# Slide tables

ST

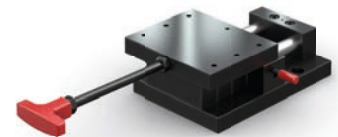**mäder** pneumatic and manual slide tables simplify manual and automatic insertion and therefore increase the economic efficiency of assembly processes.
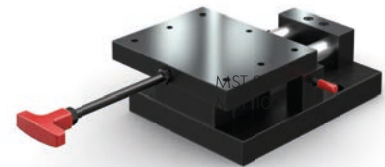
## The advantages:

▸ Insertion is carried out outside the danger area
▸ Parts can be preassembled spatially unhindered by the press
▸ Versatile options for automation and feed tasks
▸ Precise positioning of workpieces

MST 80

MST 100

## Other quality features:

| | MST 80 | MST 100 | MST 130 | PST 130 |
|---|:---:|:---:|:---:|:---:|
| Manual slide table | ● | ● | ● | |
| Pneumatic slide table | | | | ● |
| Teflon slideway | ● | ● | | |
| Hardened and ground guide columns | ● | ● | | |
| Precision cross-roller guide with high loading capacity | | | ● | ● |
| Slideway adjustable without play | | | ● | ● |
| Installs transversely or longitudinally | ● | ● | ● | ● |
| Damping at both end positions | | | ● | ● |
| Self-latching in end position | ● | ● | ● | ● |
| Different strokes on request | ● | ● | | |

MST 130

PST 130

### MST 80

59
110
160
90
-147
Hub/stroke/course 80

### MST 100

77
150
200
120
-147
Hub/stroke/Course 100

### MST 130

~80
192
~70
200 (Hub 130)
51

### PST 130

55
194
~70
200 (Hub 130)
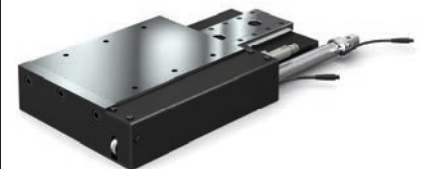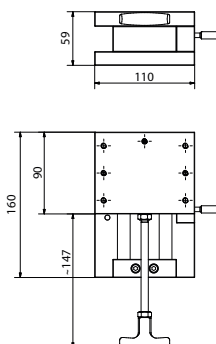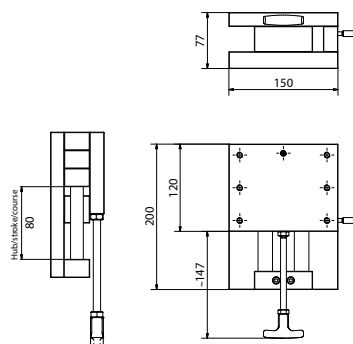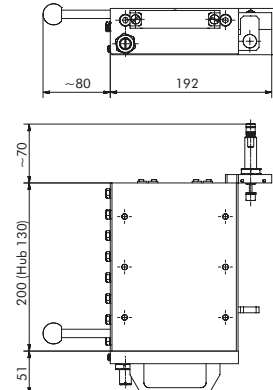
Request CAD at www.maederpressen.de or directly from Tel.+49 (0) 74 67 - 94 67 - 0

# Installation examples

EP 500 with MST 80

DA type press with PST 130
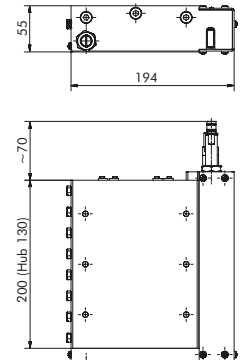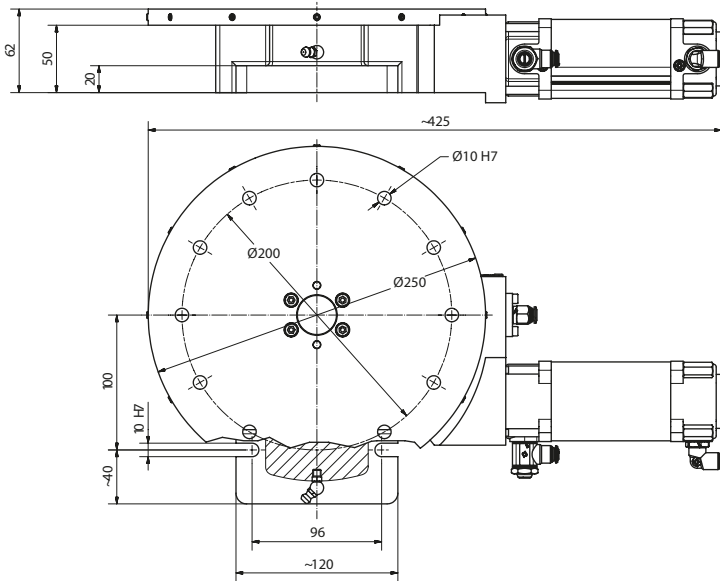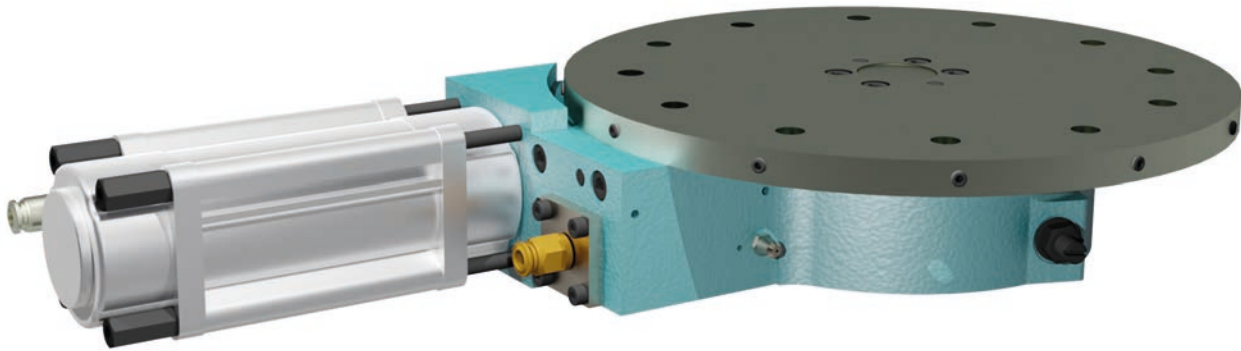Installation from the front

Installation from the side

| Type | | MST 80 | MST 100 | MST 130 | PST 130 |
|---|---|---|---|---|---|
| Stroke | mm | 80 | 100 | 130 | 130 |
| Load capacity | kN | 12 | 30 | 50 | 50 |
| Suitable for presses with throat | mm | 63/80 | 80/100 | 100/130/150/250/300 | 100/130/150/250/300 |
| Weight | kg | 5 | 8 | 14 | 15 |

Example of application
with pneumatic press

## Pneumatic rotary indexing plate

- Ideal for presses up to 13 kN compressive force with centric force application to the integrated anvil
- 12 mounting holes with fixing screws for workpiece carriers in the turntable
- Maximum load per bore hole: 200 g
- Pneumatic locking of the turntable in the working position
- Direction of rotation: clockwise

| Type | | ST 250 |
|---|---|---|
| Plate Ø | mm | 250 |
| Pitch circle Ø | mm | 200 |
| Pitch | | 12 |
| Mounting hole | mm | 10H7 |
| Installed height | mm | 62 |
| Indexing precision | mm | 0,02 |
| Operating pressure | bar | 6 |
| Air connection | | G1/8" / G 1/4" |
| Weight | kg | 13 |

The controller model MPS-2 conforms to the safety requirements which must be applied according to the EC Machinery Directive 2006/42/EC and to the standards for the safety of pneumatic presses. MPS-2 two-hand controls fulfil all requirements of type IIIC according to DIN EN ISO 13851. mäder presses can therefore be used at workstations with manual loading and open tools. Safety is provided here by the controller, which is designed to be both electrically and pneumatically redundant.

MPS-2 controls include a press safety valve, maintenance unit, push button with protective collar, PLC with free interfaces, Ethernet interface and an integrated web server for remote maintenance, as well as an insert for standard micro SD cards and an electronic piece counter.

A key switch can be used to select between 2-hand operation or external control.
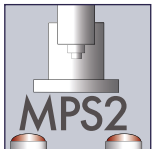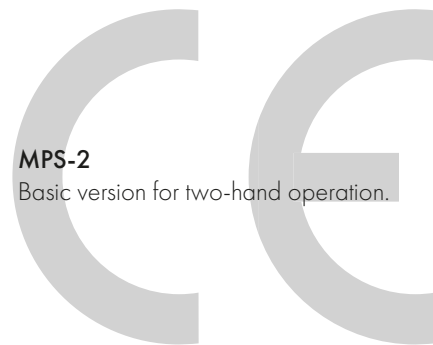
### MPS-2
Basic version for two-hand operation.
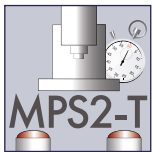
### MPS-2 T
MPS-2 controller with additional stop time function. When the press has reached its end position, a timer can be used to determine when the return stroke should take place.
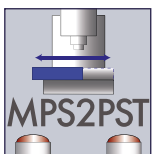
### MPS-2 PST
This type of MPS-2 controller is used to control a pneumatic slide table in addition to the press. The scope of supply also includes the stop time function (see MPS-2 T)
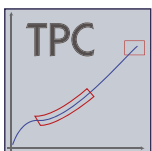
### MPS-2 TPC
MPS-2 controller with an additional module TPC-MIDI for force/displacement monitoring.

## Applications:

Joining and assembly processes using presses must today be carried out safely and if possible without retrospective checking. Specified parameters which define the press process must be maintained during production. Only in this way can the quality and safety of the manufactured product be guaranteed. For this reason, TPC-MIDI is used wherever consistent joining processes are required, the progress of which has to be checked and if applicable documented by means of software.

TPC-MIDI monitors the press operation, compares the actual progress with the requirements and subsequently evaluates it. In this way, reject parts can be reliably detected and separated out.

TPC-MIDI can be used both with hand-operated presses and with pneumatic presses. However, the TPC-MIDI is also available as a pure system component if a PLC environment already exists, e.g. in an automation system.

## The advantages:

- ▸ TPC-MIDI can be programmed via the membrane keyboard or conveniently using the PC software.
- ▸ TPC-MIDI stores 16 different measuring programs
- ▸ Modern curve evaluation via freely parameterisable windows
- ▸ Evaluation options: Window, trapezoid window, block window, envelop curve, thresholds on the x or y axis.
- ▸ Interfaces: Ethernet and USB. Optional fieldbus integration with PROFIBUS, PROFINET or EtherNet/IP.
- ▸ Force measurement directly in the force characteristic with DMS sensor developed especially for presses.
- ▸ Software for programming and saving monitoring programmes, as well as for documentation of the individual press-fit processes

## Clear
## OK / NOK message

With OK parts, the indicator light is green and the press is ready for the next working stroke.
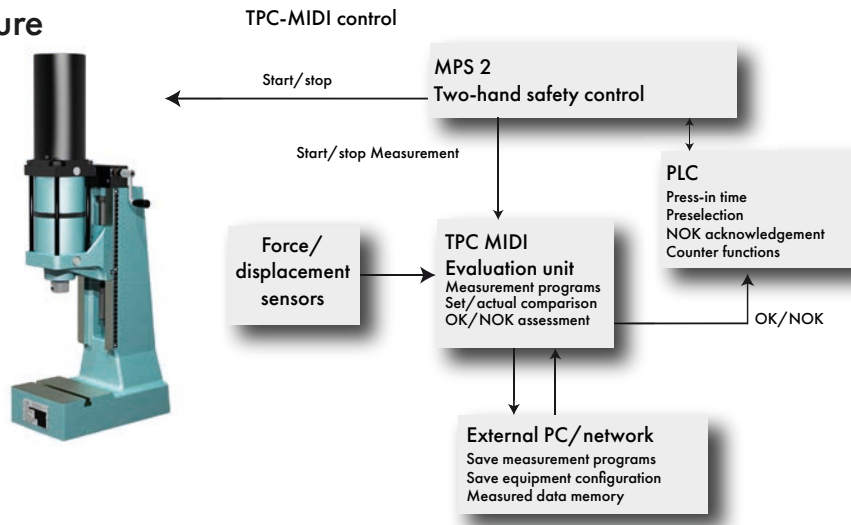
NOK parts are reliably reported by the TPC-MIDI as an audible signal and by a red indicator light.
The next press stroke cannot be initiated until the error has been acknowledged.

DA 2800-40-130 with MPS-2 TPC

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## System structure



TPC-MIDI control

Start/stop

**MPS 2**
Two-hand safety control

Start/stop Measurement

**PLC**
Press-in time
Preselection
NOK acknowledgement
Counter functions

**Force/
displacement
sensors**

**TPC MIDI
Evaluation unit**
Measurement programs
Set/actual comparison
OK/NOK assessment

OK/NOK

**External PC/network**
Save measurement programs
Save equipment configuration
Measured data memory

## Load cell force sensors for TPC-MIDI

The load cell force sensor is fixed inside the ram bore. The tool holder can be fixed in the hole at the other end of the sensor. The force sensor is therefore always directly in the force flow between the press ram and the tool.

| Measurement range | Measured value divergence | Tool holder |
|---|---|---|
| 0 – 500 N | ≤ ± 0.5% of EV | 10H7 x 24 mm |
| 0 – 1 kN | ≤ ± 0.5% of EV | 10H7 x 24 mm |
| 0 – 2 kN | ≤ ± 0.5% of EV | 10H7 x 24 mm |
| 0 – 5 kN | ≤ ± 2.0% of EV | 10H7 x 24 mm |
| 0 – 10 kN | ≤ ± 2.0% of EV | 10H7 x 24 mm |
| 0 – 20 kN | ≤ ± 1.0% of EV | 10H7 x 24 mm |
| 0 – 50 kN | ≤ ± 1.0% of EV | 20H7 x 24 mm |
| 0 – 100 kN | ≤ ± 1.0% of EV | 20H7 x 24 mm |



Unless expressly required to the contrary, the load cell force sensor is selected to match the maximum capacity of the press used
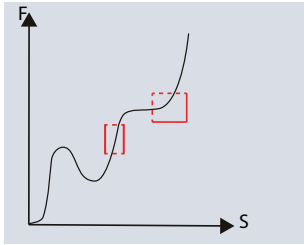
## Potentiometric travel meter

Travel is measured potentiometrically. The service life of the sensors is $10^8$ movements

| Press stroke | Resolution | Linearity error |
|---|---|---|
| 40 mm | 0.025 mm | 0.42% |
| 60/80 mm | 0.038 mm | 0.41% |
| 100 mm | 0.050 mm | 0.40% |
| 120 mm | 0.075 mm | 0.40% |

## Monitoring windows

### Pass-through window



The force/displacement curve must pass through the window from the entry to the exit side as defined without one of the other window boundaries being infringed. The entry and exit sides can be freely selected.

### Block window
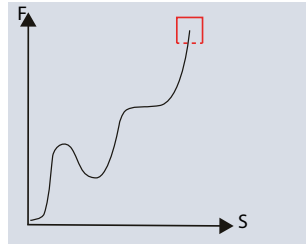


The block window monitors the final values of the press operation. With this type of window, the force/displacement curve must enter the specified entry side and must not leave the window again.

### Envelope curve
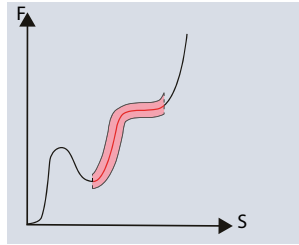


The measuring curve must pass continuously through the envelope curve and must not infringe it. The envelope curve is taught by means of a teach-in process. Its X-axis parameters and the delta-Y, i.e. the force tolerance range, are then defined.

### Monitoring window
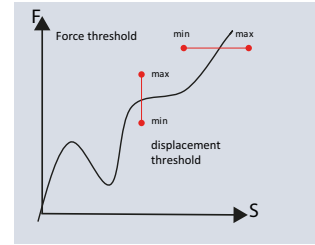


Thresholds define minimum values that must be reached within a certain range and may no longer be undershot. A force threshold (Y-axis) and alternatively a displacement threshold (X-axis) are available.

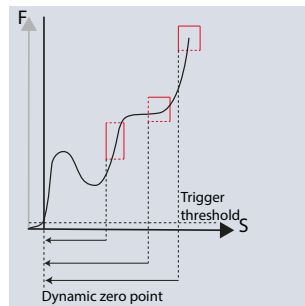## The reference points of the monitoring windows

The reference points of the monitoring windows on the X-axis can be defined both rigidly and dynamically.
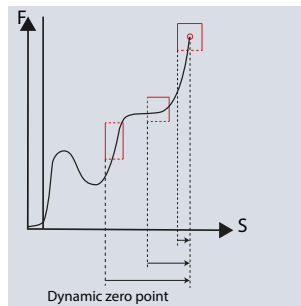
### Absolute
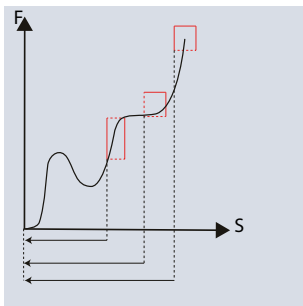


In the case of assembled parts with high repeat accuracy, the calibrated zero point of the displacement sensor on the X-axis is used as the reference point.

### Trigger



If the assembly sequence is identical as such, but the start of assembly has a major deviation on the X-axis, the beginning of the measurement can be defined by setting a trigger threshold on the Y-axis.

### End force



If a measurement with an absolute or a trigger reference point is not useful, the position of the end force (Fmax) on the x-axis can be selected as the reference point. The position of the evaluation window on the X-axis then relates in reverse to this dynamic zero point.

### Block window
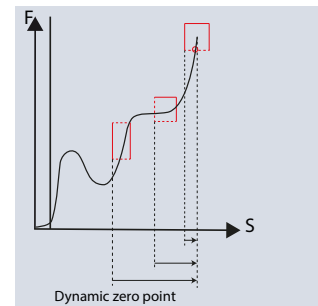


If the end force shows a wide spread, the reference point of the evaluation windows can also be defined using the entry of the curve into the block window. Any values after the block window has been reached are no longer taken into account. The position of the evaluation windows on the X-axis then relates in reverse to this dynamic zero point.

# PC Software

TPC-MIDI is supplied as standard with the basic version of the software, with which the configuration of TPC-Midi and measurement programs can be set up and saved.

### Equipment configuration

▸ Settings or teach-in of the force and displacement sensors (X/Y axes)
▸ Stipulation of measurement method and reference points
▸ Backup of complete unit configurations (up/download)

### Measurement programs

▸ Creation and internal saving of 16 measuring programs.
  Further measurement programs can be created, saved and reloaded when required.
▸ Input of sets of curves
▸ Creation of monitoring windows and envelope curve
▸ Test runs with OK or NOK assessment





With the licensed full version, the production data per press-in operation can be recorded in addition.

▸ Production mode
▸ Measured data recording
▸ Clear-cut part reference
▸ Besides the programme's own format automatic print and export to ACII and Excel
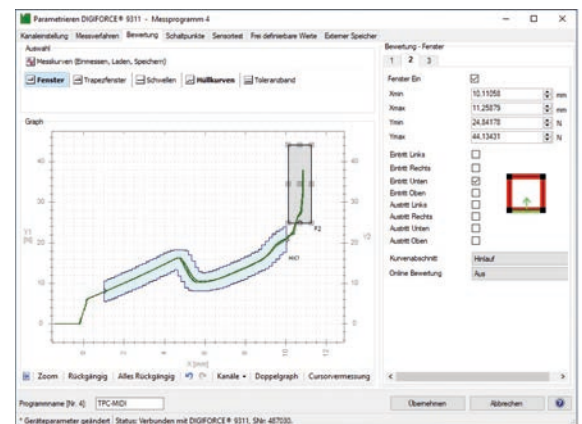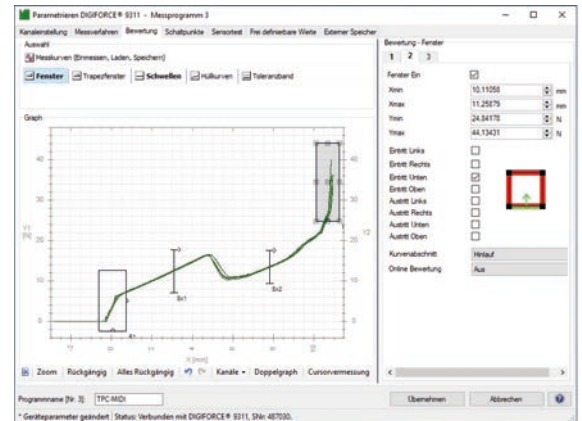
29.11.2021

## Introduction of the new MPS-2 control system

From 01.01.2022, all mäder presses ordered with a control system will only be delivered with the new MPS-2 control system. The outdated MPS-1 control system will be discontinued on 31.12.2021.

## Advantages and functions of the new MPS-2 control type

MPS-2 control types comply with the safety requirements that must be applied in accordance with the EC Machinery Directive 2006/42/EC and the standards for the safety of pneumatic presses EN 16092-1 08/2018 (general safety requirements for presses) and EN 16092-4 12/2020 (pneumatic presses).

MPS-2 two-hand controls meet the requirements of the highest possible type IIIC according to EN 13851 11/2019 (two-hand controls).

DA 1700-40-100 with MPS-2 ½"

DA 250-80-40 with MPS-2 ¼"

Control unit in auxiliary housing

DA 2800-40-130 with

MPS-2 TPC 9311

**Standard scope of delivery of the MPS-2 control unit:**

- Press safety valve
- Maintenance unit
- All pneumatic elements required to operate the press

- Pushbutton with protective collar
- Siemens LOGO PLC with free interfaces
- Ethernet interface
- Integrated web server for remote maintenance
- Insert for standard micro SD cards
- electronic parts counter

- A key switch can be used to select between 2-hand operation or external control.

**Models and functions:**

| MPS-2 | Standard 2-hand control |
|---|---|
| MPS-2 T | Standard 2-hand control<br><br>with timer for holding function in BDC and automatic return stroke |
| MPS-2 PST | Standard 2-hand control<br><br>with timer for holding function in BDC and automatic return stroke<br><br>and control for pneumatic sliding table type PST |

**Valve size**:

| ¼" | Pressing safety valve with ¼" connection dimension |
|---|---|
| ½" | Pressing safety valve with the connection dimension ½". |

The valve size depends on the required air volume per stroke.

**Free interfaces**

| MPS-2 | 4 In<br><br>1 Out |
|---|---|
| MPS-2 T | 3 In<br><br>1 Out |
| MPS-2 PST | 2 In |
| MPS-2 TPC 9311 | 2 In |

## Use of Model MPS-2 ¼"

| Number | Type | Seprate Housing | Models XL included | Stroke in mm | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 63 | 80 | 100 | 130 | 150 | 250 | 350 |
| 9-000-2-0240 | MPS-2 ¼" | | APK 3 L APK 4 L APK 5 L APK 6 L | | | | | | | |
| 9-000-2-0242 | MPS-2 ¼" T | | VKL 1000 VKL 2400 VKL 3200 VKL 6000 | | | × | × | × | × | × |
| 9-000-2-0244 | MPS-2 ¼" PST | | DA 450 DA 850 DA 1300  HP 5,000 HP 10,000 | | | | | | | |
| 9-000-2-0241 | MPS-2 ¼" | | APK 2 L  VKL 500 | | | | | | | |
| 9-000-2-0243 | MPS-2 ¼" T | × | DA 450 L-DA 450 DA 850 L-DA 859 | × | × | | | | | |
| 9-000-2-0245 | MPS-2 ¼" PST | | DAF 450 DAF 850 DAF 1300  DAP 450 DAP 850 DAP 1300  MicroPress ® | | | | | | | |
| 9-000-1-0240-1 | MPS-2 ¼" | | KP 3.1 N KP 3.1 W | | | | | | | |

## Use of Model: MPS-2 ½"

| Number | Type | Seperate Housing | Models XL included | Stroke in mm | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 63 | 80 | 100 | 130 | 150 | 250 | 350 |
| 9-000-2-0250 | MPS-2 ½" | | DA 1700 DA 2100 DA 2800 | | | | | | | |
| 9-000-2-0252 | MPS-2 ½" T | | DA 3300 DA 4500 DA 5600 | | | × | × | × | × | × |
| 9-000-2-0254 | MPS-2 ½" PST | | | | | | | | | |
| 9-000-2-0251 | MPS-2 ½" | | DAF 1700 to DAF 5600 | | | | | | | |
| 9-000-2-0253 | MPS-2 ½" T | × | | | | | | | | |
| 9-000-2-0255 | MPS-2 ½" PST | | DAP 1700 to DAP 5600 | | | | | | | |

**TPC Controls**

Functions and components of the MPS-2 TPC control unit

- TPC process monitoring
  Force/displacement monitoring
  Signal conditioning instrument 9311 with Ethernet connection
- Attached potentiometer for displacement measurement
- Strain gauge force sensor with TEDS

- IO/NIO display:
  Audible signal
  RED/GREEN LED signal lamp
- Evaluation of the OK or NOK signal
- Stop and acknowledge function for NOK parts

- Preselection of the OK parts to be manufactured

- Stroke takeover in the BDC
- Adjustable press-in time in the BDC

- PLC with extension module
- TDE Display

| Number | Type | For presses with Valve size | Presses with stroke |
|---|---|---|---|
| 9-000-2-2605 | MPS-2 TPC 9311 | ¼" | 40 mm |
| 9-000-2-2606 | MPS-2 TPC 9311 | ¼" | 60 mm - 120 mm |
| 9-000-2-2607 | MPS-2 TPC 9311 | ½" | 40 mm |
| 9-000-2-2608 | MPS-2 TPC 9311 | ½" | 60 mm - 120 mm |