

UFM Line5/ UFM Line5s

PROMESS assembly presses for
assembly and joining applications
with force-distance monitoring



For more efficiency.

PROMESS

ASSEMBLY + SENSOR TECHNOLOGY

Your partner in the field of assembly and testing technology

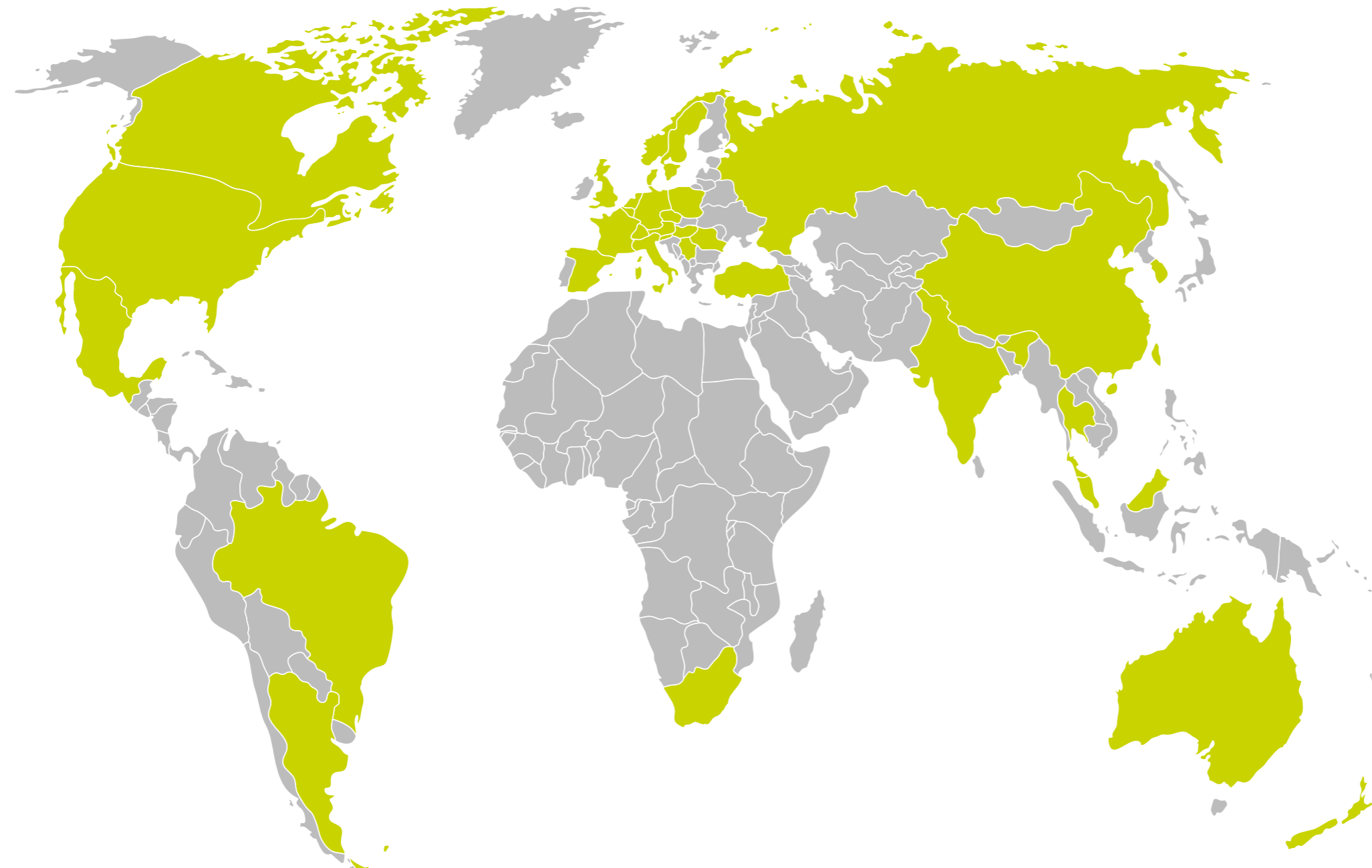
Gerhard Lechler founded the company PROMESS in 1977 as an engineering office in the field of technical measurement in Berlin. Initially, the company distributed handmade patented measuring bearings for tool condition monitoring before the electro-mechanical assembly press (UFM) with integrated NC control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

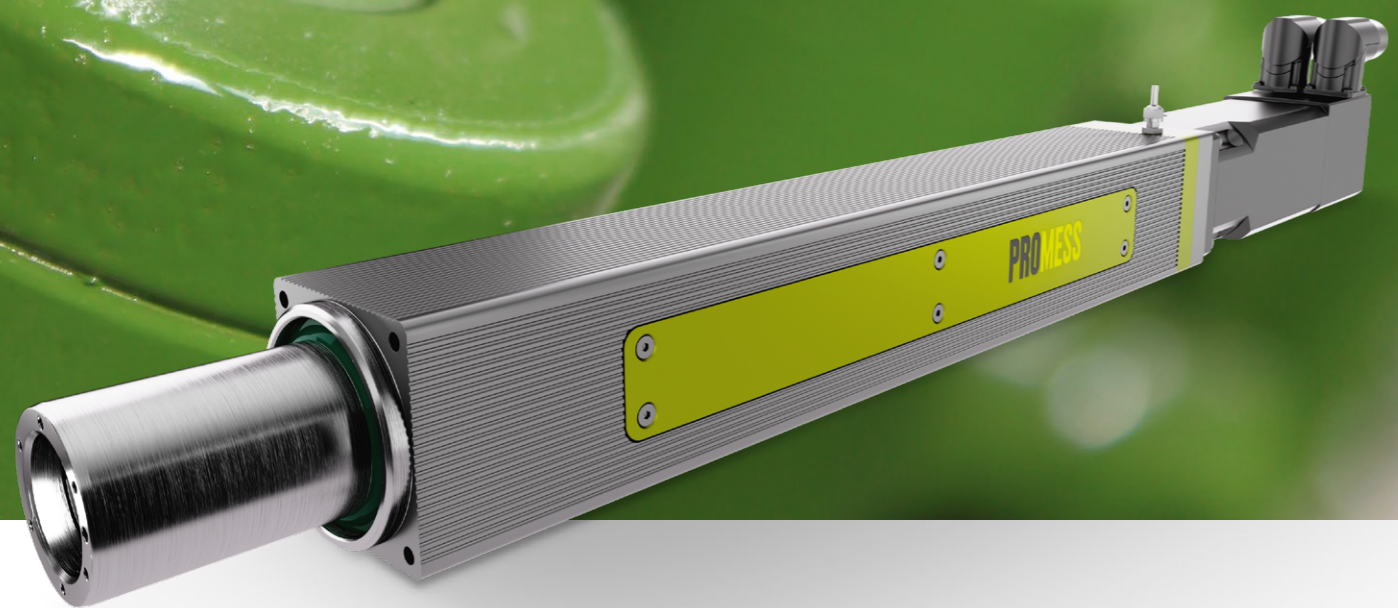
requirements of our customers. From process development to preliminary testing, from initial installation to daily production, PROMESS offers holistic expertise from a single source. Our specialist teams have comprehensive knowledge of our products and offer prompt and effective advice worldwide. Today 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 welcome your enquiries and questions.



Australia	Mexico
Austria	Netherlands
Argentina	Norway
Belgium	Poland
Brazil	Romania
Canada	Russia
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
Malaysia	



UFM Line5/ UFM Line5s

The UFM Line5/UFM Line5s range includes standard press designs with an optimum price/performance ratio.

They are well suited for assembly and joining applications with force-distance monitoring and can be integrated in automated assembly lines, test stations or manual workstations.

Overview of Press Types

UFM Line5 Inline and Parallel		
Force (kN)	Stroke (mm)	Vmax (mm/s)
200	750, 550, 350, 200 parallel	100
100		200
60		250
30		250
10	200	300
UFM Line5s Inline		
Force (kN)	Stroke (mm)	Vmax (mm/s)
3	200	200
1	200	200

Advantages

- Standard model includes absolute encoders that eliminate the need for referencing
- Only the power amp is required, no need for an additional external monitoring system
- Multi measurement with 24-bit resolution
- Multi range calibration for force input (optional for Line5)
- Sensor system can be easily extended using versatile PROMESS-BUS
- Field busses can be optionally expanded using plug-in modules
- Utilization of window and envelope technologies
- No PLC knowledge required
- Movement and monitoring as an integrated solution
- Slim internal micrometer
- Automatic grease unit optionally available (optional for Line5)
- Integrated program memory
- PLe for STO by default



Mechanics

The Line5 universal joining module is robustly designed thus making it well suited for heavy duty cycles.

The mechanical system consists of the following components:

AC servo motor with integrated absolute encoder, precision gearbox (from 30 kN on), integrated force transducer, robust housing, screw assembly, non-rotating press ram

The units use an inline design, i.e., the shaft is driven by a motor spindle in line with the shaft. The excellent rotational characteristics of this system provide excellent dynamic response. However for compact installation

Design basis

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

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

spaces, we recommend joining the modules UFM Line 5 using an angled motor spindle. The integrated absolute encoder ensures precise positioning and eliminates the need for referencing at the start of a cycle.

Set-up of the mechanics

1. Servo motor with absolute encoder
2. Integrated strain-gauge force transducer
3. Housing
4. Non-rotating press ram



UFM Line5

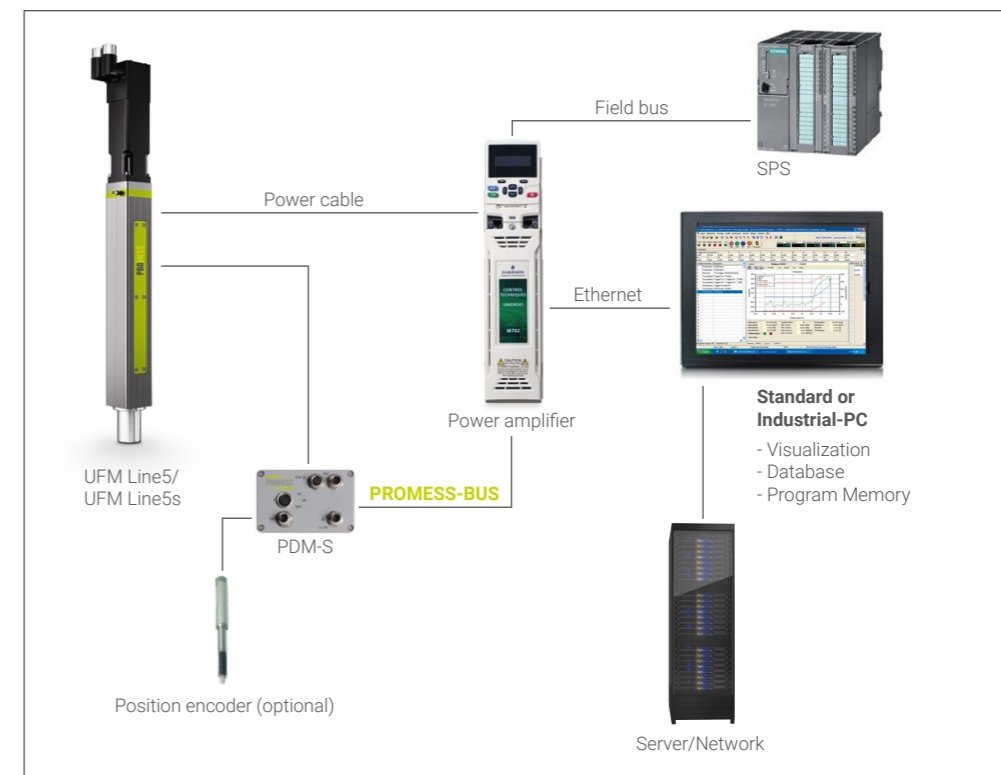
UFM Line5s

System Design

The mechanical system is controlled by a power amplifier with an integrated NC module. The internal RISC processor coordinates the joining module 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

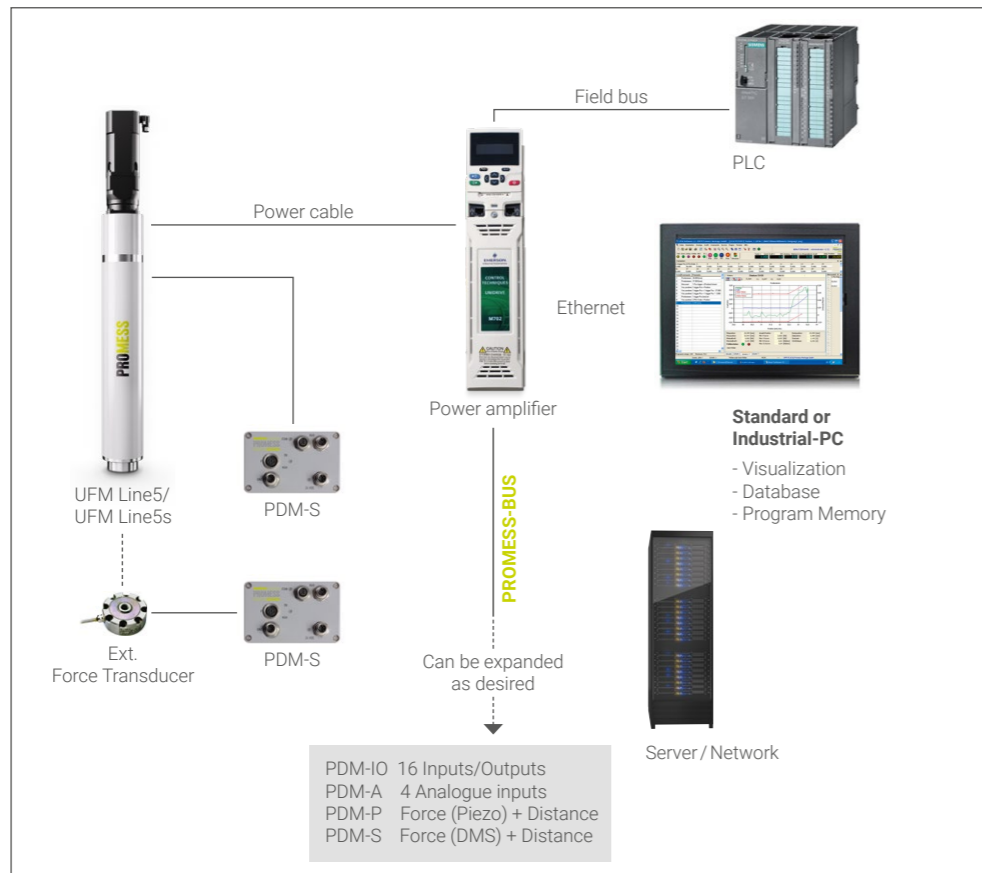
numerically and graphically so that each individual process can be easily monitored. The automatic learning function allows customers to eliminate the need for custom programming and simply learn the processing limits using a good part. Quality assurance data is stored using the database plugin and can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



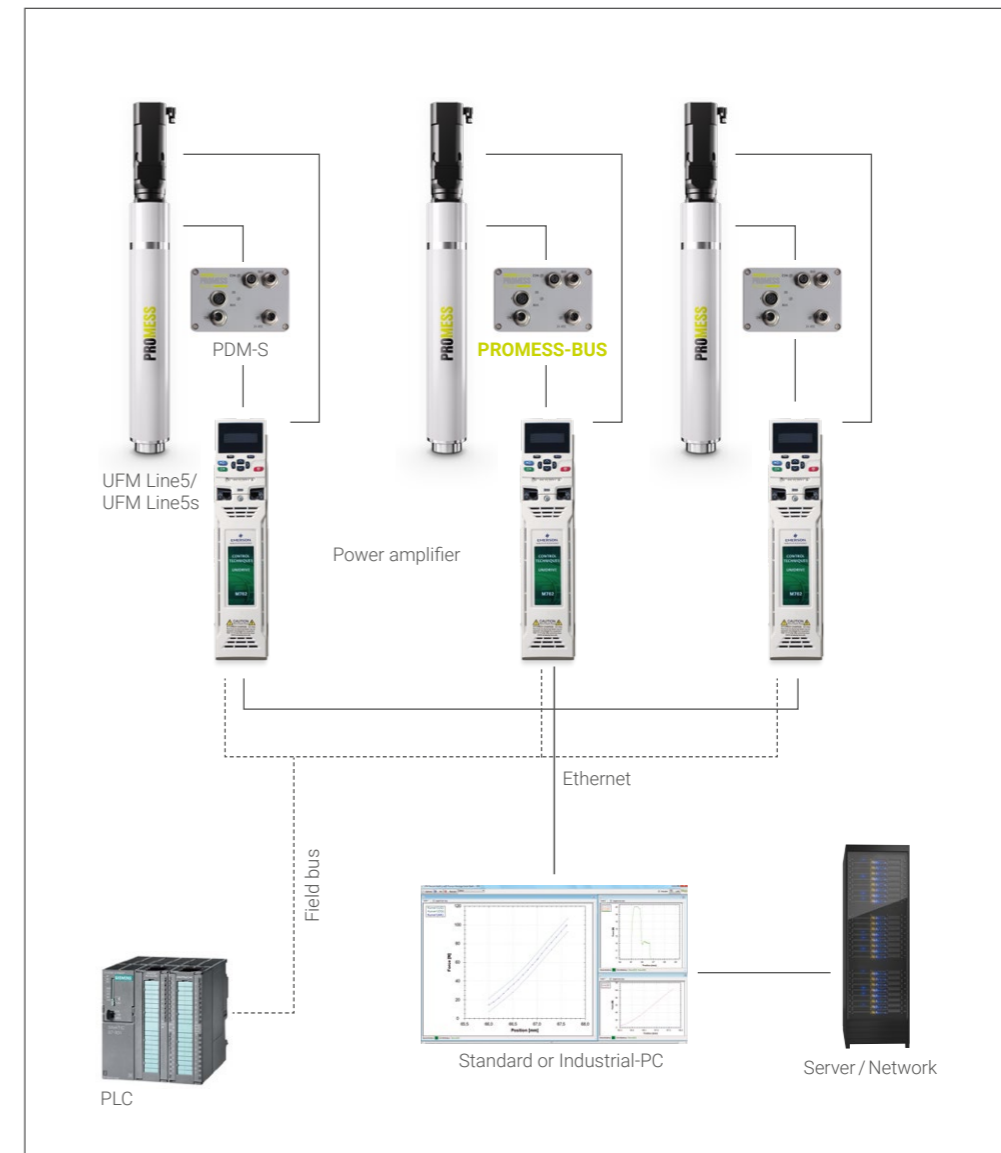
Basic version

The system utilizes a digital preamplifier, PROMESS digital module PDM-S. This transfers the force signal at a resolution of 24-bit almost trouble-free. When the characteristics are calibrated, the joining system 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.

The PROMESS Digital Module PDM-S contains an input for connecting a force transducer (strain gauge) as well as an encoder input for connecting digital sensors. The PDM-S is digitally connected to the UFM control via the PROMESS BUS.



Extension/Options



Line configuration

Software

The servo presses UFM Line5/UFM Line5s come **with our programming software UFM V5.xx**. It allows the creation of the press program, of the recording and displaying of the quality data and of 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 assembly processes.

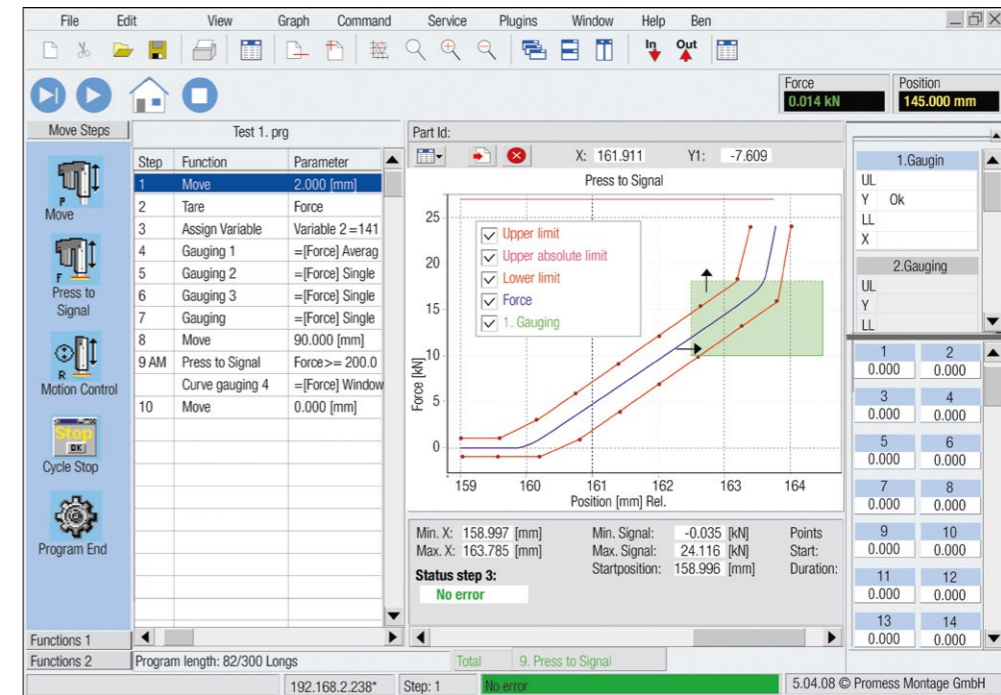
The transparent and concise program surface allows users to quickly create programs.

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.

The **monitoring of the joining process** is achieved by window and/or envelope technology using 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 anytime.

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 and are thus 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 window

Highlights for demanding applications:

■ Positioning on force slope:

Joining components until a definite slope (increasing force) or relatively once a knee-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., rolling processes 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).

■ Strain compensation:

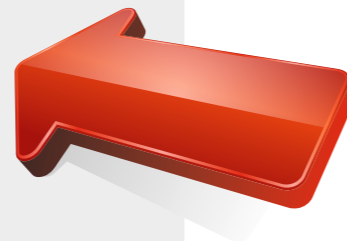
Not only customizable for separate systems but, also for specific processes and components.

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 are 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. Thus program changes are traceable and thereby 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 joining module Line5/Line5s
- Power amplifier incl. application module and UFM V5 firmware
- Brake resistance (except UFM Line5s)
- Digital preamplifier PDM-S
- Cable, field bus and more accessories on demand



Safety Box PSB

As an option to our assembly presses UFM Line5/UFM Line5s 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.



PSB010G1

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

Accessories / Options

PROMESS has developed extensive accessories for the UFM Line5/UFM Line5s range of presses that provide them with additional functionality. Drawing on our many years of expertise, we provide you with complete technologies for solving your own complex assembly and testing tasks.

Technical Data

UFM Line5/UFMLine5s	1 kN	3 kN	10 kN	30 kN	60 kN	100 kN	200 kN
Item no.	PSB001G2	PSB003G2	PSB010G2	PSB030G2	PSB060G2	PSB100G2	PSB200G2
Connection voltage	3 AC 380 V - 480 V, +/- 10 %, 48-65 Hz						
Connected load at 400 V	8,7 kVA		10 kVA		18,3 kVA	19 kVA	
Protection class	IP 54						
Weight	17 kg		18 kg		28 kg		
Recommended protection	IEC 20 A Class gG				IEC 40 A Class gG		
Temperature range	0° C ... +40° C						
Power loss	368 W		493 W		654 W	756 W	
PC Interface	Ethernet						
Option PLC fieldbus interface	Profibus, Profinet, EtherCAT (add. on request)						

PSD Safety Module

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 (for UFM Line5 with safety brake).

The safety module simplifies and accelerates the installation procedure for the joining unit.

The PSD is suitable for our UFM Line5 units with and without brakes. As a prerequisite, it must be controlled using a field bus.

Advantages

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

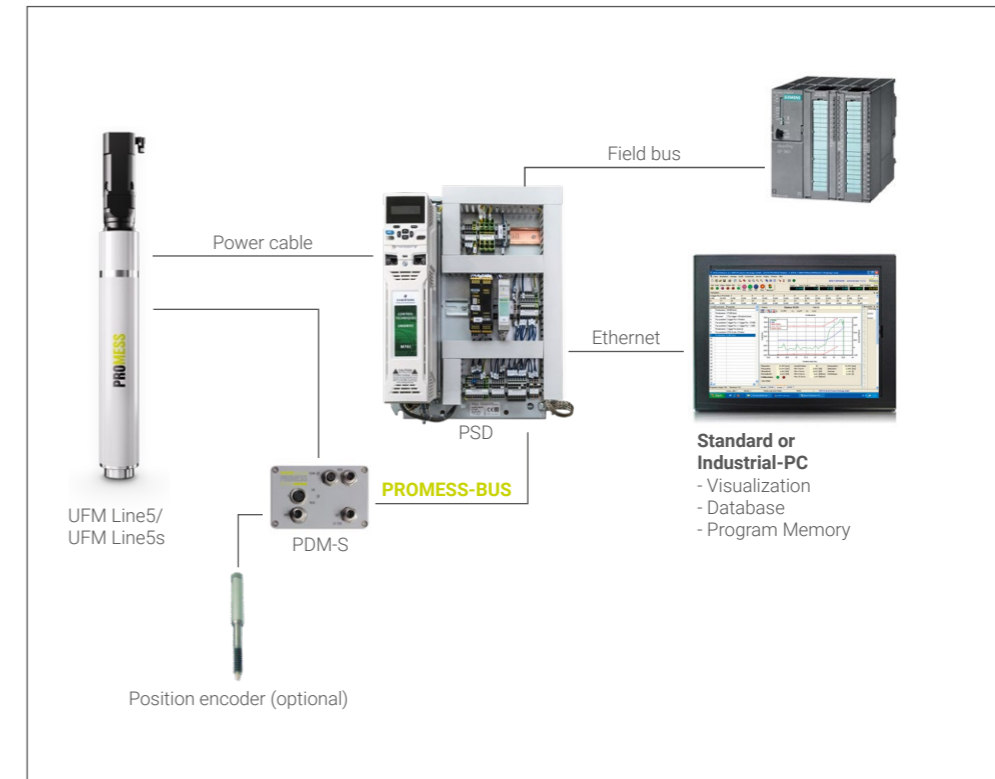
Connected Components

- AC servo amp with NC module
- Brake resistance
- 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 (for UFM Line5 with safety brake)
- 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 Line5/ UFM Line5s	Item no.	WxHxD (mm)	Supply - Voltage	Frequency	Operating temperature range	Control voltage
1 kN	PSD001YG2					
3 kN	PSD003YG2	350x475x300				
10 kN	PSD010YG2					
30 kN	PSD030YG2	500x500x300	380-480 VAC +/-10%, 3 ph	50-60 Hz	+5-40 °C	24 VDC +/-10%
60 kN	PSD060YG2	500x500x320				
100 kN	PSD100YG2					
200 kN	PSD200YG2	500x500x350				

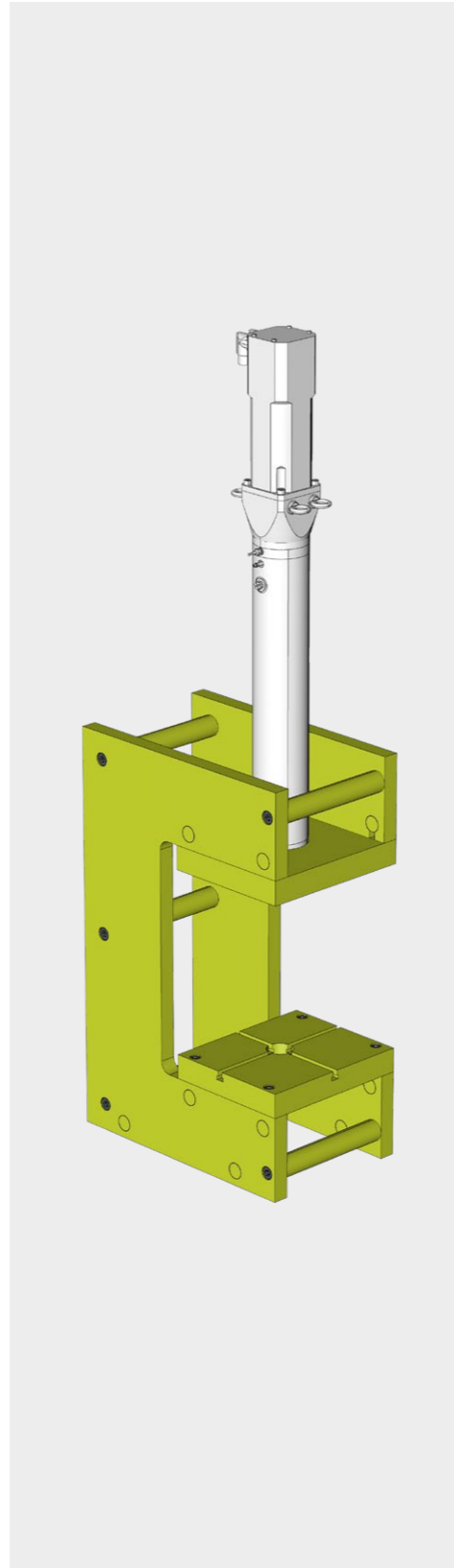
Frames

PROMESS offers matching C- and four-column frames for each type of press in the UFM Line5/UFM Line5s range.

C-Frames

The robust C-frames are easily accessible from the front and sides and provide high stiffness. The max. bending is 0.2 mm under nominal load. They are mainly suitable for use in assembly lines or machines.

By default, the lower plates are equipped with a center hole and 2-T grooves as optimum tool mounts. The upper plates are pre-fabricated to hold a specific joining module.

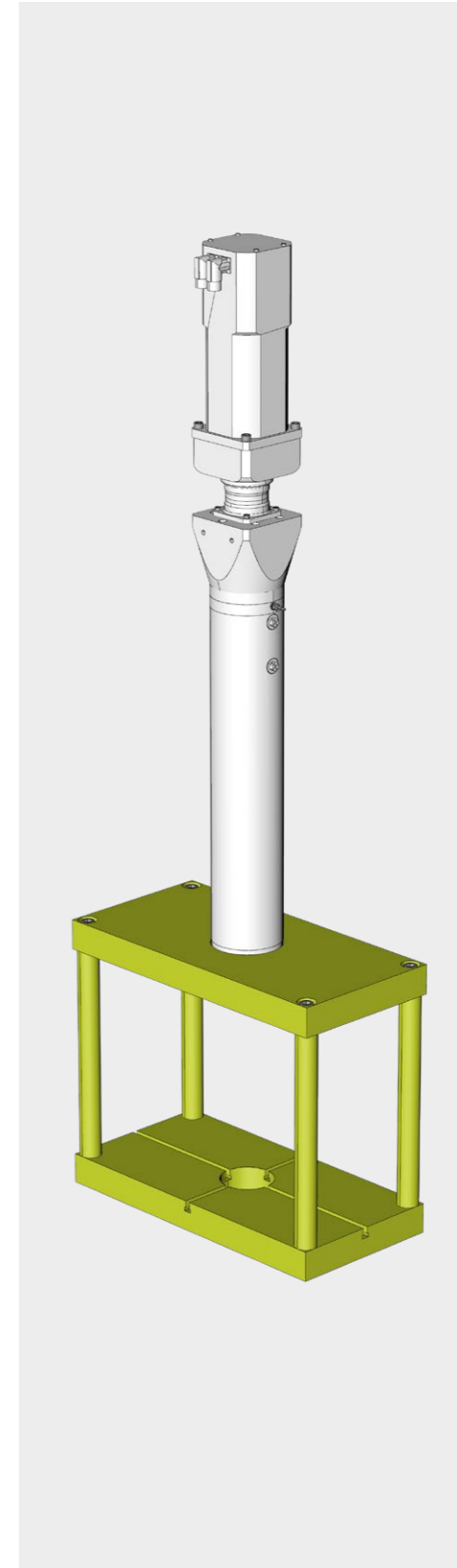


C-Frame

Four-Column Frame

Four-column frames are suitable for applications with a central axial application of force. They offer low bending that is solely parallel.

By default, the lower plates are equipped with a center hole and 2-T grooves as optimum tool mounts. The upper plates are pre-fabricated to hold a specific joining module.



Four-Column Frame

External Force Transducer

The force transducers in the UFM Line5/ UFM Line5s range are designed to measure tension and compression forces both statically and dynamically. They offer high measurement precision and a low installation height.



External Force Transducer

Cable Track Module

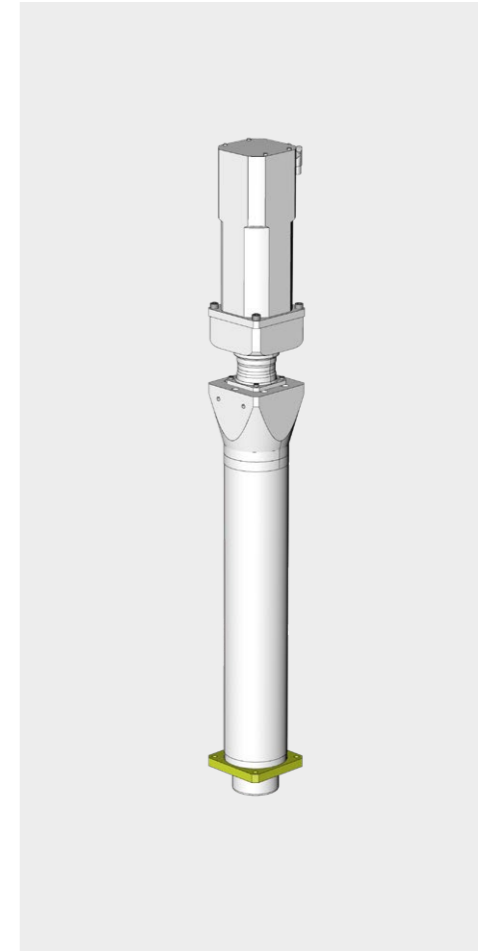
PROMESS offers different modules for moving the force transducer cable safely without wear and tear.



Cable Track Module

Flange Plate

PROMESS offers corresponding flange plates for fastening the joining modules.



Flange Plate

Sensors (Displacement Transducers)

The PROMESS NC controller allows the connection of various additional sensors for measuring force, distance, temperature or other variables.

Sensor / Accessory	Cable	Stroke	Resolution
Precision sensor ST 1278	axial	12 mm, neutral position extended	+/- 0.001 mm
Precision sensor ST 1278	radial	12 mm, neutral position extended	+/- 0.001 mm
Precision sensor ST 1277	axial	12 mm, pneumatic retracted	+/- 0.001 mm
Precision sensor ST 3078	axial	30 mm, neutral position extended	+/- 0.001 mm

Connecting cables have to be ordered separately.

Connector Sets

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

UFM Line5	Item no.
10 kN	750100LNM
30 kN	750300LNM
60 kN	750600LNM
100 kN	751000LNM
200 kN	752000LNM

Cable Sets

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

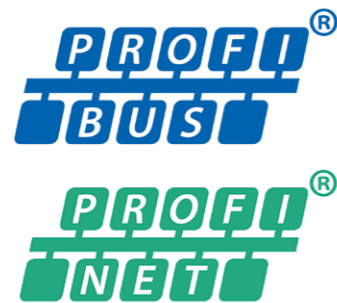
UFM Line5	Item no.
10 kN	750105LNM*
30 kN	750305LNM*
60 kN	750605LNM*
100 kN	751005LNM*
200 kN	752005LNM*

Field Busses

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

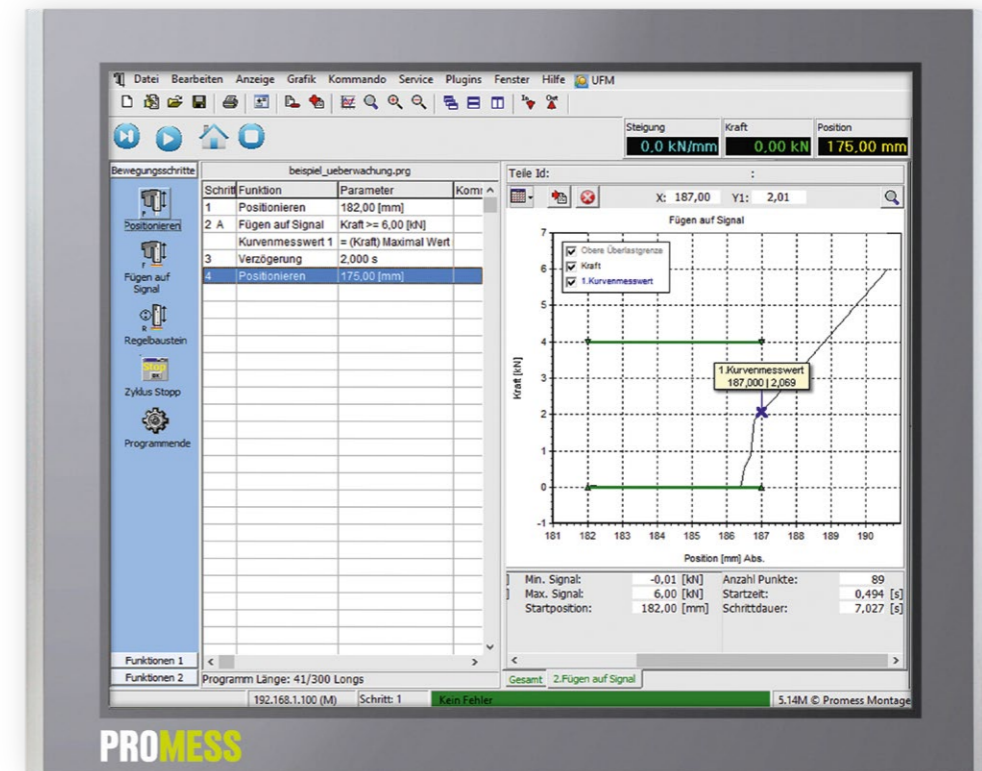
UFM Line5	Item no.
Profibus	3302005550
Profinet	3302005585
EtherCAT	3302005595
EtherNet/IP	3302005590

Additional field busses on request.



Display and PC

As a programming unit for editing NC programs and for visualizing signals, PROMESS offers an industrial PC and different displays.



Panel-PC

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

Display

PROMESS offers different displays on request.

Plugin

PROMESS offers a range of customized plugins for its powerful UFM V5.xx programming software. These can be connected to the software via 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:

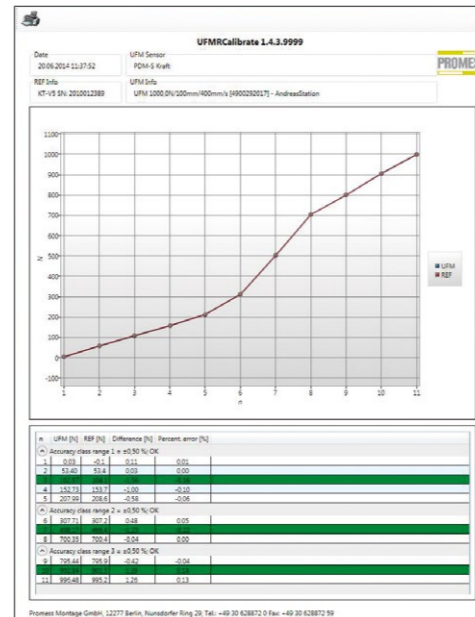
■ UFM Calibrate

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

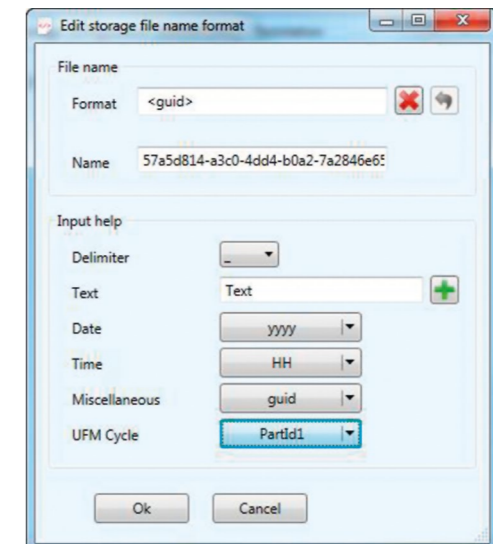
■ UFM IPM

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.



■ URM 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.

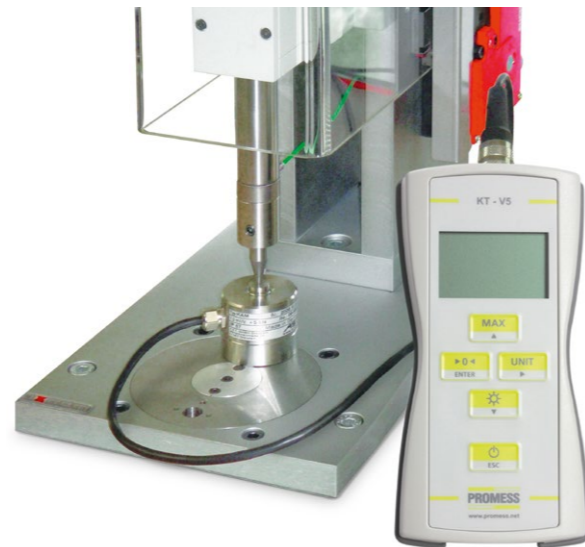


URM XML-Writer

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

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.

ROMESS 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 (or DKD calibration by request)
- PROMESS Software UFM Calibrate (optional)
- Case



Special Features:

- Simple operation
- Robust battery-driven display
- Industrial strength case
- 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 of 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	10 kN	20 kN	50 kN	100 kN	200 kN
Item no.	5106	5107	5104	5101	5103	5105	5108
Force transducer	KAM/1kN/0.2	KAM/5kN/0.2	KAM/10kN/0.2	KAM/20kN/0.2	KAM/50kN/0.2	KAM/100kN/0.2	KAM/200kN/0.2
Base plate	XKM 096	XKM 096	XKM 096	XKM 094	XKM 094	Without	Without
Diameter/height	Ø40 / 12	Ø40 / 12	Ø40 / 12	Ø90 / 25	Ø90 / 25	Ø90 / 25	Ø90 / 25
Plug	XKC 041	XKC 041	XKC 041	XKC 041	XKC 041	XKC 041	XKC 041
Display	KT-V5	KT-V5	KT-V5	KT-V5	KT-V5	KT-V5	KT-V5
Factory calibration	XKW 221	XKW 221	XKW 221	XKW 221	XKW 221	XKW 221	XKW 221



For more „green“ efficiency.

When you choose an assembly press from PROMESS you are opting for a durable, energy-efficient drive system. You save energy costs and conserve resources. We design your assembly module in advance, which avoids oversizing and increased energy consumption. If possible, we take back used assembly presses, rework them and return them to the product cycle.

Service expertise

PROMESS assembly presses have been used worldwide for many years in heavy industrial applications. This has been made possible by the solid quality of our products as well as by 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 sustainable rapid service and specialist advice.

Training

PROMESS has developed various training modules to simplify, as much as possible, the installation, operation, maintenance and handling of our assembly presses. 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 conducted by experienced and qualified training personnel.

Express deliveries

On request, we deliver within two weeks by express delivery for up to five units for an additional charge.

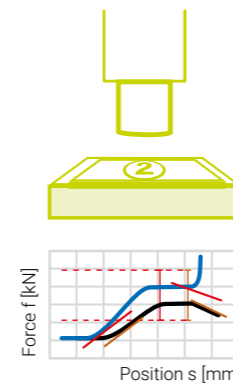


We are at your service worldwide

Our services include:

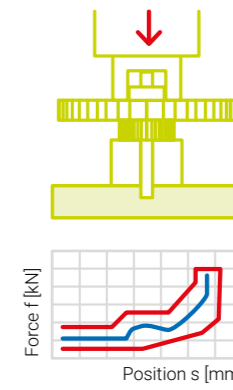
- Process development
- Preliminary testing
- Rental units
- Installation
- Extensive documentation
- Training
- Local and remote maintenance
- Calibration services
- Emergency repairs and spare part delivery
- Consignment warehouse
- Worldwide distribution and service network





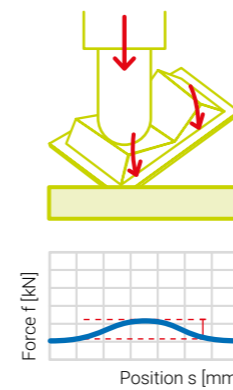
Stamping/Forming

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



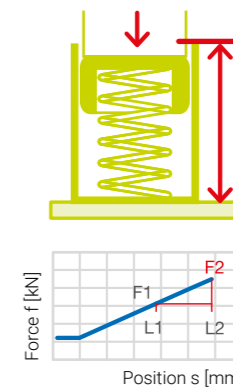
Join on Contact

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



Surface Checks

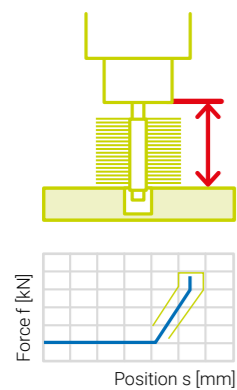
- Logging of force-distance data for multiple switch points.



Testing/Measuring

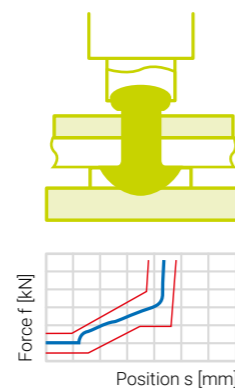
- Logging of force-distance data for multiple positions.

Application Examples



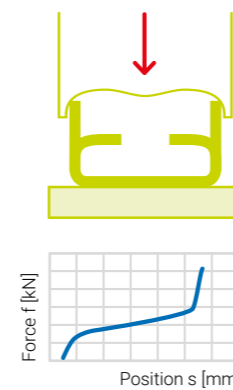
Precision Joining

- Precision joining <math>< 0.002\text{ mm}</math>, collision-free due to electronic bending compensation.



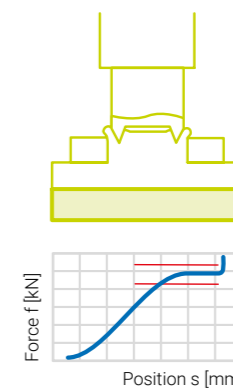
Riveting

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



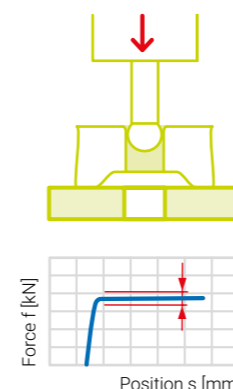
Bending

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



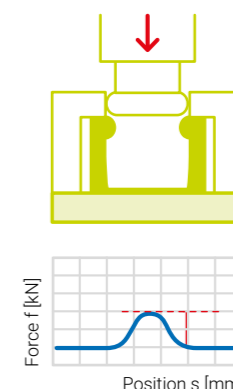
Press-fitting

- 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.

PROMESS. For more efficiency.



PROMESS

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