VE120…450B – XX

Electric film feed unit with Baumer NE 210 counter and stepper motor

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Operating instructions
Version 2.2 2023-12
Original operating instructions

1. About this document

1.1 Other applicable documents

All available documents for the product www. folienvorschub.de

Type	Product	Supplier	Content
NE 210	Counter	Baumer	Manual
PD4-C59xx-E-08	Stepper motor with integrated controller	Nanotec	Operating instructions

Table 1: Applicable documents for the product

1.2 Product version

This documentation refers to the following versions:
- Firmware version of the integrated drive FIR-v1650-B527540
- System for programming the drive PNDS 1.1.0
- Programme VE120SC_07_CW_CCW_Quickstop V.23-04

When replacing the motor, programme accordingly.
If a different firmware version is used, check whether a corresponding version of the documentation is available www.folienforschub.de

2. Safety

2.1. Safety instructions

General instructions

- These devices must be commissioned, operated and maintained in accordance with the information in these operating instructions. Any other use is not permitted without the written authorisation of the manufacturer and may result in harm to persons and damage to the complete machine or property.
- Every person involved in the maintenance, commissioning, operation and repair of the feed units must have read and understood these operating instructions, in particular, the “Safety” section. Alternatively, instruction can be provided by authorised representatives of the operating company.
- The operating company is recommended to obtain written confirmation of understanding of the safety information.
- It is the operating company's duty of care to operate the device only if it is in perfect condition.

Ensuring safety in the workplace

- Keep the working area and the floor around the device clean and free of oil, grease and material residues.
- Adequate lighting in the working area of the device.
- Use the device only at the intended location.

Ensuring electrical safety

- Disconnect the product from the power supply before carrying out maintenance or repair work.
- Always carry out a safety test after carrying out maintenance work on the wiring or electronic components.
- Always operate feed units with the protective earth conductor connected in the mains cable.
- If defects are detected, disconnect the feed unit from the power supply and block it from further operation. Repairs must be ordered immediately

Ensuring general occupational health and safety requirements

- Do not work on the device if you are tired, unfocussed or under the influence of medication, alcohol or drugs.
- Wear safety shoes to protect yourself from foot injuries in the event of falling objects.
- If necessary, wear protective gloves to protect yourself from hand injuries.
- Long hair must be tied back or a hair net must be worn to prevent injuries to the head as a result of being caught and wound up by moving parts.
- Wear tight-fitting clothing.

Safety markings and other instructions

- Observe the labelling on the product.
- Store the product in a cool, dry place, protected from UV light and corrosion. Ensure short storage times.

2.2. Intended Use

The intended use of the film feed units is the synchronised transport of PE protective films. The feed units are intended for attachment to ultrasonic welding machines.

The feed drive pulls the film from an unwind roller and pulls it between the sonotrode and the part to be welded. A spring-loaded idler roller on the unwinding side is used to keep the film taut and ensure horizontal guidance. A roller with an expanding core is used to wind up the used film.

Fig. 1 Film pulling

- Use in industrial and commercial environments
- Not for use in explosive or flammable environments
- Use in dry, dust-free rooms
- Permissible temperature range: 5° C to 40° C
- Use of PE film

2.3. Qualification of qualified personnel

Work on the product may only be carried out by qualified specialist personnel who can assess the work and recognise hazards. The qualified personnel must have knowledge and experience in handling electrical drive systems.

2.4. Safety equipment

The film feed unit must be integrated into the safety concept of the ultrasonic welding machine. The feed start must be integrated into the welding sequence in such a way that the operator can expect the movement and can adjust his behaviour accordingly.

The feed can be stopped using the on/off switch 1. An overrun is available.

Optionally, a quick stop can be triggered by switching off an enable signal from the ultrasonic welding machine.

Fig. 2: Mains switch

2.5. Residual risk

⚠ CAUTION

Risk of injury at the feed points of the rewinder.

- Avoid proximity to the feed point during the film cycle or test run.
- Wear tight-fitting clothing. Tie your hair back or wear a hairnet to prevent head injuries.

3. Additional Information

– Contact us for technical questions ➔ Info@folienvorschub.de
– Accessories and spare parts ➔ www.folienvorschub.de

4. Product overview

4.1. Scope of delivery

The film feed unit can be supplied in the following control versions and film widths:

Type/designation	Film widths
VE120B	20 mm -120 mm
VE160B	20 mm -160 mm
VE200B	20 mm -200 mm
VE250B	20 mm -250 mm
VE300B	20 mm -300 mm
VE350B	20 mm -350 mm
VE400B	20 mm -400 mm
VE450B	20 mm -450 mm

The feed units are designed for different film widths. The film must always run in the centre of the feed shaft or deflection roller!

Integrate control unit
(standard version) - all operating elements are located on top of the rewind drive.

Fig. 3: VE120-B rewinding unit

External control unit
(in separate cast housing)

Fig. 4: External control

Without control unit
(control from the ultrasonic welding machine)

Fig. 5: VE120B without control unit

From size VE300B, the machines are supplied with an additional support on the drive axle.

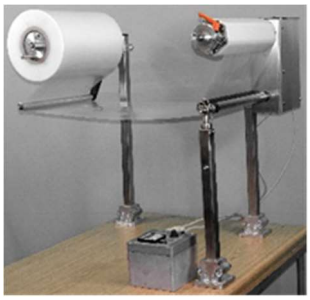


Fig. 6: VE300B-K4-EX

The following components are included in the scope of delivery:

- Frame parts for installation or attachment to the ultrasonic welding machine
- Feed drive with rewinder
- Unwinding unit
- Operating instructions.

4.2. Function

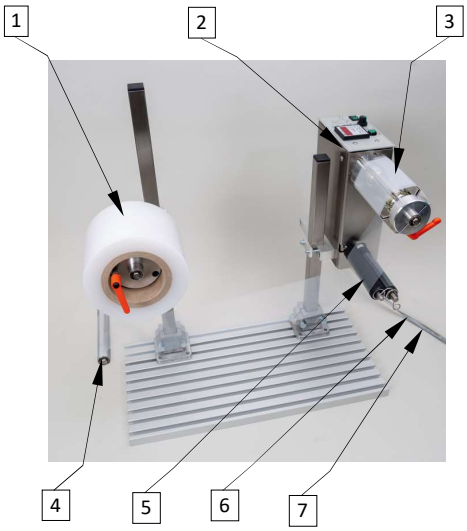
The feed drive pulls the film from an unwind roller and pulls it between the sonotrode and the part to be welded. A spring-loaded idler roller on the unwinding side is used to keep the film taut and ensure horizontal guidance. A roller with an expanding core is used to wind up the used film.

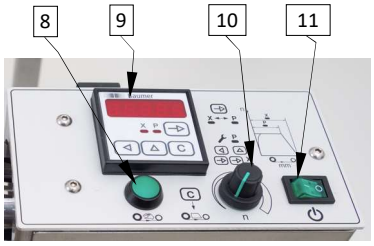
Special features:

- A brushless DC servo motor with integrated controller (stepper motor) is used as the drive. No wear of carbon brushes.
- The force transmission to the feed roller and the film rewinder occurs by means of a 3 mm round belt. The tension of the round belt limits the drive force.
- The round belts are the only easily replaceable wearing parts.
- The round belt between the feed roller and the rewinder works as a sliding clutch. The pre-tension of the belt determines the tensile force during rewinding. Different belt lengths are available.
  Long belts for thin, narrow film or low tensile force.
  Shorter belts for thick, wide film or high tensile force.
- Expanding core for coreless rewinding of the used film.
- Unwinding unit is equipped with a spring-loaded rocker arm/brake combination for constant film web tension.

4.3. System overview

4.3.1. Product structure





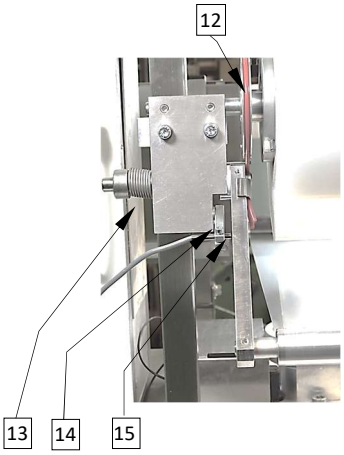


Fig. 7: Components

(1) Unwinding unit
(2) Rewinder drive
(3) Rewinder with expanding cor
(4) Deflection roller rocker arm
(5) Pinch roller
(6) Power cable
(7) Control cable
(8) Button free feed
(9) Counter
(10) Winding speed potentiometer
(11) Mains switch
(12) Belt brake
(13) Torsion spring
(14) Sensor holder
(15) 4 mm inductive sensor (optional)

Items 14 and 15 are not included in the scope of delivery (optional)!

4.3.2. Internal components

(16) Terminal Output relay for function query. (not wired on delivery)
(17) Nanotec PD4-C5918M4204-E-08 electronic motor
(18) RS-25-24 MEAN WELL switching power supply

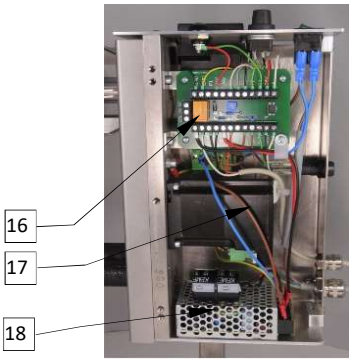


Fig. 8: Electrical components

(19) Drive belt 1 from the motor to the drive roller serves as overload protection)
(20) Drive belt 2 works as a sliding clutch from the drive shaft to the expanding core. The length of the belt determines the rewinding tension of the waste film.

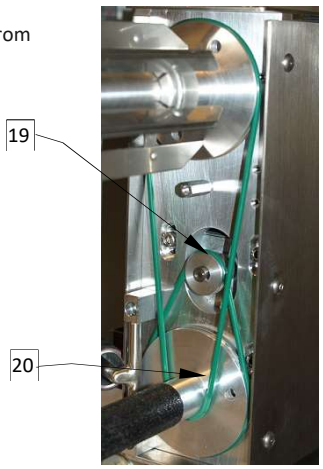


Fig. 9: Belt guide

4.3.3. Counter control

The feed step is controlled by a preselection counter. After the start signal is applied, the motor is enabled until the preselected path is reached.

5. Transport

⚠ CAUTION

Unexpected and unhindered movement of components.
The thrust ring from the rewinder and the core holder (called bobby core in the following text) on the unwind can slip off the shafts. This can lead to damage to the mechanics and contusions of body parts.

- Move the pinch roller of the rewinder with spring clip into the pressed position.
- Clamp the thrust ring to the expanding core and bobby core.

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1. Take the product weight into account ➔ 4.4 Technical data.
2. The film feed unit is supplied packaged.
3. If the transport packaging is defective, check the film feed unit. Report any defects to the transport company and the manufacturer immediately.

6. Assembly

6.1. Mechanical assembly

⚠ CAUTION

Risk of injury from falling components.
Parts can fall on your feet and cause injuries.
Bring moving mechanical parts into a safe position.

Before commissioning the film feed unit, the parts removed for transport must be refitted.

A visual check for loose connections must be carried out. Fastening screws may have to be retightened.

The unwinding and rewinding drive must be firmly attached to the ultrasonic welding machine and aligned with each other so that the film can be wound up without running.

6.2. Electrical installation

⚠ WARNING

Risk of injury from electric shock.

- When working inside the device, the connecting cable must be disconnected from the mains.
- Observe IEC 60204-1/EN 60204-1.
- Work inside the appliance may only be carried out by a qualified electrician.

The mains cable must be connected to an earthed socket with a properly installed protective earth conductor or to the 230 V AC machine control unit with protective conductor.
In the standard version, the control input of the machine must be connected to a 24 V DC, 8 mA control output of the ultrasonic welding machine.
In the “potential-free start input” version, the control input must be connected to a potential-free relay 24 V DC 8 mA; the film feed unit starts when the control input is short-circuited. This can also be done using a limit switch.

7. Operating and display elements

The film feed unit is operated using the following controls:

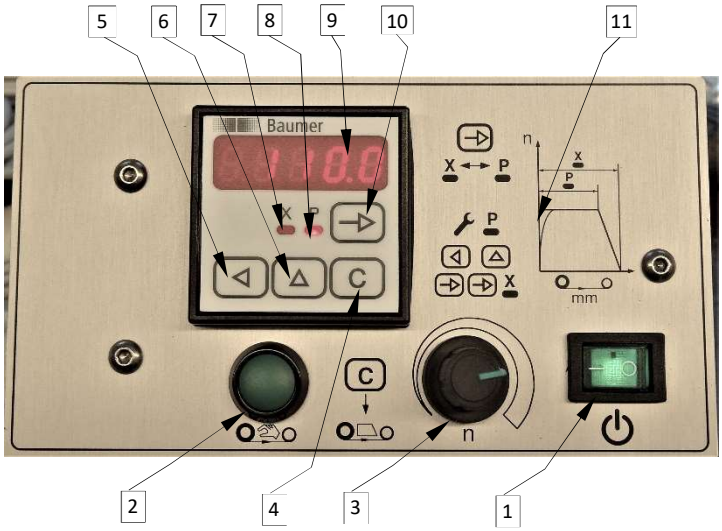


Fig. 10: Operation

(1) Mains switch
(2) Free feed button (jogging)-independent set value
(3) Potentiometer for regulating the film speed
(4) Button for starting the feed unit (reset counter) when pressing the
(5) button for selecting the entry point
(6) Button for increasing the numerical value
(7) LED X Actual value display
(8) LED P Set value display
(9) Display
(10) Button for switching the display between X and P
(11) Pictogram for setting the set value

The counter works in the levels: Operation and programming. It is pre-programmed for the application and the device is automatically in the operating level when the operating voltage is switched on.
The following functions are possible:

- The feed path (set value) can be set when the ‘P’ LED lights up. When the ‘X’ LED lights up, the ACTUAL value is displayed.
- The arrow key -> is used to switch between the set value input (LED P) and the actual value display (LED X), or is used to acknowledge the configured set value after the change.
- ◅ button is used to select the digit to be changed in the set value menu.
- Δ button to increment the selected digit.
- To set further digits, repeat steps 2 and 3.
- Confirm the entered parameter with the -> button and press again to switch to the actual value display (LED X).
- If there is no acknowledgement within 15 seconds, the previous set value is retained.

8. Operating software

No operating software is required for the film feed unit in the version described.

9. Operating the machine

9.1. Film loading

⚠ CAUTION

Risk of injury due to unexpected movement of components.

- Ensure that the start input on the ultrasonic welding machine is not activated.
- Switch off the mains switch if necessary.

⚠ CAUTION

Risk of injury due to drawing in on winding elements

- Avoid proximity to the draw-in points during the test run. Wear tight-fitting clothing. Tie your hair back or wear a hairnet to prevent head injuries.

Insert the film as shown in the schematic representation.

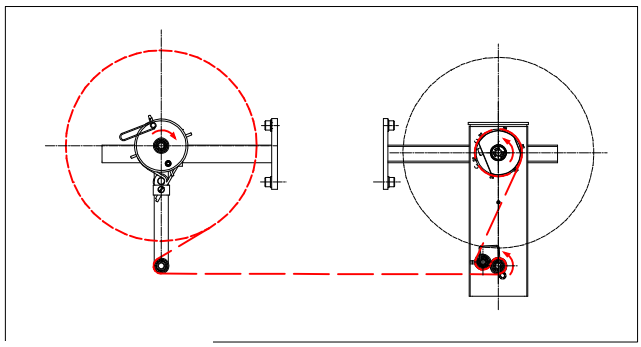


Fig. 11: Film run

The feed button (jogging) can be used when inserting the film. The drive runs as long as the button is pressed.

Tensioning the film roll

The unwinding unit is equipped with a torsion-sprung belt brake [1]. The film is kept under constant tension via the deflection roller with the spring-loaded swivel arm. When the film is pulled off, the brake reduces the tensile force depending on the deflection of the swivel lever. The tension force can be adjusted using the torsion spring [2]. When the film ends or tears, the swivel arm rotates back to the stop. An optional sensor can be used to detect the position of the swivel arm and thus the end of the film or a film tear.

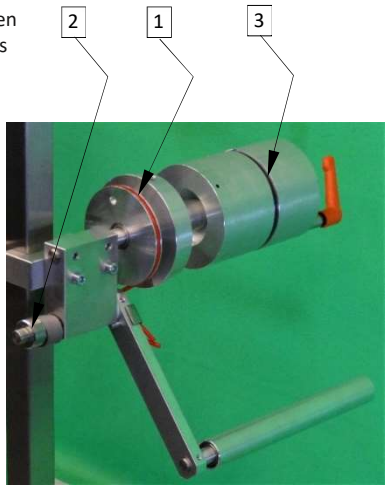


Fig. 12: Unwinding unit

The film roll is attached to the bobby core [3].

The clamping lever [4] ensures the tensioning of the film roll on the bobby core and the functioning of the belt brake.
The stud bolt [5] is used to clamp the bobby core onto the unwind roller, which can be used to optimise the sideways movement of the film web.

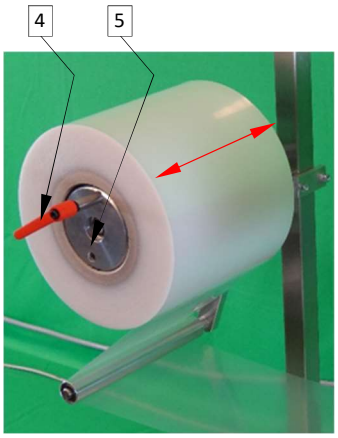
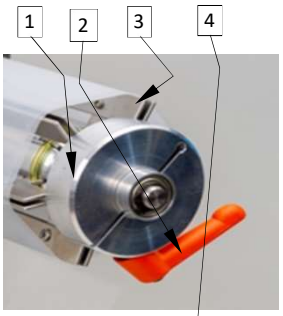


Fig. 13: Roll on bobby core

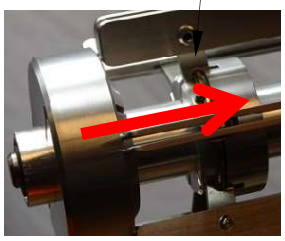
The film is pulled by the feed unit. The pull roller [7] pulls the film. The swivelling pinch roller [8] is used to increase the wrapping angle and improves the pulling force and film run thanks to the special bearing. To insert the film, the wire bracket [9] must be unhooked and the pinch roller swivelled down.
Before loading the film, the expanding core must be spread open.
The film is placed on the bobby core [6], fixed in place with the wire tip and wound on. The wire bracket must then be reattached.

Fig.14: Feed with rewinder

The expanding core is formed by slats [3], which are guided by tabs [4].
The thrust ring [1] is fixed in place with the clamping lever [2].



To wind up the film, the thrust ring is pushed in the direction of the drive and clamped, the slats are spread.



To remove the wound film, release the clamp and pull the thrust ring off the shaft. The slats collapse and the film can be easily removed.

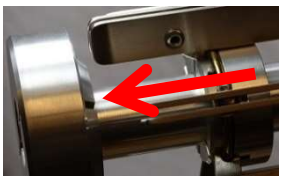


Fig.15: Expanding core

9.2. Programming the feed step

To use the film feed unit, the feed step must be set according to the part to be welded with the ultrasonic welding machine.
To do this, programme the counter according to the procedure described in ➔ point 7.

10. Help in the event of faults

The film feed unit has a simple and robust design. After longer running times, the belts may become worn or dirty. The following faults may occur:

Diagnosis	Reason	Action
Feed drive does not respond	• Fuse blown • Power supply failure • Mains switch off	• Replace fuse • Check power supply • Switch on mains switch
Remote control does not respond	• Start signal missing	• Check start signal
Feed path not correct	• Incorrect programming • Belts have slippage	• Correct path programming • Check the belt
Film runs crooked	• Unwind roller is not aligned	• Correct position of unwind roller
Film is sagging	• Deflection roller suspension faulty • Roller slips on the unwinding core	• Adjust torsion spring • Check clamping
Film tension too high	• Round belt brake on the unwinding unit is faulty	• Check the belt tension

11. Maintenance and inspection work for operators

⚠ Caution

Risk of injury due to unexpected movement of components.

- Ensure that the start input on the ultrasonic welding machine is not activated.
- Switch off the mains switch if necessary.

The components of the film feed unit are largely maintenance-free.
The following work is recommended to ensure perfect handling and functionality of the device:

- All screws and connecting elements must be checked regularly to ensure they are tight. Loose screws or parts must be re-fastened.
- Regularly remove dirt and dust from the mechanical components.
- Lubricate the bearing points with a drop of oil.
- If necessary, tighten the round belt of the unwinding brake ➔ Fig. 6 pos. 1.
- Adjust the torsion spring ➔ Fig. 6 pos. 2 according to the desired film tension.

12. Maintenance work Qualified personnel

⚠ WARNING

Risk of injury from electric shock.

- When working inside the device, the connecting cable must be disconnected from the mains
- Observe DIN EN 60204-1.
- Work inside the appliance may only be carried out by a qualified electrician

The film feed unit is equipped with ventilation gaps on the top and bottom cover. It should be used in an environment that is as dust-free as possible. We recommend checking the interior and blowing out any dust after long periods of operation.

13. Decommissioning and disassembly

The individual assemblies may only be dismantled and scrapped at the end of their service life by specialised personnel qualified to carry out these operations.
Dismantle the drive system.
Allow the product to cool down to room temperature.
Disconnect electrical installations.
Remove the attached add-on element.
Remove attached accessories.
Remove the fastening elements.
Observe the transport instructions ➔ 5 Transport.
The individual components must be separated into

- Scrap steel
- Non-ferrous metal
- Oil-contaminated parts (e.g. hydraulic cylinders)
- Electrical scrap
- Plastics

and to be disposed of accordingly.

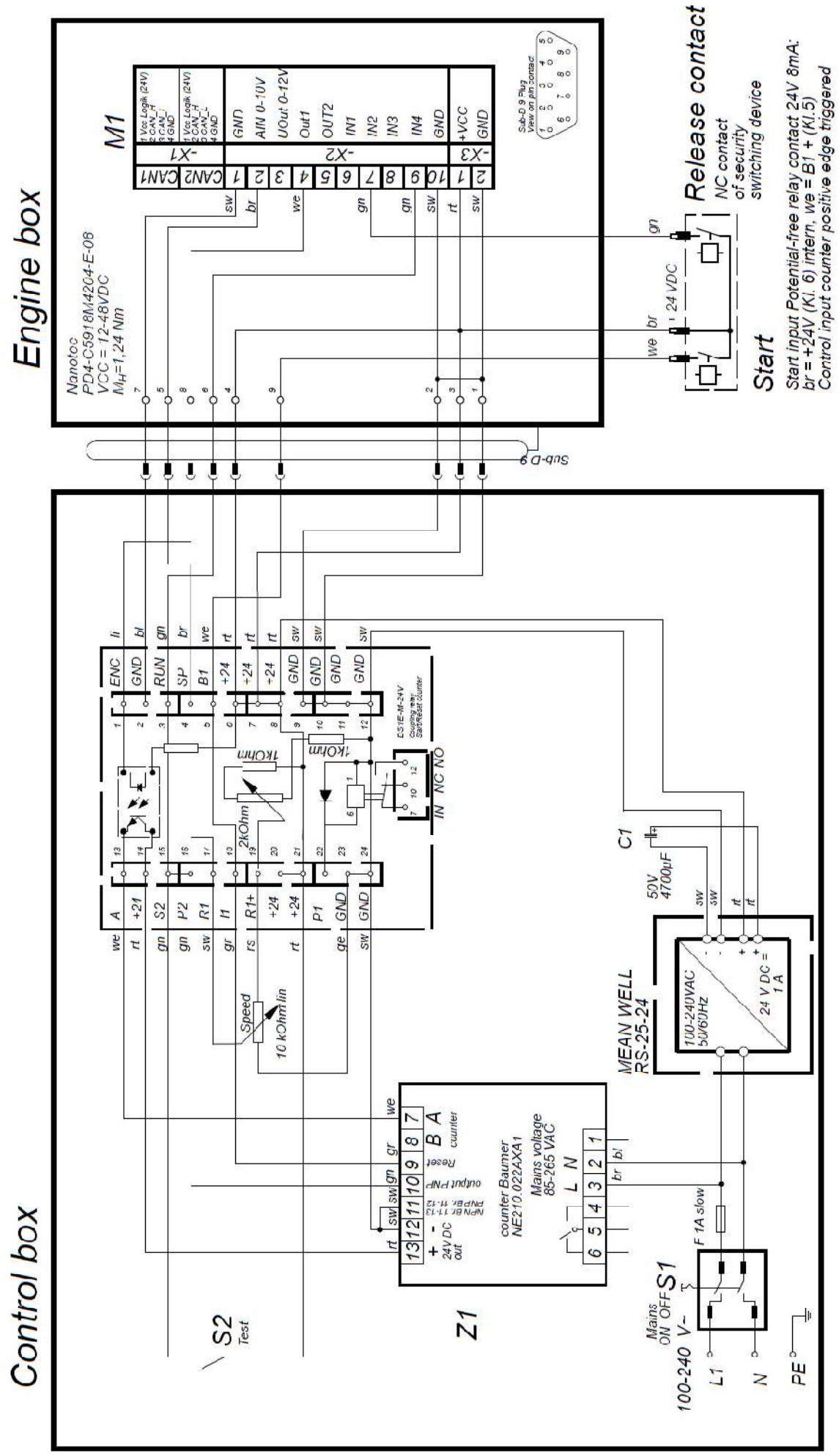
14. Technical data

14.1. Control

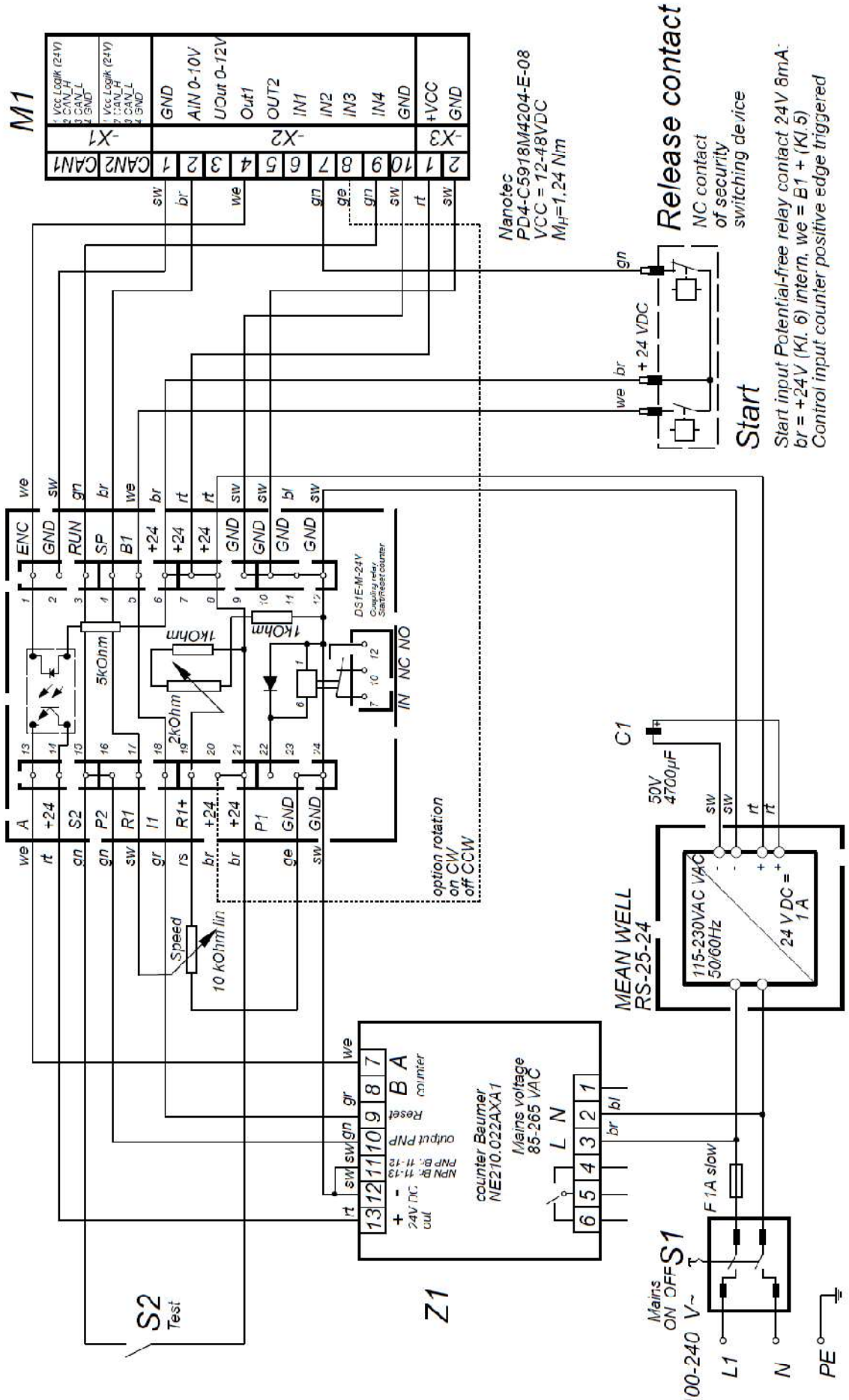
Type	VE70B, VE120B …… VE450 B
Feed control	Preselection counter counts the encoder pulses of the motor
Start input	Positive edge of the signal switching - Potential-free relay contact, push-button - Inductive sensor, - 24 V external voltage (PLC output)
Drive	Brushless DC servomotor with integrated controller (stepper motor) - NEMA 23
Feed speed	Continuously adjustable via potentiometer
Feed path:	Adjustable from 0.1 mm to 9999 mm Repeat accuracy less than ±0.4 mm
Power supply	100 - 240 V AC 26 W switching power supply 24 V DC Overload and short-circuit protection
Power consumption	Max. 32 W
Film width depending on type	20-70/ - 120/ - 160/ - 200/ -250/ - 300/ -350/ - 400/ - 450 mm Rollers with inner core diameter 3" = 76.4 mm

14.2. Connection diagram

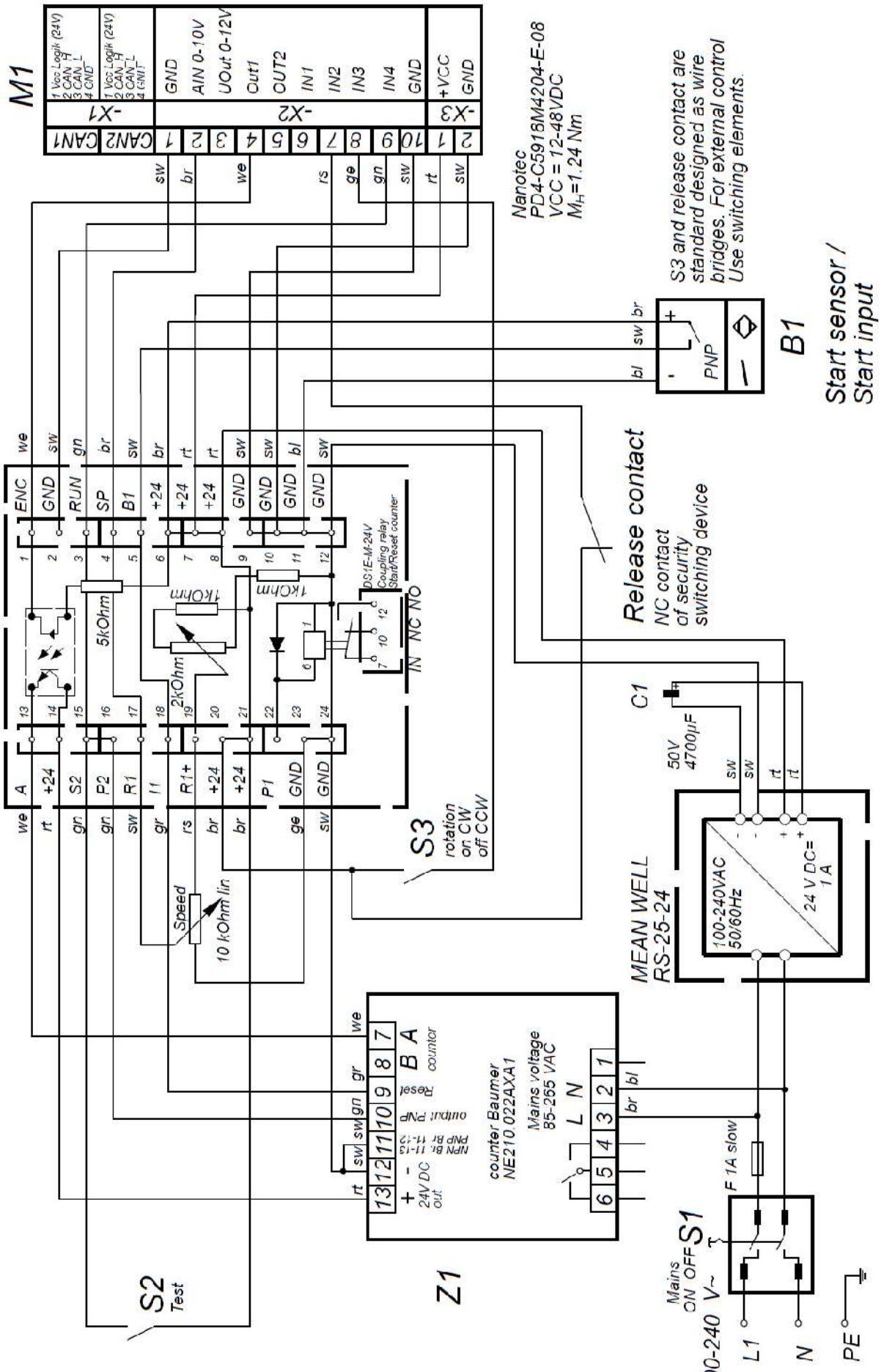
14.2.1. Connection diagram with external control box



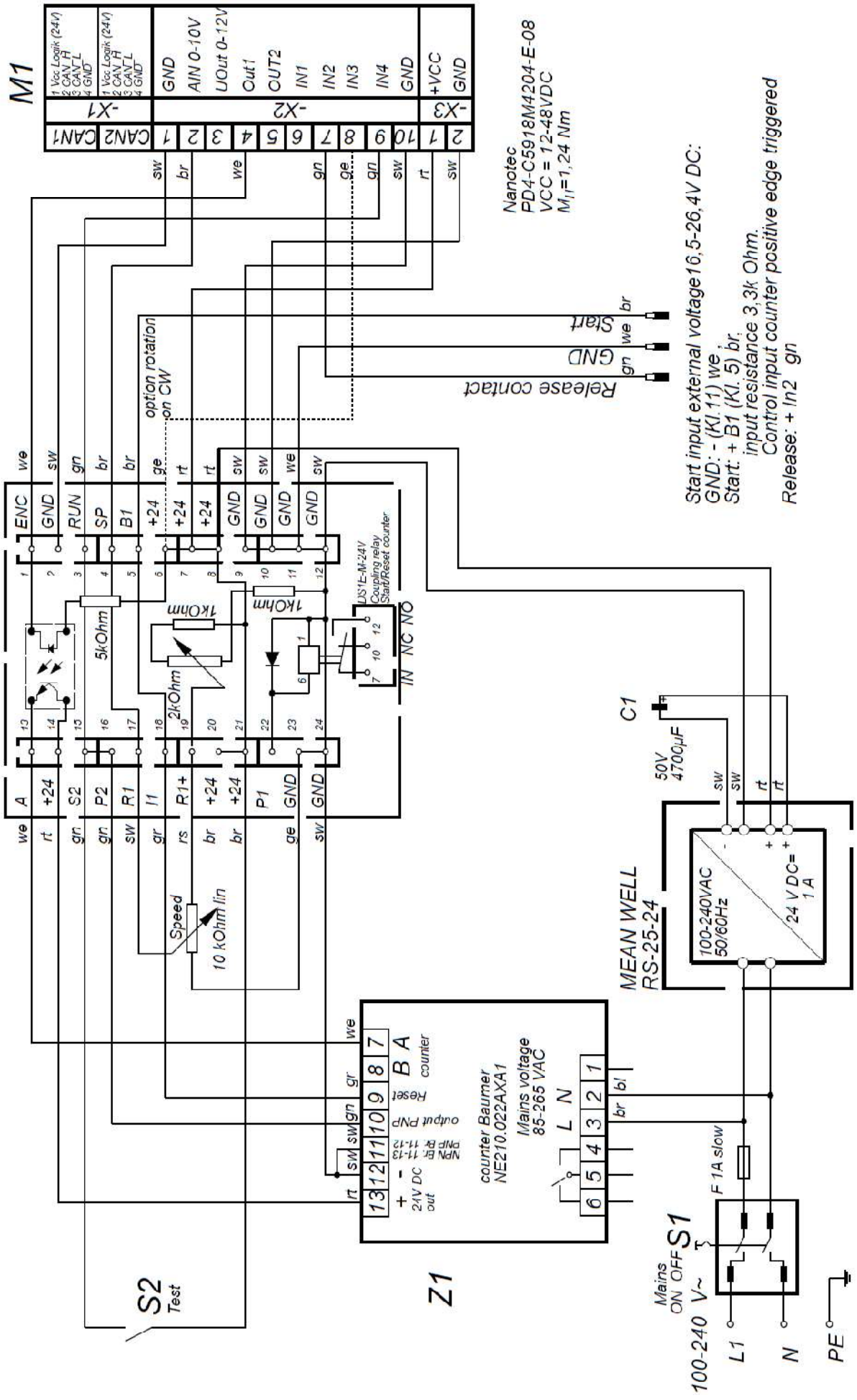
14.2.2. Start input – Potential-free relay contact



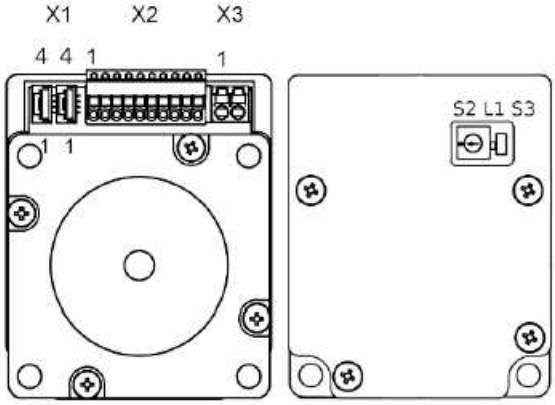
14.2.3. Start input – Inductive sensor



14.2.4. Start input – 24V DC external voltage



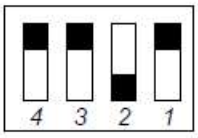
Setting CAN



L1 Power-LED
S2 Node-ID Baud rate
S3 DIP switch for 120 Ω
termination for CAN- Bus On
programming:
S2 = 0 Node-ID 127 (Objekt 2009h Standard)
Baud rate 1 MBd fixed
others depending on the application
S2 = 1 Node-ID 1
baud rate 1 MBd fixed
->
S2 = 7 Node-ID 7
baud rate 1 MBd fixed
S2 = 8 Node-ID Objekt 2009h
Baudrate Objekt 2005h
S2=
9 - F Node-ID Hex coding switch -8
Baud rate Objekt 2005h

Setting DIP-switch

DIP Einstellung
1 OFF
2 ON
3 OFF
4 OFF

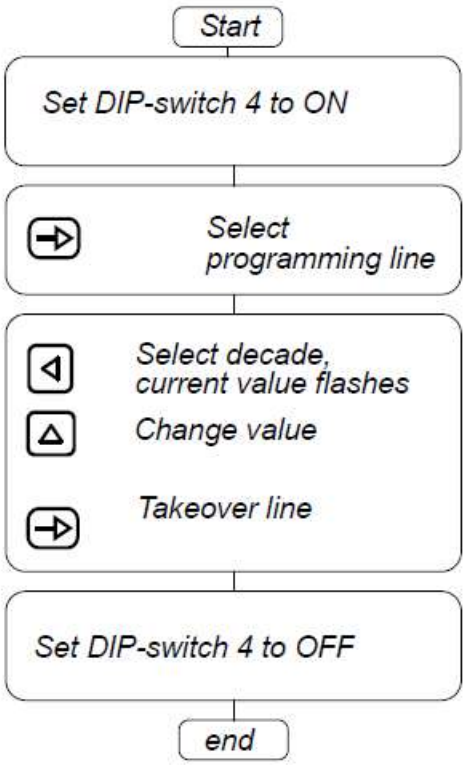


Off
On

Programming mode

current meter reading = like last value
preselection value = like last value
Scaling factor = 3,2480

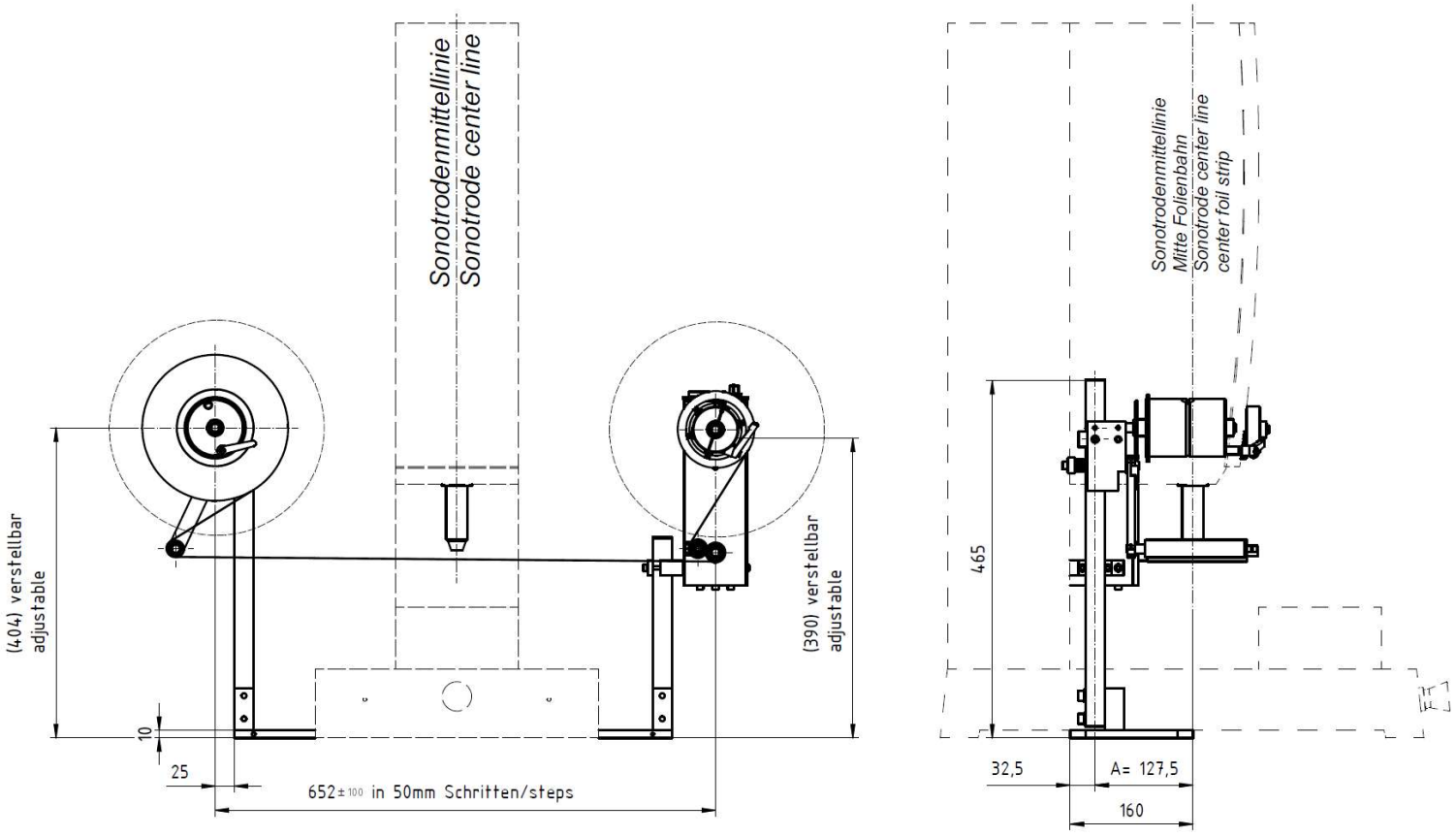
Programming field PRO 1
1= 1 Decimal point 9999,9
2= 0,25 Pulse signal time in seconds*
(DIP-switch 2 activates pulse
contact of continuous contact)
3= 0 Counting mode*
4= 1 Accept preset value
5= 0 Function enabled in operating mode*
*6= 0*Reset key, function enabled*
in operating mode
7= 1 Reset input function
8= 0,0 Start count value*
9= 0 Time scale and resolution*
10= 0 Time delay relay cycle*
11= 1 Output signal logic (inverted)
12= 0 Output signal function*
**= Factory setting*

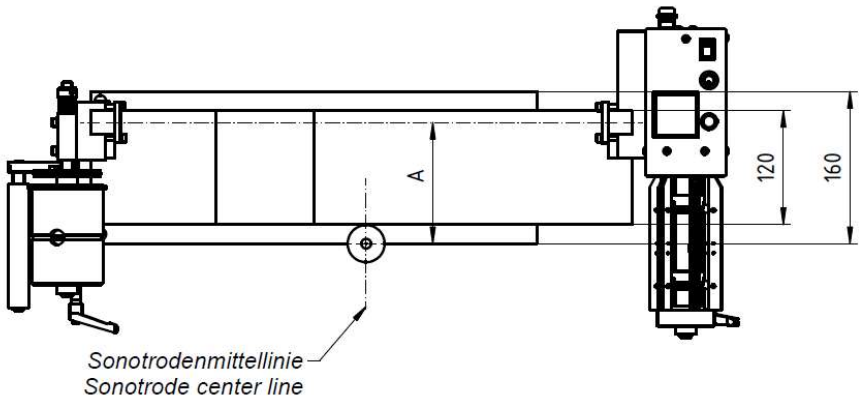


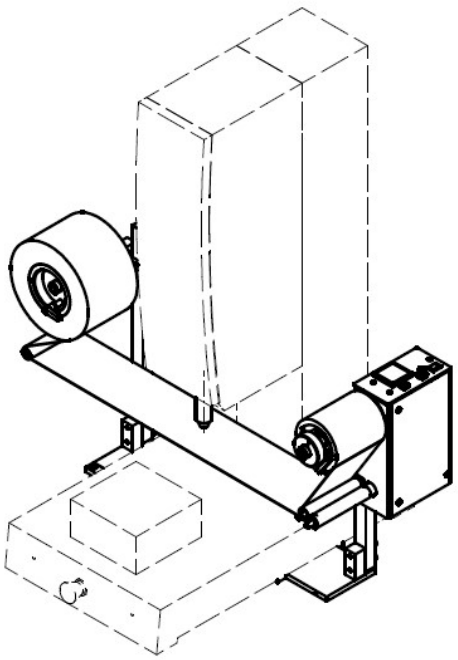
14.3. Assembly Drawing

14.3.1. VE120B-K1 Universal Mounting Bracket with Mounting Plate

The 10mm mounting plate is placed under the ultrasonic welding machine's base and fixed due to its weight.



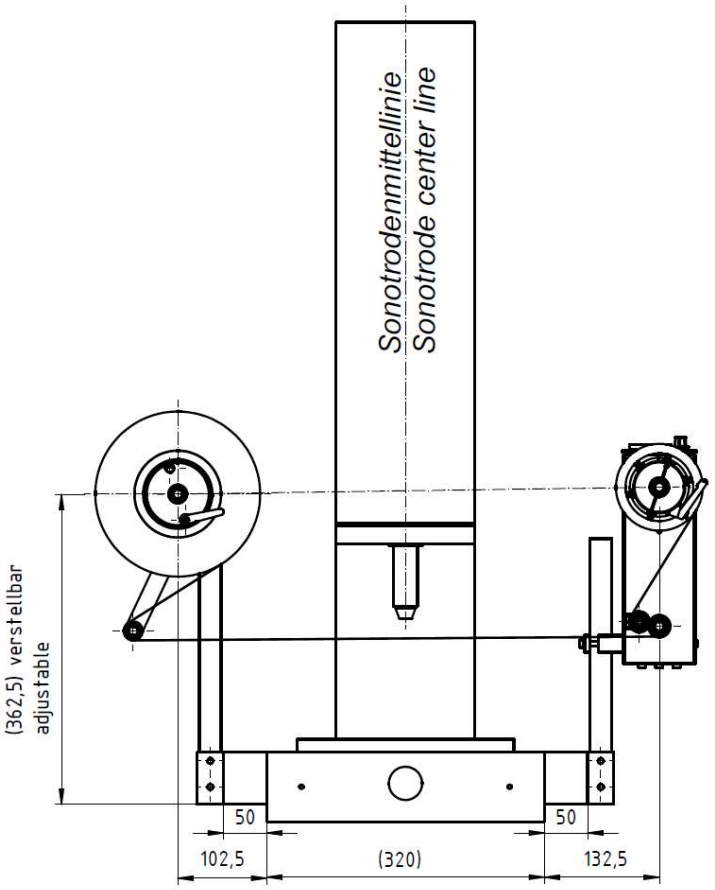


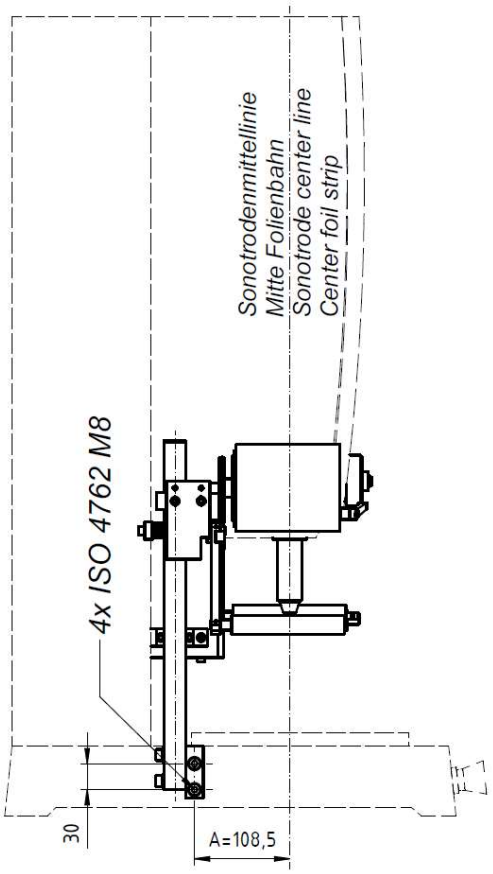


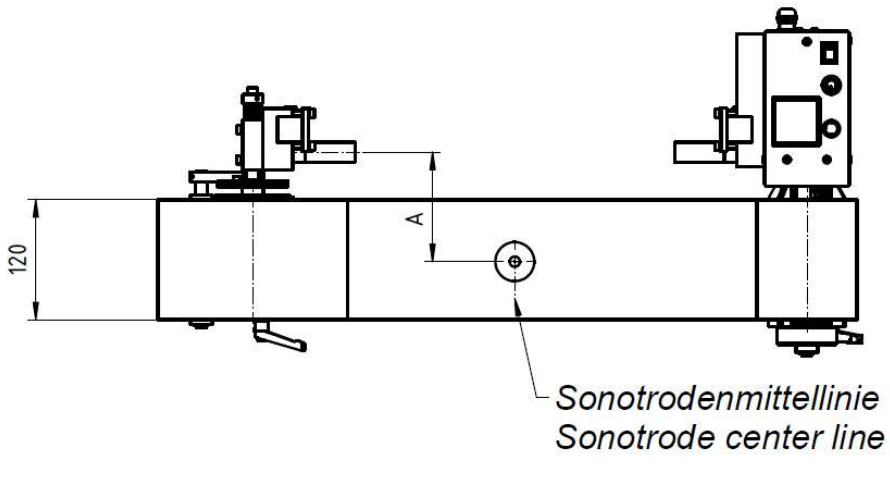
TYP	Maß A
VE120B	127,5
VE160B	147,5
VE200B	167,5
VE250B	192,5

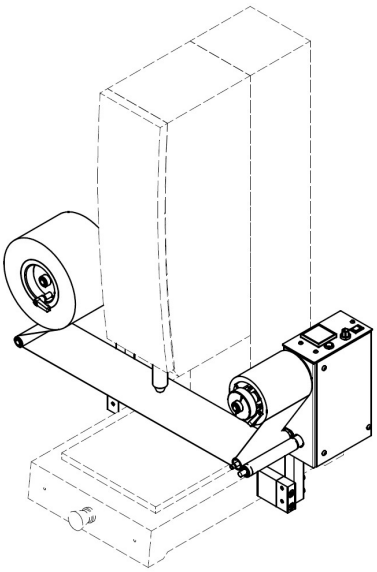
14.3.2. VE120B-K2 Mounting Bracket on the Ultrasonic Welding Machine's Base

The mounting bracket is attached on the side of the ultrasonic welding machine's base using two M8 screws.





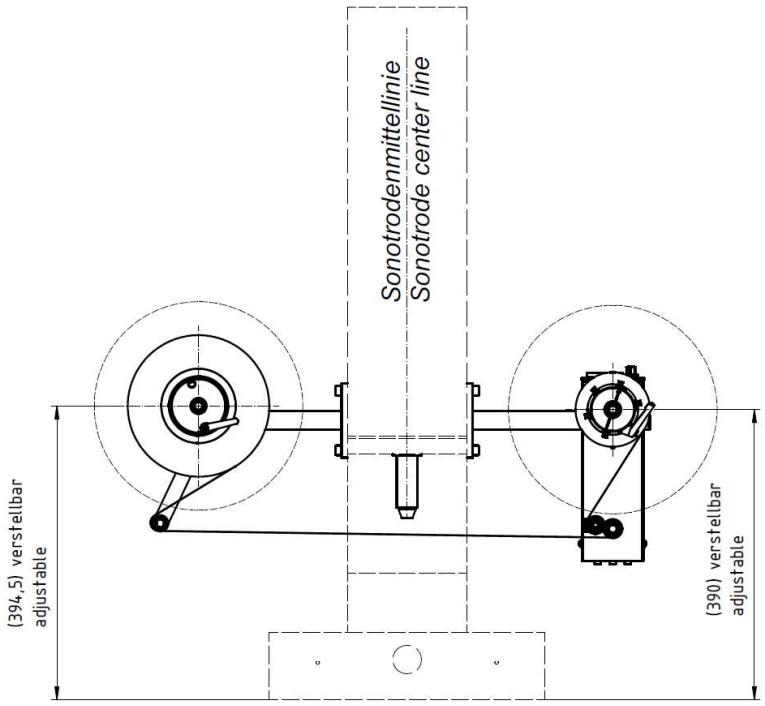


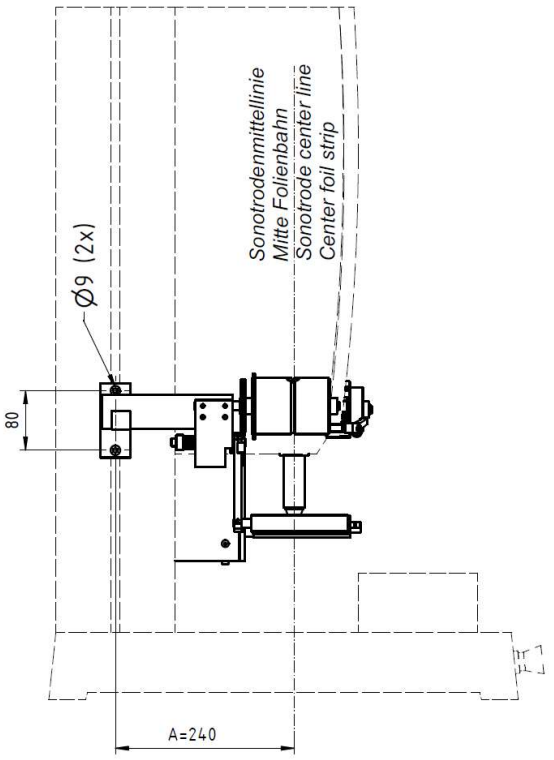


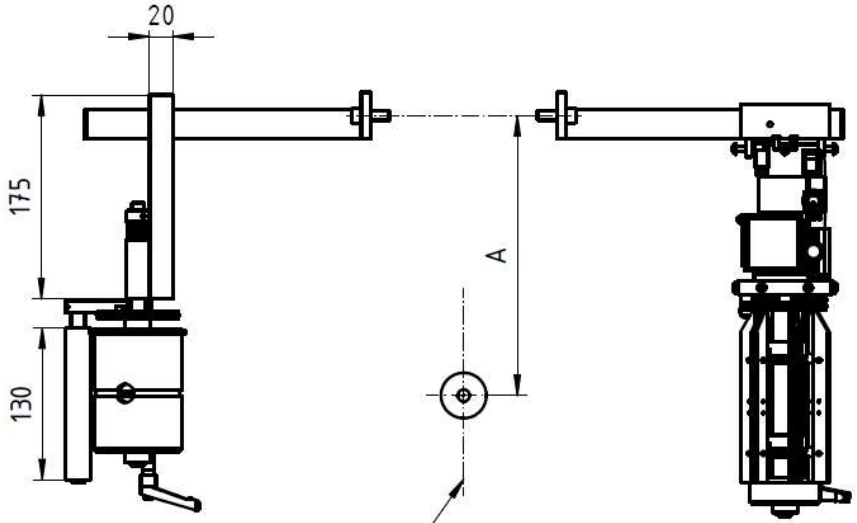
TYP	Maß A
VE120B	108,5
VE160B	128,5
VE200B	148,5
VE250B	173,5

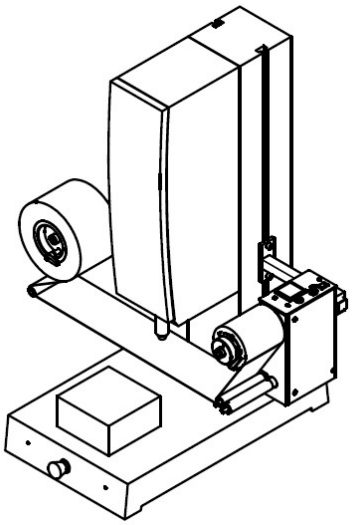
14.3.3. VE120B-K3 Mounting Bracket on the Ultrasonic Welding Machine's Column Structure

This mounting bracket is suitable for profile columns on the ultrasonic welding machine. For foil feeds of different widths an adapted mounting bracket is to be manufactured to ensure that the foil path's middle and the sonotrode's middle are in line.







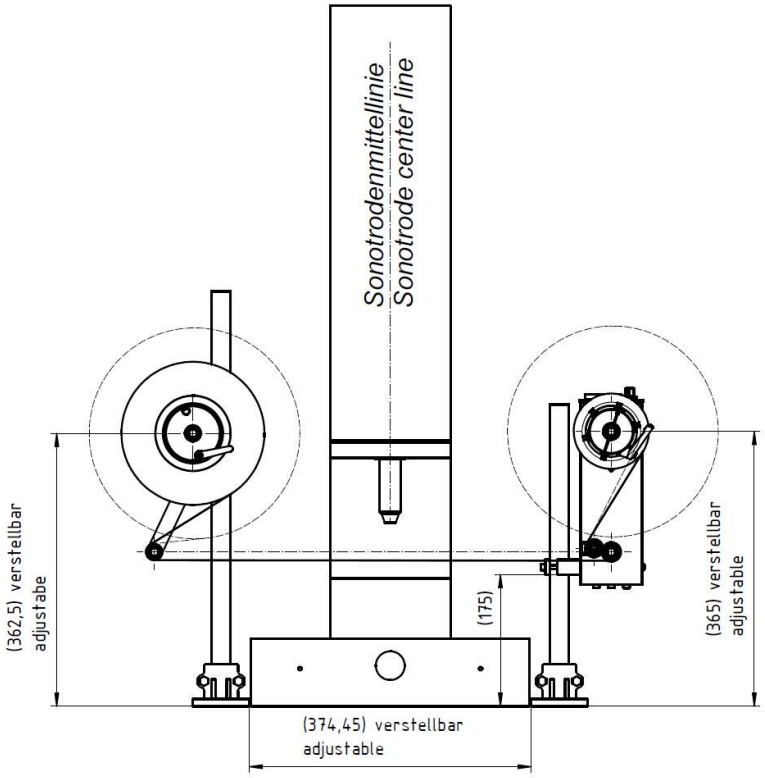


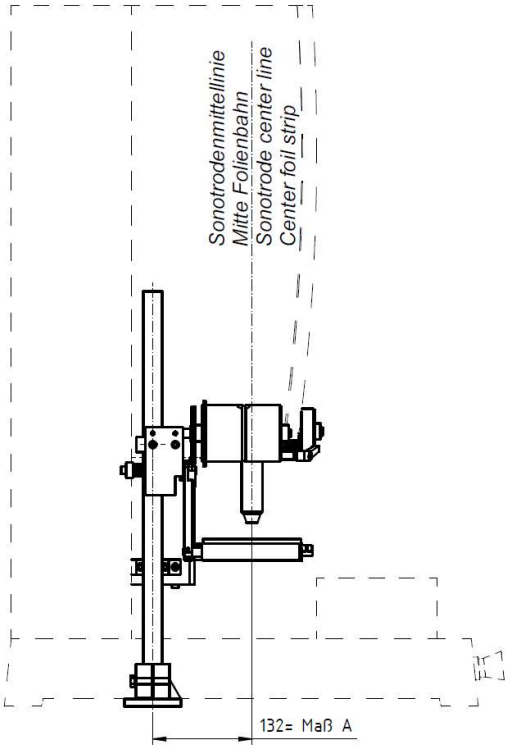
Sonotrodenmittellinie
Sonotrode center line

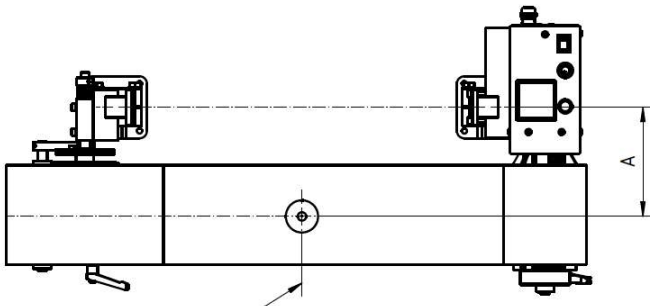
TYP	Maß A
VE120B	240
VE160B	260
VE200B	280
VE250B	305

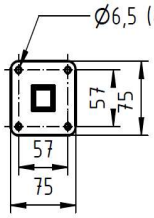
14.3.4. VE*B-K4 with Rose-Krieger-VF25_Fuss column bracket assembly**

This bracket is screwed on the table supporting the machine next to its base. This bracket offers the most variation options and can be used for foil feeds of any width. For this reason, the set-up dimensions for special width are included as well.

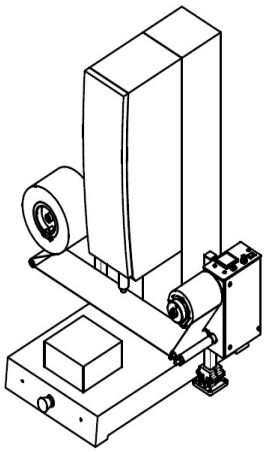




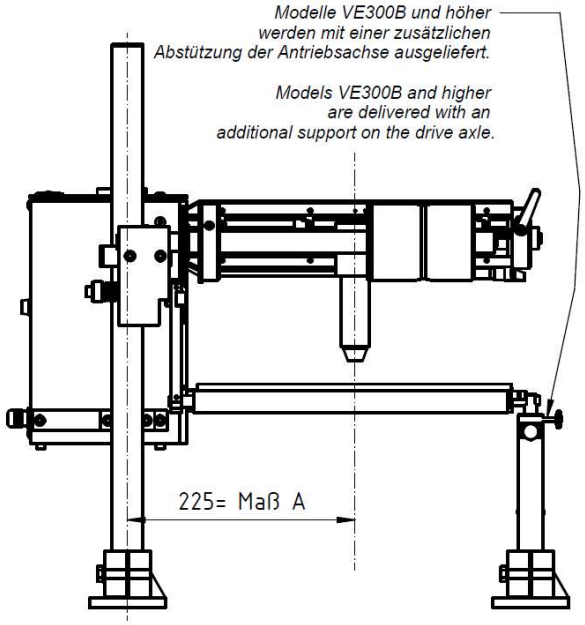


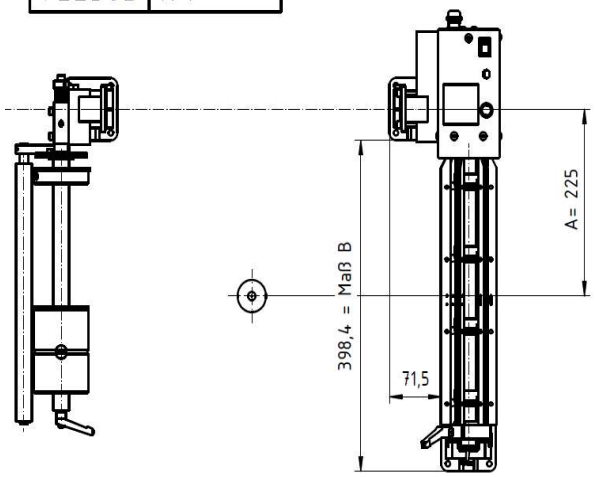


Fuß ROSEKRIEGER



TYP	Maß A
VE120B	132
VE160B	152
VE200B	172
VE250B	197





TYP	Maß A	Maß B
VE300B	225	398,4
VE350B	250	423,4
VE400B	275	448,4
VE450B	300	473,4