High-Reliability and High-Performance
Electric Injection Molding Machine

FANUC

ROBOSHOT α-*Si*B series

FANUC standard CNC and servo system installed
Electric injection molding machine achieves high-quality, high-

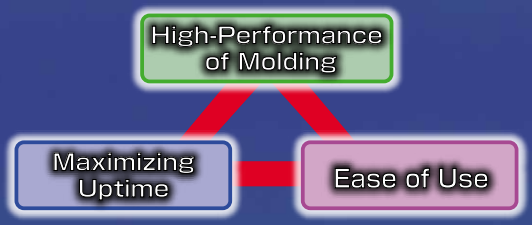
FANUC ROBOSHOT α-*i*B series

ROBOSHOT α-S50*i*B

ROBOSHOT α-S100*i*B

ROBOSHOT α-S150*i*B

reliability and high-productivity



High-Performance of Molding

FANUC standard CNC achieves superior molding repeatability
High-rigidity and low-friction mechanism achieve precision molding
Additional servo axis control and second injection unit achieves extra value in molding

Maximizing Uptime

FANUC standard servo system achieves high-reliability and lower energy consumption
High-precision AI protection minimizes downtime
Network capability to support molding plant IoT

Ease of Use

21.5 inch large display unit achieves superior operability
Conformity to safety standards supports molding plant globalization
Robot system to promote automation of molding plant

Vertical second injection unit
ROBOSHOT SI-20A

Horizontal second injection unit
ROBOSHOT SI-300HA

Production and quality information management tool
ROBOSHOT-LINKi2

ROBOSHOT Robot package

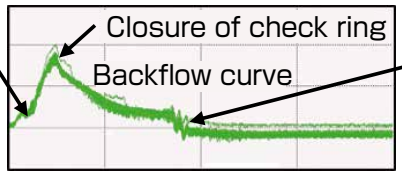
High-Performance of Molding

FANUC standard CNC achieves superior molding repeatability

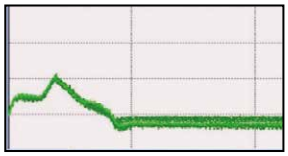
Backflow monitor

- Detects backflow precisely at injection start, Displays injection repeatability in graph
- Enables to decide replacing time of check ring and verifying stability of precise metering control

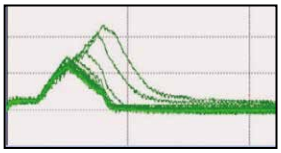
Check ring OPEN
(Start of injection)



Check ring CLOSE
(In injection)



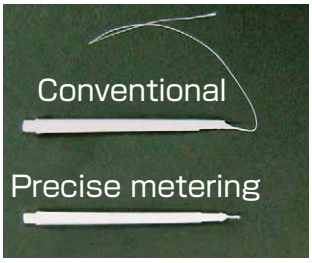
Stable closure of
backflow prevention ring



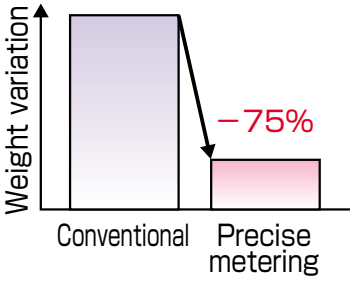
Unstable closure of
backflow prevention ring

Precise metering

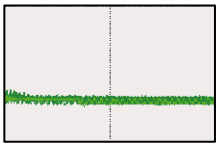
- Controls screw movement during metering optimally, Prevents string and silver streaking



- Eliminates backflow of resin, Stabilizes injection volume and reduces weight variation of molded products



Precise connector
Resin : PA66

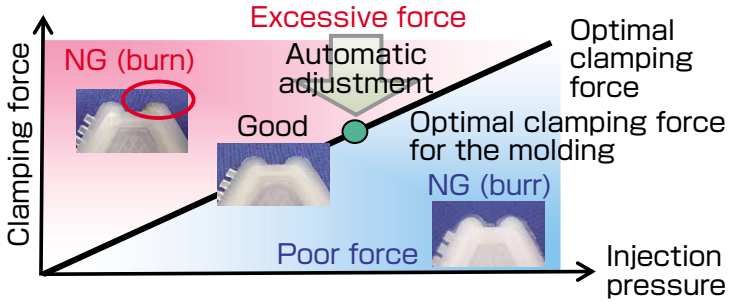


No backflow

Control technology achieves high-quality and stable molding

Precision clamping force control

- Adjusts clamping force automatically to be optimal for the molding by clamping force sensor
- Prevents molding defects such as burn and burr, Reduces frequency of mold maintenance

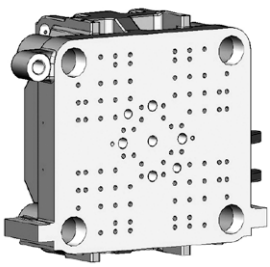


High-rigidity and low-friction mechanism achieves precision molding

Clamping unit

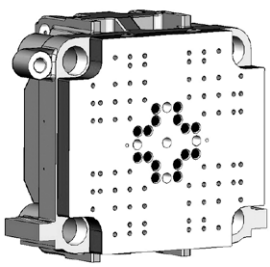
- Selectable two types of moving platen
- Low-friction linear guided support*

[Single platen]
Expands mold area



Magnetic clamping system
Three plates mold etc.

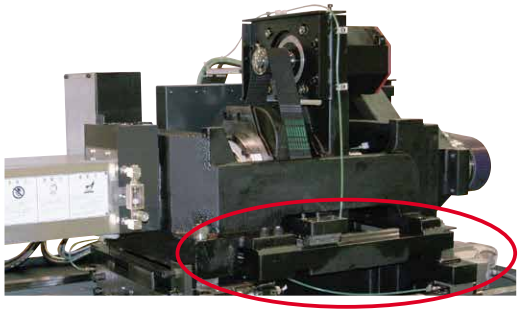
[Double platen]
Pursuits high rigidity



Multi cavities
Thin wall molding etc.

Injection unit

- Adopts low-friction linear guides, Achieves smooth injection and metering motion



Low-friction linear guides
Standard for α-S50*i*B/α-S100*i*B/α-S130*i*B

*Optional. Available options differ in region and model.

Additional servo axis control and second injection unit achieves extra value in molding (Option)

Second injection unit

- FANUC standard CNC achieves accuracy and repeatability as same level as ROBOSHOT
- Integrated control into ROBOSHOT operation screen
  (Second injection unit, Rotary table, Integrated hot runner controller)*

[Vertical second injection unit]
ROBOSHOT SI-20A*1

Mechanical unit　Control unit

*1 Available for models with ROBOSHOT S-2000*i*B series or later and clamping force of 50 tons or more

[Horizontal second injection unit]
ROBOSHOT SI-300HA*2

Built-in control unit

*2 Available for models with ROBOSHOT *α*-S*i*A series or later and clamping force of 100 tons or more

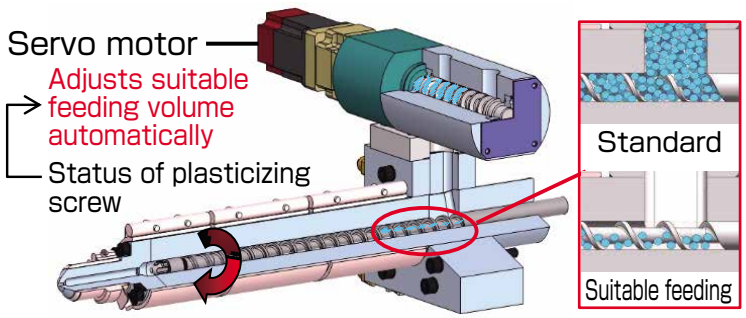
Item		Unit	SI-20A					SI-300HA			
Injection unit	Screw diameter	mm	14	16	18	20	22	26	28	32	36
	Maximum injection volume	cm^3	9	11	19	24	29	50	58	103	147
	Maximum injection pressure (High pressure filling mode)	MPa	--	--	--	--	--	340	320	270	220
	Maximum injection pressure	MPa	200	180	140	130	120	260	240	220	190
	Maximum pack pressure	MPa	180	160	120	110	100	260	220	200	170
	Maximum injection speed	mm/s	300					330			
	Maximum screw rotation speed	min^{-1}	250					450			

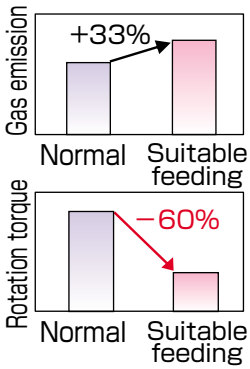
Note : Molding conditions may be restricted depending on the screw diameters. For details, see the attached specification list.

Additional servo axis control advances ROBOSHOT further*

[Suitable feeding device]

- Achieves optimal amount of resin supply by feedback control, Achieves long term molding repeatability





Promotes gas ventilation
- Reduces residue on mold surface
- Prevents wearing of screw and cylinder

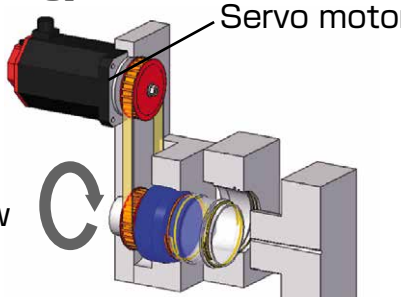
Reduces shear heating
- Prevents molding defects such as burn

Additional axis control achieves versatile applications*

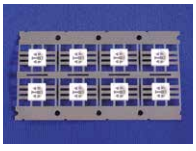
- High-speed and accurate positioning by FANUC servo technology
- No additional control equipment required, Integrated into ROBOSHOT operation

[Unscrewing molding]

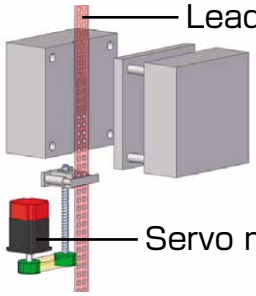
Container with screw
Resin : PS



[Hoop molding]



LED parts
Resin : LCP



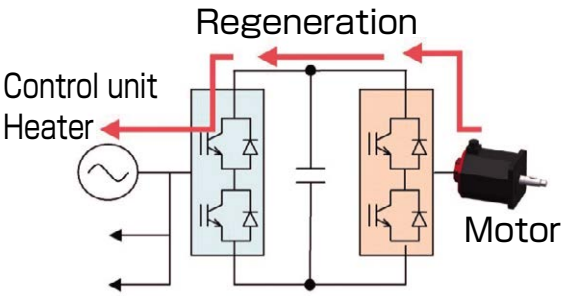
*Only additional servo system will be offered

Maximizing Uptime

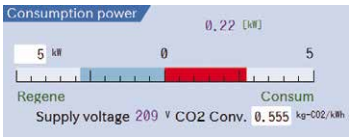
FANUC standard servo system achieves high-reliability and lower energy consumption

- High-efficiency servo system reuses regenerated power during deceleration of motors, Excellent energy saving performance
- Displays consumption power and regenerated power on operation screen
- Monitors power consumption including auxiliary equipment*

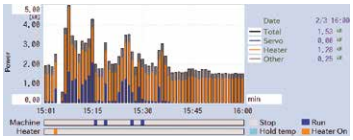
High-performance servo motors and servo amplifiers αi series



Energy saving by power source regeneration



Real-time display of consumption power and regenerated power



Consumption power history and machine status can be displayed.

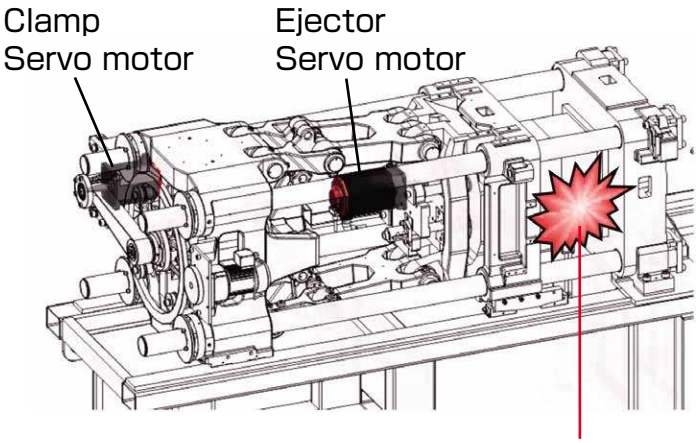
Consumption power monitor screen

*Optional. Available options differ with region and model.

High-precision AI protection minimizes downtime

AI mold protection

- Detects remaining molded products during mold closing or abnormal sliding core motion during mold opening with high-accuracy
- Interrupts motion immediately after abnormal status detected, Protects mold and ejector pin from damage
- The load deviation during mold closing and opening can be detected, automatic setting of monitoring width is available



Experimental example of AI mold protection by paper cup

AI mold protection ON

AI mold protection OFF

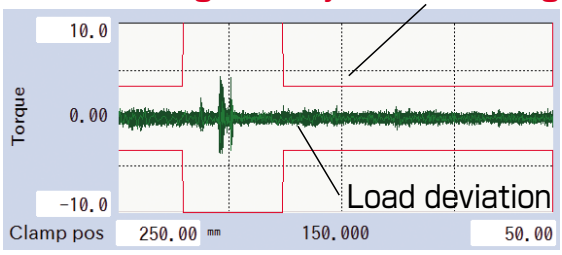
1.Realtime monitoring
Monitors load of servo motors in every cycle

2.Problem detection
Detects load deviation precisely caused by remaining molded products etc.

3.Protection
Interrupts clamp and ejector motion immediately

[Manual setting of monitoring width]

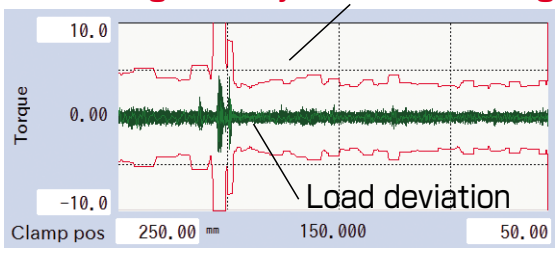
Monitoring width by manual setting



Depends on the experience of the operator

[Automatic setting of monitoring width]

Monitoring width by automatic setting



Optimal setting with easy operation

Network capability to support molding plant IoT

ROBOSHOT-LINK*i*2*

- Production and quality information management tool supports larger-scale and globalization of molding plant
- Supports Web browsers and can be displayed on various devices such as PC and tablet
- Supports communication standards (EUROMAP63, EUROMAP77) for production management system (ERP, MES)
- Display on ROBOSHOT screen (*α*-S*i*B series)

*Option

IoT of molding cell (Network between injection molding machine and peripheral devices, VNC)

VNC (Virtual Network Computing)
- Remote display and operation of the screen

Parts picker

ROBOSHOT-LINK*i*2
- Production and quality information management

Product image

FANUC Robot
- Remote operation from ROBOSHOT
- ***i*RVision** image collection

Sensors
Measuring device

Analog input
- Input voltage or current

Mold temperature controller
Material dryer
Hot-runner controller

SPI OPC UA

Auxiliary communication
- Total management of the setting value

Ease of Use

21.5 inch large display unit achieves superior operability

FANUC PANEL *i*H Pro with the latest 21.5 inch display unit

- Achieves doubled display area by full HD high-definition display screen
- Intuitive operation by swiping and multi-touch

Setting Area

Second screen Area

Status Monitoring Area (1)

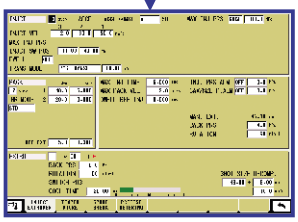
Status Monitoring Area (2)

Divided screen

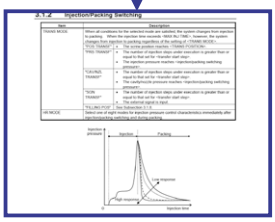
- Selectable from various screens
- The horizontally arranged two screens provide easy sight line motion, superior visibility and operability.

Wave form screen

Easy switching



Second injection unit screen



Operation manual

Peripheral device screen

Full screen

- **ROBOSHOT-LINK*i*2** displayed in full screen

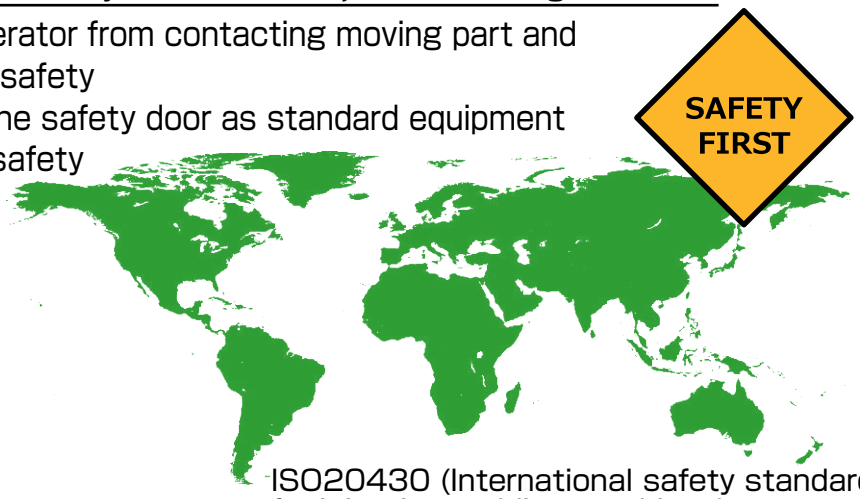
Easy switching

ROBOSHOT-LINK*i*2 screen

Conformity to safety standards supports molding plant globalization

Conform to ISO 20430, the international safety standard for injection molding machines

- Fully enclosed cover style inhibits operator from contacting moving part and high temperature part with high-level safety
- Electromagnetic lock is installed on the safety door as standard equipment
- Cylinder heat encover with improved safety



ISO20430 (International safety standard for injection molding machines)

Multiple languages support

Japanese / English / Chinese simplified / Chinese traditional / Korean / Thai / Vietnamese
Indonesian / German / French / Italian / Spanish / Spanish (Mexican) / Portuguese / Czech
Finnish / Dutch / Hungarian / Danish / Polish / Turkish / Swedish

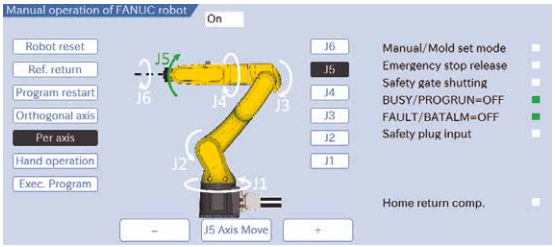
Safety requirements differ in region
Please confirm the latest safety requirements of the region where ROBOSHOT is installed.

Robot system to promote automation of molding plant

Easy connection between ROBOSHOT and FANUC Robot by FL-net

- ROBOSHOT (α-*Si*B series) and FANUC Robot can be connected by single Ethernet cable
- Remote operation of FANUC robot on ROBOSHOT screen is available

α-*Si*B series

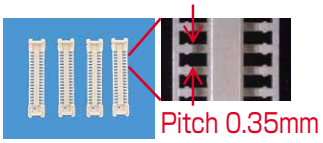


Robot operation screen of ROBOSHOT

ROBOSHOT Robot package

- Package product of fundamental elements of Robot system to start automatization
- Compact design, Easy installation, Easy setting and Easy operation

Automatic inspection and alignment process by delta robot



Precise connector
Resin : LCP

Automatic insert and taking out process by LR Mate

Water pump rotor
Resin : Phenol

Application to a range of molding fields

Precision lens

Moving platen support by linear guides*
- Prevents sink marks and warpage, Achieves uniformed thickness distribution

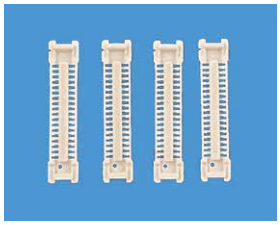
Screw and cylinder for lens molding
- Optimized screw design and surface treatment achieves high-quality molding

Camera lens for smart phone
Resin : COC

Precision connector

Precise metering
- Reduces weight variation and eliminates stringy, Achieves long term molding repeatability

Nozzle for Liquid Crystal Polymer*
- Optimized nozzle and temperature control for LCP achieves high-quality molding, Prevents resin carbonization



Precise fine-pitch connector
Resin : LCP

Automotive parts

Single platen
- Expanded mold installation area, Supports magnetic clamping system

Hot runner controller (Built-in)*
- Integrated into ROBOSHOT operation, Achieves precise temperature control

Automotive connector
Resin : PBT

Medical parts

Medical package*
- Package options suitable for medical parts molding

Suitable feeding device*
- Prevents burn and carbonization, Suitable for molding with transparent resin

Syringe
Resin : COP

Multi-components molding

Second injection unit(Vertical, Horizontal)*
- FANUC CNC installed, operation from ROBOSHOT screen

Additional servo axis control*
- Integrated into ROBOSHOT operation, Achieves high-speed and accurate positioning of rotary table

Waterproof connector
Resin : PBT+Silicone

Various molding materials

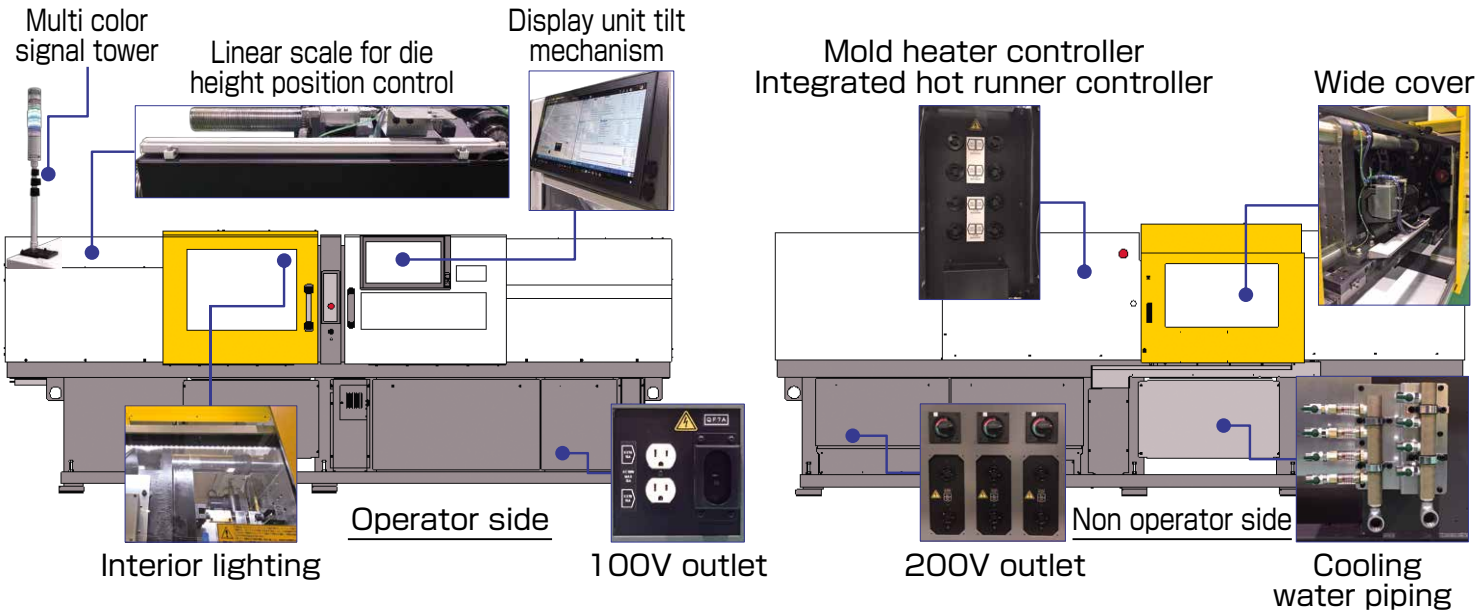
Screw and cylinder suitable for various molding materials
- Standard machine equipped with dedicated screw and cylinder enables various moldings

Various molding materials are available
- Silicone, MIM, CIM, Thermoset resin, carbon fiber reinforced resin, etc.

Endoscopic forceps
Resin : PP+Metal powder

*Optional, Available options differ with region and model.

Options



ROBOSHOT α-S150iB Medical package

[Tiebarbushless clamping specification]

Tiebarbushless design
Reinforced bearing
Linear guide
Reinforced base frame

[Options for medical parts molding] (Individual order is available)

(1) White painted cover or Stainless cover
(2) Plated platen
(3) Anti-rust linear guide
(4) Food grade grease
(5) High rigidity mount

Optional, Available options differ with region and model.
Refer to the attached "specification list" for the details on the options.

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.

FANUC ACADEMY

FANUC ACADEMY operates training programs on FANUC ROBOSHOT which focus on practical operations and molding know how and maintenance.

Specifications

	Item	Unit	α-S15iB	α-S30iB		α-S50iB	
Clamping unit	Tonnage	kN	150 (15tonf)	300 (30tonf)	300 (30tonf) High precision clamp	500 (50tonf)	500 (50tonf) High precision clamp
	Maximum and minimum die height: Double platen	mm	260/130	330/150	330/150	350/150	350/150
	Maximum and minimum die height: Single platen	mm	---	---	---	410/210	---
	Clamping stroke	mm	160	230	230	250	250
	Tie bar spacing (H x V)	mm	260×235	310×290	310×290	360×320	360×320
	Platen size (H xV)	mm	355×340	440×420	440×420	500×470	500×470
	Ejector point / Ejector force / Ejector stroke	point/kN/mm	1 / 7(0.7tonf) / 50	1 / 8(0.8tonf) / 60	1 / 8(0.8tonf) / 60	5 / 20(2.0tonf) / 70	5 / 20(2.0tonf) / 70
Injection unit	Screw diameter	mm	14 16 18	14 16 18 20 22	14 16 18 20 22	18 20 22 26 28 32	14 16 18 20 22 26 28 32
	Maximum injection volume	cm^3	9 11 19	9 11 19 24 29	9 11 19 24 29	19 24 29 50 58 76	9 11 19 24 29 50 58 76
	Injection specification	---		600mm/s	600mm/s	350mm/s	350mm/s
	Max. inj. prs.(High prs.mode)	MPa	--- --- ---	--- 330 300 --- ---	--- 330 300 --- ---	300 360 340 290 250 190	--- 330 300 360 340 290 250 190
	Max. inj. prs.(W/C)	MPa	--- --- ---	250 280 280 270 220	250 280 280 270 220	280 310 290 240 220 180	250 280 280 310 290 240 220 180
	Max. inj. prs.(General purpose)	MPa	--- --- ---	250 250 260 270 220	250 250 260 270 220	260 280 260 210 190 150	250 250 260 280 260 210 190 150
	Maximum injection speed	mm/s	---	600	600	350	350
	Maximum screw rotation speed	min^{-1}	---	450	450	450	450
	Injection specification	---	800mm/s	---	---	550mm/s	550mm/s
	Max. inj. prs.(High prs.mode)	Mpa	--- --- ---	--- --- --- --- ---	--- --- --- --- ---	300 330 --- --- --- ---	--- 330 300 330 --- --- --- ---
	Max. inj. prs.(W/C)	MPa	250 250 230	--- --- --- --- ---	--- --- --- --- ---	280 310 280 200 170 ---	--- 280 280 310 280 200 170 ---
	Max. inj. prs.(General purpose)	MPa	250 250 230	--- --- --- --- ---	--- --- --- --- ---	260 280 260 190 170 ---	--- 250 260 280 260 190 170 ---
	Maximum injection speed	mm/s	800	---	---	550 ---	--- 550 ---
	Maximum screw rotation speed	min^{-1}	450	---	---	450 ---	--- 450 ---

	Item	Unit	α-S100iB	α-S130iB	α-S150iB	α-S220iB
Clamping unit	Tonnage	kN	1000 (100tonf)	1300 (130tonf)	1500 (150tonf)	2200 (220tonf)
	Maximum and minimum die height: Double platen	mm	450/150	---	500/200	---
	Maximum and minimum die height: Single platen	mm	520/220	570/200	575/275	650/250
	Clamping stroke	mm	350	400	440	550
	Tie bar spacing (H x V)	mm	460×410	530×530	560×510	650×650
	Platen size (H xV)	mm	660×610	730×730	800×750	900×900
	Ejector point / Ejector force / Ejector stroke	point/kN/mm	5 / 25(2.5tonf) / 100	5 / 25(2.5tonf) / 100	5 / 35(3.5tonf) / 150	13 / 35(3.5tonf) / 150
Injection unit	Screw diameter	mm	22 26 28 32 36 40	26 28 32 36 40	22 26 28 32 36 40 44	32 36 40 44 48 52 56
	Maximum injection volume	cm^3	29 50 58 103 147 181	50 58 103 147 181	29 50 58 103 147 181* 243	121 153 188 268 318 442 512
	Injection specification	---	200mm/s	200mm/s	350mm/s (Small capacity, High pressure)	200mm/s
	Max. inj. prs.(High prs.mode)	MPa	340 340 320 270 220 ---	340 320 270 220 ---	--- --- --- --- --- --- ---	--- --- --- --- --- --- ---
	Max. inj. prs.(W/C)	MPa	290 290 270 250 190 160	290 270 250 190 160	--- --- --- 290 260 210 170	310 310 260 220 190 160 ---
	Max. inj. prs.(General purpose)	MPa	260 260 240 220 190 160	260 240 220 190 160	--- --- --- 230 220 210 170	280 280 260 220 190 160 280 280 260 220 190 160 ---
	Maximum injection speed	mm/s	200	200	350	200
	Maximum screw rotation speed	min^{-1}	300	300	450 400	300
	Injection specification	---	350mm/s	350mm/s	350mm/s (Small capacity)	350mm/s
	Max. inj. prs.(High prs.mode)	MPa	340 340 320 270 220 ---	340 320 270 220 ---	340 340 320 270 220 --- ---	380 345 --- --- --- --- 380 345 --- --- --- ---
	Max. inj. prs.(W/C)	MPa	290 290 270 250 190 160	290 270 250 190 160	290 290 270 250 190 160 ---	310 310 280 240 190 160 310 310 280 240 190 160 140
	Max. inj. prs.(General purpose)	MPa	260 260 240 220 190 160	260 240 220 190 160	260 260 240 220 190 160 ---	280 280 260 220 190 160 280 280 260 220 190 160 140
	Maximum injection speed	mm/s	350	350	350 ---	350
	Maximum screw rotation speed	min^{-1}	450	450	450 ---	400
	Injection specification	---	550mm/s	550mm/s	550mm/s (Small capacity)	
	Max. inj. prs.(High prs.mode)	MPa	340 --- --- --- --- ---	--- --- --- --- ---	340 --- --- --- --- --- ---	--- --- --- --- --- --- ---
	Max. inj. prs.(W/C)	MPa	290 260 220 170 --- ---	260 220 170 --- ---	290 260 220 170 --- --- ---	--- --- --- --- --- --- ---
	Max. inj. prs.(General purpose)	MPa	260 260 220 170 --- ---	260 220 170 --- ---	290 260 220 170 --- --- ---	--- --- --- --- --- --- ---
	Maximum injection speed	mm/s	550 --- ---	550 --- ---	550 --- --- ---	---
	Maximum screw rotation speed	min^{-1}	450 --- ---	450 --- ---	450 --- --- ---	---
	Injection specification	---	650mm/s	650mm/s	650mm/s (Small capacity)	
	Max. inj. prs.(W/C)	MPa	290 290 270 210 --- ---	290 270 210 --- ---	290 290 270 210 --- --- ---	--- --- --- --- --- --- ---
	Max. inj. prs.(General purpose)	MPa	260 260 240 210 --- ---	260 240 210 --- ---	260 260 240 210 --- --- ---	--- --- --- --- --- --- ---
	Maximum injection speed	mm/s	650 --- ---	650 --- ---	650 --- --- ---	---
	Maximum screw rotation speed	min^{-1}	450 --- ---	450 --- ---	450 --- --- ---	---

	Item	Unit	α-S250iB	α-S300iB
Clamping unit	Tonnage	kN	2500 (250tonf)	3000 (300tonf)
	Maximum and minimum die height: Double platen	mm	650/300	650/300
	Maximum and minimum die height: Single platen	mm	---	---
	Clamping stroke	mm	600	600
	Tie bar spacing (H x V)	mm	710×635	810×710
	Platen size (H xV)	mm	1030×960	1130×1030
	Ejector point / Ejector force / Ejector stroke	point/kN/mm	13 / 80(8.0tonf) / 200	13 / 80(8.0tonf) / 200
Injection unit	Screw diameter	mm	32 36 40 44 48 52 56	40 44 48 52 56 40 44 48 52 56 64 68 72 64 68 72 80
	Maximum injection volume	cm^3	121 153 188 268 318 442 640	188 268 318 442 640 188 268 318 442 640 836 944 1059 901 1090 1303 1608
	Injection specification	---	350mm/s	350mm/s (Small capacity) 270mm/s 160mm/s (Large capacity)
	Max. inj. prs.(High prs.mode)	MPa	380 345 --- --- --- --- ---	--- --- --- --- --- --- --- --- --- --- --- --- --- --- ---
	Max. inj. prs.(W/C)	MPa	310 310 280 240 190 160 140	280 240 190 160 140 280 280 270 240 225 175 155 135 220 200 185 150
	Max. inj. prs.(General purpose)	MPa	280 280 260 220 190 160 140	260 220 190 160 140 280 280 270 240 225 175 155 135 220 200 185 150
	Maximum injection speed	mm/s	350	350 270 160
	Maximum screw rotation speed	min^{-1}	400	400 400 300 400 300 200

	Item	Unit	α-S450iB
Clamping unit	Tonnage	kN	4500 (450tonf)
	Maximum and minimum die height: Double platen	mm	1000/350
	Maximum and minimum die height: Single platen	mm	---
	Clamping stroke	mm	900
	Tie bar spacing (H x V)	mm	920×920
	Platen size (H xV)	mm	1300×1300
	Ejector point / Ejector force / Ejector stroke	point/kN/mm	21 / 150(15.0tonf) / 250
Injection unit	Screw diameter	mm	40 44 48 52 56 48 52 56 64 68 72 64 68 72 80 68 72 80 90 100
	Maximum injection volume	cm^3	188 268 318 442 640 318 442 640 836 944 1059 901 1090 1303 1608 1090 1303 1810 2290 2827
	Injection specification	---	350mm/s (Ultra small capacity) 270mm/s (Small capacity) 160mm/s 180mm/s (Large capacity)
	Max. inj. prs.(W/C)	MPa	280 240 190 160 140 270 240 225 175 155 135 220 200 185 150 280 280 250 200 160
	Max. inj. prs.(General purpose)	MPa	260 220 190 160 140 270 240 225 175 155 135 220 200 185 150 280 280 250 200 160
	Maximum injection speed	mm/s	350 270 160 180
	Maximum screw rotation speed	min^{-1}	400 400 300 400 300 200 200

Note: When high pressure filling mode is used, a special cylinder is needed.
Maximum injection pressure and maximum pack pressure are the maximum values that can be set. Maximum pack pressure is equal to maximum injection pressure. Maximum injection pressure and maximum pack pressure may vary depends on the installed screw and cylinder specifications. Molding conditions may be restricted depending on the screw diameter.
For details, see a separate list of specifications.

＊ : When the injection speed 350mm/s (High pressure) specification with screw diameter of ϕ40 is selected, the maximum injection volume is 201cm^3.

FANUC CORPORATION

High-Reliability and High-Performance
Compact Machining Center

FANUC

ROBODRILL

α-DiB Plus series

Standard version / Advanced version

High-Reliability and High-Performance
Compact Machining Center

FANUC ROBODRILL α-D*i*B Plus

＊1
＊2

α-D14/21L*i*B Plus
α-D14/21/28L*i*B$_{ADV}$ Plus Y500

X-axis stroke : 700 mm

＊1

α-D14/21M*i*B Plus
α-D14/21/28M*i*B$_{ADV}$ Plus

X-axis stroke : 500 mm

＊1

α-D14/21S*i*B Plus
α-D14/21S*i*B$_{ADV}$ Plus

X-axis stroke : 300 mm

＊1 Photo when **DDR***i*B mounted
＊2 Photo when front double doors option mounted

series

High-Performance of Machining

High-speed, high-precision and fine surface machining by high-rigidity machine structure and latest CNC functions
Utilization in various fields by wide variety of spindle
High-productivity by stable machining with thermal displacement compensation function

Maximizing Uptime

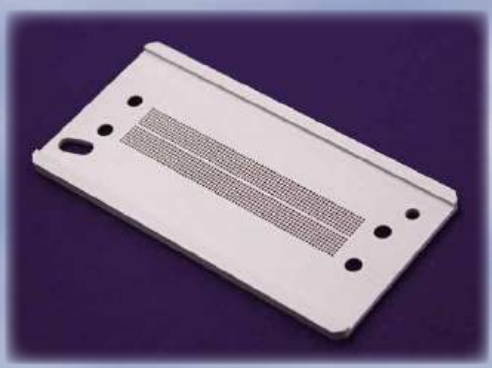
Long-term stable operation by high-reliability, high-maintainability and preventive maintenance functions
Reducing power consumption including peripherals by energy saving technologies
Operation condition monitoring and analysis by **ROBODRILL-LINK*i***

Ease of Use

Excellent operability of exclusive screens with human-centered design
Easy to connect peripherals or network by high-expandability and user-interface
Easy integration with FANUC Robot by automation supporting functions





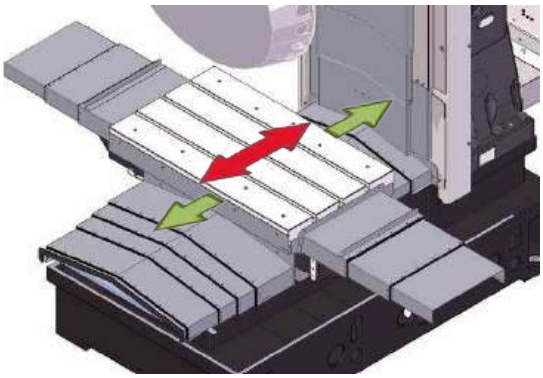



Features of α-D*i*B Plus series Advanced version

New product α-D28L*i*B$_{ADV}$ Plus Y500

- Y-axis stroke 500mm
  - Stroke extension by 100mm to meet the needs of combined and large-sized parts machining
  - Table depth also extended to 500mm to accept larger fixture
  - Machine length extension only by 65mm by applying multi-steps telescopic cover, etc.
  - Approach from front door to table only 180mm
- Tool storage capacity 28 tools *
  - Large-sized turret to enhance process integration
  - Max. tool mass 4kg, Max. total tool mass 46kg
  - Tool change time 0.7s (1.5kg setting, Tool to Tool)

  * Option for X-axis stroke 500mm and 700mm of Advanced version
- Level-up of Z-axis feed
  - Rapid traverse rate 60m/min, Max. acceleration 2.2G
  - Cycle time reduction in drilling and tapping
- **DDR-TL***i*B raised version (option)
  - Max. turn diameter 540mm to make the most of Y-axis stroke 500mm



Extension of Y-direction stroke and table size

Large-sized turret for 28 tools

* Photo when optional front double doors and basic top cover are mounted

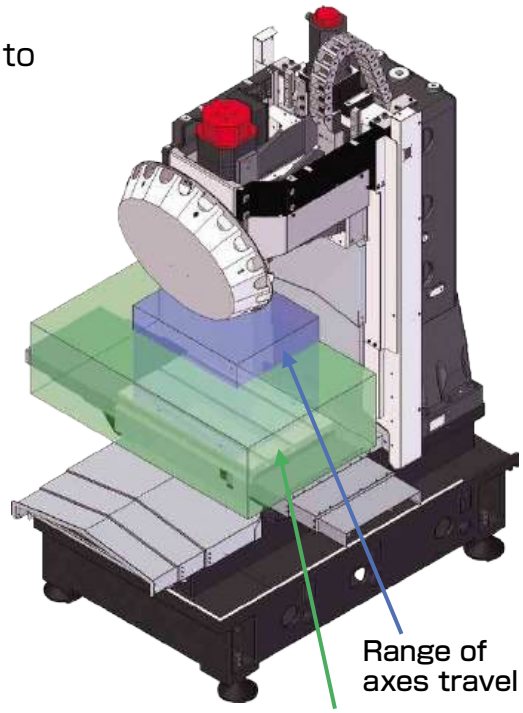
α-D28L*i*B$_{ADV}$ Plus Y500

Expanding application range

- Expanding machining area
  - Z-axis stroke extension to 400mm improves approach to the machining point
  - Less interference structure with the large fixture
- Table load capacity 400kg *
  - Applicable to large fixture and workpiece

  * Max 200kg for X-axis stroke 300mm
- High column (option) *
  - Column raising up to 400mm depending on fixture is available for wide range of application

  * Max 200mm for X-axis stroke 300mm
- Servo turret
  - Max. tool weight 4kg enables larger cutting tool
  - Tool change time reduction by 0.2s compared with standard version ROBODRILL

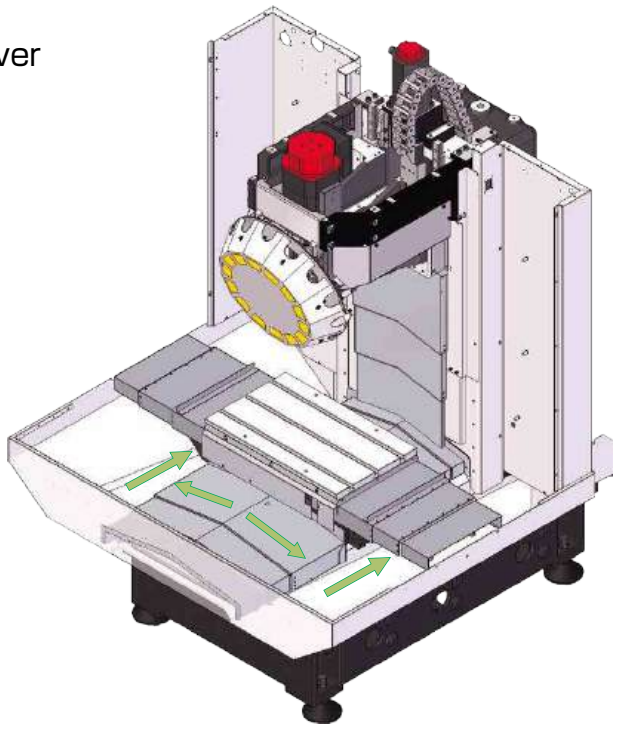


Excellent chip countermeasure

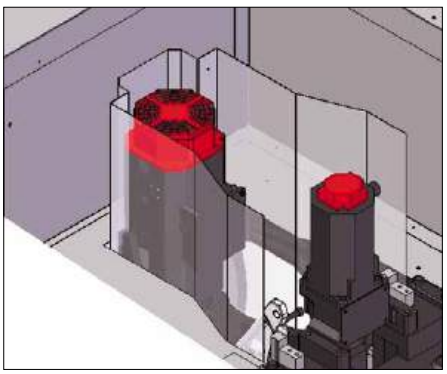
- Z-axis telescopic cover
  - Higher durability by newly applying telescopic cover
  - Compact design for less interference
- Y-axis front mountain-shaped telescopic cover *
  - Smooth coolant flow improves chip evacuation
  - Enhanced covering against chips and coolant

  * Applied except for X-axis stroke 300mm
- X-axis telescopic cover with 3 pieces *
  - 3 pieces cover is applied as standard
  - Higher reliability by the improvement of structure

  * Applied except for X-axis stroke 300mm



Telescopic covers are applied on all axes



Enhanced cover around spindle motor

- Enhanced cover around spindle motor (option) *
  - Certain separation of spindle mechanism from machining area protects intrusion of chips and coolant and achieves high-sustainability

  * Basic top cover (option) is necessary

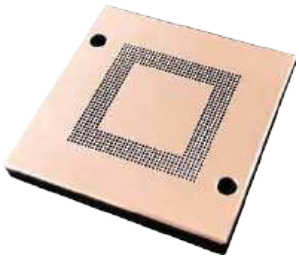
Features of α-DiB Plus series

Cycle time reduction technologies to achieve high-productivity

● Machining mode setting function 2
- New machining modes with latest CNC functions realize further cycle time reduction, high-precision machining and fine surface machining
- Intuitive and operable screen helps to select and adjust the optimum machining mode

● Level-up of table loading capacity setting
- Easy and exact tuning by automatic setting function
- Finer loading capacity setting in 1kg to achieve optimized acceleration/deceleration

● Canned cycle for ROBODRILL
- Programming techniques for cycle time reduction and machining quality improvement on ROBODRILL are functionalized
- Useful G-codes such as fast deep drilling cycle, circle milling cycle, deburring cycle, tool change cycle, etc. are ready to use



Fast deep drilling example (Φ0.4mm x 720 holes)

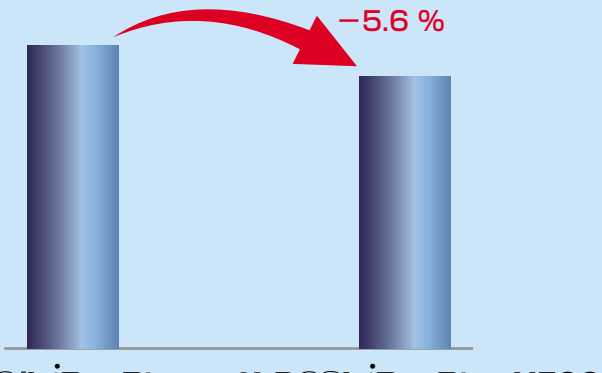
Deburring cycle example

● Fast Cycle-time Technology
- The latest CNC functions effective for cycle time reduction such as smart overlap function, smart rigid tapping function, etc. are applied

● Other technologies
- Overlap of the ATC and table motion
- High-speed SKIP interface to reduce measurement time with touch probe
- Tapping spindle with low inertia and high acceleration/deceleration for effective Aluminum machining (option)

Application example of cycle time reduction

Example of indexing application by **DDR-TiB**



α-D21LiB$_{ADV}$ **Plus** 225 s

α-D28LiB$_{ADV}$ **Plus Y500** 212 s

Technology for power saving

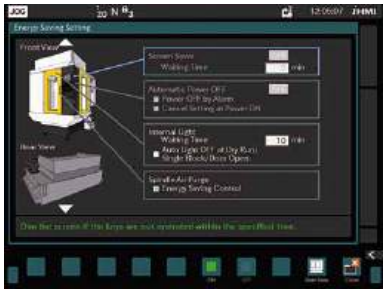
● Energy saving setting screen
・Energy saving setting for Robodrill and option devices is available
Automatic power off function
Energy saving control of screen saver, illumination, coolant pumps, lubrication, and spindle air purge
Energy saving mode of servo system and rigid tapping*
*Motor output at acceleration/deceleration is limited to reduce consumption. Cycle time becomes longer relatively

● Sleep function
・Reducing power waste during stand by, by cutting off power supply to servo motors and optional devices

● Mist collector control function (option)
・Energy saving control of mist collector, one of the most power consuming peripherals, can be easily achieved with dedicated interface unit

● Power consumption monitor
・Energy saving effect can be confirmed by the consumption record
・Consumption record can be collected by **ROBODRILL-LINK*i***

● Power regeneration
・Power regeneration function that regenerates the energy at deceleration of motors has been adopted since 1994.
・Regenerated power is used at other equipment and contributes to reduce power consumption of entire factory



Energy saving setting screen

Power consumption monitor

Network function

● On-board multifunction Ethernet
・Fast Ethernet port is available for high-speed data transfer. Together with standard Ethernet port, CNC can be connected to two different networks at the same time
・Various field network protocols such as FL-net, EtherNet/IP, PROFINET, Modbus/TCP are supported

● Field network (option)
・Other field network protocols such as CC-Link, DeviceNet, PROFIBUS-DP are also available by adding option board on CNC

● Network manager screen
・Operability improvement by unifying screens for network settings
・Connection guidance helps to connect PC software such as Program transfer tool or FANUC LADDER III
・Detailed setting screen supports multiple network connection assignment

Connection guidance screen

Change allocation screen

High-Performance of Machining

Wide variety of high-speed and high-power spindle

● High-power spindle

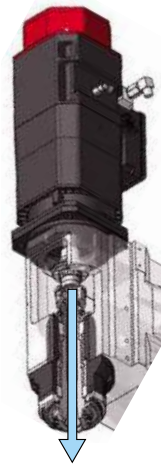
・High-rigidity machine structure and optimized combination of spindle unit and spindle motor enables excellent ability in milling in addition to the high-speed drilling and tapping

High power spindle motor

● Optimum spindle selectable according to application

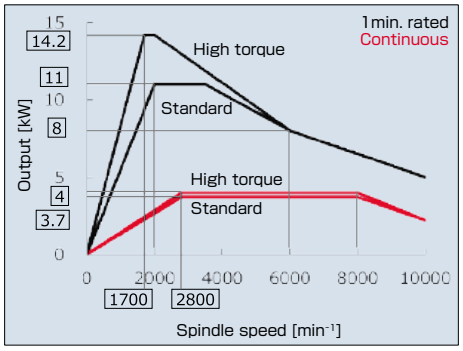
Spindle spec.	Max. speed	Application
Standard	10000 min^{-1}	Wide range of machining use
High-torque		Heavy machining of steel parts (Max. 100N·m)
High-acceleration		High-speed and high-efficiency machining of aluminum parts
Tapping	12000 min^{-1}	High-cycle light machining of aluminum parts
High-speed	24000 min^{-1}	High-speed machining with small diameter tools

＊BBT30 (BIG PLUS) tool taper (option): Available for all spindle spec.
＊Center through coolant spindle (option): Available for all spindle spec.
Withstand pressure 7MPa

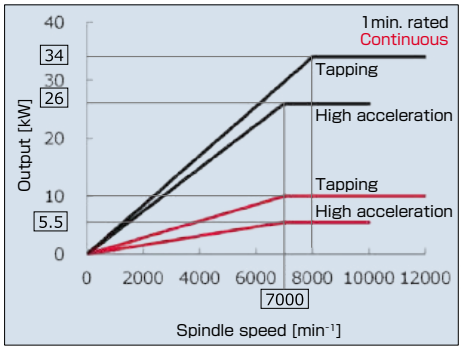


Center through spindle

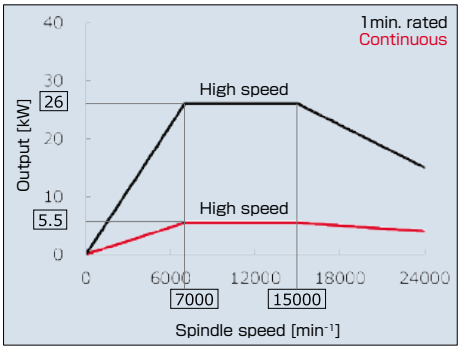
Spindle output characteristic



Standard / High-torque

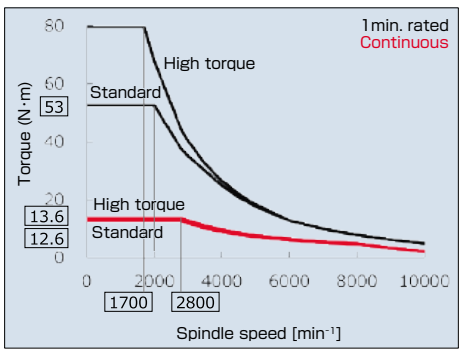


High-acceleration / Tapping

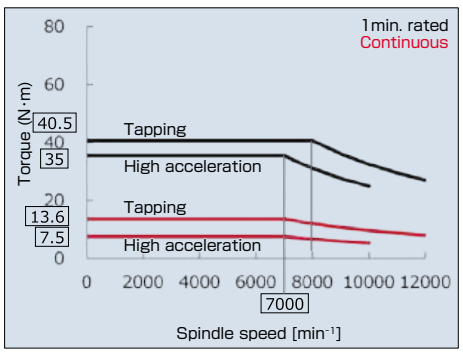


High-speed

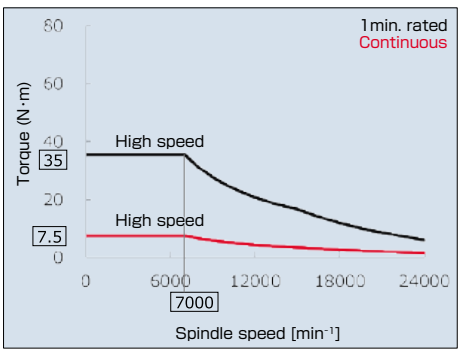
Spindle torque characteristic



Standard / High-torque



High-acceleration / Tapping



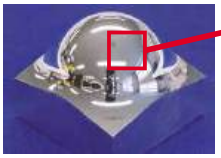
High-speed

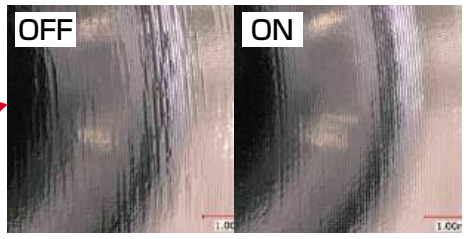
＊Characteristics of High-torque, High-acceleration, and High-speed spindles are for high-power version

High-precision and fine surface machining

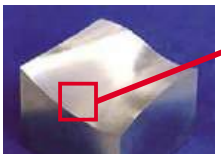
● Fine surface technology
- SERVO HRV+ control
  Achieving high-responsiveness by optimized electrical control
- High-precision program command
  Machining programs with least unit 0.1 μm are executed exactly
- Smooth tolerance+ control
  Achieving fine surface by smoothing tool path with short line segments and reducing steps between adjacent paths

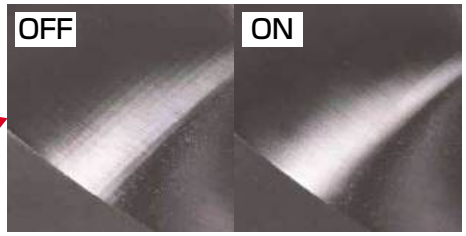
Further improvement of machining accuracy and surface quality by applying the latest CNC and Servo functions





Example of high precision program command
* Program with least unit 0.1 μm





Example of smooth tolerance+ control
* Program with CAM tolerance 5 μm

Stable machining

● Thermal displacement compensation function
- Real time compensation by estimating the thermal displacement based on the operation status of the spindle and feed axes
- By using touch probe (option), compensation effect adjustment can be performed automatically from the measurement result.

● AI thermal displacement compensation function II (Option)
- Thermal displacement is estimated precisely with the temperature sensors equipped around spindle head and column.
- Stable compensation against temperature change between day and night or seasons.
- Even if some of sensors got trouble, sensor check function will keep proper compensation.

AI thermal displacement compensation

Machining Capability

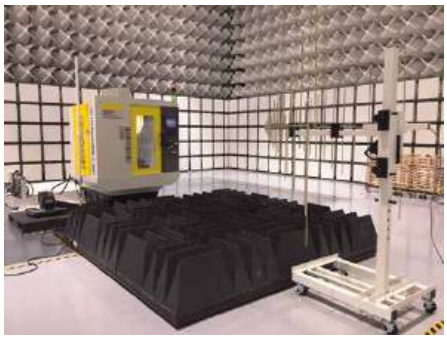
	Machining	Drilling Tool dia.(mm) x Feed(mm/rev)			Tapping Tap size x Tap pitch(mm)		
	Material	S50C	FC200	ADC12	S50C	FC200	ADC12
Spindle spec.	Standard	Dia.30 x 0.10	Dia.30 x 0.25	Dia.32 x 0.35	M20 x 2.5	M27 x 3.0	M30 x 3.5
	High-torque	Dia.30 x 0.15	Dia.30 x 0.30	Dia.32 x 0.40	M20 x 2.5	M27 x 3.0	M30 x 3.5
	Tapping	Dia.25 x 0.15		Dia.32 x 0.30	M18 x 2.5		M27 x 3.0
	High-acceleration	Dia.20 x 0.10		Dia.22 x 0.25	M16 x 2.0		M24 x 3.0
	High-speed	Dia.20 x 0.10		Dia.22 x 0.25	M16 x 2.0		M24 x 3.0

* These data may change by cutting tools or machining conditions.

Maximizing Uptime

High-reliability

- Endeavor to enhance reliability
  - Reliability oriented product development under the slogan of “Reliable, Predictable, Easy to Repair”
  - Promoting further improvement of reliability by FANUC’s original reliability development method such as accelerated life test
- Reliability evaluation building
  - Simultaneous multiple accelerated life tests are carried out in the vast experiment area
  - Dedicated test rooms such as anechoic chamber, EMS test room, vibration test room, etc. are utilized for evaluation tests under various conditions
- Abundant track records at FANUC in-house factory
  - More than 200 units of ROBODRILLs are working 24 hours at FANUC in-house factory for both steel and aluminum parts machining
  - Achieving High-reliability by analyzing the operation and maintenance data and returning to ROBODRILL design

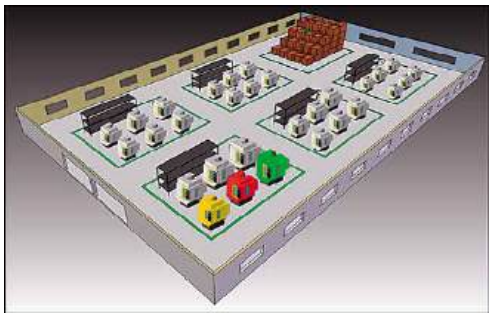


EMC test in anechoic chamber

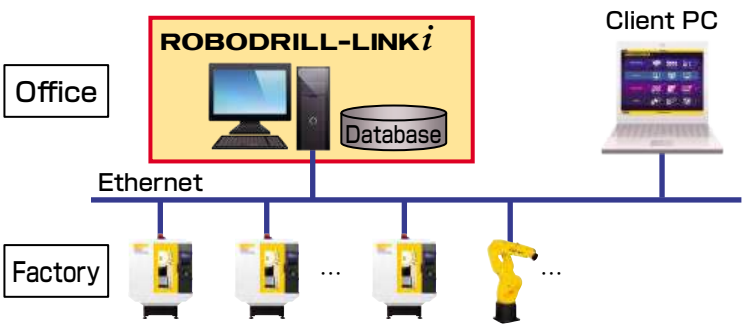
FANUC in-house factory

ROBODRILL-LINK*i* (PC software)

- Operation condition monitoring system
  - Real time display of the entire production area helps to understand the condition of each machine at once
  - Supporting improvement of machine utilization by collecting each machine’s information and displaying in the graph
- Easy introduction
  - The system can be built with general PC and no server PC is required
- Useful tools for management of ROBODRILLs
  - Collecting ROBODRILL’s additional information such as periodical maintenance data, tool life, etc.
  - Making Backup of machining program, parameter, etc.
  - NC program can be transferred to multiple ROBODRILLs simultaneously



Condition overlook screen



Connection example

Individual machine operation achievement

Complete preventive maintenance

- Maintenance information management
  - Monitoring the condition of maintenance items and announcing the abnormality or maintenance timing to support effective periodical maintenance
  - Maintenance items can be customized (up to 10)
- Leakage Detection Function
  - Early detection of insulation resistance drop of each motor and motor power cable
  - Enable preventive maintenance before breakdown
- Fan Monitor Function
  - Monitoring cooling fans of CNC, Servo Amplifiers, Spindle Amplifier and Power Supply
  - Announcing before failure when the rotation speed of the cooling fans is dropping
  - Easy to detect the abnormal fan

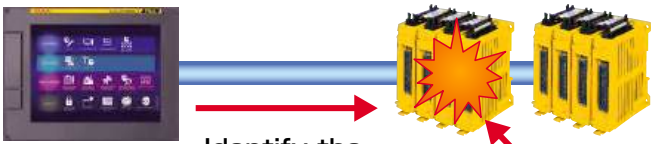
Maintenance information management screen

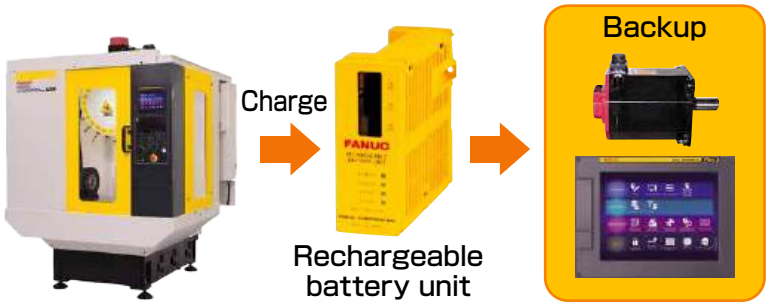
Fan monitor screen

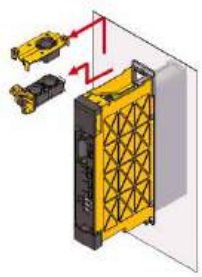
High-maintainability

- Recovery guidance screens
  - Easy to recover the turret position, motor origin, etc. by following instructions in each screen in case of accident
- Improvement of maintainability for I/O device
  - Cause and point of the failure of I/O devices (disconnection, earth fault etc.) are identified by CNC
- Machine configuration to improve parts replacement
  - Cartridge type fan motor units realizes easy parts replacement
- Rechargeable battery unit (option)
  - Supplying backup power both CNC and Pulsecorder
  - Automatically recharged while ROBODRILL power ON and battery maintenance free

Motor origin restoration screen







Fan motor for Servo Amplifier

Ease of Use

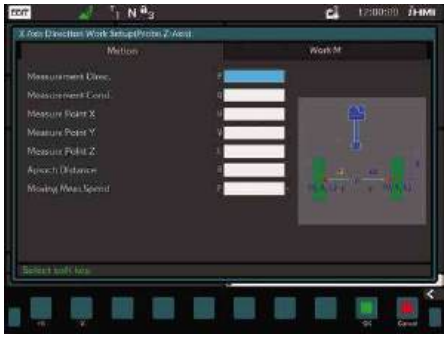
High-usability

● Operator's panel with 10.4″ Color LCD for ***i*HMI**
- Intuitive and operable interface by ***i*HMI**
- Seamless flat display unit with high-resistance to coolant oil
- Touch panel type display (option) is available

● Supporting PDCA cycle by ***i*HMI** CNC operation screen
- A series of works from programming to machining are realized in one screen
- Easy to make program through graphic guidance (***i*HMI** Machining Cycle)
- Easy to check program by machining simulation with 3D solid model
- Various measurement cycles with touch probe are available (***i*HMI** Set-up Guidance)

***i*HMI** CNC operation screen

***i*HMI** Machining Cycle



***i*HMI** Set-up Guidance

Automation with Robot

● Robot interface 2 (option)
- System start/stop, operation status check, robot manual operation, etc. are available on screen
- Easy to connect Robodrill and robot by easy setting function
- Safety function and less wires connection by FL-net

● **ROBODRILL** Robot Package (option)
- Package of basic elements of robot system such as robot, robot base, automatic side door, consolidated connecting cable, Robot interface 2, sample programs of robot, etc.
- Easy to setup robot system as Robodrill and robot are connected at delivery.

operation status screen

Robot manual operation screen

Application Example

High-expandability

● External interface function
- General I/O signals for fixture and peripheral control are ready to use only by assigning in the screen
- Lighting conditions of signal lamps can be set on the screen

● Custom PMC function
- Ladder program to control peripheral devices can be created without adding any external sequencer unit
- Custom PMC Ladder can be edited and monitored on screen
- I/O signals: Input 16 / Output 16 (standard)
  Input 1024 / Output 1024 (option, maximum)

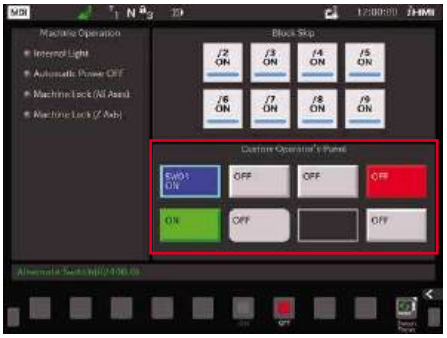
● Custom PMC for DCS
- Safety I/O signals of peripherals can be connected (Input 12 / Output 8)
- Software safety circuit can be developed by duplicated signals with Custom PMC function

● Custom control panel
- Control switches (ON/OFF or pulse) and indication lamps can be created on screen without hardware
- Operability of peripherals can be improved without cost

● Custom screen
- Up to 15 applications developed with FANUC PICTURE (PC software) can be registered
- Usable to control peripheral devices by linking Custom PMC function
- Various exclusive screens for peripheral devices are provided from their suppliers

● Favorite screen
- Shortcuts of frequently used screens can be registered

External interface function



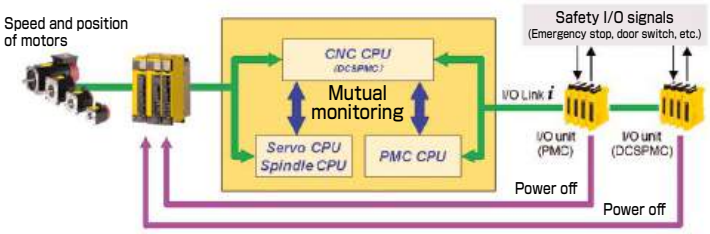
Custom control panel

Examples of Custom screen

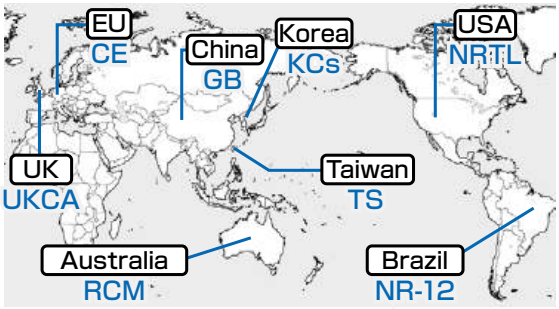
Conformity of safety standards

●Dual check safety
- Securing operators by duplicating safety I/O signals such as emergency stop and door switch

●Safe torque off (STO) function
- Power between motors and amplifiers are certainly stopped by using safe torque signal

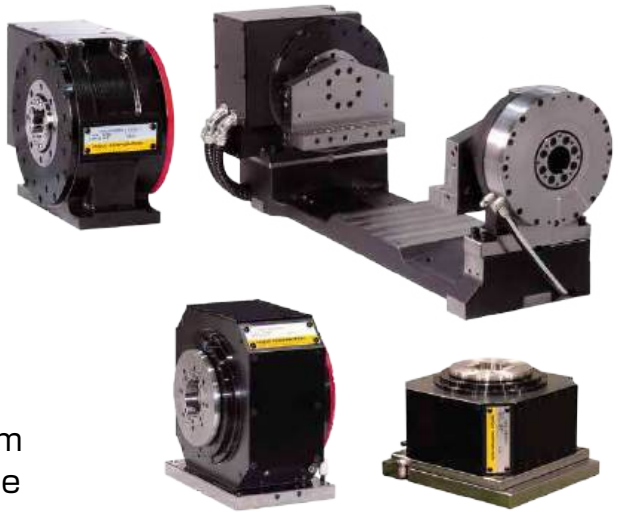


● Conformity of major safety standards (option)



Options

FANUC ROBODRILL DDR*i*B



- High-speed and high-precision additional 1-axis rotary table **DDR*i*B**
  - Synchronous built-in servo motor and αiCZ sensor provide non-backlash, high-speed and high-precision machining
- Trunnion unit with **DDR*i*B** and support spindle for quick setup of indexing fixture **DDR-T*i*B**
  - Easy to setup fixture by making the best use of ROBODRILL's working space
- High-speed rotary table for turning **DDR-HS*i*B**
  - Max. speed 1,500min^{-1} and Max. torque 100N・m
  - High-precision and high-quality turning is available with CNC functions for turninig

* For detailed information, please see the catalogue of **DDR*i*B**, **DDR-T*i*B** or **DDR-HS*i*B**

Main options

Coolant unit (tank)

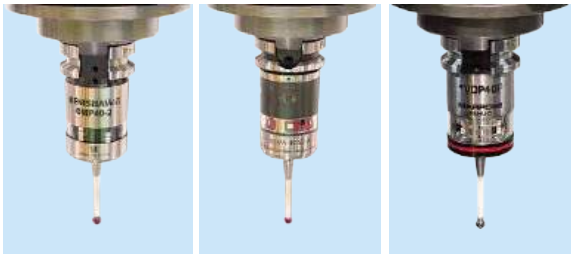
Coolant unit with chip flush (with oil gun)

Cleaning unit for tool taper shank

Top cover

LED Illumination

Tool length switch for automatic measurement



Touch probe

Signal lamp

Automatic Oil Lubricating System

Automatic Grease Lubricating System (LHL Liquid Grease)

Portable manual pulse generator

Rechargeable battery unit

(Note)
- The machine life may be shortened depending on the workpiece, tool, coolant, or lubricant to be used.

Function list

Standard specifications

Control unit FANUC Series 31*i*-B Plus
Simultaneously controlled axes (Max. 4 axes)
Multi-function Ethernet*1
Control unit incorporated type display unit with 10.4″ color LCD*2
PCMCIA memory card port
USB port (USB2.0)
Part program storage size 4Mbyte
Number of registerable programs 1000
Addition of workpiece coordinate system 48 pairs
Tool offset pairs 200-pairs
Tool life management
Production control counter
*i*HMI Set-up Guidance (MANUAL GUIDE *i* on *i*HMI)
Machining Mode Setting
Thermal displacement compensation function
Custom PMC
Dual check safety
Smart Trouble Shooting Function
Leakage Detection Function
Backup function for power failure (quick stop function)*3
Smart rigid tapping
Spindle Smart Load Meter
AI contour control Ⅰ
HRV control
Rapid traverse block overlap
Helical interpolation
Coordinate system rotation
Tool offset
Multi-step skip
High-speed skip
Custom macro
Interruption type custom macro

Mechanical Option (Note) Some options are not applicable depending on machine model and configurations.

High torque spindle 10,000min^{-1}, High acceleration spindle 10,000min^{-1}
Tapping spindle 12,000min^{-1}, High speed spindle 24,000min^{-1}
Low vibration High speed spindle 24,000min^{-1}
High power version spindle
Double contact tooling (BBT30/NBT30)
Center through spindle (7MPa)
High column (100/200/300/400mm)*4
Splashguard wide opening door *5
Automatic front door opening/closing of splashguard
Automatic side door of splashguard (right/left)
Splashguard glass window (window size is smaller)
Basic top cover of splashguard/Full-closed cover of splashguard *6
Color specification
X-axis telescopic cover with 3-pieces *7
Z-axis metal cover *7
Additional 1 axis rotary table DDR*i*B/DDR-T*i*B/DDR-HS*i*B (C-axis installation/Horizontal axis installation)
Rotary joint for DDR*i*B/Tail support (Standard type)
Rotary joint for DDR*i*B/Tail support (High pressure type)
Rotary joint for DDR-HSiB (Hydraulic type)
Adjustment of center height, Adjustment of shaft length, End plate (for DDR*i*B)
Coolant unit (Tank capacity : 100/200/140*8 L)
Coolant unit for center through coolant (Tank capacity : 240/200*8 L, Pressure : 1.5MPa)
Coolant unit with chip flush (with oil gun)
Cleaning unit for tool taper shank
Excellent chip evacuation
Air blow for chips
Grip cover
Automatic oil lubricating/Automatic grease lubricating
Illumination (LED)
Signal lamp (3 lamps)
Tool length switch
Touch probe

Electric Option (Note) Some options are not applicable depending on machine model and configurations.

Additional controlled 1 axis (Simultaneously controlled 4 axes)
Conformity to safety standards for EU (CE), China (GB), Taiwan (TS), Korea (KCs), UK(UKCA), US(NRTL), Australia (RCM) and Brasil (NR-12)
Automatic breaker shutdown
Backup function for power failure (quick stop funcion)*3
Power cable (length : 5/12/3*9 m)
Mounting plate for options
Various additional I/O unit
CNC with touch panel LCD
Network adapter (DeviceNet, PROFIBUS-DP, CC-Link)
Fast data server (with Compact Flash Memory 4GB)
ROBOT INTERFACE 2
Portable MPG (with ESP switch)
RS-232C port
Recharegeable battery unit

Software Option (Note) Some options are not applicable depending on machine model and configurations.

AI thermal displacement compensation Ⅱ
AI tool monitoring
Part program storage size 8Mbyte
Number of registerable programs 4000
Addition of workpiece coordinate system 300 pairs
Tool management function (1000 pairs)
3D interference check
Single direction positioning
Conical/spiral interpolation
Involute interpolation
Cylindrical interpolation
Polar coordinate command
Scaling
Programmable mirror image
AI contour control Ⅱ
High-speed processing
Look-ahead blocks expansion (1000 blocks)
Smooth tolerance^{+} control
NURBUS interpolation
Smooth TCP
3-dimensional cutter compensation
3-dimensional coordinate conversion
Punch tapping function
Smart spindle load control
Quick progtram restart
Turning function

PC Software

ROBODRILL-LINK*i*
ROBODRILL-CNCGuide
FANUC SERVO VIEWER
FANUC LADDER-Ⅲ
FANUC PICTURE
Program transfer tool

*1 Fast Ethernet is embeded on CNC main board. Available network functions: FL-net, Ethernet/IP, PROFINET IO, Modbus/TCP
*2 The color LCD screen may have a few missing or constantly lit pixels.
*3 This function is standard for Advanced version and option for Standard version.
*4 Max 200mm for X-axis stroke 300mm, Max 300mm for X-axis stroke 500mm and 700mm of Standard version
*5 Opening width is 730mm for X-axis stroke 500mm and 1100mm for X-axis stroke 700mm. It is standard for X-axis stroke 300mm.
*6 Mist collector must be used together.
*7 Only for Standard version
*8 In case of X-axis stroke 300mm
*9 In case of the compliance with safety regulation (except for NRTL, RCM and NR-12)

Specification

Item		α-D21S*i*B Plus α-D14S*i*B Plus	α-D21M*i*B Plus α-D14M*i*B Plus	α-D21L*i*B Plus α-D14L*i*B Plus
Machine (Standard)				
Capacity	X-axis travel (longitudinal movement of table)	300 mm	500 mm	700 mm
	Y-axis travel (cross movement of saddle)	300 mm + 100 mm	400 mm	
	Z-axis travel (vertical movement of spindle head)	330 mm		
	Distance from table surface to spindle gage plane	150 mm to 480 mm (when no high column is specified)		
Table	Working space (X-axis×Y-axis)	630 mm×330 mm	650 mm×400 mm	850 mm×410 mm
	Capacity of workpiece mass	200 kg (uniform load)	300 kg (uniform load)	
	Working surface configuration	3 x T-slots size 14 mm pitch 125 mm		
Spindle	Speed range	100 min^{-1} to 10000 min^{-1} 100 min^{-1} to 12000 min^{-1} / 240 min^{-1} to 24000 min^{-1} (option)		
	Spindle gauge (Call number) *1	7/24 taper No.30 (with air blow)		
Feedrate	Rapid traverse rate	48 m/min (X, Y, Z)		
	Cutting feedrate	1 mm/min to 30000 mm/min		
Turret	Type of tooling / Type of pull stud bolt	JIS B 6339-2 No.30 / MAS 403-1982 P30T-1 (45°) *2		
	Tool storage capacity	21 tools : α-D21S*i*B Plus / D21M*i*B Plus / D21L*i*B Plus 14 tools : α-D14S*i*B Plus / D14M*i*B Plus / D14L*i*B Plus		
	Maximum tool diameter	80 mm		
	Maximum tool length	200 mm (changes by specifications)	250 mm (changes by specifications)	
	Maximum tool mass [Total mass]	2 kg [23 kg] / 3 kg [33 kg] : 21 tools 2 kg [15 kg] / 3 kg [22 kg] : 14 tools		
	Tool changing time (Cut to Cut)	1.6 s (2 kg setting) : 21 tools 1.4 s (2 kg setting) : 14 tools		
Motors	Spindle drive motor	11.0 kW (1minute rating) / 3.7 kW(continuous rating) (changes by specifications)		
Accuracy *3	Bidirectional accuracy of positioning of an axis	0.006 mm to 0.020 mm (ISO230-2:1988)		
	Bidirectional repeatability of positioning of an axis	Less than 0.004 mm (ISO230-2:1997,2006)		
Sound pressure level		Less than 70 dB *4		
Control unit		**FANUC Series 31*i*-B Plus** (Simultaneously controlled axes: Max.4 axes)		
Installations (note) Please make sure to comply with installation conditions specified by FANUC when installing ROBODRILL *5				
Power source	Power supply	200V AC to 220V AC, −15 % to +10 %, 3-phase, 50 Hz±1 Hz or 60 Hz±1 Hz Standard/High-torque/High-torque (High-power version)/High-acceleration/High-speed: 10kVA, High-acceleration/High-speed (High-power version): 12kVA, Tapping: 18kVA *6		
	Compressed air supply	0.35 MPa to 0.55 MPa (0.5 MPa is recommend) (gage pressure), 0.16 m^3 /min (at atmospheric pressure) *7		
Machine size	Machine height	2236 mm ± 10 mm (when no high column is specified)		
	Floor space	995 mm×2210 mm	1615 mm×2040 mm	2165 mm×2040 mm
	Mass of machine	Approx. 1950 kg	Approx. 2000 kg	Approx. 2100 kg

*1 Spindle gauge does not conform to JIS B 6340:1992, JIS B 6340-1:2019 or JIS B 6340-2:2019.

*2 In case of using center through coolant, please apply suitable pull stud bolt for Robodrill of each tooling supplier.

*3 Positioning accuracy is the adjusted and measured value in compliance with applicable standard at FANUC's factory. Depending on an influence of JIG & workpiece mass on table, the use conditions and installation environment, there may be a case where the accuracy shown in this catalog can not be achieved.

*4 Sound pressure level is measured in compliance with FANUC's own regulation. Depending on the use conditions and installation environment, there may be a case where the sound pressure level shown in this catalog can not be achieved.

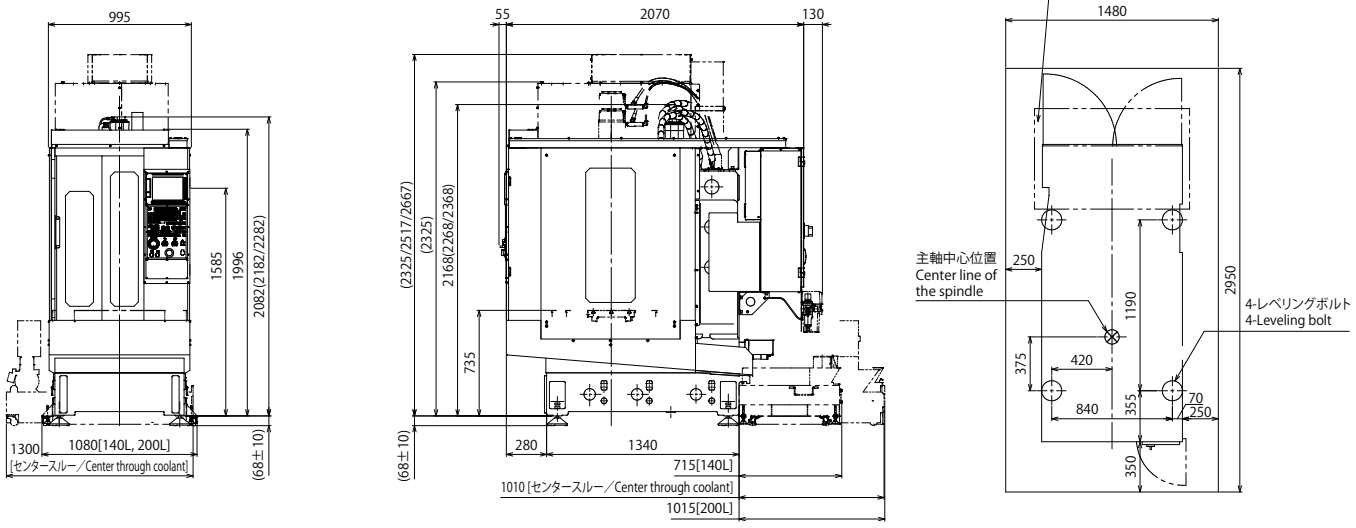
*5 Fastening the machine to the floor (mounting anchors) may be required depending on the use conditions and installation environment, or to prevent the machine from toppling over due to an earthquake.

*6 When peripherals such as coolant unit or rotary table are added, additional power is required. Please contact FANUC for detail. A cable with 10 mm^2～14mm^2 should be used at primary power connection.

*7 In case of center through coolant, additional + 0.05 m^3/min is required. In case of air blow for chips, additional + 0.2 m^3/min is required. In case of side automatic door, 0.4 MPa compressed air supply or more is required.

α-D14/21S*i*B Plus

*1



α-D14/21M*i*B Plus

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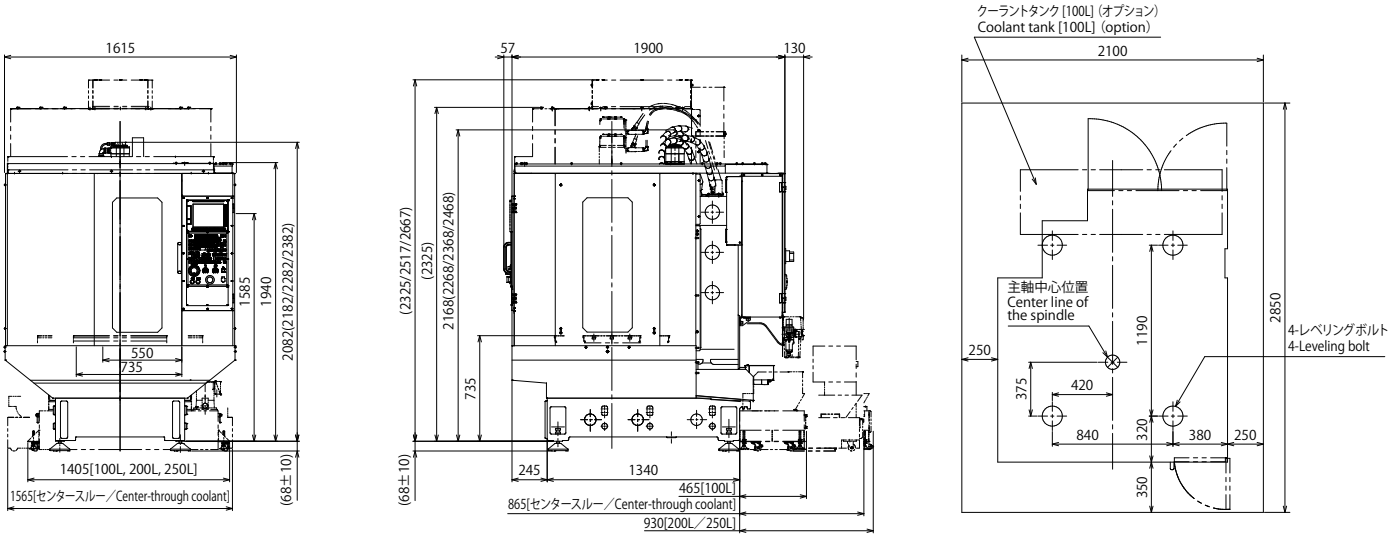

α-D14/21L*i*B Plus

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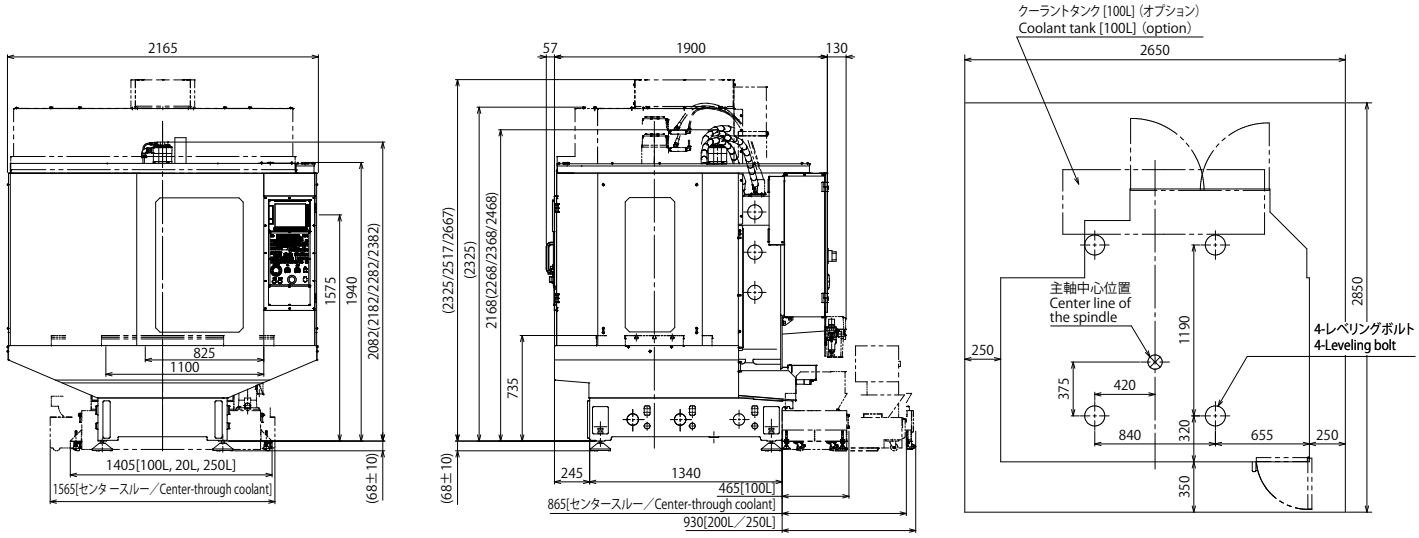


*1 These dimensions may change by adding options. (For further details, please contact FANUC.)

Specification

Item		α-D21S*i*B$_{ADV}$ Plus α-D14S*i*B$_{ADV}$ Plus	α-D28M*i*B$_{ADV}$ Plus α-D21M*i*B$_{ADV}$ Plus α-D14M*i*B$_{ADV}$ Plus	α-D28L*i*B$_{ADV}$ Plus Y500 α-D21L*i*B$_{ADV}$ Plus Y500 α-D14L*i*B$_{ADV}$ Plus Y500
Machine (Standard)				
Capacity	X-axis travel (longitudinal movement of table)	300 mm	500 mm	700 mm
	Y-axis travel (cross movement of saddle)	300 mm + 100 mm	400 mm	500 mm
	Z-axis travel (vertical movement of spindle head)	400 mm		
	Distance from table surface to spindle gage plane	80 mm to 480 mm (when no high column is specified)		
Table	Working space (X-axis×Y-axis)	630 mm×330 mm	650 mm×400 mm	850 mm×500 mm
	Capacity of workpiece mass	200 kg (uniform load)	400 kg (uniform load)	
	Working surface configuration	3 x T-slots size 14 mm pitch 125 mm		
Spindle	Speed range	100 min^{-1} to 10000 min^{-1} 100 min^{-1} to 12000 min^{-1} / 240 min^{-1} to 24000 min^{-1} (option)		
	Spindle gauge (Call number) *1	7/24 taper No.30 (with air blow)		
Feedrate	Rapid traverse rate	54 m/min (X, Y, Z)		54 m/min (X,Y), 60 m/min (Z)
	Cutting feedrate	1 mm/min to 30000 mm/min		
Turret	Type of tooling / Type of pull stud bolt	JIS B 6339-2 No.30 / MAS 403-1982 P30T-1 (45°) *2		
	Tool storage capacity	28 tools : α-D28M*i*B$_{ADV}$ Plus / D28L*i*B$_{ADV}$ Plus Y500 21 tools : α-D21S*i*B$_{ADV}$ Plus / D21M*i*B$_{ADV}$ Plus / D21L*i*B$_{ADV}$ Plus Y500 14 tools : α-D14S*i*B$_{ADV}$ Plus / D14M*i*B$_{ADV}$ Plus / D14L*i*B$_{ADV}$ Plus Y500		
	Maximum tool diameter	80 mm		
	Maximum tool length	200 mm (changes by specifications)	250 mm	
	Maximum tool mass [Total mass]	1.5 kg [24 kg] / 2 kg [30 kg] / 3 kg [38 kg] / 4 kg [46kg] : 28 tools 2 kg [23kg] / 3 kg [33 kg] / 4 kg [46 kg] : 21 tools 2 kg [15kg] / 3 kg [22 kg] / 4 kg [30 kg] : 14 tools		
	Tool changing time (Tool to Tool)	0.7 s (1.5 kg setting) / 0.8 s (2 kg setting) / 1.0 s (3 kg setting) / 1.1 s (4 kg setting) : 28 tools 0.7 s (2 kg setting) / 0.9 s (3 kg setting) / 1.1 s (4 kg setting) : 21/14 tools		
	Tool changing time (Cut to Cut)	1.3 s (1.5 kg setting) / 1.5 s (2 kg setting) / 1.7 s (3 kg setting) / 1.8 s (4 kg setting) : 28 tools 1.3 s (2 kg setting) / 1.5 s (3 kg setting) / 1.7 s (4 kg setting) : 21/14 tools		
Motors	Spindle drive motor	11.0 kW (1minute rating) / 3.7 kW(continuous rating) (changes by specifications)		
Accuracy *3	Bidirectional accuracy of positioning of an axis	0.006 mm to 0.020 mm (ISO230-2:1988)		
	Bidirectional repeatability of positioning of an axis	Less than 0.004 mm (ISO230-2:1997,2006)		
Sound pressure level		Less than 70 dB *4		
Control unit		**FANUC Series 31*i*-B Plus** (Simultaneously controlled axes: Max.4 axes)		
Installations (note) Please make sure to comply with installation conditions specified by FANUC when installing ROBODRILL *5				
Power source	Power supply	200V AC to 220V AC, −15 % to +10 %, 3-phase, 50 Hz±1 Hz or 60 Hz±1 Hz Standard/High-torque/High-torque (High-power version)/High-acceleration/High-speed: 10kVA, High-acceleration/High-speed (High-power version): 12kVA, Tapping: 18kVA *6		
	Compressed air supply	0.35 MPa to 0.55 MPa (0.5 MPa is recommend) (gage pressure), 0.16 m^3 /min (at atmospheric pressure) *7		
Machine size	Machine height	2236 mm ± 10 mm (when no high column is specified)		
	Floor space	995 mm×2220 mm	1615 mm×2050 mm	2165 mm×2115 mm
	Mass of machine	Approx. 2200 kg	Approx. 2250 kg	Approx. 2450 kg

*1 Spindle gauge does not conform to JIS B 6340:1992, JIS B 6340-1:2019 or JIS B 6340-2:2019.

*2 In case of using center through coolant, please apply suitable pull stud bolt for Robodrill of each tooling supplier.

*3 Positioning accuracy is the adjusted and measured value in compliance with applicable standard at FANUC's factory. Depending on an influence of JIG & workpiece mass on table, the use conditions and installation environment, there may be a case where the accuracy shown in this catalog can not be achieved.

*4 Sound pressure level is measured in compliance with FANUC's own regulation. Depending on the use conditions and installation environment, there may be a case where the sound pressure level shown in this catalog can not be achieved.

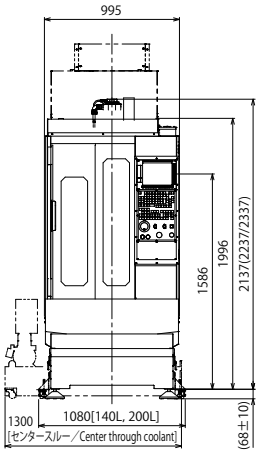
*5 Fastening the machine to the floor (mounting anchors) may be required depending on the use conditions and installation environment, or to prevent the machine from toppling over due to an earthquake.

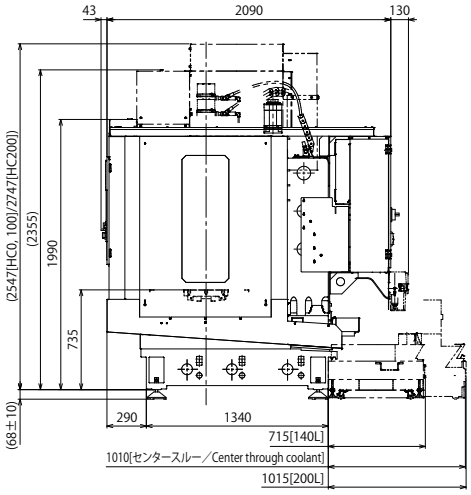
*6 When peripherals such as coolant unit or rotary table are added, additional power is required. Please contact FANUC for detail. A cable with 10 mm^2～14mm^2 should be used at primary power connection.

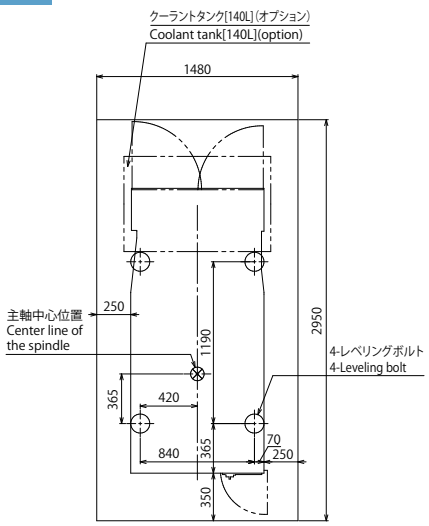
*7 In case of center through coolant, additional + 0.05 m^3/min is required. In case of air blow for chips, additional + 0.2 m^3/min is required. In case of side automatic door, 0.4 MPa compressed air supply or more is required.

α-D14/21S*i*B ADV Plus

*1

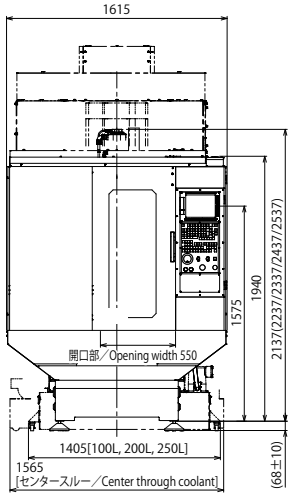


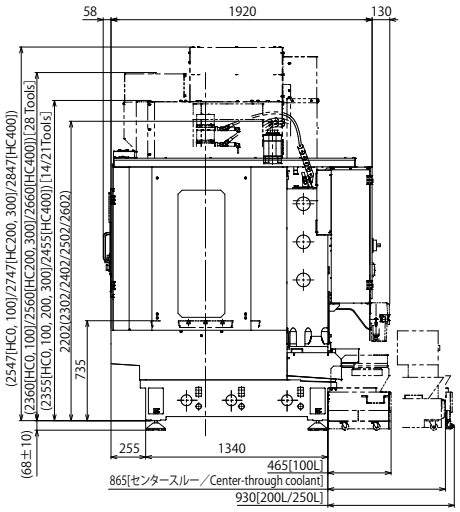


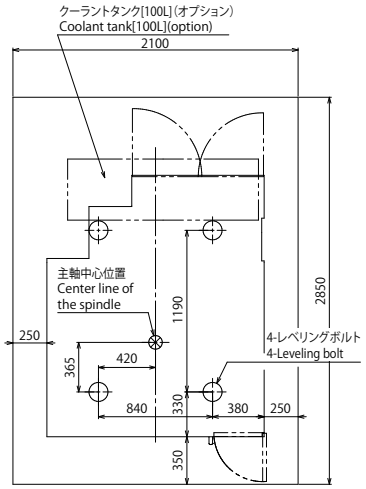


α-D14/21/28M*i*B ADV Plus

*1







α-D14/21/28L*i*B ADV Plus Y500

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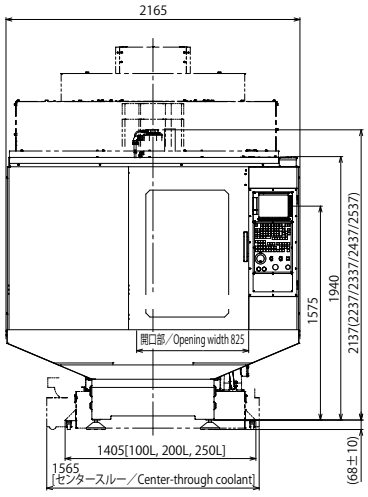
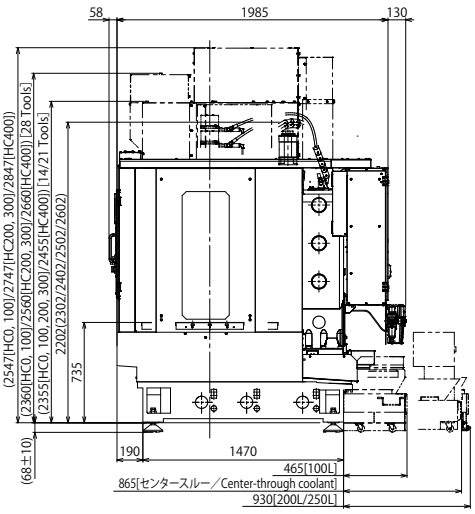
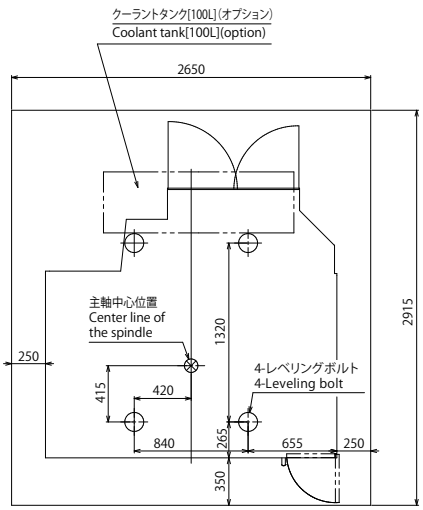






*1 These dimensions may change by adding options. (For further details, please contact FANUC.)

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.

FANUC ACADEMY

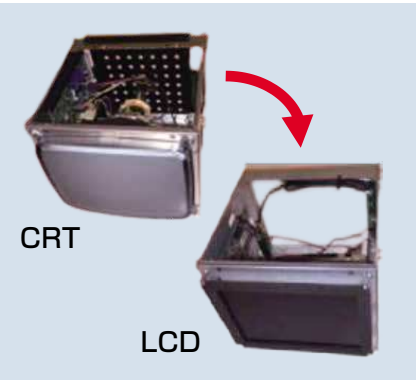
FANUC ACADEMY operates training programs on FANUC ROBODRILL which focus on practical operations and programming with machining know-how and maintenance.

Lifetime maintenance

FANUC offers lifetime maintenance, where FANUC’s products will be serviced as long as they are used by customers.
The motors, PCBs or any units of even over thirty years old can be repaired and recovered.
To perform lifetime maintenance, FANUC stocks enough amount of discontinued spare parts and even redesigns units when spare parts have run out.

Lifetime Maintenance

TAPE CENTER-MODEL D
(1978~1986)



Redesign of CRT display

FANUC Repair factory

FANUC CORPORATION

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

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

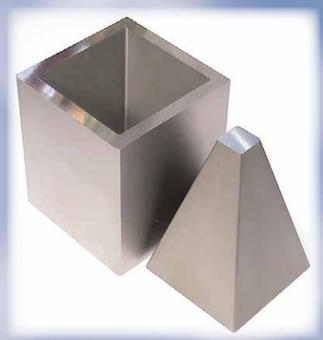
Maximizing Uptime

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



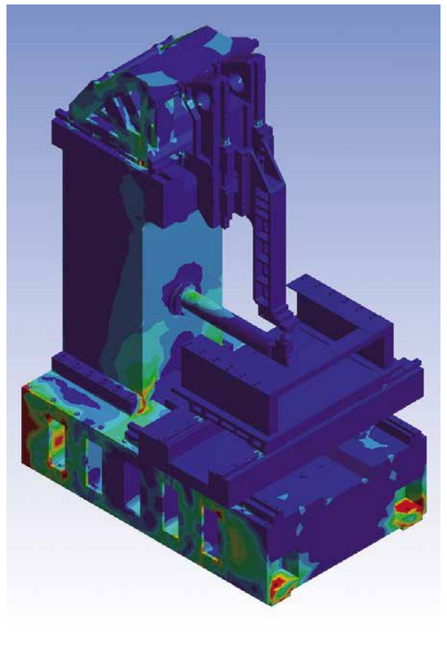



* The outer view will be different as machine specifications

High Performance of Cutting

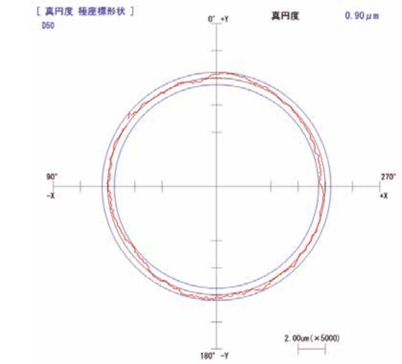
Mechanical structure to provide high precision cutting

・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.



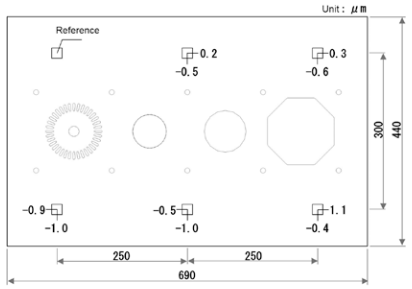
FEM analysis

【High precision cutting of circle shape】

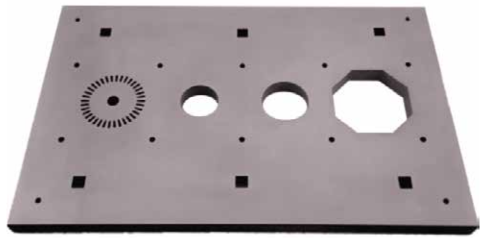


Die steel, 20mm
1 rough 5 skims
Roundness 0.90μm

【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)

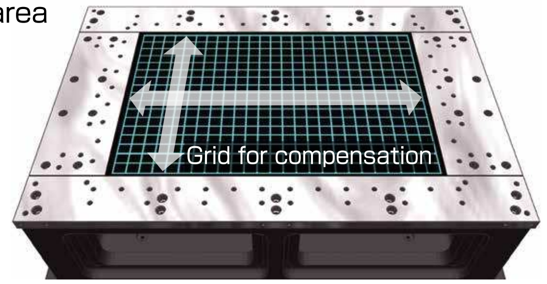
・Simple setup for high precision taper cutting

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

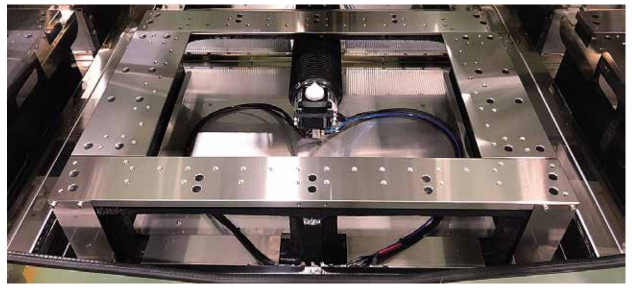
High precision pitch error compensation function

・Corrects the pitch error over the entire table area



Workpiece table (standard installed)

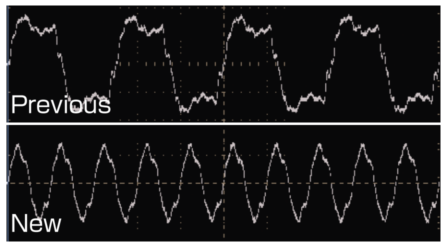
・Durable table to prevent scratch



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】



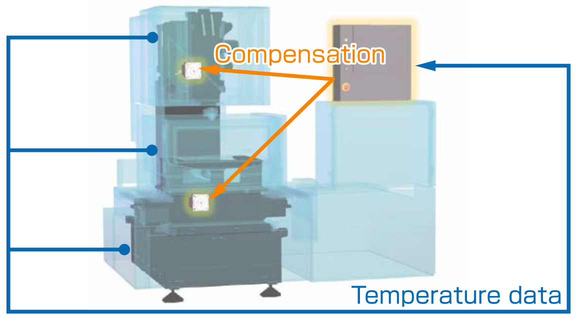
【The best surface roughness by MF2 (option)】

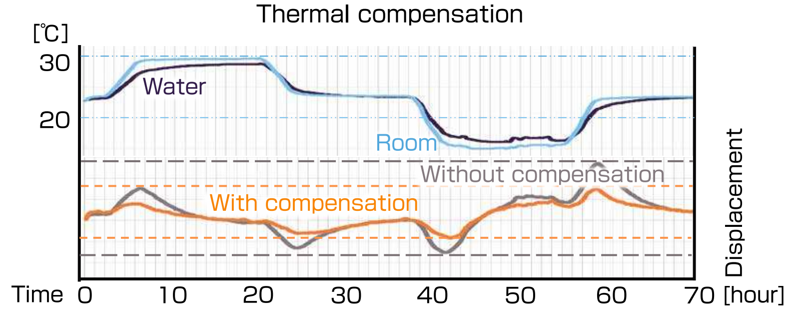
Carbide, 30mm
1 rough 8 skims
Rz 0.7μm (Ra 0.10μm)

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



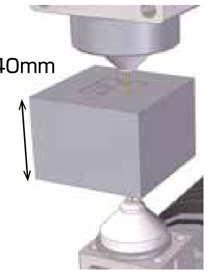


Discharge control to provide high precision cutting

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

【Overview】

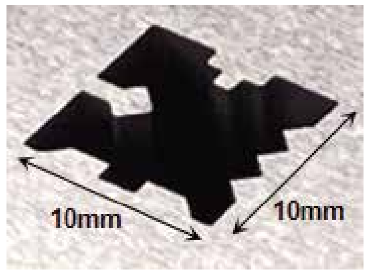
40mm



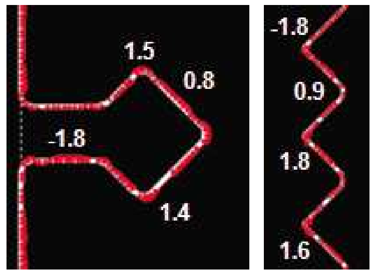
Nozzle clearance
Top : 15mm

Nozzle clearance
Bottom : 5mm

【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)

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

ROBOCUT CCR

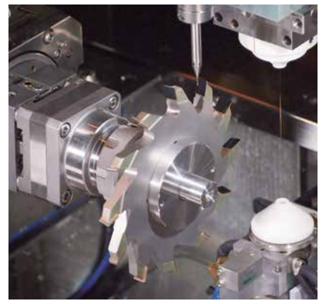
・FANUC Servo motor & rotary encoder are installed

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

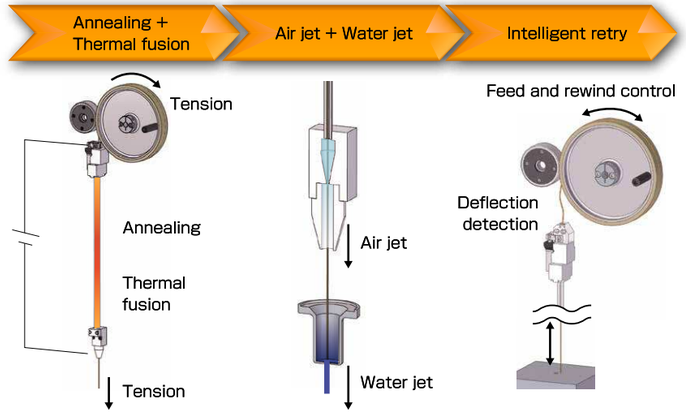
* All cutting results obtained under FANUC-designated conditions (Including Machine type).

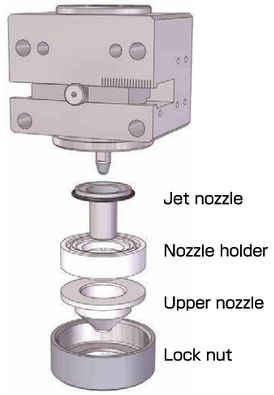
* All cutting results obtained under FANUC-designated conditions (Including Machine type).

Maximizing Uptime

Automatic wire feeding system AWF3 to support unmanned operation

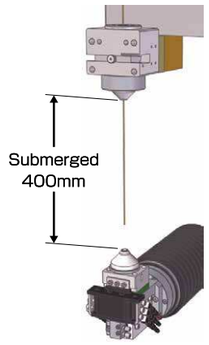
- Simple structure provides a great maintainability, higher rate of wire threading, and high reliability
- Provides AWF for Max.400mm height in submerged condition, AWR with 150mm work thickness



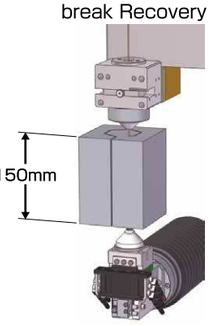


Simplified upper guide unit

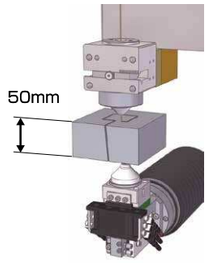
AWF



AWR
Automatic Wire break Recovery



Taper AWR
Allowed taper angle: Max. 5 degrees

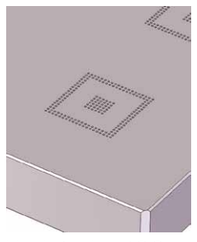


Various AWF functions support strongly unmanned operations

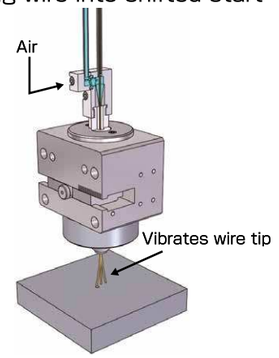
*All AWF obtained under FANUC-designated conditions

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)

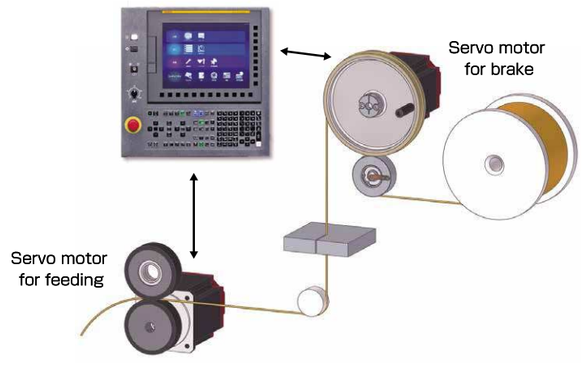


Min. hole size: ϕ0.3mm



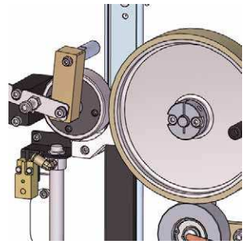
Twin servo wire feeding system

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

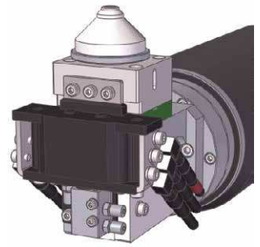


Wire running system to contribute for higher rate of operation

- Simple structure to provide easier wire installation

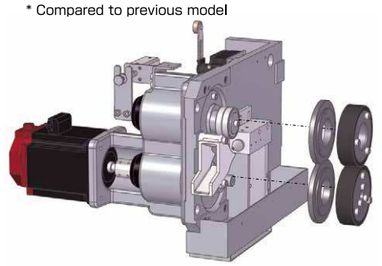


- Maintenance-free structure on the lower guide



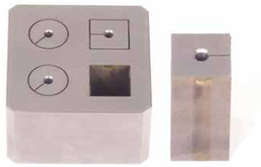
- 50%* shortened maintenance time at wire outlet mechanism

* Compared to previous model

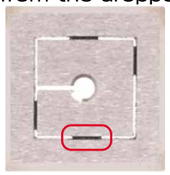


CORE STITCH* function to adhere the cores

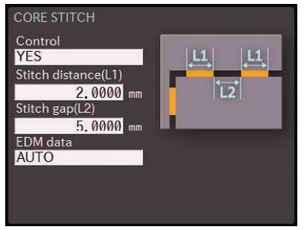
- The function to adhere the core by brass welding provides continuous unmanned operation.
- Prevents the machine damage from the dropped cores
- Easy operation to activate on the CNC screen
- Easy setting of adhesion distance and gap



Core adhesion and a removed core



Adhesion by brass ingredient

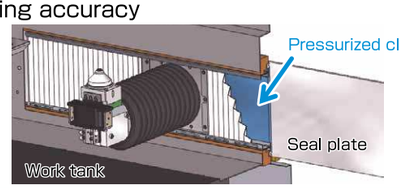


*CORE STITCH is a registered trademark of Seibu Electric & Machinery Co., Ltd.

Pre-seal mechanism for work tank to provide high reliability

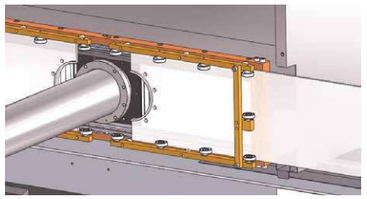
Pre-seal mechanism

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



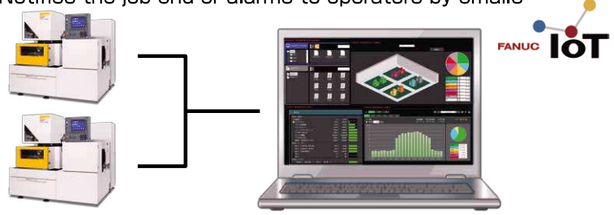
Two-split Transparent seal plates

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



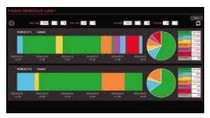
ROBOCUT-LINK*i* to manage production and quality information

- 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

Previous

PANEL *i*H Pro — 75% time savings

- 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

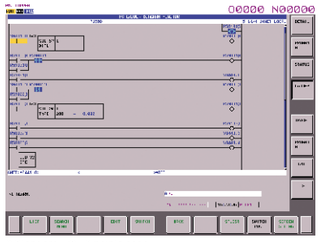
The cutting speed can be adjusted from 50% to 120% keeping the discharge gap to achieve stable cutting

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

Customize functions to support user needs

Custom PMC

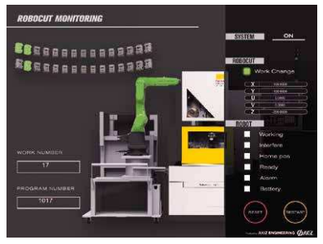
- Ladder programs for peripheral devices can be created on the screen



※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)

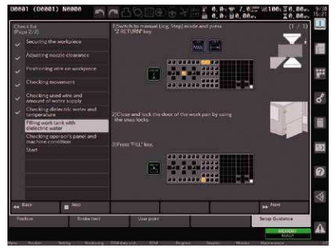
- 4 units of ROBOCUT with one Robot are connectable through FL-net
- Easy setup of workpiece exchange system by Robot
- Automation system for high-mix low-volume production

Workpiece exchange system with FANUC Robot (sample)

Various functions to support setting up

Setup Guidance function

- Explains the set up procedure



Searching EDM screen

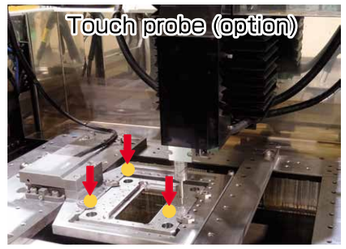
- Provides the proper EDM technologies to each application

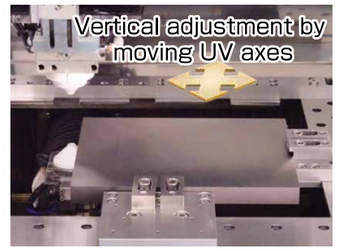
Smart Programming

- 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.





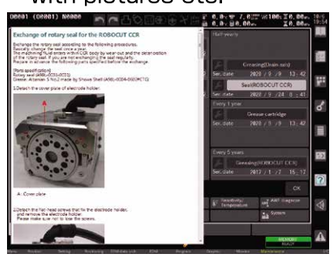
Various functions to support daily maintenance

Consumables management

- For monitoring the lives of consumable parts

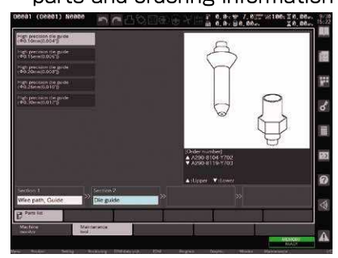
Maintenance guidance

- Provides the daily maintenance with pictures etc.



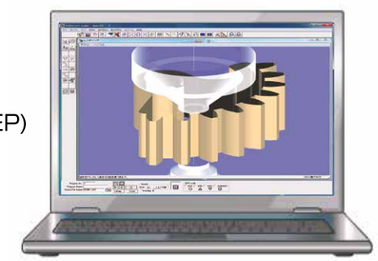
Parts list

- 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

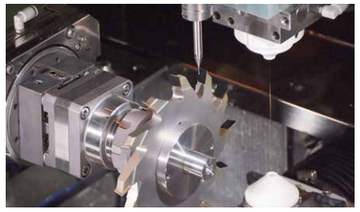


*OS : Microsoft® Windows® 8 / 8.1 / 10 / 11

Options

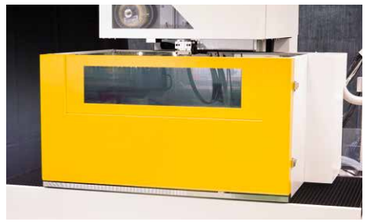
Linear encoder

MF2 power supply for skim cutting



PCD tool cutting system

Double doors



Automatic door

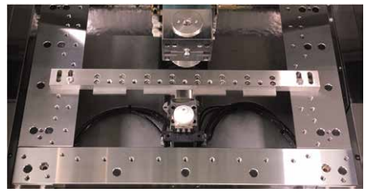
45 degrees taper kit

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

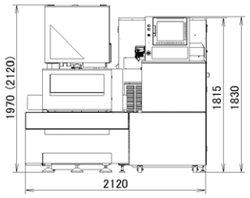
Conforming to the spirit of "Service First", FANUC provides lifetime maintenance to its products for as long as they are used by customers, through more than 270 service locations supporting more than 100 countries and regions throughout the world.

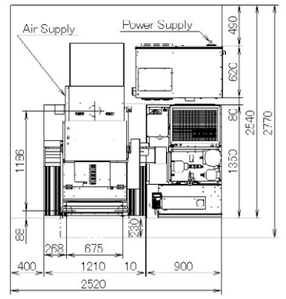
FANUC ACADEMY

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

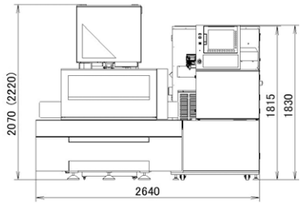
Floor Plan

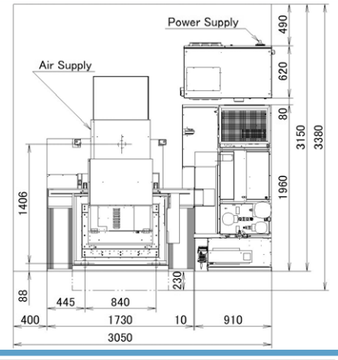
α-C400iC



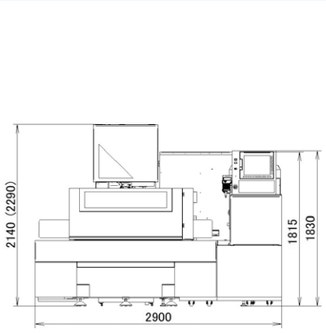


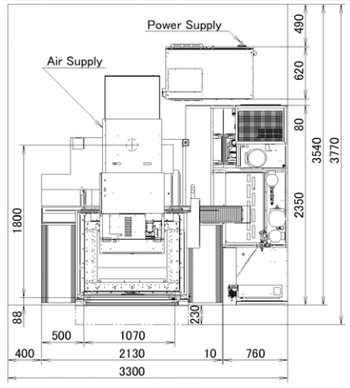
α-C600iC





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**		

FANUC CORPORATION