

# A7a Flying Probe Test System

Automated Test for Rigid and Flexible Boards



- ▲ 8 Test Heads
- ▲ Fully Automated
- ▲ Soft touch probe
- ▲ Kelvin 4-Wire Testing

## 1.3 Machine type, series, year of construction

Designation: Automatic test system for bare printed circuit boards /  
flying probe test system  
Machine / Project: A7a  
Year of construction: 2014

## 1.4 Manufacturer, service addresses

Manufacturer: atg Luther&Maelzer GmbH  
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97877 Wertheim  
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## 1.5 Training

During the commissioning of the machine, training is carried out by the manufacturer and those responsible for bringing the machine onto the market, in the context of which the operational and maintenance personnel are familiarized with the machine. This also affects the operation of the machine controller.

The operator is also obligated to instruct the operating and maintenance personnel on further currently valid legal and accident prevention regulations and to instruct them on a regular basis about the machine's safety installations. In this context the different professional and technical qualifications of the individual employees are to be taken into account.

The operating personnel have to understand the instructions and it must also be ensured that all instructions are complied with.

Checks must take place to monitor the safety-conscious work on the machine by authorized employees on a regular basis.

## 2. Intended use

The automatic A7a test system is designed for the testing of printed circuit boards. The permitted dimensions of the circuit boards that are stated in the operating instructions are to be complied with (see 8. Technical Data).

The test system consists of the flying probe test machine and additional devices required for automatic operation. The circuit boards are placed on the loading system in stacks, automatically isolated during the test operation and then fed to the flying probe test machine. After the testing the circuit boards are also separated into good and poor products and stacked on stacking facilities from where they are then removed by hand.

If required, the machine can also be used manually for the testing of individual circuit boards, which can then be placed directly between the sliders for feeding the circuit boards to the test area (shuttle).

Intended use also includes observing the instructions on safety, operation and maintenance which are provided with these operating instructions.

Within the scope of the intended use, the decommissioning of safety installations is not permitted.

If errors occur the machine may not be operated any more!

## 3. Reasonably foreseeable misuse

Using the machine when it is in a poor condition and in any way which does not correspond with the information and instructions in these operating instructions and the accompanying instructions manual is considered to be improper use and is not permitted!

The user/operator of the machine is solely liable for any damage that results.


This also applies to unauthorized changes and also to the use of other circuit boards than those stated as suitable in these operating instructions.

Improper use also applies if, subsequent to the completion of the work, keys remain inserted in the key switch and also if the key for the switch cabinet has not been removed. The switch cabinet must be kept closed at all times during normal operations. The keys for the key switch and the switch cabinet are to be kept in a safe place to prevent unauthorized access.

The operator of the machine is responsible for any consequences which result from incorrect use.

With observation of the specified instructions and operation by appropriately instructed operating personnel, a reasonably foreseeable improper use of the machine is not otherwise conceivable.

cladding panels. These panels can only be removed with tools.  
 All of the safety notices are counted with the safety installations on the test system.  
 It must be guaranteed that these instructions are kept in a complete and readable state throughout the duration of use of the machine.

<b>DANGER!</b>	
	<b>Operating the test machine with missing or damaged safety installations is not permitted! This is considered to be improper use and can lead to serious injuries!</b>

## 6. Labeling of the machine /Type plate



Image 1: Type plate of the machine. Technical details can deviate from the actual type plate.

CE-labeling:

Indicates conformity with the valid EU regulations

- that relate to the product and
- that prescribe CE-labeling.

# 1. General remarks

## 1.1 Information about this instruction

This instructions contain important details and is a substantial help for save and successful application of the machine.

You have to take notice of the instructions before you work with the machine. The instructions must be provided throughout the full machine utilization period for the operating and maintenance personnel in complete and readable condition and have to be placed at the machine.

The instructions are valid only for the described machine type and are not subject of the updating service of the manufacturer.

The featured sketches and drawings are not true to scale. The dimensions are defined in Millimeters.

The main focus of this instructions is safe handling of the machine. For further information, which are necessary for different work procedures with the machine, please consider the additional provided user manuals and supplementary documents.

This instructions do not suppose to be a comprehensive technical description. For any damages caused by operating errors, insufficient reading of the provided documentation, or other unqualified acts on the machine, the manufacturer does not bear responsibility.

This instructions are subject to change without notice and can be adapted to further technical developments.

## 1.2 Copyrights

This instructions must not be copied or distributed, neither in whole nor in parts, without explicit authorization of the manufacturer. This also applies to storage on other media. This document must not be used outside the intended purpose. Distribution to third parties is prohibited without agreement of the manufacturer.

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Contravention will result in indemnification.

circuit board. This upward movement is automatically stopped in this context. With the lifting arm (5) the circuit boards are removed individually from the stack in automatic operation with the help of vacuum suction device. The lifting arm then swings across and places the circuit board on the conveyor system of the test system. Vacuum generators are used to create a vacuum on the suction cups. The positions of the vacuum suction device are set automatically on the product.

If button (7) is pressed in once the stacking device moves down 6 cm. If the button is pressed and held it is possible to continue the returning of the stacking device to the lowest position.

With the conveyor system of the test system the circuit boards are brought into position on the shuttle by a powered roller conveyor, stopped at a limit stop and then positioned exactly with the help of the clamping device of the shuttle and held for running into the flying probe test machine.

After the test the shuttle returns the circuit board to the power driven roller conveyor, which takes control of the subsequent transport to the stacking devices for the tested circuit board on the left of the test machine.

According to the test findings the circuit boards are placed on the good stacker (18) or on the bad stacker (20) and collected for manual removal.

The test system can optionally be equipped with a label printer (1). With the labels that are made it is possible to create identification and test result information as well as a data matrix code which are applied to the individual circuit boards.

The remote control (12) and the mouse (13) can be used to correct the automatic settings of the suction position and the shuttle to a new circuit board.

Emergency off buttons are located on different positions of the machine (8), (10), (19), (23) with which the machine can be switched off in the event of an emergency.

A switch panel with a key switch (23) is situated on the rear side of the machine. With this switch it is possible to deactivate the safety shutdown of the cover (3) so that this area of the machine is accessible for tests, setting work and measurements by specialists in the operational status of the machine.



Image 3: Switch panel on the back of the flying probe test machine

The machine control can be switched on with button (24) and switched off with button (25). The mains cut-off switch (26) is lockable and turns the machine to completely zero voltage in the off-state.

The flying probe test machine and the additional devices are separate components that are bolted together and which can be arranged exactly via height adjustable machine bases. The basic construction of the finger test machine is an inherently stable welded construction, the additional devices are constructed on the basis of an aluminium profile material construction.

The dangerous areas within the test system are protected against access by bolted cladding panels.

All the system components are equipped with potential equalization throughout.

Compressed air is required on the test system which must be provided on a constant basis by the operator to the necessary amount and with the necessary pressure.

No machine-specific lighting system is provided on the test system. Specific fire protection systems are not necessary or available. Measures necessary for the work place must be provided by the user of the test system.

## 8. Technical Data

<b>Technical Data Machine</b>	
Total weight of the test system	1.850 kg
Dimensions of the flying probe test machine L/W/H [mm]	1.846 x 1.154 x 1.790 mm
Installation surface of the test system L/W/H [mm]	3.648 x 2.502 x 1.790 mm
Power supply	3 x 400 V AC, 50 Hz (3 x 208 V AC, 60 Hz)
Output of test system	2.5 kVA
Required compressed air supply	6 bar, ISO 8573-1: class 4
Permitted environmental temperatures	18°C to 27°C
Relative air humidity	40 to 60%
Data format	IPC-D-356A
Network connection	Ethernet, TCP/IP
Max. circuit board dimensions, automatic operation	610 x 460 mm
Max. circuit board dimensions, manual operation	610 x 460 mm
Min. circuit board dimensions, automatic operation	100 x 100 mm
Min. circuit board dimensions, manual operation	25 x 25 mm
Max. circuit board thickness, automatic operation	up to 4 mm
Max. circuit board thickness, manual operation	up to 7 mm
Max. loading height of the stacking device	390 mm
Cycle time, automatic operation	20 s
Smallest possible pad	50 µm
Smallest possible pitch	100 µm
Adjustable pressure of the test probe	5 bis 15 g, soft touch probe 10 to 100 g, rigid probe
Adjustable test voltage	up to 500 V
Continuity test	1 Ω to 10 kΩ
Isolation test	up to 25 MΩ (FM), 2 GΩ (ohmic)



## 7. Technical description

The A7a circuit board test system consists of the flying probe test machine and additional feeding and conveying devices required for automatic operation.

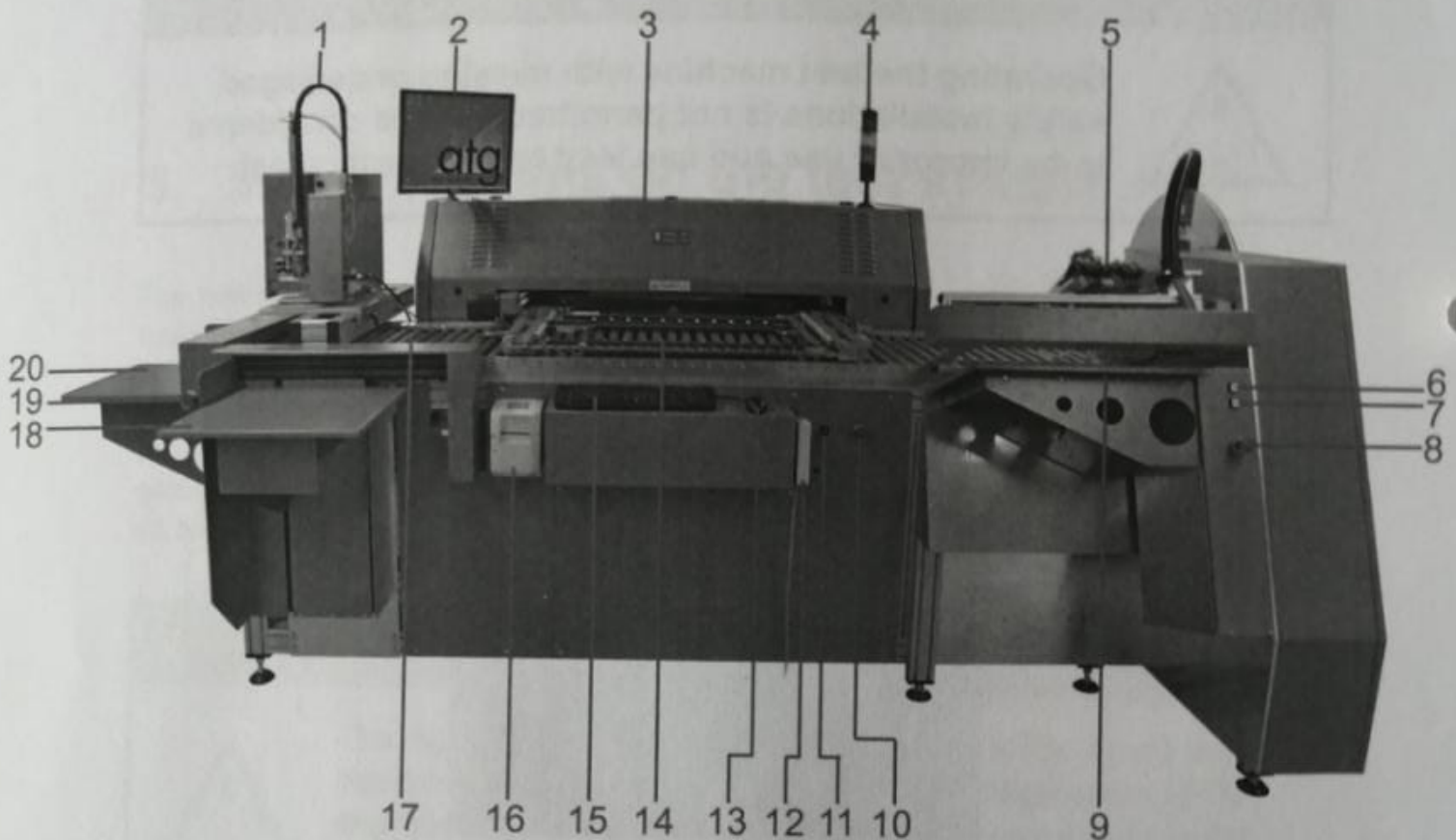


Image 2: General view, control side of test system A7a

The monitor (2) is the interface for controlling the machine. Here it is possible to read out test results or error messages and/or to set up the test system.

The cover (3) protects the test area of the flying probe test machine. The feeding of the circuit board requiring testing takes place via an automatic shelf / shuttle (14). The circuit boards are held in the shuttle by pneumatically driven and spring-loaded clamping devices.

The cover is secured against slamming on opening through gas springs. The machine status is displayed on the three colored lights (4) on the cover. Green signalizes fault-free functioning of the machine, yellow highlights a lack of parts and/or that the parts have been processed, and the red lamp displays an error on the test system.

The circuit boards for testing are stacked on the right side of the test system and placed on the stacker (9). This is previously lowered using button (7) and after the stacking of the circuit boards, button (6) is then pressed in order to move the stack upwards until a sensor has ascertained the correct pick-up position of the uppermost

The operating location is to meet the following requirements:

#### Space requirements

Width 5.00 m (195 in), depth 3.70 m (145 in), including operator's activity area and maintenance area

Setup area:	plain, stable
Soil bearing capacity:	min. 3 t (6600 lb)
Power supply:	3 x 400 V, 50 Hz or 3 x 208 V, 60 Hz
Pressurized air supply:	6 bar (90 psi), filtered
Network connection:	Twisted Pair
Operating temperature:	19° C - 27° C (66° F - 80° F)
Relative humidity:	40% - 60%

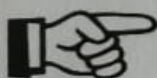
#### Unloading and Transport:

The test system is delivered in two cases:

test system case and case with automation and accessories (monitor, table, etc.).

1. Inspect the delivery for transport damages. Inform freight carrier and atg Luther & Maelzer immediately in case of damages.
2. Use a forklift, min. fork length 1.80 m (70 in), min. lifting capacity 1600 kg (3500 lb) and of a sufficient width in order to avoid lateral tilting drive. Move underneath the longer side of each palette and carefully lift the cases off the transport truck.
3. Move both cases as close as possible to their final operating destination and all around remove the wooden case's walls. To avoid condensation keep the air proof packing foil intact and store test system for 24 hours in a well tempered room.
4. Loosen all 4 screws on each palette bottom side.
5. Use a forklift, min. fork length 1.20 m (47 in), lifting capacity of at least 1600 kg (3500 lb) and of a sufficient width in order to avoid lateral tilting. From the front side (shuttle side) underneath the test system or long side of automation carefully lift test system and automation off the palette. Store the accessory parts (monitor, spare parts) at the test system.

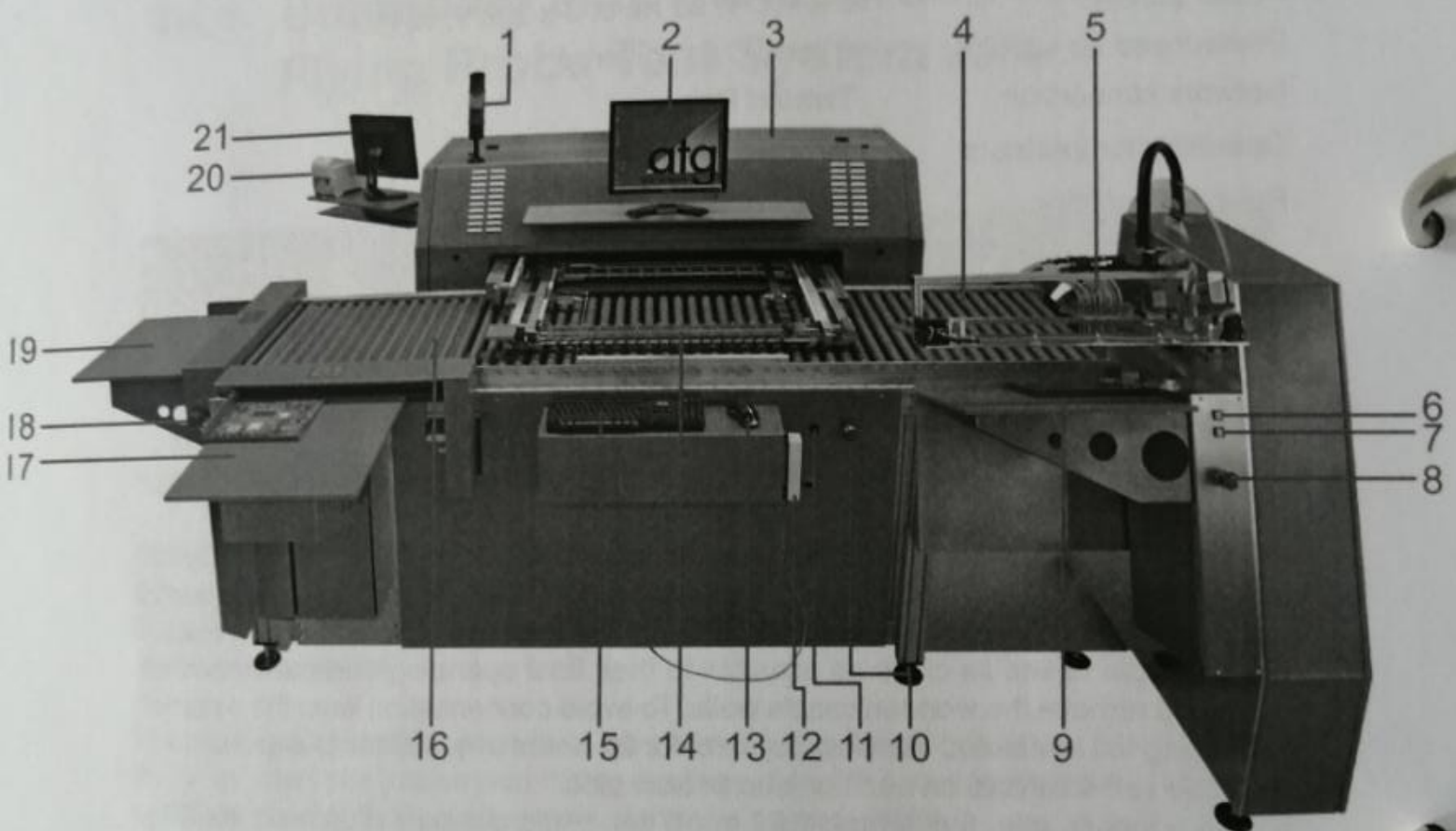
### Notice!



**Set-up and putting into operation only by atg Luther & Maelzer service personnel!**

## 16.2 General View of the Test System

### 16.2.1 Front Side



General view of the A7a test system (operating side)

Position	Description/Function
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- |   |   |
|---|---|
| 1 | <b>Signal Light</b><br>Indicates the machine status                                     |
| 2 | <b>Monitor of the operator side</b><br>Same view as rear monitor (pos. 21)              |
| 3 | <b>Rear side top cover</b><br>With emergency stop switch. Do not open during operation! |

## 16. System Overview

### 16.1 Unloading and Transporting the Flying Probe Test System A7a

#### WARNING!



**Wear the appropriate safety gear for these activities! Pay attention to the generally applicable safety precautions!**

The user is responsible for the internal transportation of the test system on the customer side, even in the presence of atg Luther & Maelzer personnel. Furthermore, he must assure that all safety and accident prevention precautions are observed!

The appropriate safety gear is to be worn during these activities. The applied transport devices (crane and lifting devices, forklift, hand forklift etc.) must be sufficiently dimensioned for the load to be transported!

The transported object including its loose parts must be secured against moving, turning, tipping, tilting (consider center of gravity)!

Do not walk underneath lifted objects! Sufficiently secure the transported object! When turning/arranging the transported object in narrow areas pay attention towards keeping a sufficient safety distance (risk of bruising)!

#### WARNING!



**The accident precaution instructions for transporting the test system must be strictly adhered to at all times!**