# Aggregate & Sonderbau KLUGE

# HIT-M-2750 HIT-M-3300

User Manual





CE

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# 1 Safety regulations and general advice



Please read the USER MANUAL very carefully before you start to work with the machine. Please make sure that you have understood all advices and regulations before you work with the machine. Store the user manual in the machine storage box, that you are able to read the user manual also later on in the case of doubts.



By non-compliance of following the safety regulations, serious injuries can result of it. Also non-compliance of the safety regulations and general advice can result in electric shocks, fire and/or serious injuries

- Don't touch any rotating and/or moving parts.
- Please consider, that the machine can reach high temperatures.
- Don't touch any hot components.
- Hold the running machine any time safe in both hands.
- Don't lean against the machine so far it's still hot.
- Mind anytime that the connecting cable is always unrolled and that it is not impede during the work.
- The pressured air has to be free of oil, solvents and water and has to be also filtered.
- In the case you adjust, store or maintain the machine, unplug the machine always from the power and pressured air supply.
- Park the machine any time after the work on a safe ground and let it cool down completely before you store it. Otherwise hot components can create any damage.
- Please check before every use of the machine, that the connecting cable is in a good condition and does not show any damages.
- Do not misuse the connecting cable to carry the machine, to unplug it or to hang the machine up with it. Keep the cable away from extensive heat, oil, sharp edges or moving machine components. Damaged or knotted cables are increasing the probability of an electric shock.
- Don't maintain or adjust the machine, so far the machine is still hot.
- Please check before every use the cable and plug. Don't use the machine, if you are detecting any damages on the machine and its components. Do not open the machine on your own and let it repaired just by qualified personnel only with original spare parts. Damaged cables and machine components are increasing the probability of an electrical shock.
- Wear always gloves and do not touch any hot components. High risk of burns
- Don't use the machine in the near of burnable and explosive substances.
- Don't use the machine in an environment with high humidity or in the rain.
- The machine can release any vapors of the edge which is used.
- Please work only in well-ventilated areas. In the case the edge banding manufacture is asking of wearing a breathing mask, you have to follow this advice.
- You have to follow also the safety regulations and general advices of the edge banding manufacture.
- Please wear all the time ear protection when you are working with the machine. Loud noises can lead to permanent hearing damage.







# 2 **Product description**

#### 2.1 Approved Use

This machine is developed to be able to process any kind of existing "Laser edges" so called coextruded, recoated edge and also for the traditional pre-coated EVA Holt melt edge. The machine is able to process straight, curved, circled and angled cutting surfaces of the board materials. Angled cutting surfaces of 50° and more are no problem for this machine.

# 2.2 General description of the mobile edge banding machine

- 1. HIT-M Main body
- 2. Fine wire fuse 2A (Control unit)
- 3. Connection foot switch (accessory)
- 4. Feed rate adjustment
- 5. Edge input
- 6. Guiding plate
- 7. Main pressure roller
- 8. Second pressure roller (pivotable)
- 9. Pressured air supply NW 7,2
- 10. Power supply
- 11. Locking bore for second pressure roller
- 12. Clamp lever for guiding plate
- 13. Work piece thickness adjustment
- 14. Edge height adjustment hold down clamp
- 15. Thread for eyebolt
- 16. Air pressure control
- 17. Air temperature control
- 18. Heating element I/O-Switch
- 19. Power indicator heating element
- 20. Edge height adjustment Edge input
- 21. Nozzle heating and edge input **I/O**-Switch
- 22. Power indicator nozzle heating
- 23. Edge banding processing switch
- 24. Processing air pressure display



Figure 1 - Connecting cable incl. pressured air hose



Figure 2 - Locking bolts for second pressure roller



Figure 3 - Eyebolt



Figure 4 - Cleaning brush



Figure 5 - 5 & 6 mm Allen key

#### 2.3 Technical Details

230V AC 50/60Hz
3,05 KW
230V 16A
10-65mm
22mm (10mm*)
0,4-3mm
1-5,5m/min
520°C
2,5bar
Min. 5bar
Max. 10bar
Main body
temperature
70°C
5m
11kg

#### 2.4 Standard Equipment

The standard equipment of the HIT-M contains:

- HIT-M machine
- Guiding plate
- Eyebolt
- 2 Locking bolts for second pressure roller
- Connection cable
- User manual
- Cleaning brush
- 5 & 6mm allen key
- Tanos-Systainer (Transport box with foam inlay)

#### 2.5 Optional Accessory

- Tanos-Systainer Transport trolley
- Foot switch for HIT-M stationary use
- Table for HIT-M stationary use



Figure 6 - Foot Switch (Accessory)



Figure 7



## 2.6 Packaging and Transporting

The HIT-M machine is delivered with a steady Tanos-Systainer inclusive a foam inlay to avoid any damages on the machine during transportation.

### 2.7 Before the first use

Take the machine carefully out of the transport box and put all components which are mentioned under 2.4 on a table. Keep the transport box for a later storage of the HIT-M machine or for safe transport of it. Turn the clamping lever A counter clockwise to lose the fixing of the guiding plate. Move the guiding plate **B** in an upwards direction as it is shown in Figure 7. In the next step you have to move the guiding plate from the bottom up into the height adjustment (Figure 8). After that you have to connect the machine with the power and pressured air supply. To do so, you have to connect the connection cable to the machine as shown in Figure 9 in a first step and then afterwards with your power and pressured air connection in your facility.



The pressured air has to be free of oil, solvents and water and has to be also filtered to avoid any damages on the machine. **Min. air pressure 5 bar** 

Before you start to work with the machine you have to follow the following advices in the next chapters. Otherwise the operator can be injured seriously or the machine can get damaged. Also the quality of the processing results can be affected by any misuses

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Figure 8



Figure 9 - Power and pressured air connection



Figure 10 - Ground tracer

# 2.8 Important advices whilst working with HIT-M

- The surface of the workpiece, on which you want to process the laser edge, has to be positioned to the pressure roller and has to be free of dust. In case of an angled surface, see chapter Fehler! Verweisquelle konnte nicht gefunden werden..
- Especially on thin edges, it's very important to have a high quality cutting surface on the workpiece to receive good gluing results. The gluing results are mainly pending on the cutting surface quality
- The room temperature should be at least above 15°C (59°F).
- The quality of the gluing result is also pending on the force, with that you have processed the edge on the work piece.
- To double check the interaction of pressure, temperature and feed rate, it's reasonable to make some test runs on some useless work pieces before you start to process edges.
- Keep the machine in a clean condition without any dust or chips to have all the time excellent gluing results
- Use the machine when it's fully heated up and the pressure supply can supply enough pressure and air flow for the machine.

#### 2.9 Ground Tracer

The machine has implemented a ground tracer underneath the bottom surface, to trace if the machine is lifted up by the operator for using it. (Figure 10). The advantage of this ground tracer is, that the machine switched directly into the stand-by mode (deactivated heating device) if it's not used. This saves energy and extends the lifetime of the machine.



Figure 11 – Guiding Plate setting



Figure 12 - Hold down clamp setting

## 2.10 Machine Settings

The following settings are mandatory to achieve excellent gluing results, while processing laser edges with this device.

### 2.10.1 Guiding Plate settings

Figure 11 is showing how you can adjust the height of the guiding plate. To do so, you have to untighten the clamp lever for the guiding plate first. Afterwards move the guiding plate so far up or downwards that the top edge of the hexagonal rod and the top edge of the laser edge are at the level. With this setting, an edge overhang of 2mm to both sides of the workpiece is ensured. After the setting of the guiding plate you to tighten the clamp lever again.

Example: Workpiece thickness 19mm  $\rightarrow$  Laser Edge height 23mm  $\rightarrow$  Overhang 2mm.

## 2.10.2 Edge height settings

To adjust the edge height in the machine you have to follow the two following steps.

• Hold down clamp setting

The hold down clamp setting is shown in Figure 12. At first untighten the knurled screw **A** and pull the hold down clamp **B** so much upwards so that the edge fits into area **C**.



Figure 13 - Edge input area



Figure 14 - Height adjustment



Figure 15

After that push the hold down clamp back onto the edge in are C so that you are still possible to remove the edge easily. Tighten the knurled screw **A** again that the hold down clamp can't move during operation. If the edge is still sticking in the area of the hold down clamp, move the hold down clamp just a slightly bit upwards.

• Edge Input area height adjustment

To adjust the edge height at the edge input area, you have to untighten the orange clamp lever in Figure 13 first and move it upwards afterwards. Please observe that the nozzle heating is not turned on, because otherwise the entry rollers are rotating. After that you have to position the edge between the entry rollers and observe that the edge is touching the ground plate. In the next step push the red button of the handle (Number 23) so long so that the edge is pulled in by the entry rollers. If the edge is appearing in the viewing window stop pressing the red button immediately (Figure 14). Move the clamp lever back on the edge and tight it again (Figure 15). After that you can turn on the nozzle heating switch again. The edge will may be pulled a bit further in until it stops automatically. Now you can pull the edge backwards with some force out of the machine.

• To avoid any blocking in the entry area it's reasonable to chamfer the beginning of the edge band as shown in Figure 13, (**red line**). This procedure is very helpful, if you processing very thin edges



Figure 16 - Temperature setting



Figure 17 - Air pressure setting

#### 2.10.3 Temperature Setting

To set the temperature, you have to press the buttons next to the display in Figure 16. With button A you can decrease the set value in single Celsius steps. With button B you can increase the set value again. Push either the A or B button so long so that the green set value in the display reaches your desired air temperature. The green set value is flashing a short time afterwards to confirm you that the new set value is active now. The actual value of the air temperature is shown in red digits in the display. As soon as the ground tracer detects that the machine is lifted by the (Chapter Fehler! Verweisquelle operator konnte nicht gefunden werden.) the air system is heating the air up to the set temperature in just a few seconds.

Caused by fluctuations in the pressured air supply system and internal parts of the machine, the actual value can fluctuate by approx. +/-30°C around the set value. If the actual value is 20°C below the set value, the green set value in the display switch to the letters "GO"(Figure 17). This confirms you that the machine is now ready to use.

#### 2.10.4 Pressure Setting

Next to the temperature it is also mandatory to adjust the working air pressure to the right value. The pressure display shows you the current value **just** during processing mode. To set the pressure to the correct value you have to turn the set screw **A** in Figure 17. Before you set the pressure, you have to heat up the air to the set value by tilting the machine so far that the ground tracer activates the heating element. Now press button **B** so that the air valve is open and you can hear air flowing out of the nozzle. In this condition you can now set the pressure.



Figure 18 - Feed rate setting



Figure 19 - Untighten the socket head screw



Figure 20 - Angled guiding plate

It makes sense to decrease the pressure first below the desired value before you slowly increase to the value. The pressure can be read out by the pressure display, as long as button **B** is activated. If button **B** is not activated any more, the pressure value in the display sinks on a minimum, which you can hear as a quiet noise. This little air breeze in the stand-by mode is needed to cover all sensors with air so that they can work properly. The minimum set value of the air pressure has to be 0,4 bar. Preferably 0,5-1,0 bar pending on the edge type.

#### 2.10.5 Feed rate setting

This chapter describes the setting of the feed rate. By rotating the setting wheel in Figure 18 you can adjust the federate which is displayed in the display above the setting wheel. The feed rate is shown in **m/min**. After you have adjust the feed rate value by turning the setting wheel, you have to press the wheel once to confirm the value. After that the value is flashing a few seconds in the display, which shows you that the new set value is active. If don't press the wheel, the old value is still active. By processing edges with a big height (>40mm) its reasonable reduce the feed rate to achieve consistent gluing results.

## 2.10.6 Angled guiding plate

This machine is capable to process edges on angled cutting surfaces which are not rectangular to the work piece surface.



Figure 21 - Turn on the HIT-S machine



Figure 22 - Feed in the edge



Figure 23 - Positioning the machine at the work piece beginning

By not using any glue or similar material which can leak out of the machine, the machine can be tilted in every dimension. Therefore it's possible to glue edges on cutting surfaces which are angled with more than 50°. To do so, you have to untighten the socket screw (width across flats 6mm) in Figure 19 and tilt the guiding plate in the desired angle. Afterwards you have to tighten the socket screw again. To adjust the correct angle you may can use a sliding bevel. If the guiding plate is angled, you can't use the edge height adjustment procedure out of Fehler! Verweisquelle konnte nicht aefunden werden.. In this case you have to adjust the height directly on the work piece.

#### 2.11 Operation



konnte nicht gefunden werden.

Put the machine on a flat surface, so that it stands safe and that the ground tracer is touching the surface. Plug the machine as described in the previous chapter to power supply and also to the pressure supply. Now you can turn on the machine by switching the buttons **A** into position "I", *(see switch A in Figure 21)*. From this moment, the entry roller are starting to rotate automatically (in the case there is no edge in the edge input area) and the machine starts to heat up. The heating up phase lasts so long as the red indication light **B** in Figure 21 is lightning. The phase lasts approx. 2 minutes, in the case the machine was started from cold condition. Now the machine is ready to use. It can appear that the red indication light is sometimes flashing during operation, but has no impact for the use.



Figure 24 – Start edge processing



Figure 25 - Edge processing



Figure 26 – Example result

During operation you should respect that the red indication light is lighting, when you start to process an edge. Process edges just in the case you have adjusted the machine according to previous chapter and that they are matching to requirements of the edge you are using. A table with references values for pressure, temperature and feed rate is attached in chapter Fehler! Verweisquelle konnte nicht aefunden werden.. If the machine is heated and set up properly you can feed the edge into the rotating entry rollers (Figure 22). To avoid any blockings, it makes sense to chamfer the beginning of the edge. The machine is pulling automatically the edge into the machine and stops after a few centimetre. Keep in mind that the edge should be at least 3-4cm longer as the work piece, so that you get an overhang at each side of the work piece. Lift now the machine with your hand and position it at the beginning of the work piece.

Advice: Allow a gap of 10mm between the first pressure roller and the beginning of the work piece (Area **A** - Figure 23)).

Follow in the display how the temperature is increasing rapidly to the adjusted set value. Shortly before the set value, the green digits of the set value are switching to the letters "**GO**". This is the start signal to start to process the edge on the work piece. Press the red button on the top of the handle to start the process. Important to know is, that you can lock the button, when you are pushing it fully down. This is reasonable, if you are processing longer work pieces. To lose the lock it, you have to press the button again. In the normal mode it's working as a bush button.



Figure 27 - Removal of the blind screw



Figure 28 - Insert the eye screw

Which you have to hold continuously during the processing operation. After you have pressed the button, the feed start automatically and leads the edge along the pressure roller. At the point of time when the edge is appearing between the first pressure roller and the work piece, press the edge against the work piece. Through the rotating pressure roller, the machine is moving along the work piece. You don't have to move the machine on your own, just follow it. Press the machine with a continuous force against the work piece until you have reached the end of the work piece. After that put the machine back on the surface so that the ground tracer is touching the surface. Please ensure that you have deactivated the button on the handle again (B, Figure 17) otherwise the heating element would waste constantly energy and pressured air. If you have finished the edge banding process, switch the two buttons (Figure 21) into position "O" and wait until the actual temperature in the display drops below 60°C. Afterwards you can disconnect it from the energy and pressure air supply.

To get constantly excellent gluing results it's reasonable to check before every operation the machine settings and do some test trails on some test work pieces. This helps you to understand this kind of unique new technique and also to ensure that you are able to process laser edges with a high quality standard.

**Important notice:** Too high temperatures or pressures are not resulting in better gluing result. You may start to burn the glue layer on the edge already. "A lot doesn't help necessarily a lot"

#### 2.12 Stationary Operation

This machine can be also operated in a stationary mode for edge banding combined with the optional available angle table and the foot pedal for the HIT-M machine



Figure 29 - Put shackle in place



Figure 30 - Locking the 2nd pressure roller

This application is particularly suitable for small and shaped work pieces. The setting for the stationary use is described in detail in the user manual of the angled table.

# 2.13 "Flying" - Operation

With the suitable accessory (shackle and eye screw in Figure 3) it's possible to install the machine on handling devices or small cranes. To do so, remove the blind screw in Figure 27, insert the eye screw in Figure 28 and put the shackle in place (Figure 29). Now you can connect your handling system with the shackle, that machine can be operated safely.

### 2.14 Locking the 2<sup>nd</sup> pressure roller

With the two supplied locking pins (Figure 2) it's possible to lock the 2nd pressure roller. To do so pivot the 2nd pressure roller into the desired position and put the two lock pins into the bores which are the closets to pressure roller. Figure 30 shows an example how the 2<sup>nd</sup> pressure roller can be locked. With this configuration it's possible to process small inner radii or edges close to inner corners.

# 3 References values for pressure, temperature and feed rate

Table 1 until table 4 are showing reference values for temperature, pressure and feed rate settings for the different edge heights sorted against the different laser edge manufacturer who are available at the moment.

	Rehau Edges			
Edge	Pressure	Feed	Temperature	
height	[bar]	rate	[C].	
		[m/min]		
23mm	0,85	3,5	430	
33mm	0,7	3,5	450	
45mm	0,6	3,0	480	
55mm	0,6	2,5	480	

Table 1 - Reference values Rehau

	Ostermann Edges		
Edge	Pressure	Feed	Temperature
height	[bar]	rate	[C].
		[m/min]	
23mm	0,85	3,5	310
33mm	0,7	3,5	350
45mm	0,6	3,0	380
55mm	0,6	3,0	400

Table 2 - Reference values Ostermann

	Hranipex Edges			
Edge	Pressure	Feed	Temperature	
height	[bar]	rate	[C].	
		[m/min]		
23mm	0,85	3,5	320	
33mm	0,7	3,5	370	
45mm	0,6	3,0	400	
55mm	0,6	3,0	420	

Table 3 - Reference values Hranipex

Nevertheless it's still reasonable to do some test trails when you are changing the edge type to fine adjust the settings for temperature, pressure and feed rate. The given values should give you a start point where you can start the fine adjustment. More values can be requested under info@aggregate-sonderbau.de

#### 4 Maintenance and Cleaning

# 4.1 Cleaning of the edge leading channel

To get all the time excellent gluing results and also no machine break down, it's mandatory to clean the edge leading channel (entry roller until first pressure roller) in the machine. Therefore we added a special wire brush to the equipment, with that you can clean the edge leading channel easily. To do so, move the hold down clamp in the highest position (Figure 12) and remove with the brush possible dirt or particle which are may can stick in edge leading channel. In parallel activate the red button at the handle (Number 23) so that no particles can enter into the nozzle bores. Clean the machine every time when you see sticking dirt in the edge leading channel.

#### 4.2 Cleaning of the pressure and entry rollers

It's also mandatory to clean the pressure and entry roller form time to time to get high quality edge bandings. If you don't clean the rollers, it's possible that remaining particles on the rollers can stick afterwards on the outside surface of the edge band and will influence the appearance of the edge band.

	Dölken Edges		
Edge	Pressure	Feed	Temperature
height	[bar]	rate	[C].
		[m/min]	
23mm	0,85	3,5	430
33mm	0,7	3,5	450
45mm	0,6	3,0	480
55mm	0,6	2,5	480

Table 4 - Reference values Dölken

	Hot-melt edges			
Edge	Pressure	Feed	Temperature	
height	[bar]	rate	[C].	
		[m/min]		
23mm	0,8	3,5	160	
33mm	0,7	3,5	170	
45mm	0,6	3,0	180	
55mm	0,6	3,0	180	

Table 5 - Reference values hot-melt edges

#### 5 Elimination machine failures

#### 5.1 Fuse

The machine is hedged with a fuse (Number 2). In a case of a failure the fuse might can burn to avoid any damages on the interiors of the machine. In a case on a failure the fuse has to be replaced only with the following type of fuse

Fuse-Type: F, 2 A for 230 V, D5xL20mm

# 5.2 Edge band is blocked into the machine

Check, if all edge height adjustment elements (chapter 2.10.2) are set up correctly. If even so the edge is blocked for any reason in the machine, you have to follow the following instruction to avoid any damage at the machine. Put the machine back to the table and try to remove the edge with normal manual force out of the machine, to avoid that hot air is still blowing on the edge. Try to remove the edge in direction away from the pressure roller. If you can't remove the edge immediately, switch both buttons (Number 18 and 21) off and disconnect the machine from the pressured air supply. Otherwise it might can happened that the remaining edge can catch fire in the nozzle area. After you have removed the edge afterwards, check if there are not further dirt or particles in the edge leading channel. If the machine is properly cleaned you can connect the machine back to the pressured air supply to ensure that there is no remaining heat in the machine.

#### 5.3 Automatic edge detection

If the edge doesn't stop automatically after entry rollers, check the following task.

Check if remaining dirt or particles are blocking the small edge detecting switch in the edge leading channel area. Use an air pistol to remove the particle carefully.

#### 6 Guarantee and Service

#### 6.1 Guarantee

All machines produced of the Aggregate & Sonderbau Kluge GmbH have a warranty time of 12 months, counted from the point of the delivery date. Excluding of the warranty are all operations and damages which are results of incorrect use of the machine or be subject of the naturally wear of machine components. Please contact in any case of a repair the service department of Aggregate & Sonderbau Kluge GmbH. Warranty cases can just be recognized, if the machine will be send unopened to the service department.

Aggregate & Sonderbau Kluge GmbH reserves the right to change the products without prior notice.

#### 6.2 Service

The service department is available work days between 08:00-18:00h under the following contact details:

Aggregate & Sonderbau Kluge GmbH Winterseite 30 57392 Schmallenberg/Germany

Phone: +49 (0)2975-963938-0 Mail: <u>service@aggregate-sonderbau.de</u>

# 6.3 Declaration of conformity CE

We declare under our sole responsibility that this product is in conformity with the following standards or standardization documents:

- EN 50144 (Safety of hand-held electric motor operated tools)
- 2014/30/EU (electromagnetic compatibility)
- 2006/42/EG (Directive on machinery)
- DIN EN ISO 12100:2010 (Safety of machinery)

Holger Kluge (Manager)

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