

FP240-Training

Technical Instruction



MAJA[®]

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SLICING

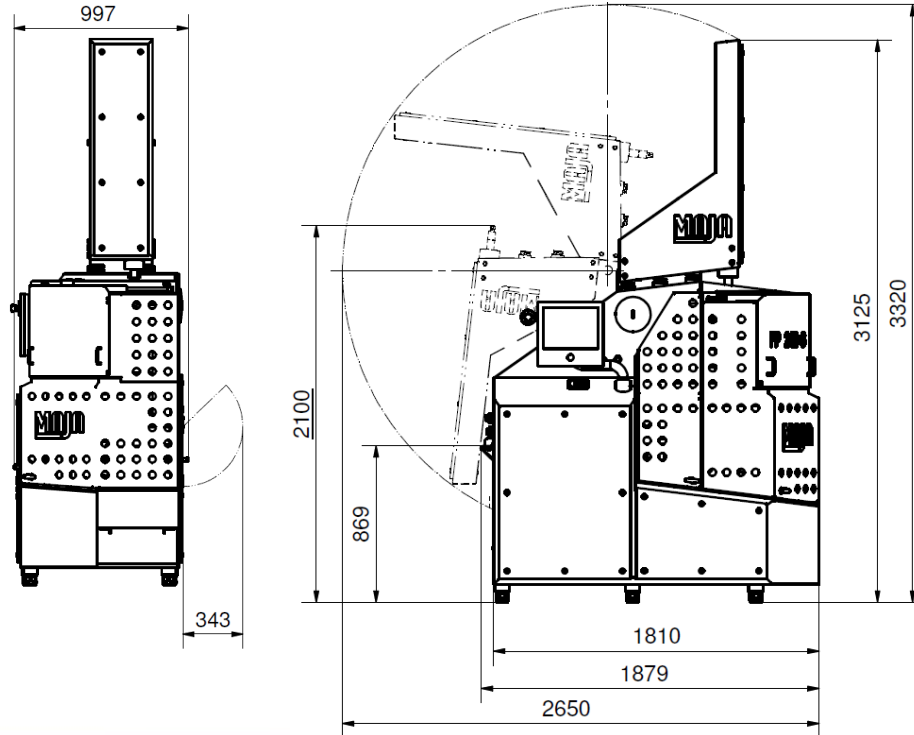
Overview of the machine



I. Technical data FP240-6



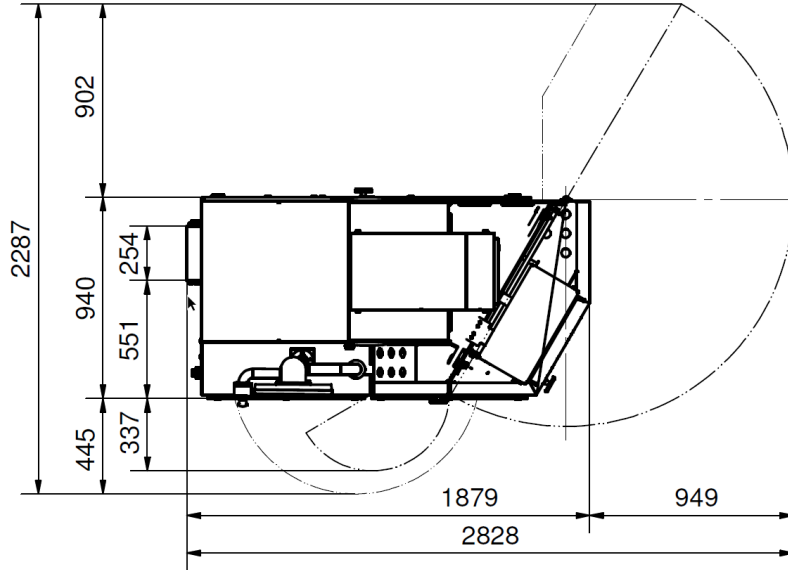
All measurements in [mm]
Transport height 2100mm



Overview of the machine



I. Technical data FP240-6



Consider the RCD!

m= 1500 kg	32 A	---
proj. footprint = 1,9 m ²	(Optional) Δn 300mA RCD In 40A Typ B Recommendation Siemens 5SM3644-4	p= --- bar
necessary surface load: 15 kN/m ²	P= ca. 17 kW	\dot{V} = --- l/min
Ground pressure: 2 N/mm ²	U= 380-460, V / Hz / Ph 50/60,3p,PE	no compressed air necessary
	Imax= 25 A	

Overview of the machine

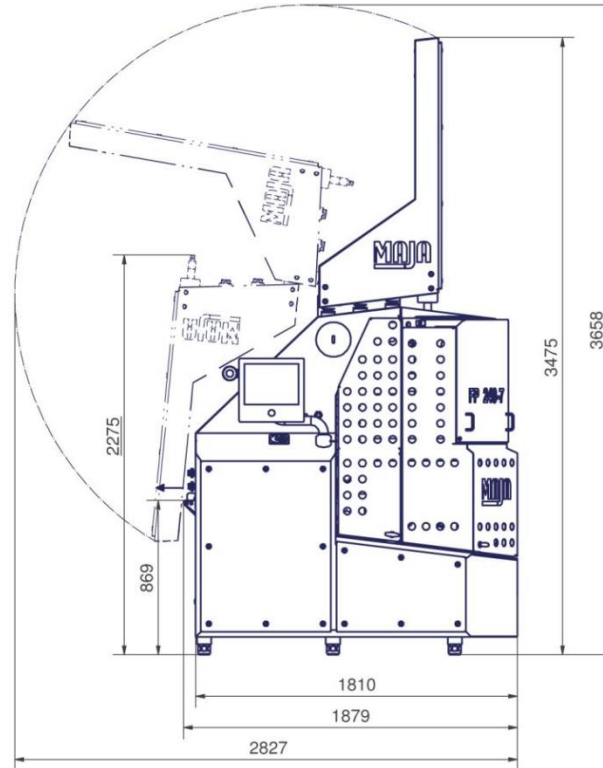


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I. Technical data FP240-7

All measurements in [mm]
Transport height 2275mm

FP240-7 only distinct in height.



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II. Raising the pressing unit

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Preparations:

- Attend for a solid and non-slippery ground.
- Grip and guide the wires only through the designated opening in the housing!
- Pay attention to not squeeze your hands on the handle of the conveyor belt.
- Pay attention to the Video

Tools:

- Wrench for the POM covering
- Box wrench Size 24 mm for the screws
- Ratchet + Size 17 mm wrench-socket for the side-covering
- Hexagon socket screw key (Allen key) Size: 6 mm



III. Aligning the machine

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Preparations:

- Screw the foots of the machines near to the minimum level.
(Deposit height should not raise to much.)
- Recommendation: Use a hand-fork-lifter to slightly lift the machine during the aligning of the machine.



Tools:

- Wrench size 72 mm for the foots of the machine
- Spirit level
- Hand-fork-lifter (For the aligning)



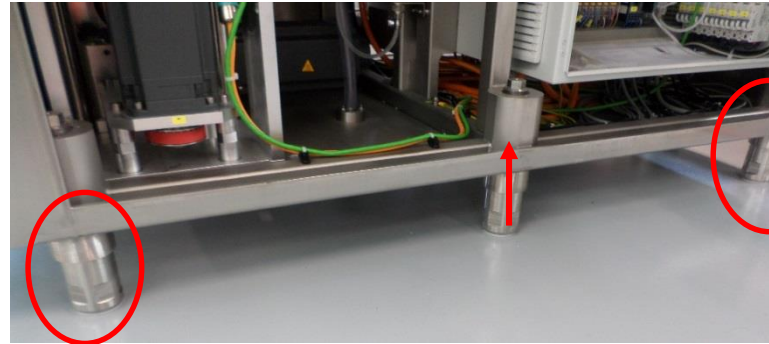
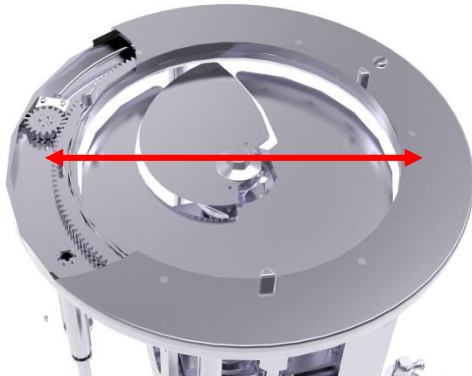
Overview of the machine



III. Aligning the machine



1. Lay the spirit level crosswise to the cutting plane on the standard drive.
2. The two feet in the middle should be screwed more inside than the others.
3. Level the machine with the feet in the corner.



Overview of the machine



III. Aligning the machine

1. Lay the spirit level lengthwise to the cutting plane on the standard drive.
2. Level the machine with the feet in the corner.



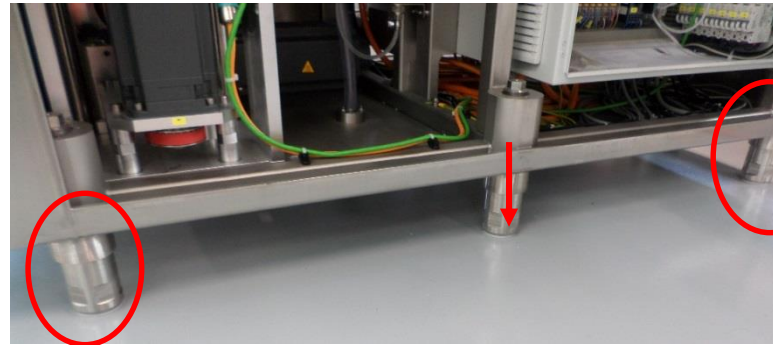
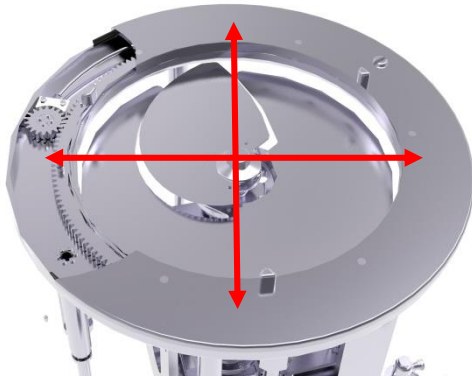
Overview of the machine



III. Aligning the machine



1. Repeat this, until the machine is correctly leveled in both directions.
2. Stabilize the machine with the two foots in the middle.
3. If all six foots have solid contact to the ground, the machine is aligned.



Components of the machine



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I. Entire machine

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Components of the machine

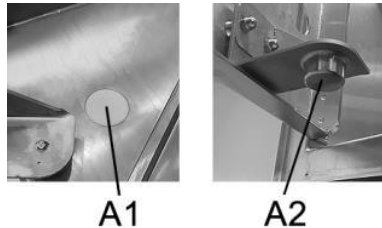
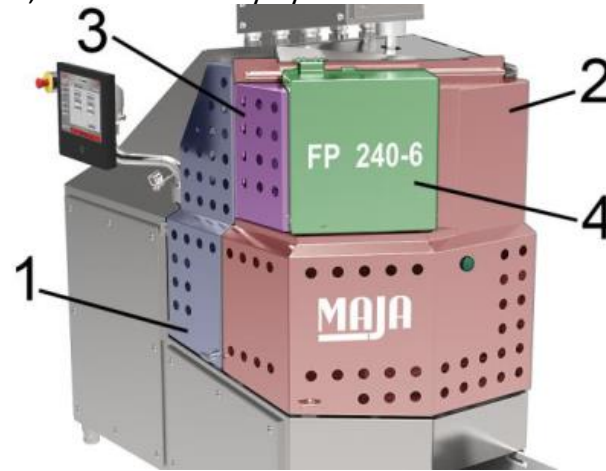


II. Doors

- Open the doors with the handle. (Swings out)
- Doors are observed with sensors.
Opening the doors leads the operating state of the machine to change to stopped or aborted. Open doors are signaled in the display.
- The feeding door can only be moved by software, not mechanically by hand.

Protection doors (Pos. 1, Pos. 2 und Pos. 3),
Feeding door (Pos.4)

A1 = Safety sensor
A2 = magnet (coded)



Components of the machine

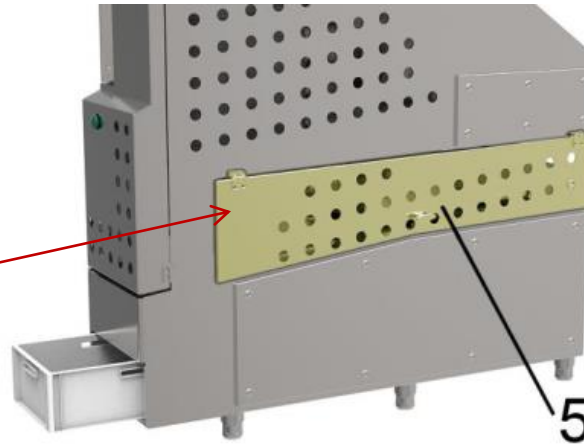


II. Doors

SLICING

- Open the door with the handle. (Swings up)
- Lock the door with the arm (left site)

Protection door (Pos. 5), opens upwards



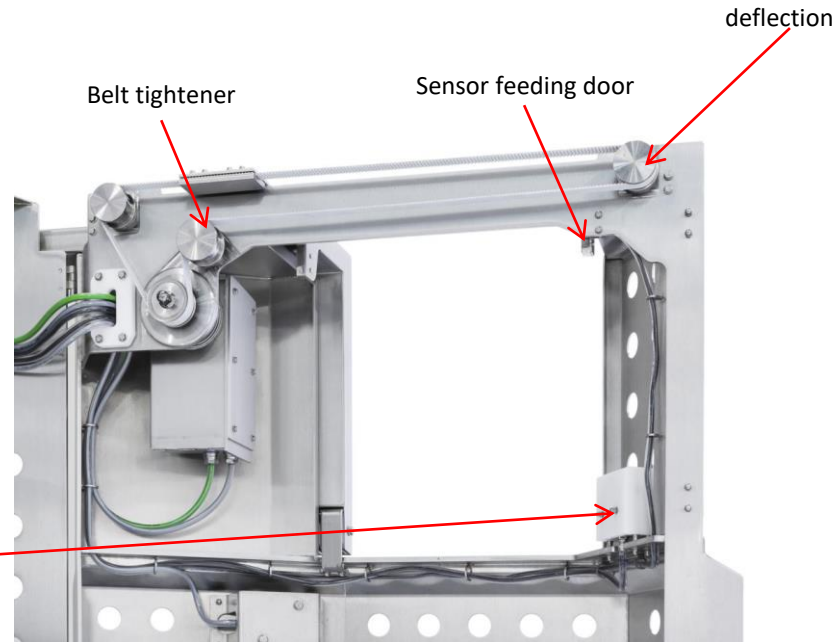


III. Feeding door



- The belt drive of the feeding door opens and closes the door.
- The closing is triggered by the green button on the front side of the machine.
- The belt drive moves over two deflections and the belt tightener.
- A magnetic-lock at the safety door is protecting the operator of injuries when the feeding-door closes. The magnetic-lock unlocks the safety door, when the feeding door is closing.

Magnetic lock at the safety-door

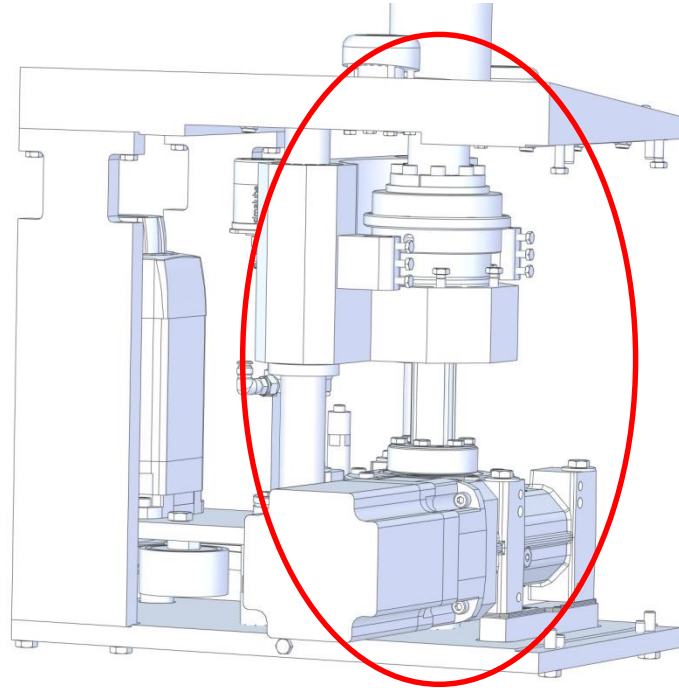




IV. Blade unit

- Servo-Motor
- Gear
 - Tightening torque 30 Nm
- Locking device
 - Tightening torque 30 Nm
- Blade shaft (Sphere-Wedge-Shaft)
- Brace with heavy-force-bearing
 - Lifetime lubricated
- Locking device „Clampex“
 - Tightening torque 25 Nm
- Reception tube of the plate-thickness-adjustment.

Function: Drive of the Blade





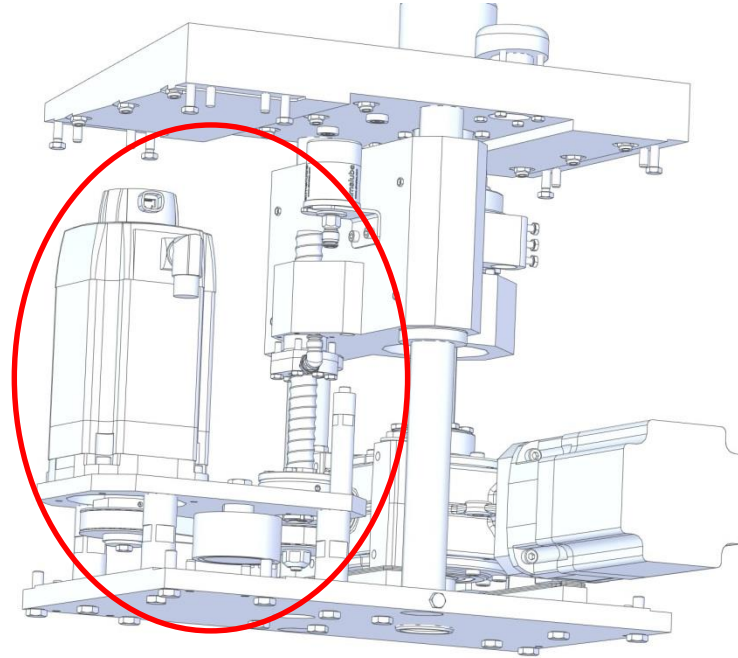
IV. Blade unit



Plate-thickness-adjustment

- Motor
- Drive wheel
- Tooth belt
- Belt tightener
- Driven gear
- Spindle (Height adjustment)
- Lubricator at the spindle

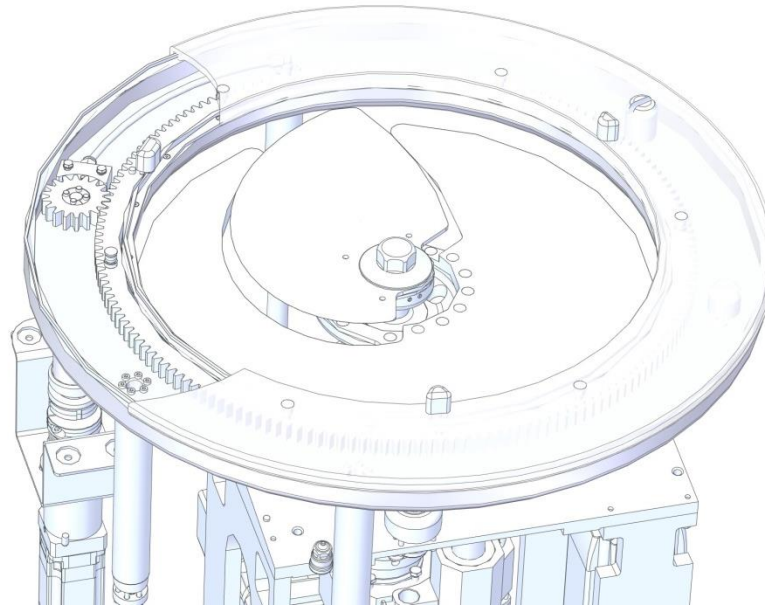
Function: Adjusts the thickness of the meat portions. (Weight)





V. Standard drive

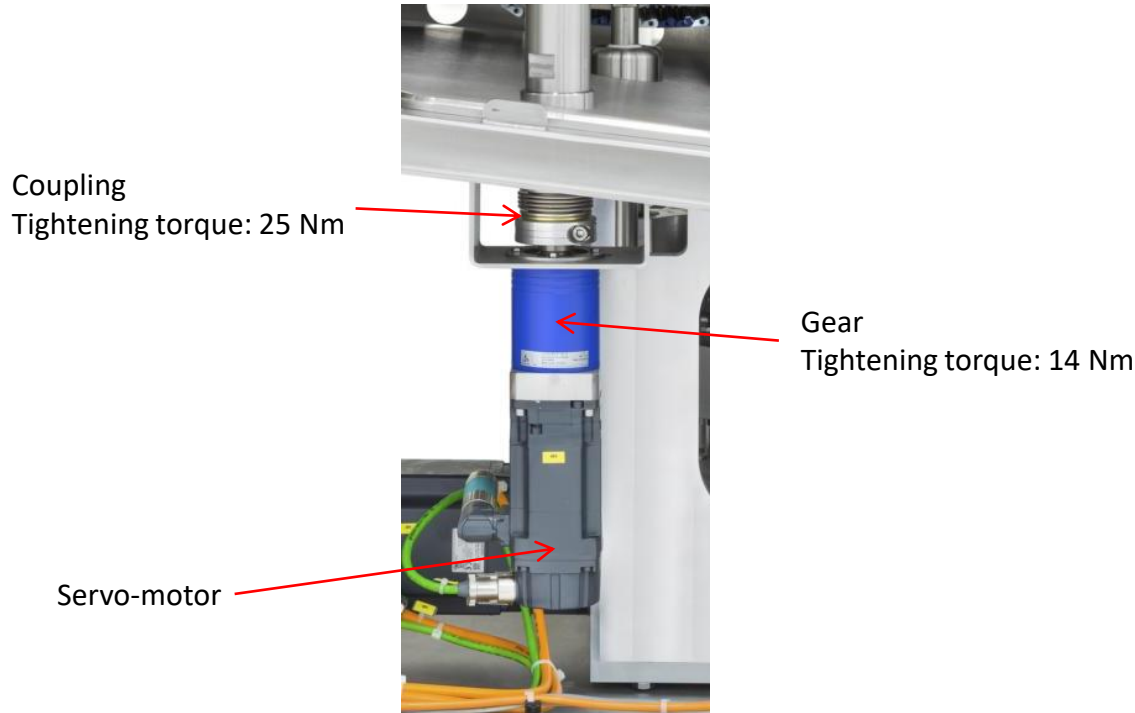
- Function: Turns the meat-part-drums to move the new meat-parts to the cutting position.



Components of the machine



V. Standard drive



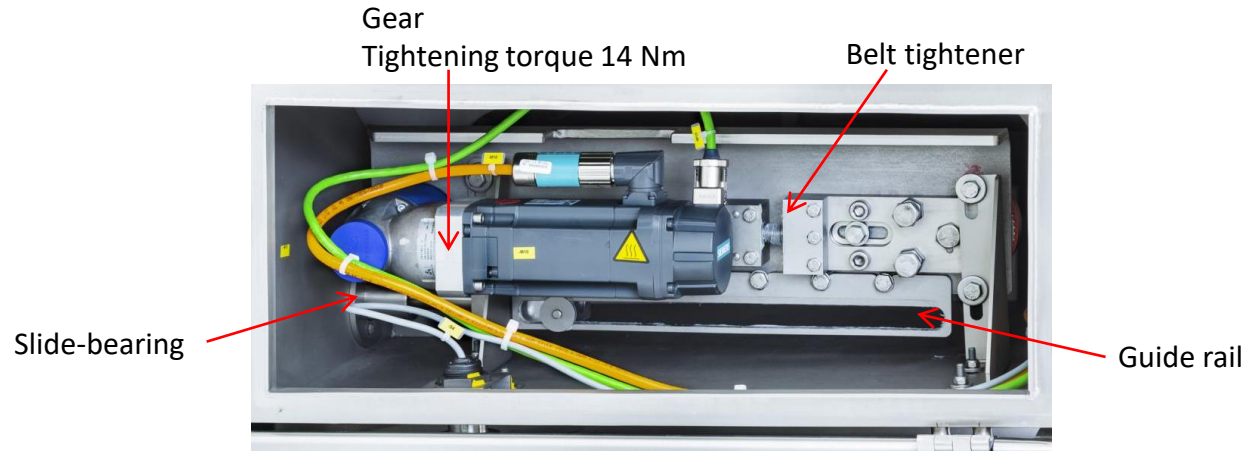
Components of the machine



VI. Slider



- Moves the pressing plate





VII. Belts

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Step-belt

- Used for shingled deposit of portions and for removing first and last cuts.
- The deflection in direction to the outfeed-belt is used to tighten the belt.
- The step-belt is driven by a servo motor.

Outfeed-belt

- Transport of the finished portions out of the machine.
- Adjustable but constant velocity.
(Asynchronous motor)
- The deflection in direction to the step-belt is used to adjust the running position of the outfeed belt and the distance between the belts.
- The belts should only be adjusted in upper end position.
- The distance between the belts should be 3 mm. (Measured at the top of the knobs.)





VIII. Pressing unit

- Tightening the belts.
Adjust the tension of the belt with a „Trummeter“ on the long side of the belt. (36-39Hz)
- The belt should not drain off. If necessary underlay at the upper belt pulley.
- The guide rails should only slightly touch and not clamp the aluminum block.
- If the aluminum block bounces during the movement, the guide rail is to far away.



SLICING



IX. Control cabinets/PLC

SLICING

Control cabinet

- Power supply is placed on X1 in the control cabinet
- Remote maintenance module (Optional): Communication interface for remote access.
- SPS Siemens S7-1500 Safety -> Handles the safety circuit. Additionally this is the connecting point of all sensors and the feeding door motor.
- IPC -> Industrial-PC includes the recipe-control and the HMI (Graphical user interface)
- All the fuses are placed in this cabinet.





IX. Control cabinets/PLC

SLICING

Remote maintenance module

- The remote maintenance can be released with a hardware-switch in the cabinet.



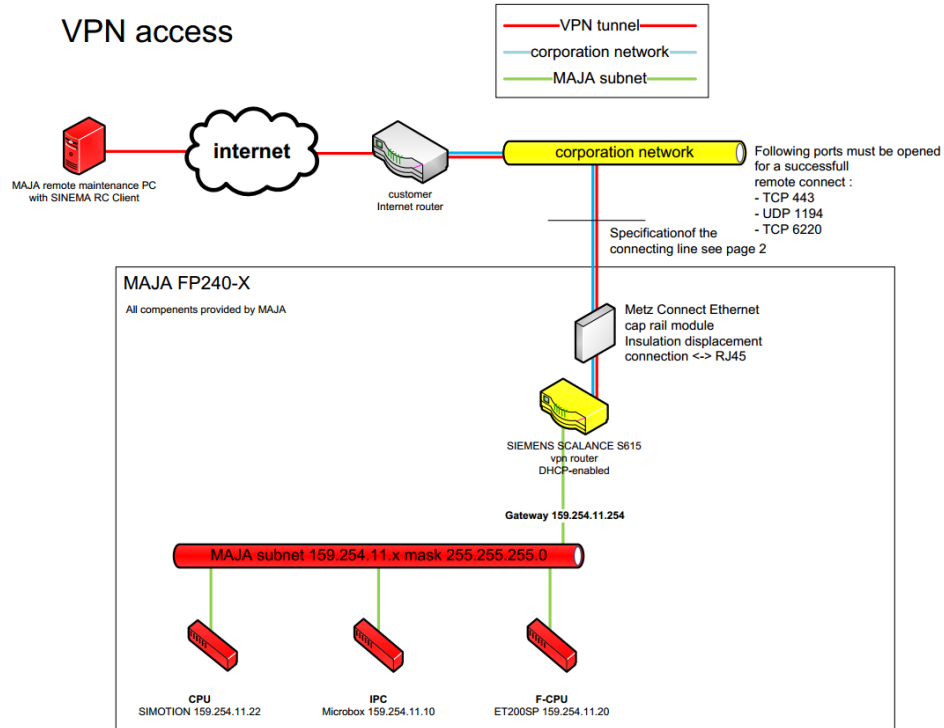
Components of the machine



IX. Control cabinets/PLC



Remote maintenance module



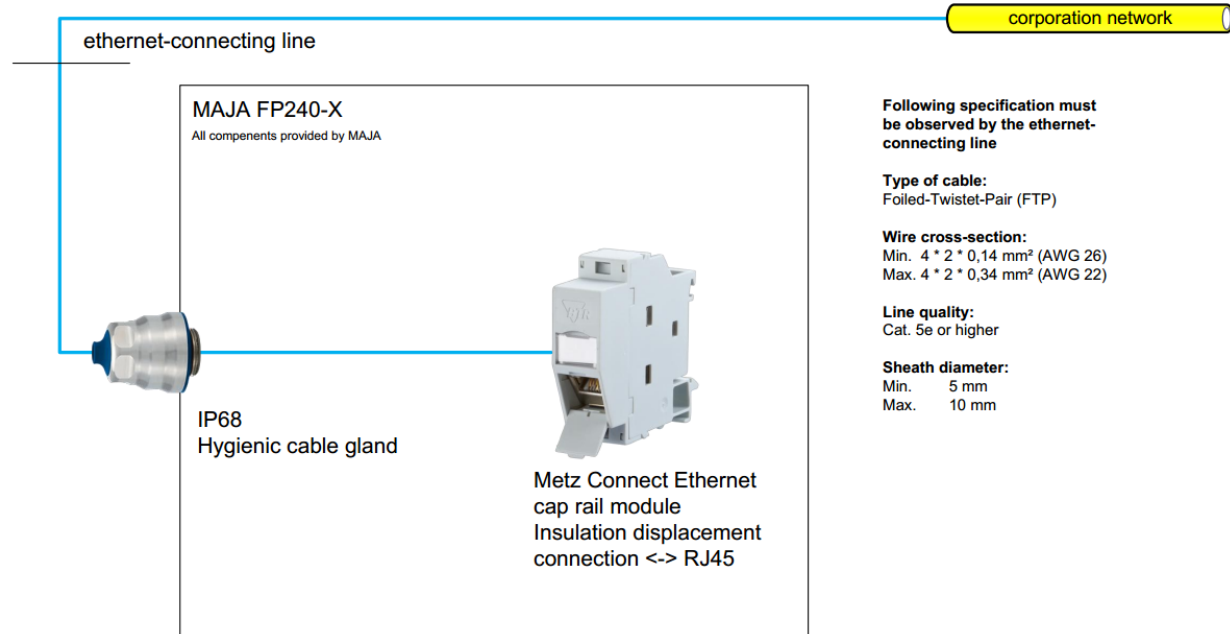


IX. Control cabinets/PLC



Remote maintenance module

Specification of the connecting line



Following specification must be observed by the ethernet-connecting line

Type of cable:
Foiled-Twistet-Pair (FTP)

Wire cross-section:
Min. 4 * 2 * 0,14 mm² (AWG 26)
Max. 4 * 2 * 0,34 mm² (AWG 22)

Line quality:
Cat. 5e or higher

Sheath diameter:
Min. 5 mm
Max. 10 mm



IX. Control cabinets/PLC

SLICING

Drive cabinet

- Siemens Simotion Control
Includes the main part of the software system.
- Connecting point of all servo-motors
- The plugs from the servo-motors are coded to prevent plugging at the wrong position. (See schematics)
- ID-plates of the motors are placed in the door of the cabinet.





X. Display/Interfaces/RFID



The display is the only input interface of the machine.

It fulfills protection class IP69K which means it is possible to clean it with pressure up to 28bar.

At the right side of the machine a USB- and a LAN-interface are placed (IP67).

The USB-Interface is designated to export/import the recipes from the machine to a USB-Stick.

The LAN-interface is designated to connect to the machine in case of maintenance/service.








X. Display/Interfaces/RFID

The RFID-area is placed in the middle below the display. (Blue LED)

With the RFID-Key you can get access to different authority-levels.
Inactivity (Not touching the display in any way) leads to reset the authority level after 2 min.

Key	Authority Level	Description
No key	User (view box empty)	Only has permission to load programs and produce
Black key 	Setter	Is additionally allowed to create programs
Blue key 	Customer Service/Technician	Is additionally allowed to use the manual operation menu
Red key 	MAJA Service/Technician	Has some additional options to change machine parameters and to reset the maintenance counter.

Components of the machine



X. Display/Interfaces/RFID



- Webserver Simotion
- Access via the LAN-Connector at the machine.
- Browser: 159.254.11.22
- User name: service
- Password: majamaja

The screenshot shows a web browser window with the address bar containing '159.254.11.22/index.mwsl#navi=diag-service'. The page title is 'SIEMENS Simotion D445-2'. The interface includes a navigation menu on the left with options like Home, Device Info, Diagnostics, Messages&Logs, Machine Overview, Manage Config, Settings, and Files. The main content area is titled 'Diagnostics - Service overview' and contains a table of signal statuses.

Signal Description	Ram	Knife	Portion_Thickness	PortionDrum	StepBelt	Outfeed_Belt	Press_Plate
Position control status	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Operational status	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Technological alarm at the axis	🟡	🟡	🔴	🟡	🟡	🟡	🟡
Cyclic drive interface active	🟢	🟢	🟢	🟢	🟢	🟢	🟢
Drive enable	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Power enable	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Actuator error	🟡	🟡	🟡	🟡	🟡	🟡	🟡
Status of axis motion	🟢	🟢	🟢	🟢	🟢	🟢	🟢



I. Lubrication

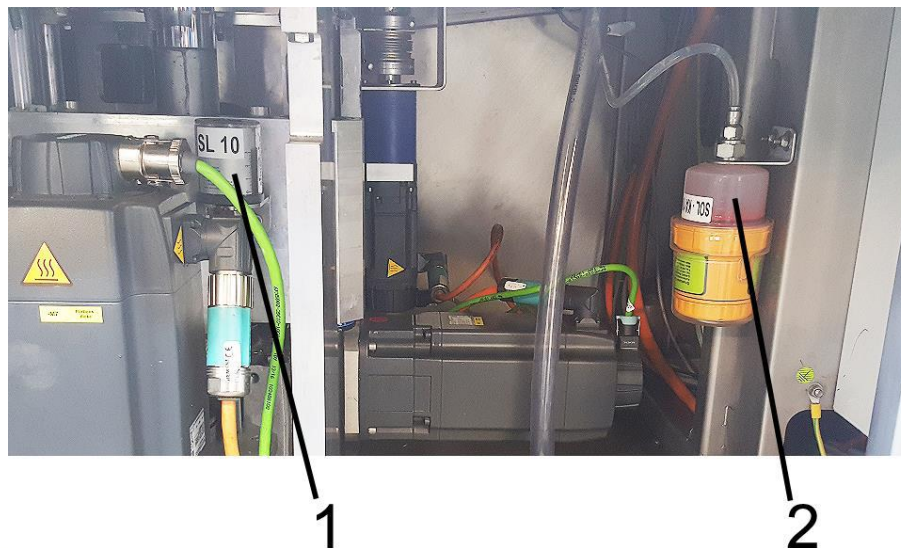
SLICING

In the machine are two lubricators:

Small one (Pos. 1) at the spindle of the plate-thickness-adjustment.

Big one (Pos. 2) at the standard drive.

You can check in the display when the need to be replaced.





I. Lubrication

You should NOT lubricate:
Pressing-rod and slider rod.

Reason: The rods are guided by slide-bearings.
Lubrication grease tends to get black by the abrasion
of the slide-bearing.
This is unhygienic and should not get in contact with
the product.



SLICING



II. Desiccant bag

SLICING

Display:

- Between the Display and the flange, a desiccant bag is placed.
- The desiccant bag sucks off humidity to protect the display contacts from corrosion.
- Needs to be replaced regularly.





III. Tension of the belt

SLICING

Pressing unit:

Adjust the tension of the belt with a „Trummeter“ on the long side of the belt (36-39Hz)

Slider:

Adjust the tension of the belt with a „Trummeter“ on the long side of the belt (~30Hz)

Belt may not drop of.

Feeding door:

Adjust the tension of the belt with a „Trummeter“ between belt-tightener and deflection.

(Need to be less than 20Hz)

Plate-thickness-adjustment:

Adjust tension of the belt with a „Trummeter“ on the long side of the belt (~30Hz)



IV. Check belt tightener and bearings

Belt tightener:

Belt tightener are installed in the feeding door and the plate-thickness-adjustment.

The play and the operating characteristics need to be checked.

Bearings:

Bearings are installed at several places, such as:

- Deflection of the Pressing unit
- Deflection of the conveyor belts
- Slider
- Drive shaft of the standard drive

The play and the operating characteristics of the bearings need to be checked.

Slide-bearings:

Slide-bearings are installed at several places, such as:

- Indexed belt
- Mechanical guide of the slider-rod
- Mechanical guide of the pressing-rod

The play and abrasion of the slide bearings need to be checked.



V. Wear and tear

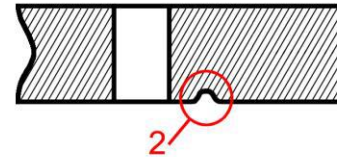
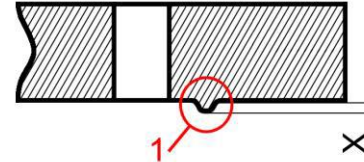
SLICING

Wear on meat part drums

Careless handling of the meat part drums can damage their surface.

Warps (Pos. 1)

- Meat part drums with Warps (Size > 0,5mm) need to be processed.
- Effects on the cutting result



Depressions (Pos. 2)

- Depressions, scratches, dents etc. in the meat part drum do not directly effect the cutting result.
- Unhygienic



V. Wear and tear

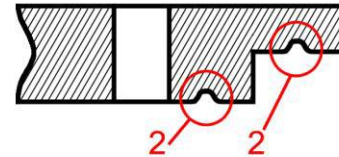
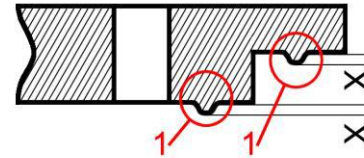
SLICING

Wear on intermediate drum

Careless handling of the intermediate drum can damage its surface.

Warps (Pos. 1)

- An Intermediate drum with warps (Size > 0,5 mm) needs to be processed.
- Effects on the cutting result.



Depressions (Pos. 2)

- Depressions, scratches, dents etc. in the intermediate drum do not directly effect the cutting result.
- Unhygienic

Pressing blocks with damages effect the cutting result and need to be replaced.



VI. Adjusting the sensors



Minimum sensor complexity,
States are visualized in the display.

- Protective doors + Intermediate plate
Magnetic sensors
- Feeding door
RFID Sensor
- Safety door
Magnetic lock



MAJA IO status

22/03/2018 13:59:56

PLC Safety PLC Customer-service

Inputs

Emergency stop	S6 NO1 loading door
Feedback loop mains contactor	S6 NO2 loading door
S2 NC intermediate plate standard	S8 NC protection door left
S2 NO intermediate plate standard	S8 NO protection door left
S3 NC intermediate plate special	S9 NC protection door front
S3 NO intermediate plate special	S9 NO protection door front
S4 NC protection door outlet conveyor	S11 NO close feeding door
S4 NO protection door outlet conveyor	Motor protective switch Q2
S5 NO1 loading door	Circuit breaker
S5 NO2 loading door	

Outputs

Release motor loading flap	Release line contactor
Lock loading door	Release motor modules

Back

Acknowledge

22/03/2018 13:38:38 TO-Message Knife: TO 40012 Dynamic limitations are being violated

