



Smart Pulse & Smart Linear

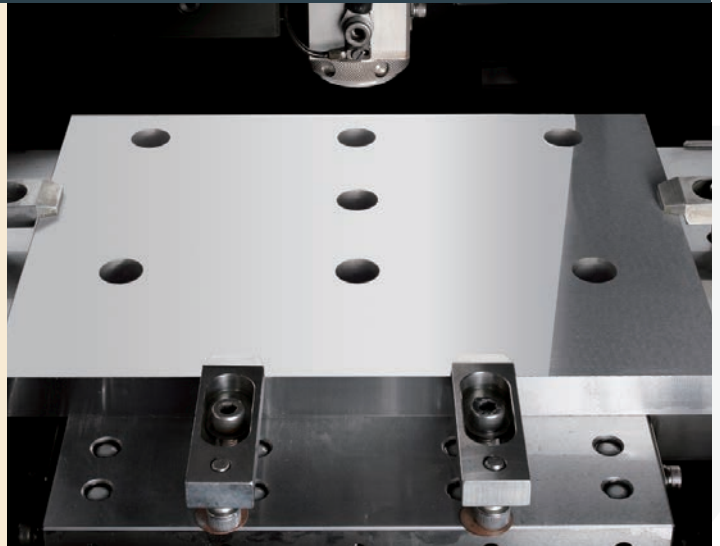
ALC400P/ALC600P

Super-accurate Wire EDM

Pursuit of Unrivalled Accuracy

ALC-P machines incorporate as standard an invert-type dielectric chiller which monitors and maintains the dielectric temperature to within ± 1 degree, minimising the thermal effect inside the work-area. An additional thermal sensor is installed inside the work-tank for even more accurate temperature control.

The CNC controller incorporates 2-dimensional pitch compensating software which automatically compensates pitch error in positioning every square of 10 x 10mm. In addition, cross-type roller guides provide super-high rigidity and accuracy and longer life. Even the door to the machine has been considered and is constructed of Carbon fibre to minimize "weight shift".

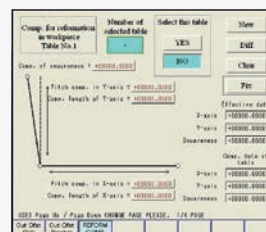
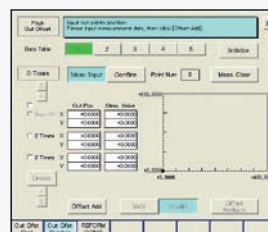
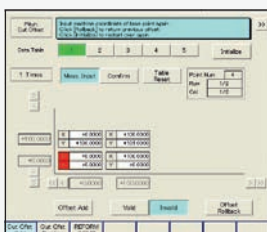


TECH 1 & 2 / NC Power Supply Unit + Discharge Unit

The ALC Series is equipped with the all-new "SPW Power Supply Unit" with a Multi-touch LCD monitor to bring new innovations in operability. In addition, the unit is equipped with a high-speed dual core processor.

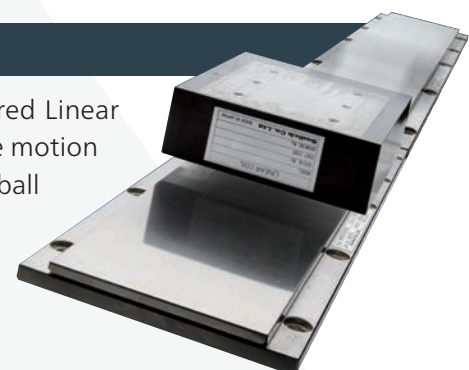
With operability optimized with a LCD monitor system, the unit creates an innovative environment in which workers can perform all necessary work through simple touch operation.

NC unit employs 2D pitch compensating software only for ALC-P series



TECH 3 / Linear Motor

The most outstanding features of the Sodick in-house developed and manufactured Linear Motors are high-speed axis motion and quick response, which result from wear-free motion and without 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 the 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 motion of motor to linear movements.



When Sodick set itself the task of improving on the performance and accuracy of its ALC-G series it took on a major challenge – these machines are already technical leaders, incorporating Sodick linear technology and digital Smart Pulse generators. But some sectors have requirements are even more demanding and Sodick was finding that an increasing number of customers were looking for super-high accuracy, for example a pitch accuracy of ± 1 micron – and every element of the ALC-P series has been developed to achieve these objectives.

TECH 4 / Motion Controller / Absolute Linear Scales

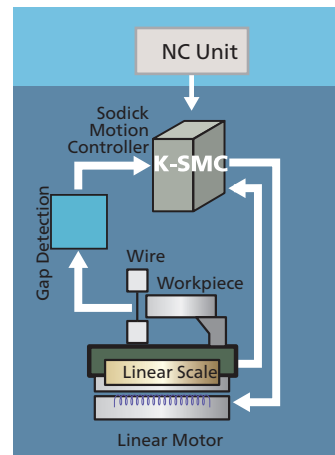
Motion Controller

In order to achieve maximum performance with a linear motor, the K-SMC motor controller is also developed in-house and incorporates Sodick control know-how accumulated over the years.

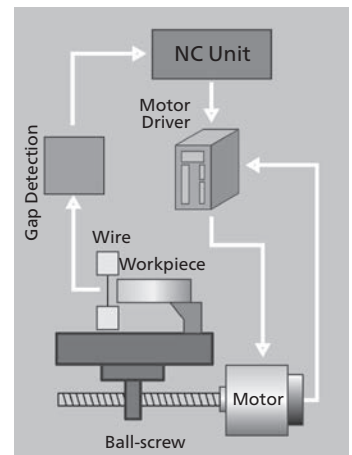
The feedback from the spark gap is directly input in to the K-SMC board allowing for instantaneous adaptation of the sparking conditions.

Absolute Linear Scales

With the introduction of new advanced absolute linear glass scales the need for referencing has been removed. Therefore, ensuring total positional control at all times and reduced setting up time.



Sodick Motion Controller



Conventional Ball Screw Drive

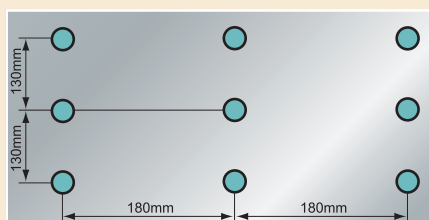
TECH 5 / Ceramic Components

Ceramic work stand ensures high rigidity and long-life accuracy. Sodick developed its own Ceramic table for work stands and guides on all machines. So, long life of high insulation and high accuracy are provided. Also low thermal distortion of ceramics helps higher machining accuracies.

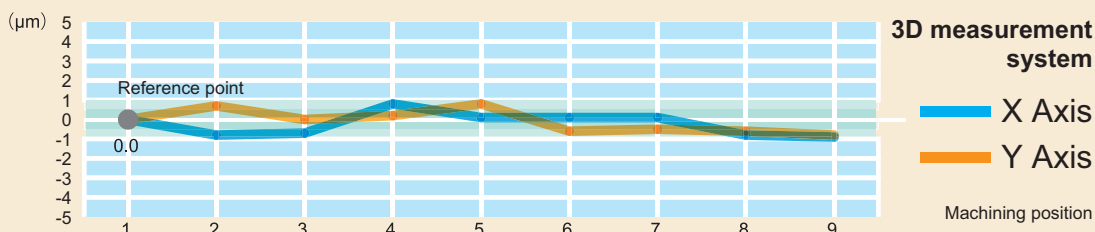
		Sodick's Ceramic	Granite	Cast Iron
Specific gravity		3.5 – 3.9	3.0	7.8
Water absorption ratio	%	0	0.03 – 3.0	*
Hardness	Gpa (HV10)	13 – 16	5.9 – 10	6.2
Bending strength	MPa	300 – 390	300 – 500	400
Young's modulus	GPa	280 – 370	30 – 90	110
Thermal conductivity	W/m·k	13.8 – 23.0	1.3	46.0
Linear expansion coefficient	$\times 10^{-6}/^{\circ}\text{C}$	5.7 – 5.8	8	11



Sample – Pitch accuracy of $\pm 1 \mu\text{m}$



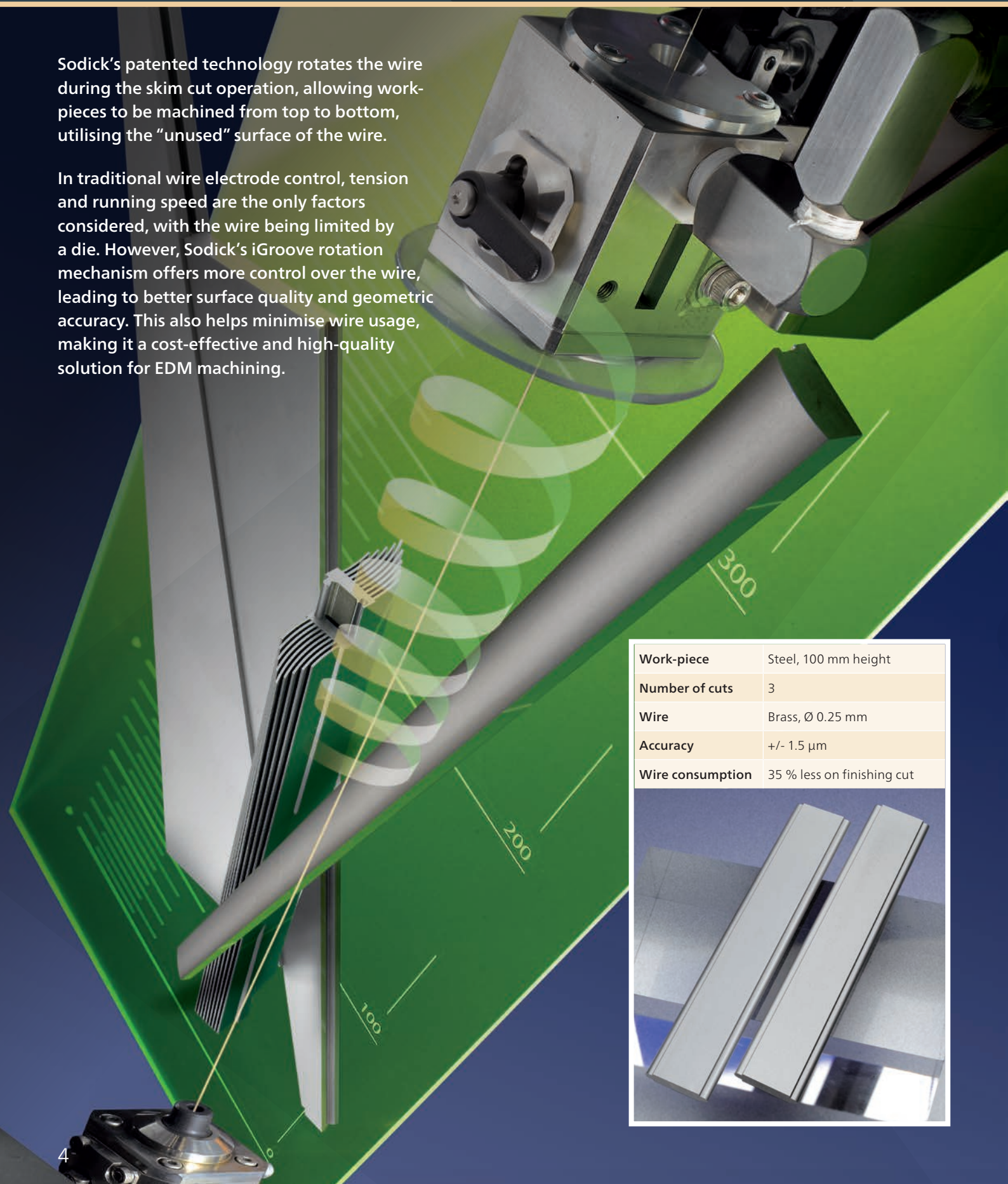
Machine: ALC600P
Work-piece: Steel (550 x 350 x 20 mm)
Surface finish: 0.15Ra
Wire dia: 0.25mm



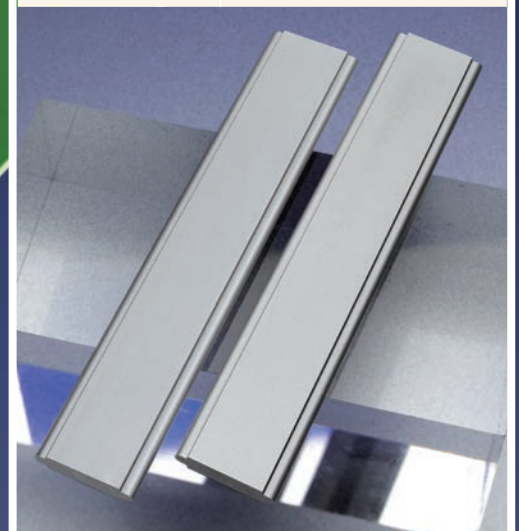
New Wire Rotation Mechanism

Sodick's patented technology rotates the wire during the skim cut operation, allowing work-pieces to be machined from top to bottom, utilising the "unused" surface of the wire.

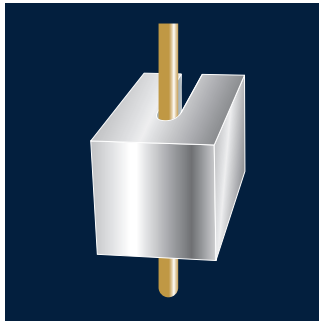
In traditional wire electrode control, tension and running speed are the only factors considered, with the wire being limited by a die. However, Sodick's iGroove rotation mechanism offers more control over the wire, leading to better surface quality and geometric accuracy. This also helps minimise wire usage, making it a cost-effective and high-quality solution for EDM machining.

A detailed 3D cutaway diagram of the Sodick iGroove rotation mechanism. It shows a wire electrode being fed through a series of rollers and guides. The wire is shown rotating as it moves through the mechanism, which is designed to utilize the "unused" surface of the wire. The diagram includes a green background with yellow and white curved lines representing the wire's path and rotation. A work-piece is shown being machined by the wire, with a cross-section revealing the internal structure. The work-piece has dimensions of 100, 200, and 300 marked on it. The wire is shown entering from the bottom left and exiting towards the top right.

Work-piece	Steel, 100 mm height
Number of cuts	3
Wire	Brass, Ø 0.25 mm
Accuracy	+/- 1.5 µm
Wire consumption	35 % less on finishing cut

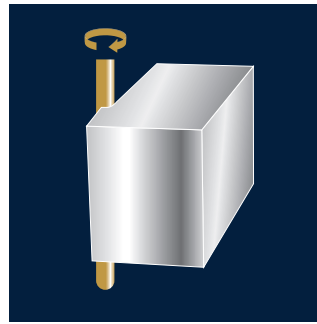


Rough/Approach cut



On rough cut,
no wire rotation is applied.

Skim cut (2nd cut onwards)



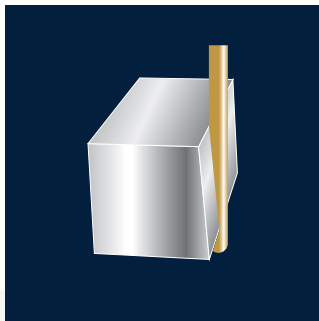
clock-wise rotation



counterclock-wise rotation

For skim cuts, CNC automatically defines the rotation direction of wire (clockwise or counter-clock wise) depending on offset side, by analysing the cutting program.

Benefit of the new Wire Rotation Mechanism



With the conventional machining method, wire electrode wears as it runs which creates "taper" on the surface, especially when cutting a thick work-piece.

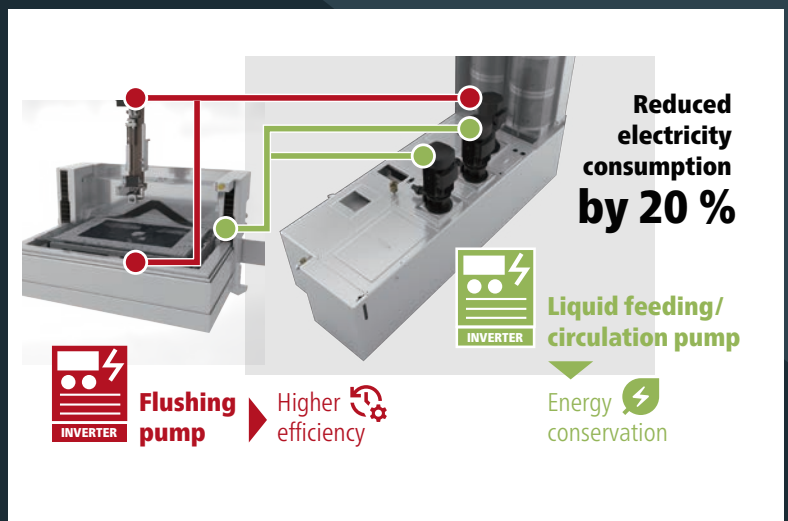
To obtain the straight surface, taper compensation is required. Otherwise, increasing the wire feed rate would be the another solution but it may cause frequent wire breakage and more wire consumption.



By rotating the wire electrode, work-piece is cut with unused surface of wire, improving the geometric accuracy and surface quality without having taper compensation nor higher wire feed rate.

Efficient Energy Conservation with Advanced Pump Technology

A newly developed energy-saving pump system has been integrated into the dielectric tank. Additionally, a circuit that monitors the vertical flushing flow rate during machining has been included as standard equipment. This intelligent monitoring system helps reduce the pump drive energy required for flushing. As a result, the ALC series achieves an impressive 20% reduction in power consumption, including standby, compared to the standard models. This advancement in energy efficiency ensures cost savings and environmental benefits without compromising on performance.



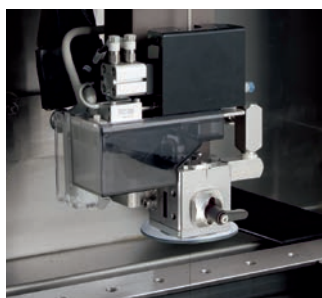
Machine Construction

FJ AWT

Diamond guide

Diamond round guide with small clearances realises high-precision machining.

* Please use genuine consumable supplies.



Wire Threading on Curved Surfaces

FJ-AWT performs wire threading without the need for water-jet support.

Jet-less threading mode enhances threading reliability on slopes and curved workpieces, eliminating the need for water submersion.

Precision in Narrow Clearance

Enhanced machining performance achieved through wire guides with narrow clearance.

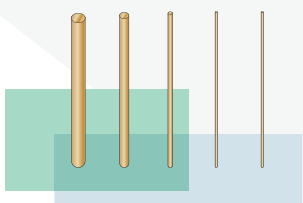
0.05 wire AWT

Optional automatic wire threading for thin wire ($\varnothing 0.07$ and 0.05mm) is available, featuring the HTP circuit (high-voltage circuit) for applying a higher voltage

Wire diameters

0.3mm 0.2mm 0.1mm 0.07mm 0.05mm

Standard AWT
Supported wire
diameters



AWT (Automatic Wire Threading) with HTP circuit is available as an option for wire diameters of 0.05mm .



The machine has a variety of standard built-in functions, including a new tension servo function, auto fluid-level control, and the new FJ-AWT (Automatic Wire Threader). Paying close attention to the machine accessibility for work preparation in the field, a square-shaped work stand, ceramic stand base, 3-sided machining tank with automatic lifting door, quadruple filters and many other features, all of which works to ensure improvements in productivity. Furthermore, by adopting a unique full-cover machine structure, comfort and safety in the work environment is not compromised.

"TH COM" – Temperature-synchronized machine

High-Precision Thermal Displacement Correction and Total Temperature Control System

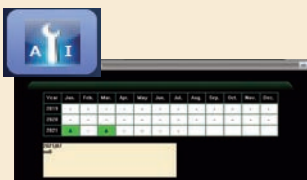
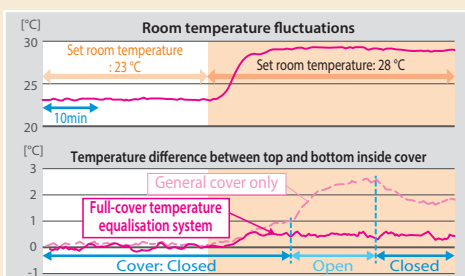


All models in the series come with standard features like the AIM (AI Maintenance) environmental temperature diagnosis function and TH COM thermal displacement correction function. These advanced functions allow the machines to operate efficiently in a wide range of temperature environments, from high accuracy to rough conditions. Additionally, the series includes a logging function and temperature display of the machine surroundings, providing valuable information for optimal performance and maintenance.

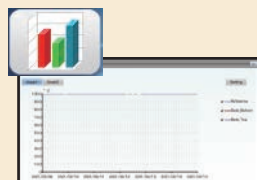
Furthermore, the full-cover specification machine features a temperature equalisation system to provide a more stable machining environment.

Full-cover specification machine

Example of temperature equalisation system



AIM environmental temperature diagnosis



TH COM temperature logging

Quadruple Filter (Dielectric tank) and O-Shape Worktable

With a keen focus on machine accessibility for work preparation in the field, the ALC series features quadruple filters and an O-shape worktable as standard.



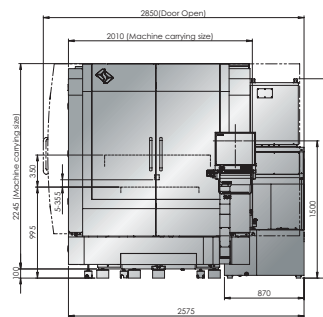
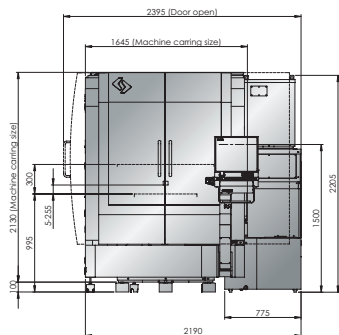
Specifications

Machine Tool	ALC400P	ALC600P
X Axis travel	400 mm	600 mm
Y Axis travel	300 mm	400 mm
Z Axis travel	250 mm	350 mm
U x V Axis travel	150 x 150 mm	150 x 150 mm
Taper angle (Work. thickness 130mm)	±25° (±45° option)	±25° (±45° option)
Work tank dimensions (W x D)	850 x 610 mm	1050 x 710 mm
Max. workpiece weight	500 kg	1000 kg
Wire diameter	0.1 ~ 0.3 mm (0.01 mm option)	0.1 ~ 0.3 mm (0.01 mm option)
Wire tension	3 ~ 23N	3 ~ 23N
Max. wire speed	420 mm/sec	420 mm/sec
Distance from floor to table top	995 mm	995 mm
Machine tool dimensions (W x D x H)	2,190 x 2,590 x 2,230 mm	2,575 x 2,945 x 2,345 mm
Machine installation dimensions	3,425 x 3,850 mm	3,860 x 4,245 mm
Machine tool weight	3400 kg	4600 kg
Total power input	3-phases 50/60Hz 13KVA	3-phases 50/60Hz 13KVA

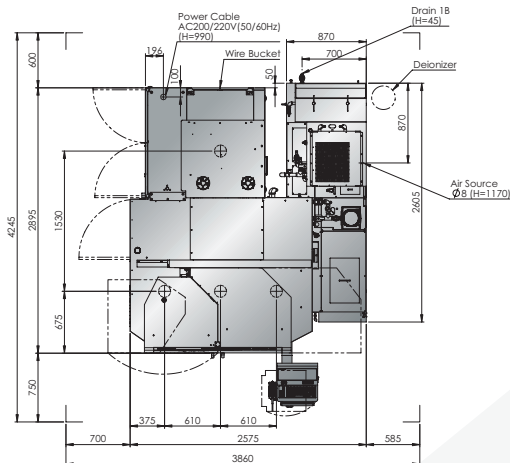
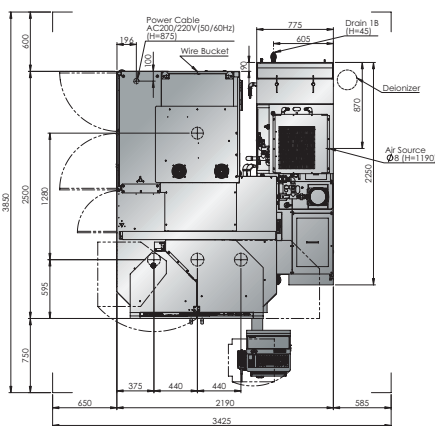
Dielectric Tank	ALC400P	ALC600P
External dimensions (W x D)	775 x 2,250 mm	870 x 2,605 mm
Empty weight	450 kg	500 kg
Capacity	790 lit	1,000 lit
Dielectric fluid filtration system	4 Replaceable paper filters (internal pressure)	4 Replaceable paper filters (internal pressure)
Deionizer	Ion exchange resin (18-lit. type)	Ion exchange resin (18-lit. type)

ALC400P

ALC600P



Top View



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