

Fully  
CNC-controlled  
Wire EDM

# FANUC

## Robocut

Alpha CiA Series





## Lowest unit costs – highest precision

The extreme precision of the control and drives is outstanding: Without requiring any adaptation, the FANUC Robocut models all offer options for sophisticated wire EDM tasks of utmost accuracy and surface quality. For the best price-performance ratio. **For the lowest unit costs of your parts.**





# Ideal conditions

The control is our strength: Around 60 years of FANUC CNC experience goes into each FANUC Robocut machine and continuous technical advancement since its market launch in 1975. All Robocut machines and their main components – controls, amplifiers and motors – are manufactured 100% in the FANUC factory in Japan. According to the Japanese philosophy: fewer modules, fewer components.  
**The result: lower vulnerability, less maintenance and the highest reliability in the industry.**



**simple machining** with optimal workspace utilisation and a front door that can be lowered\*. The working area opens without complete emptying with fully-automatic filling-level control

**simple crane loading** for heavy work pieces

**simple cleaning** thanks to a self-cleaning sealing system and worktank lining made of polished stainless steel

**simple maintenance** through compact configuration, easy access to all areas and straightforward self-cleaning of the wire guides

**Paper filter** for long machine life cycle



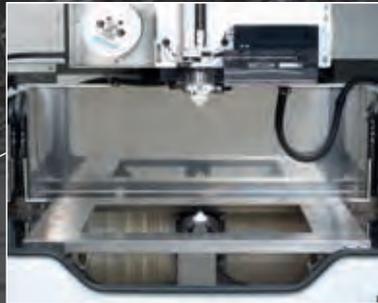


**FANUC 31i-WB High-Performance Control**  
for up to 7 axes (6 axes controlled simultaneously)

**simple programming**

**continuous collision protection** through constant monitoring of the axis drives

**especially energy-efficient** through power-safe mode and recovery of energy generated



**universal positioning table** – solid and precise for the exact positioning of work pieces and device

**highest precision in positioning** thanks to high-resolution glass scales (accuracy 0.05  $\mu\text{m}$ ) in the X and Y axis and use of the latest servo motors of the FANUC Alpha Series

**highest precision slope and radius distances** thanks to extremely high resolution of the axis movements through nano interpolation in command sequence steps of 0.001  $\mu\text{m}$

**maximum concentricity** through travelling distances between the U and V axes

**high stability in all axis positions** by means of symmetrical casting design with precise cross table design for utmost rigidity of the machine body

**generously designed machine bed** without load overhang even when travelling to the end position

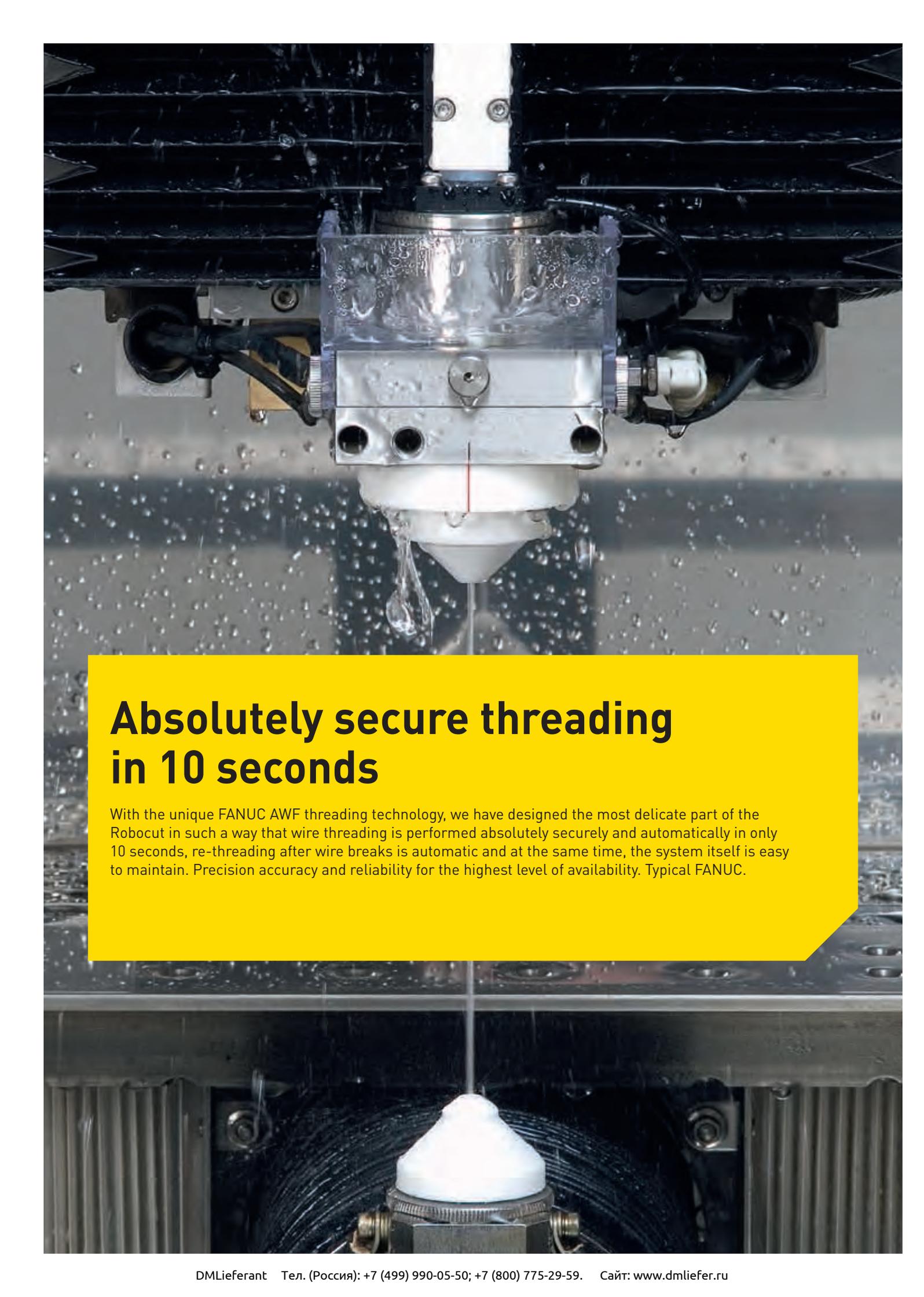
**automatic threading** in 10 seconds using the unique, patented FANUC AWF threading system

**thin-wire technology of up to 0.05 mm** wire diameter with process-secure threading – ideal for micro-machining and the finest surfaces (option for C400iA)

**Wire spool weight of up to 16 kg** (30 kg option)

**the latest generator technologies**  
for the most demanding EDM applications

\* = Opción



## Absolutely secure threading in 10 seconds

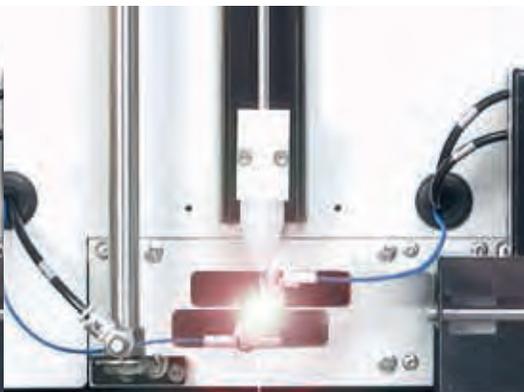
With the unique FANUC AWF threading technology, we have designed the most delicate part of the Robocut in such a way that wire threading is performed absolutely securely and automatically in only 10 seconds, re-threading after wire breaks is automatic and at the same time, the system itself is easy to maintain. Precision accuracy and reliability for the highest level of availability. Typical FANUC.



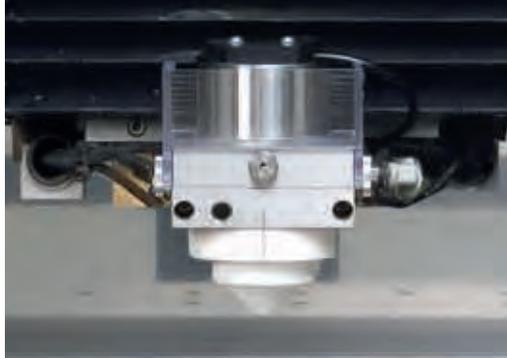
Start



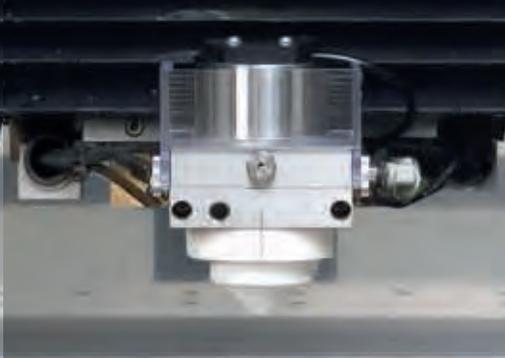
The guide roller retracts, the contact points are moved in to the wire.



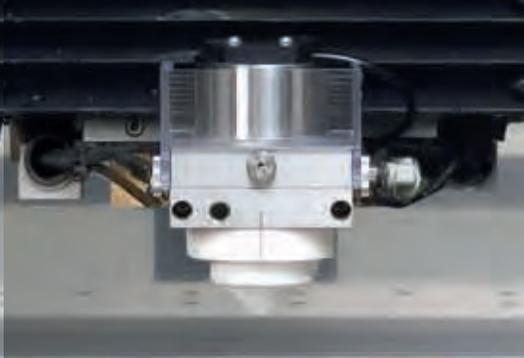
The wire is heated and expanded until it breaks.



00000 sec.



00000.5 sec.

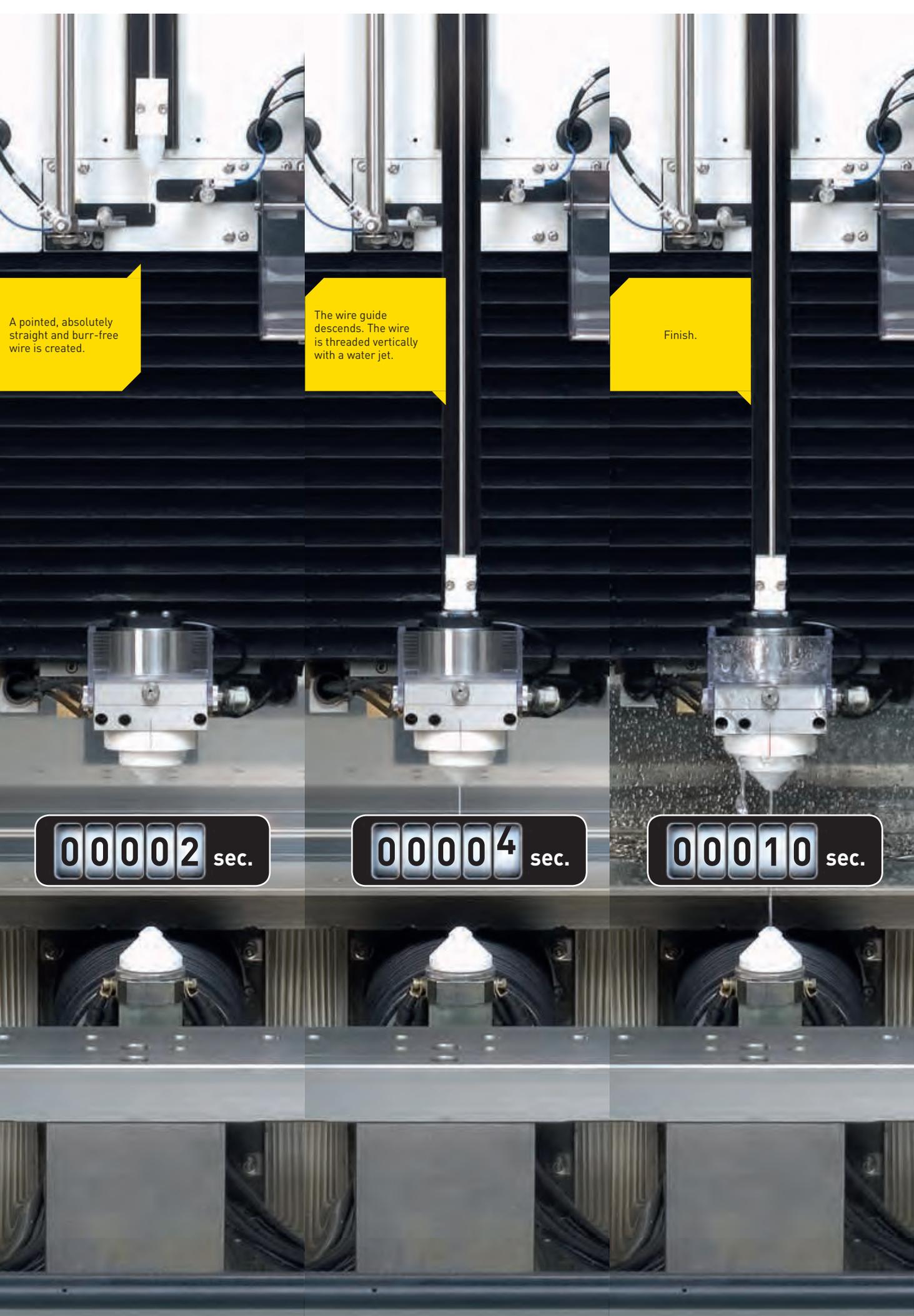


00001 sec.



## The idea is as ingenious as it is simple.

In the FANUC Robocut the wire is heated using electricity and simultaneously expanded until it breaks. The result: a pointed wire end, absolutely straight and free of burrs, which is simply vertically threaded using a water jet. Fast, easy, and absolutely safe. In this, the entire threading mechanism consists of very few components and is thus easily disassembled, cleaned and reassembled.



A pointed, absolutely straight and burr-free wire is created.

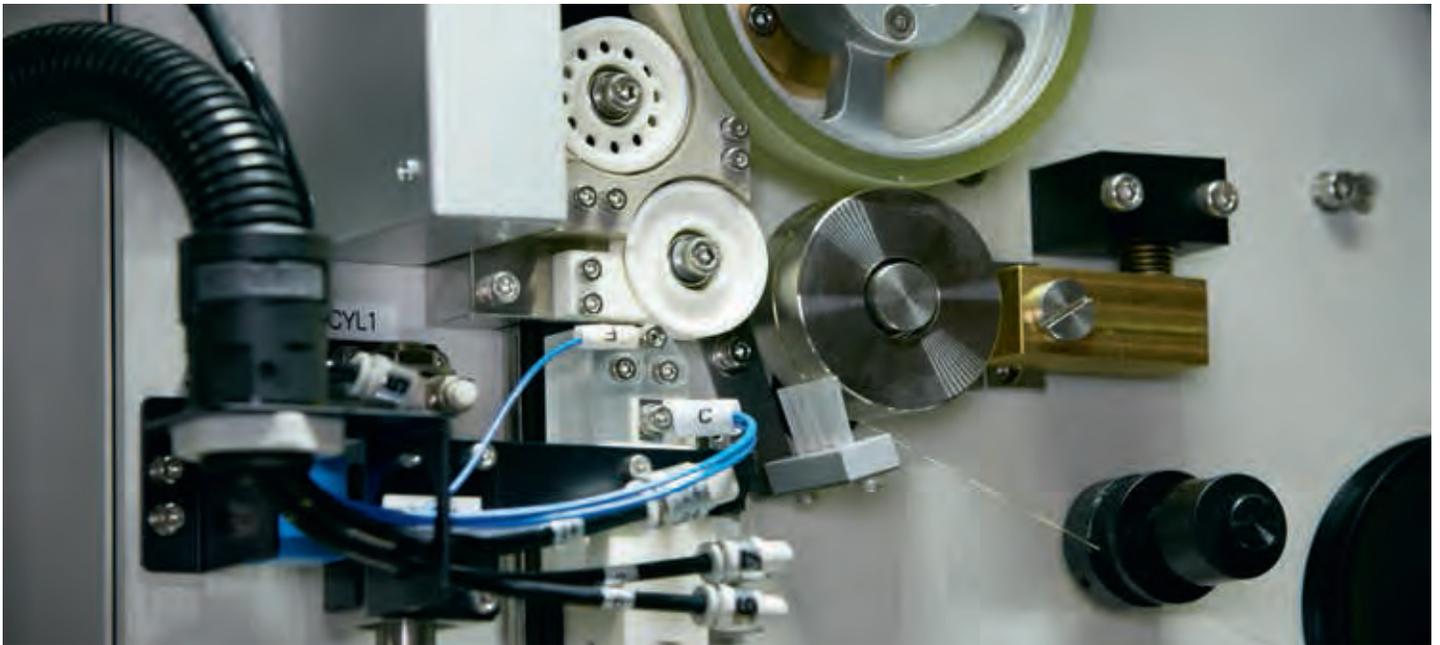
The wire guide descends. The wire is threaded vertically with a water jet.

Finish.

00002 sec.

00004 sec.

00010 sec.



## Your advantages with the FANUC AWF threading system

### **Perfect wire feed with servo technology**

Wire feed and wire tensioning are very precisely regulated by FANUC Robocut through servo motors, constantly measured separately during machinery and thus kept constant for years. For even more reliability with less maintenance.

**Automatic wire break repair** without loss of time: In case of a wire break, the FANUC Robocut automatically travels to the starting point, is re-threaded automatically and returns in rapid traverse along the cutting path to the holding point, in order to continue work immediately.

**Process-secure threading in a water bath** up to a filling level of 200 mm without having to empty the working basin and refill it. Your advantage: Quick machining, no corrosion and higher precision, because the work piece is constantly in the water bath.

**Fast starting hole search function** within a grid consisting of 9 or 25 points for automatic searching for an imprecise starting borehole. In this, the search distances can be freely selected.

**Automatic short-circuit reset** through travelling of the X, Y, U and V axes, in case the wire short-circuits after threading. This process allows free selection of the travelling steps.

**Safe starting point correction** through eroding procedure to the defined starting position, where the eroding wire cuts itself free in several cycles.

### **Simply choose from among the standard functions:**

**AWR Off-Time Control:** In order to prevent further wire breaks, the spark cycle can be automatically be adapted after each wire break. After a defined distance, it is then restored to its original value.

**AWR Retry Skip:** After a certain number of wire breaks in a contour, the procedure is cancelled and the machine moves onto the next contour.

**AI AWR:** Option for rethreading directly in the cutting gap

**AI AWF:** Option upto 150mm to be added

**AWR Diagnostics Screen:** Offers a simple step-by-step guidance for troubleshooting on the wire threading system with indications on the position and number of repetitions of the re-threading as well as the marking of the position of the wire break.

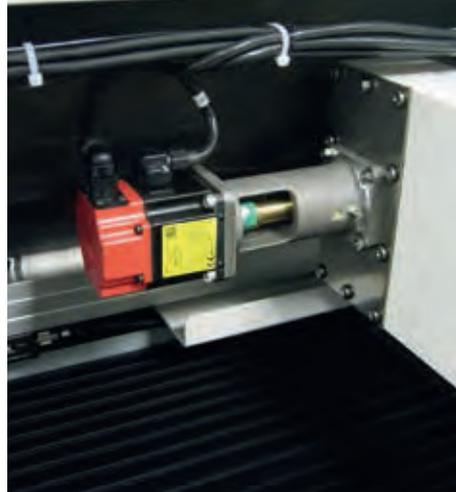
# Yellow ideas for simple machining

Through the large, ergonomic working area with automatic lowering of the front door (option), the FANUC Robocut offers especially good access to the work piece underside. Extremely practical: For large work pieces and maintenance procedures, the front door can be opened completely. This allows even protruding debris to be removed without unclamping. These are but a few of the many yellow FANUC ideas for especially simple machining.



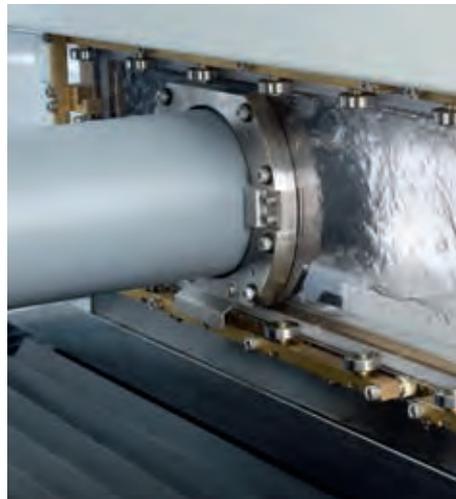
### Practical automatic opening mechanism\*

The working tank of the Robocut opens automatically at the push of a button, so that you can remove parts without completely emptying the tank. Your advantage: considerably shorter waiting times when filling – and the rest of the water provides for temperature stability in the working area.



### Fully-automatic filling level control

Instead of a pneumatically actuated feeder and a floating switch on the Z axis, the Robocut measures the water pressure on the tank bottom and regulates it through a servo motor according to the Z axis position. Your advantage: Fewer parts, less maintenance overhead and more reliability



### Self-cleaning sealing system

Corrugated bellows in the Robocut keep waste water away from the sealing plate and are in turn constantly cleaned through continuously circulating water. Your advantage: Constant precision over a longer period of time – and minimised maintenance overhead through longer maintenance intervals. Even the working tank is especially easy to clean thanks to its polished stainless steel lining.



### Optimal workspace utilisation

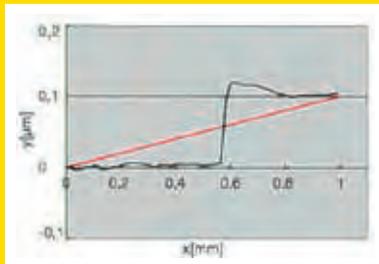
Depending upon the model, the U and V axes of the Robocut can be traversed up to 90 mm beyond the inner edge of the table. In this, the distance between the wire midpoint and the inner edge of the table is 10 mm. Your advantage: work pieces with a small footprint can be easily and perfectly machined even without a clamping device.

# High-precision control

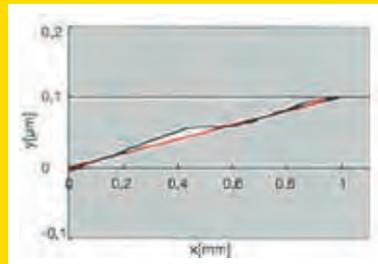
The centrepiece of every FANUC Robotcut is the most reliable CNC control in the world – especially user-friendly and particularly easy to program.

- **fast auto-diagnosis**
- **reliable auto-correction**
- **safe predictive maintenance**
- **practical auto-programming function**
- **Nano interpolation** in command sequence steps of 0.001  $\mu\text{m}$  high resolution of the axis movements and highest precision slope and radius distances

Without nano interpolation



With nano interpolation



easy-to-clean membrane keyboard

Main fibre optic cable  
for minimal vulnerability to failures

energy saving switching electronics



**15" colour display** with touchscreen for easy input of data with a minimum of keystrokes



**Extremely simple maintenance:**

The maintenance screens of the integrated FANUC 31i-WB CNC control, through their intuitive visual user guidance, provide for quick recovery, e.g. when current collectors are worn.

**Safe early detection:**

The integrated early warning system detects errors before they occur and thus ensures greatest possible quality assurance.

Ethernet interface

USB interfaces

CF card slot

RS232C interface



## Perfect Surfaces – Free-form Contours

Thanks to our many years of experience, we are pioneers in EDM PCD machining. The result is the unique FANUC PCD generator: Our own proprietary hardware and cutting technology for easy and high-precision machining, even of poorly conducting material. For better surfaces through contact-free polishing – and the option of virtual free-form contours through the use of an axis of rotation.

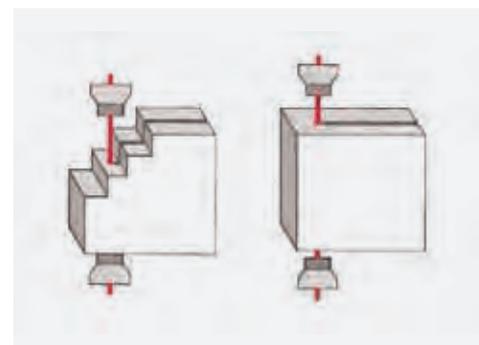
With the optional axis of rotation, complex rotation parts can be machined simultaneously in six axes without exerting mechanical forces on the work piece. Your advantage: an ideal alternative to polishing or turning with special polishing discs or lathing tools, and perfect for producing parts of very small diameters.



## Your advantages with the FANUC performance generator *i*-Pulse

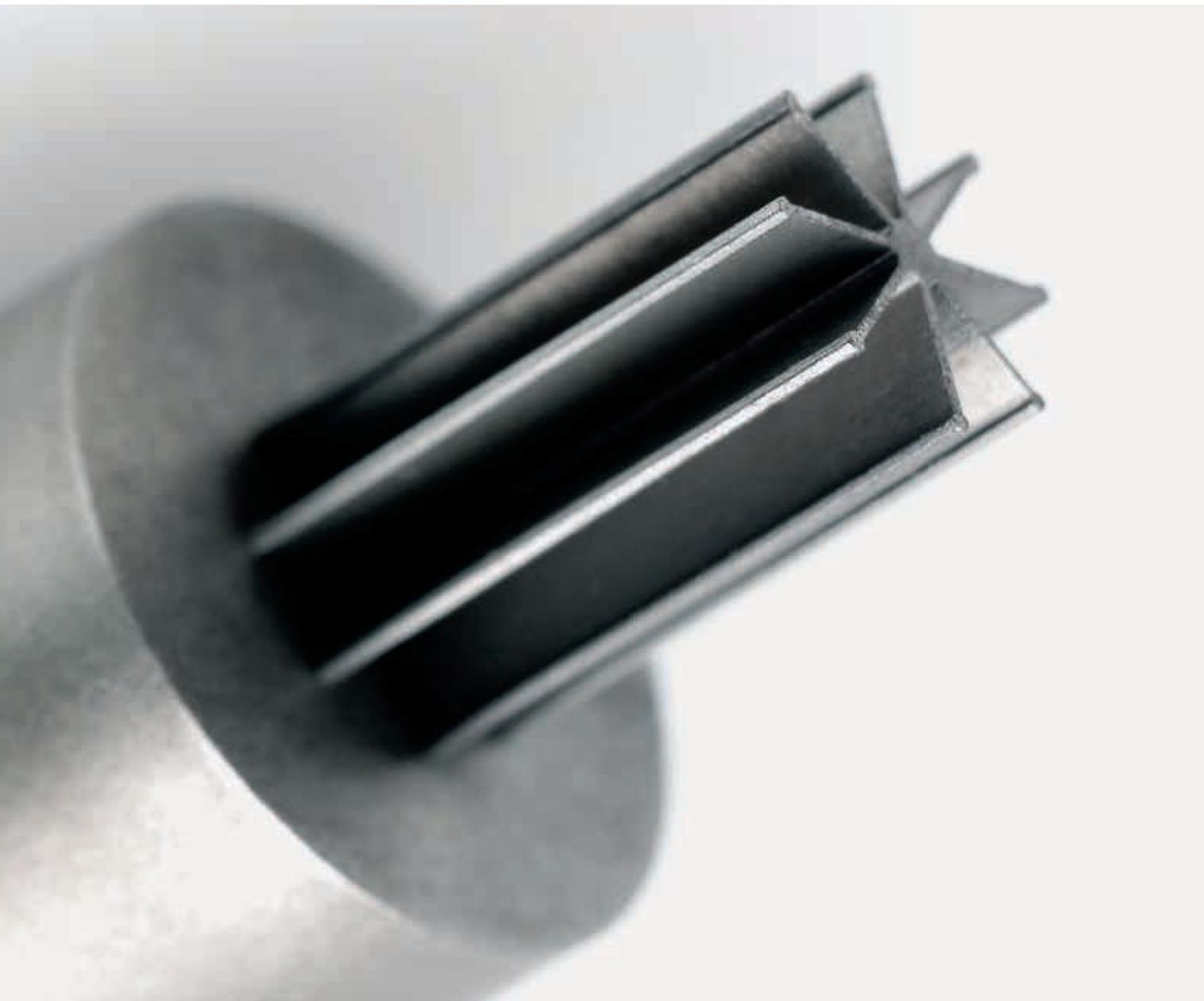
### AI Cutting Technology

After inputting the wire diameter, material type and material height, along with the desired specifications for machining time, precision and surface quality, the generator automatically selects the proper machining technology. In doing so, it simultaneously detects the declining material thickness and automatically reduces the spark intensity and voltage.



### AI Impulse Control

Enables high machining speeds with minimal wire break risk, even under difficult conditions such as close and wide nozzle distances or changing cutting levels.



### AI Corner Control

Through timely matching of the spark cycle, feed rate and flushing pressure on the corners, the the generator provides especially high precision on the critical places of the work piece.

### MF2 Generator

for surface roughnesses of up to  $RA = 0.1 \mu m$

### High-speed cutting

for cutting speeds of up to  $330 \text{ mm}^2/\text{min}$  with economical bronze wire 0.30 mm in diameter

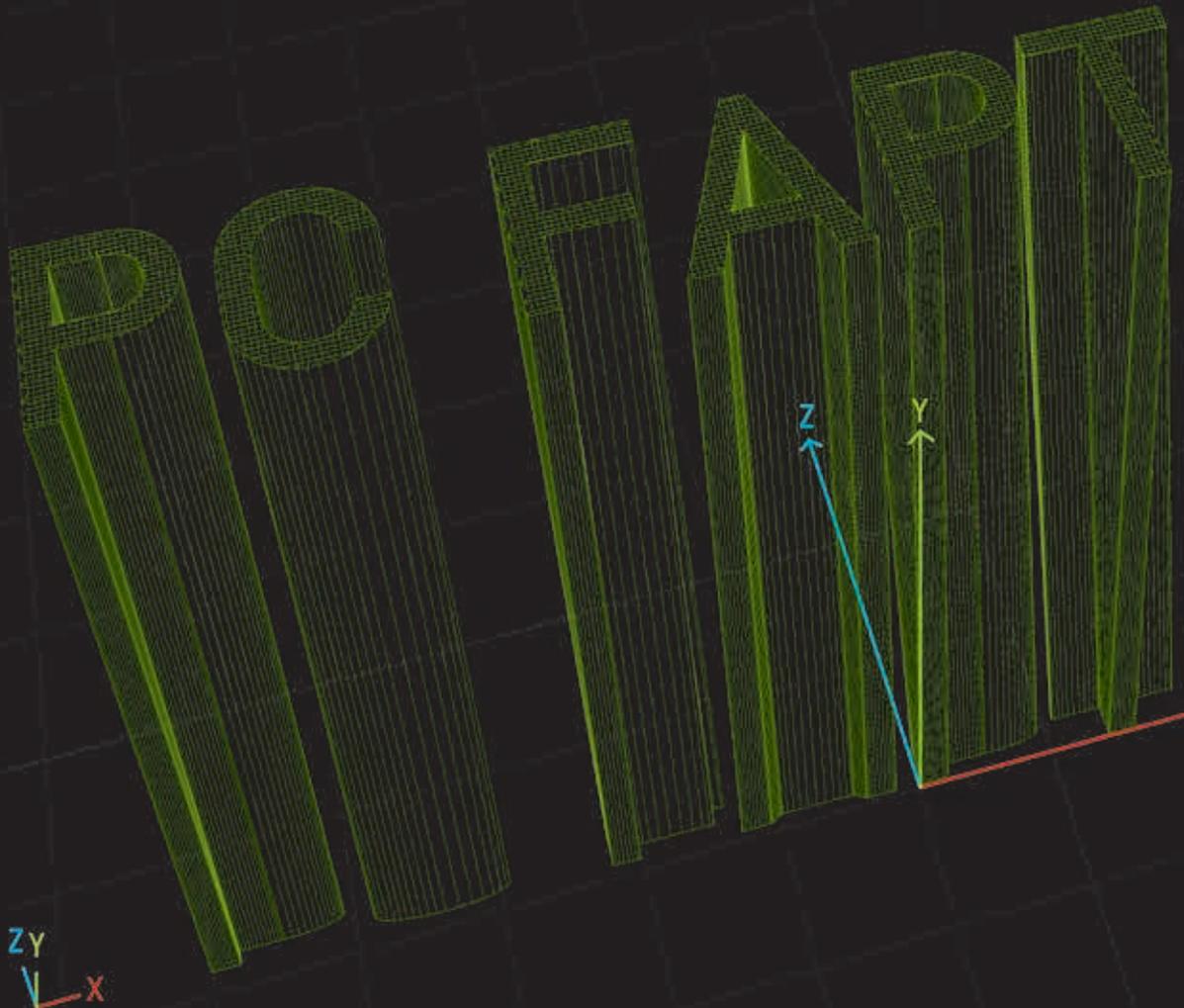
# Simple CAM Programming

Especially for the FANUC Robocut, we have developed the PC FAPT CUT *i* high-performance CAM system. If programming a shape for conical and non-conical machining routines, along with 4-axis programs, after just a brief orientation.

Contours can be directly generated in PC FAPT CUT *i* or imported as IGES or DXF files. Thus, NC programs can be very quickly and individually generated for each type of FANUC machine. **Fast, easy, efficient.**

## Your advantages with FANUC PC FAPT CUT *i*:

- substantial adaptation options of the post processors
- graphical representation of the machine movement in 3D view
- simple program transfer via Ethernet or RS 232 interface
- minimum tooling time through automatic set-up of all default settings
- simple generation of programs with different contours on the top and bottom
- simulation of axis movements with representation of the work piece and nozzles in 3D view
- simple programming of involute toothing
- simple programming of destruction cuts without debris





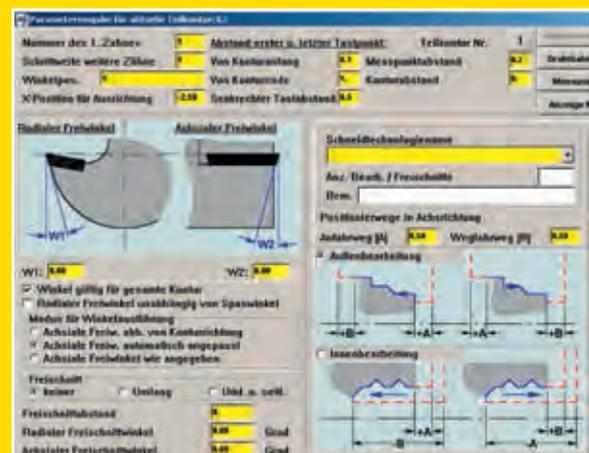
## Ideal 5-axis programming: FANUC ProfDia\*

For easy generation of 5-axis programs, we have optimally adapted the ProfDia programming system to the functionality of the FANUC Robocut. In just a few steps, it leads from the contour to finished programming of rotating and fixed tools.

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ProfDia subsequently calculates the EDM routine fully automatically and sends it to the machine, which can begin the machining immediately.

An additional function for the cutting of PCD blanks reduces waste through optimal allocation of the blank to a minimum. The import of the contour is made the the form of a dxf file.



# We'll show how it's done!

In order for you to work as quickly and effectively as possible, for all FANUC production machines we offer compact, intensive training sessions. Always up to date and hands-on, led directly by our application technicians, and especially learning-efficient in small groups of up to 5 participants. All phases from commissioning of the machine, through setup, right down to troubleshooting – and especially for the Robocut for CAM programming. The instruction is well organised and individually tailored. **Please consult us! We are happy to share our knowledge.**





## The easy solution to automation

With an extensive range of experienced system partners throughout Europe, FANUC boasts an especially tight-knit network of specialists who offer you optimal automation solutions and develop fully automated production cells with FANUC robots for your specific task. Your advantage: All FANUC products have a common control platform and all speak the same language – which makes for especially easy integration and operation.

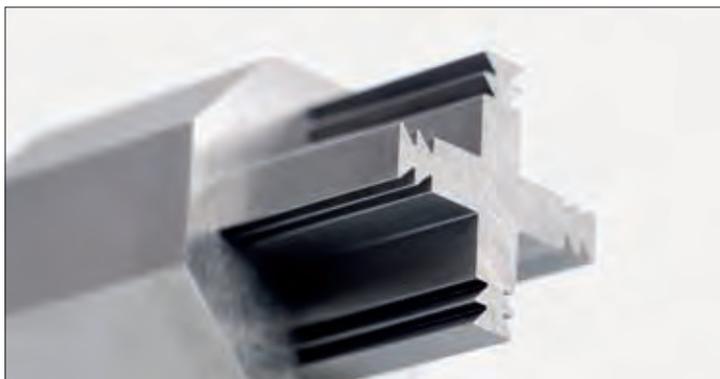


## Wherever you need us, we are there for you

Through the global network of locations in Europe, America, Asia, Africa and Australia, we are always on the scene to address your needs quickly and effectively.

Throughout Europe, we offer a substantial FANUC network with assistance in the fields of sales, technical support, logistics and service. This ensures you'll always have a direct local contact who speaks your language.

# Alpha C400iA Technical Data



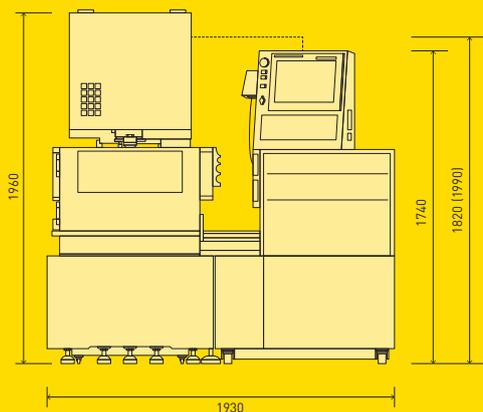
## Standard

XY axis travelling distance	370 x 270 mm
UV axis travelling distance	± 60 mm
Z axis travelling distance	255 mm
Control	FANUC 31i-WB
Max. work piece size	700 x 555 x 255 mm
Max. work piece weight	500 kg
Max. taper angle	± 30°/80 mm
Max. rapid traverse	900 mm/min.
Small step sizes of the drives	0,0001 mm
Closed guides	Diamond
wire diameter	Ø 0.10 ~ Ø 0.30 mm
Adjustable wire speed	1-15 m/min.
Wire tension	200-2500 g
Wire spools	16 kg
Footprint (W/D)	1930 x 2210 mm
Machine weight	1800 kg

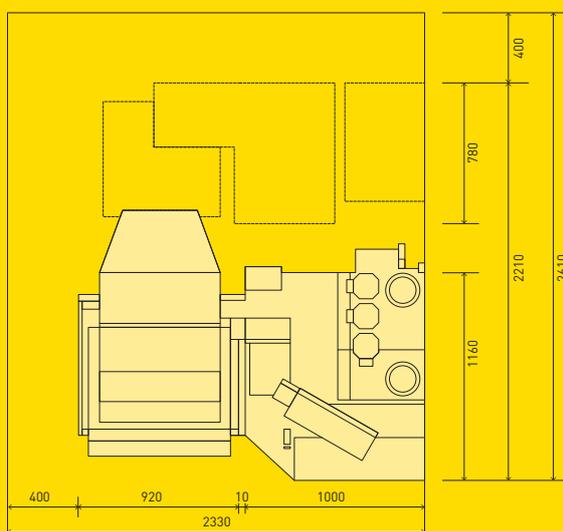
## Optional

Max. work piece size	-
Max. taper angle	± 45°/40 mm
wire diameter	Ø 0.05 ~ Ø 0.30 mm
Wire spools	30 kg

## Dimensions



## Layout



# Alpha C600iA Technical Data



## Standard

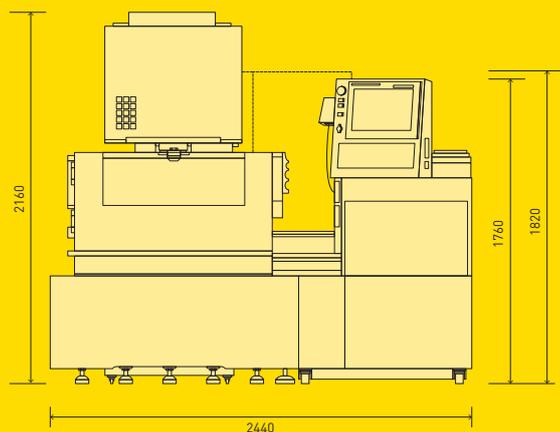
XY axis travelling distance	600 x 400 mm
UV axis travelling distance	± 100 mm
Z axis travelling distance	310 mm*
Control	FANUC 31i-WB
Max. work piece size	1050 x 775 x 310 mm
Max. work piece weight	1000 kg
Max. taper angle	± 30°/150 mm
Max. rapid traverse	1000 mm/min.
Small step sizes of the drives	0,0001 mm
Closed guides	Diamond
wire diameter	Ø 0.10 ~ Ø 0.30 mm
Adjustable wire speed	1-15 m/min.
Wire tension	200-2500 g
Wire spools	16 kg
Footprint (W/D)	2440 x 2740 mm
Machine weight	3000 kg

## Optional

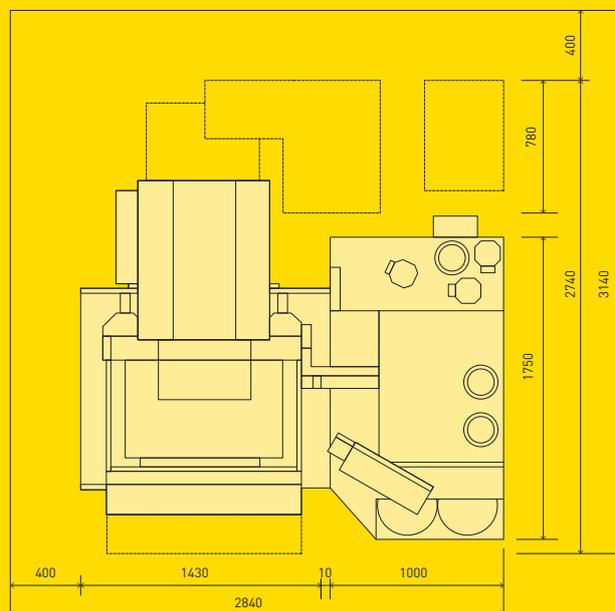
Max. work piece size	1050 x 820 x 410 mm**
Max. taper angle	± 45° / 70 mm
wire diameter	-
Wire spools	30 kg

\* optional Z axis travelling distance: 410 mm \*\* without automatic front door and MF2 generator

## Dimensions



## Layout



**Push  
the  
button**



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MBR-00217-ENG