High-Reliability and High-Performance Wire-cut Electric Discharge Machine

FANUC ROBOCUT α-CiB series
High-Reliability and High-Performance Wire-Cut Electric Discharge Machine

FANUC ROBOCUT α-CiB series

High Performance of Cutting

- High speed, High precision, High quality
- Stable cutting
- Wide range of applications

Minimizing Downtime

- High reliability
- High maintainability

Ease of Use

- Superior operability
- Fulfilling EDM technologies
- Various automatic functions

Applying the latest CNC & servo technology

Good combination with FANUC Robot

ROBOCUT-LINK
High Performance of Cutting

New discharge control iPulse2 and cutting power supply provides high speed, high precision, and high quality cutting
AI thermal displacement compensation function and various shape compensation functions provide stable and accurate cutting
High precision rotary table, ROBOCUT CCR extends the range of applications

Minimizing Downtime

High reliable auto 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

Latest user interface iHMI provides various CNC screen functions
Fulfilling EDM technologies support high speed, high precision, and high quality cutting
Automatic functions support set-up operations

α-C400iB
X×Y×Z axis travel
400×300×255 mm

α-C600iB
X×Y×Z axis travel
600×400×310 mm
600×400×410 mm (Option)

α-C800iB
X×Y×Z axis travel
800×600×310 mm
800×600×510 mm (Option)

* The outer view will be different as machine specifications
High Performance of Cutting

New discharge control \textit{i}Pulse2 and cutting power supply providing high speed, high precision, and high quality cutting

- New discharge control \textit{i}Pulse2 provides high precision cutting by optimizing the discharging feed rate control at corner and approaching point.

\textit{i}Pulse2 corner control
- High precision cutting at small corners

\begin{figure}[h]
\centering
\includegraphics[width=0.4\textwidth]{corner_cutting}
\caption{(3 paths, standard EDM technology, Die steel 40mm, \(\phi 0.25\)BS wire)}
\end{figure}

\textit{i}Pulse2 approach control
- Provides less line mark at approaching point

\begin{figure}[h]
\centering
\includegraphics[width=0.4\textwidth]{approach_cutting}
\caption{(3 paths, standard EDM technology, Die steel 60mm, \(\phi 0.25\)BS wire)}
\end{figure}

High speed, high precision, and high quality cutting performance by \textit{i}Pulse2

- \textit{i}Pulse2 and SF2 (Standard power supply for skim cutting) provide surface roughness Ra0.30\(\mu\)m with die steel parts (less than 30mm thickness)

\begin{tabular}{|l|}
  \hline
  \textbf{[Punch / Die sample]} \\
  Die steel 50mm \\
  \(\phi 0.20\) BS wire \\
  4 paths \\
  Accuracy \(\pm 3.0\)\(\mu\)m \\
  Ra 0.30\(\mu\)m \\
  \hline
  \end{tabular}

\begin{tabular}{|l|}
  \hline
  \textbf{[Press die sample]} \\
  Die steel 25mm / 75mm \\
  \(\phi 0.25\) BS wire \\
  3 paths, high speed cutting \\
  Accuracy \(\pm 3.0\)\(\mu\)m \\
  Ra 0.50\(\mu\)m \\
  \hline
  \end{tabular}

* All cutting results obtained under FANUC-designated conditions
AI thermal displacement compensation function provides stable and accurate cutting

- Advanced thermal displacement compensation with multiple sensors
- With AI (Machine learning), stable cutting can be realized even if the large temperature change happens
- Optimizes the amount of compensation at each user environment

High precision rotary table, **ROBOCUT CCR**, extends the range of applications (Option)

**ROBOCUT CCR**
- FANUC Servo motor and rotary encoder provides high precision positioning
- Light weight and compact size

**Examples of PCD tool cutting**
- PCD tool Cutting with ROBOCUT CCR
- PCD Power Supply provides high quality cutting

High accuracy thick work piece cut by **iPulse2**
- High precision cutting for thick work piece

Best surface roughness by **MF2** (Option)
- MF2 (Optional Power Supply for skim cutting) achieves the best surface roughness Ra 0.10μm for tungsten carbide (less than 30mm thickness)

* All cutting results obtained under FANUC-designated conditions
Minimizing Downtime

Auto wire feeding AWF3 providing unmanned machining

- Simple designed AWF has great maintainability providing higher rate of wire threading and high reliability
- AWF3 achieves the wire threading for the Max.500mm thickness and also provides AWR (Automatic Wire Recovery) for 150mm thickness in submerge condition.

Simple designed upper guide unit

- Various AWF functions support strongly unmanned machining

Air retry

- Higher success rate of threading wire by intentional wire vibration even in such difficult situation as wire break point or small start hole.
- Great combination with CORE STITCH function

Twin servo wire feeding system

Wire feeding system with twin FANUC servo motors accurately controls wire tension and suppresses wire vibration to achieve high precision cutting.
Core adhesion function by CORE STITCH®

- The core is adhered by brass welding
- Time reduction of the process for cutting the cores off
- Prevent the machine damage from the dropped core

![Core adhesion diagram]

Pre-seal mechanism for high reliability

Pre-seal Mechanism
- Pressurized clean water tank prevents the sealing plate from sludge that adheres to it
- Prevents deterioration of cutting accuracy caused by the increased frictional resistance

![Pre-seal mechanism diagram]

Two-Split Transparent Seal Plates
- Easy to disassemble and clean
- Easy to check how dirty

Parts list function and maintenance guidance function

Consumable management Function
- Monitoring of consumables’ lives

Maintenance Guidance Function
- Easy to understand the routine maintenance with pictures and figures

Parts List Function
- Search for maintenance parts and ordering information

![Parts list and maintenance guidance screenshots]

ROBOCUT-LINK® provides production and quality information management

- Monitoring cutting status in real time
- High speed transfer of NC program

![ROBOCUT-LINK® screenshots]

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

* OS: Microsoft® Windows® 7 / 8 / 8.1 / 10
** It’s necessary to contract with provider to use mail function.
Ease of Use

FANUC latest user interface iHMI provides various CNC screen functions

<table>
<thead>
<tr>
<th>Home screen</th>
<th>Manual viewer</th>
<th>PC operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Adopt iHMI home screen</td>
<td>· Referring to the manuals on the CNC screen</td>
<td>· Remote connection with ROBOCUT-CAMi</td>
</tr>
</tbody>
</table>

Simple Adjustment Function of EDM Technologies to support stable cutting

· Keeps gap to realize high precision cutting
· Simple adjustment by touching buttons
· Simple adjustment by NC program

FANUC CNC and guidance function provide easy user friendly operations

<table>
<thead>
<tr>
<th>AI setting Screen</th>
<th>Setup Guidance Function</th>
<th>Positioning Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Provides the optimum EDM technologies to each application</td>
<td>· Displays the setup procedure step by step</td>
<td>· Measuring/positioning the shape of work piece through the guidance</td>
</tr>
</tbody>
</table>

QSSR : Quick and Simple Startup of Robotization (Option)

QSSR : Quick and Simple Startup of Robotization
· Packaging FANUC Robot, Robot interface, Robot stand, safety fence, Robot sample program, and so on
· QSSR easily provides the work exchange system by FANUC Robot

Sample of work exchange system by FANUC Robot
**Automatic function supporting the setup operation**

**Smart Programming Function (Option)**
- Easy programming for the keyway cutting

**3D Coordinate System Rotation Function**
- Compensates wire vertical position by moving the U / V axes according to the work tilt.

**Probe Measurement Function (Option)**
- Measuring the shape of work-piece on the machine with a touch probe

**ROBOCUT-CAMI** (Option)
- Easy operation to make NC programs for standard cutting, taper cutting, different profiles in the top and the bottom cutting, gear shape cutting, CORE STITCH, and so on for ROBOCUT interactively
- Easy operation to create cutting path from CAD data (DXF, IGES, STEP) or NC programs
- Standard EDM technologies for ROBOCUT are installed

**NC programs**
- USB stick
- CF card
- Ethernet

*OS: Microsoft® Windows® 7 / 8 / 8.1 / 10*
Options

- Linear encoder
- MF2 power supply for skim cutting
- PCD tool cutting system
- Double door
- Automatic door
- Work light (LED)
- Warning light (Three-stage LED with buzzer)
- Auto grease lubrication
- Removable table (α-C400B)
- Auto 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

**α-C400iB**

**α-C600iB**

**α-C800iB**

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

* The values in parentheses ( ) are for thin wire or auto grease lubrication option.
* 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

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Environment</th>
<th>Grounding</th>
</tr>
</thead>
<tbody>
<tr>
<td>200VAC ± 10% 3-phase 50/60Hz ± 1Hz</td>
<td>Ambient temperature: 15 to 30°C</td>
<td>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 100Ω. Also, the grounding should be isolated from other machines.</td>
</tr>
<tr>
<td>Connection cable terminal size: B-8</td>
<td>Recommend 20 ± 1°C for high precision machining. Install under the oil mist free and dust free environment. Humidity: 75%RH or less</td>
<td></td>
</tr>
<tr>
<td>Power consumption: 13kVA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Air supply:
- Pressure: 0.5 to 0.7 MPa
- Flow rate: 100L / min or more
- : 120L / min or more (with a thin wire option)
- *Regulator-side coupler mounting screw: Rc1/4*

Shield room:
- If discharge noise can interfere with surrounding radio, television and other sets, a shield room needs to be created
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>α-C400iB</th>
<th>α-C600iB</th>
<th>α-C800iB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum workpiece dimensions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without Automatic door</td>
<td>730 x 630 x 250 mm</td>
<td>1050 x 820 x 300 mm</td>
<td>1250 x 1020 x 300 mm</td>
</tr>
<tr>
<td>with Automatic door</td>
<td>—</td>
<td>1050 x 820 x 400 mm</td>
<td>1250 x 1020 x 500 mm</td>
</tr>
<tr>
<td><strong>Maximum workpiece mass</strong></td>
<td>500 kg</td>
<td>1000 kg</td>
<td>3000 kg</td>
</tr>
<tr>
<td><strong>XY axis table travel</strong></td>
<td>400 x 300 mm</td>
<td>600 x 400 mm</td>
<td>800 x 600 mm</td>
</tr>
<tr>
<td><strong>Z axis travel</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>standard</td>
<td>255 mm</td>
<td>310 mm</td>
<td>310 mm</td>
</tr>
<tr>
<td>option</td>
<td>—</td>
<td>410 mm</td>
<td>510 mm</td>
</tr>
<tr>
<td><strong>UV axis travel</strong></td>
<td>±60 mm x ±60 mm</td>
<td>±100 mm x ±100 mm</td>
<td>±100 mm x ±100 mm</td>
</tr>
<tr>
<td><strong>Maximum taper angle</strong></td>
<td>±30° /80 mm</td>
<td>±30° /150 mm</td>
<td>±30° /150 mm</td>
</tr>
<tr>
<td>option</td>
<td>±45° /40 mm</td>
<td>±45° /70 mm</td>
<td>±45° /70 mm</td>
</tr>
<tr>
<td><strong>Wire diameter</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>option</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum wire mass</strong></td>
<td></td>
<td></td>
<td>16 kg</td>
</tr>
<tr>
<td><strong>Machine mass (approx.)</strong></td>
<td>1800 kg</td>
<td>3000 kg</td>
<td>4200 kg</td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td>FANUC Series 3i/-WB</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acoustic noise level</strong></td>
<td>LPA= 64 dB</td>
<td>LPCpeak= 81 dB</td>
<td></td>
</tr>
</tbody>
</table>

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FANUC CORPORATION

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