

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

# FANUC

## ROBOCUT $\alpha$ -CiC series



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Wire Electrical-Discharge Machine

# **FANUC** ROBOCUT $\alpha$ -C*i*C series



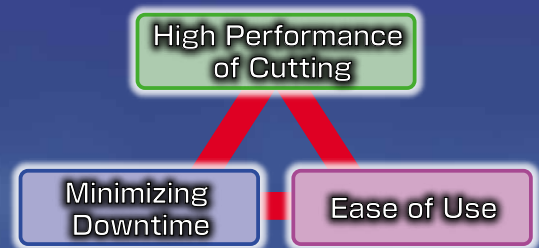
## **ROBOCUT** $\alpha$ -C400*i*C

X×Y×Z axis travel : 400×300×255 mm



## **ROBOCUT** $\alpha$ -C600*i*C

X×Y×Z axis travel : 600×400×310 mm



## High Performance of Cutting

New 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

High precision rotary table ROBOCUT CCR to expand the applications

## Minimizing Downtime

High reliable automatic wire feeding (AWF3) provides continuous unmanned machining  
Consumables management function and Maintenance guidance function support routine maintenance

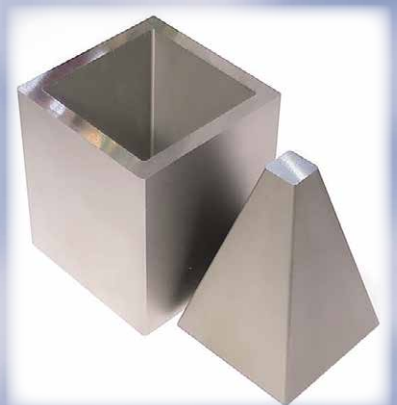
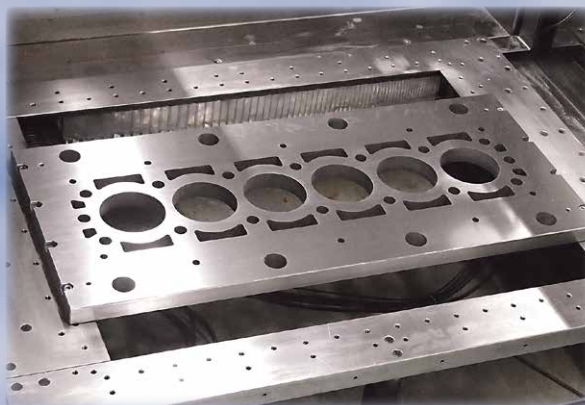
ROBOCUT-LINK*i* provides Production and Quality information management

## Ease of Use

FANUC CNC and operation guidance function provide superior operations

Fulfilling EDM technologies support high speed, high precision, and high quality cutting

Automatic functions support set-up operations



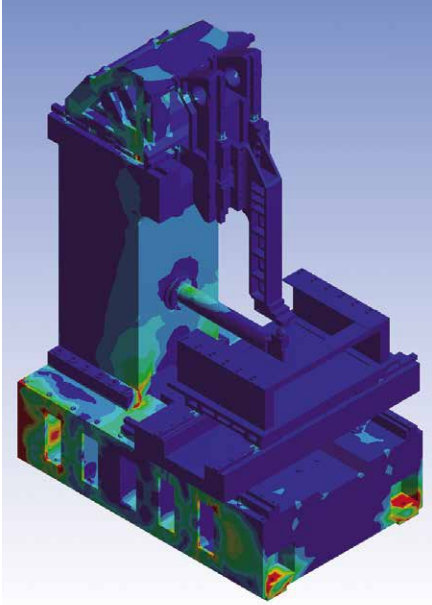


# High Performance of Cutting

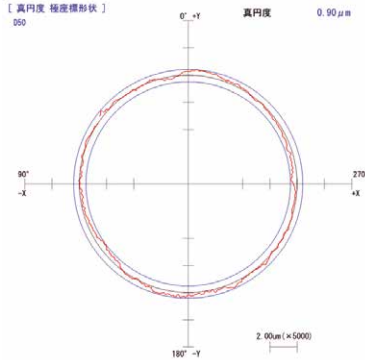
## Mechanical structure to provide high precision cutting

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

### 【High precision cutting of circle shape】

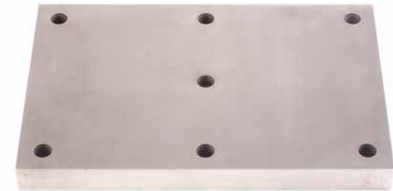
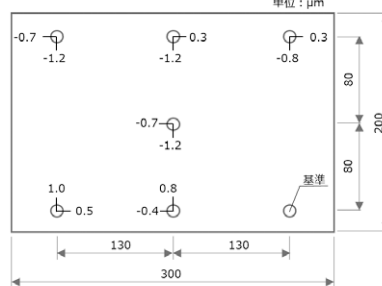


FEM analysis



Die steel, 20mm  
1 rough, 5 skims  
Roundness  $0.90\mu\text{m}$

### 【High precision pitch cutting】

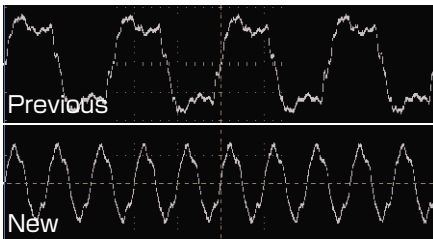


Die steel, 25mm  
1 rough, 5 skims  
Pitch accuracy  $-1.2\mu\text{m}$  to  $+1.0\mu\text{m}$

## 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 pulse by SF3】



### 【The best surface roughness by MF2 (option)】



Carbide, 30mm  
1 rough, 8 skims  
 $R_z 0.7\mu\text{m}$  ( $R_a 0.10\mu\text{m}$ )

## Discharge control to provide high speed and high precision cutting

- Discharge control *i*Pulse3 provides high performance of cutting by corner control and step shape control

### 【High speed cutting: Keyway】



Stainless, 40mm  
1 rough, 1 skim  
Accuracy  $\pm 5.0\mu\text{m}$   
Cutting speed 13% faster

### 【Fitting parts】



Die steel, 40mm  
1 rough, 3 skims  
Accuracy  $\pm 3.0\mu\text{m}$   
 $R_z 2.5\mu\text{m}$  ( $R_a 0.30\mu\text{m}$ )

### 【Step shape】

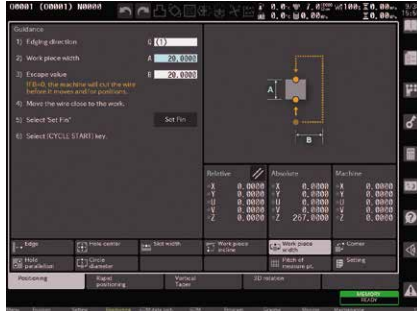


Die steel, 10-50-100mm  
1 rough, 3 skims  
Accuracy  $\pm 3.0\mu\text{m}$   
 $R_z 3.3\mu\text{m}$  ( $R_a 0.36\mu\text{m}$ )

## Various functions and mechanisms to support high precision cutting

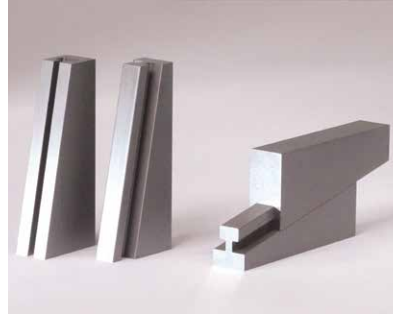
### High precision positioning function

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



### New taper adjustment function

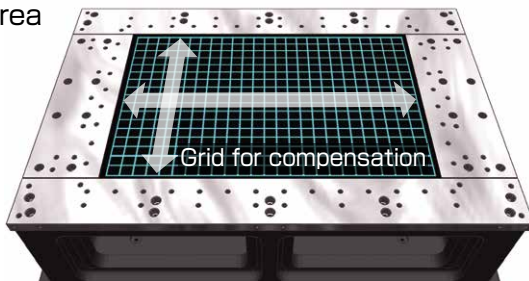
- New function with operation screen and jig providing high precision taper cutting



Die steel, 50mm  
1 rough, 3 skims  
Set angle 12 degrees  
Measured angle  
12.004 deg.  
Accuracy  $-3\mu\text{m}$  to  $+1\mu\text{m}$   
Rz  $2.6\mu\text{m}$  (Ra  $0.34\mu\text{m}$ )

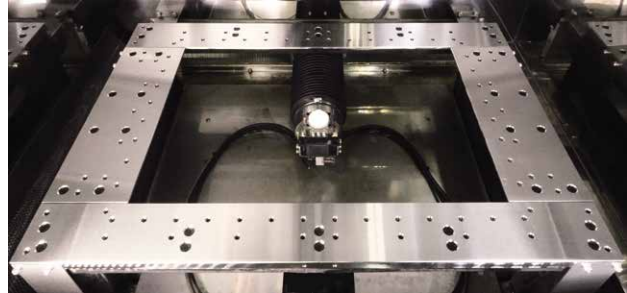
### High precision pitch error compensation function

- Corrects the pitch error over the entire table area



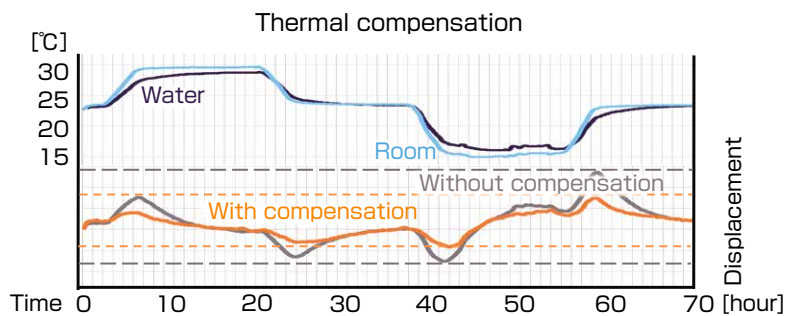
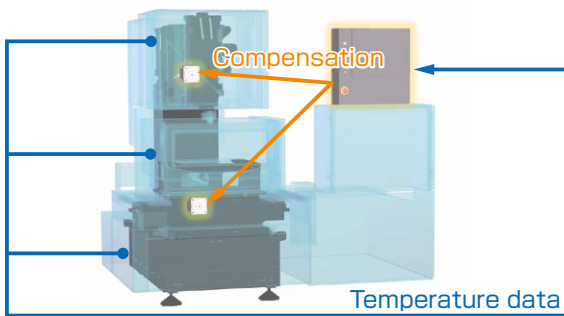
### Hardened workpiece table (standard installed)

- Durable table to prevent scratch



## AI thermal displacement compensation function to realize stable cutting

- Multiple temperature sensors and AI (Machine Learning) realize stable cutting even if in the room where the temperature changes on a large scale.



## 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



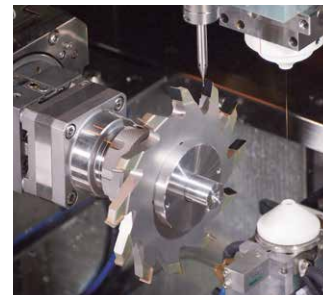
Helical cutting

### PCD tool cutting

- PCD tool applications with ROBOCUT CCR



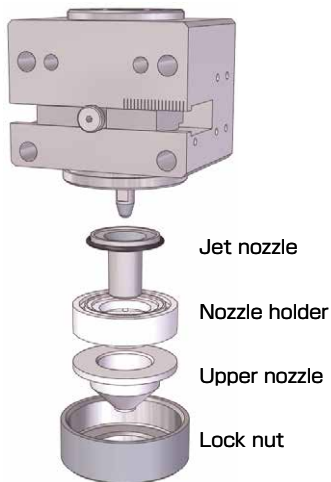
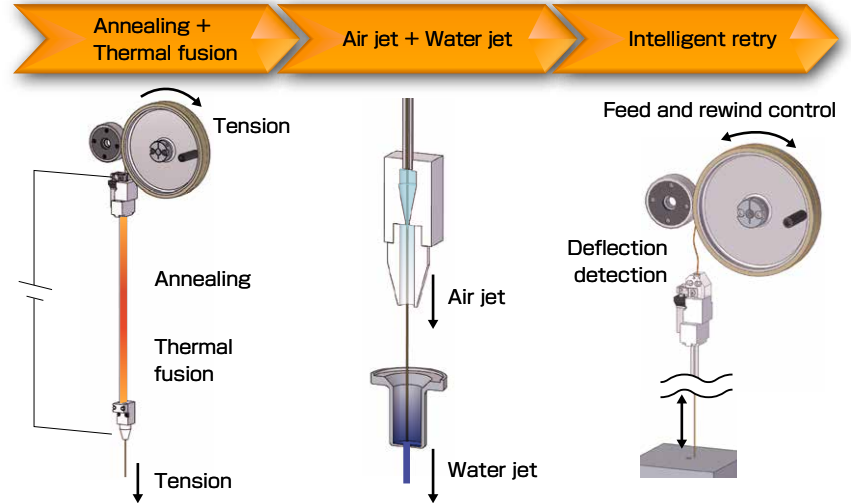
PCD power supply provides high quality cutting



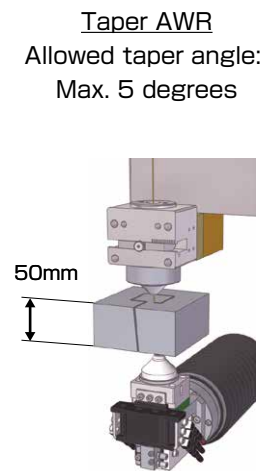
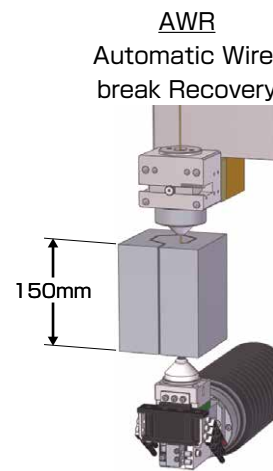
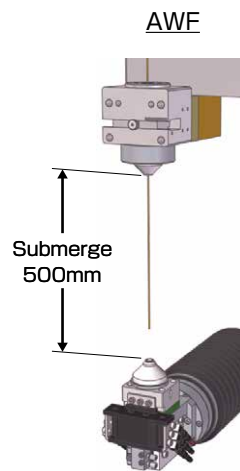
# Minimizing Downtime

## 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.500mm height in submerge condition, AWR with 150mm work thickness



Simplified upper guide unit

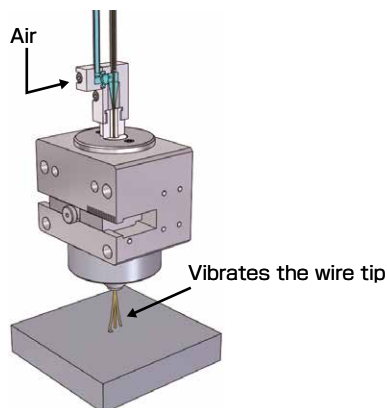


Various AWF functions support strongly unmanned operations

\* All cutting results obtained under FANUC-designated conditions

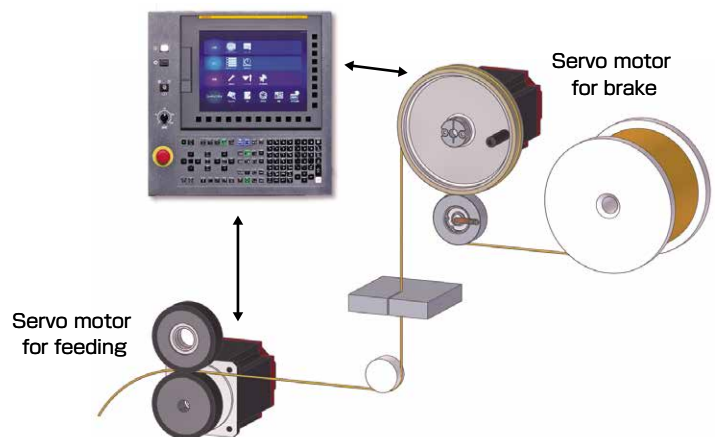
## Air retry

- Higher success rate of threading wire by vibrating the wire intentionally even in difficult places to thread wire such as at the wire break point or at the small start hole
- Great combination with CORE STITCH function



## Twin servo wire feeding system

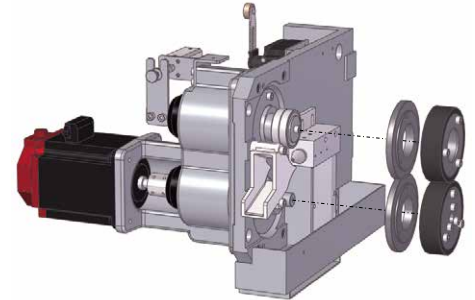
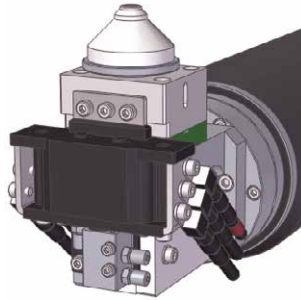
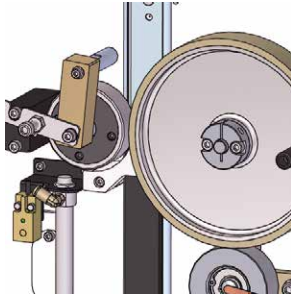
- Wire feeding system with FANUC servo motors accurately controls the wire tension and suppresses the wire vibration to provide high precision cutting





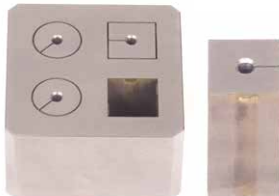
## Wire running system to contribute for higher rate of operation

- Simple structure to provide easier wire installation
- Maintenance-free structure on the lower guide
- 50% time reduction for maintaining the wire feed part

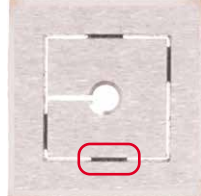


## CORE STITCH\* function to adhere the cores

- 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

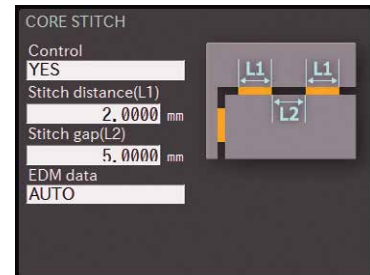


Core adhesion and a removed core



Adhesion by brass ingredient

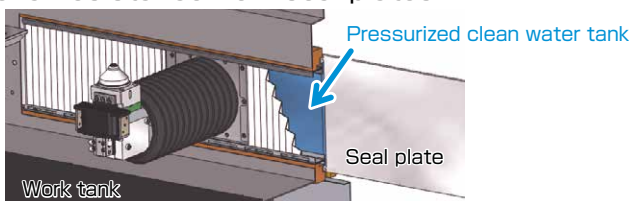
\*CORE STITCH is a registered trademark of Seibu Electric & Machinery Co., Ltd.



## Pre-seal mechanism for work tank to provide high reliability

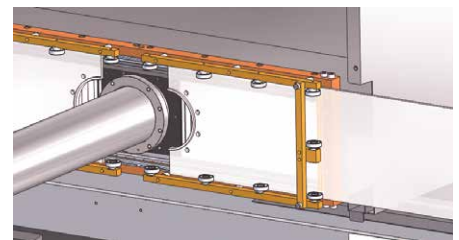
### Pre-seal mechanism

- Pressurized clean water tank prevents the seal plates from sludge adhering to it
- Prevents deterioration of cutting accuracy caused by the frictional resistance from seal plates



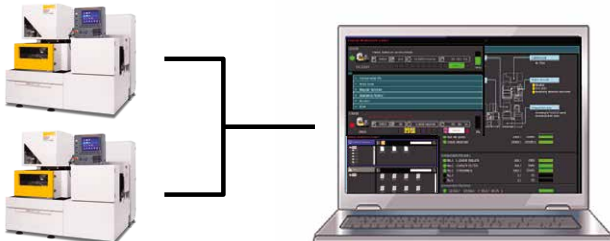
### Two-split Transparent seal plates

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



Max.32 units connectable



Send emails



Consumables' lives



Operation monitor



Regular Maintenance



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

# Ease of Use

## FANUC's latest CNC to improve operability



### PANEL iH Pro, the high performance display unit of FANUC

- Provides 75% faster drawing speed than previous model

Previous



PANEL iH Pro



75% time savings

- Multi-touch screen will support operation
- Undo/Redo function will save the operation mistakes
- ROBOCUT-CAMi 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



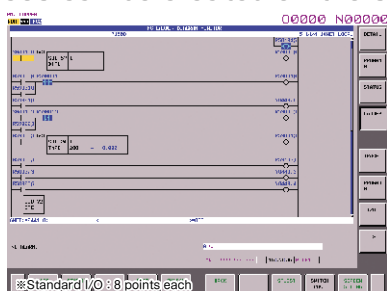
The cutting speed can be adjusted from 50% to 120% keeping the discharge gap to achieve stable cutting

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

## Customize functions to support user needs

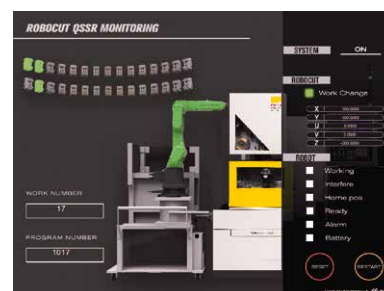
### Custom PMC function

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



### Custom screen function

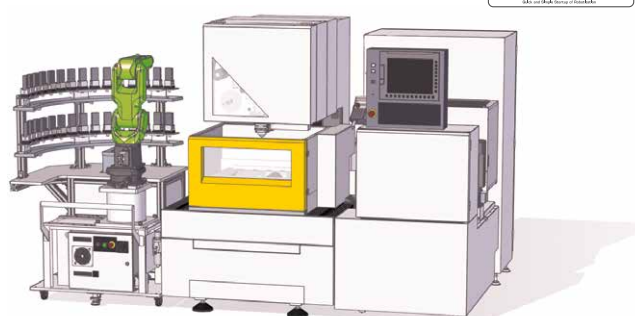
- Original applications created by yourselves can be installed and operated on ROBOCUT



## QSSR : Simple Startup of Robot system (Option)

### QSSR (Quick and Simple Startup of Robotization)

- Packaging FANUC Robot, Robot interface, Robot stand, safety fence, Robot sample program, and so on
- QSSR provides the work exchange system by FANUC Robot



Work piece exchange system by 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



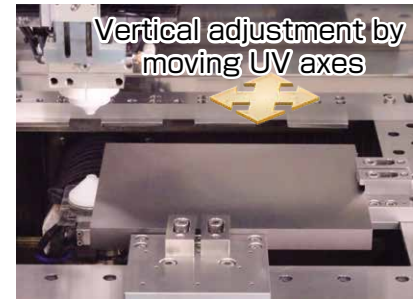
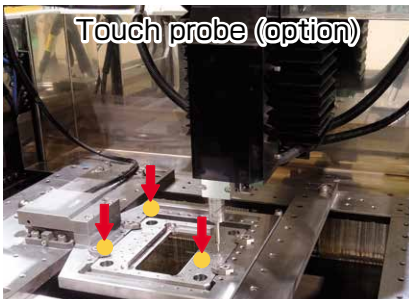
### Smart Programming function

- Provides an easy programming process for keyway cutting



### 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

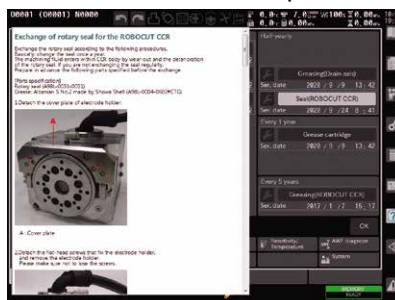
### Consumables management

- For monitoring the lives of consumable parts



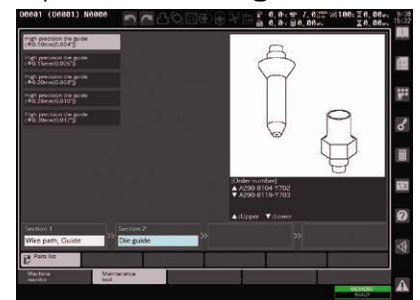
### Maintenance guidance

- Provides the routine maintenance with pictures etc.



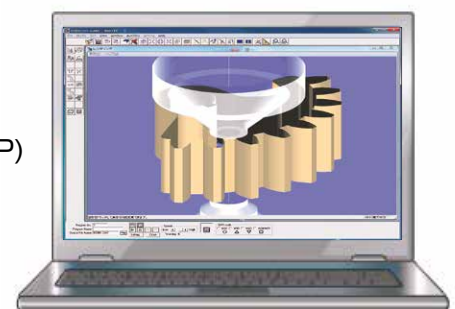
### Parts list

- For searching maintenance parts and ordering information



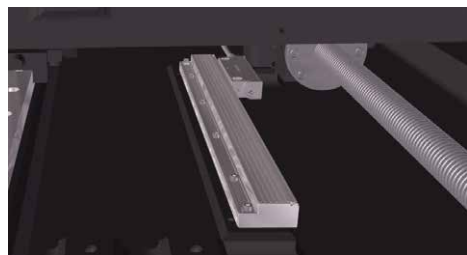
## ROBOCUT-CAMi (Option)

- The PC software to create NC programs for ROBOCUT
- Easy operation to make NC programs interactively for standard cutting, taper cutting, different profiles in 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

# Options



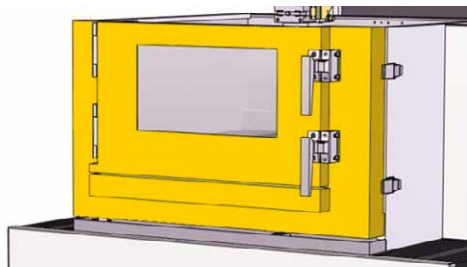
Linear encoder



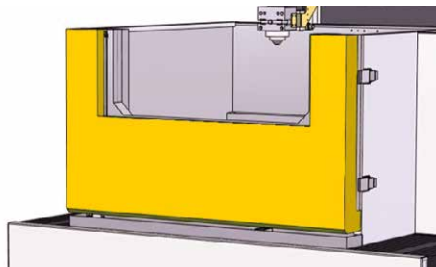
MF2 power supply for skim cutting



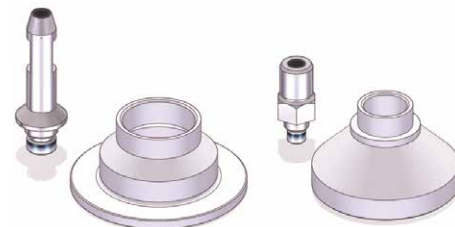
PCD tool cutting system



Double doors



Automatic door



45 degrees taper kit



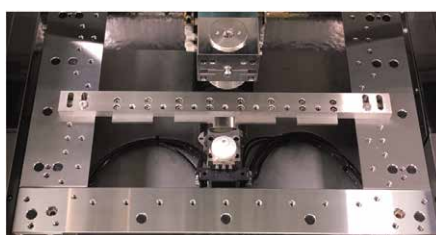
Work light (LED)



Warning light (Three-stage LED with buzzer)



Automatic grease lubrication



Removable table (α-C400iC)



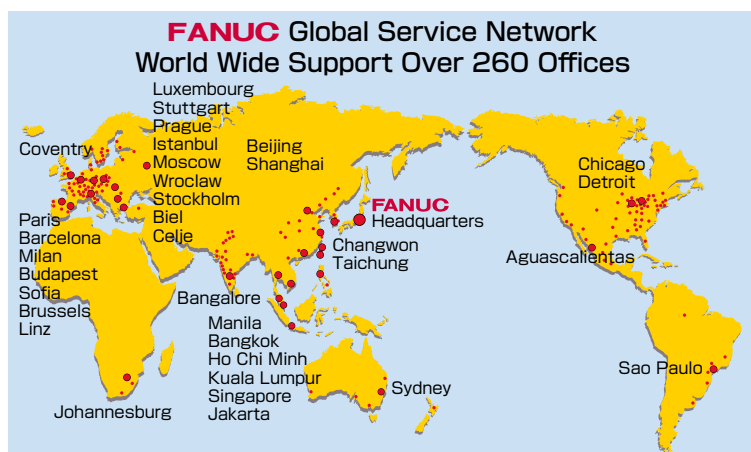
Wire loader for 20 - 30kg wire

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

# Maintenance and Customer Support

## Worldwide Customer Support and Service, Lifetime support

FANUC operates customer service and support system anywhere in the world through subsidiaries, affiliates and distributor partners. FANUC provides the highest quality service with the quickest response at the location nearest you.



## FANUC ACADEMY

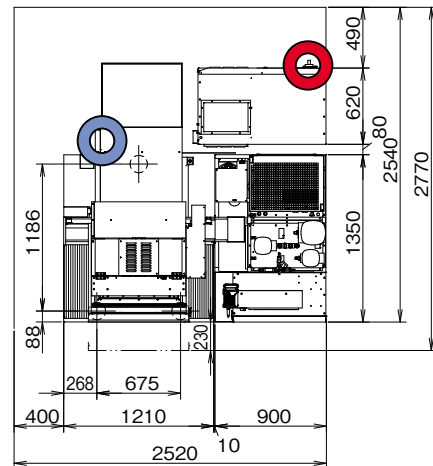
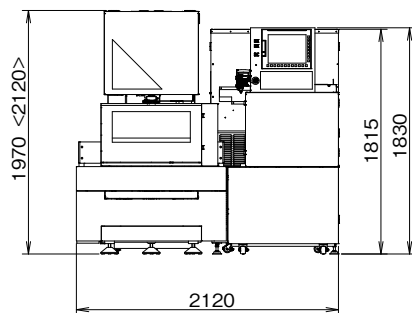
FANUC ACADEMY operates training programs on FANUC ROBOCUT which focus on practical operations and programming with cutting know how and maintenance.



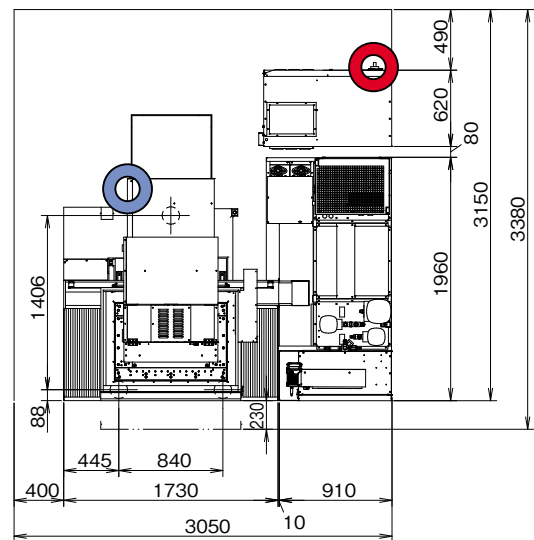
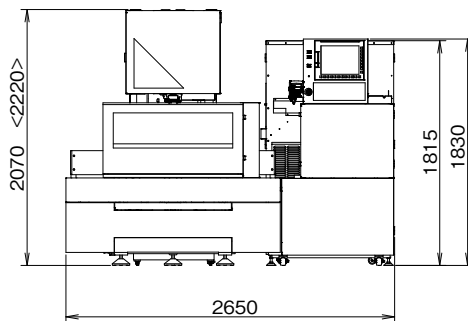
Inquiries : Oshino-mura,  
Yamanashi, Japan 401-0597  
Phone : 81-555-84-6030 Fax : 81-555-84-5540

# Floor Plan

## $\alpha$ -C400iC



## $\alpha$ -C600iC



Power input position (200V AC, 3-phase)



Compressed air input position

\* 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 $\pm$ 10% 3-phase 50/60Hz $\pm$ 1Hz 220VAC $\pm$ 10% 3-phase 60Hz $\pm$ 1Hz Connection cable terminal size : 8-5 Power consumption : 13kVA	Environment	Ambient temperature : 15 to 30°C *Recommend 20 $\pm$ 1°C 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 2 $\mu$ m 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 10 $\Omega$ . 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			$\alpha$ -C400 <i>i</i> C	$\alpha$ -C600 <i>i</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
		Z axis travel option	—	1050 x 775 x 400 mm
Maximum workpiece mass			500 kg	1000 kg
XY axis table travel			400 x 300 mm	600 x 400 mm
Z axis travel		standard	255 mm	310 mm
		option	—	410 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	
Machine mass (including the dried work tank)			About 2200 kg	About 3600 kg
Controller			FANUC Series 31 <i>i</i> -WB	

## FANUC CORPORATION

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