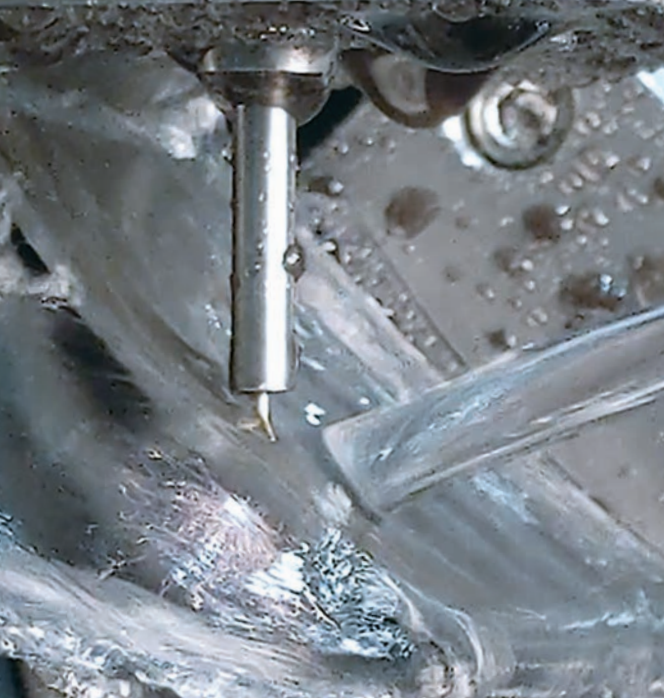


create your future



Linear Hole Drilling EDM

K4HL



The "K4HL" is a small-hole drilling EDM which comes with linear motors on X, Y and Z-axis as standard that has been developed and manufactured in-house, making the most of the company's experience and know how gained over 20 years.

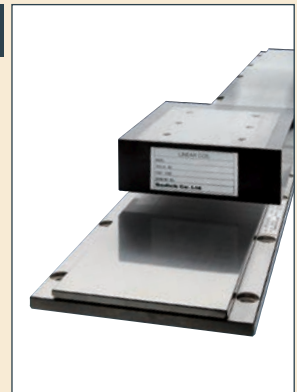
K4HL achieves high-speed, high-accuracy and high-quality machining of precision holes, and is equipped with the latest automated equipment which allows for prolonged continuous machining of different hole sizes.

In various fields, including the aerospace, energy industry, automobile industry, medical instruments, semiconductors, electrical and electronic industries, the difficulty of the machining needs has been increasing, such as fine and deep holes and high-quality holes in difficult to machine materials which is difficult to achieve by conventional drilling machines.

Features

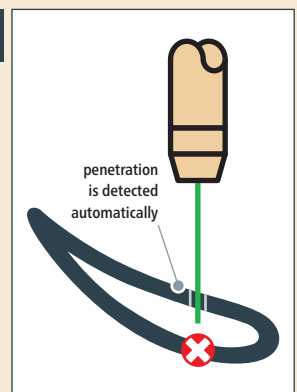
Feature 1 Linear Motor Drive

The K4HL is equipped with Sodick in-house developed Linear Motors on X, Y and Z-axis, which has outstanding features of high-speed axis motion and quick response, thanks to its wear-free motion thus eliminating the need for old-fashioned ball screws. Conventional drive systems use ball screws to convert the rotational motion of the motor into the linear motion of the axis stroke, leading to the unavoidable deterioration in response of high-speed servo motors due to back-lash and mechanical lost motion. However linear motors directly provide motion to each axis without converting rotational movements of motor to linear motion.



Feature 2 Breakthrough Detection

The machine comes with the advanced breakthrough detection function as standard. Since the penetration depth of hollow-shaped workpieces such as turbine blades is automatically detected and stopped, unnecessary drilling can be prevented and overfeeding can be eliminated, resulting in shorter cycle time and minimising potential for part scrapping when drilling unattended.



Feature 3 Diffuser-shaped Hole Drilling

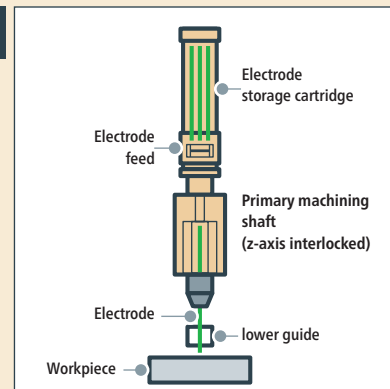
The Loran function allows use of a single electrode to drill holes of various shapes. In addition, hole diameters can be increased and the surface finish of hole side surfaces can be made finer during finish machining. These functions can be effectively applied to drilling holes in turbine blades, as required in the aerospace and energy industries, which can be easily programmed with LN Assist Software which comes standard with the machine.

Feature

4

AEF - Automatic Electrode Feeder

The AEF is a cylindrical cartridge housing with multiple electrodes at the upper part of the machining spindle. Only one of the contained electrodes is extracted from a hollow part of the spindle and inserted through a lower guide to feed the electrode outward toward the work-piece. By the simple setup operation of storing dozens of electrodes in the cartridge, this device can automatically collect worn-out electrodes and continuously and automatically supply new electrodes stored in the cartridge. This allows unmanned drilling of multiple holes.



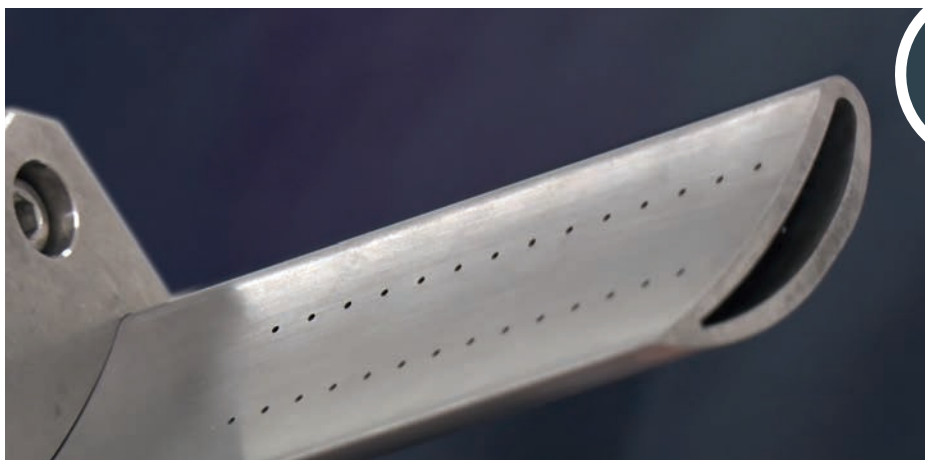
Feature

5

LN Assist Software

An automatic programming system, LN Assist, comes as standard on K4HL. Its simplified graphic screen allows for easy operation. As LN Assist is also capable of a series of calculations and macro-functions, operators can easily work with any kind of complex cutting layouts and programmes. A customised function is available where operators can register their own programmes as a utility. The software incorporates the operations of optional items such as AEF-C, ATC, and LGC.

Case Study



Watch the K4HL at work!

Scan the QR code with your smartphone camera and experience a new piece of great technology.



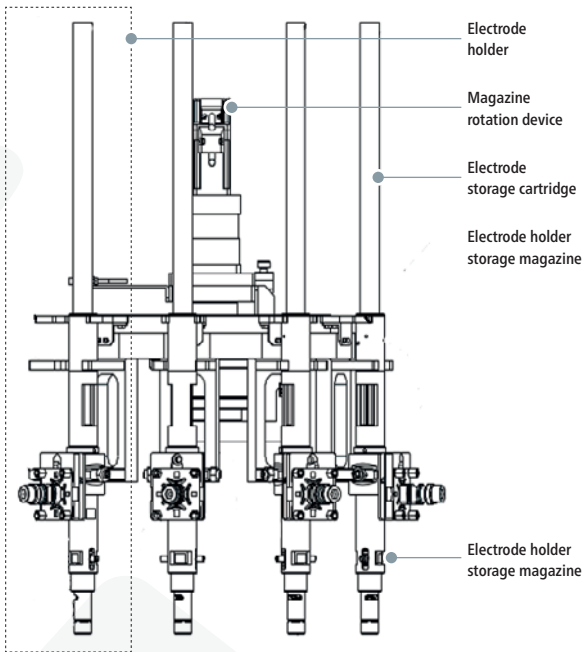
Work-piece material	Inconel®
Thickness	2.2 to 5.6mm (Thickness varies by the angle of gradient)
Notes	Hollow Shape

* Inconel® are registered trademarks of Special Metal Corporation

* The machining data indicated here is based on Sodick's specified conditions, machining environment and measurement standards.

Optional Items





AEF-C Automatic Electrode Feeder Changer

The Automatic Electrode Feeder Changer expands the capacity of the pipe electrode feeder and further supports automatic unmanned drilling of multiple holes. The unique and advanced design of the feeder when configured as a changer increases stock pipe electrode capacity to 300+ depending on diameter.

ATC - Automatic Tool Changer

The Automatic Tool Changer replaces the collects that hold pipe electrodes automatically offers greater diameter options and further expands the flexibility of the K4HL for automated unmanned drilling.

LGC - Lower Guide Changer

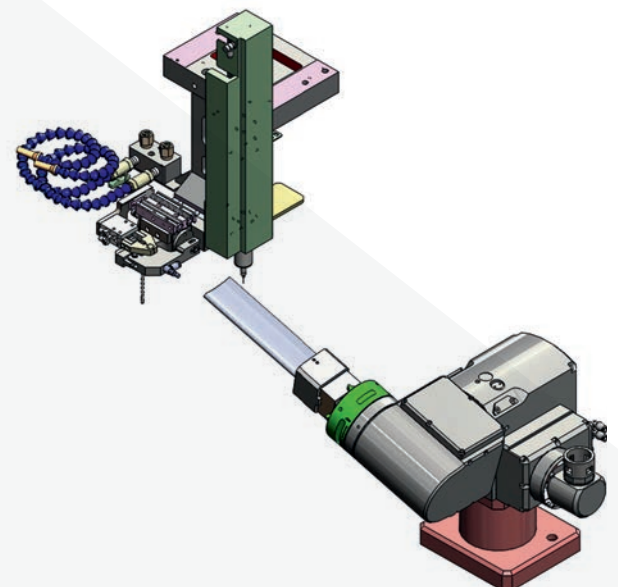
For automated drilling of different diameter holes, the LGC (Lower Guide Changer) option is available. The lower guide changer supports the automatic electrode changer and automatic electrode feeder changer. Complete flexibility for parts with multiple holes of varying size diameters, expanding the potential of automatic operation.

Measurement Probe

The Renishaw Part Probe option is useful for datum location with-out fear of part pickup damage. The probe can be programmed through canned cycles or macro routines, which can be deployed as an option.

A/B-axis Table

A/B-axis table is available as an option to meet the customer's requirements. – (SPK-E controller required)



Specifications

Specification of Machine

Ceramic table size (W x D)	750 × 650 mm
X-axis travel	400 mm
Y-axis travel	300 mm
Z-axis travel	500 mm
W-axis travel	400 mm
Max. workpiece weight	500 kg
Max. workpiece height (W × D × H)	740 × 640 × 500 mm
Applicable electrode diameter	φ0.25 ~ φ3.0 mm
Revolution velocity	10 ~ 1,000 rpm
Prevent run outs of the electrode function	Intermediate guides (4 positions)
Distance from lower guide undersurface to table	255 ~ 655 mm
Work-tank dimensions (WxDxH)	1,165 × 995 × 610 mm
Machine installation space (WxD) (not including maintenance space)	1,760 × 3,135 mm
Machine weight	3,530 kg
Air pressure	0.55 MPA 30 NL/min
Processing method	Flushing

Supply Tank

External dimensions (WxDxH)	1,250 × 380 × 1,430 mm
Dielectric fluid	De-ionised water
Weight(Dry)	190 kg
Tank capacity	140 L
Dielectric fluid filtration method	Replaceable paper filter HF-17 (Water) (Pressurized)
High-pressure pump	3-phase 200 220V 0.75 kw
Max. pressure	8 MPa
Deionizer	Eco ion (18L specification)

The dielectric chillers on Sodick machines contain either fluorinated greenhouse gas R410A or R407C
 Due to ongoing research, specifications are subject to change without prior notice.

AEF Unit

Electrode diameter range	φ0.5 ~ φ3.0 mm
Max. electrode length	500 mm
Electrode storage capacity	Varies by electrode diameters. φ0.5 about 40 pcs, φ1 about 25 pcs φ2 about 15 pcs, φ3 about 5 pcs
Max. Electrode length for AEF ejection	300 mm (500 mm when AEF-C and ATC unit are used)

ATC Unit (Optional)

Number of Electrodes	18 pcs
Max. electrodes length	500 mm (300 mm when AEF-C is installed)

LGC - Lower Guide Changer (Optional)

Number of Guides	8
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AEF Changer (Optional)

Automatic Electrode Feed Exchanger (AEF-C) is an AEF device with electrode stocker that supports different electrode diameters.

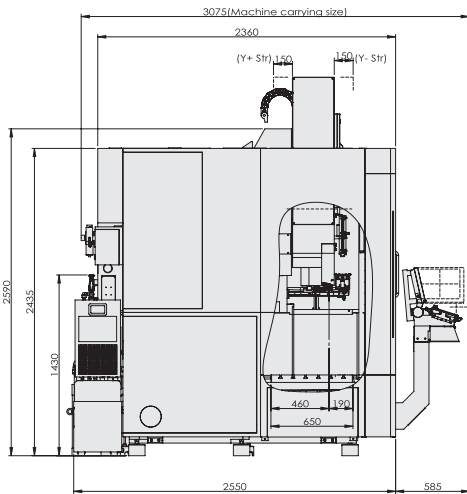
Number of Cylindrical EL Stocker	9
Electrode diameter range	φ0.5 ~ φ3.0 mm
Max. electrodes length	500 mm
Electrode storage capacity (Per Cylindrical EL stocker)	Varies by electrode diameters. φ0.5 about 40 pcs, φ1 about 25 pcs φ2 about 15 pcs, φ3 about 5 pcs

SPK CNC Power Supply Unit

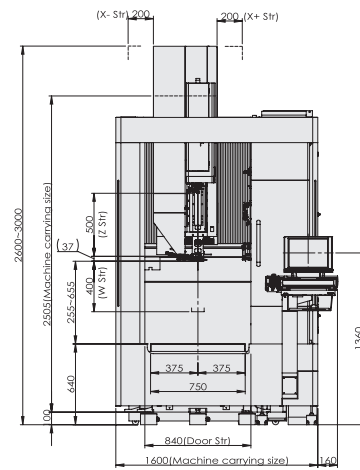
Total power input	3-phase 200/220V 50/60 Hz
Power Consumption	6.5 KVA
Discharging power supply unit	Optimum pulse control for TM power supply
Max. machine current	10 A
CNC unit	Install of 32bit CPU
Input format	Touch panel Keyboard External memory
Min. input command	0.1 μm
Simultaneous controlled axes	4 axes (Max. 8 axes with SPK-E optional)

Machine Layout

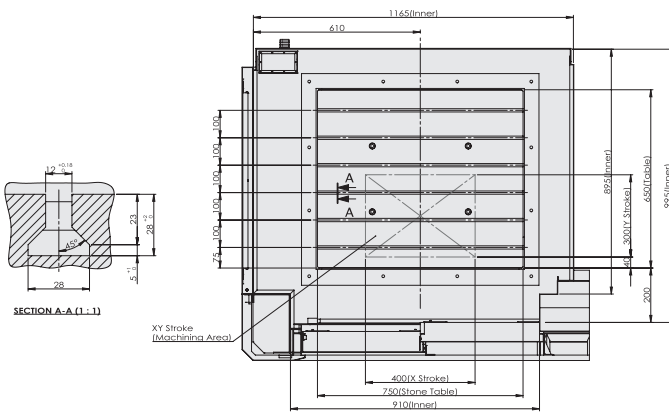
Side View



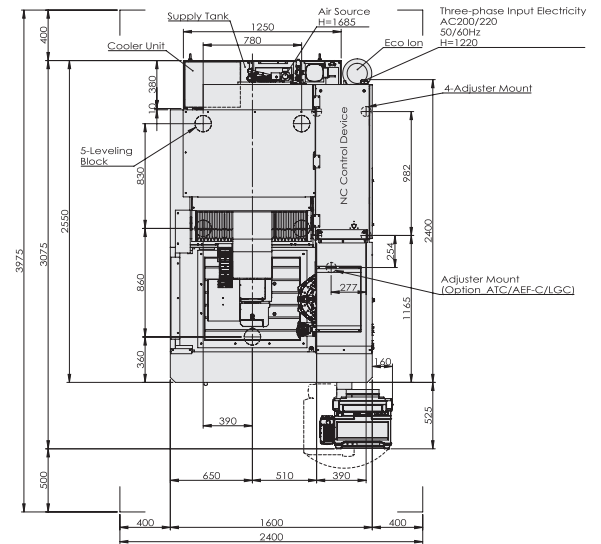
Front View



Work Table



Top View



All the CE machines have external transformer with dimension of approx. 650 x 460 x 540 mm



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