

# FRITSCH

*Competence in SMT*

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# FRITSCH

*Competence in SMT*

Manual / Fine-Pitch / Semiautomatic - Manipulators



For prototyping and small series production runs often a fully automatic SMT assembly line does not pay for itself. This is either due to high setup costs or a too high initial investment in relation to the low output of the production line.

For this reasons Fritsch has developed advanced SMT assembly systems in the range of low volume high mix production using manual and semi-automatic assembly systems. For years users used them to effectively build SMT assemblies.



The assembly process of build prototypes and small series production runs can be carried out most flexible using the Fritsch *Classic Line*. Cycle times and cost are greatly reduced compared to outsourcing this task.

All Fritsch systems are designed using a modular concept. The basic devices are expandable using new modules to adapt to different tasks in your company.

## LM 900



### LM 900

The LM 900 is a purely manual assembly system. Due to smooth-running assembly guides and the Fritsch standard hand rest, fatigueless work is guaranteed. Parts can be handled in tape, strips, stick feeders or bulk-components, trays (details see page 7). The LM 900 ensures a cost-efficient entry into manual SMD assembly.

## LM 901



### LM 901

The LM 901 represents the beginning of our modular systems. Besides the functionality of the LM 900, dispensing systems, axis brakes and different methods of optical guidance can be used. LM 901 realizes the whole Pick & place process:

- Application of solder paste/ glue
- Assembly of standard components
- Assembly of BGAs and Fine Pitch components

Detailed information for each option can be found on the following pages.

To achieve a high measure of flexibility, the LM 901 can be extended to a software-based semi-automatic Pick&Place system.

## SM 902



### SM 902

The semi-automatic Pick & Place system SM 902 eliminates wrong placements and reading the assembly drawing by your assembly staff. The next components to be placed are displayed in the virtual software on the monitor; it also shows which component is located in which feeder. The picture of the circuit board on the monitor shows the user where to place the current part. The LED's on the assembly head show the way to the placement position. When reaching the placement position an audio signal comes on.

As for the optional modules, you can apply the same list of options as on the LM 901. The SM 902 can also be extended easily to become a high-end semi-automatic solution called SM 902 *professional*.

### **SM 902 professional**

The SM 902 professional features a higher output Pick & Place system with a higher process security. Besides the higher user comfort compared to the standard SM 902 system, the required components can be supplied using automatic feeders. LED's for each feeder, signal the component which should be picked next. During assembly the guide-hook device moves to the next assembly position showing you where the next part needs to be placed. The operator simply inserts the guide-pin in to the guide-hook and places the picked component.

## **SM 902**



### **FP 904**

The Fine Pitch FP 904 enables you to place fine pitch components using a microscope or camera. For the precise alignment this system has an X /Y-axis desk with micrometers. A safe placement of the components is ensured by a motorized nozzle. The FP 904 can be operated as a stand-alone machine, the Fine Pitch function can also be combined with other systems.

## **FP 904**



### **Any wishes left ?**

If you need customized solutions for your company or you have a different process environment, just contact us!

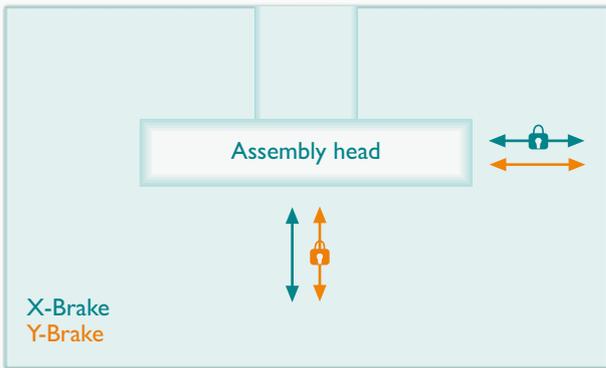
Based on our standard products we often develop customer specific applications. Maybe a similar project to yours has already been designed by us in the past. We have the complete software and hardware development facility as well as the manufacturing under one roof.

## Extensions

### X-Y axis-brakes

900	901	SM	FP
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With the patented X- and Y-magnetic brakes you can lock each of the moving axes. This makes it easy to dispense dots of glue or straight lines of solder past. An automatic function locks the X-Y-axis by it self as soon as the component touches the circuit board. Thus it ensures the component is placed exactly where you want it to be. With this feature the SM machines can also be used for the assembly of FP (Fine Pitch) components.



### Dispensing

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For all manual systems there are two different dispensing systems. A simple time-pressure-dispenser and a microprocessor-controlled volumetric dispensing system, it controls parameters like temperature, fill level of the cartridge and viscosity of the material. By the additional measurements of the above listed parameters the dispensing amount can be very accurately calculated by the unit.

Besides solder past and glue you can even dispense other materials. Both dispensing systems start the dispensing process as soon as the conical dispense needle touches the circuit board.



### Camera

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With a camera attached to the assembly head you can view the total process – magnified on a monitor from the component pick- to its placement position. The SM systems display this camera picture directly in their software interface. The other systems use a separate monitor. A further benefit of using the camera pictures is the documentation of the assembly process.



## Microscope

900  901  SM  FP

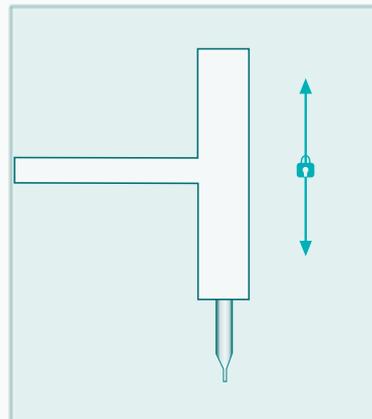
The optional microscope can be used across the total work area. It is used to enlarge the placement area of a multi lead component very detailed. In combination with the X/Y-desk and the micrometer lead screw adjustment the components can be aligned and placed precisely time after time.



## Z-axis brake

900  901  SM  FP

The z-axis magnetic brake makes it possible to fix components just above the placement area on the circuit board surface. This makes placing Fine Pitch and customized components easy and exact. Alignment between the parts and the circuit board is accomplished effortlessly all day long.



## Ergonomics

900  901  SM  FP

The unequalled guiding system of the assembly head results in a comfortable and fatigue-free work place. All of the control elements are arranged logically and ergonomically, which assists the user in the best possible way. A re-locatable hand-rest (see picture on the right) is already included in the basic version of the machine.



## Assembly head

900  901  SM  FP

The assembly head is equipped with a patented constant force trapezoidal spring. The spring tension is equally distributed over the total travel of the z-axis, using this feature the user doesn't have to carry out any adjustments on the assembly head at all. Even when using the dispensing cartridge instead of the placement head only a few changes have to be carried out by the user.



## Feeder

To produce prototypes or small series with the manual manipulator, different types of component feeders can be used. These systems enable you to handle taped components on reels and strips, sticks, bulk components or trays to make your day to day task easy.



### Tape-Feeders

900 901 SM FP

By using tape-feeders you can store and handle a large amount of standard components. If the cover tape is removed, the strip is forwarded automatically uncovering the parts which have to be picked. The tape-feeders are available in all standard width and can be used with each of the systems.



### Stick-Feeders

900 901 SM FP

Stick-feeders provide the possibility to feed complete component-sticks, so that the sensitive parts don't have to be dispensed in to loose trays or boxes. One or more components can be released for the current assembly step.



### Manual carousel

900 901 SM FP

With the carousel you can supply bulk components. Different carousels can be prepared off-line for different programs and changed very quickly.



### Autom. carousel/paternoster

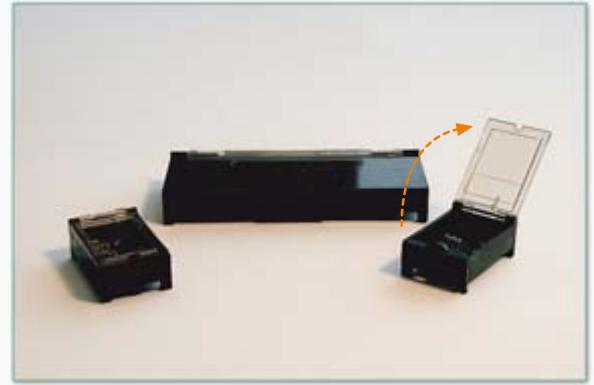
900 901 SM FP

These automatic supply devices can deliver up to 504 different component types. The required part is transported to a fixed pick position using the PC software. This pick position is shown using the integrated LED's. Both systems also can be driven manually with a foot pedal. Automatic devices are especially useful in combination with the SM 902 series system.

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### Bulk container

For prototype and small series production these patented bulk containers are preferred, especially IC's can be supplied out of small containers as well as capacitors or resistors. These containers can comfortably be arranged together using a rail-system. This allows a large variety of components to be stored and assembled in a dust-free storage system. The containers are opened and closed actively using a spring system and therefore to use the assembly head to open the containers is not necessary.



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### Labor-tape feeders

This feeder-type can handle a single strip of a component tape, especially useful for prototyping or small series assemblies. Each part can be picked up directly from the tape, it is not necessary to fill them into bulk containers.



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### Trays

Fine-Pitch components, connectors or BGA's are mostly supplied in trays. This packaging style can be supplied directly to the LM and SM series systems. A comfortable and precise assembly is assured using the Fine Pitch function and the X/Y axis-brakes.



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### Tape-strip-feeders

With these feeders you can supply single strips of a component tape. It combines different tape width and can be used to assemble small amounts of different parts.

## more options

### Testing device

900  901  SM  FP

The testing device allows you to check passive components prior to assembly on function and electrical tolerances. The measured data is documented. This function is often used for high reliability products and processes.



### LED bar

900  901  SM  FP

The SM series can be equipped with LED strips to show you the next component pick position when using tape- or stick-feeders.



### Circuitboard holder

900  901  SM  FP

All manipulators come with a universal circuit board quick clamping support table for single or double-sided board assemblies. The flexible holding fingers can be adjusted and fix the board in position, this can be expanded for large circuit boards. Also we can provide you a customized support and holder for your special projects.



### Nozzles and dispensing needles

900  901  SM  FP

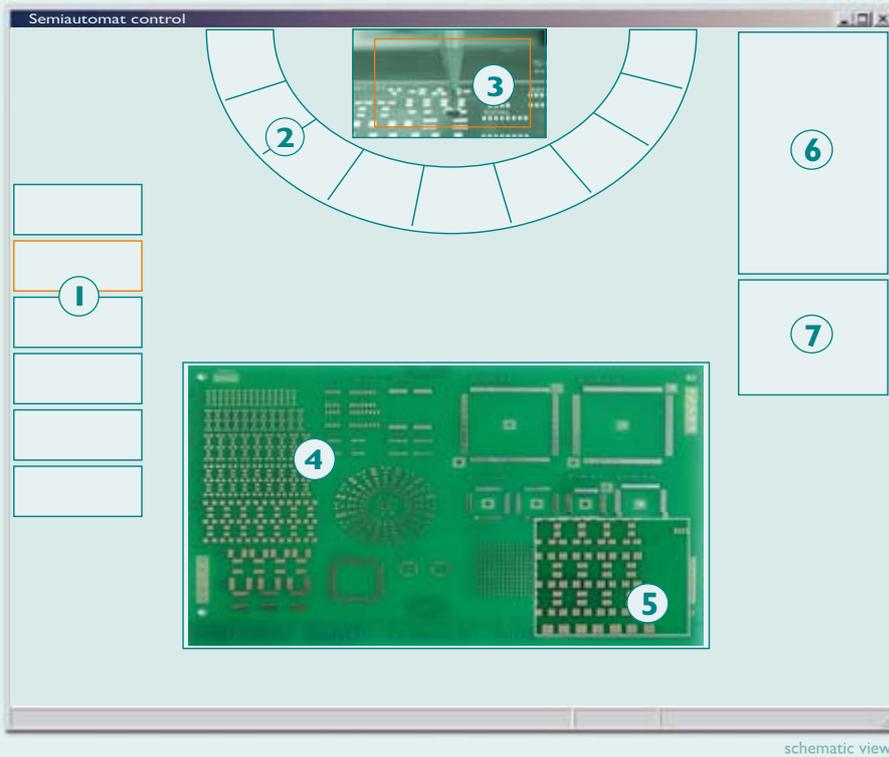
Accessories like nozzles and dispense needles or other expendables are available from stock. Even for special purposes we offer different pipettes. If you need a version we can't provide instantly, our developer team can for sure help you out.

### Calibration device

900  901  SM  FP

Together with this device you can calculate i.e. the value of a tuning resistor inside a circuit. This value is then displayed to the user or can be used for the automatic feeding systems we offer.

# Software SM 902



- 1 Tape- and reel-feeder
- 2 Carousel feeder
- 3 Camera picture of placing area
- 4 Current circuit board
- 5 Magnification of assembly area
- 6 Current program data
- 7 Polarity of current component

The software of the SM 902 assists the user, displaying the pick and place positions and the integrated liner measuring system monitors this to ensure the specified position of the guide-hook has been reached with highest accuracy. The user interface of the software displays all relevant assembly data (see points 1 to 7 above).



Shows the direction to the placement position. If this position is reached, an acoustic signal comes on.

The LED's on the assembly head are used to guide the operator to the component placement area. When the position is reached the acoustic signal comes on and all four LED's will be flashing.

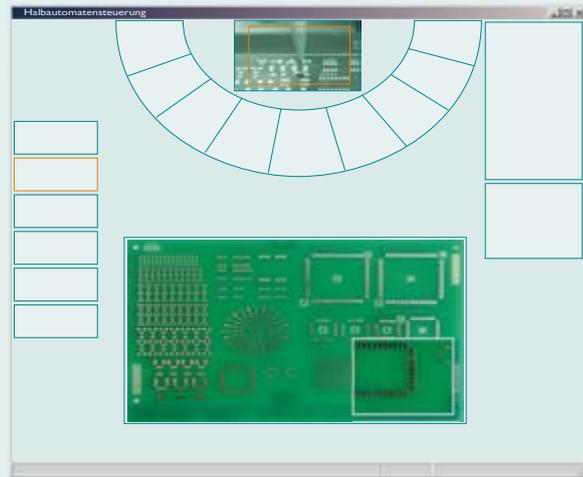


The SM 902 can at any time be expanded with further functions, which increase the user comfort and even further increase the already good production output. You can find more details on the following SM 902 professional pages.

# SM 902 *professional*

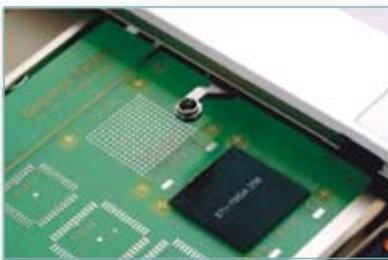
## Extension SM 902

To improve the user comfort further as well as the production output, the relevant assembly data can be displayed directly inside the working area of the machine. With this expansion of the semi-automatic system the constant view-change between monitor and circuit board is eliminated and therefore cuts down extra movements by the Operator.



## Rotation angle display

The rotational angle of the current picked component is displayed using a 4 LED display on the assembly head itself and after placing the part, the display switches to the next placement.



## Target guidance

To make the assembly process easier for the operator the motorized guide-hook shows the placement position of the current component. A guide-pin that is moving parallel to the placement nozzle can be inserted into the guide-hook and the picked component is now in the exact x/y position. After placing the component on to the circuit board the guide-hook moves automatically to the next placement position.



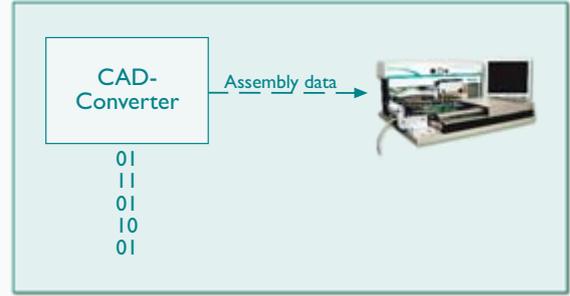
## Pickup position display

The current pick position is shown using an LED bar corresponding with the feeder position. The user can now produce existing as well as new projects error-free and without a long training or learning curve.

### CAD-data transfer

- 900
- 901
- SM
- FP

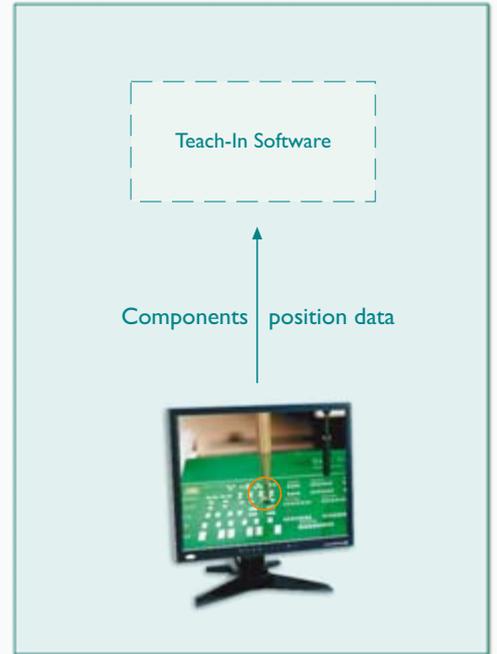
Existing CAD data can be used for programming of the assembly equipment like the SM 902 and SM 902 *professional*. This can be done with the "universal CAD data converter" a tool which easily is adapted to all common CAD data-formats. This way you remain flexible in the future.



### Teach-In

- 900
- 901
- SM
- FP

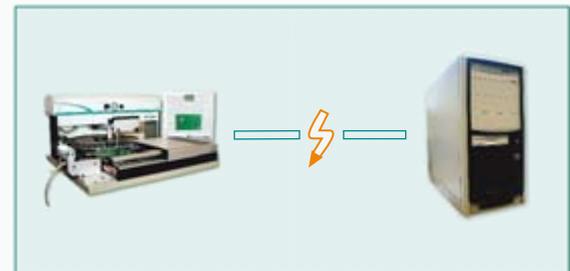
If there is no existing CAD data for your new program, you can teach the individual placement positions manually. The respective position is approached with the assembly head by hand and then confirmed to the system. If all parts have been assembled and confirmed once, you can start producing circuit boards of the same type using the taught positions immediately.

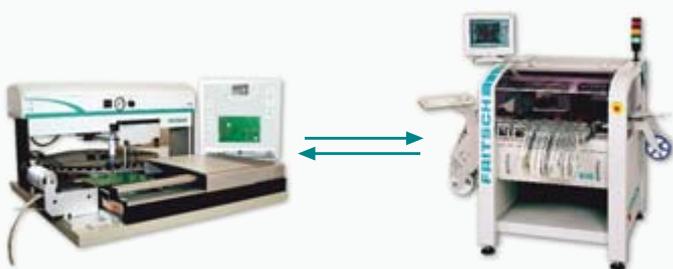


### Offline-Software

- 900
- 901
- SM
- FP

The offline software enables you to prepare all process data on a separate PC, which is not attached to the machine. You can transfer the data via network or a data storage device to the SM 902 or SM 902 *professional*.

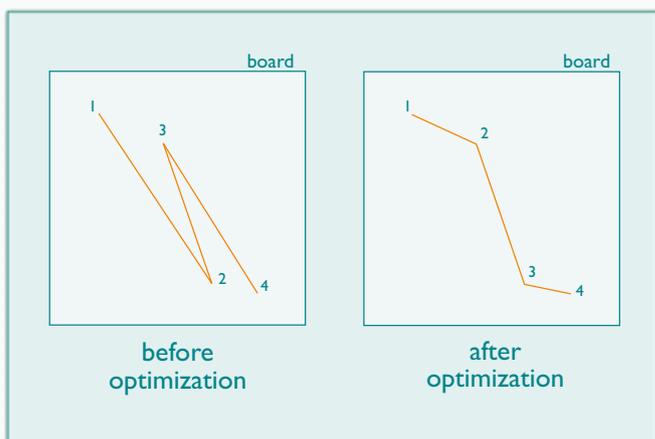




### placeALL© Connectivity

900  901  SM  FP

All semi-automatic placement systems data can be directly imported into the software of our placeALL© 500/600 and 600L automatic placement machines. Thus you can use your semi-automatic programs easily when upgrading to a fully automatic Pick & Place system.



### Assembly optimization

900  901  SM  FP

To produce efficiently the pick positions are optimized automatically. The assembly path of the Pick & Place equipment is kept as short as possible, saving you time and increasing the output. This feature is already included in the basic software version. The placement path optimization is used in the same way for the dispensing program (see left picture).



### Auto-Dispenser

900  901  SM  FP

The auto-dispenser (together with the SM 902 *professional*) can dispense solder past and/or glue automatically before the SMT assembly process.

## other devices

### placeALL© automatic-pick & placer

With our fully automatic Pick & Place systems you can build flexible automatic assembly lines capable of placing 2'500 to 18'000 components per hour. Our machines can be adapted to your requirements and your production needs. They can be changed and upgraded to new needs at any time.

If you require a customized solution, we can develop total turn key systems for you, using our in-house software, hardware and process expertise. Just contact us to see what we can offer!



### µ-Placer

The µ-Placer is a selective assembly- and repair system. It is used to handle BGA's, CSP's, Fine Pitch as well as custom components. At the end of the process you can inspect hidden solder joints using a camera.



## Support worldwide



A worldwide dealer network ensures the continued support of Fritsch products. Specially trained service staff is available in each market. This guarantees faster response times on machines, training and spare parts.

# Worldwide Fritsch distributors



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