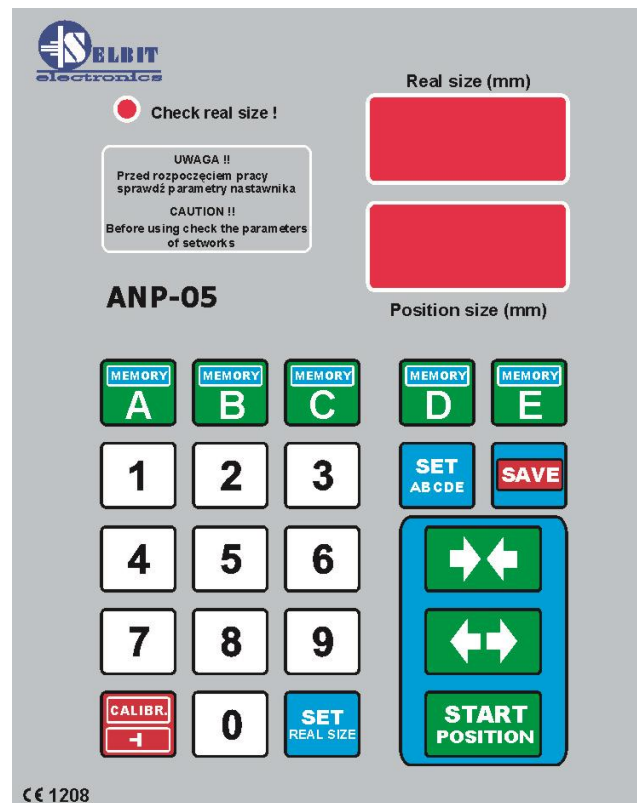


ANP-05

Automatic controller for two-sided cutting machine



Automatic cutting thickness regulating unit ANP-05 is designed for installation in machines such as bilateral disc or belt trimming machines, or other machines requiring manual or automatic setting of spacing of the vertically working saws.

Before assembly and start please read this handbook manual carefully, instructions provided help you in correct mounting and operating of our product.

Mounting and controller's connections

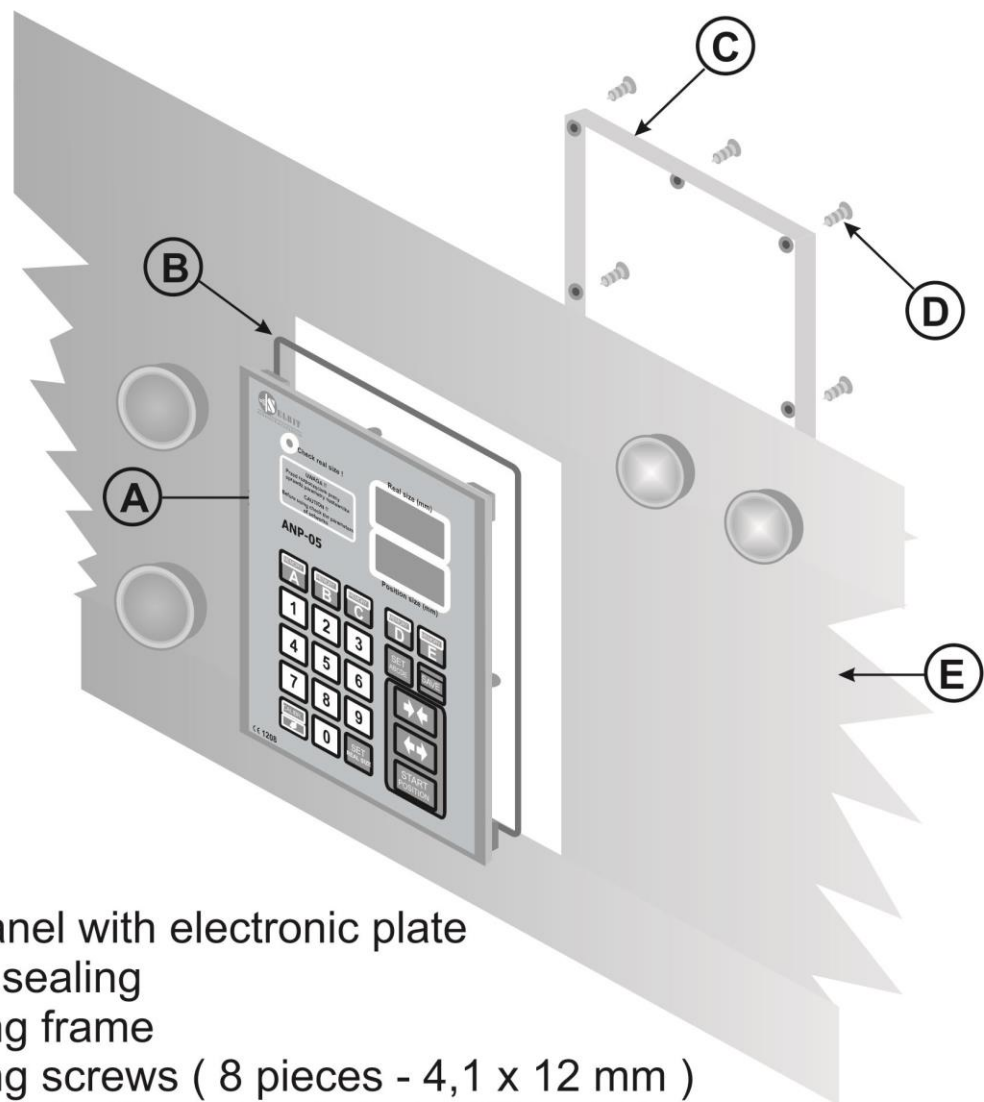
During controller's mounting is advised to follow this instructions correctly.

Point - 1

Before mounting in the main board (fig. 1) please cut off rectangle hole 175 x 140 mm.

This hole should be made carefully thus rubber sealing is adjoined to the from panel. Eventually any irregularity created after incorrect cutting out please smooth them using small metal file and protect it by anti-corrosion painting. If on the main panel is no place to mount controller, it is possible to add it as separate device (fig. 2).

Figure 1. Controller mounting on the main board.



A - Front panel with electronic plate

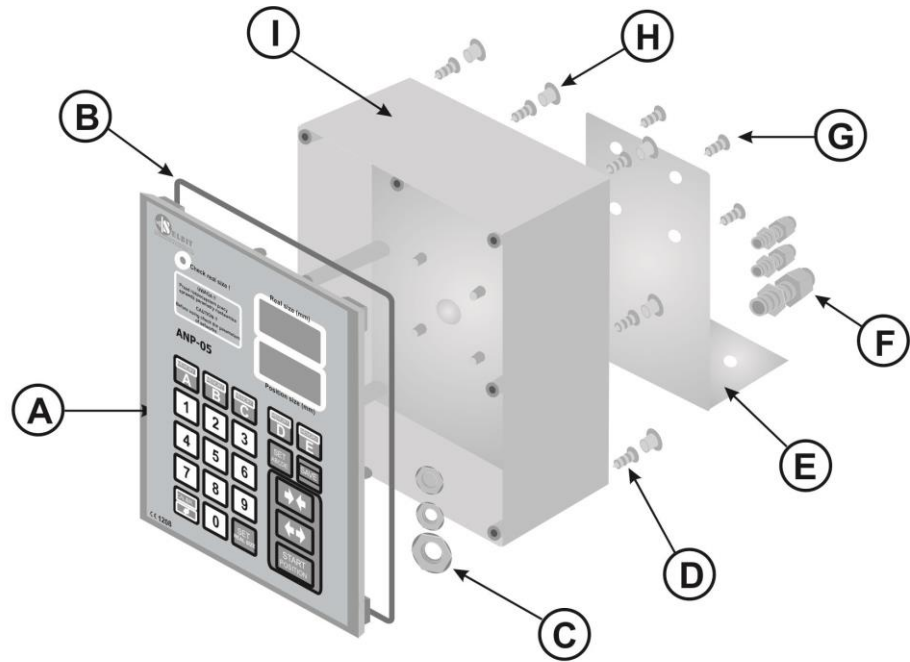
B - Rubber sealing

C - Mounting frame

D - Mounting screws (8 pieces - 4,1 x 12 mm)

E - Main board with rectangle hole 175 x 140 mm

Figure 2. Mounted controller as separate device.



- A - Front panel with electronics board
- B - Rubber seal
- C - Cable gland locknut
- D - Back casing mounting screws (6pcs. - 4,1 x 12 mm)
- E - Mounting bracket (Due to the variety of machines
It is not included in the kit)
- F - Cable gland
- G - Mounting screws(4 pcs. 4,1 x 10 mm)
- H - Mask of the mounting screws
- I - Back casing

In case of controller mounting as a separate device it is possible after its assembly to attached it to the machine's frame using 4 added screws for this purpose. In another case please made special fixing for mounting the controller which can be used as a distance support as well (fig. 2, E element).

Electric montage



CAUTION !

During electrical assembly there is a possibility of a electric shock thus all actions should be made while electric power is off. For this purpose please turn off machine's main electric switch!!!

All cable connections should be made using special wires with double insulation oriented for use of the electric devices powered by 230V alternating current. Cables should be rounded with diameter suitable into holes in the controller back casing accordingly. Tips of the cables should be cleaned and special quill should be used or tips should be covered by thin tin layer. Please follow this instructions very carefully especially electric connections should be made according to provided instructions. It is required for correct and failure-free controller operating.

Machine where the controller is mounted should be equipped in well working head saw ending switchers and contactors of the up and down feeding should be protected to be on at the same time !!!

Point - 2

Power transformer TSS-8/001 assembly

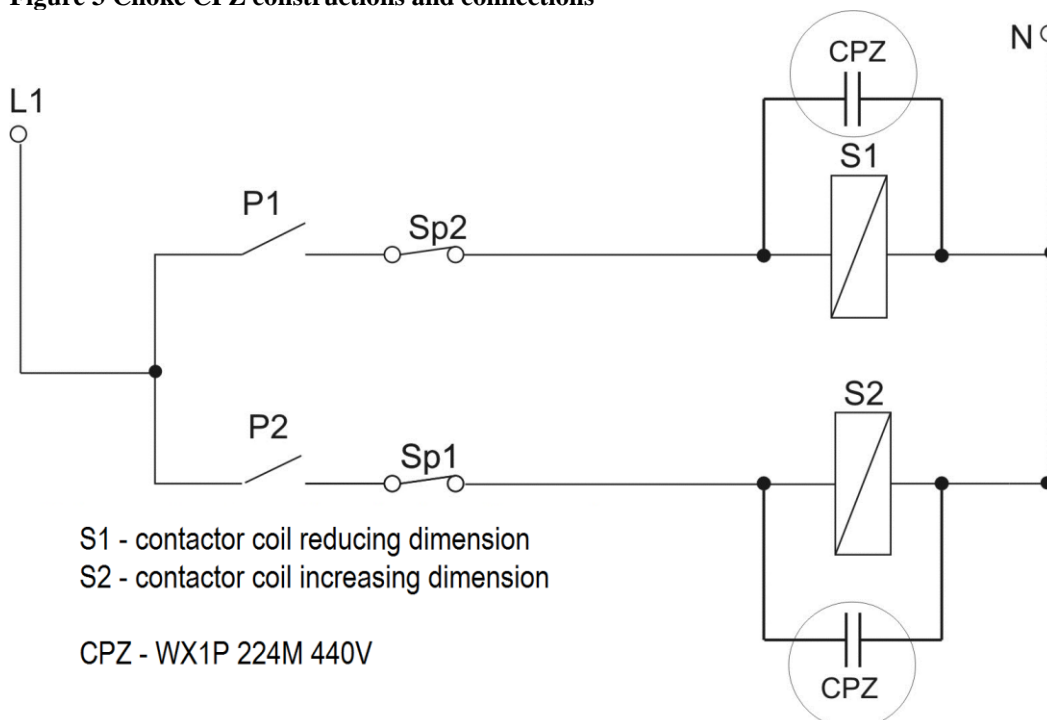
In power cubicle added power transformer TSS-8/001 needs to be mounted. Mounting is designed for well known and used holding bus TSS-35. Please place the transformer as far as possible from other electrical elements (e.g. frequency changer, contactors, other transformers). It is important because of the electromagnetic interference which may disturbing controller's electronics. Please connect to the connections marked as PRI power supply of 230V. For power supply please choose this phase of electric supply of the machine which is not connected to the any inductions coils, contactors or inverters. 230V supply cables should be placed as far as it is possible from other cables in the power cubicle. To the transformer's clips marked as SEC 12V please connect wires which feed electronic plate of the controller. Analogically please place this wires as far as it is possible from other power cables, especially from 230V which powered the transformer. Length of the cables (12V) should be chosen accordingly to the place where the controller is mounted.

Point - 3

Choke CPZ mounting

Anti-disturbance choke CPZ (WX1P 224M 440V) added in the controller kit is designed to protect from any other electromagnetic disturbance made by other electrical devices mounted on the frame machine saw. Its correct mounting is decisive for correct controller operating. - 4 - Those CPZ outputs should connected in parallel to the contactors' coil. CPZ should be connected with contactor's coil of the down feeding, up feeding and barker contactor separately (if the sawing frame machine is equipped with barker).

Figure 3 Choke CPZ constructions and connections



Point – 4

Installation of the magnetic sensor

In the machine where one head is mobile and aligned to the other stationary head linked mechanically to the machine body, the magnetic sensor should be mounted on a support connected to the stationary body. The magnetic tape should be applied on a flat guide rail fixed directly to the mobile head, so that along the entire working range of the head the tape moves under the MSK-320 sensor. Particular attention should be paid to the stability of the sensor and tape installation, so that they do not vibrate during operation.

In the machine where both heads are mobile and move simultaneously with respect to the stationary machine body, in order to maintain high level of precision, the following mounting instructions should be followed:

The MSK-320 sensor should be fixed to the first mobile head using the support, while the flat guide rail with the applied magnetic tape should be attached to other mobile head. This way, you limit the effect of backlash occurring between the heads on the correct measurement of the distance between the heads.

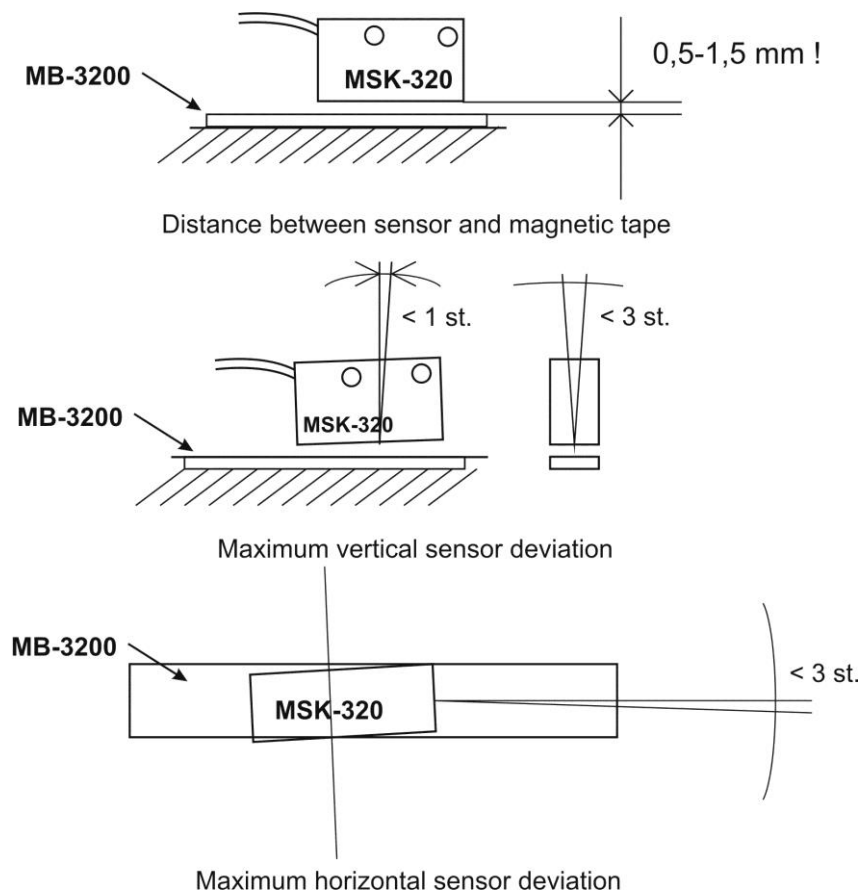
The magnetic tape contains two parts which contains with self-adhesive layer. First, thicker part please place on the smooth and flatten surface (please clean the surface carefully before sticking the tape using acetone or spirit). During sticking please get unstuck only small part of the tape on the tip and stick it to the surface. Next get unstuck rest of the tape slowly sticking it to the surface simultaneously. During sticking please use rubber roll to create bigger adhesive pressure. Please stick the tape very careful and try to not create any air bulging and notice to stick it straight. Next please stick the second part of the magnetic tape – steel protection strip using the same proceeding as above. Both tapes should be stuck in one line laying on each other creating two layers. Sensor MSK-3200 should be mounted on not moveable part of the machine (according to the controller) to not create any cable movements which can cause its damage. In case of mounting sensor on moveable part please protect cable from its non-controlled damage leading it in a special portable buses.

Sensor should be mounted with two screws in a way that the magnetic tape should be in a 1 to 1,5 mm distance and in parallel with it. Please notice during leading the cable to place it as far as it is possible from other cables. Please do not place any sources of the magnetic field next to the magnetic tape during, before and after mounting. It may cause it serious damage and incorrect working of the controller.

Please clean the surface of the tape from time to time with sift brush. Please do not hit sensor or the tape. The sensor should be mounted in that way thus text SCALE SLIDE is faced on the magnetic tape side.

The sensor and the tape should be mounted in a such way that during feeding sensor “is above” the tape in all range. Please notice the stability of the tape and the sensor during normal operating.

Figure 4 Sensor and magnetic tape mounting example



Point - 5

Connecting increase-reduce motion control cables

Connect two pairs of wires to the head motion control contractors; short circuit (in the first or the second pair) will cause switching of the reduction contractor (the first pair) and of the increase contractor (the second pair). Adjust the cable length to the mounting space of the adjuster. Cable ends should be fitted with connection sleeves or tin-plated.

Point - 6

Prepared cables connections and casing assembly of the controller.

After creation of the all required connections next step is to connect them with the controller's main plate. In the back casing please screw in two PG chokes facing nuts from the inside. Please lead through mounted chokes follows cables:

- through the biggest one, wires of the head saw contractors steering (two pairs of the cables from steering buttons)
- through middle one, cable of the rotating encoder
- through choke which is the nearest of the casing middle, power cable 12 V (connection SEC 12 V from the transformer TSS8/001).

Please connect power cable 12 V (with prepared cables' tips) to the junction marked as 12V on the controller's main plate.

Contractors steering wires connect with junctions on the controller's main plate as follow:

- no. 1 pair of cables of the **reduce dimension** with junction marked as **DWN**
- no. 2 pair of the **increasing dimension** with junction marked as **UP**.

Magnetic encoder's connection MSK-320 :

Magnetic encoder cables please connect with junctions marked **ENCODER** as follow:

- brown cable of MSK-320 with controller's junction marked as (+) **plus**
- black cable of MSK-320 with controller's junction marked as (-) **minus**
- red cable of MSK-320 with controller's junction marked as **IN-1**
- orange cable of MSK-320 with controller's junction marked as **IN-2**



CAUTION!!!

Incorrect connection of the rotating or magnetic encoder may cause its serious damage!!

Next step after creating all of the connections is assembly of the controller's casing.

Before connecting from panel with the back side please check if the rubber sealing is in the special groove. It is important in regarding sealing and protecting controller's main electronic plate from any contamination.

After put the front panel in together with the back side please screw casing using included six screws 4,1x12. Before mounting the controller on the machine it is recommended to checking of proper controller's operating according to "first start" chapter (2). After checking of the controller's proper operating please use safety plugs in the places where screws are and mount the controller on the machine.

Controller's mounting in the main machine's board is analogical, there is only one difference that front panel is screwed from the inside with plastic frame and main panel casing.

After all mounting please carefully pull out cables which go out at the back side of the controller's casing to reduce their unnecessary length in the inside. Please be careful to not destroy any connection. After this operation please screw PG choke to create proper sealing. Next step, in case the controller as a separate devise, please mount it using four 4,1x10 screws on the sawing frame machine. Screws should go through four holes in the back casing created for this purpose.

First start



Controller's connections checking

To check the connections, follow these steps:

- After turning on the power, check if the adjuster displays the message: "ANP-05". Otherwise, check the TSS 8/001 transformer connections and retry.
- After the message "ANP-05" disappears, press the green button with arrows pointing inwards; at this point, the adjuster should connect the reduction contactor and the value of the dimension, visible in the "Real size" window, should decrease. Similarly, when you press the green button with arrows pointing outwards, the adjuster should connect the increase contactor and the dimension value in the "Real size" window should increase. If the counter is working incorrectly, i.e. the value displayed decreases while pressing the increase button and increases while pressing the reduction button, swap the wires, red with orange (**ENCODER connector, terminals In1, In2**), and check again the accuracy of the counter. Checking the accuracy of the counter is very important, because if the counting direction is incorrect, the adjuster will not function.

If the connections have been checked successfully according to the above description, you can proceed to the next step of the adjuster start-up.

Point 7

Checking the values of the input divider

During the display of the "ANP-05" message, press and hold the "Calibr" button; after a while, the top display will show horizontal bars and the lower display will show the symbol of the divider (reversed T) and its current value. In case of using the magnetic tape and the MSK-320 sensor, the divider's value should be **5**. Otherwise, enter the correct value of **5** using the numeric keypad of the adjuster. To save the entered divider value, press shortly the "Save" button; the message "Save" will appear to confirm correct setting. Enter the divider value at the first start-up or if there is a suspicion of incorrect configuration of the adjuster.

Point 8

Entering the dimension calibrating the "Real size" counter (Real size)

Warning! Due to the mode of entering the Real size dimension (value to one decimal place), entering the dimension is possible only if the value shown in the "Real size" display does not exceed 999mm!!

Due to the one way motion of backlash elimination, be sure to reduce dimension before entering the dimension (press and hold the button with arrows pointing inwards)!!

To make sure that the top display shows the real size correctly, press the **button with arrows pointing outwards**, to set spacing of the saws to any dimension **less than 999 mm**. Then read the actual spacing of the saws in the machine, by using e.g. a mechanical gauge of the machine (if it is precisely calibrated) or by measuring the spacing with another gauge. Then press and hold for approx. **3s** the "Set Real size" button; after a while, the top display will show horizontal lines and the lower display will show the previously used dimension; using the numeric keypad, enter the measured spacing value, **making sure to enter the dimension to one decimal place**, e.g. the spacing of the saws equal **140 mm** should be entered by pressing: **1, 4, 0, 0**, while another sample dimension **232.4** should be entered by pressing: **2, 3, 2, 4**. After entering the dimension, confirm by pressing "Save". The control system will display the message "Save" and exit the function, while the top display will show the entered real dimension of the spacing of saws. If the machine has not been mechanically reset while the power supply of the control system was off, there is no need to calibrate the counter after restarting (the counter's dimension is saved in the memory of the control system); **recalibration should be made if the values displayed are divergent or if there was e.g. a break in the power supply during operation and the control system has not saved the counter value.**

Entering the real value of the spacing of saws is necessary for the correct operation of the control system!

Point 9

Auto-calibration of the adjuster

In order to assure correct operation of the control system (adjusted to the slip of the head after stopping the engine), use the auto-calibration function after the first start-up. **Use this function also if the screws of the head's drive or the engine have been replaced or after applying lubricant to screws or other moving parts of the head, if there are significant divergences in cutting dimensions.** To auto-calibrate, set the saws to the smallest dimension (smallest spacing of the saws), then switch on the control system, **wait until the “ANP-05” message disappears from the display, then press and hold the “Calibr” button.** The display will show the message: “Auto call”. The control system is ready to auto-calibrate. Press again the “Calibr” button. The adjuster will perform automatic measuring movements. After performing measuring movements, the adjuster will indicate the end of the function and enter normal working mode. During auto-calibration, the adjuster makes a test run over a distance of approx. 140 mm in the direction of increasing the dimension: it should be taken into consideration when setting the starting position of the saws.

Having completed the steps above, the adjuster is ready for normal operation.

Operation of the ANP-05 adjuster

Immediately after turning on the power, a red LED will be blinking next to message: “Check real size”, reminding to check the dimension displayed in the “Real size” window with the actual dimensions of the saws. In the event of divergences, enter correct dimensions, following the instructions described in point 8.

The adjuster allows manual control of the spacing (dimension cut) of the saws using green buttons with arrows or automatically by entering the dimension and pressing shortly “**Start position**”.

Enter the dimensions using the numeric keypad or fast dimension buttons described as “A” to “E”, which are assigned to individual spacing dimensions of the saws. Dimension values assigned to the keys A-E can be adapted to individual needs, according to the following description:

In order to change one or more dimensions assigned to the keys A-E, press and hold for approx. 3s the button “**Set Abcde**”; after a while the upper display will show the message: “**Abc**” and the lower display will show horizontal lines. Now select the key you want to overwrite with new dimensions and press it shortly. The upper display will show the letter corresponding to the key which had been pressed and the lower display will show the previously assigned dimension. Using the numeric keypad, you can enter another value. After entering the value, press shortly another key with the letter to change the assigned value. After making all the necessary changes to one or more keys (A-E), save changes by pressing shortly the button “**Save**”; the adjuster displays the message: “**Save**”, confirming the setting. From now on, the saved dimensions will be available by pressing A-E keys.

Rotating encoder mounting (optional)

On machines whose mechanical construction (relative lack of mechanical clearances of the drive) enables the use of a rotary encoder, it can be mounted instead of the MSK linear encoder.

Added rotating encoder is designed to convert rotation of the head saw feeding screw for electrical impulses. Number of the impulses depends on screw pitch and this relation describes table 1.

In most of the frame sawing machines this screw has got free tip where the encoder can be installed. Please make a concentric hole in the screw and mount encoder's clutch.

Please make sure that this hole is concentric otherwise it can cause swinging and eventually incorrect encoder working and its damage. Please make hole around 15 mm and create thread M8. Next mount encoder using fixing band (fig.5). The band should be attached to the special fixing which because of the variety of the frame sawing machines should be created individually. Example of the encoder mounting is shown at the photo 1.

Table 1	Screw pitch [mm./obr.]	Encoder type [imp./rotation]	Devider
	3	Rotating 42	28
	4	Rotating 42	21
	5	Rotating 50	20
	6	Rotating 48	16
	7	Rotating 42	12
	8	Rotating 48	12
	9	Linear MSK320 + MB3200	5
	10	Rotating 50	10
	Chain sawing frame machine	Linear MSK 320 + MB 320	5

The data contained in the table should be used during the procedure of checking the parameters of the controller

Attention! In the case of a machine with two sliding heads using one screw in opposite directions, the proper divisor read from the table should be divided by 2.

Example:

The pitch of the screw in the machine is 6, the used encoder has 48imp / Rot. Divider 16 read from the table should be divided by two and entered into the controller 8. This is necessary due to the movement of the two heads in opposite directions (in this case the actual head displacement is twice as large as the pitch of the screw)

Cable connection of the encoder should be routed as far as it is possible from other electrical cables. Using special clip bands lead it to the place where the controller is mounted.

Attention, check the tightening of the encoder cable connector to ensure correct sealing of the connection!!!

Figure 5 Encoder mounting example.

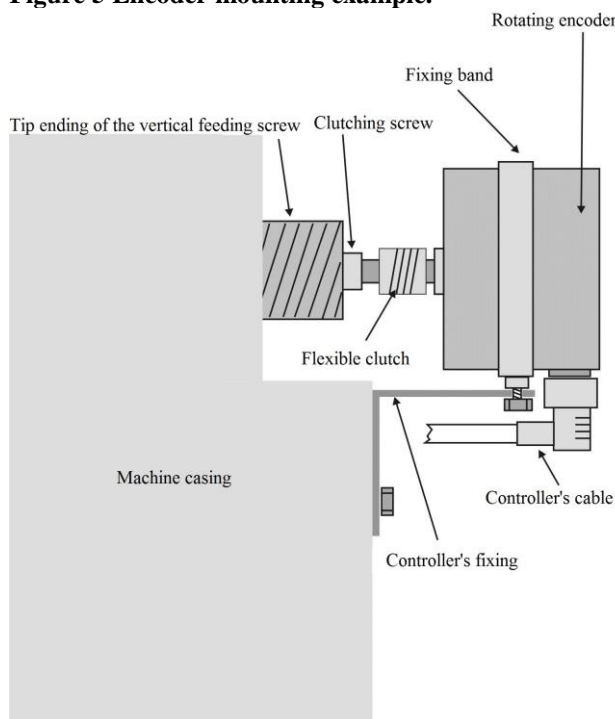
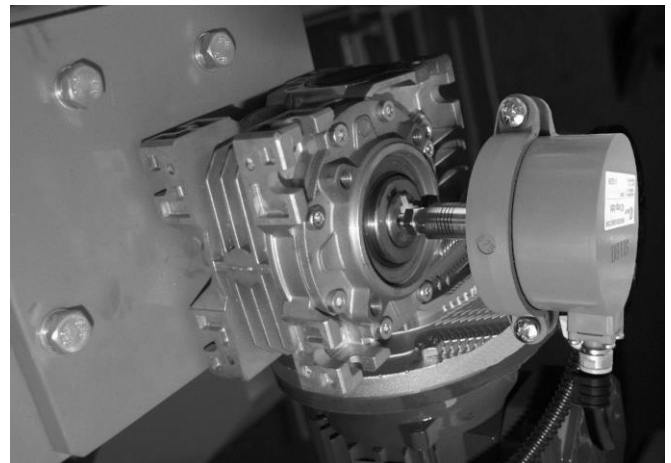


Photo 1



List of errors which may occur during the operation of the adjuster:

If an error occurs during operation, the adjuster displays an error message and stops movement. To erase the message, press shortly the button "Start position" and then locate the cause of the malfunction and correct it before restarting work.

No power supply:

- check connections of the TSS8/001 transformer.

No control over the machine:

- check output connections DWN and UP of the adjuster to contactors.

After pressing "Start", the machine does not stop, despite the correct dimension entered:

- check the value of the input divider (Point 7).

The machine stops, the display shows the message “Er P”:

- check the MSK-320 encoder connection to the adjuster plate; check whether the transducer cable is broken or whether the machine head is in a position causing the activation of limit switches; check the contactors' connections.

The dimensions are too divergent:

- auto-calibrate; check the installation of the MSK-320 sensor and its correct movement over the magnetic tape; check the distance of the sensor along its path over the magnetic tape.

During auto-calibration, the adjuster displays the message “Auto Er P”:

- measure the distance between the saws and enter the correct value to the adjuster, using the key “**Set Real size**” (see **Point 8**), check whether the head has caused the activation of the limit switch during the calibration movement; check the connection of the MSK-320 sensor and its path over the tape as in the case described above regarding the message “**Er P**”.

During manual control of the saws with the spacing reduction button, the adjuster stops and displays the message “Set Real”:

the counter value “Real size” is below zero; mistyped spacing dimension. Measure the spacing of the saws and enter the correct value to the adjuster, using the button “**Set Real size**” (see **Point 8**).

Operation recommendation

For having maximal good parameters of the cutting it is recommended to use auto-calibration at least twice a week. Auto-calibration proceedings are in details described in the point 3 of the chapter 3 “Auto-calibration (controller’s checking in with technical parameters of the sawing frame machine where its mounted)”. Before starting of the operation the “Saw Height” displayed needs to be checked and compared with the real head saw position. In case of the any divergence it needs to be corrected according to the procedure shows in the point 4 of the chapter 3 “real saw height settings”.

Do not press the keyboard using hard or sharp objects, it can cause irreversible damages. In case of the dirty keyboard, please use only proper medium to clean it up. Please remember to not press to hard membrane buttons. Pressing to hard of the buttons can cause damages and eventually exchange of the hole keyboard. The controller should not be exposed direct on getting wet with rain, water or any other fluids.

EMC Approval

Controller ANP-05 is approved and fulfill all requirements concerning electromagnetic norms according to EMC.

The controller ANP-05 should be set up and installed according to European and domestic norms. Responsible for adjusting the controller is person who set up the electric and control system on the sawing frame machine. It needs to be under EMC regulations.

The controller need to be concern as a component of the sawing frame machine, it is not a separate machine or electronic device according to European directive (machine directive and electromagnetic compatibility directive).

The assembler of the controller ANP-05 is responsible for fulfill all those directives. Product and equipment described within this instruction can be modify as from technical as operational point of view. This written description – handbook manual cannot be consider as a contract.