CHMER

High Precision Linear Drive Q Series

WIRE CUT EDM Q SERIES

USA/USA1Design +886-0970-061888 / 2013.06.06/ 1000 / S5B-4103-A

Environment Conditions:

1. Optimum Room Temperature: 23 ± 0.5°C Humidity: Below to 75% RH
2. Avoid being Floor Vibration.
3. Avoid being located against sunshine.
4. Avoid being located against heat-treatment or plating plant nearby.
5. Clean and low dust environment.

Space Requirement:

Take notice of the space for machine stoke to move during normal operation and daily maintenance.

Grounding :

1. It's recommended to have an Earth Ground.
2. An independent ground is recommended.
3. The grounding cable should be 10 gage wire or larger.

Demand of Air pressure :

1. Air pressure of 6 kg/cm² (95 PSI) for options of AWT and submerged machine is needed.

CHMER
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High Precision-Gantry Type Linear Motor Drive Wire Cut

2013 TAIWAN EXCELLENCE

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.

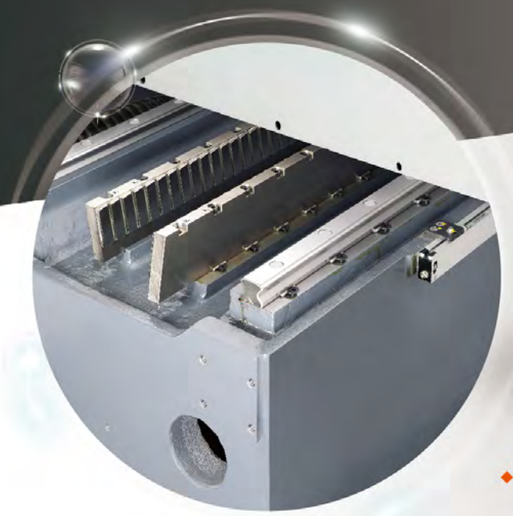
New G7 energy saving power supply

- *Longer durability of electronic components: Latest G7 features lower temperature inside the power supply by utilizing advanced Cool MOSFET transistor to reduce circuit impedance by 40%(compared with G6).*

Global pioneer gantry moving structure design

PATENT

- *Innovative "No Back Seal Plate" designs helps to improve cutting accuracy by eliminating lower arm deflection and, more importantly, eliminates the need for back seal maintenance and repair. No more water leakage problems!*
- *Advanced compact design-saves space nearly 15% compared to conventional model.*



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 ± 0.3°C for precise machining and greatly reduces heat emission meanwhile save energy consumption of air-conditioner by 45%.

Highly efficient In-House Linear Motor drive system

PATENT

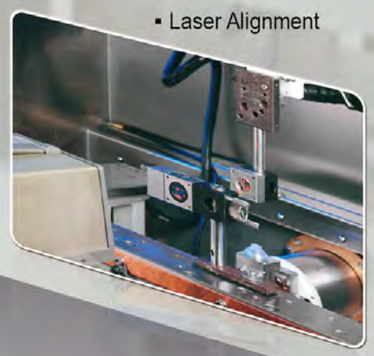
- *Linear Motors with linear scales lead a complete close loop. Linear Drive obtains many advances such like backlash- free, perfect accurate positioning as well as long life span.*

Highly efficient Linear Motor drive system

▪ Linear Motor

▪ Linear Scale

▪ Ball-Bar Test



▪ Laser Alignment

Benefit of Linear Motor

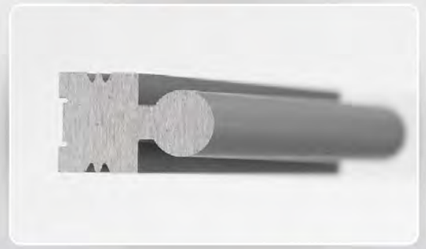
Linear Motor

The CHMER built linear motors, utilizing high resolution drivers and scales, offer ultimate positioning accuracy and repeatability with no mechanical backlash commonly seen in all ball screw machines. Benefits include better part profile on the first pass, precision skim passes with less than 0.0002" offset, maintenance-free system, and no accuracy degradation over time as found with traditional ball screw drive systems.

Reduce Profile Error
(Improving Linear & Circular Cross-section) | **Surface Roughness Enhancement**

Work Conditions:
Brass Wire :Ø0.20mm Work-Piece = SKD11
Harden Steel Thickness =50mm
Cutting Pass = 1+2 Skims

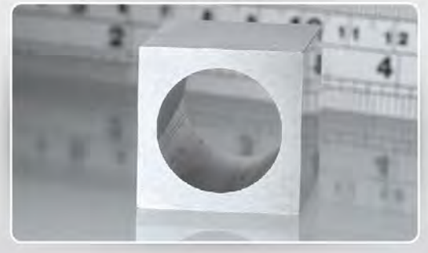
《Cutting Shape》



	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

With Funtion ：『AC μ 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 <0.0001"(0.25 microns)

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



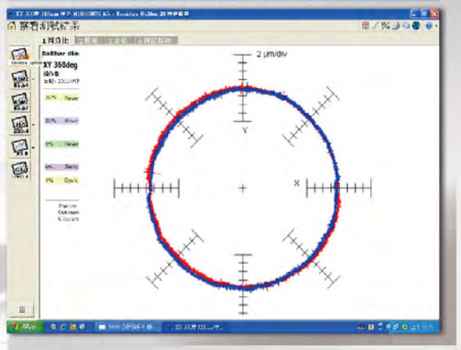
Linear Motor	Ball-Screw
1+4Skims=0.20μm/Ra	1+4Skims=0.28μm/Ra

Linear Motor vs Ball-Screw

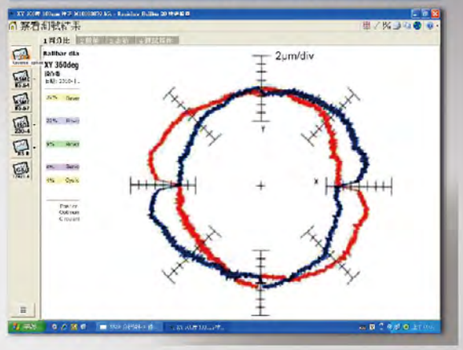
Ball-Bar Test

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

Linear Motor "Q" (Circularity 6~8μm)



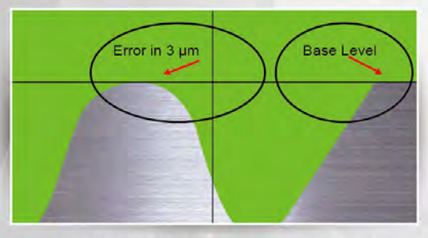
Ball-Screw Typical (Circularity 15~20μm)



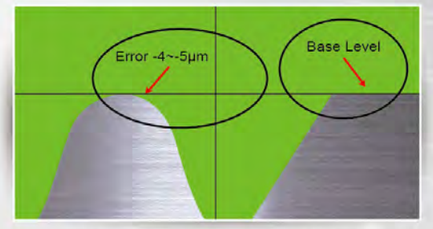
Improvement on "Corner" by Linear Motor

Work Conditions:

Brass Wire :Ø0.20mm 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 : 3μm)
Optical Projector Scaling: 120X



Ball-Screw (Radius Error: 4~5μm)
Optical Projector Scaling: 120X

CHMER
The Newest Generation AWT

Unattended over night and over weekend Auto Threading

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

Patented in-house Auto Wire Threading (AWT) can thread0.07mm Dia. Wire has a simple and reliable AWT mechanism which allows for minimal, cost effective maintenance while ensuring productivity.

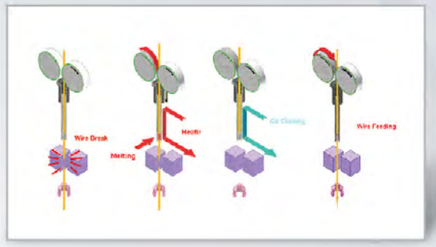
All new servo system feedback module of AWT

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 designed and copyrightedby 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 6th Axis (B Axis) Support (OPT) . Indexing and “Turn & Burn”.
- All software functions and controller are fully compatible with FANUC™ post processor in CAM software.

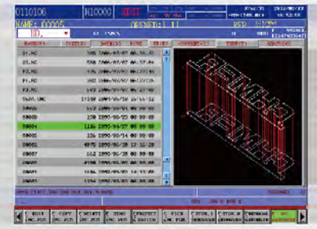
▪ **User-Friendly Console Panel**
The Operation Panel with a clear and bright 15” TFT LCD monitor allows a user-friendly interface and experience which is easy to learn and operate.

▪ 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

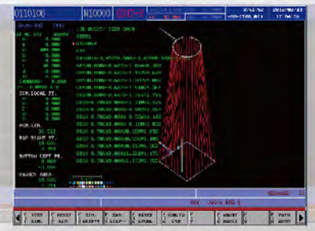
EDM Technology Database

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 G7 energy saving discharge circuit

Circuit boards and parts in the power supply are modular in design. The modular design creates a higher stability and durability but also allows for simple, quick diagnostics giving our partners confidence in productivity.

『G6』 Generator Power Control System

AC-μ Super Fine Finish

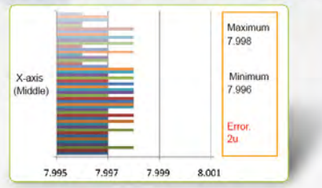
Job Material : SKD11 / Wire diameter : 0.2mm / Job Thickness : T50mm							
Cut Pass		6	5	4	3	2	1
Surface Roughness	Ra	0.12	0.20	0.28	0.62	2.0	2.4
	Ry	1.1	1.7	2.5	5.0	13.3	14.3

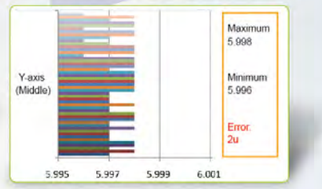
Material	Carbide	Wire diameter	0.20 mm
Thickness	20.0mm	Process	8 cut
Accuracy	3 μm	Working Time	58 mins
Surface Roughness	Ra=0.09 μm		

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.

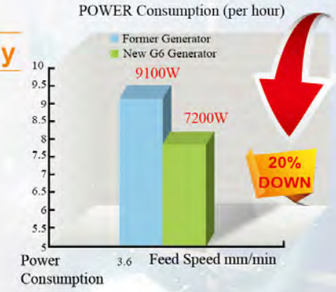
8x6mm square punch (Continually for 50pcs job with a single-cut at 30mm thick)





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)

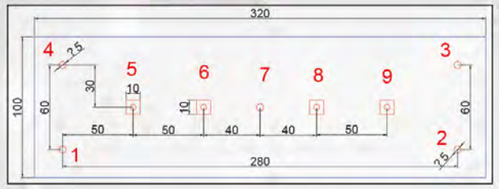
NFPG Wire Breaks Refrain

5~10% cutting speed increased: The 100MHz high frenquency FPGA chip is used to intensively monitor and optimize electric pulse.

High Accurate Cutting

±3μm

Workpiece material : SKD11
Workpiece thickness : 20.00mm
Diameter : 0.20mm (Brass Wire)
Number of cuts : 4 times
Environment Condition :
Temperature controlled room at 23°C

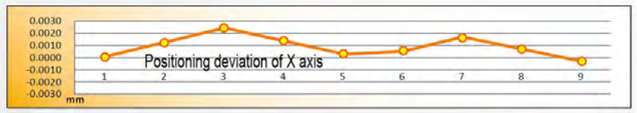


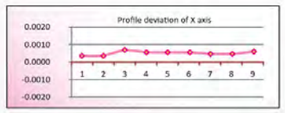
Pitch (mm)

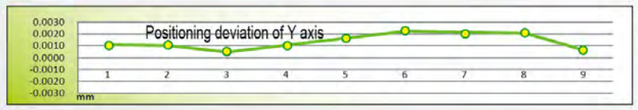
NO	Coordinate X	Coordinate Y	Measured Error X	Measured Error Y
1	0.00	0.00	0.0000	0.0000
2	280.00	0.00	-0.0012	0.0000
3	280.00	60.00	0.0023	-0.0006
4	0.00	60.00	0.0014	-0.0001
5	50.00	30.00	0.0002	0.0006
6	100.00	30.00	0.0005	0.0012
7	140.00	30.00	0.0016	0.0010
8	180.00	30.00	0.0006	0.0011
9	230.00	30.00	-0.0004	-0.0004
Min. error (mm)			-0.0004	-0.0006
Max. error (mm)			0.0023	0.0013

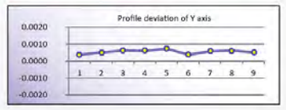
Cutting Shape (mm)

NO	Dimension	Measured Error X	Measured Error Y
1	5.0000	0.0004	0.0004
2	5.0000	0.0004	0.0005
3	5.0000	0.0007	0.0006
4	5.0000	0.0006	0.0006
5	10.0000	0.0006	0.0007
6	10.0000	0.0006	0.0004
7	5.0000	0.0005	0.0006
8	10.0000	0.0005	0.0006
9	10.0000	0.0006	0.0005
Min. error (mm)		0.0004	0.0004
Max. error (mm)		0.0007	0.0007





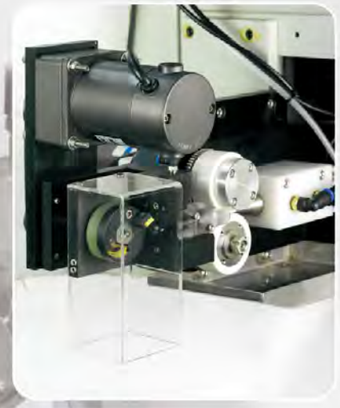




A. Real Room Temperature：23.5˚C ±0.5˚C / B. Water Temperature：23.0˚C ±0.5˚C / C. Real m/c body Temperature：23.5˚C ±0.5˚C

Optional Hardware Functions

6th Axis continuous cut or indexing (optional) with in-house submergible rotary B-Axis for turns an d burns.



▲ Wire chopper
Not available for dia 0.07 / 0.1mm wire.

◀ The absolute linear scale with a high resolution of 0.1μm leads an extremely precise positioning as well as high abilities of anti-noise to have high stability in machining. When power restart after power shoot down , easy to resume work by one-touch, no need home searching, no more error in positioning!

Sample Illustration

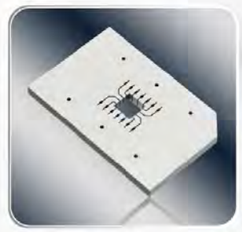
Job Material: SKD-11
Job Thickness: 30 mm
Wire diameter: Ø0.20 mm
Number Of Cut: 1+ 3 Skims
Accuracy: 3μm
Surface Roughness: Ra 0.35μm

Job Material: SKD-11
Job Thickness: 17 mm
Wire diameter: Ø0.15 mm
Number Of Cut: 1+ 2 Skims
Accuracy: 3μm
Surface Roughness: Ra 0.55~0.58μm

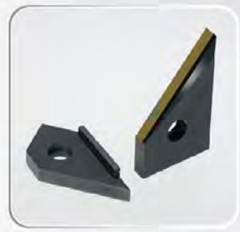
Job Material: SKD-11
Job Thickness: 25 mm
Wire diameter: Ø0.20 mm
Number Of Cut: 1+ 2 Skims
Accuracy: 3μm
Surface Roughness: Ra 0.55~0.58μm

Job Material: SKD-11
Job Thickness [Punch]: 50 mm
Job Thickness [Die]: 30 mm
Wire diameter: Ø0.20 mm
Number Of Cut: 1+ 2 Skims
Accuracy: 3μm
Surface Roughness: Ra 0.58~0.63μm

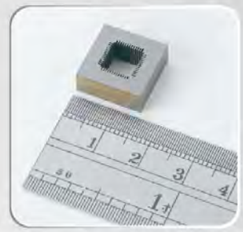
Job Material: SKD-11
Job Thickness[Punch]: 50mm
Job Thickness[Die]: 20mm
Number Of Cut: 1+2 Skims
Surface Roughness:Ra 0.58~0.63μm



Job Material: SKD-11
Job Thickness: 20 mm
Wire diameter: Ø0.07 mm
Number Of Cut: 4 Cut
Accuracy: 3 μm
Surface Roughness:Ra 0.28μm



PCD formed milling cutters
Job Material: PCD
Job Thickness: 2.5 mm
Wire diameter: Ø0.20 mm
Feed rate: 2.0 mm/min



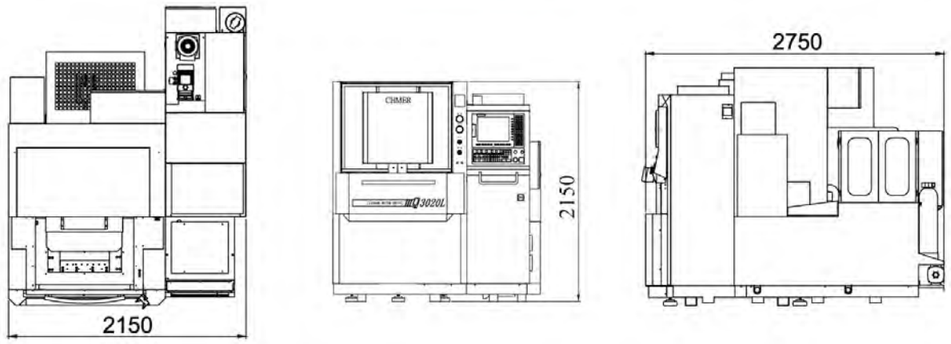
Dia.Ø0.1mm wire processing
Purpose: For the precision molds of IC industries etc.
Job Material: Carbide
Job Thickness: 5 mm
Wire diameter: Ø0.10 mm
Number Of Cut: 1+ 2 Skims
Accuracy: 3μm
Surface Roughness:
Ra 0.40μm (AC-μ circuit, opt)

Specification

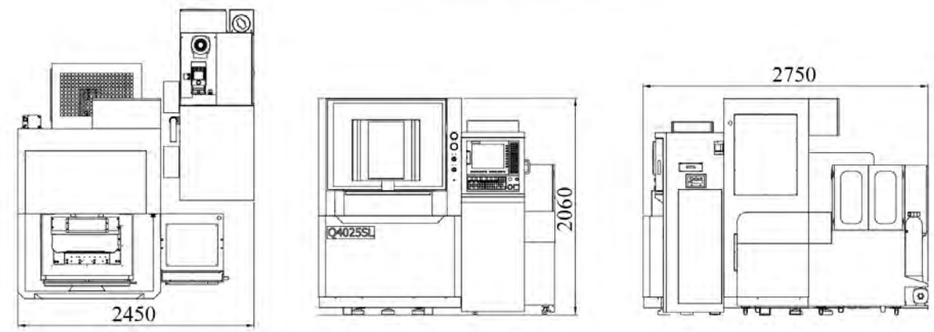
Model	Q3020L	Q4025L	Q5030L
Axis Travel (XxYxZ mm)	300 x 200	400 x 250	500 x 300
Axis Travel (UxV mm)	60 x 60 x 150	60 x 60 x 200	60 x 60 x 200
Max. Size of Workpiece (mm) mm)	600 x 450 x 150 (Flushing) 600 x 450 x 145 (Submerged)	750 x 450 x 200 (Flushing) 750 x 450 x 180 (Submerged)	850 x 500 x 200 (Flushing) 850 x 500 x 180(Submerged)
Max. Weight of Workpiece (kg)	300 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: Ø 0.1 mm 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)	2150x2700x2150	2450x2750x2060	2650x2750x2060
Tank Capacity (L)	2500	2580	2780
Working Fluid Supply Unit			
Tank Capacity	650L	760L	930L
Filter Element	Paper	Paper	Paper
Ion Exchange Resins	14L	14L	14L
Conductivity Control	Auto	Auto	Auto
Fluid Temperature Control	Auto	Auto	Auto
Power Supply Unit			
Circuit System	Power MosFET Transistor		
Max. Output Current	25A		
IP Slelect	10		
Off Time System	50		
CNC Unit			
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		

Floor Layout

Q3020L



Q4025L



Q5030L