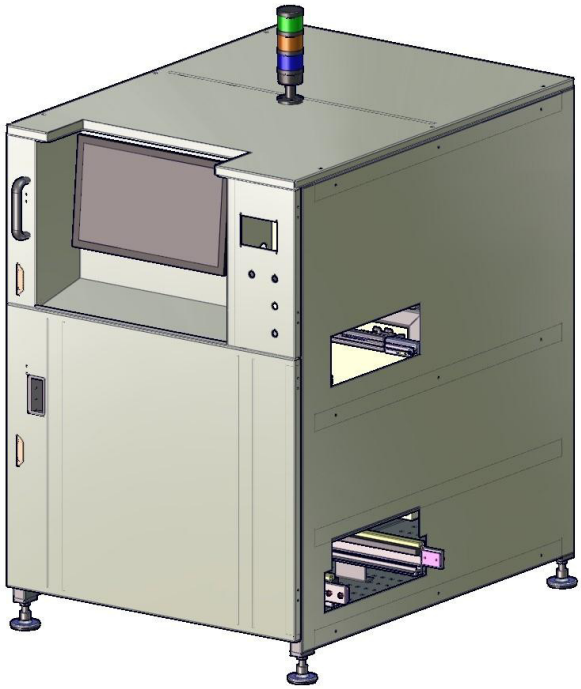
AOI-Station

Vipro Inline



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Subject to technical changes after printing!

1 General notes

1.1 How to use the operating instructions

The operating instructions are part of the AOI station. For this reason, it must be kept close to the system.

All operating, maintenance and service personnel working at the workplace are obliged to read these operating instructions beforehand.

Note: **Keep the operating instructions for further use!**

Note: **If you have any questions about error messages that cannot be clarified with the help of the operating instructions, please fill in the "Error report" form at the end of the instructions and send it by fax to our service department [Fax: (+49) 9342 / 889-200].**

1.2 Safety instructions in these operating instructions

The safety instructions in these operating instructions prescribed by law are intended to prevent harm to users and other persons in the vicinity of the machine. You must therefore always ensure that you comply with the safety regulations.

Safety regulations from local authorities and restrictions imposed by your supplier for consumables are not part of these operating instructions, but must also be followed.

To make safety instructions easily recognizable, they are always structured according to the following pattern:

Attention: **Description of the hazard and regulations to exclude a hazard.**

1.3 Intended use

The AOI station is used for the horizontal transportation and inspection of soldered PCBs. The system is designed ex works in such a way that it is only suitable for transporting and checking the PCBs.

The AOI station may only be operated in a non-explosive atmosphere in a closed room. The system must not be exposed to high humidity

The cladding must be kept closed during operation. Work is not permitted if the cladding is damaged.

Structural changes to the AOI station are generally prohibited.

Any other use or use beyond this is considered improper use. The manufacturer is not liable for any resulting damage.

Intended use also includes

* observance of all instructions in the operating instructions,
* observance of all instructions attached to the system,
* compliance with inspection and maintenance work and maintenance cycles.

2 Safety note

Attention: **The AOI station is part of the soldering system. For this reason, all safety instructions for the soldering system also apply to the AOI station!**

3 Operation

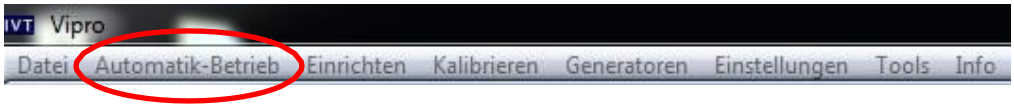
3.1 Switch on

For proper operation of the AOI station, the system must be switched on as follows:

1. Turn the main switch ON.
2. Press the green ON button.
3. Switch on the AOI PC
4. Once the PC has booted up, start the following software using the corresponding icon on the user interface:
   a. AOI software
   b. MES software

Attention: It is essential that you adhere to the start sequence of the software!

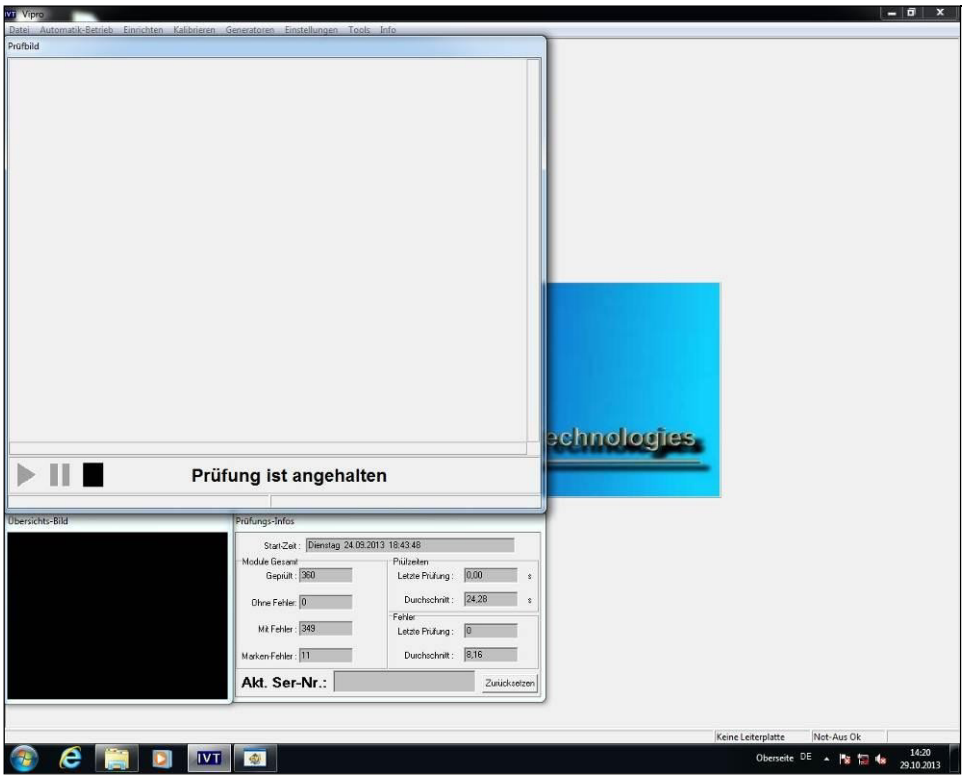
5. After starting the software, the AOI station is automatically initiated and a reference run is performed.
6. Start automatic mode by pressing the corresponding menu item in the menu bar in the AOI software.



In automatic mode, the status of the AOI station is displayed in the status bar of the AOI software.

No circuit board	There is no circuit board in the AOI station Circuit board
present	There is a circuit board in the AOI station Emergency stop
OK	The AOI station does not have an emergency stop
situation	
Emergency stop OK (flashing)	The AOI station is in an emergency stop situation

7. The AOI station is ready for operation and is waiting for a circuit board.



3.2 Process flow

1. The PCB comes out of the soldering system and is transported to the AOI station. The PCB then moves automatically to the test position in the AOI station.
2. The workpiece carrier is first locked and the circuit board identified by a scanner.
3. The test procedure is then started.
4. The AOI system checks the solder joints on the PCB.
5. At the end of the test, the test results for the PCB are sent to the MES system and saved. Errors or error images are output to the operator or the verify workstation. A signal is then sent to the PLC controller to indicate that the test is complete.
6. The circuit board then leaves the AOI station t.
7. The operator can request the PCB and feed it to the next process step.

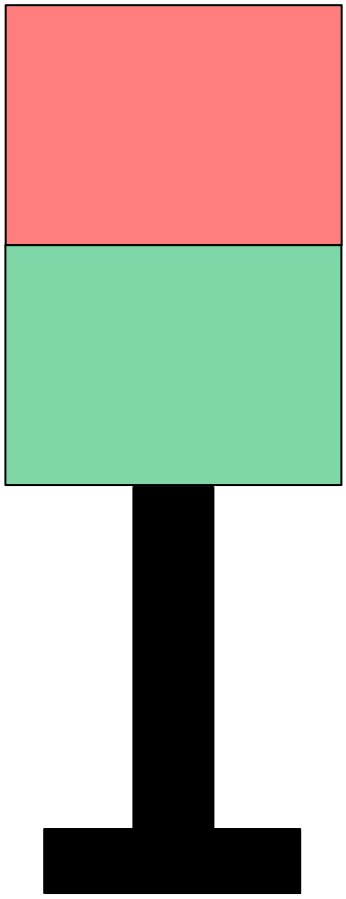
3.3 Switch off

For proper operation of the AOI system, the system must be switched off as follows:

1. Wait until the circuit board has left the AOI station.
2. Exit the AOI software.
3. Exit the MES software.
4. Shut down the AOI PC.
5. Turn the main switch OFF.

3.4 Signal lamp

Different colored signal lamps are to the AOI station.



Signal lamp **RED**:

Permanent: System fault

Signal lamp **GREEN**:

Duration: System is ready for operation

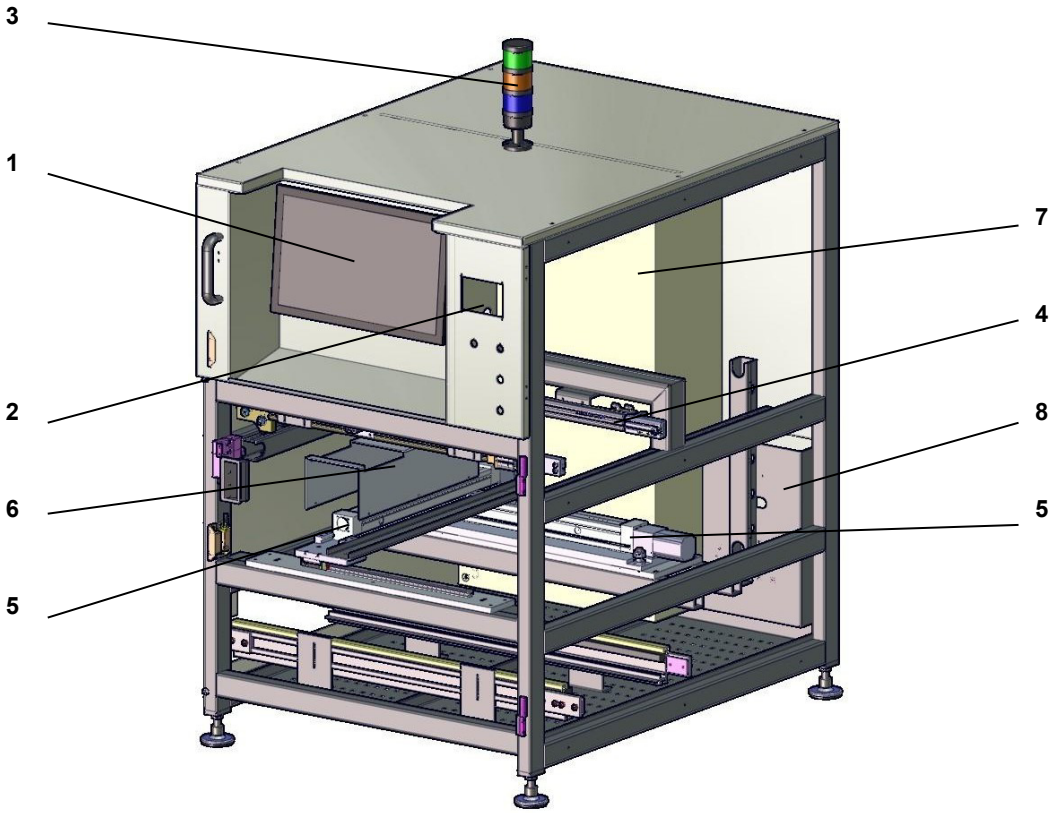
Flashing: System is in test mode

Fig. 3-1 Signal lamps on the soldering system

Note: **For troubleshooting instructions, refer to the "Error messages" chapter in the control unit description.**

4 Structure

The AOI station is integrated into the transport system downstream of the soldering system.



1	Keyboard / monitor, AOI software	5	Axis system for AOI camera
2	Touch panel, AOI station control	6	AOI camera
3	Signal lamp	7	Switch cabinet
4	Pin chain transport	8	Pneumatics

Fig. 4-1 AOI station

The AOI station essentially consists of a steel frame in which the pin chain transport and the axis system for the AOI camera are mounted.

The control cabinet and pneumatics are located at the rear of the AOI station.

4.1 Control unit / switch box

The control cabinet is mounted on the back of the AOI station. All control and safety components required for controlling and monitoring the AOI station are installed in this control cabinet.

The control system for handling the PCB in the AOI station is operated via a touch panel mounted on the front of the AOI station. All settings (inputs) and status messages (outputs) are made via the touch panel. A fault in the process is also indicated by an indicator light.

Note: **For more information on operation, please refer to the operating instructions for the AOI station control unit.**

Other operating elements (emergency stop, emergency stop reset, etc.) for controlling the AOI station are also located on the front below the touch panel.

The AOI software is operated using the keyboard and monitor located on the front of the AOI station.

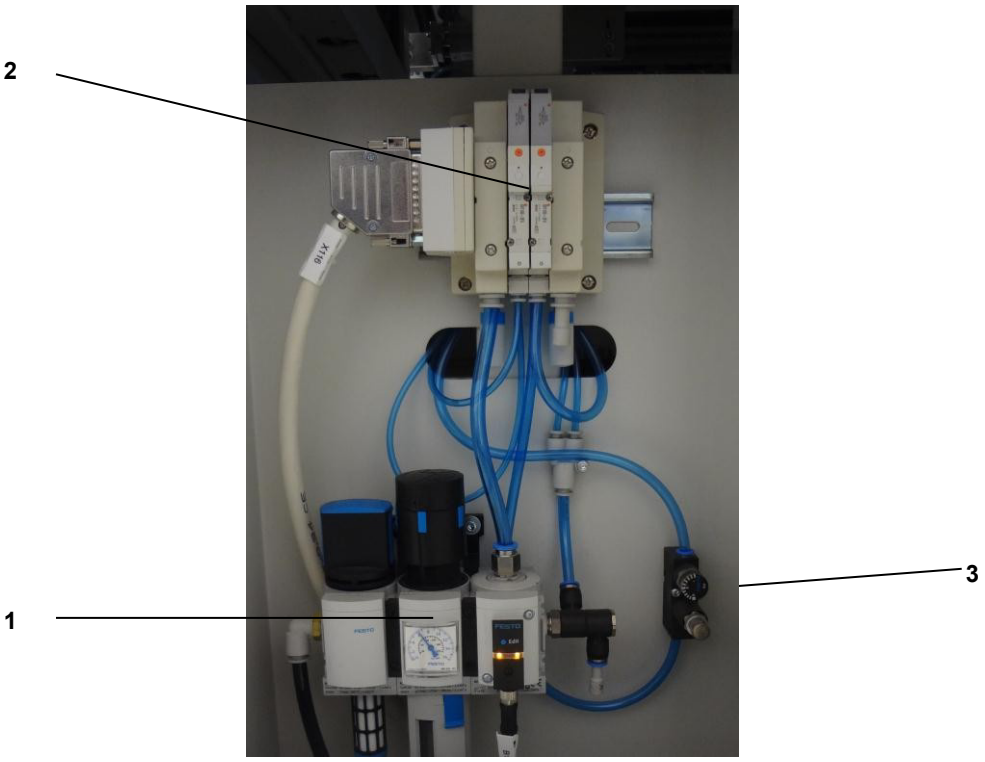
Note: **For more information on operating the AOI software, please refer to the operating instructions for the AOI software.**

4.2 Pneumatic system

The pneumatic system of the AOI station consists of a pneumatic cylinder for clamping the workpiece carrier at the test position and a pneumatic cylinder for pneumatic clamping of the pin chain transport.

Pneumatic control is carried out via the pneumatic plate using electromagnetic valves and pressure regulators. The pneumatic plate is located on the back of the AOI station next to the control cabinet.

The maintenance unit is also located on the pneumatic plate. The inlet pressure of the maintenance unit must be set to **6 bar.**



1	Maintenance unit	3	Pressure control valve
2	Valve terminal		

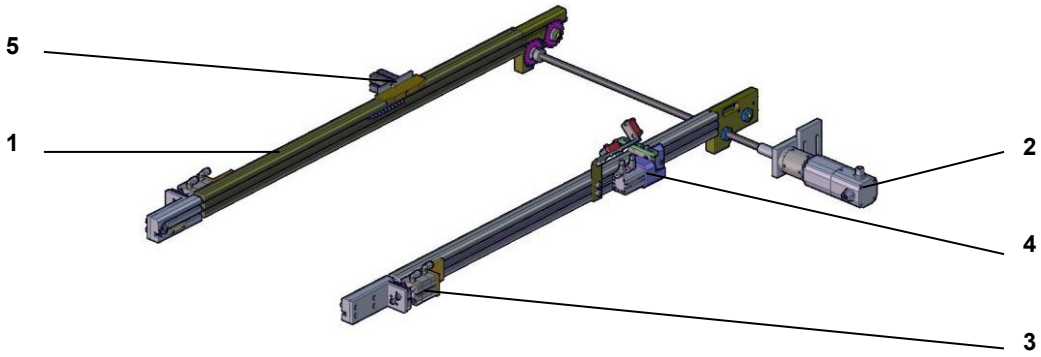
Fig. 4-2 Pneumatic plate / maintenance unit

Please refer to the circuit diagrams for the connection assignments of the electromagnetic valves.

4.3 Pin chain transport

The pin chain transport is installed in the AOI station. It transports the workpiece carrier to the test position in the AOI station and then out of the AOI station.

The workpiece carrier is held at the test position by a stopper and fixed in place with the aid of the PCB clamp.



1	Aluminum profile	4	Stopper
2	Drive motor	5	PCB clamping
3	Automatic chain tensioner		

Fig. 4-3 Pin chain transport

The soldering frames are transported using a pin chain. The pin length is 5mm. The pin chain is guided in coated aluminum profiles. The chain guide also serves as a lateral guide for the workpiece carriers.

The pin chain conveyor is driven by a DC drive motor. An automatic chain tensioner (pneumatic cylinder) is located at the start of the pin chain conveyor.

4.3.1 Maintenance

To ensure trouble-free operation of the buffer transport, it is essential to carry out the following maintenance work carefully and regularly.

Attention:	**Danger of electric shock!**
	Switch off the main switch of the system and secure it with a padlock to prevent it from being switched on again.
	Work on electrical and mechanical parts of the system may only be carried out by qualified specialist personnel.

During commissioning

- Check that the deflections are correctly seated.
- Check the chain guide for parallel running.
- Check the chain tension.

Note:	**In the first three months after commissioning, the chain tension of the conveyor chain should be checked every 4 weeks.**

Weekly:

- Carry out a visual inspection of the deflections for foreign objects.
- Carry out a visual check of the deflection for free movement.
- Clean the pin chain transport (transport profiles, cladding and insert plates, as well as attachment parts) with a slightly alkaline solution.

Monthly:

- Check the bearing points.
- Carry out a visual inspection of the transport chain for damage.
- If necessary, lubricate the conveyor chain with a resin-free oil or a suitable Teflon / silicone lubricant.

Half-yearly:

- Check the chain tension of the transport chain.
- Protect the drive shaft with a resin-free oil.

Attention: Risk of soiling the support pins!

Apply the lubricant sparingly.

Remove excess lubricant with a dry, lint-free cloth.

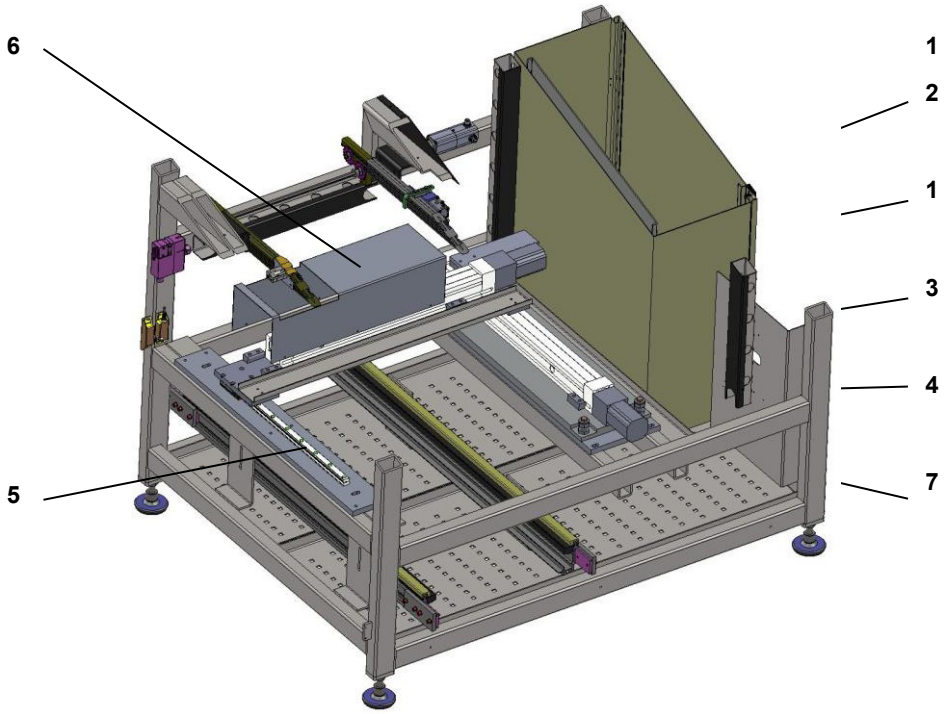
Every 1000 operating hours:

- Check all electrical connections and tighten them if necessary.

Attention: After completion of the maintenance and cleaning work Safety devices Check function!

4.4 Axle system

The guide system consists of two linear guides with ball screws, one each for the X and Y directions. The axis system is driven by stepper motors. The camera is mounted on the linear guide for the X direction. The axis system is maintenance-free and only needs to be lubricated if necessary.



1	Linear unit X-axis	5	Guide rail, X-axis
2	Gearbox and motor, X-axis	6	AOI camera
3	Linear unit Y-axis	7	Leveling unit
4	Gearbox and motor, Y-axis		

Fig. 4 Axle system

Note: **For more information on the linear guides, please refer to the original operating instructions for the linear axes.**

4.4.1 Maintenance

To ensure fault-free operation of the system, the following maintenance work must be carried out carefully and in good time.

Daily:

- Clean the axle system and the surrounding area with a cloth.

Monthly:

- Check the settings and function of the sensors.

Every 1000 operating hours:

* Check all electrical connections and tighten them if necessary.

Attention: After completion of the maintenance and cleaning work Safety devices Check function!

5 Maintenance schedule

The following checklist gives you a quick **overview of the maintenance work to be carried out by the operator**. Further details can be found in the previous chapters.

The best use for this maintenance plan is to have a copy available at the machine.

Attention: This chapter does not contain any safety instructions. Please refer to the respective detailed descriptions in the previous chapters.

Time	Name	Date	Module	Activity
On commissioning				Check that the deflections are correctly seated. Check the chain guide for parallel running. Check the chain tension. **Note:** **In the first three months after commissioning, the chain tension of the conveyor chain should be checked every 4 weeks.** **be controlled.**
Daily			Axle systems	Clean the axle system and the surrounding area with a dry cloth.
Weekly			Pin chain transport	Carry out a visual inspection of the deflections for foreign objects. Carry out a visual check of the deflection for free movement. Clean the pin chain transport (transport profiles, cladding and mounting plates, as well as attachment parts) with a slightly alkaline solution.
Monthly			Pin chain transport	Check the bearing points. Carry out a visual inspection of the transmission chain for damage. If necessary, lubricate the conveyor chain with a resin-free oil or a suitable Teflon / silicone lubricant.

Attention: **This chapter does not contain any safety instructions. Please refer to the respective detailed descriptions in the previous chapters.**

Time	Name	Date	Module	Activity
Monthly			Axle systems	Check the settings and function of the sensors.
Half-yearly			Pin chain transport	Check the chain tension of the transmission chain. Protect the drive shaft with a resin-free oil.
Every 1000 operating hours				Check all electrical connections and tighten them if necessary.

Attention: **After completion of the maintenance and cleaning work Safety devices Check function!**