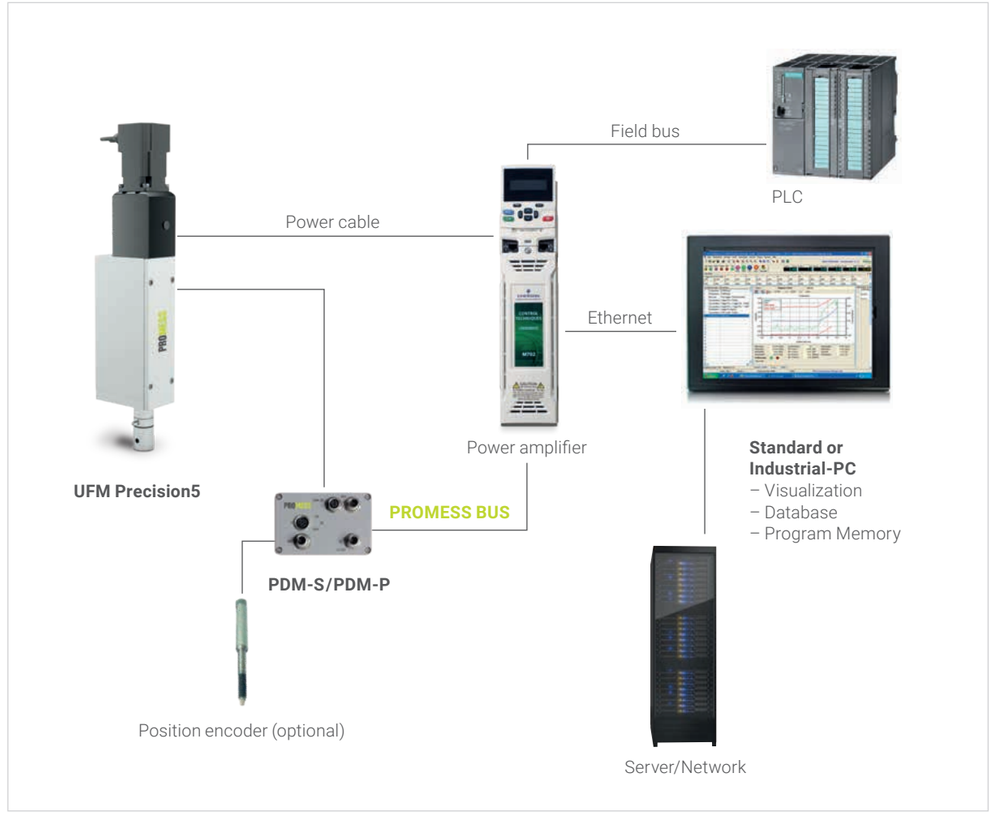
1. **AC servomotor with absolute encoder** (except 200 N unit)
2. **Direct drive**
3. **Steel housing**
4. **Non-rotating press ram with precision guidance**
5. **Piezo- or strain gauge force transducer**
6. **Tool holder**

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.

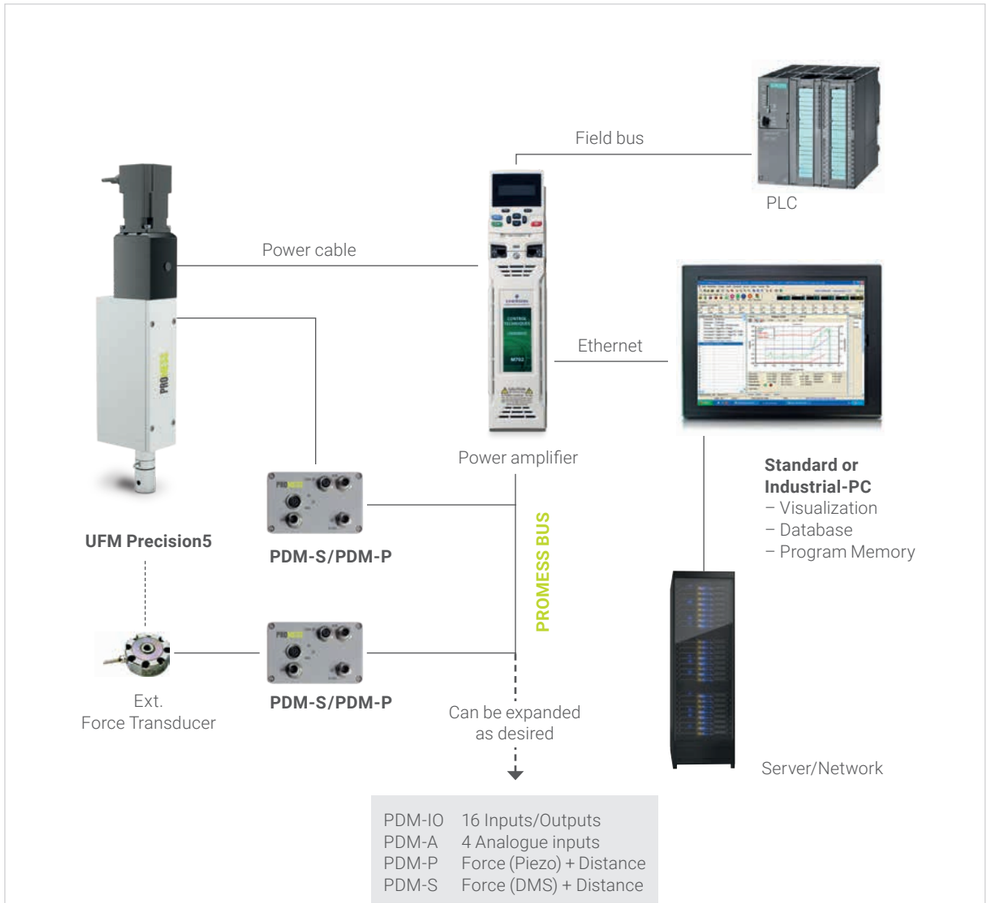
The controller coordinates the mechanical motion of the press as well as monitoring the force and distance. The force-distance characteristic can be monitored using envelopes and/or window methods.

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.

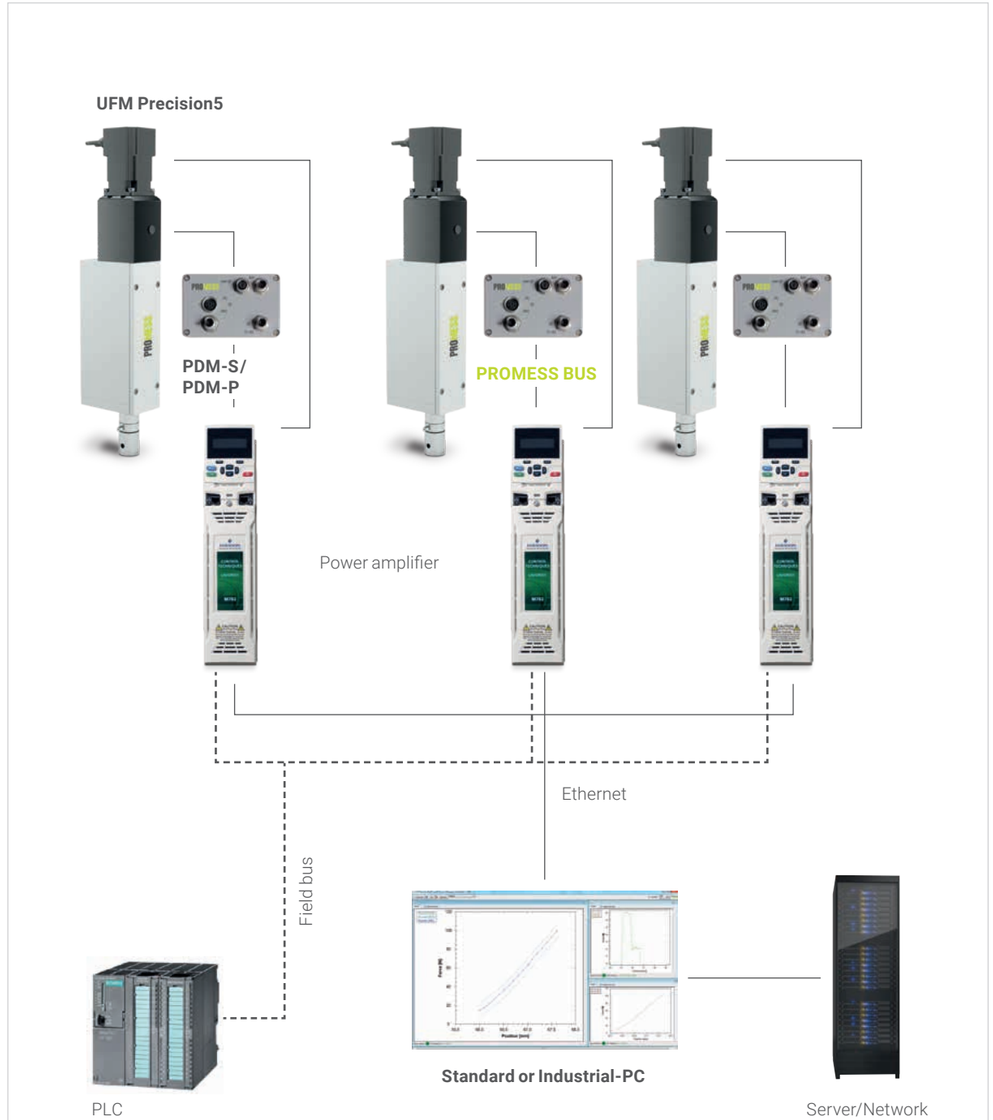


Basic version

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 multi-span 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

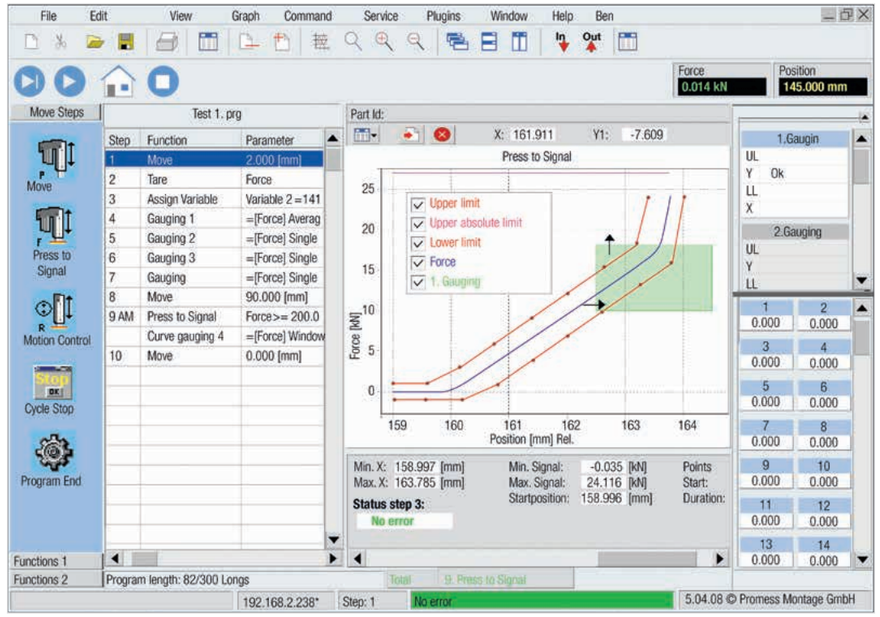
The servo presses UFM Precision5 come with our **programming software UFM V5.xx.** It serves for the creation of the press program, for the recording and displaying of the quality data and for the storage of the process data. The software is intuitive to operate and does not require any PLC expertise. It can be used to create simple or advanced joining processes.

The **transparent and concise program surface** allows users to quickly create programs.

The main window lists all programming steps together with their funcitons. 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.

The **monitoring of the joining process** is effected by window and/or envelope technology by force-distance sensors and the analysis and evaluation of the data by our UFM V5.xx software and the DB Viewer. A force-distance analysis of the joining process enables a 100% control of every part in real time. The data of the analysis is numerically and graphically editable so that the course of the process can be controlled individually. The customer can also pass on the individual programming by using the teach mode functionality. The limit curve will then be learned automatically by a good part. Data for quality control will be stored by the database plugin and can be used at every time.

The software features an **integrated User** Administration with different permission levels and logging for process safety. Changes to the program are documented by the log so thus are traceable. 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 fieldbus (e.g. Euchner EKS system).



Main screen

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

Triggertechnology by PROMESS

The triggers are „pulse points“ that can be set within the program steps Move, Press to Signal and the controller module. The trigger provokes an action as soon as the defined condition within the program step is fulfilled. The conditions are set by the user. He can set up to seven trigger points in one program step 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

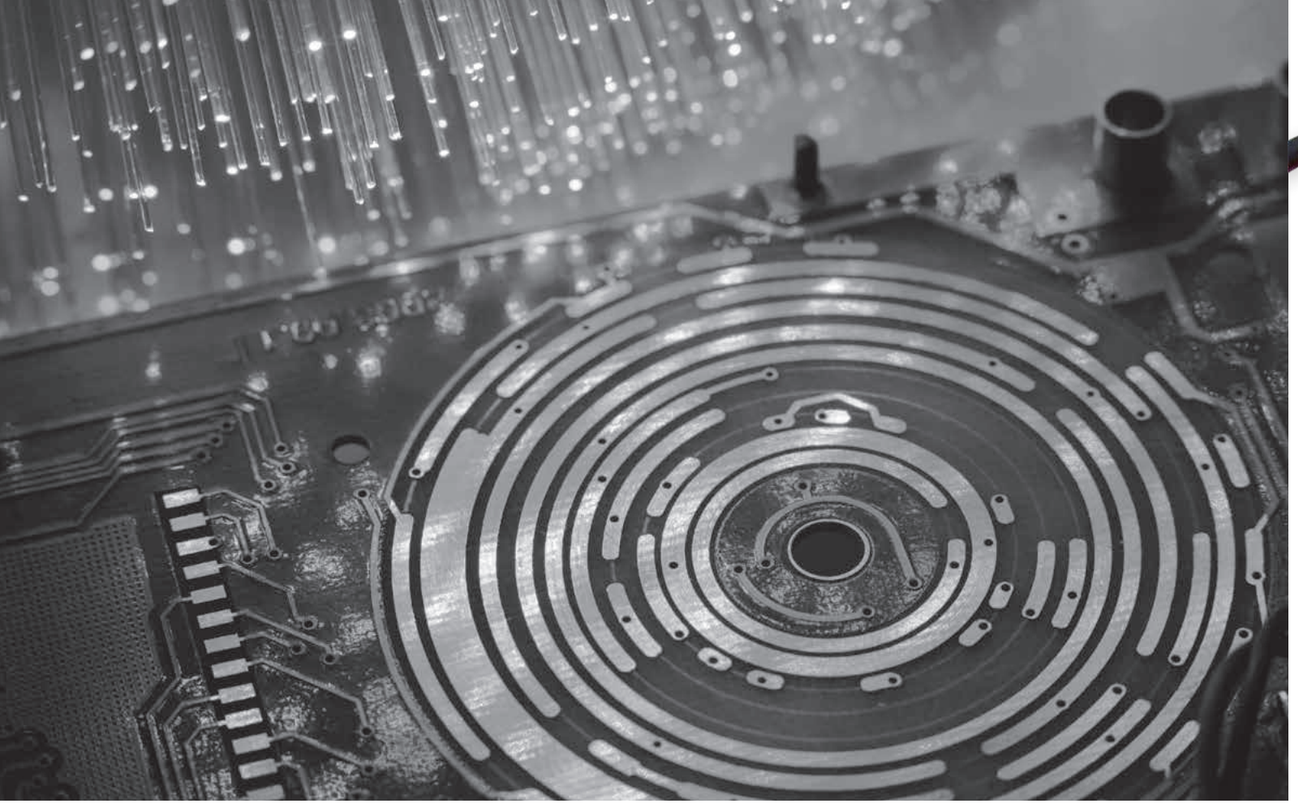
All process data including the curves can be stored in a database. All common database formats such as Oracle, MS SQL and Access are supported. A separate database is created for each station. Programs can be stored and re-used at any time. Since the program changes can be traced, this provides 100 % 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.

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

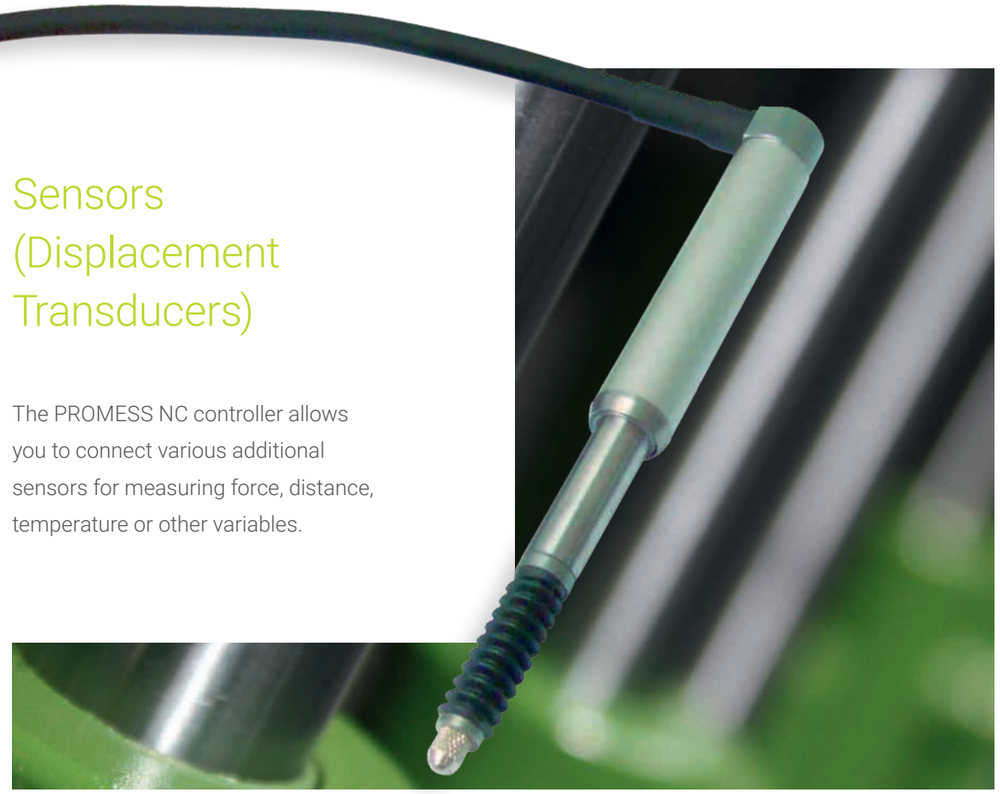


Accessories / Options

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.



Technical Data

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	
4103003080	Precision sensor ST 1277	axial	12 mm, pneumatic retracted	
4103003078	Precision sensor ST 3078	axial	30 mm, neutral position extended	

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.

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.

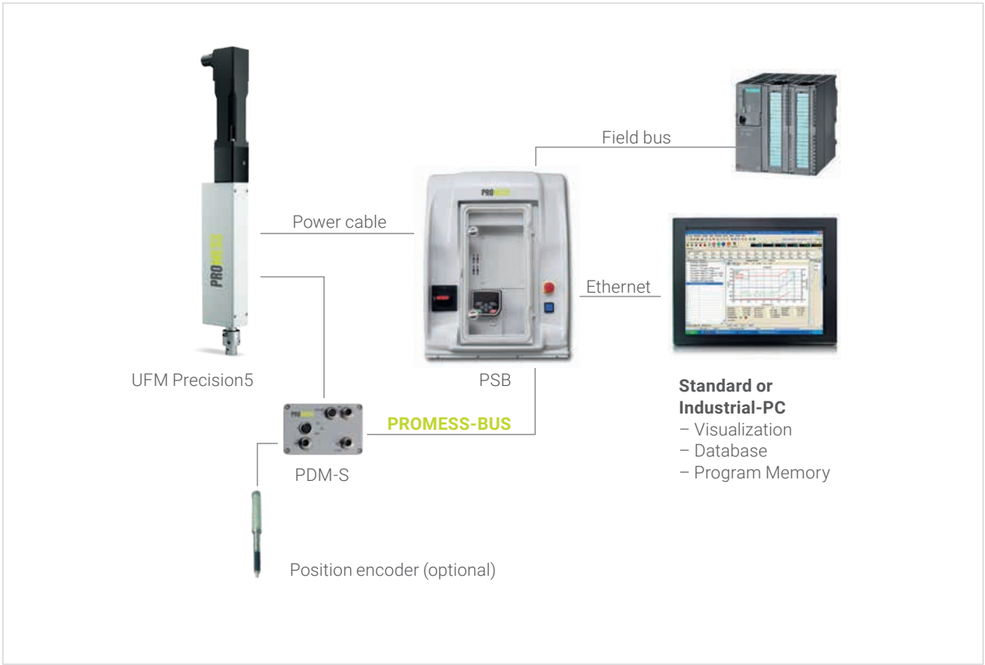
Advantages

- 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

PSB010G2

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 Klasse gG	
Temperature range	0 … +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

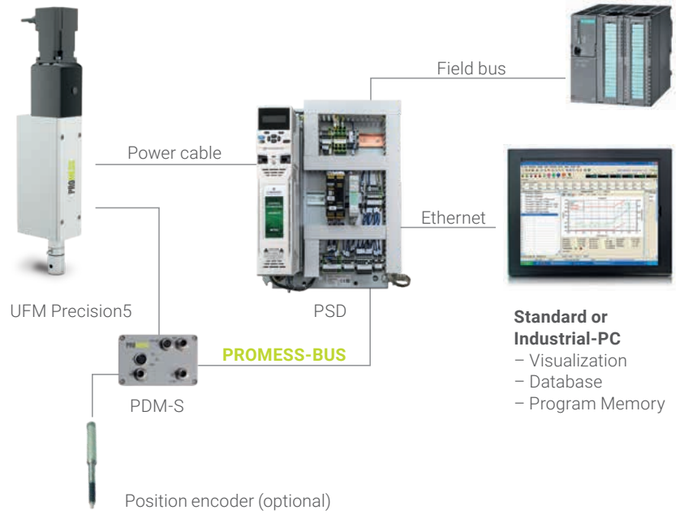
- Short installation times
- No wiring necessary
- Completely inspected and tested
- EMC tested

PSD 010G1

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

System Design



System Design

Technical Data

UFM Precision5	Item no.	WxHxD (mm)	Supply - voltage	Frequency	Operating tempera-ture range	Control voltage
200 N	23200500G2	354 x 475 x 300	230 VAC +/- 10%, 1ph	50 – 60 Hz	5 – 40 °C	24 VDC, +/- 10 %
1 kN	23400250G2					
3 kN			380-480 VAC +/- 10%, 3ph			

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 ...5mV/V
Analogue bandwith	10 kHz typ. (-3dB)
Resolution A/D converter	24 bit
Housing	Aluminium die-cast
Protection class EN 60529	IP 40
Dimensions WxHxD	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

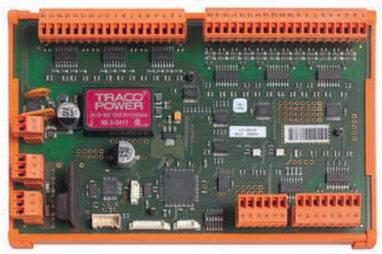
Input Force Transducer	
Accuracy class	0.1%
Analogue bandwith	10 kHz typ. (-3dB)
Resolution A/D converter	24 bit
Housing	Aluminium die-cast
Protection class EN 60529	IP 40
Dimensions WxHxD	125x80x57 mm (height without connectors)
Input Encoder	
Tracks	A+, B+, A-, B-
Level	Rectangle TTL 5V
Counter	16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

PDM-A

Item no. 14711

Four analogue inputs

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 WxHxD	125 x 80 x 57 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

Digital in- and outputs	
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 WxHxD	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

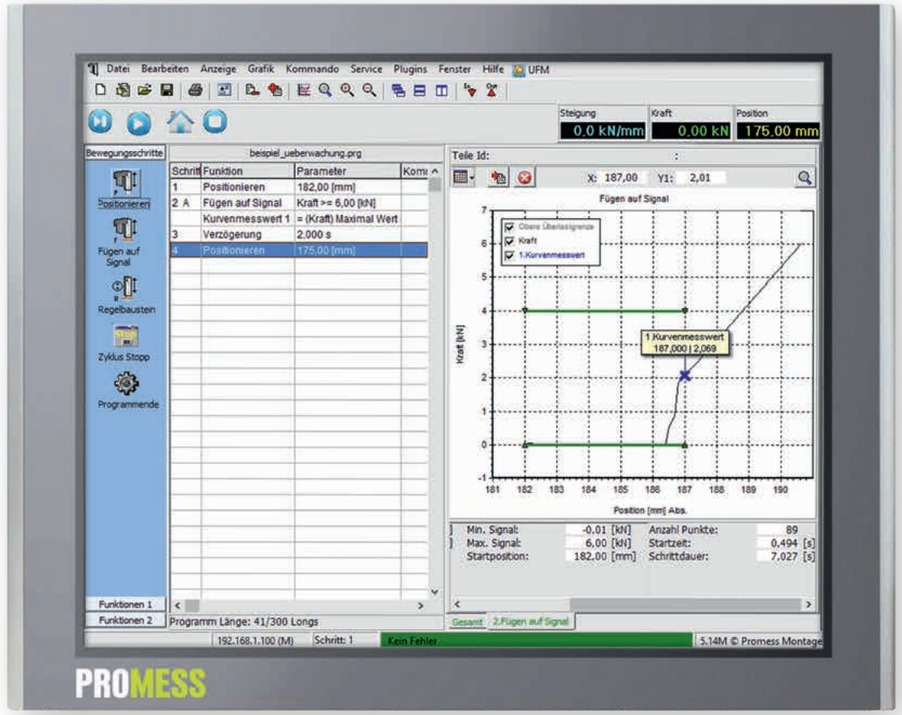
PROMESS provides various field busses
for communicating between the PLC and
NC controller of the press.

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

Additional field busses on request.

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

- Display size 19‘‘
- Resolution 1280 x 1024
- Fanless
- Touchscreen: resistiv

Display

PROMESS offers different
displays on request.

Software Plugins

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.

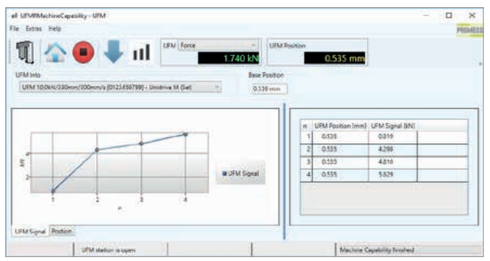
Excerpt from the plugin library:

- **UFMR 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 MachineCapability**

  The plugin UFMR MachineCapability is used to determine the machine capability of force measurements in an electromechanical assembly press. The machine capability test is performed by repeatedly running of a UFM program running to a given force value while reading the position and force values of the joining unit as well as optionally the values of a reference transducer.

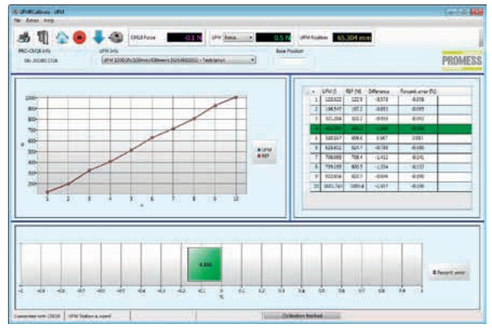


UFM Machine Capability

- **UFMR Calibrate**

  The plugin UFM Calibrate was developed for the calibration of the force transducer of our electro-mechanical assembly presses. It supports the 2-point calibration of the analog preamp as well as the characteristic calibration with the integrated range calibration of our digital preamp PDM-S.

  PROMESS offers a calibration set consisting of a reference force transducer and a KT-V5 analysis unit with display for the calibration. The KT-V5 is connected to the USB port of the computer where the servopress is operated in order to read in the values of the reference force. The values of the reference force transducer are automatically detected by the integrated TED5 and are displayed into a calibration protocol that can be exported to Excel.

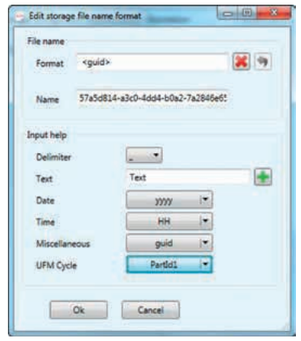


Calibration plugin

It is also possible to perform the calibration using other non-integrated references. In this case, the base point values of the reference transducer are entered manually.

- **URMR XML-Writer**

  The XML Writer plugin is used to export date generated during the joining process, such as gaugings, curve data and variable values, to an XML file. The XML files can be used for any further processing and analysis.



URMR XML-Writer

- **UFMR QDE**

  The UFMR QDE plugin allows you to export quality data into the statistics software Qs-STAT from the Q-DAS company and thus helps you to control and optimize your production process. You can export measurement data as characteristic data, as well as supplementary data and description data for every joining program. Exports are supported for “dfq“ as well as “dfd“ and „ dfx” file formats.

- **UFMR IPM**

  The plugin UFMR IPM also supports the control and optimization of your assembly process and helps you to detect production failures early. You can export process

Our services for you

From development to after-sales service, we offer the complete package from a single source. On request, we support you from process development through to the use of our assembly presses at your premises. Whether you are using our assembly presses for the first time or are already familiar with them is not important. We offer you the necessary service for a long and sustainable use of our products at every stage.

The service of our products includes the following services:

- Process development
- Preliminary tests
- Rental units
- Start-up operation
- Documentation
- Training courses
- Remote / maintenance
- Calibration service
- Emergency, repair and spare parts service
- Sale of used assembly presses
- Consignment warehouse
- Worldwide sales and service network

PROMESS CUSTOMER SERVICE

For more „green“ efficiency

By choosing a universal joining module from PROMESS, you are choosing a long-lasting, energy-efficient drive system. We design your joining module individually in advance, which avoids overdimensioning and increased energy consumption. This saves you energy costs and conserves resources. Where possible, we take back used assembly presses, rework them and bring them back into the product cycle. The refurbished modules are state-of-the-art and have short delivery times. In addition, you receive a 12-month warranty and contribute to climate protection.

Maintenance

Preventive maintenance is the easiest way to reduce costly downtimes, increase machine service life and boost productivity. A maintenance contract for regular preventive maintenance by our trained personnel ensures maximum use of your products.

Our maintenance contract includes one service assignment per year with the following services:

- Re-grease all lubrication points
- Change of transmission oil as required (if applicable)
- Visual and noise inspection of mechanical and safety-relevant components
- Replacement of worn parts as required and if spare parts are in stock
- Update of the software as required and requested by the customer
- Checking / setting the zero point as required
- Checking the force curve over the nominal stroke
- Preparation of a machine condition report and quotation for the rectification of any defects
- Calibration and adjustment of the force signal, issue of a calibration certificate
- Adjustments (e.g. belt tension) as required
- Travelling expenses included
- Warranty extension by 12 months after maintenance (maximum of 5 years after delivery)
- 10% discount on spare parts
- 10% discount on services and training

Calibration service

Deutsche Akkreditierungsstelle D-K-21209-02-00

Our assembly presses are supplied with a factory calibration. After this, we recommend regular calibration to ensure the reliability of your measuring equipment and to prevent incorrect process parameters from occurring. On request, PROMESS can support you with the calibration and adjustment of your force measuring system with appropriate calibration services. Choose between a factory calibration or a calibration according to an accredited in-house procedure. Both services are carried out by our experienced service technicians on your premises.

Our calibration laboratory is accredited in accordance with DIN EN ISO/IEC 17025:2018 by the German Accreditation Body (DAkkS) and carries out calibrations in the accredited area.

Calibration services	
Factory calibration	**Accredited calibration**
■ Factory calibration of the force measuring system ■ Factory calibration certificate ■ Traceable calibration ■ Conformity assessment	■ Calibration of the force measuring system according to accredited in-house procedure ■ Internationally recognised calibration certificate (with ILAC and DAkkS logo) ■ Traceable calibration ■ Conformity assessment (optional) ■ Fulfilment of the requirements of the DIN EN ISO/IEC 17025 ■ Recognised measurement uncertainties for each measuring point ■ Determination of the reversal margin (hysteresis) (optional)
■ Adjustment of the force measuring system ■ Checking the distance measuring system ■ Function check for noise and wear ■ Lubrication ■ Testing the machine capability (optional)	

What are the advantages of calibration according to an accredited procedure compared to factory calibration??

- Calibration in accordance with the accredited procedure fulfils the requirement 7.1.5.3.2 external laboratories from the IATF 16949 standard.
- You will receive an internationally recognised calibration certificate that meets the requirements of DIN EN ISO/IEC 17025 and bears the DAkkS logo.
- Measurement uncertainties are shown and assigned directly to each measuring point.
- Determination of the reversal span (hysteresis) on request.
- You have the verification of a traceable calibration.
- We can carry out a conformity assessment for you on request.

Calibration set

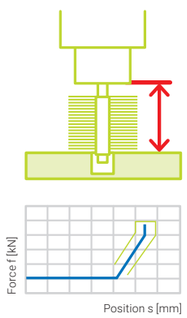
Alternatively, you can calibrate or test the machine capability of your assembly press yourself using our calibration set. The process can be automated using the optionally supplied software. Finally, a log is created that can be exported to Microsoft Excel.

The PROMESS calibration set contains

- Reference transducer
- Evaluation unit for the reference transducer with display and USB interface for connection to a PC
- Calibration certificate of the reference transducers as a factory calibration certificate or as a “DAkkS calibration certificate” possible
- PROMESS UFMR Calibrate software (optional)
- Case

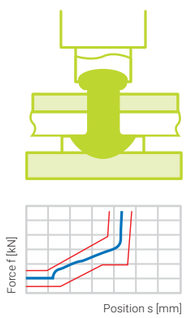
Calibration set	1 kN	5 kN
Item no.	5106	5107
Force transducer	KAM/1kN/0,2	KAM/5kN/0,2
Base plate	XKM 096	XKM 096
Diameter/height	Ø40 / 12	Ø40 / 12
Plug	XKC 041	XKC 041
Display	KT-V5	KT-V5
Factory calibration	XKW 221	XKW 221

Application Examples



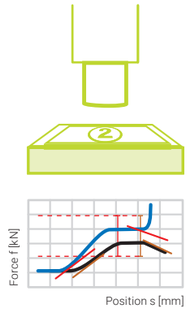
Precision Joining

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



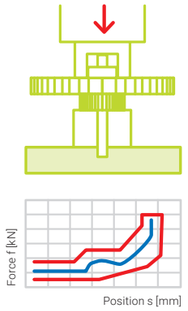
Riveting

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



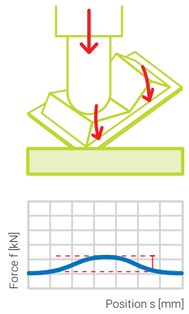
Stamping/Forming

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



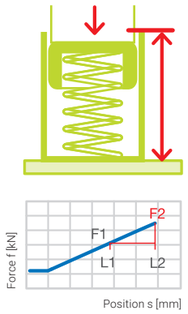
Join on Contact

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



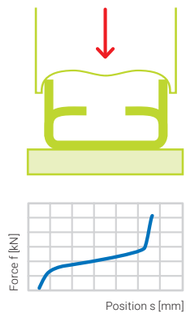
Surface Checks

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



Testing/Measuring

- Logging of force-distance data for multiple positions.

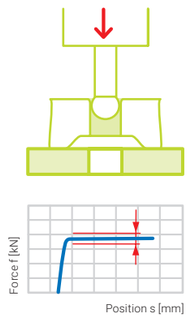


Bending

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

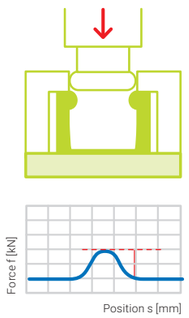
Press-fitting

- Press-fitting with controlled force for relative displacement.



Calibrating

- Calibration with quality assurance through monitored force.



Clipping

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

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