maku-DieTool®

quick manual guide

Trade name: **_maku-DieTool®_**

Manufacturer: maku ag
Flurhofstrasse 13
CH-6374 Buochs
Tel. +41 41 620 11 14
Fax. +41 41 620 11 23

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maku ag, Flurhofstrasse 13, CH-6374 Buochs

1 Mechanical installation

First and foremost, the maku-DieTool® or in particular the cross beam needs to be aligned properly with the die bolts. In order to do that, 2 sets of adjustment bolts are located on the side plates (Fig. 1). One set for the height and the other set for the cross alignment. If the adjustment bolt is being turned clockwise, the cross beam moves towards the adjustment bolt head, if the adjustment bolt is being turned counter clockwise, the cross beam is being moved away from the adjustment bolt head. The alignment needs to be done as such, that the actuator travels along the center of the die bolt with approximately the same distance to the die body. A good alignment ensures proper engagement between the actuator and the die bolts.
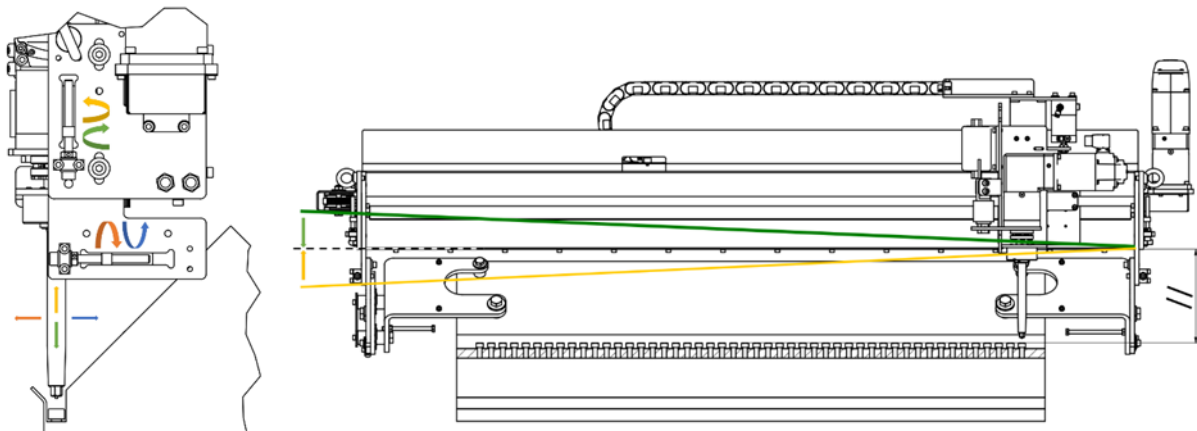

Figure 1: adjustment bolts on side plates

2 Angle adjustment

The actuator needs to match the angle of the die lip bolts. To measure the angle of the actuator, angle measurement devices should be use. With the angle adjustment bolt(s), located on the side plates(s), the angle of the actuator can be adjusted to the correct value. Referencing servo motors

3 Referencing servo motors

The servo axes can only be operated if they have been referenced in the menu [referencing] → [axes]. As the servo motors have an absolute encoder, the axes do not have to be referenced after a power cutoff.

Important: If the power and absolute encoder cables are disconnected from the maku-DieTool®, the device must first be turned off by pushing the main switch (OFF). Otherwise there is the risk that the absolute encoder loses its position and has to be referenced.

Before referencing the carriage, the carriage must first be moved to the reference point with the encoder, the reference point is 300 mm away from the side of the cross beam where the encoder counts negative:

1. Move carriage back and forth to determine the negative count
2. Move carriage all the way to the side plate where the encoder counts negative until it touches the side plate.
3. Refence the carriage by pushing the button [reference cross beam], push it twice to confirm it. The reference point is set at 300 mm (but in reality, it is not, so continue with point 4)
4. Push the button [reference cross beam] again, move the carriage 300 mm from the side plate where the encoder counts positive until it reaches 600 mm
5. Refence the carriage by pushing the button [reference cross beam], push it twice to confirm it. The reference point is set at 300 mm for good now.
6. The button [reference die lip actuator] just needs to be referenced without turning

orange   carriage is not referenced
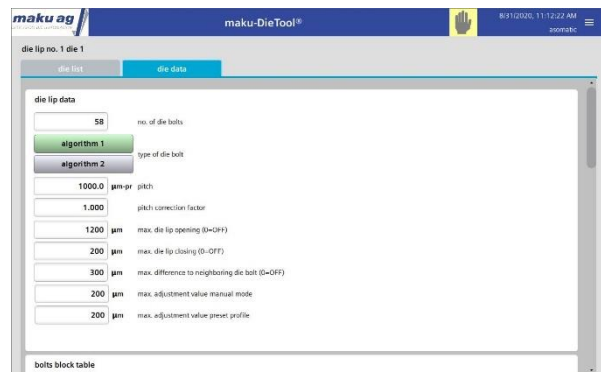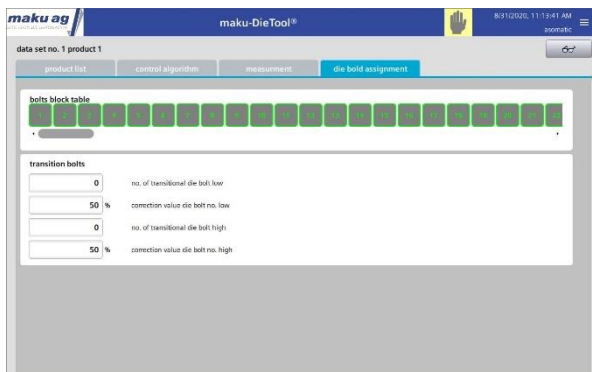green   carriage is referenced

4   Die data

At least one die needs to be parameterized. The list can be accessed in the menu under [machine data] → [die list]. A list of 10 recipes is available.
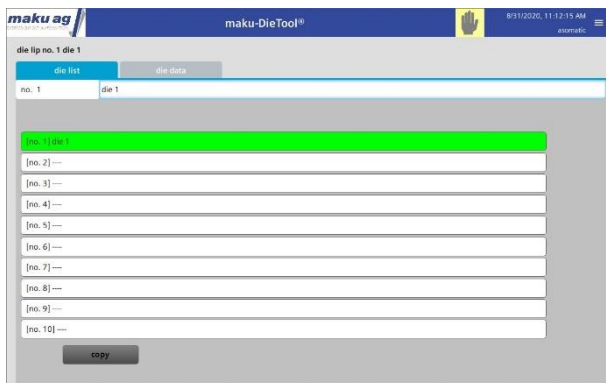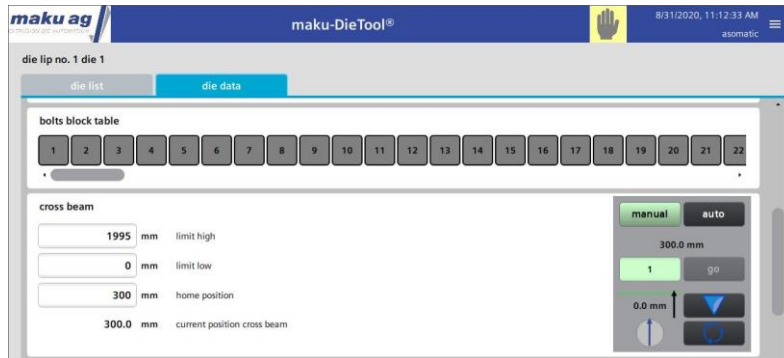

4.1   Setting up the die parameters

The parameters for every individual die are stored under [machine data] → [die data].

4.2 Determine cross beam limits and home position of the carriage

To determine the limits (high and low) the cross beam can travel go to [machine data] → [die data] →[cross beam].

The home position can be set anywhere between the two limits under [machine data] → [die data] → [cross beam].

5 Referencing the pneumatic piston stroke

The signal from the position sensor must be aligned with the stroke of the pneumatic piston. It can be set under [referencing] → [depth measurement sensor]. This needs to be done after the sensor has been remounted or moved to a new position.


6 Referencing of the actual profile

The actual profile or lip opening must be entered in the PLC. In order to do this, all die bolts are adjusted manually to the same reference value with the feeler gauge. The reference value is then entered in the menu [profile data] → [referencing die bolts]. When the [reference] button is pushed and confirmed, all values in the actual profile are set accordingly.
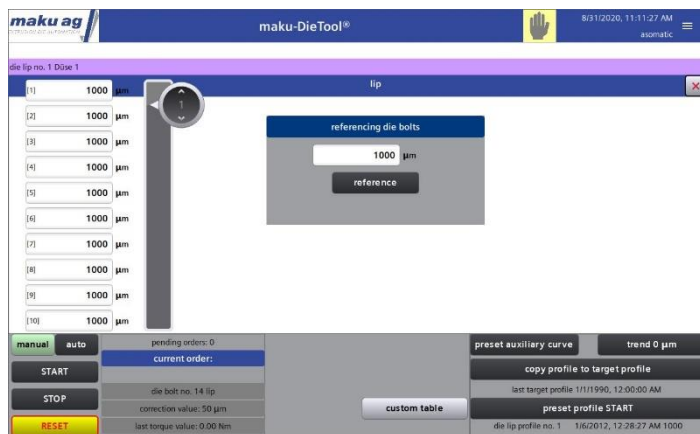
7 Determining the middle of the die

In order for the carriage to engage with any die bolt, the exact position of each die bolt is stored in a table. Any die bolt can be selected as the refence die bolt. The calculation of the positioning table is under [machine data] → [die data] → [position table] → [calculate]. If the reference die bolt and the distance to the reference die bolt has been entered, the actuator can be lowered with the ▼ button to see how it is aligned against the die bolt.
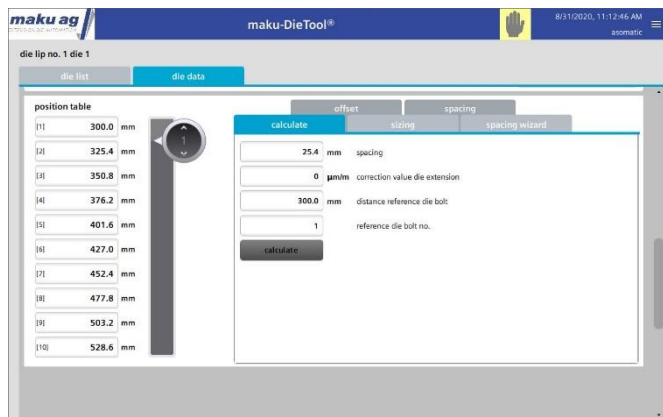

If the actuator is too far left or right, move the actuator by using the offset button under [offset].

8 Determine engagement depth

The engagement depth is determined when the actuator is indeed engaged with the die bolt. This can be done by moving the actuator to a die bolt position and lowering ▼ the actuator (if the actuator doesn't lower look up next step). If the actuator is not engaged, it needs to be raised ▼ and slightly rotated ➡ and lowered again. This procedure needs to be repeated until the actuator is firmly engaged with the die bolt. When the actuator is firmly engaged, the engagement depth can be stored with the button "record die bolt engagement". This depth applies for all other die bolts as well.

Or, with the button [start measurement], the actuator taps every single die bolt on top calculating the engagement depth with preset parameter under [referencing] → [depth measurement sensor]. Note, after every adjustment, the new engagement depth is updated automatically.
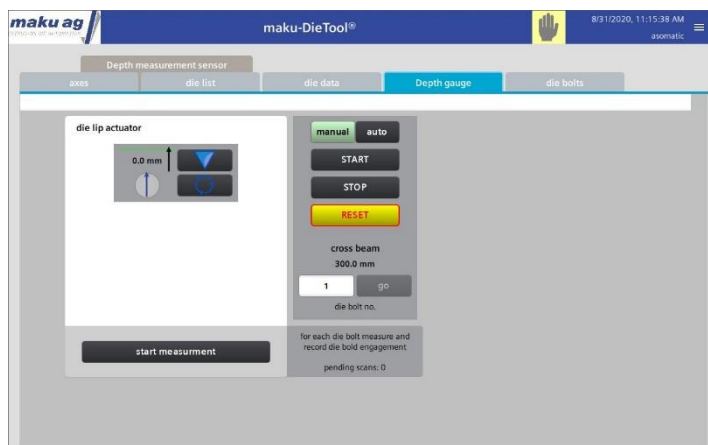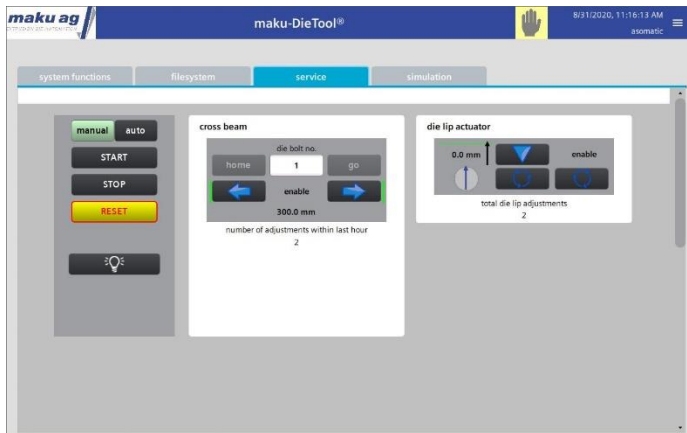
8.1 Determine engagement time

The engagement time is defined as the time it takes to engage the actuator with the die bolt. There are 2 different settings which can be used:

A. The actual time to engage from the 0 position to the engagement depth. A shorter time can also be chosen for the searching motion or

B. The time in seconds per millimeter (e.g. 1.2 sec. per 80 mm would result in 0.015 sec/mm). This is a more dynamic and suitable setting for larger differences of the die bolt heights (push/pull).
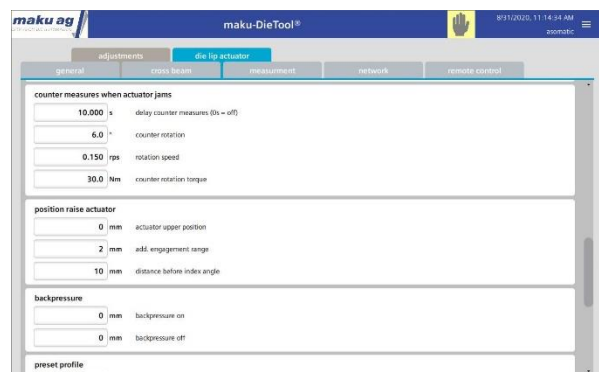
9 Pneumatic box

The pneumatic piston requires 1-3 bars to lower the piston. With the reducer valve (silver knob), the pressure can be adjusted (clockwise it increases, counterclockwise it decreases).
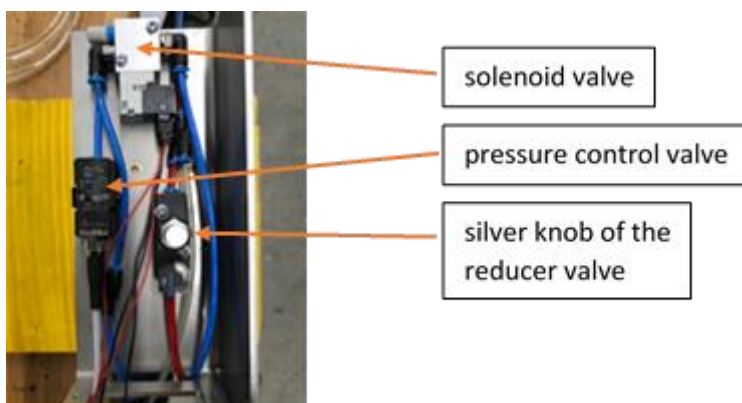
10   Network settings

In order to exchange data such as the thickness profile from a gauging system, the network setting (IP address) can be entered under system-machine data-network. The IP address can be freely chosen.