

THE FACTORY AUTOMATION COMPANY

**FANUC**

# Drive Systems

Product overview



# 100% FANUC

## No. 1 in the world

FANUC is the leading global manufacturer of factory automation, with more than 60 years experience in the development of computer numerical control equipment.

# 1

FANUC Laser Systems



FANUC CNC Controls



FANUC Motors



FANUC Amplifiers

# Widest range – highest reliability

FANUC offers the widest range of drive systems on the market: servo and spindle motors of all sizes in optimised packages with perfect matching amplifiers. That's our strength. You'll always find the best system delivering perfect results for your requirements – with outstanding performance and work piece surface quality.

All FANUC motors and amplifiers are developed and manufactured in-house at FANUC Japan. This results in superior functional reliability, ease of availability, simple installation and maintenance, and optimised energy efficiency.

**That's how we increase your productivity.**

## Your benefits:

- perfect matching packages for highest productivity
- easy installation by plug & play technology
- highest reliability through 100% FANUC quality
- outstanding performance
- easy maintenance
- optimised energy efficiency

Up to  
**32,000,000**  
pulses per  
revolution

More than  
**47**  
years MTBF  
(Mean Time Between Failures)

\*for 0i-D/F series



# Servo motors

## *αi-D series*



Servo motors with excellent acceleration performance – for use in high speed and high precision machining.

- high feed smoothness
- two versions available: F – ferrite magnet, S – strong motor (neodymium magnets)
- wide torque output range 0.2-60 Nm
- maximum speed up to 8000 rpm
- high resolution *αi* series encoder (32000000/rev)
- protection class IP67

## *αi-B series*



Large servo motors for use in large industrial machines.

- high feed smoothness
- wide torque output range: 150–3000 Nm
- maximum speed up to 3000 rpm
- high resolution *αi* series encoder (32000000/rev)
- protection class IP65

*αi-D series*

Torque [Nm]	0.2	0.3	0.5	1	1.5	2	4	8	12	18	22	30	40	50	60			
Flange [mm]	40		60		90	60	90		130		174	130						
Brake option [Nm]	0.32	0.32	0.65	1.2	3	1.6	3	3	8	8	12	35	12	35	35	70	70	70
<i>αiS-D</i> 200V	•	•	•	•		•	•	•		•	•		•	•	•	•	•	•
<i>αiF-D</i> 200V					•		•		•	•		•		•	•			
<i>αiS-D</i> (HV) 400V			•	•		•	•	•		•	•		•	•	•	•	•	•
<i>αiF-D</i> (HV) 400V									•	•		•		•	•			

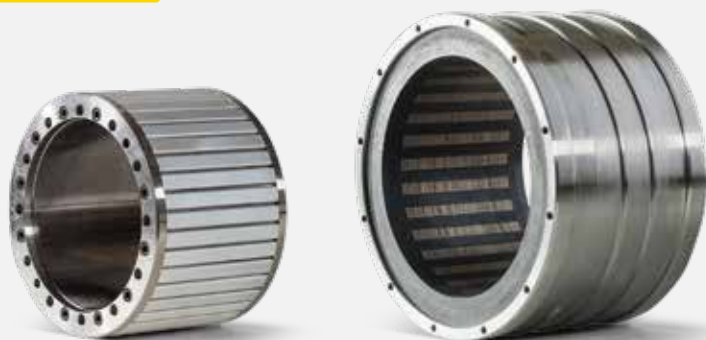
*αi-B series*

Torque [Nm]	150	300	500	1000	1500	2000	3000
Flange [mm]	265			380		500	
Brake option [Nm]	-						
<i>αiS</i> 200V	•	•	•				
<i>αiF</i> 200V							
<i>αiS</i> (HV) 400V	•	•	•	•	•	•	•
<i>αiF</i> (HV) 400V							



# DD motors

## DiS-B series built-in servo motors



The ideal solution for tables, turrets and the high precision rotary axis of 5-axes machines.

- large torque by strong neodymium magnets
- maximum torque 35-10000 Nm, continuous torque 15-4500 Nm
- high speed models up to 2000 rpm
- low ripple – optimum magnetic circuit design
- maintenance free direct drive

	DiS15-B	DiS60-B		DiS80-B		DiS120-230-B		DiS180-B		DiS250-B		DiS300-B		DiS400-B	DiS600-B		DiS600-385-B	
<b>Maximum torque [Nm]</b>	50	150		200		275		400		550		600		800	1200		1200	
<b>Continuous torque [Nm]</b>	17	60 - 65		60 - 80		120		155 - 180		250		270 - 280		380	550 - 620		600	
<b>Diameter [mm]</b>	140	180		230		230		230		230		310		230	310		385	
<b>Height [mm]</b>	70	90		80		100		120		140		100		190	150		130	
<b>Speed [min<sup>-1</sup>]</b>	2000	600 1500 3000	600HV 1200HV 3000HV	400 1000 3000	400HV 800HV	600	600HV 1200HV	800 1000 3000	400HV 3000HV	300	300HV	300 1500	300HV	400HV	100 600 1500	300HV	300	300HV
<b>200V</b>	•	•		•		•		•		•		•			•		•	
<b>400V</b>			•		•		•		•		•		•	•		•		•

	DiS900-B	DiS1000-385-B		DiS1000-B		DiS1300-385-B	DiS1500-385-B		DiS1500-B	DiS2000-485-B		DiS2000-B		DiS3000-B		DiS5000-B	
<b>Maximum torque [Nm]</b>	1800	1800		1900		2250	2500		2800	4000		4000		5600		10000	
<b>Continuous torque [Nm]</b>	825	920		830 - 1000		1210	1340		1400	2200		2100 - 2200		3200 - 3300		4500 - 4770	
<b>Diameter [mm]</b>	310	385		455		385	385		565	485		565		565		795	
<b>Height [mm]</b>	190	160		130		195	210		130	210		160		210		180	
<b>Speed [min<sup>-1</sup>]</b>	200	150	150HV	150 200	150HV 400HV	300HV	300	300HV	100	150	150HV	200	200HV 500HV	100	100HV 500HV	50HV 500HV	
<b>200V</b>	•	•		•			•		•	•		•		•			
<b>400V</b>			•		•	•		•			•		•		•		•

# Spindle motors

## *αil*-D series



Powerful motors for high acceleration with high mechanical precision and low vibration (V3) – suited to spindles of high performance and large size machines.

- wide range of constant power up to high speed by winding switching
- power range 0.55-150 kW
- large torque at low speed available
- special versions with hollow shaft for centre-through-coolant or liquid cooled motors available
- protection class IP40, with oil seal IP54, IP65 as option for some models

<i>αil</i> -D series																			
Power [kW]	0.55	1.5	2.2	3.7	5.5	7.5	9	11	15	18.5	22	26	30	37	45	60	75	100	150
<i>αil</i> -D (200V) Standard model	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
Max. speed [rpm]	10000 15000	12000 15000	12000 20000 24000	12000 20000	12000 15000	12000 15000		10000 12000 15000	8000 12000	8000 12000	8000 12000	8000 12000	7000	7000	5000				
<i>αil</i> -D (400V) Standard model	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Max. speed [rpm]	10000	12000	12000 20000	12000 20000	12000	12000		10000 12000	8000 12000	8000 12000		8000 12000	7000	7000	5000	5000	5000	5000	5000
<i>αil</i> P-D (200V) Wide constant power range				•	•	•	•	•	•	•	•								
Max. speed [rpm]				10000	8000	8000	8000	8000	8000	6000	5000 6000								
<i>αil</i> P-D (400V) Wide constant power range							•		•	•	•								
Max. speed [rpm]							8000		8000	8000	5000 6000								
<i>αil</i> T-D (200V) Coolant through			•	•	•	•			•	•		•							
Max. speed [rpm]			20000 24000	12000 20000	12000 15000	12000 15000		10000 12000 15000	8000 12000	12000 15000		12000							
<i>αil</i> T-D (400V) Coolant through			•	•	•	•		•	•	•		•							
Max. speed [rpm]			20000	20000	12000 15000	12000		10000 12000 15000	12000	12000 15000		12000							
<i>αil</i> L-D (200V) Coolant through										•	•		•						
Max. speed [rpm]										20000	15000		15000						
<i>αil</i> L-D (400V) Coolant through										•	•		•						
Max. speed [rpm]										20000	15000		15000						

# Asynchronous built-in spindle motors

## BiI series



Compact built-in motors for compact, high speed, and high performance machines with best adaption in mechanical machine design.

- large torque at low speed – high power at high speed
- power range 0.75-50kW
- larger torque and higher power achieved by efficient heat radiation of stator resin mold (option) or copper-bar rotor (some models)
- maximum speed up to 70000 rpm

Standard 200V	BiI50S/30000	BiI50M/25000	BiI50L/25000	BiI50L/30000	BiI80S/20000	BiI80S/20000	BiI80S/30000	BiI80M/15000	BiI80M/15000	BiI100SS/12000	BiI80M/30000	BiI80L/8000	BiI100S/12500	BiI112S/15000	BiI112M/15000	BiI112L/15000	BiI112LL/15000	BiI132L/14000	BiI160M/13000	BiI160L/13000		
Stator outer Diameter [mm]	88				120				156		120		156		180				210		240	
Rotor inner Diameter [mm]	34.8				41				58		41		58		74				84		101	
Continuous power [kW]	0.75	1	1.5	5.5	1.5	2.2	7.5	1.5	2.2	3.7	11	1.1	2.2	15	18.5	18.5	22	22	22	22	26	
Length [mm]	71	100	154		135				195		152	205	245	202	219	272	330	394	360	321	406	
Speed [min <sup>-1</sup> ]	25000	20000	25000	30000	20000		30000	15000		12000	30000	8000	12500	15000				14000	13000			

Standard 200V	BiI16LL/13000	BiI170S/6000	BiI170M/6000	BiI180M/10000	BiI180L/10000	BiI180LL/10000	BiI200S/6000	BiI200M/6000	BiI200L/6000	BiI250S/6000	BiI250M/3000
Stator outer Diameter [mm]	240			292			300			370	
Rotor inner Diameter [mm]	101	110		124			146			168	
Continuous power [kW]	26	11	22	26	30	37	15	15	15	22	37
Length [mm]	461	265	335	363	455	515	302	322	394	395	522
Speed [min <sup>-1</sup> ]	13000	6000		10000			5000	6000		4000	3000

High speed 200V	BiI40S/70000	BiI60SS/50000	BiI60S/50000	BiI100S/20000	BiI100S/30000	BiI112SS/20000	BiI112S/20000	BiI112S/20000	BiI112M/20000	BiI112L/20000	BiI160M/20000	BiI160L/20000	BiI160LL/20000
Stator outer Diameter [mm]	88	110		156		159		180			240		
Rotor inner Diameter [mm]	28	37		70		74		74			101.4		
Continuous power [kW]	0.55	3.7	5.5	11	15	2.2	11	15	18.5	18.5	18.5	25	30
Length [mm]	71	106	145	202	202	155	200	219	272	330	321	406	461
Speed [min <sup>-1</sup> ]	70000	50000		20000	30000	20000							



Standard moulded (TYPE M) 200V	B;i150S/30000 TYPE M	B;i150M/25000 TYPE M	B;i150L/30000 TYPE M	B;i180M/15000 TYPE M	B;i180M/30000 TYPE M	B;i100S/12000 TYPE M	B;i100S/12500 TYPE M	B;i112S/15000 TYPE M	B;i112M/15000 TYPE M	B;i112L/15000 TYPE M	B;i112LL/15000 TYPE M	B;i160M/13000 TYPE M	B;i160L/13000 TYPE M	B;i160LL/13000 TYPE M	B;i170S/8000 TYPE M	B;i170M/8000 TYPE M	B;i180M/10000 TYPE M	B;i180L/10000 TYPE M	B;i180LL/10000 TYPE M	B;i200S/6000 TYPE M	B;i200M/6000 TYPE M	B;i200L/6000 TYPE M
Stator outer Diameter [mm]	107			138		167	180	200				267				332			340			
Rotor inner Diameter [mm]	34.8			52	41	70	58	74				101		110		124			146			
Continuous power [kW]	1.1	1.2	3	2.2	15	5.5	3.7	15	18.5	18.5	22	26	30	30	22	22	26	30	37	22	22	15
Length [mm]	86	113	165	210	210	159	227	237	299	350	414	342	421	494	288	358	385	475	535	317	337	415
Speed [min <sup>-1</sup> ]	30000	20000	30000	15000	30000	12000	12500	15000				13000			8000	6000	10000			6000		

High speed moulded (TYPE M) 200V	B;i160S/50000 TYPE M	B;i100S/30000 TYPE M	B;i112SS/20000 TYPE M	B;i112S/20000 TYPE M	B;i112M/20000 TYPE M	B;i112L/20000 TYPE M
Stator outer Diameter [mm]	129	180			200	
Rotor inner Diameter [mm]	37	70	74		74	
Continuous power [kW]	7.5	18.5	3.7	11		18.5
Length [mm]	158	227	170		215	299
Speed [min <sup>-1</sup> ]	50000	30000	20000			

Standard 400V	B;i180S/20000	B;i100S/12500	B;i112S/15000	B;i112M/15000	B;i112L/15000	B;i112LL/15000	B;i160M/13000	B;i160L/13000	B;i160LL/13000	B;i170S/8000	B;i170M/8000	B;i200S/6000	B;i200M/6000	B;i200L/6000	B;i250S/4000	B;i250M/6000	
Stator outer Diameter [mm]	120	156	180				240				300			370			
Rotor inner Diameter [mm]	41	58	74				101			110		146			168		
Continuous power [kW]	2.2	3.7	15	15	18.5	25	25	25	25	15	26	22	25	15	22	37	
Length [mm]	135	202	219	272	330	394	321	406	461	265	335	302	322	394	395	522	
Speed [min <sup>-1</sup> ]	20000	12500	15000				13000				6000				4000	6000	

High speed 400V	B;i100S/20000	B;i112SS/20000	B;i112S/20000	B;i112M/20000	B;i112L/20000	B;i112L/25000	B;i160LL/20000
Stator outer Diameter [mm]	156	159			180		240
Rotor inner Diameter [mm]	70	74		74			101.4
Continuous power [kW]	11	7.5	18.5	22		25	50
Length [mm]	202	155	200	272	330	330	461
Speed [min <sup>-1</sup> ]	20000	20000		20000		25000	20000

Ask your local FANUC partner for dedicated customized motor/amplifier combinations.

# Synchronous built-in spindle motors

## BiS series



Compact built-in motors with high torque for tough material (e.g. Titanium) and heavy cutting processes.

- large torque at low speed – strong neodymium magnet rotor structure
- power rating 11 – 80 kW
- low ripple – optimum magnetic circuit design
- larger torque and high power achieved by efficient heat radiation of stator resin mould
- suitable for lathe and gear cutting machines
- maximum speed – 33000 rpm

Standard 200V	BiS100L2/10000	BiS132L2/3000	BiS132L3/2500	BiS160L4/1400	BiS200L4/750
Frame [mm]	100	132		160	200
Stator outer Diameter [mm]	160	205		250	350
Rotor inner Diameter [mm]	60	92		120	170
Continuous Power [kW]	7.5	11	12	16	14
Stator length [mm]	170	200	250	310	324
Speed [min <sup>-1</sup> ]	6000 10000	3000	2500	1400	750

Standard 400V	BiS90L3/33000	BiS132L2/7000	BiS132L3/7000	BiS160L4/6000	BiS160L6/4500	BiS200L4/3000	BiS200L6/3000
Frame [mm]	90	132		160		200	
Stator outer Diameter [mm]	135	205		250		350	
Rotor inner Diameter [mm]	70	92		120		170	
Continuous Power [kW]	80	24	25	33	25	31	30
Stator length [mm]	170	200	250	310	410	324	424
Speed [min <sup>-1</sup> ]	33000	7000		6000	4500	3000	

# Amplifiers and power supply modules

## *αi*-D series



The energy efficient solution with power source regeneration and low loss power devices.

- modular structure with *αi*PS-D (power supply), *αi*SP-D (spindle amplifier), and *αi*SV-D (servo amplifier)
- compact amplifier unit for 1 spindle & 3 axes
- built-in Leakage Detection function
- Safe Torque Off function in servo and spindle amplifier
- quick maintenance by circuit board and fan replacement without disassembly
- 75/100kW spindle amplifier (400V) with high efficient SIC (silicon carbide) power circuit available
- high voltage protection modules for voltage protection of spindle and servo amplifier
- integrated brake circuit

Width [mm]	<i>αi</i> -D amplifier (200V)					
	Power supply <i>αi</i> PS-D [kW]	Spindle amplifier <i>αi</i> SP-D [kW]	Servo amplifier <i>αi</i> SV-D			Servo/Spindle amplifier <i>αi</i> SVP-D
			1 axis [A]	2 axes [A]	3 axes [A]	
60	3 11	2.2 7.5	4	4/4	4/4/4	20/20/20-2.2 40/40/40-2.2
			20	4/20		
			40	20/20		
			80	20/40		
			160	20/20/40		
90	20	11 18	360S	80/160 160/160	80/80/80	20/20/20-7.5 40/40/40-11
			360			
120	30 40	26 37	360			
240	60	45 60				

Width [mm]	<i>αi</i> -D amplifier (400V)					
	Power supply <i>αi</i> PS HV-D [kW]	Spindle amplifier <i>αi</i> SP HV-D [kW]	Servo amplifier <i>αi</i> SV HV-D			Servo/Spindle amplifier <i>αi</i> SVP HV-D
			1 axis [A]	2 axes [A]	3 axes [A]	
60	11	7.5	10	10/10	10/10/10	20/20/20-11
			20	10/20		
			40	20/20		
			80	20/40		
			40/40	20/20/20		
90	20	11 18	180S	40/80 80/80	40/40/40	10/10/10-7.5 20/20/20-11
			180			
120	30 60	26 37 45 60	180			
240	75 100 125	75 100 125	360 540			

# Amplifiers and power supply modules

## *αi-D* series



The cost efficient solution with integrated power supply.

- servo amplifier for up to 2 axes
- compact amplifier unit for 1 spindle & up to 3 axes
- low loss power devices
- safe torque off function
- quick maintenance by circuit board and fan replacement without disassembly
- servo amplifier suitable for auxiliary axes
- *αiPSVSP-D* especially for economical small/medium size compact lathe or milling machines

Width [mm]	<i>αi-D</i> amplifier (200V)			
	Servo amplifier <i>αiPSV-D</i>		Compact Servo/Spindle amplifier <i>αiPSVSP-D</i>	
	1 axis [A]	2 axes [A]	2 axes [A] / 1 spindle [kW]	3 axes [A] / 1 spindle [kW]
60	4 20 40 80	20/20 40/40		
180			20/20-7.5 20/20-11 40/40-18 80/80-18	20/20/40-7.5 20/20/40-11 40/40/40-11 40/40/40-18 40/40/80-18 80/80/80-18
240			80/80-26	80/80/80-26 80/80/160-26

Width [mm]	<i>αi-D</i> amplifier (400V)			
	Servo amplifier <i>αiPSV HV-D</i>		Compact Servo/Spindle amplifier <i>αiPSVSP HV-D</i>	
	1 axis [A]	2 axes [A]	2 axes [A] / 1 spindle [kW]	3 axes [A] / 1 spindle [kW]
60	10 20 40	10/10 20/20		
180			10/10-11 40/40-18	20/20/20-11 20/20/40-18 40/40/40-18
240			40/40-26	40/40/40-26 40/40/80-26

## Extra equipment



### Power Failure Backup Modules (PFBM)

In case of main power shutdown:

- Power supply module quickly recognises the power drop
- With PFB-24 module the CNC and drives can be supplied with 24Vdc control power from DC-link.
- Power Failure Backup Modules (PFB-C + capacitors) buffer energy to supply control power and to provide sufficient energy for a safe retraction of servo axes, preventing damage on tools and work piece.
- By using additional resistor modules (PFB-R) the servo and spindle motors can be stopped quickly, avoiding free-run.



### Energy Charge Module (ECM)

Suitable for large machines equipped with large servomotors, e.g. press machines that generate power peaks during acceleration and deceleration. Energy Charge Module reduces this peak of electrical power consumption and minimises the voltage fluctuation of electrical facilities. Energy released during deceleration can be stored in capacitor modules and used for acceleration. This ensures the electric power consumption can be balanced effectively.

## Accessories

### Separate Detector Unit (SDU)

- To connect scales or rotary encoders with Fanuc serial or analogue interface

### Position coders

- *α*BZ
- *α*CZ
- *α* Position Coders

### High resolution interface circuits

### Rechargeable battery unit

- Buffering absolute axes position in Power OFF status and CNC data

### Filter modules necessary to fulfil EMC-requirements

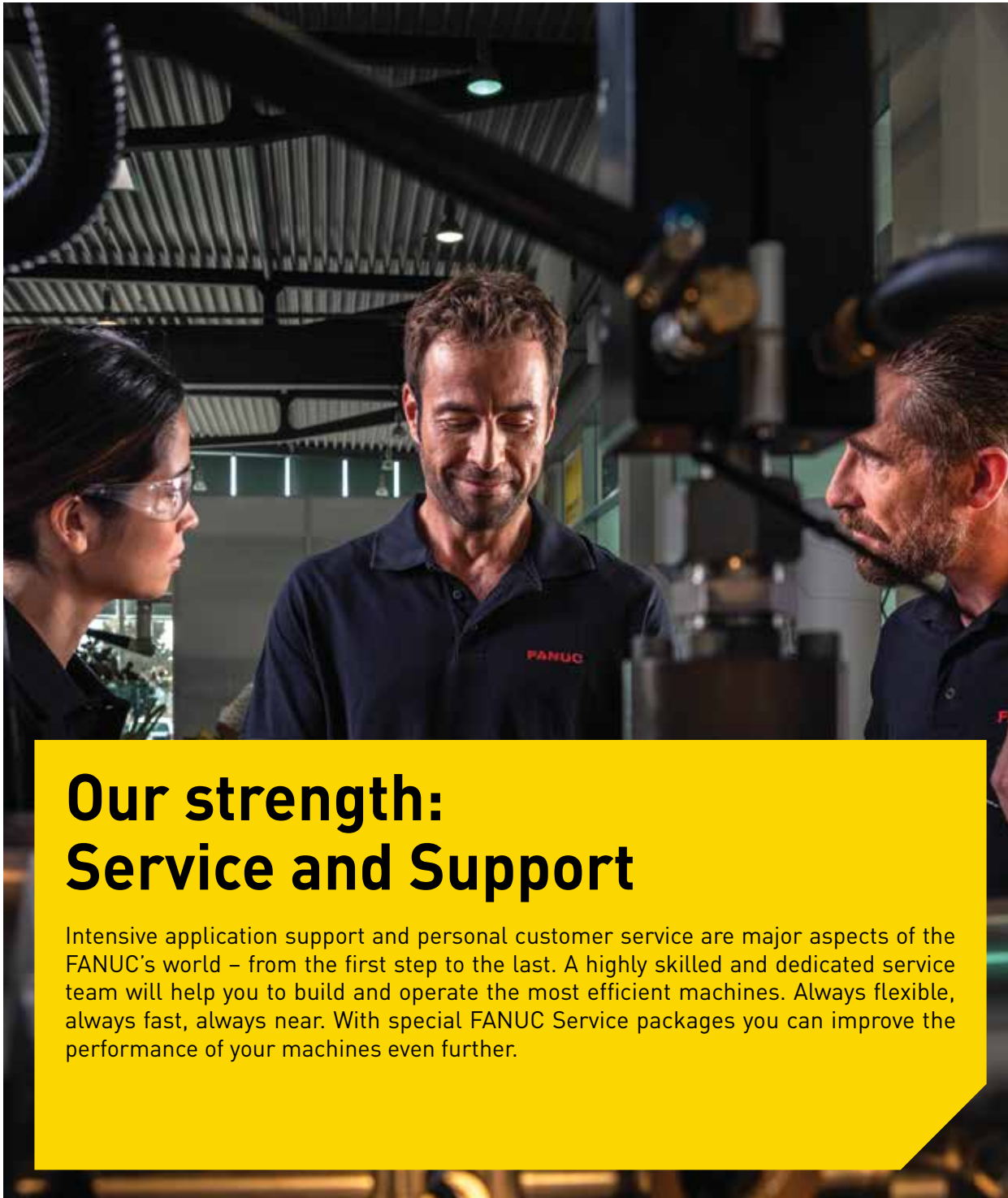
- AC line filters/AC reactors
- noises filters

### Switching and protection devices detecting overcurrent and overvoltage

- magnetic contactors
- circuit breakers
- lightning surge absorbers

### Connection material

- connectors
- short bars
- transformers
- 24V power supplies



## Our strength: Service and Support

Intensive application support and personal customer service are major aspects of the FANUC's world – from the first step to the last. A highly skilled and dedicated service team will help you to build and operate the most efficient machines. Always flexible, always fast, always near. With special FANUC Service packages you can improve the performance of your machines even further.



## FANUC Repair Centre

Benefit from worry-free repair services by FANUC experts while you can concentrate on your business. We grant reliable repairs for amplifiers – including more than 30 year old models – motors, CNC, PCB, and laser power supply.

**Extend the lifetime of your equipment.**



# Wherever you need us: we are there

With the largest global network of local subsidiaries across all continents, we are always there to meet your needs when you need us. Fast and efficient – 24/7. You will always have a local contact that speaks your language.



## FANUC Academy

We help you get the most potential out of your automation by enhancing the skills of your employees. Certified FANUC instructors train them in our fully equipped professional training centres, or at your own premises, using standard training modules as well as customised training packages to meet your specific needs.

**Let's optimise your productivity.**



**Service First** 

# One common servo and control platform – Infinite opportunities THAT'S FANUC!



## **FA**

CNCs,  
Servo Motors  
and Lasers

## **ROBOTS**

Industrial Robots,  
Accessories  
and Software

## **ROBOCUT**

CNC Wire-Cut  
Electric Discharge  
Machines

## **ROBODRILL**

Compact  
CNC Machining  
Centres

## **ROBOSHOT**

Electric CNC  
Injection Moulding  
Machines

## **IoT**

Industry 4.0  
solutions