



NC iSONIC
Ultrasonic welding machine
with servo drive

NC iSONIC

Slim design and smart automation

NC iSONIC is an ultrasonic series welding machine with a servo drive and open control concept. During the development phase, the modular design of the machine was of special importance to ensure that it can be flexibly adapted to different applications and workpiece dimensions.

- 1 Pillar-shaped housing with integrated electrical cabinet slot
- 2 NC feed unit with an ultrasonic oscillating unit and a freely selectable starting point
- 3 Tool change head
- 4 Work area lighting
- 5 Operation indicator light
- 6 Slot for extensions
- 7 Workpiece clamping plate to ensure the quick plane-parallel arrangement of the holder with regard to the sonotrode
- 8 Ergonomic 2-hand operation
- 9 Touchscreen
- 10 Emergency stop
- 11 USB 3.0 interface (for data import/export)
- 12 Ultrasonic generator (external)



Highest levels of precision

Ultrasonic welding with servo drive

The NC iSONIC is suitable for a wide variety of applications from different industries where highly precise welding processes are a must. The parameters for an ultrasonic welding process cover the ultrasonic (frequency, amplitude, time) and the mechanical requirements concerning the sonotrode positioning unit (working force, feed rate).

The energy that is produced in the ultrasonic generator causes the sonotrode to oscillate with a small amplitude (a few micrometres) and a frequency between 20 and 35 kHz (ultrasonic frequency range). The welding time determines the time during which the ultrasound acts on the workpiece to be welded. To fuse a (plastic) workpiece, a precise feed system with a variable working force and adjustable feed rate is required in addition to an oscillating sonotrode. In terms of the NC iSONIC, SONOTRONIC ensures all this with the aid of a servomotor which is integrated in a smart control concept.

Advantages

- Highly precise movements (resolution < 1/100 mm)
- Open-loop and closed-loop control of absolute and relative positions
- Torque and speed control (accuracy +/- 0.01%)
- Torque limitation
- Realisation of minimal forces
- Variable speeds and forces ($V_{\max} = 200 \text{ mm/s}$)
- Motion profiles (target position, set speed, acceleration, deceleration time, delay time, etc.)
- Graphical representation and storage of the parameters during the process (documentation)
- Recipe management
- Safe motion monitoring (integration of functional safety)
- Numerous monitoring functions of the feed
- Calibration
- Ergonomic operation:
 - Two-hand start (visual feedback)
 - LED lighting
 - LED for OK / not OK indication

Welding methods

The operating modes are selected and monitored via the control device. Parameters, such as "amplitude", "welding force" and "feed rate", can be adjusted. In addition, the various welding methods can be freely combined.

- **Time-dependent**
Welding based on a specified time value
- **Distance-dependent (absolute and relative)**
Welding up to a specified final point (absolute) and welding based on a relative, specified distance when a specific reference point is reached (relative)
- **Energy-dependent**
Welding up to a previously specified energy value
- **Force-dependent**
Welding based on a specified force profile: this function can also be used for detecting a workpiece (scanning and detection of the increase in force when contact with the workpiece is made)
- **Contact shut-off**
Safety shut-off when contact with metal is made

Available options

- **Pre-ultrasonics**
The sonotrode already oscillates when it approaches the part
- **Post-ultrasonics**
The sonotrode still oscillates when it retracts from the part
- **Pre-joining**
Joining without the application of ultrasound

Machine mode

- Password-protected user levels (operator/setter/service)

Special setting mode for comfortable setting

- Automatic calibration after a tool change: the setter is guided through the functional sequence by way of plain text instructions
- Optional teach-in of the welding depth via the control device

Industries

The NC iSONIC product series is extremely versatile and can be used in a wide range of industries.



Modular design

Flexible use and possible integration of accessories

The modular concept and the mechanical and control-system-related design ensure that the machine can be used as a wide range of variants, for example as a welding unit, a machine without a base or as a benchtop machine. Optional accessories, such as a sound protection hood, sliding table or film feed unit can be integrated into the NC iSONIC machine via the interface modules. As a result, the machine can be upgraded at a later stage and, thereby, adapted to a wide range of applications.

NC iSONIC Unit

- Welding unit
- with IPC (Pro) or separate PLC and HMI (basic)

NC iSONIC Integra

- Machine without the base
- with IPC (Pro) or separate PLC and HMI (basic)

NC iSONIC

- Benchtop machine
- with IPC (Pro) or separate PLC and HMI (basic)



Pneumatic film feed unit

- For the protection of sensitive workpiece surfaces against welding marks
- Selection and deselection via the control system
- Film feed adjustable between 0 mm and 190 mm
- For films with a width between 40 mm and 110 mm
- Easy integration via an interface module



Sound protection hood

- Ergonomic workpiece positioning
- Opened lifting door permits side access
- Lifting door Selection and deselection via the control system
- 500 mm travel (pneumatic)
- Safety cabin for 1-hand operation
- Easy integration via an interface module



Pneumatic sliding table

- For positioning high parts under the sonotrode
- 125 mm travel
- Selection and deselection of the sliding table function
- Universal clamping plate 300 x 300 mm
- Easy integration via an interface module

Integration made easy

Concept with different variants

The NC **i**SONIC can be flexibly deployed and can be integrated in the designs NC **i**SONIC Integra and NC **i**SONIC Unit, even in existing or new machine concepts. This is primarily of interest, where series production using precise ultrasonic welding is a must. With our experience in building special machines and the joining of plastics, we support you with our engineering services in both the planning and construction of your installations using our components.

NC **i**SONIC Integra

In machine designs without a base, the NC **i**SONIC Integra can be incorporated in existing or new machine concepts. Typical applications include the connection of injection moulded parts in series production.



NC **i**SONIC Unit

In the version NC **i**SONIC Unit, SONOTRONIC supplies the NC feed unit with ultrasonic components and generator as well as electrical cabinet module and control device. Moreover, the NC **i**SONIC Unit can also be integrated in existing or new machine concepts for the series production processing of plastic parts.



Smart concept

Intuitive and user-friendly touchscreen operation

Features

- Self-explaining operating concept
- Representation of process-relevant values (setpoints and actual values)
- Graphical representation of the welding curves for the easy interpretation of the values
- Integrated help feature
- Multi-level selection of functions depending on the access rights
- Numerous configuration options
- Language selection
- Documentation and operating instructions
- 50 parameter programs

All functions at a glance



Easy input of parameters



Clear diagrams





Mechanical structure

	NC iSONIC benchtop machine		NC iSONIC Integra without the base		NC iSONIC Unit welding unit	
	Basic	Pro (with an IPC)	Basic	Pro (with an IPC)	Basic	Pro (with an IPC)
NC feed unit	■	■	■	■	■	■
Machine stand	■	■	■	■	—	—
Machine base with 2-hand operation	■	■	—	—	—	—
Ultrasonic generator	■	■	■	■	■	■
Integrated electrical cabinet slot	■	■	■	■	—	—
Control cabinet with IPC hardware	—	■	—	■	—	■
Control cabinet with control system hardware	■	—	■	—	■	—
Control device with integrated IPC	—	■	—	■	—	■
Control device without IPC	■	—	■	—	■	—
Control device holder	■	■	■	■	—	—
Tool change head	■	■	■	■	■	■
Cooling system	■	■	■	■	■	■
Flange-connected machine stands	—	—	■	■	—	—
NC feed unit fastening bracket	—	—	—	—	■	■
Servo & controller cable set (5 / 10 / 15 m)	—	—	—	—	■	■
Electrical cabinet cable set (5 / 10 / 15 m)	—	—	—	—	■	■

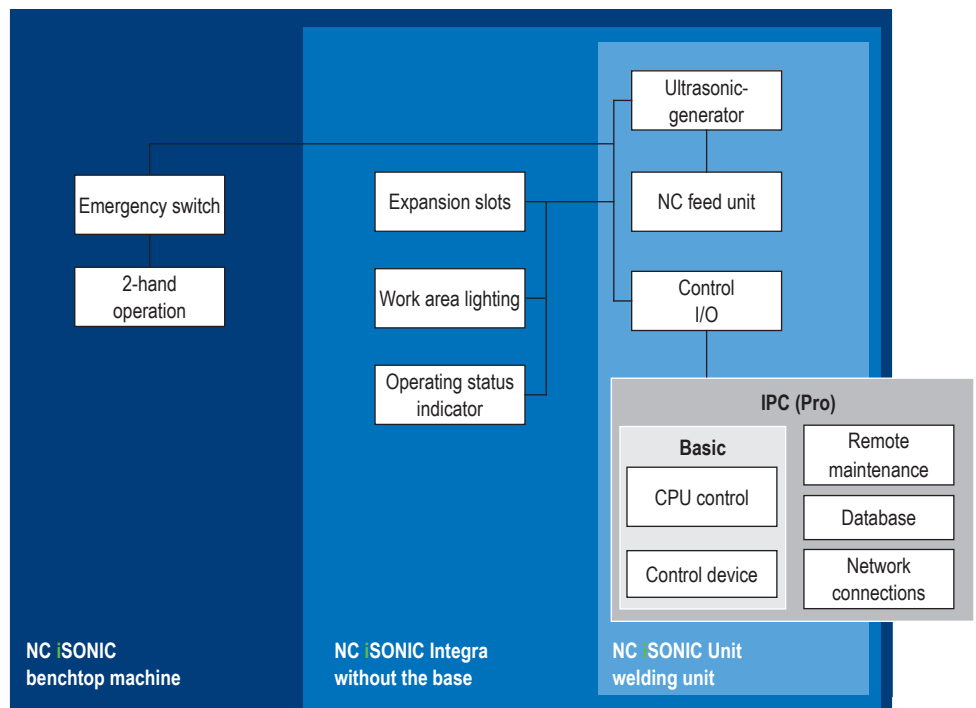
Accessories (optional)

Sliding table	■	■	—	—	—	—
Film feed unit	■	■	■	■	—	—
Sound protection hood (with single hand start)	■	■	—	—	—	—

■ Included — Not included

Control and automation

Control components from Siemens simplify integration in customer networks thanks to standardised communication. In the PRO version (industrial PC with soft PLC) additional customised functions such as barcode, camera, data evaluation, remote maintenance and future Industry 4.0 applications can be easily implemented. It is also possible to integrate the welding unit, NC iSONIC Unit, without its own PLC in the production system control.



Technical data: NC iSONIC

Ultrasonic welding machine with servo drive

Technical data NC iSONIC		
Type/working frequency [kHz]	20	30/35
Electrical connected value [V AC/A]	230/10	
Mains frequency [Hz]	50	
Compressed air [bar], optional	6	
Welding force [N]	100 to 3,000	25 – 600
Feed rate max. [mm/s]	200	
Welding unit working stroke [mm]	0 ... 350	
Clamping plate [mm]	300 x 300 x 12	
Weight [kg]	200	160
Dimensions (W x H x D) [mm]	640 x 1,455 x 770	640 x 1,300 x 725

Technical data USG iSONIC ultrasonic generator			
Working frequency* [kHz]	20 (+/-500 Hz)	30 (+/-500 Hz)	35 (+/-500 Hz)
Output power* [W]	2,000	2,000	400 / 800 / 1,200
Mains voltage [V], mains frequency [Hz]	230 (L, N, PE), 50/60		
Rated current [A]	10.6	11.0	2.4 / 4.3 / 6.0
Mains fuse [A]	2 x T 12.5 (internal)		
Switch-on duration	50 %	50 %	50 %
Case dimensions without a mounting plate (w x h x d) [mm]	100 x 285 x 270		
Case dimensions with a mounting plate (w x h x d) [mm]	100 x 333 x 271		

* Selectable ultrasonic equipment of the USG iSONIC generators
Subject to technical changes.



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