



Sodick

ALN600G iGroove (Control SPW) Wire-EDM

"Smart Linear and Smart Pulse Technology"



Sodick, Inc. created the world's first linear motor driven EDM machine in 1998. Two decades later over 55,000 machines incorporating this superior drive technology have been delivered.

ALN600G iGroove (Control SPW) Wire-EDM

Standard Features:

10-Year Positioning Accuracy Guarantee

2-Year Standard Warranty

Rigid Precision Linear Motors (X, Y, U, V-Axes)

Absolute Glass Scales (X, Y, U, V-Axes)

TH COM (Thermal Displacement Compensation System)

iGroove – Wire Rotation Strategy

Heart-NC CAM Software (For importing DXF Files)

Intelligent Q³vic EDW Technology – Automatic Wire Path Detection from CAD Files (Includes Solid Models)

Digital PIKA-W Plus Circuit (Surface finish > to 4.3 RMS on steel / 2.0 RMS on carbide)

2D and 3D Graphics and Program Simulation

S-Viewer (Remote Machine Status Monitoring Function)

Fixed-Jet AWT (Automatic Wire Threader)

Advanced Corner Control

Auto-Cutting Condition Selection

Remote Pendant

19" LCD Touch Panel Screen

LAN Connection Port

USB Port

4GB Sodick USB Memory Stick

Wire Alignment Block (Manual and Automatic)

Multi-line Transformer

Water Deionizer

Automatic Voltage Regulator

φ 0.010" (0.25 mm) Wire Guides - 1 set

Air Filter & Paper Filter (4)

High-Speed Electrolysis-Free Power Supply

Sodick LED Work Light

3-Sided Rise/Fall Work Tank

4-Sided Clamping Table

Z-Axis Automatic Fluid Level Control

Flushing Nozzles (2 pcs per set / 2 sets) [For 0 to 10° taper angle, and 0 to 25° taper angle]

Automatic Wire Tension Servo Control System

Dielectric Cooling Unit (Chiller)

3-Day Operator Training for 2 people at Sodick facility

Machine Options:

SPW-E Control – Up to 8-axis simultaneous control. Add for “Turn and Burn” capability

Jumbo Wire Feeder 110 lb (50 kg)

Integrated ‘Jumbo’ Wire Feeder 44 lb (20 kg)

S3Core – Automatic Core Processing Device (Factory Only Option)

UPS System – Back up power supply keeps control running for up to 10 minutes if main power supply fails. Machine can be powered down properly while running on the UPS.

L-Cut Wire Chopper

Custom Color – Factory option only and will extend delivery by approx. 12 to 14 weeks

Taper Flex Neo – Hardware and software to enable the machining of precision taper angles up to 22 degrees. This option works with standard wire guides ϕ .010” (0.25 mm) and ϕ .008” (0.20 mm) sizes. Guides sold separately.

Taper Flex Neo 45 – Hardware and software to enable the machining of precision taper angles up to 45 degrees. This option requires **Taper Flex Neo 45 Ruby Guides**
Available in: ϕ .010” (0.25 mm) and ϕ .008” (0.20 mm) sizes. Guides sold separately.

Taper Flex Neo 45 Ruby Guides –

Available in ϕ .010” (0.25 mm) and ϕ .008 (0.20 mm)

Signal Tower – 3-tier light system (Green, Yellow, Red) indicates machine status.

FJ Wire Guides – 1 Set (Upper, Lower and Pre-Guide) Available in:

ϕ .004” (0.10 mm) / .006” (0.15 mm) / .008” (0.20 mm) / .010” (0.25 mm) / .012” (0.30 mm)

ϕ .002” (0.05 mm) Wire Capability W/AWT Function –

Includes ϕ .002” (0.05 mm) Guide Set and the HTP Circuit

HTP Circuit – High voltage circuit that improves machining efficiency when cutting PCD and similar materials

Sodick WS-4P Rotary / Indexing Table – (Additional details on page 3)

SPW-E control option required if used as a simultaneous rotary table.

WS-4P/5P Table Interface option* required if used as an indexing table.

Sodick WS-5P Rotary / Indexing Table – (Additional details on page 3)

SPW-E control option required if used as a simultaneous rotary table.

WS-4P/5P Table Interface option* required if used as an indexing table.

***Table Interface** – Required for WS-4P/5P table if used as an indexing table

Standard Automation Interface – Provides standard interface between machine and Robot (System 3R or Erowa). The Robot acts as a 'slave' to the machine.

Custom Automation Interface – Special interface for machine operating in automation with Cell management software or interfaced with robot other than System 3R or Erowa.

Heart NC External – Heart NC (Onboard CAD – CAM Software) Offline PC version

MT Connect Adaptor – MT Connect Compatible Port for streaming data to a 3rd party monitoring and analytics platform

Transient Voltage Surge Suppressor – Psytronics Model P2403D Suppressor. Sodick is not responsible for any electrical supply modifications required for installation of this unit.

WTPC Circuit – Advanced circuit for PCD machining to enhance surface integrity / finish

On-Site Training – 3 days of operator training at customer facility by a Sodick Engineer

Sodick CAD / CAM Options:

SOLID WIRE PLATINUM PLUS Software –

Platinum Plus version includes 4-axis programming, coreless machining involute gear module and CAD / Solid model compatibility

On-Site Consulting / Training –

DP Technology Trainer at customer location (First Day)

On-Site Consulting / Training –

DP Technology Trainer at customer location (Additional Days)

Traditional Operator Training (3 Days) –

Sodick CAM System training at DP Technology for one person

Web-based Operator Training (3 Days) –

Sodick CAM System training via web meeting for one person

Customer Specific Training Curriculum –

One day or one part thereof at DP Technology or virtual

Software Post Processor – Program other brand Wire EDM machines

Annual Maintenance Contract -

Yearly contract to maintain software updates and product support

Sodick Rotary Axis Options:

1) Sodick WS-4P Rotary Table*

*(SPW-E Control is required)

Table Diameter: ϕ 4.0" (102 mm) / Unit Weight: 22 lb (10 kg)

Permissible Load: Used Horizontally, 11 lb (5 kg) / Used Vertically, 22 lb (10 kg)

Table Height (Center Height): Used Horizontally, 2.1" (53 mm) / Used Vertically, 7.8" (199 mm)

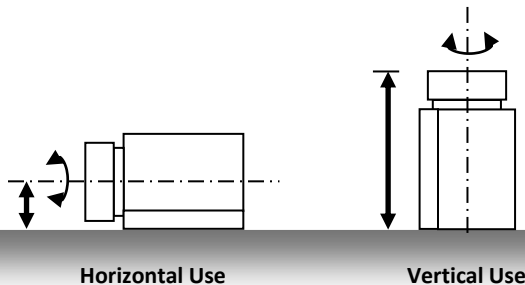
2) Sodick WS-5P Rotary Table*

*(SPW-E Control is required)

Table Diameter: ϕ 6.1" (156 mm) / Unit Weight: 44 lb (20 kg)

Permissible Load: Used Horizontally, 44 lb (20 kg) / Used Vertically, 88 lb (40 kg)

Table Height (Center Height): Used Horizontally, 3.1" (80 mm) / Used Vertically, 7.4" (189 mm)



New, Innovative and Unique Extended Warranty:

SodickCare+ offers more warranty options than just the coverage of basic parts and labor. This warranty offers unique customer support programs that will give you the peace of mind you want when purchasing new equipment. SodickCare+ is a combination of preventative maintenance, extended warranty, and features many additional benefits. Take a look at a SodickCare+ brochure to learn more about all the benefits of SodickCare+. SodickCare+ is available as a 2 or 4-year extended warranty, and must be purchased at time of machine purchase.

With SodickCare+, you can safeguard yourself from unexpected repair bills. In the event you are in need of service, rest assured that your EDM is in the hands of Sodick certified service engineers. Unlike other warranty programs, SodickCare+ is transferrable and increases the machine value if selling it before the expiration of warranty.



***** SodickCare+ is only available in the U.S. *****

SodickCare + Extended Warranty:

SodickCare+ 2 Warranty

SodickCare+ 4 Warranty

ALN600G (SPW) Specifications:

X-Axis Travel	23.62" (600 mm)
Y-Axis Travel	15.75" (400 mm)
Z-Axis Travel	13.78" (350 mm)
U-Axis Travel	5.91" (150 mm)
V-Axis Travel	5.91" (150 mm)
Axis Drive (X, Y, U, V)	Rigid Precision Linear Motors
Axis Feedback System (X, Y, U, V)	Absolute Glass Scales (Fully Closed Loop)
Linear Scale (Absolute Type)	X, Y, U, V axis: 0.01 μm
Minimum Input Command	0.00004" (0.001 μm)
Minimum Drive Unit (X, Y, U, V axes)	0.0004" (0.01 μm)
Max. Taper Angle	$\pm 25^\circ$ (At 5.12" thickness / 130 mm)
Max. Workpiece Weight	2,204 lb (1,000 kg)
Wire Diameter Range (Min. ~ Max.) *	ϕ 0.004" ~ 0.012" (0.1 ~ 0.3 mm)
Rapid Table Feed Rate	94.5"/min (2,400 mm/min)
Jog Feed Rate	Max. 118"/min (3 m/min)
Wire Guide (Lower)	Round Diamond Guide
Wire Guide (Upper)	Round Diamond Guide

ALN600G (SPW) Specifications Continued:

Work Tank Dimensions (W x D)	41.34" x 27.95" (1,050 x 710 mm)
Distance from Floor to Table Top	39.17" (995 mm)
Wire Feed Speed (Max.)	16.5"/sec (420 mm/sec)
Wire-Tension Range (Min. ~ Max.)	3 ~ 23 N (200 g ~ 2,800 g)
Wire Bobbin Weight	17.6 lb (8 kg)
Machining Method	Flushing, Submerged
Machine Tool Weight (Including Power Supply & Tank)	10,031 lb (4,550 kg)
External Dimensions (W x D x H)	100" x 109" x 95" (2,525 x 2,760 x 2,295 mm)
Required Floor Space	149" x 160" (3,775 x 4,060 mm)

*Includes power supply, dielectric tank and wire bucket

Machine Accuracy:

Positioning X & Y Axis	0.00008" (0.002 mm)
Repeatability X & Y Axis	0.00004" (0.001 mm)

(Based on 11.81" (300 mm) of axis travel, requires stable room temperature and compliant machine foundation)

Air Supply Requirements:

Air Flow Rate	30 NL/min (1.1 CFM)
Air Pressure	0.5 MPa (72 psi)

Dielectric System:

Tank Capacity	265 gallons (1,000 liters)
External Dimensions	103" x 35" x 86" (2,605 x 870 x 2,180 mm)
Dielectric Tank Weight	1,100 lbs (500 kg)
Filtration Method	4-Replaceable Eco Filters (Internal-pressure type)
Deionizer	Ion-Exchange Resin 18-liter Type (4.76 gallons)

CNC Unit:

CNC (SPW)	Windows 10 Multi-tasking OS, M4-LINK
Max. Machining Current	40 Amp
User Memory	Editing: 100,000 blocks
User Memory Capacity	30MB
Memory Device	SSD (Solid State Drive) 8GB
Position Command Method	Incremental / Absolute
Keyboard	Alphanumeric Characters & Symbols
Display	19" TFT-LCD
Inch / Metric Operation	NC Codes, MDI
Simultaneously Controlled Axes	Maximum 4 Axes
Coordinate Systems	60 Individual Systems

CNC Unit: Continued:	
Decimal Selections	4, 5, or 6 Place Selection
Min. Increment Input Command	0.001 μm
Min. Drive Unit (X, Y, U, V axes)	0.01 μm
Max. Increment Input Command	$\pm 999999.999 \text{ mm } (\pm 99999.9999'')$
Simultaneous Axis Movements:	
Jog	Up to 3 Axes
Linear Interpolation	Up to 4 Axes
Circular Interpolation	Up to 4 Axes
SPW-E (Option)	Up to 8 Axes
Auto – Stored Program Execution	Up to 7 Nested Levels
Subprogram Looping	Up to 9,999 times
Subprogram Nesting	Up to 50 Levels
Sequence Numbers	10,000 'N' or 'O' Codes
Wire Dia. Compensation Memory	1,000 'H' or 'D' Codes
Wire Dia. Compensation Range	0.00001" to 9999.9999"
Discharge Condition Codes	1,000 'C' Codes
Arithmetic Functions	+, -, *, /, []
Arithmetic Equation Length	72 characters
Character Set	Alphanumeric and Symbols
Trigonometric Functions	Sin, cos, tan, sq.-root
Scaling	0.001 to 9999.999
Mirror Image	X & Y Axes; Independently/ Simultaneously
Pulse Generation Method	Power MOS-FETS
Servo Control	CNC Digital Servo System
Input Formats	USB External Memory, Touch Panel Screen, Keyboard, LAN
Pulse Circuit	TM*

**The TM Pulse will adapt to optimally control the discharge pulse current, which results in eliminating ineffective discharge pulses and increases the discharge frequency. This consequently has increased cutting speeds.*

Memory Capacity:	
System Memory	3.25 GB
User Memory	10 MB for editing, 50 MB for storage
Power Requirements:	
Total Power Capacity	13 KVA
Power Supply	3-Phase, 200/220V (50/60Hz)
*Power fluctuation must be less than $\pm 4\%$.	

(The included multi-tap transformer accepts input voltage from 190VAC to 460VAC (3-Phase). The output from this transformer supplies the machine with the required 3-Phase, 200/220V, 50/60Hz)

Recommended Environmental Conditions:

Atmosphere

The equipment should be used in atmosphere free of high amounts of dust, vapor, humidity, etc.

Acceptable Operating Temperature Range

59°~95°F (15 ~35 °C) Specific temperature should remain constant.

For best results, rapid temperature changes must be avoided.

Ideal Operating Temperature

68° F ±1.8° F (20° C ± 1°C)

Vibration and Shock

The equipment should remain in area free of vibration and shock. If this is not possible, shock pads or isolated floor foundation should be considered prior to installation.

If environmental conditions fail to meet the requirements stated above, it may be necessary to erect an isolated room to meet the requirements. Otherwise, errors in accuracy may occur, the machine tool and control unit may be affected, and the warranty may be voided.

Special Note:

EDM's radio frequency may influence other electrical equipment in certain areas. If this occurs, a shielded room is recommended to enclose and isolate EDM radio frequency noise.

ALN-G Series – “Smart Linear, Smart Pulse”

Sodick’s 10-year Positioning Guarantee

Sodick offers the industry’s only 10-year positioning accuracy guarantee due to the highly advanced linear motor technology. Sodick fully stands behind the quality and dependability of all its in-house developed technologies, and delivers the only 10-year positioning guarantee ever to be introduced.

Rigid Linear Motors

Linear motors provide smooth, vibration-free table movement, which results in unsurpassed positioning and machining accuracy. Since there are absolutely no ball-screws or couplings, backlash, hunting, and lost motion are completely eliminated. With the use of linear glass scales in the X, Y, and Z axes, precise positioning accuracy with direct feedback is accomplished. This allows for unparalleled straight and taper cutting accuracy. The longevity of this system is matched by no other in the industry.

Linear Motor Advantages

- Improved cutting accuracy and cutting speed
- No backlash due to having no ball-screws or mechanical couplings
- Up to 1.2G of acceleration
- Axis speed up to 1,440 in/min.
- Immediate response to gap conditions (no delays due to mechanical couplings)

Sodick Motion Controller (SMC)

The Sodick Motion Control (SMC) is an integrated Control Circuit. The K-SMC board developed in the U.S.A by Sodick’s own R&D division, located in Silicon Valley specifically to meet and surpass the demanding requirements of the EDM process for today and the future. The SMC is integrated into the machine’s generator. It controls the axes motion and monitors the changes in the spark gap; because of its ultra-fast response time, it can make changes to the spark gap at 500 times per second resulting in instantaneous servo response.

Ceramic Work-Zone

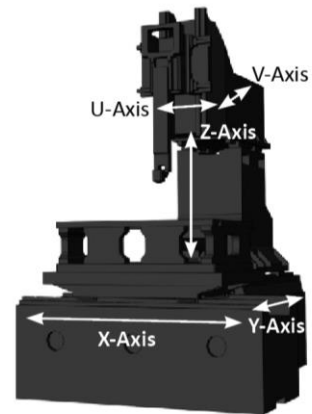
Ceramics have many advantages; lightweight, highly rigid, thermal stability 3-times better than cast iron and steel and are corrosion-free. The machine work-zone; e.g., work-table stand, AWT upper and lower arms are made from ceramics, similar to those used in measuring machines. To ensure the benefits of ceramics can be economically implemented, Sodick manufactures the material in-house.

Automatic Wire Threading with Fixed-Jet AWT

This AWT system allows submerged and non-submerged threading. Combining thermal wire cut for a straighter wire and a new waterjet function, the reliability of the Sodick AWT system has been improved. The exclusive use of closed guides on this compact ALN-G Series of machines in combination with the FJ AWT enhances productivity. The automatic threading of the wire takes less than 9 seconds and is possible during immersion – this helps to reduce idle time. If breakage of the wire does occur during machining, the machine re-cuts the wire using the annealing process and disposes of the unwanted wire-tip and rethreads the wire.

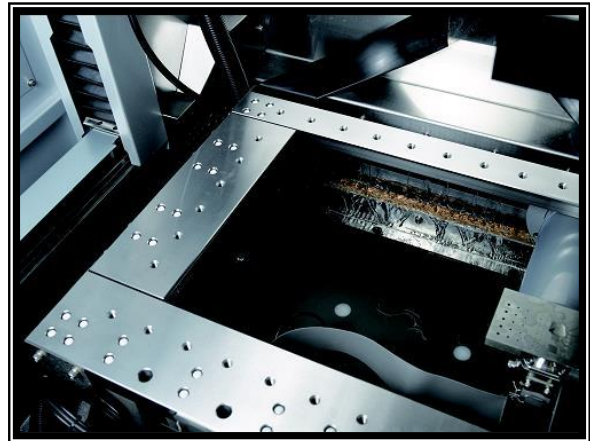
Rigid Cast Construction

The machine cast construction is made from Cast iron®, which is designed with heavily ribbed sections to provide superior long-term rigidity and stability. The surfaces to which the linear guide-ways are mounted are scraped by hand to ensure a perfectly flat surface and outstanding machining geometry. The X and Y axes are independent masses (not a compound slide design). The table has movement in the X-axis only with the Y-axis movement supplied by the lower arm and ram, therefore, geometry is not compromised.



Dielectric Tank and Working Area

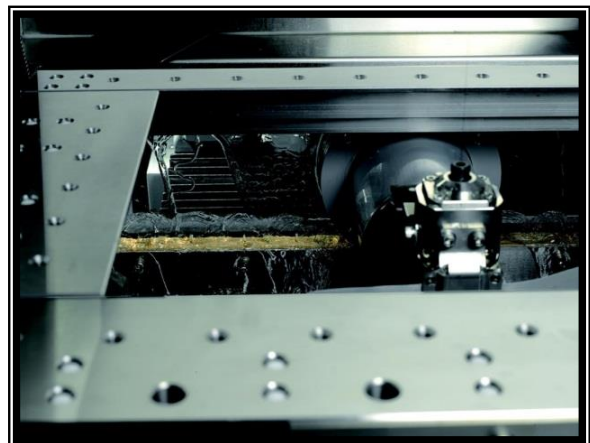
The interior of the tank is made from stainless steel for quick maintenance (unpainted). A constant supply of water flows over the moving elements at the rear of the tank and around the rear lower arm seal ensuring debris is not permitted to build-up. The dielectric water level is automatically managed by the upper guide position. The table supports, the upper/lower control arms and critical parts in contact with the wire, all of these parts are manufactured from ceramics. This ensures essential elements of the Wire EDM Machine are able to give optimal electrical insulation and excellent thermal stability. The 3-sided automatic tank door allows easy access to the work-table.



Large 4-sided table frame of the AL-P Series machines

Slide Plate Lubrication

The life cycle of the sealing portion on the slide plate can be extended since the machine features a cleaning function for the slide plate. This leads to a reduction of maintenance time and stable high speed machining performance.



Three Part Filtration System

Enhancing filtration capacity makes high speed and accurate machining easy to achieve. The filters can even be changed during machining. The system also includes an isolation switch that enables the ability to change the deionizer during machining. The integral dielectric cooling unit is also standard on the ALC-G Series machines.



Key Features

iGroove – Wire Rotation Strategy

This unique Sodick strategy that rotates the wire to use the entire wire surface during finishing. Applying wire rotation during finishing reduces wire consumption by up to 30% while improving surface finish and accuracy.

Digital Pika -W Plus Super Finish Circuit

Sodick has introduced Digital Pika-W Plus Super Technology that enables better than 4 RMS (0.05 μmRa) surface finish on steel. This circuit was created and developed by Sodick to minimize machining, energy and control the discharge spark with digital pulse. The result is the best surface finish possible, which significantly reduces, and in some cases, completely eliminates the need for subsequent polishing and other finishing operations.

Advanced Stepped Machining

Sodick's "DSF (Dynamic Shape Fast) function" automatically detects the thickness of the workpiece and calculates the optimum machining settings from rough machining to finishing for every thickness, avoiding the need for complicated programming, resulting in reliable machining of stepped parts. Additionally, parallelism of 1-2 μm can be achieved.

Intelligent Q³vic EDW

Intelligent Q³vic EDW technology allows the importation of 3D CAD files and is standard with ALN-G Series. This automatic programming system detects the profile of a work piece that can be machined with Wire EDM and extract the machining contour. Significant savings in programming hours is possible thanks to this advanced software.

Adaptive Control Circuit

This circuit constantly monitors and adapts to the parameters during machining ensuring stable machining and responding to immediate changes in the part height (steps) or progressive surface area changes (cylinders) without changing the actual machining parameters. This eliminates any short circuits that cause unwanted marks on the component or wire breaks which would result in reduced quality and production.

S-Viewer

S-Viewer is a machine monitoring system that comes standard with newer models of Sodick machines. Compatible with some older models depending on their CPU and software. The software accumulates data from each NC unit at fixed intervals onto a server (A machine's current state, run time, and cutting percentage). This gives the ability to centrally manage the information obtained from S-Viewer remotely, improving the overall machine operability. Compatible with both PC and smartphone (IOS and Android), can monitor machines from anywhere if using a VPN connection (Sodick is not responsible for performance, liability, or loss from the VPN service).

Wire Tension Servo

All ALN-G Series machines are equipped with a wire tension servo to continually monitor and regulate wire tension and adjust the servo motor current, allowing stable high precision machining. The wire tension is controlled by the Sodick Motion Controller, which is also used for controlling linear motors, to enable even more accurate and fine adjustments of the wire.



Automatic Pop-up Search Function

In the event that the wire does not go through the start hole or kerf, the wire is automatically lifted and fed again. These actions are repeated until the wire is successfully threaded. This is especially effective for threading through small start holes or on workpieces with curved/inclined surfaces.



High Precision Positioning Sensor FT-II

Using the wire itself to locate the part, the machine automatically initiates a measuring cycle to register the part position (size) and angular orientation to the axes. The positioning accuracy is crucial for the quality of machining.

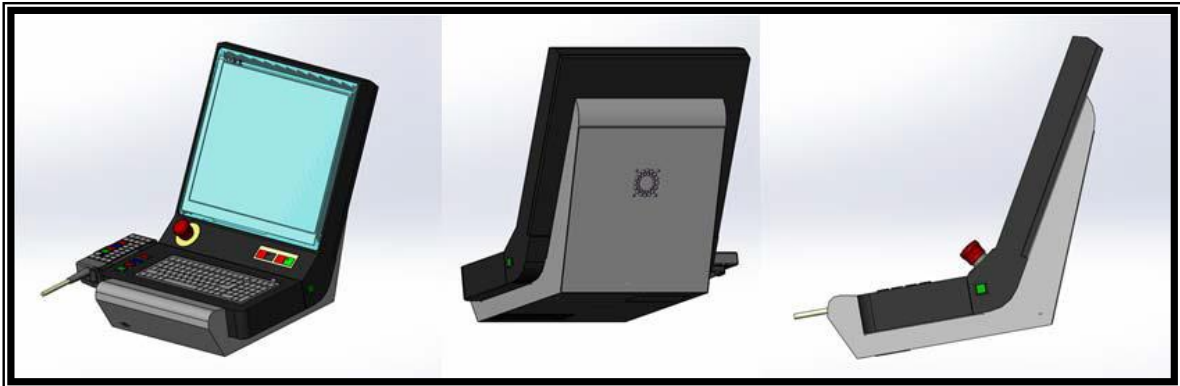
Temperature Control

All Sodick machines are equipped with dielectric chillers as standard, which automatically control the temperature of the water to maintain accuracy and repeatability, and to stabilize the workpiece and surrounding area.

SPW - The Smart Controller -19-inch TFT Touch Screen

The next-generation Sodick SPW Control has many attractive features, from the use of industry standard Windows 10® operating system, to an enhanced 19-inch TFT multi-touch screen. The new control combines the AL-series' classic and tablet modes for a streamlined interface with greater responsiveness. With the addition of the AL series' new "gadget" panel, useful tools are readily available, including operator manual, calculator, and machining data.

The NC programs are supported with 2D and 3D Graphics. Maintenance screens show the status of the machine and remote access is possible for maintenance and supervision.



Submerged Machining with 3-Sided Drop-Tank

Advantages to submerged drop-tank machining are as follows:

- Enables viewing of workpiece from 3 different sides
- Ergonomic design
- Perfect design for automation – automation ready
- Faster set-up because of the easy accessibility to the work-area

Taper Flex Neo 45 (Option)

Taper Flex Neo 45 is available as an option for further advanced high accuracy angle taper-cutting up to 45°. Taper Flex Neo 45 is easy to use, and requires no special training. The function consists of three parts; high angle guides, compensation jig and special software.

S3Core - Automatic Core Processing Device (Option)

The advanced S3Core core management system enables the complete automation of the core removal when processing multiple aperture steel plates in application such as stamping dies. The main unit comprises simply of a magnet and a cylinder and is easy to program and maintain.