

# Rápido

Laser System for Selective Precision Soldering



# Rápido

## Selective Precision Soldering with Rápido

The industrial laser system Rápido – ideal for demanding selective soldering processes.

The diameter of the laser radiation can be narrowed down to as little as 0.1 mm at the working point. Depending on the task, the adaptation of the laser beam can be managed through a large number of optical lens assemblies available. The focused laser beam can be circular or have different shapes fitting the solder pad. The control electronics have standard interfaces for easy integration into the production setting being used.



The size of the heated zone can be as small as 0.1 mm. Therefore structures with a fine pitch like miniature connectors can be soldered safely.

## Reliable Diode Laser Modules with a long Lifetime

Diode laser modules with a long lifetime generate optical output powers between 30 W and 900 W. The wavelength is 980 nm. The high efficiency with 40 % or better results in low power consumption and a practically maintenance-free usage.

The optical power is transported with an armoured fiber. The fiber is terminated with a high SMA 905 high power connector. Various optical lenses can be connected. The projected form of the laser beam can be a circular spot with 100 µm diameter as minimum or a rectangular with a dimension fitting perfectly the corresponding solder pads.

## Powerful Control Electronics

16 digital I/O ports (5 V or 24 V) isolated by opto couplers as well as an analog port (10 V) are used for the integration of Rápido into production systems. A serial interface connects Rápido with computers or other instruments. If rapid changes of the laser power are needed, the analog interface 0-10 V allows the manipulation within milliseconds.

The user interface is easy to use. It shows the selected operational mode, the actual current as well as the power values and displays all safety-relevant values in clear text. All important values like the diode laser temperature are controlled.

A CCD camera mounted on the focusing lens supports the image data processing and allows the visual inspection and documentation of the soldering point.

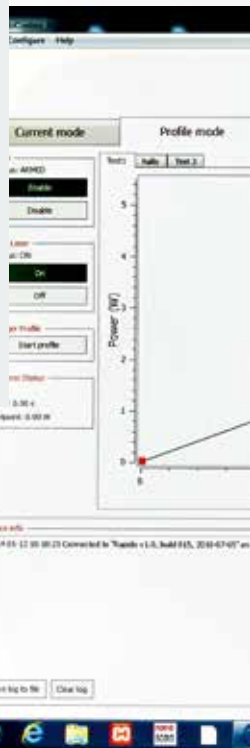


Important parameters and messages are displayed in clear text on the user interface.

Rápido is a Class IV laser system. If integrated in larger systems like NanoRapid, the interlocks of Rápido are used to meet all requirements for a Class 1 system.

## Advantages of Laser Soldering

- The laser beam fits the solder pad precisely
- Local heating
- Guaranteed high quality of soldering
- Focus down to 0.1 mm
- Parallel soldering of multiple points
- Temperature range between a few °C and up to 1200 °C
- Suitable for all soldering materials



## Programmable Power Profiles

Rápido allows the programming of three power profiles. Each profile has up to 20 set points over a time base between 1 s to 600 s. Power profiles are useful for pre-heating the solder point and for a controlled-cool down sequence. The adaption to various solder tasks is therefore easy.

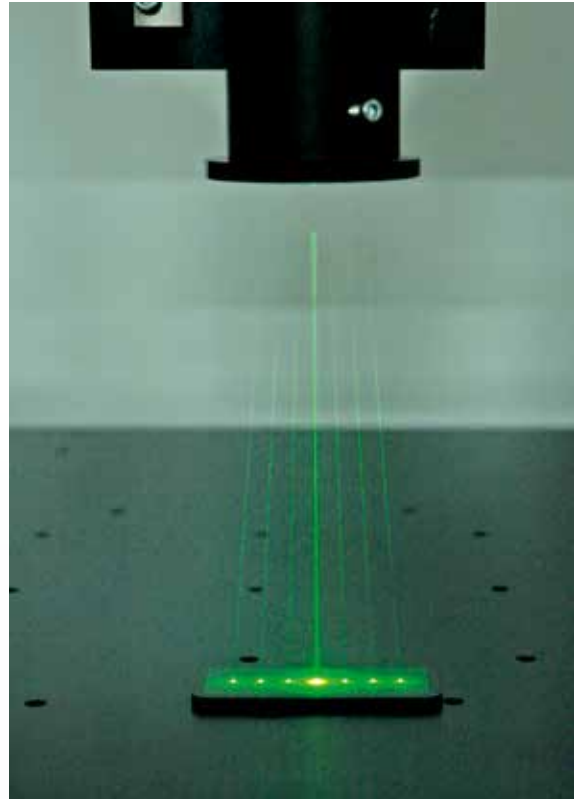
## Temperature Control

Some special tasks require precise temperature control at the soldering point. An analog interface corresponding to the output of the temperature measurement instrument like a pyrometer adjusts the laser power within milliseconds.

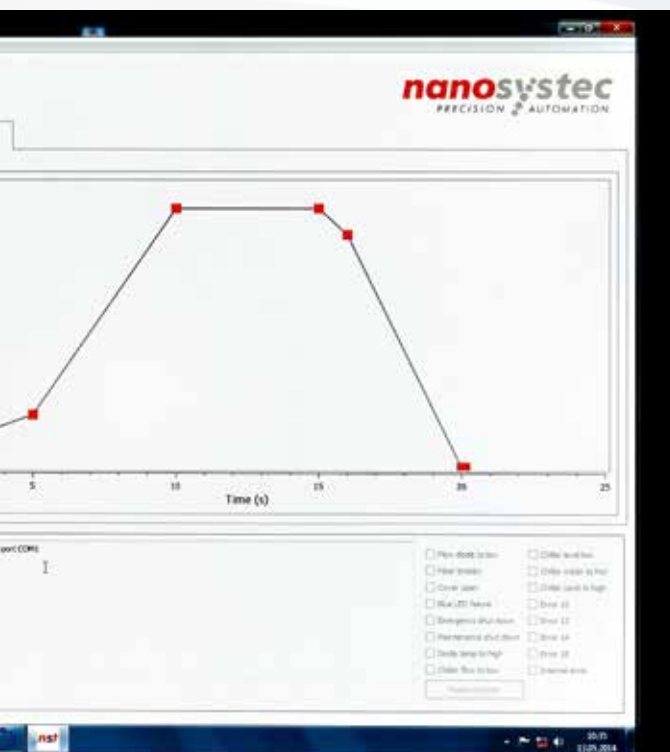
## Lens Assembly

A lens assembly is connected via SMA-HP 905 to the optical fiber. The parameters of the assembly can be varied over a large range. The spot size at the focal plane, the form of the projected laser beam and the distance to the workpiece are easily adapted to the task.

The lens assembly has a port for a CCD camera. With this camera the initial set up is easy and observation of the solder spot during soldering is useful for visual inspection and quality control.



A Multi Beam Optic reduces the process time as a number of soldering joints can be processed simultaneously.



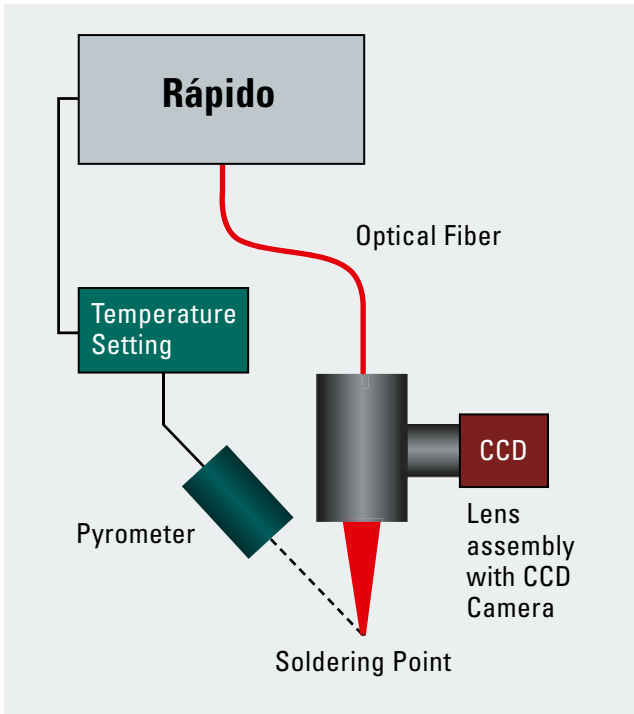
Moving the laser beam with a **XY scanner with f $\theta$  optic** from soldering point to soldering point within a few milliseconds reduces the processing time. A computer controls the movement of the laser beam within a field of approximately 100 mm x 100 mm. Any pattern can be programmed.

The **multi-beam optics (MBO)** is ideal for high production volumes and a constant pattern of soldering points. The optic splits the incoming laser beam up into several subbeams which hit each solder pad. The time reduction is proportional to the number of soldering points.

### High productivity

Assuming the solder time per point is 1.5 s with a total of 10 soldering points, a total time of 15 s is needed, positioning time not included.

With a MBO, the time remains 1.5 s for all 10 soldering points which is an increase in productivity by a factor of 10.



In order to maintain a constant temperature at the soldering point, a signal of a temperature sensor is used to correct the laser power. An analog signal of the electronics changes the applied power within a few milliseconds and subsequently the temperature.

## Technical Data

Optical Output Power	30 W, 50 W, 100 W, 150 W, 250 W, 400 W, 900 W
Wavelength	980 nm
Pilot laser	650 nm, 1 mW (optional, not available for all modules)
Pulse width	2 ms to continuous emission, full power
Trigger signal	TTL and/or 24 V
Power profile	20 power values per profile
Electrical supply	120/230 V, 50/60 Hz
Cooling	Water (tap water or recirculating chiller)
Dimensions	19 in. rack mount, 4 HU, 600 mm depth
Weight	23 kg



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