High-Reliability and High-Performance
Wire Electrical-Discharge Machine

FANUC

ROBOCUT α-*C*i*C* series

High-Reliability and High-Performance
Wire Electrical-Discharge Machine

FANUC ROBOCUT α-C*i*C series

ROBOCUT α-C400*i*C

XYZ axis travel : 400×300×255 mm

ROBOCUT α-C600*i*C

XYZ axis travel : 600×400×310 mm

ROBOCUT α-C800*i*C

XYZ axis travel : 800×600×310 mm

High Performance of Cutting

- **N**ew mechanical structure, new discharge devices, and new discharge control to provide high speed, high precision, and high quality cutting
- **AI** thermal displacement compensation function to provide stable cutting, and various functions to adjust shapes easily
- **H**igh precision rotary table ROBOCUT CCR to expand the applications

Maximizing Uptime

- **H**igh reliable automatic wire feeding (AWF3) provides continuous unmanned machining
- **C**onsumables management function and Maintenance guidance function support daily maintenance
- **R**OBOCUT-LINK*i* provides Production and Quality information management

Ease of Use

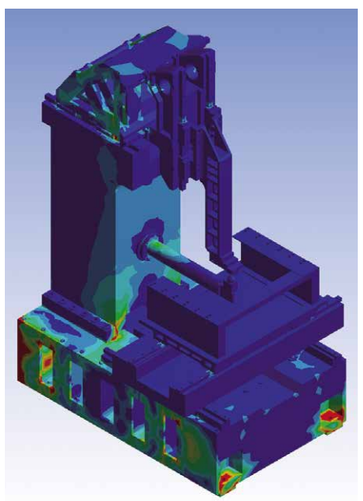
- **FANUC** CNC and operation guidance function provide superior operations
- **F**ulfilling EDM technologies support high speed, high precision, and high quality cutting
- **A**utomatic functions support set-up operations

* The outer view will be different as machine specifications

High Performance of Cutting

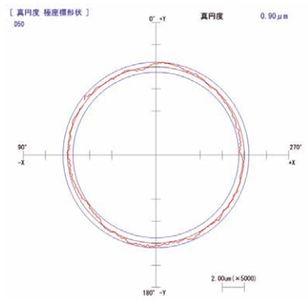
Mechanical structure to provide high precision cutting

・The strengthened machine rigidity suppresses the distortion of each part of the machine and will provide high precision cutting such as circle shape, pitch accuracy, and so on.



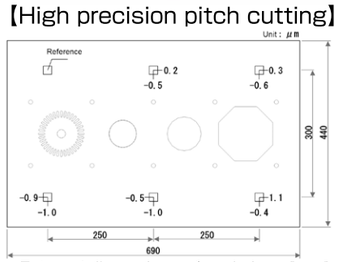
FEM analysis

【High precision cutting of circle shape】

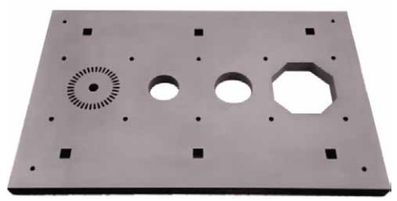


Die steel, 20mm
1 rough 5 skims
Roundness 0.90μm

【High precision pitch cutting】



External dimensions of workpiece [mm]

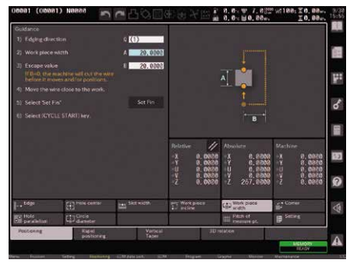


Die Steel, 30mmt, ϕ0.20 brass wire
1 rough 4 skims, 20mm square holes
Pitch accuracy: X -0.9 to 1.1μm, Y -1.0 to 0.0μm

Various functions and mechanisms to support high precision cutting

High precision positioning function

・Workpiece edge finding function with wire by applying the latest position detection method



Taper adjustment function (Max. 4 directions)

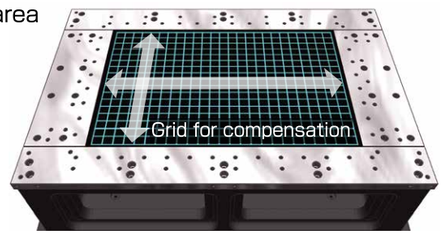
・Simple setup for high precision taper cutting

Die steel, 50mm
1 rough 3 skims
Taper angle 20 degrees

Measured angle(4 directions)
+X 20.001 degrees
- X 20.007 degrees
+Y 19.998 degrees
- Y 20.009 degrees

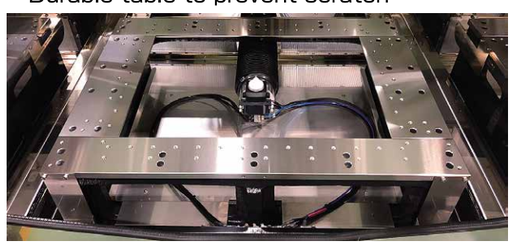
High precision pitch error compensation function

・Corrects the pitch error over the entire table area



Workpiece table (standard installed)

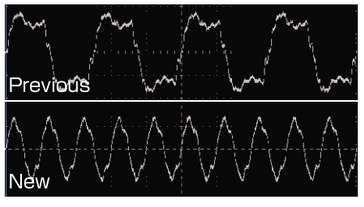
・Durable table to prevent scratch



Discharge device to provide high quality cutting

・SF3 power supply (standard installed) generates both miniaturization and high frequency of discharge pulse to improve surface roughness while the cutting speed is kept the same
・MF2 power supply generates the stable fine discharge to provide the best surface roughness

【Discharge wave by SF3】



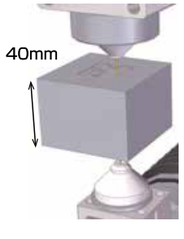
【The best surface roughness by MF2 (option)】

Carbide, 30mm
1 rough 8 skims
Rz 0.7μm (Ra 0.10μm)

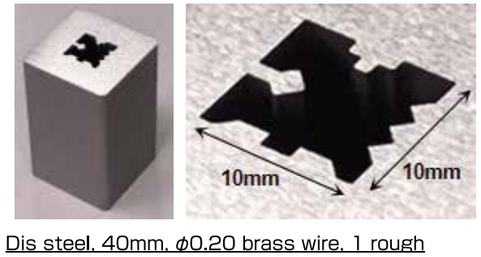
Discharge control to provide high precision cutting

・Discharge control *i*Pulse3 provides high precision cutting even while nozzle is open.

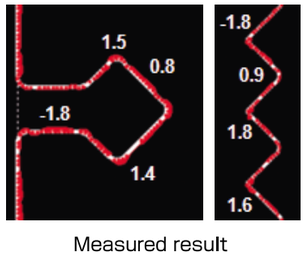
【Overview】



【Cut sample】



Dis steel, 40mm, ϕ0.20 brass wire, 1 rough
4 skims, Accuracy ±2μm, Roughness Ra 0.30μm

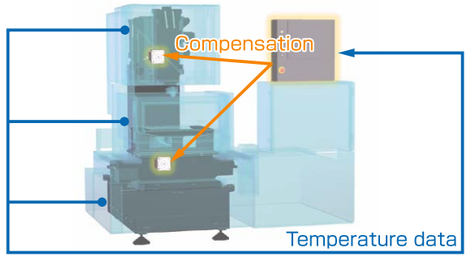


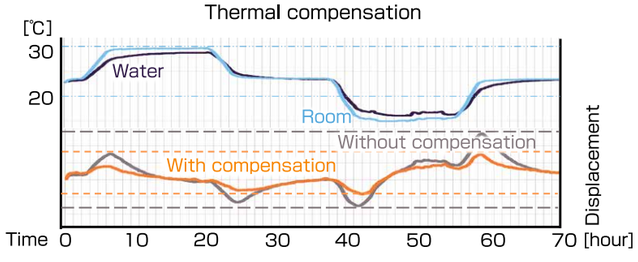
Measured result
(Deviation at top surface)

AI thermal displacement compensation function to realize stable cutting

・Multiple temperature sensors and AI (Machine Learning) realize stable cutting even if the temperature around the machine changes on a large scale.

FANUC AI
Level 3 Machine Learning

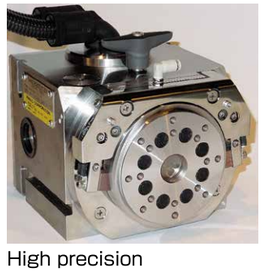




High precision rotary table, ROBOCUT CCR, to expand applications (Option)

ROBOCUT CCR

・FANUC Servo motor & rotary encoder are installed

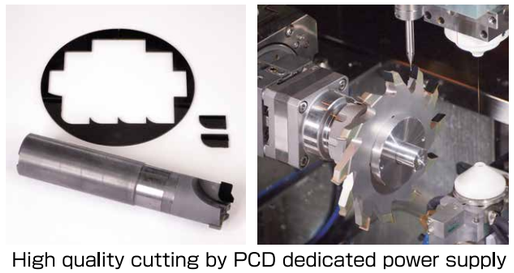


High precision
positioning, light weight,
and compact rotary table

【Cut sample】
Helical cutting

PCD tool cutting

・PCD tool applications with ROBOCUT CCR



High quality cutting by PCD dedicated power supply

* All cutting results obtained under FANUC-designated conditions (Including Machine type).

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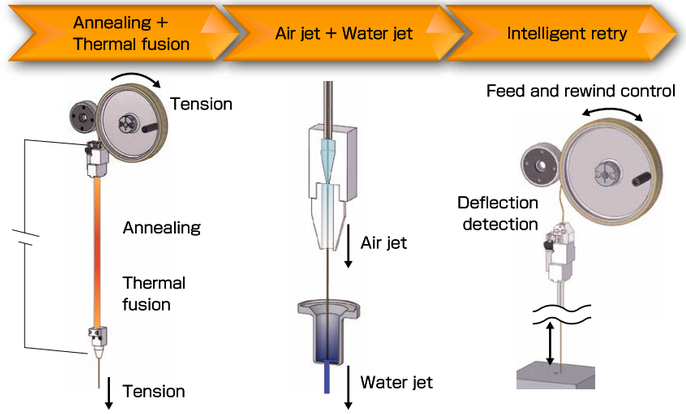
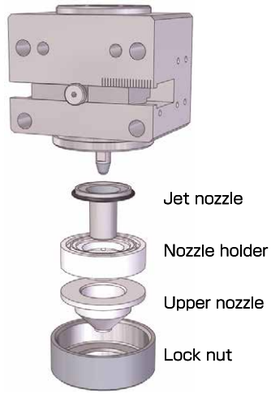
Maximizing Uptime

Automatic wire feeding system AWF3 to support unmanned operation

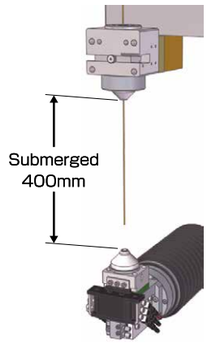
- Simple structure provides a great maintainability, higher rate of wire threading, and high reliability
- Provides AWF for Max.400mm height in submerged condition, AWR with 150mm work thickness



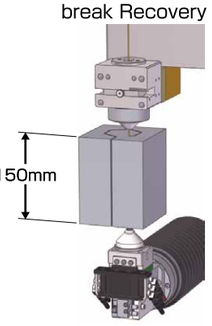


Simplified upper guide unit

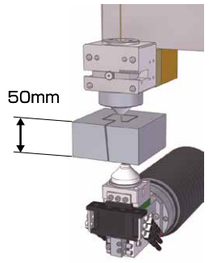
AWF



AWR
Automatic Wire break Recovery



Taper AWR
Allowed taper angle: Max. 5 degrees

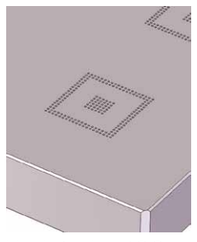


Various AWF functions support strongly unmanned operations

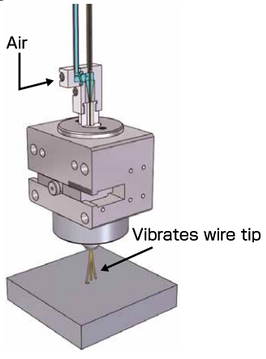
*All AWF obtained under FANUC-designated conditions

Level up performance of AWF

- Improved straightness of wire to shorten time for threading wire into small hole or wire break point while nozzle clearance is open.
- Vibrates wire tip during threading for various cases such as threading wire into shifted start hole or hole with burr inside (called air retry)

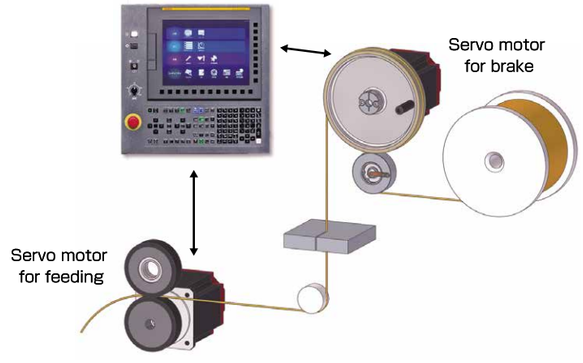


Min. hole size: ϕ0.3mm



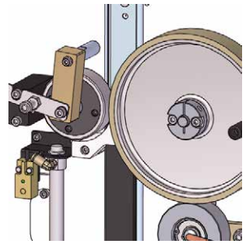
Twin servo wire feeding system

- Wire feeding system with FANUC servo motors accurately controls the wire tension and suppresses the wire vibration to provide high precision cutting

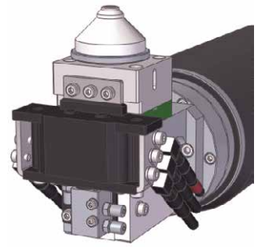


Wire running system to contribute for higher rate of operation

- Simple structure to provide easier wire installation

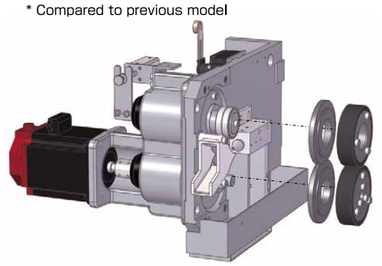


- Maintenance-free structure on the lower guide



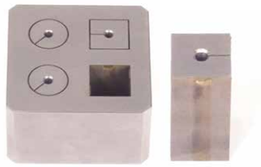
- 50%* shortened maintenance time at wire outlet mechanism

* Compared to previous model

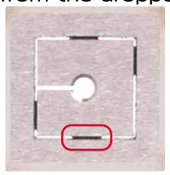


CORE STITCH* function to adhere the cores

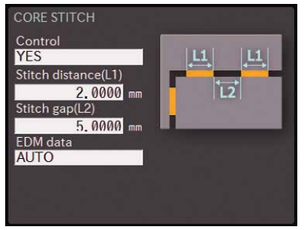
- The function to adhere the core by brass welding provides continuous unmanned operation.
- Prevents the machine damage from the dropped cores
- Easy operation to activate on the CNC screen
- Easy setting of adhesion distance and gap



Core adhesion and a removed core



Adhesion by brass ingredient

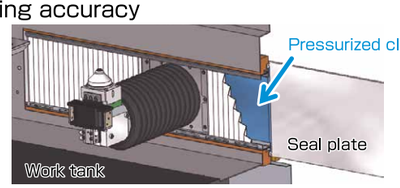


*CORE STITCH is a registered trademark of Seibu Electric & Machinery Co., Ltd.

Pre-seal mechanism for work tank to provide high reliability

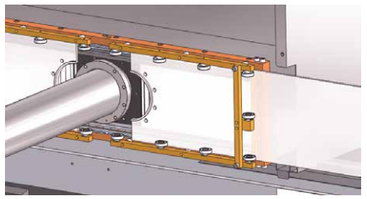
Pre-seal mechanism

- Pressurized clean water tank prevents the seal plates from sludge adhering to it
- Reduces frictional resistance to prevent from deteriorating cutting accuracy



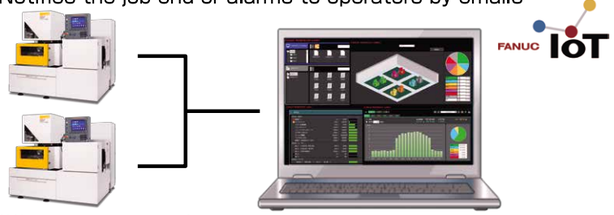
Two-split Transparent seal plates

- Easy to disassemble and keep clean
- Easy to check how much dirty



ROBOCUT-LINK*i* to manage production and quality information

- Monitors the cutting status of ROBOCUT in real time
- High speed transfer of NC programs
- Notifies the job end or alarms to operators by emails



32 units connectable

Overall monitoring

Operation result

Consumables' lives

Power consumption monitor

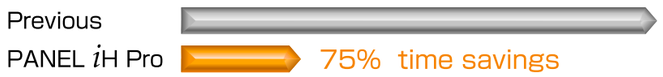
* OS : Microsoft® Windows® 7 / 8 / 8.1 / 10 / 11 ** It's necessary to contract with provider to use email function.

Ease of Use

FANUC's latest CNC to improve operability

PANEL *i*H Pro, the high performance display unit of FANUC

- Provides 75% faster drawing speed than previous model



- Multi-touch screen to support operation
- Undo/Redo function will save the operation mistakes
- ROBOCUT-CAM*i* installed in the PC can be remote-operated from ROBOCUT screen

Simple adjustment function

- Cutting speed and the shape can be adjusted by simple and intuitive operation

Touching the buttons to adjust the EDM parameters

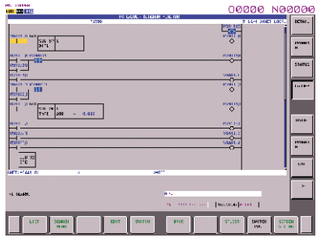
The cutting speed can be adjusted from 50% to 120% keeping the discharge gap to achieve stable cutting

The buttons to adjust visually at the corner shape and approaching shape without directly changing parameters

Customize functions to support user needs

Custom PMC

- Ladder programs for peripheral devices can be created on the screen



※Standard I/O : 8 points each

Custom screen

- Original applications created by yourselves can be installed and operated on ROBOCUT

※Designated software is necessary.

Automation system with FANUC Robot (Option)

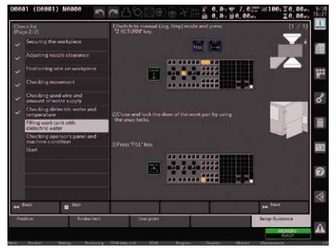
- 4 units of ROBOCUT with one Robot are connectable through FL-net
- Easy setup of workpiece exchange system by Robot
- Automation system for high-mix low-volume production

Workpiece exchange system with FANUC Robot (sample)

Various functions to support setting up

Setup Guidance function

- Explains the set up procedure



Searching EDM screen

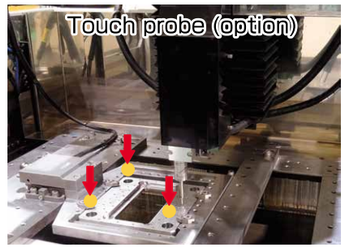
- Provides the proper EDM technologies to each application

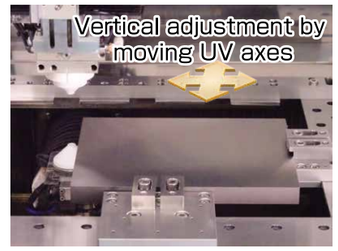
Smart Programming

- Simple operation to make NC programs automatically

3D Coordinate Rotation Function

- Compensates the wire vertical position by moving U / V axes according to the workpiece tilt.





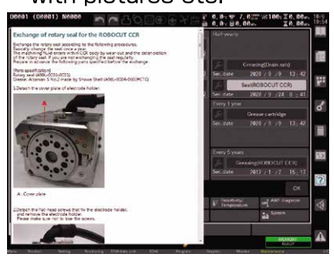
Various functions to support daily maintenance

Consumables management

- For monitoring the lives of consumable parts

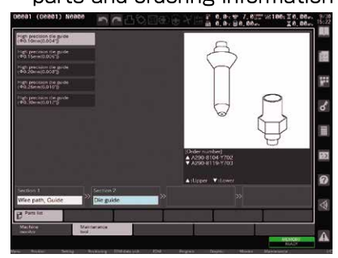
Maintenance guidance

- Provides the daily maintenance with pictures etc.



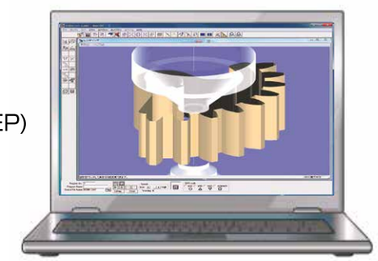
Parts list

- For searching maintenance parts and ordering information



ROBOCUT-CAM*i* (Option)

- This is the PC software to create NC programs for ROBOCUT
- Easy operation to make NC programs interactively for standard cutting, taper cutting, different profiles on the top and the bottom cutting, gear shape cutting, CORE STITCH, and so on
- Easy operation to create cutting path from CAD data (DXF,IGES,STEP) and NC programs
- Standard EDM technologies for ROBOCUT are installed
- USB memory and Ethernet are allowed to use when transferring the data between ROBOCUT and the PC

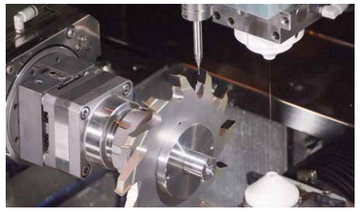


*OS : Microsoft® Windows® 8 / 8.1 / 10 / 11

Options

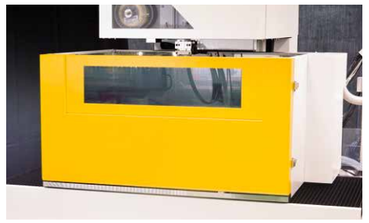
Linear encoder

MF2 power supply for skim cutting



PCD tool cutting system

Double doors



Automatic door

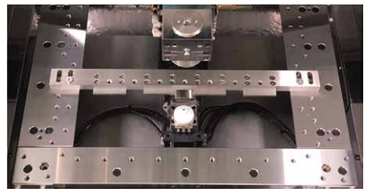
45 degrees taper kit

Work light (LED)

Warning light (Three-stage LED with buzzer)

Wire loader (Max. 30kg)

Automatic grease lubrication



Removable table (α-C400iC)

* The availability of options is different, depending on the country, region, model, Please contact FANUC.

Service & Support

Excellent Maintenance Services

FANUC service team delivers customer trust and confidence based on direction of service “Maximizing Uptime”, “Global Service” and “Lifetime maintenance”.

Service First

Conforming to the spirit of "Service First", FANUC provides lifetime maintenance to its products for as long as they are used by customers, through more than 270 service locations supporting more than 100 countries and regions throughout the world.

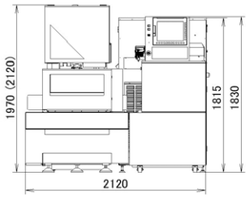
Maximizing Uptime

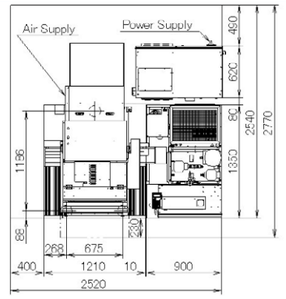
FANUC ACADEMY

FANUC ACADEMY operates training programs on FANUC ROBOCUT which focus on practical operations and programming with cutting know how and maintenance.

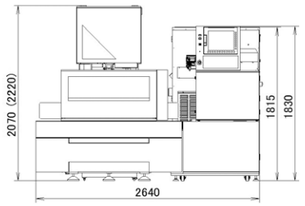
Floor Plan

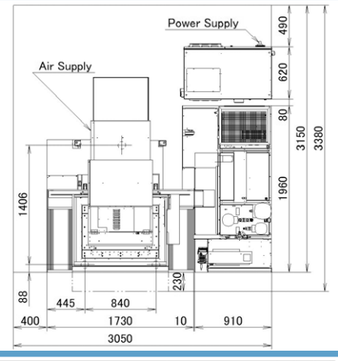
α-C400iC



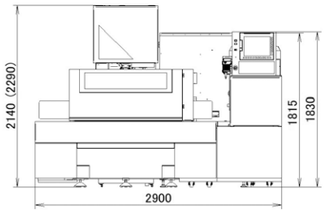


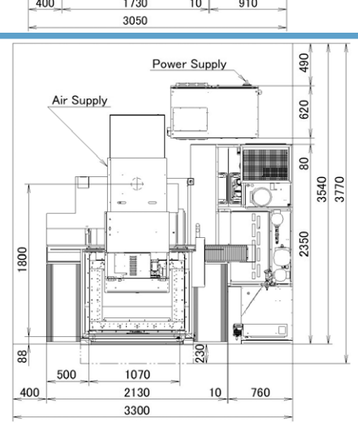
α-C600iC





α-C800iC





* The values in parentheses ( ) are when the safety cover is open.

* The above floor plan is that of a standard type machine. Contact FANUC if you wish to order the options such as a Z axis travel 410mm,/510mm and 30kg wire loader options.

Installation Requirement

Power supply	200VAC±10% 3-phase 50/60Hz ±1Hz 220VAC±10% 3-phase 60Hz ±1Hz Connection cable terminal size : 8-5 Power consumption : 13kVA	Environment	Ambient temperature : 15 to 30℃ *Recommend 20±1℃ for high precision machining. Install under the oil mist free and dust free environment. Humidity : 75%RH or less
Air supply	Pressure : 0.5 to 0.7 MPa Flow rate : 160L/min or more *Regulator-side coupler mounting screw : Rc1/4	Grounding	400mm or more are recommended as concrete foundation ground where machine is located to endure its weight. Ground should be selected where no vibration or no impact effect. As vibration level, the maximum amplitude should be 2μm or less under frequency band from 10 to 20 Hz. The unit must be grounded to prevent damage resulting from electro-magnetic interference or electrical leakage. The unit is recommended to be installed so that the ground resistance is less than 10Ω. Also, the grounding should be isolated from other machines.
Shield room	If discharge noise can interfere with surrounding radio, television and other sets, a shield room needs to be created		

Specifications

Model			α-C400*i*C	α-C600*i*C	α-C800*i*C
Maximum workpiece dimensions	without Automatic door	Z axis travel standard	730 x 630 x 250 mm	1050 x 820 x 300 mm	—
		Z axis travel option	—	1050 x 820 x 400 mm	—
	with Automatic door	Z axis travel standard	730 x 585 x 250 mm	1050 x 775 x 300 mm	1250 x 975 x 300 mm
		Z axis travel option	–	1050 x 775 x 400 mm	1250 x 975 x 500 mm
Maximum mass of workpiece			500 kg	1000 kg	3000 kg
XY axis table travel			400 x 300 mm	600 x 400 mm	800 x 600 mm
Z axis travel		standard	255 mm	310 mm	
		option	—	410 mm	510 mm
UV axis travel			±60 mm x ±60 mm	±100 mm x ±100 mm	
Maximum taper angle		standard	±30° /80 mm	±30° /150 mm	
		option	±45° /40 mm	±45° /70 mm	
Wire diameter		standard	φ0.10 to φ0.30 mm		
		option	φ0.05 to φ0.30 mm	—	
Maximum wire mass			16 kg		
Mass (including the dried work tank)			Approx. 2200 kg	Approx. 3600 kg	Approx. 5300 kg
Controller			**FANUC Series 31*i*-WB**		