

[ High Precision Linear Drive  Series ]



WIRE CUT EDM Q SERIES

USA/USA Design +886-071-661888 / 2012 / 1000 / SSB-0103A

# High Precision-Gantry TYPE Linear Motor Drive Wire Cut

CHMER Q Series are Gantry style linear motor EDMs with moving wire in X, Y, U, V and Z and a fixed table for improved accuracy with fewer passes, built-in Collision Protection and a smaller footprint.

LED working light

Drop front door for ease of loading/unloading reducing working footprint. (Patent 74419)

## High precision temperature control system

Fully-enclosed machine frame design equipped with the 1st inverter Water Chiller to hold the temperature variation inside the chamber within  $\pm 0.3^{\circ}\text{C}$  for precise machining and greatly reduces heat emission meanwhile save energy consumption of air-conditioner by 45%.

## Q4025L main features

### ◆ Global pioneer gantry moving structure design **PATENT**

Innovative "No Back Seal Plate" design improves cutting accuracy by eliminating lower arm deflection and more importantly, eliminates back seat plate maintenance. No more back seals to replace!

### ◆ Highly efficient In-House Linear Motor drive system **PATENT**

Linear Motors with linear scales lead a complete close loop. Linear Drive obtains many advances such like backlash-free, perfect accurate positioning as well as long life span.

### ◆ New G6 energy saving power supply

The exclusively power saving technology, ESL, can reduce the power consumption up to over 20%. In addition, it can stabilize voltage, enhance machining reliability and accuracy.

### ◆ High precision temperature control system

Fully enclosed work area with inverter controlled water chiller controls working temperature to  $\pm 3$  degrees Celsius and reduces energy consumptions.

### ◆ 0.07mm Dia. Wire AWT system

Patented in-house Auto Wire Threading (AWT) can thread 0.07mm Dia. Wire. Beside more simple and concise AWT mechanism can effectively reduce the building cost, failure rate so as to the frequency of maintenance.

# Highly efficient Linear Motor drive system

In house Linear Motor drive system features no wear, no backlash, quick response and no maintenance required so as to realize the highly accurate wire cutting.

## Benefit of Linear Motor

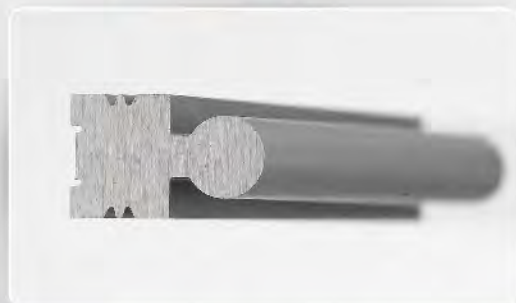
### Linear Motor

The CHMER built linear motors utilizing Panasonic drivers and precision glass scales, offer the ultimate in positioning and repeatability with no mechanical backlash common to all ball screw machines. The linear motors allow for better part definition on the first pass, as well as the precision to allow for skim passes with less than .0002" offset. Long, maintenance-free, with no degradation over time like ball screw drives.

### Reduce Profile Error (Improving Linear & Circular Cross-section)

Work Conditions:  
 Brass Wire : $\varnothing$ 0.20mm Work-Piece = SKD11  
 Harden Steel Thickness =50mm  
 Cutting Pass = 1+2 Skims

#### 《Cutting Shape》

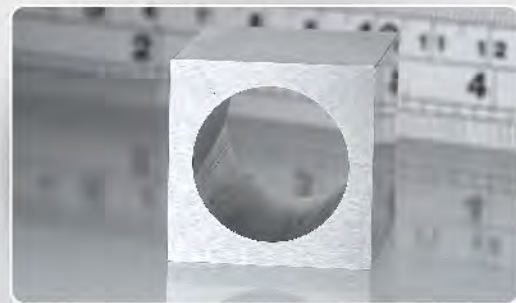


|        | Linear Motor |           | Ball Screw |           |
|--------|--------------|-----------|------------|-----------|
|        | A section    | B section | A section  | B section |
| Up     | 5.999        | 3.999     | 5.999      | 3.998     |
| Middle | 6.000        | 3.998     | 5.998      | 3.995     |
| Bottom | 6.000        | 4.000     | 6.000      | 3.999     |
| Error  | -0.001       | -0.002    | -0.002     | -0.005    |

### Surface Roughness Enhancement

With Function : 「AC  $\mu$  Super-Finish Circuit」  
 Cutting Result: Improved cutting speed and surface finish with over 3 skims cuts. Linear motor with virtually no backlash provides for even metal removal all around the work-piece , especially when skim cut is <math><0.0001''</math>(0.25 microns)

Brass Wire=0.20mm/BS Work-piece=SKD11  
 Cutting Pass=1+4 Skims T=25 MM  
 Ra=0.20 $\mu$ m



| Linear Motor                  | Ball-Screw               |
|-------------------------------|--------------------------|
| 1+4Skims=0.23~0.25 $\mu$ m/Ra | 1+4Skims=0.28 $\mu$ m/Ra |

Linear Motor



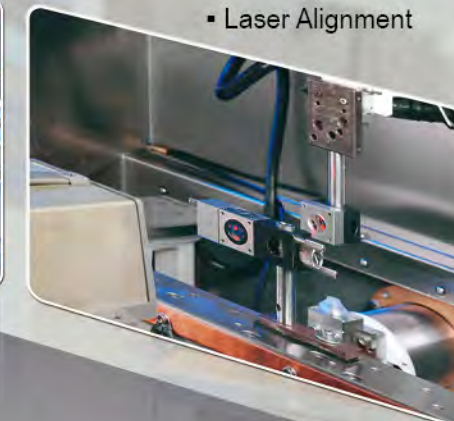
Linear Scale



Ball-Bar Test



Laser Alignment

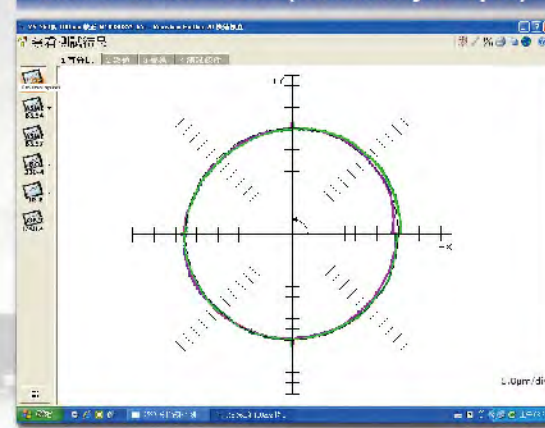


## Linear Motor vs Ball-Screw

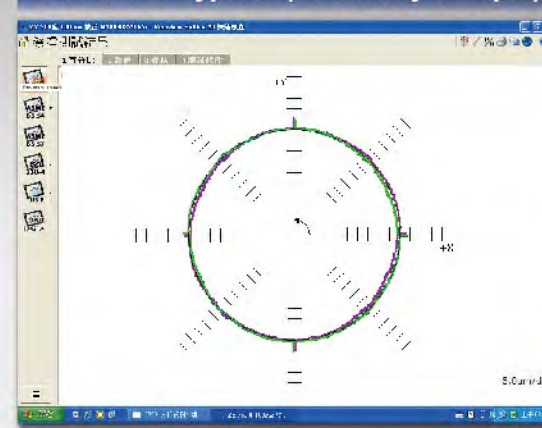
### Ball-Bar Test

New hardware with Linear Motor and Glass Scale (0.5 $\mu$ m Resolution)  
 We use Laser Interpolation and BALL-BAR Circularity Test to test the linear drives.

Linear Motor "GX" (Circularity 6~8 $\mu$ m)



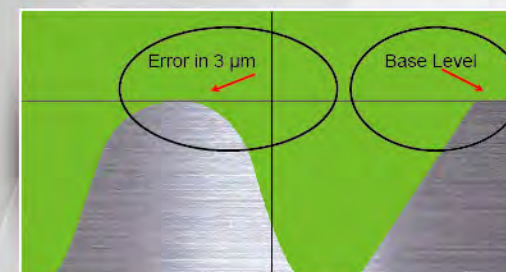
Ball-Screw Typical (Circularity 8~10 $\mu$ m)



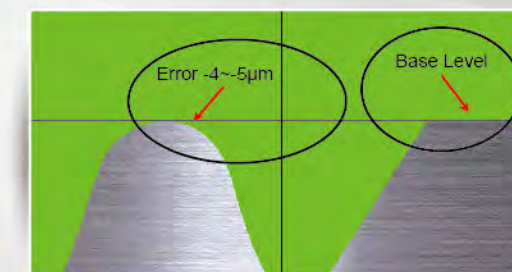
### Improvement on "Corner" by Linear Motor

Work Conditions:

Brass Wire : $\varnothing$ 0.20mm Work-Piece = SKD11 Harden Steel Thickness =50mm  
 Cutting Pass = 1+2 Skims Shape Corner =30° Ra = 0.58 Radius (R)=0.20mm



Linear Motor (Radius Error : 3 $\mu$ m)  
 Optical Projector Scaling: 120X



Ball-Screw (Radius Error: 4~5 $\mu$ m)  
 Optical Projector Scaling: 120X

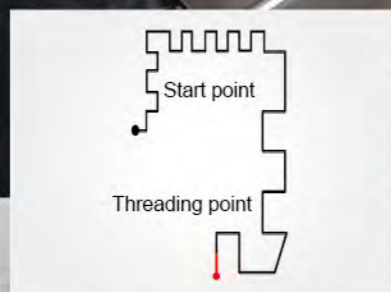
# CHMER Invented 5<sup>th</sup> generation AWT

Unattended over night and over weekend Auto Threading

## 5<sup>th</sup> Generation AWT

『EC』 Tension Control Technology, ensures a constant tension to obtain superb threading rate, less than 10 seconds.

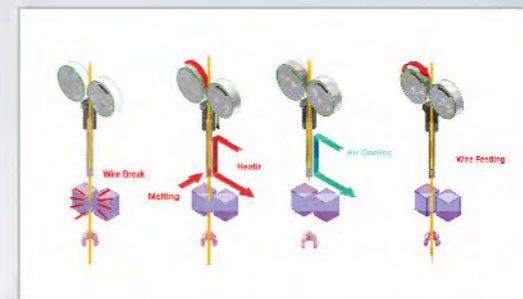
All new servo system feedback module of AWT



**Wire Rethread at break points:**  
Immediately performs rethreading when wire breaks.



**Visual parameter setting:**  
Parameters can be set for different wire diameters and types.



## Reliable automatic wire threading system control

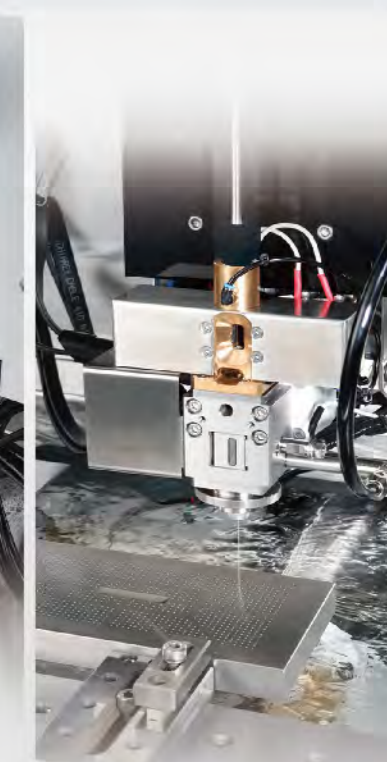
- World's most advanced and reliable automatic threading system using only five (5) moving parts for low maintenance. This auto threader will automatically rethread the wire on location, in the kerf and underwater in less than 10 seconds, no need to drain the tank, return to start point, dry run back to location, refill the tank, and then commence burning which is typical for other AWT systems.



• Stage Wire Rethreading



• AWT Device



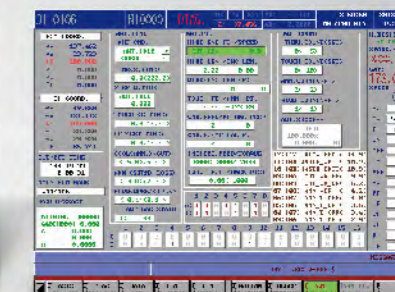
• Multi-cavity threading



**100 sets NC Program Memory:**  
Store up to 100 of your latest NC programs in the machine memory.



**3999 Sets Memory Holes:**  
Machine stores up to 3999 of the last threading cycles to check reliability.



**Monitoring Screen:**  
Records every step of the AWT process and automatically adjusts cutting conditions to help stabilize the cutting process.

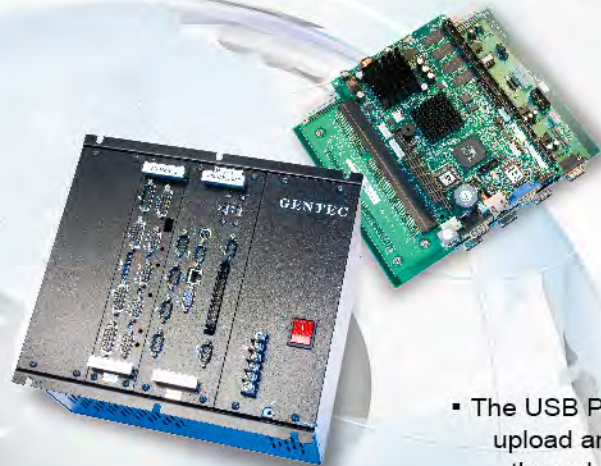
# CHMER BUILT CNC CONTROLLER

## W5F Controller Features

- ◆ All Software and Hardware are with full authorized. (Copyright Reserved by CHMER)
- ◆ IPC 586 Mother Board · Compatible Intel or similar CPU .
- ◆ DRAM 128M bytes .
- ◆ High Capacity storage device CF card 128M bytes .
- ◆ Touch Screen or Optical Mouse Support (OPT) .
- ◆ Synchronized 6<sup>th</sup> Axis (B Axis) Support (OPT) . Indexing and "Turn & Burn".
- ◆ All software functions and controller are fully compatible with FANUC™ post processor in CAM software.



▪ **User-Friendly Console Panel**  
An user-friendly Operation Panel, easy to understand & easy to learn with a clear & bright 15" TFT LCD monitor to bring good operate experience to users.



▪ The USB Port allows to upload and download through Flash drive.



## Remote Monitoring



▪ **Remote Control**  
(Through legal purchase software "Team-viewer") for real-time monitoring & operate machine.



## Software Functions



User-Friendly File Management

EDM Technology Database

Advance Application Functions



System Device Management+ Optimum system parameter

Power Record pointand CoordinateSystems

Graphic Manual Function

3D Graphic Simulation + NC path Info.

NC Register

# New G6 energy saving discharge circuit

Module PCB and parts in the power supply take less time and technical proficiency for replacement and trouble shoot in addition to high durability and stability. Due to above advantages, we could gain more confidence from distributor and end users.



## 「G6」 Generator Power Control System

AC-μ Super Fine Finish (N/A on model GX530L/GX640L)

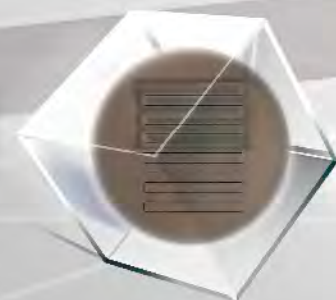
Job Material: SKD11 / Wire diameter: 0.2mm / Job Thickness: T50mm

| Cut Pass          | 6  | 5    | 4    | 3    | 2    | 1    |      |
|-------------------|----|------|------|------|------|------|------|
| Surface Roughness | Ra | 0.12 | 0.20 | 0.28 | 0.62 | 2.0  | 2.4  |
|                   | Ry | 1.1  | 1.7  | 2.5  | 5.0  | 13.3 | 14.3 |



### AC Electrolysis-Free Power

AC & DC switchable power supply. AC used for minimum cobalt depletion and best surface roughness in Carbides, also best cutting speed in PCD and PCBN materials. Also extend the life-Span of molds.

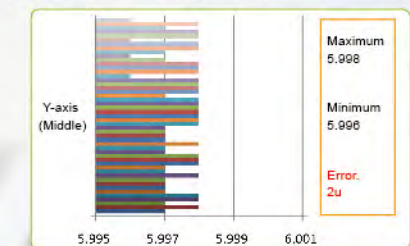
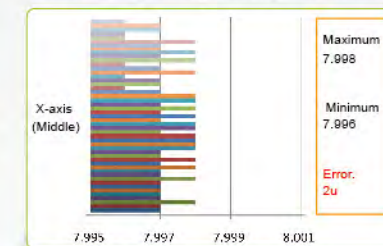


### HP-AVR Cutting Voltage Stabilizer

Automatic/Smart voltage-stabilizing power supply. By using the cutting-edge technology, the new power control system can transform the unstable energy into pure stabilized electricity. Input voltages are controlled within +/-1 volt.

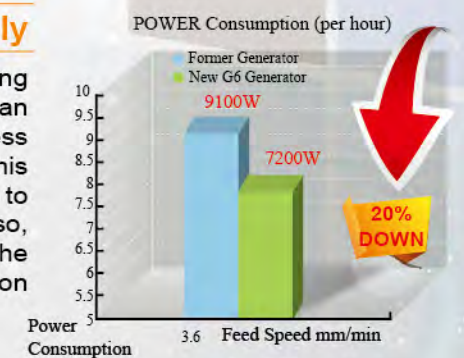


8x6mm square punch (Continually for 50pcs job with a single-cut at 30mm thick)



### ESL -Energy Saving Power Supply

With exclusively developed power saving techniques; the New Power Control system can transform the power applied in discharge process and recharge the electricity of the generator. This process can reduce the power consumption up to 20% (compared with the previous models). Also, it reduces the heat emission problem. It fits the idea of energy saving and carbon emission reduction.

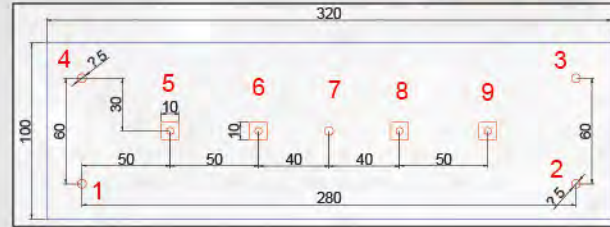


### Professional Industrial High Speed Processor & Discharge Erosion control

Embedded DOS OS system, reduce burden on processor, gives more stability to control system and better speed. The superior ASIC Chip, increases the response speed and feedback of cutting servo / current / voltage by real-time. DOS greatly improves CPU reliability while virtually eliminating CPU virus. DOS also is instantly on; no booting time required. (Windows OS is available as an option)

## High Precision High Repeatability pitch= $\pm 3\mu\text{m}$

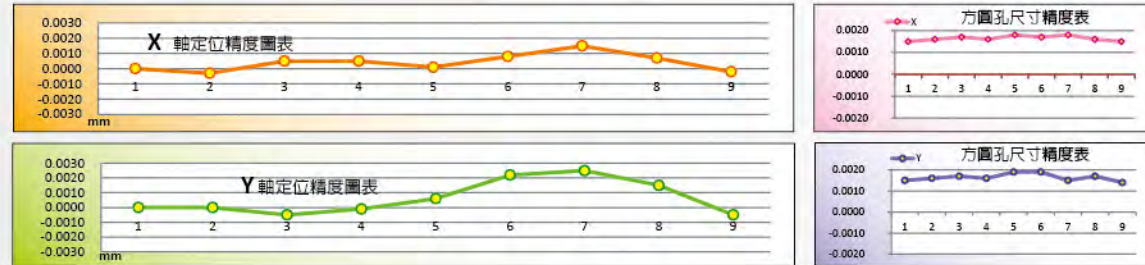
Workpiece material : SKD11  
 Workpiece thickness : 20.0 mm  
 Diameter : 0.20 mm (Brass Wire)  
 Number of cuts :  
 3 times (粗割一次、修二回)  
 Environment Condition :  
 Temperature controlled room at 23~24°C



### Pitch Accuracy (mm)

| NO              | Coordinate |       | Measured Error |         | NO              | Measured Error |        |        |        |
|-----------------|------------|-------|----------------|---------|-----------------|----------------|--------|--------|--------|
|                 | X          | Y     | X              | Y       |                 | Job Size       | X      | Y      |        |
| 1               | 0.00       | 0.00  | 0.0000         | 0.0000  | 1               | 5.0000         | 0.0015 | 0.0015 |        |
| 2               | 280.00     | 0.00  | -0.0003        | 0.0000  | 2               | 5.0000         | 0.0016 | 0.0016 |        |
| 3               | 280.00     | 60.00 | 0.0005         | -0.0005 | 3               | 5.0000         | 0.0017 | 0.0017 |        |
| 4               | 0.00       | 60.00 | 0.0005         | -0.0001 | 4               | 5.0000         | 0.0016 | 0.0016 |        |
| 5               | 50.00      | 30.00 | 0.0001         | 0.0006  | 5               | 10.0000        | 0.0018 | 0.0019 |        |
| 6               | 100.00     | 30.00 | 0.0008         | 0.0022  | 6               | 10.0000        | 0.0017 | 0.0019 |        |
| 7               | 140.00     | 30.00 | 0.0015         | 0.0025  | 7               | 5.0000         | 0.0018 | 0.0015 |        |
| 8               | 180.00     | 30.00 | 0.0007         | 0.0015  | 8               | 10.0000        | 0.0016 | 0.0017 |        |
| 9               | 230.00     | 30.00 | -0.0002        | -0.0005 | 9               | 10.0000        | 0.0015 | 0.0014 |        |
| Min. error (mm) |            |       | -0.0003        | -0.0005 | Min. error (mm) |                |        | 0.0015 | 0.0014 |
| Max. error (mm) |            |       | 0.0015         | 0.0025  | Max. error (mm) |                |        | 0.0017 | 0.0019 |

### Cutting Shape (mm)



## Sample Illustration



Job Material: SKD-11  
 Job Thickness: 30 mm  
 Wire diameter:  $\varnothing 0.20$  mm  
 Number Of Cut: 1+ 2 Skims  
 Work Hour: 1 Hour 10 Mins  
 Accuracy:  $3\mu\text{m}$   
 Surface Roughness:  
 Ra 0.55~0.58 $\mu\text{m}$



Job Material: SKD-11  
 Job Thickness: 17 mm  
 Wire diameter:  $\varnothing 0.15$  mm  
 Number Of Cut: 1+ 2 Skims  
 Work Hour: 1 Hour 50 Mins  
 Accuracy:  $\pm 3\mu\text{m}$   
 Surface Roughness:  
 Ra 0.55~0.58 $\mu\text{m}$



Job Material: SKD-11  
 Job Thickness: 25 mm  
 Wire diameter:  $\varnothing 0.20$  mm  
 Number Of Cut: 1+ 2 Skims  
 Work Hour: 1 Hour 50 Mins  
 Accuracy:  $\pm 3\mu\text{m}$   
 Surface Roughness:  
 Ra 0.55~0.58 $\mu\text{m}$



Job Material: SKD-11  
 Job Thickness [Punch]: 50 mm  
 Job Thickness [Die]: 30 mm  
 Wire diameter:  $\varnothing 0.20$  mm  
 Number Of Cut: 1+ 2 Skims  
 Work Hour: 4 Hours 00 Mins  
 Accuracy:  $3\mu\text{m}$   
 Surface Roughness:  
 Ra 0.58~0.63 $\mu\text{m}$



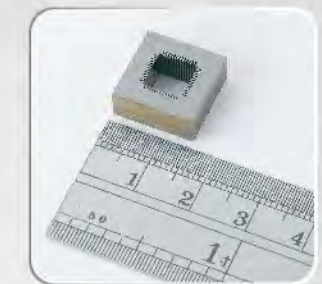
Job Material: SKD-11  
 Job Thickness[Punch]: 50mm  
 Job Thickness[Die]: 20mm  
 Number Of Cut: 1+2 Skims  
 Surface Roughness:  
 Ra 0.58~0.63 $\mu\text{m}$



Job Material: SKD-11  
 Job Thickness: 11.45 mm  
 Wire diameter:  $\varnothing 0.20$  mm  
 Number Of Cut: 1 Cut  
 Work Hour: 1 Hour 30 Mins  
 Taper Angle: 21°



**PCD formed milling cutters**  
 Job Material: PCD  
 Job Thickness: 2.5 mm  
 Wire diameter:  $\varnothing 0.20$  mm  
 Feed rate: 2.0 mm/min



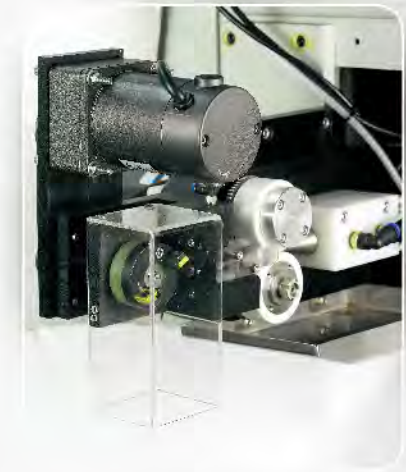
**Dia.  $\varnothing 0.1$  mm wire processing**  
 Purpose: For the precision molds of IC industries etc.  
 Job Material: Carbide  
 Job Thickness: 5 mm  
 Wire diameter:  $\varnothing 0.10$  mm  
 Number Of Cut: 1+ 2 Skims  
 Accuracy:  $3\mu\text{m}$   
 Surface Roughness:  
 Ra 0.40 $\mu\text{m}$  (AC- $\mu$  circuit, opt)

## Machine Installation Environment :

- A. Real Room Temperature : 23.5°C  $\pm 0.5^\circ\text{C}$
- B. Water Temperature : 23.0°C  $\pm 0.5^\circ\text{C}$
- C. Real m/c body Temperature : 23.5°C  $\pm 0.5^\circ\text{C}$

## Hardware Functions

6th Axis "Turn and Burn" or indexing.



▲ Wire chopper

### Specification

| Model                            | Q4025L   | Q5030L                  |
|----------------------------------|--|-------------------------|
| Axis Travel (XxYxZ mm)           | 400 x 250 x 200 (mm)                                       | 500 x 300 x 200 (mm)    |
| Axis Travel (UxV mm)             | 60 x 60 (mm)   | 60 x 60 (mm)            |
| Max. Size of Workpiece (mm)      | W750 x D560 x H195 (mm)                                    | W850 x D610 x H195 (mm) |
| Max. Weight of Workpiece (kg)    | 550 Kg   | 600 Kg                  |
| XY Feed Rate                     | Max.1500 (mm/min)  |                         |
| Axis Drive System (axis)         | X, Y axis by Linear Motor ; U, V, Z axis by AC Servo Motor |                         |
| Wire Diameter Range (Standard)   | Ø 0.15~0.3 (Ø 0.25) (Note: Ø0.10mm optional)               |                         |
| Max. Wire Feed Rate              | 300 mm/sec.  |                         |
| Wire Tension                     | 300~2500 (gf)  |                         |
| Taper Angle                      | ±14.5°/80 (wide-angled nozzle ; DA+DB=15mm)                |                         |
| Outside Dimension (WxDxH mm)     | 2450x2750x2060   | 2650x2750x2060          |
| Machine Weight (kg)              | 2580   | 2780                    |
| Tank Capacity (L)                | 760  | 930                     |
| <b>Working Fluid Supply Unit</b> |  |                         |
| Tank Capacity                    | 590L   | 760L                    |
| Filter Element                   | Paper  | Paper                   |
| Ion Exchange Resins              | 14L  | 14L                     |
| Conductivity Control             | Auto   | Auto                    |
| Fluid Temperature Control        | Auto   | Auto                    |
| <b>Power Supply Unit</b>         |  |                         |
| Circuit System                   | Power MosFET Transistor                                    |                         |
| Max. Output Current              | 25A  |                         |
| IP Select                        | 10   |                         |
| Off Time System                  | 50   |                         |
| <b>CNC Unit</b>                  |  |                         |
| Date Input                       | Keyboard ; RS-232C ; USB ; LAN                             |                         |
| Display                          | 15-Inch Color  |                         |
| Control System                   | 32bit ; 1-CPU ; X&Y Closed Loop                            |                         |
| Control Axis                     | X, Y, U, V, Z (5 Axis) ; 6th axis optional                 |                         |
| Setting Unit                     | 0.001 mm   |                         |
| Max. Command Value               | ±9999.999 mm   |                         |
| Interpolation                    | Linear/Circular  |                         |
| Command System                   | ABS/INC  |                         |
| Machining Feed Control           | Servo/Const. Feed  |                         |
| Scaling                          | 0.001-9999.999   |                         |
| Machining EDM Condition Memory   | 1000-9999  |                         |
| Total AC Power Input             | 3 Phase 220 ±5%/11KVA                                      |                         |

### Q Series Standard / Optional Accessories ● : Standard ○ : Option — : Not Available

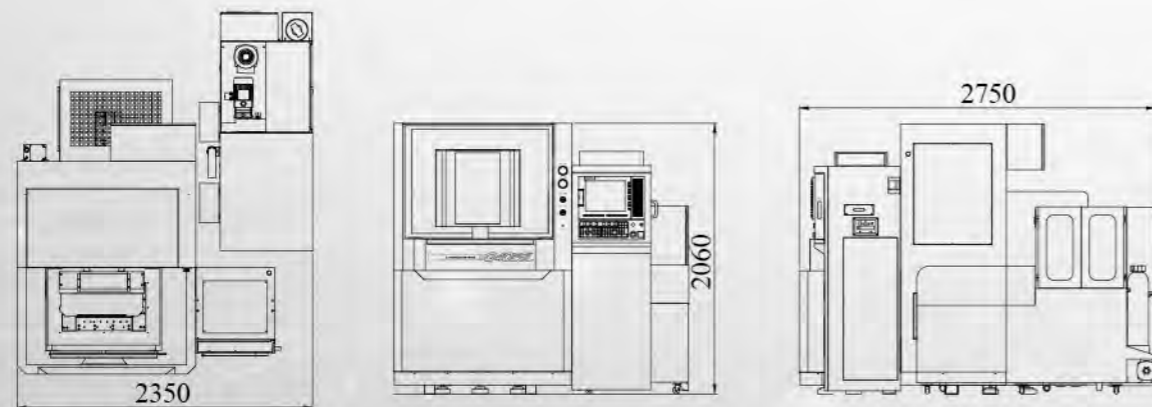
| Item                                   | Specification | Level |   |   |
|--|---------------|-------|---|---|
|  |               | P     | V | E |
| X&Y Liner Motors                       | CHMER         | ●     | ● | ● |
| 絕對式光學尺                                 | 0.05um        | ●     | — | — |
| 增量式光學尺                                 | 0.0.5um       | —     | ● | ○ |
| 增量式光學尺                                 | 0.1um         | —     | — | ● |
| AWT System                             | G6 Generator  | ●     | ● | ● |
| 自動升降前門                                 |               | ●     | ○ | — |
| 手動升降前門                                 |               | —     | ● | ● |
| Drive System                           | Panasonic     | ●     | ● | ● |
| Drive System                           | Delta         | —     | — | ● |
| Wire AWT System                        | 0.07mm        | ●     | ○ | — |
| Precision Temperature Control System   |               | ●     | ○ | ○ |
| 變頻冷卻機                                  |               | ●     | ● | ● |
| B-Axis (6 <sup>th</sup> Axis Function) |               | ○     | ○ | ○ |
| LED                                    |               | ●     | ● | ● |
| AC/DC Power                            |               | ●     | ● | ● |
| ESL                                    |               | ●     | ● | ● |
| HP-AVR                                 |               | ●     | ● | ● |
| Remote Monitoring                      |               | ●     | ● | ● |
| USB                                    |               | ●     | ● | ● |
| 觸控面板                                   |               | ●     | ○ | ○ |

3 years warranty on Linear Motors (Rotor+Stator)

5 years X Y positioning guarantee

### Floor Layout

Q4025L



Q5030L

