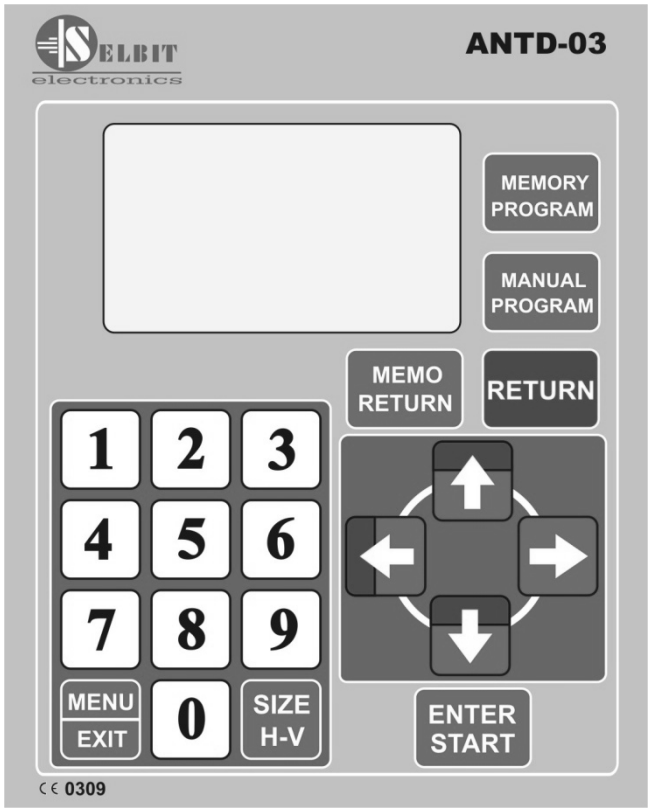
# ANTD-03

# AUTOMATIC CUT THICKNESS CONTROLLER

# FOR 2-HEAD BANDSAWING MACHINE




**INSTALLAOR AND USER MANUAL**

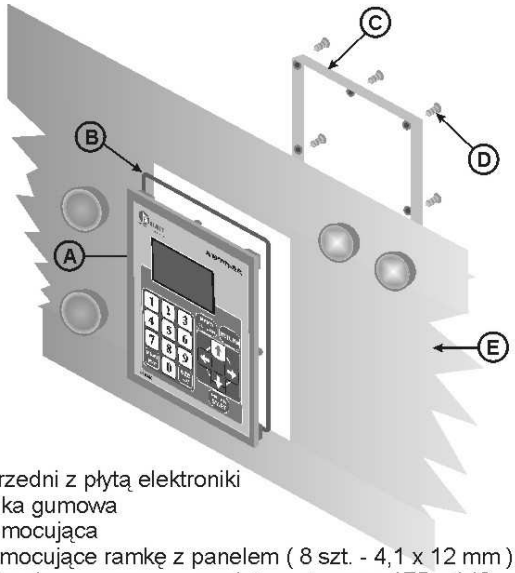
## (1) Controller Installation and Connection

**In installation of the controller, one must follow the instructions stated in this manual.**

Before installation in the control panel (fig. 1), it is necessary to cut a rectangular hole with dimensions 175 x 140 mm. The hole should be madeaccurately, so that the rubber seal of the control panel will fit tightly on the whole length. Possible irregularities left after the cutting ought to be flatten with a small file and protected from corrosion with a high-quality paint or lacquer.
If there is not enough free space on the control panel to install the controller, it can be installed in any location as an additional, stand-alone device (fig. 2).

**Fig. 1 – installation of the controller in the control panel of the machine**

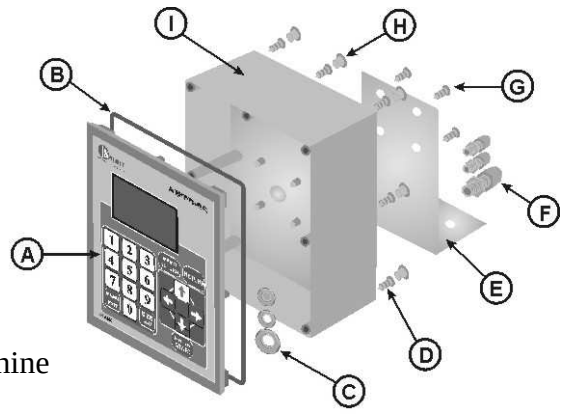
A – front panel with electronics board
B – rubber seal
C – installation frame
D – frame and panel fixing screws
(8 units, 4.1 x 12 mm)
E – Machine control panel with a cut out
175 x 140 mm hole




A - Panel przedni z płytą elektroniki
B - Uszczelka gumowa
C - Ramka mocująca
D - Wkręty mocujące ramkę z panelem ( 8 szt. - 4,1 x 12 mm )
E - Pulpit sterujący maszyny z wyciętym otworem 175 x 140 mm

**Fig. 2 – installation of the controller as a stand-alone device**

A – front panel with electronic board
B – rubber seal
C – nut for the PG chokes
D – screw fixing back of the case
(6 units, 4.1 x 10 mm)
E – Installation element (because of the different type of machines, the set does not contain this element)
F – PG chokes for introduction of the cables
G – Screws fixing the case to a support or the machine
(4 units, 4.1 x 10 mm)
H – hole plugs for the holes of fixing screws
I – back of the case




A - Panel przedni z płytą elektroniki
B - Uszczelka gumowa
C - Nakrętki mocujące dławiki PG
D - Wkręty mocujące tył obudowy ( 6szt. - 4,1 x 12 mm )
E - Element mocujący ( ze względu na różne typy maszyn komplet nie zawiera tego elementu )
F - Dławiki PG do wprowadzenia przewodów
G - Wkręty mocujące obudowę do wspornika lub maszyny ( 4 szt. 4,1 x 10 mm )
H - Zaślepki wciskane w otwory śrub mocujących
I - Tył obudowy

When the controller is installed as a stand-alone device, one can after the installation screw it directly on the machine with 4 units of 4.1 x 10 screws included in the set, or, if necessary, make an additional installation element, which after screwing it on to the case will serve as a distance support.

(2) Electrical installation

**CAUTION!**

**Because of the risk of electric shock, all connections shall be performed only when the machine is disconnected from power. The best way to do that is to turn off the main switch of the machine.**

**All connections should be done with double-insulated cables, intended for controlling devices powered from 230V AC network. The cables which enter the case ought to be round, with the diameter adjusted to the chokes installed in the back of the case. Endings of the cables should cleaned and have sleeves, or be tinned before screwing. This is important for correct and fail-safe operating of the controller in the future.**
**In order to assure correct and fail-safe operation, the wiring ought to be performed in accordance with the following instructions. Incorrect wiring can result in disturbing the work of the controller, and thus impeding its operation.**

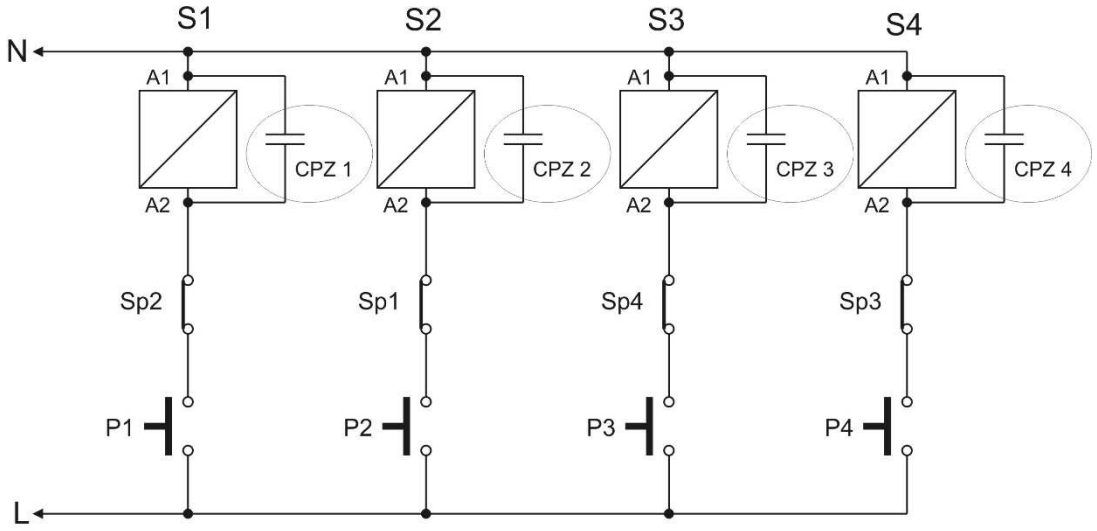
**The machine, in which the controller is installed, should have operational limit switches, and feed contractors ought to have a blockade preventing both of them to be turned on at once!**

**(3) Installation of the TSS-8/24 power transformer**

The**TSS-8/24 230/24V** power transformerincluded in the set ought to be installed in the power supply cabinet of the machine.
The transformer is intended for a standard TSS-35 fixing rail, commonly used in electric machines. The location of the transformer ought to be maximally away from other electric elements (electrical converters, contractors, other transformers). It is important, because otherwise electromagnetic noise may penetrate the electronic system of the controller through the transformer.
The cables providing 230V power should be connected to the transformer clamps marked as **PRI 230V. The transformer should be installed in the circuit which includes neither contractor inductors nor an inverter.**
**230V power cables ought to be laid as far from other cables in the cabinet as possible.**
The cables transmitting power to the electronic board should be connected to the transformer clamps marked as **SEC 24V.** Similarly as in the previous connection, these cables ought to be laid as far from other cablesas possible, including the 230V cables powering the transformer. Length of the power cables (24V) should be adequate to the location of the controller.
The cables going from the **SEC 24V** transformer clamps should in the final stage of the installation be connected to controller board clamps marked as **PWR.**

**(4) Installation of the interference suppressors (CPZ)**

Interference suppressors **CPZ** (**RC 100nF 100 Ohm 440VAC)** included in the set prevent excessive emission of the electromagnetic noise, which is generated when the contractors installed in the machine are operating. Their proper installation is crucial for correct work of the controller.
CPZ suppressors ought to be connected parallel to the inductors of the contractors which control the move of each of the two heads of the machine (H1, H2), according to the following picture:




CPZ1-4 kondensatory WX1P 224M 440V
S1, S2, S3, S4 - cewki styczników załączających ruch głowic H1 i H2

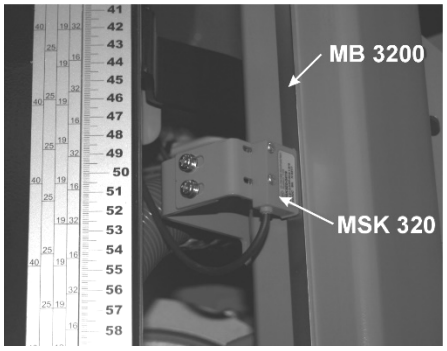
CPZ 1-4 – WX1P 224M 440V suppressors
S1, S2, S3, S4 – inductors controlling the movement of heads H1 and H2

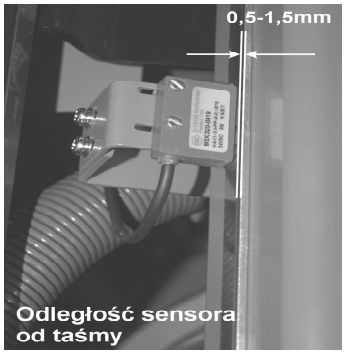
## (5) Installation of the encoders in the machine heads

**Installation of the linear magnetic encoder MSK-320 and magnetic tape MB-3200.**
The magnetic measuring tape consists of two elements, each of which has a layer of self-adhesive tape.
The first part, thicker one, is to be stuck on a smooth, flat, and straight surface (after it has been carefully cleaned and degreased with acetone or alcohol).
During the sticking, one should remove only part of the foil protecting the glue, then stick the first part, starting from the top. Then, gradually, one should remove further pieces of the foil, while sticking the freed piece of the tape to the surface.
A rubber roller might be used for pressing after the sticking, to provide a better pressure. The tape should be stuck carefully, to avoid any bulges and stick the tape **exactly straight.** After sticking the first part, protecting steel tape ought to be stuck on the top of the tape, with the same precautions as in the case of the first sticking. Both tapes should be stuck exactly one on top of another. MSK 320 sensor with a cable should be installed on a non-moving part of the machine (with respect to the controller), so there will be no movements of the cable which may lead to its damage. **When the sensor is installed in the moving position, its cable must be protected with moving rails preventing bending of the cable.**
The sensor ought to be fixed with two screws going through the case in such a way that it will be exactly **1 to 1.5 mm** above the tape, in aparallel position.

**In laying the sensor cable, it is important to put the cable as far away from the other cables and electric devices. The tape, above which the sensor is moving, cannot be located close to any source of magnetic field (magnets, electromagnets) before, during and after installation. Otherwise, it may be damaged!**
The surface of the tape ought to be regularly cleaned from dust and dirt with a soft brush. It is prohibited to hit the tape or the sensor. The sensor should be installed in a position in which the sticker **SCALE SIDE** in pointing towards the magnetic tape.
**Both the sensor and tape should be installed in such a way that in performing the whole movement, the sensor constantly remains in the range of the tape located below.**
**Special attention should be put to stability of the sensor and tape installation, to prevent vibrations of these elements while they are at work.**

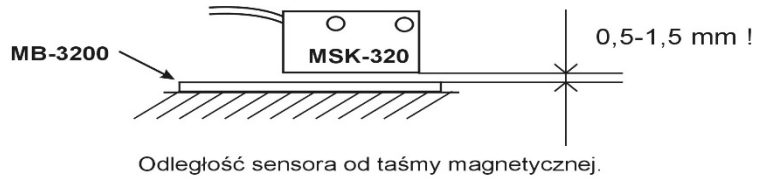
**The manner of the magnetic sensor and tape installation**



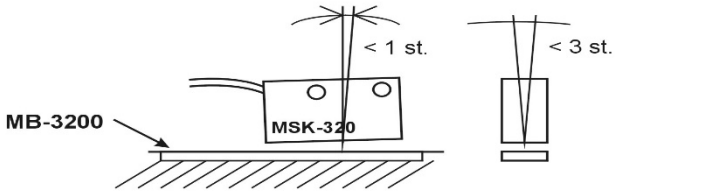




Distance of the sensor and tape

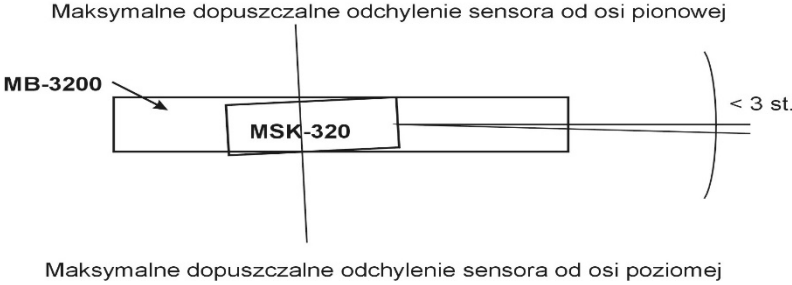
Distance of the sensor and magnetic tape



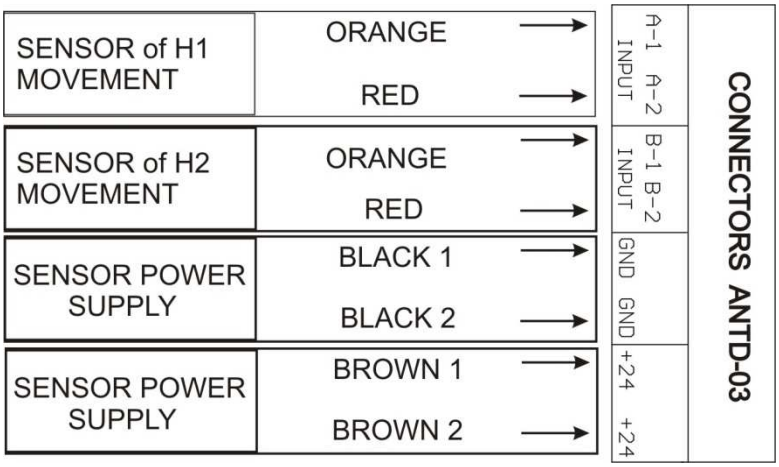

Maximal allowed tilt of the sensor and the vertical axis




Maximal allowed tilt of the sensor and the horizontal axis



Magnetic sensor of heads H1 and H2 movements should be connected as presented in the figure below.
When the controller is turned on for the first time, it might be necessary to invert the direction of counting in one or both sensors. It is done in accordance with the description of the first launch, by switching places of **orange and red** sensors.




**Connecting of the sensors MSK – 320 to ANTD-03 connectors**

**(5a) Rotating encoder installation**

**If rotating encoder is being installed (for the machines with a saw moving with a trapezoidal screw), it should be done as follows:**
Rotating encoder transforms rotating movement of the screw which moves the head into electric impulses contrived to the controller. The number of impulses per rotation of the screw depends on its pitch. This dependency is presented in Table 1.
The trapezoidal screw moving the machine head should have free one end, so it will be possible to drill a hole to screw in the clutch of the encoder.
In most bandsawing machines available on the market, this free end of the screw is located on the top.
The hole should be drilled exactly centrically. Otherwise, the installed encoder may sway, what can result in its damage. After drilling the hole of ca. 15 mm depth, it should be tapped with M8 tap. Now, the encoder can be fixed with a fixing band included in the set (fig. 4). The band should be fixed on the machine with a support which, given the differences in mechanical constructions available on the market, must be supplied by the client. Fig. 4a presents as typic look of the encoder installed on the top end of a trapezoidal screw.

**Fig. 4**

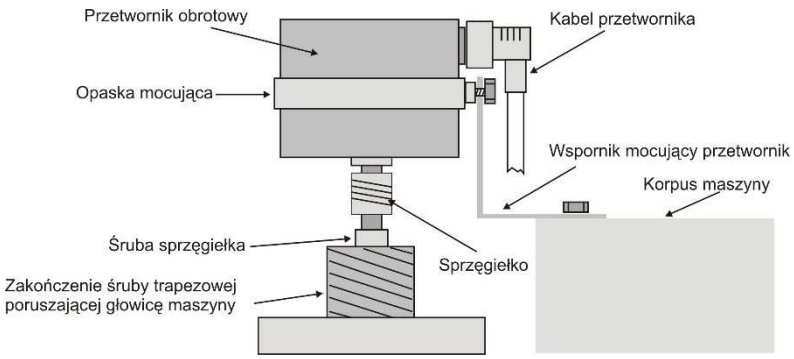



**Fig. 4a**

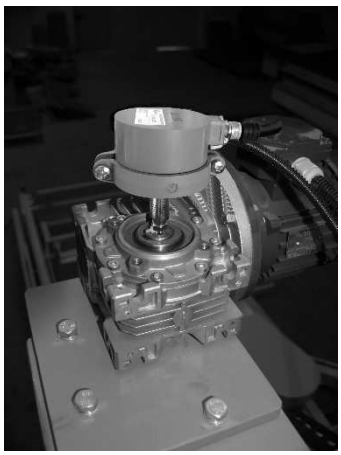
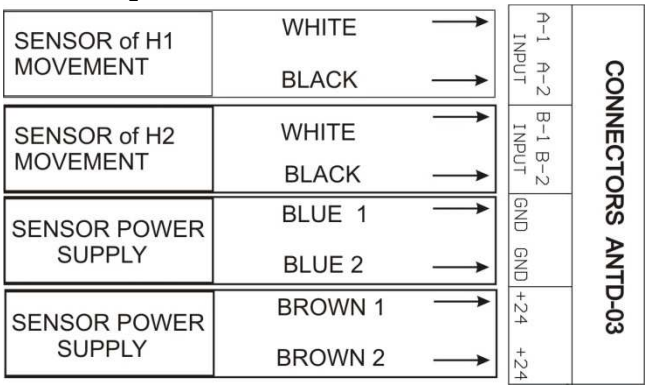


**Table 1**

| Screw Pitch (mm/r) | Encoder type | Divider |
|---|---|---|
| **3** | **Rotating 42 imp / min** | **28** |
| **4** | **Rotating 42 imp / min** | **21** |
| **5** | **Rotating 50 imp / min** | **20** |
| **6** | **Rotating 48 imp / min** | **16** |
| **7** | **Rotating 42 imp / min** | **12** |
| **8** | **Rotating 48 imp / min** | **12** |
| **9** | **Linear MSK 320 + MB 320** | **5** |
| **10** | **Rotating 50 imp / min** | **10** |
| **Chain Bandsawing Machine** | **Linear MSK 320 + MB 320** | **5** |

**The data presented in the table should be used to check the controller parameters**




**Connection of the rotating encoder cables to ANT-2G connections**

During the first launch of the controller, it might be necessary to change the direction of counting for one or both encoders. It is done in accordance with the description of the first launch by switching places of the **white and black** encoder.

The rotating encoder cables should be lied away from other electric cables. Through fixing it with fixing bands it is introduced to the location where the controlled will be installed.

**Caution! The encoder cable must be screwed tight, to ensure in turn the proper tightness of the connection!**

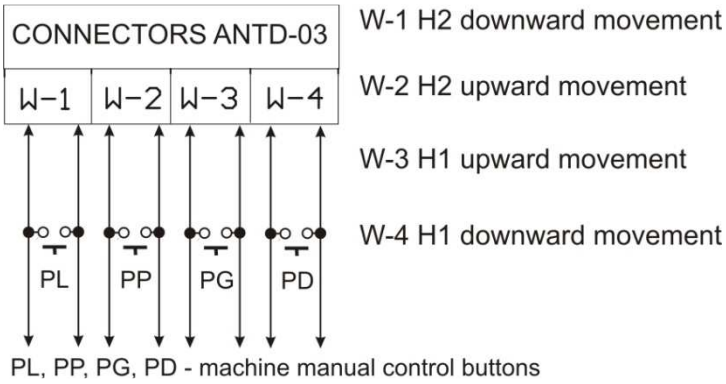
**Caution! Incorrect cable connection will result in a serious damage to the encoder.**

**(6) Connecting the cables controlling the contractors**

Buttons controlling the up- and downwards movement of the heads, which the machine should have installed in the factory, ought to be of the clasping type, without sustaining (i.e. they should clasp the junctions while pressed on, and unclench when the button is released).
To the buttons in the machine control panel which control the movement of the head, one should connect a wire which consists of four pairs of cables, with double, round insulation, with a diameter small enough to put them through the bigger choke in the back of the case of the controller. Two pairs of cables should be connected parallel to the clamps of the upward and downward movement of head 1 buttons, and the other two, analogously, should be connected to the clamps of the buttons of head 2. It is important to remember to put the sleeves or tinthe junctions. The cables should have different colours, what will facilitate their further correct connection to the right clamps on the controller board. **The cables ought to be laid away for other electric cables and lead to a place where the controller panel will be located.**

**The machine in which the controller is installed should have operational limit switches and feed contractors of up- and downward movement ought to be prevented from both being turned on at once!**

The cables connecting the contractors ought to be connected according to the following picture:



PL, PP, PG, PD - machine manual control buttons

**The manner of connecting the contractors control**

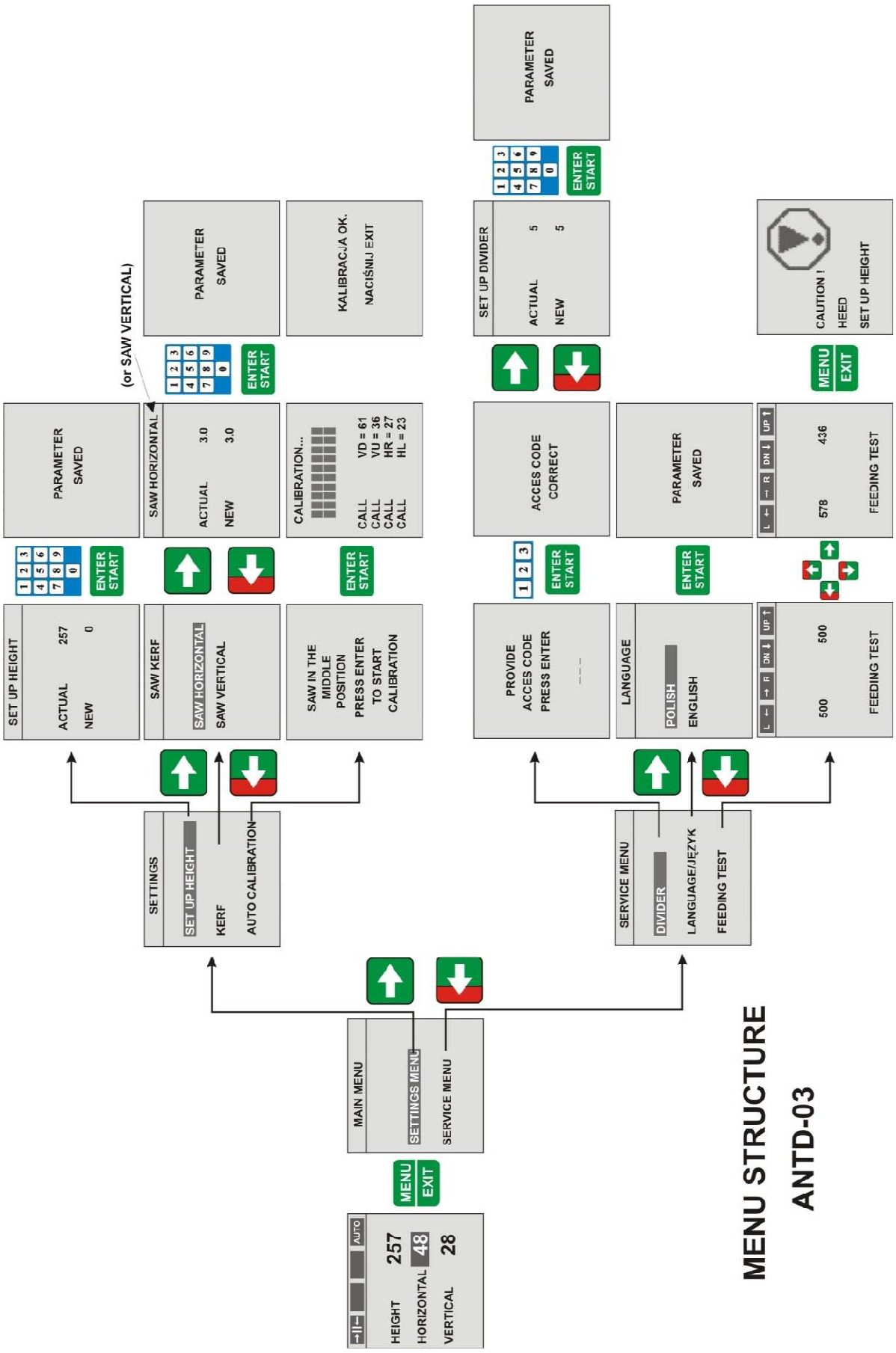
After all connections have been made, you can proceed to assemble the controller casing.
Before putting the front panel into the back part of the casing or the workbench, check whether the rubber gasket is placed in the grove running around the panel where it is supposed to be. It is important for ensuring proper tightness of the connection and prevents dirt from getting inside the casing.

After the panel has been placed in the back part of the casing, screw in the six 4.1x12 screws included in the set. Before the finally installing the controller and tightening the connection to the machine, it is recommended to check whether it works correctly according to the next section titled '**First launch**'. Having ensured that the controller is connected properly and works as described, you can place the end caps securing screw holes and install the controller in the machine.
The installation of the controller in the workbench is analogous to the above, except the front panel screws, which are screwed in from the back with a plastic frame and through the metal casing of the workbench.
After the screws have been fixed, gently stretch the cables running out of PG chokes to remove excess cables from inside the casing (do not pull the cables too hard to avoid damaging connections between them and the choke terminals), and then tighten the outer nuts of the PG chokes that seal the cable entries.
In the case of installation as an independent device, you can now install the entire set in the machine or the brackets using four 4.1x10 screws which are to be placed in the designated holes in the back part of the controller casing.

## First launch

The controller has a multi-level menu available by pressing the **MENU/EXIT** key.
After entering the menu, use the **up** and **down arrow keys** to select the next menu (**the current menu is shown against the dark background**).
To enter the next menu (selected and highlighted using the dark background), use the **right arrow key**. To go back to the previous menu, press the **left arrow key**, and to exit the entire menu altogether at any moment, press the MENU/EXIT key.

After


MENU STRUCTURE
ANTD-03
MAIN MENU
SETTINGS MENU
SERVICE MENU
MENU
EXIT
HEIGHT 257
HORIZONTAL 48
VERTICAL 28
AUTO
SETTINGS
SET UP HEIGHT
KERF
AUTO CALIBRATION
SERVICE MENU
DIVIDER
LANGUAGE/JĘZYK
FEEDING TEST
SET UP HEIGHT
ACTUAL 257
NEW 0
SAW KERF
SAW HORIZONTAL
SAW VERTICAL
SAW IN THE MIDDLE POSITION PRESS ENTER TO START CALIBRATION
PROVIDE ACCES CODE PRESS ENTER
LANGUAGE
POLISH
ENGLISH
ENTER START
PARAMETER SAVED
SAW HORIZONTAL
ACTUAL 3.0
NEW 3.0
CALIBRATION...
CALL VD = 61
CALL VU = 36
CALL HR = 27
CALL HL = 23
KALIBRACJA OK.
NACIŚNIJ EXIT
ACCES CODE CORRECT
PARAMETER SAVED
L ← → R DN ↓ UP ↑
578 436
500 500
FEEDING TEST
SET UP DIVIDER
ACTUAL 5
NEW 5
PARAMETER SAVED
CAUTION !
HEED
SET UP HEIGHT
(or SAW VERTICAL)

turning the power on, check if the controller **logo** is shown on the display. If not, check the **TSS 8/24** transformer connection and repeat the attempt.

**Input divider validation**

Enter the appropriate divider value depending on the type of encoder connected to the controller.
In the case of **MSK-320** linear encoders working with **MB-3200** magnetic tape, the input divider value is **5 !**.
To check or set the divider value, enter the **main menu** (press the **MENU/EXIT** key) and select **SERVICE** and then **DIVIDER**.
It is possible to change the divider value after entering the three digit access code, the default code being **123**.
After the checking and possibly modifying the divider value, confirm the change by pressing the **ENTER/START** key or exit the menu if you do not want to save changes.
**The divider value is entered only once when the controller is launched, and there is no need to interfere with this setting later on unless it is suspected that the controller has decalibrated, e.g. after a power supply overvoltage.**

**Verification of saw kerf width setting in controller memory**

To enter or verify the kerf width value, enter the **main menu**, select **SETTINGS**, then **SAW KERF** and choose the relevant saw (**horizontal saw** or **vertical saw**).
Remember that the kerf width has impact on the accuracy of the controller, the kerf width of the saws should be measured as precisely as possible. **Kerf width is entered with the precision of 0.1 mm!**
After checking or entering the width of the saws currently in use in the gang saw, confirm the change with the **ENTER/START** key or exit the menu if you do not want to save changes.

**Controller connection verification**

To check the motion contactor connections, carry out the **direction test**.
To do so, enter the main menu and then select **SERVICE** followed by **DIRECTION TEST**.
After entering the test menu, the display shows two counters both at **500**.
The **left hand side counter** corresponds to **left** and **right** movement, the **right hand side counter** corresponds to the **up** and **down** movement.
Now, use the **arrow keys** to test movement as follows:
**Left-right movement test**
After pressing the **left arrow key**, the head of the machine should start moving **left**, and after pressing the **right arrow key**, the head of the machine should start moving **right**.
**Up and down movement test**
After pressing the **down arrow key**, the head of the machine should start moving **down**, and after pressing the **up arrow key**, the head of the machine should start moving **up**.

**If the machine does not respond correctly to the keys being pressed, check whether W1-W4 control outputs of the controller have been correctly connected to the relevant contactors.**

**Horizontal counting test**

After pressing the **left arrow key**, the value of the **left hand side** counter should decrease, and after pressing the **right arrow key**, the value of the **left hand side** counter should grow.

**Vertical counting test**

After pressing the **down arrow key**, the value of the **right hand side** counter should decrease, and after pressing the **up arrow key**, the value of the **right hand side** counter should grow.

**If the horizontal or vertical test results in an incorrect counting direction, turn off the power and swap the red and orange cables of the MSK-320 sensor (the one relevant to the direction where the incorrect counting observed) that are connected to the INPUT joints on the controller panel.**

**The direction test is carried out only after the controller has been installed, at the first launch, there is no need to perform it again during further operation of the machine.**

If movement and counting directions are correct, exit the direction test menu and remember to set the proper counter value corresponding to the actual elevation above the bed as described below.

## Setting the actual elevation above the bed

The controller is equipped with a counter showing the actual elevation of the saw above the bed of the machine.

**In order to make the controller work properly, take care to ensure that the elevation displayed on the controller is equal to the actual physical elevation of the saw in the machine.**

To change (set) the displayed value, enter the **main menu** and then select **SETTING** and then **SET ELEVATION**. At this point, check the **actual** elevation of the saw (e.g. using a mechanical measuring tool the machine is equipped with), enter the value and confirm using the **ENTER/START** key.

**It is recommended to check whether the value shown on the display corresponds to the actual value each time before starting work with the machine.**

## Autocalibration

Each machine has certain inertia depending on numerous factors, such as internal temperature, internal resistance after lubricating the guide rails, etc.

To ensure the maximum precision of dimension settings, calibrate the controller automatically as often as necessary.

**It is recommended to carry out automatic calibration at least once a weak and each time after applying lubricant to mechanical elements responsible for moving the heads of the machine.**

To perform an automatic calibration, enter the **main menu**, select **SETTING** and **AUTOCALIBRATION**.

Then move the saws the **middle** location, and, having ensured that starting the machine will not pose a threat to other people, start autocalibration by pressing the **ENTER/START** key.

During the autocalibration, the controller moves the heads of the machine, while displaying the progress bar and the correction factor measurements for the subsequent movements.

Upon the completion of the autocalibration process, the controller displays a relevant message.

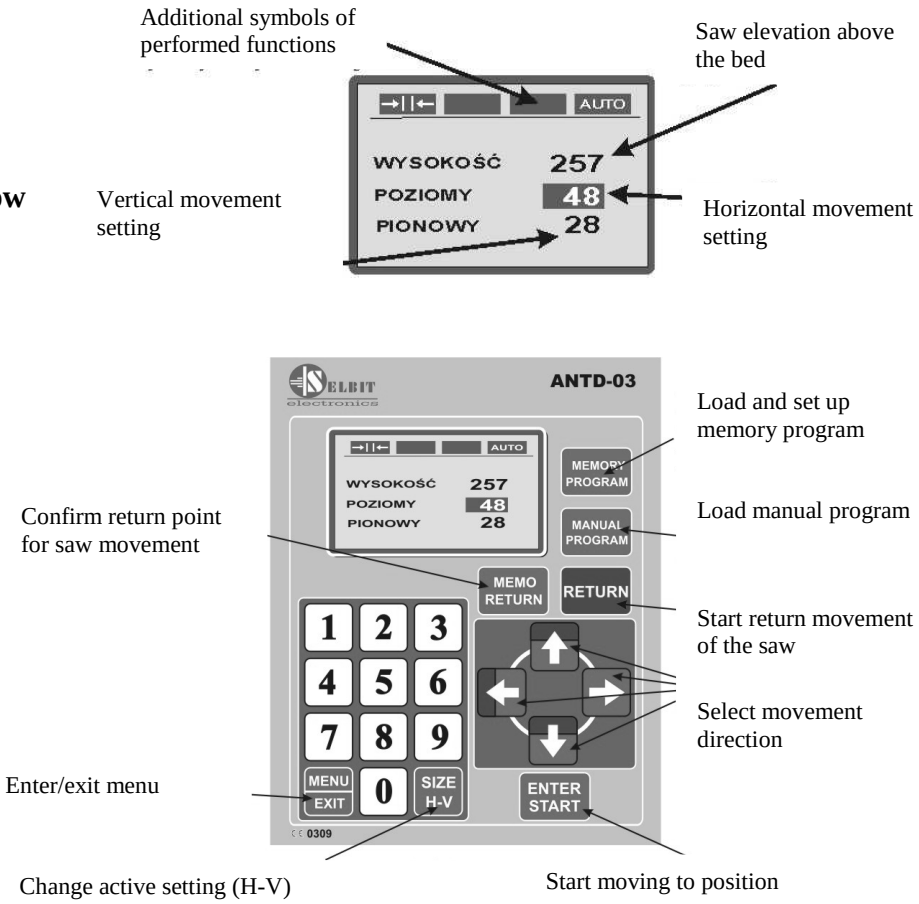
**Menu language selection**

The controller allows the user to select the language used for displaying the menu. To choose the language, enter the **main menu**, then **SERVICE**, **JĘZYK/LANGUAGE** and select the language version. Having changed the language, confirm your choice by pressing **ENTER/START**.

## Operation of the ANTD-03 controller

The ANTD-03 is equipped with an LCD graphic display that shows the functions carried out by the controller and the settings.

**Main window**




**ANTD-03 controller key function**

To change the cut width setting, use the **SIZE H-V** key, select the setting to be changed (**the selected setting is displayed against a dark background**), and enter the relevant dimension using the numeric keys. The setting should be entered without undue delay between the digits where the setting consists of several digits.

**The selected setting is active until a contradicting one is chosen.**

**Automatic positioning for single cut mode**

To start automatic move, select the desired direction by using the relevant **arrow key** followed by the **ENTER/START** or **RETURN** key depending on the direction of the move.

**The controller allows the following movement sequences:**

- - **Movement down** by a distance defined by the vertical setting
  **(down arrow plus START),**
- - **Movement right** by a distance defined by the horizontal setting
  **(right arrow plus START),**
- - **Simultaneous movement down and right** by a distance defined by both settings (**down arrow plus right arrow plus START**).
- - **Movement up**by a distance defined by the vertical setting
  **(up arrow plus START),**
- - **Movement left**by a distance defined by the horizontal setting
  **(left arrow plus START),**
- - **Return movement** in the horizontal plane to the previously set reference point
  **(left arrow plus RETURN),**
- - **Return movement**in the horizontal plane to the previously set reference point with the simultaneous **down movement** by a distance defined by the vertical setting
  **(left arrow plus down arrow plus RETURN),**
- - **Horizontal and vertical return movement** to the previously set reference point
  **(up arrow plus left arrow plus RETURN).**

The controller has a memory storing the reference point set by the users at any place within the movement range of the horizontal head. After selecting the point that the horizontal head should return to, press the **MEMO RETURN** key shortly. After confirming the key, it is active (**its symbol is shown on the display**) until it is changed. **The reference point is deleted after power has been turned off and it is impossible to use without prior confirmation.**

**Cutting programs**

ANTD-03 offers the option to set the dimension for the worked material from the level of the bed up.

**1 - Manual program.**

To use the dimension setting function, lift the head with the saw up to the starting material cutting line, and press the **MANUAL PROGRAM** button shortly.
The controller enters the dimension setting mode and shows words ‘manual program’ at the top of the display, below (description reads ‘STAYS’) is the current possible cutting dimension (which depends on the elevation of the vertical head saw) and the number of the current position (P-) and its dimension.

You can enter the first dimension from the bed at the P-1 position and then use up arrow key to change the position to a higher one enter other dimensions.
While entering the dimensions, the controller calculates and shows the remaining distance to the saw elevation.
When the sum of the dimensions exceeds the elevation of the saw, the controller replaces the word 'STAYS' with horizontal lines and the background of the neighbouring digits alternates between light and dark.
At this point you can:
- press the ENTER/START key to set the saw at the elevation of the last position
- change the dimension of the last position
- lower the position number
- manually raise the saw head

When the required number of position has been set, you can confirm the cutting program.
This is done by pressing the MANUAL PROGRAM key shortly.
It is possible to confirm the program only if the ENTER/START key has already been used and the controller has placed the saw in the proper position, which is shown by caption 'Position ready – press manual program' on the display.
An attempt to confirm the program without having pressed the ENTER/START key results in a 'Press Start' message.
When the program has been confirmed, the controller displays the 'Program saved' message.
At this point, the cutting process can be started in a manner analogous to the manual mode.
In the programmed cutting mode, the vertical saw position is set according to the subsequent positions in the programme, and the dimension of the horizontal saw movement is selected by the operator, and it is shown at the bottom of the display as 'horizontal'

**In the programmed mode, the following movement sequences are possible:**

- - **Movement down**by a distance defined by the current position setting **(down arrow plus START),**
- - **Simultaneous movement down and right** by a distance defined by the currently visible program position setting and horizontal dimension entered by the operator **(left arrow plus right arrow plus START)**,
- - **Movement left**by a distance defined by the horizontal setting **(left arrow plus START),**
- - **Movement right**by a distance defined by the horizontal setting **(right arrow plus START),**

After reaching position No. 1, the display shows the 'Program completed' message and movement further down is not possible, it is only possible to move the head left and right.
To leave the program mode, press the MENU/EXIT key shortly.

## 2 - Memory program.

The ANTD-03 controller has the option to set up and save an individual cutting program that can be loaded from the memory at any moment.

To set up an individual cutting program, **press and hold** the MEMORY PROGRAM key **for about 3 seconds**.
The controller enters the program set up mode, a ‘memory program’ caption is shown at the top of the display, and the current position number and dimensionis shown at the bottom.
Now, enter all the necessary cutting position and dimensions as it is done in the manual program, using the arrow keys and the numeric keypad.
After entering the last needed position, press the MEMORY PROGRAM key shortly. The controller confirms that the program has been saved by displaying the ‘program saved’ message and automatically exits the program set up mode.

To use a saved program, just like in the case of a manual program, raise the head with the saw to the starting line and then press the MEMORY PROGRAM button **shortly**.
After loading the memory program, the controller automatically displays the calculated final possible position in related to the current position of the saw.
Other actions in the memory program are identical to those in the manual programme.

## Operating recommendations

In order to maintain good cutting parameters, it is recommended to perform autocalibration at least **twice a week** following the instruction in the section titled **‘Autocalibration’.**
**Warning! The controller should be operated only in temperatures ranging from -10 to +45 degrees Celsius.**

**Before starting work, check if the saw elevation displayed on ANTD-03 conforms to the elevation shown by the mechanical measuring tool.**
Should there be a discrepancy, enter the proper elevation according to the instructions in the section titled: **‘Setting the actual elevation above the bed’.**

**Do not press any keys on the controller with hard objects or too hard as this can cause irreversible damage.**
If the keypad is dirty, you can use popular cleaning agents, remembering not to press the membrane keypad too hard. Excessive pressure on the keys may lead to damage and the necessity to replace the entire keypad.
**The controller should not be exposed to direct contact with water or other liquids.**

**If a specific movement is impossible for reasons independent of the controller (limit switch engaged, damaged encoder or controller connections), the controller unit stops any movement and displays relevant messages.**

**Error messages and their causes**

| Message type | Cause of error |
|---|---|
| **Reference point not saved** | At attempt at a return movement without having saved a reference point. |
| **No signal, movement stopped**<br>**Press ENTER, reset controller** | A head movement limit switch has been engaged.<br>Interrupted MSK-320 connection.<br>Damaged MSK-320 sensor.<br>Improper input divider. |
| **Autocalibration failed**<br>**Press ENTER, reset controller** | A head movement limit switch has been engaged.<br>Interrupted MSK-320 connection.<br>Damaged MSK-320 sensor.<br>Improper input divider. |
| **Warning wrong direction** | An attempt to perform a contradicting movement (e.g. simultaneous movement up and down). |
| **Invalid entry** | The entered divider value or kerf width is out of the permitted range. |
| **Warning set head elevation** | Decalibrated elevation counter. |
| **Warning vert. setting too high** | The vertical movement setting too high in relation to the actual elevation of the head over the bed. |

**EMC compliance**

The ANTD-03 controller complies with the binding electromagnetic compatibility (EMC) standards.
The ANTD-03 controller should be installed and set up according to the European and national standards. Installers of the electric machine steering system are liable for the adjustment of the device, and they have to comply with the EMC directive.
The ANTD-03 controller has to be considered as a component because it is not a machinery or a ready-to-use appliance according to European directives (Machinery Directive and EMC Directive). Liability for compliance with those standards lies with the end user installing an ANTD-03 controller.
The product and fittings described in this manual may be changed and modified from time to time both in terms of the technical aspect and the manner of use.
The description may not in any way be regarded as a contract.