THE FACTORY AUTOMATION COMPANY

FANUC

*i*ntelligent robot

Smart robot functions

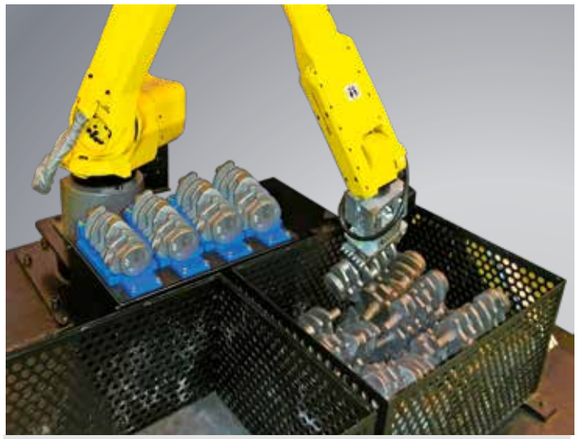
Customise your robots!

With more than 250 software functions for enhanced intelligence, motion, safety and productivity, and a wide variety of high quality FANUC accessories we have a solution for every conceivable application. We make your robots able to see, to feel, to learn and to behave safely. **Increase your productivity!**

Your benefits:

- Vision sensor and force sensor with the FANUC robots realise highly automated manufacturing systems in assembling and machining areas.
- Vision sensor can be applied to bin-picking automation.
- Intelligent robot eliminates peripheral equipment conventionally required for part-positioning and rearrangement, and reduces total cost of your system.
- Force control function with the force sensor automates high precision insertion of parts with sensitive control of force applied to a robot end effector.
- Intelligent robot promotes robotisation of deburring and polishing by contouring motion with specified pushing force.
- Robot accuracy enhancement product suites improve robot's positioning accuracy and enhance productive utilisation of offline programming system for an actual robot

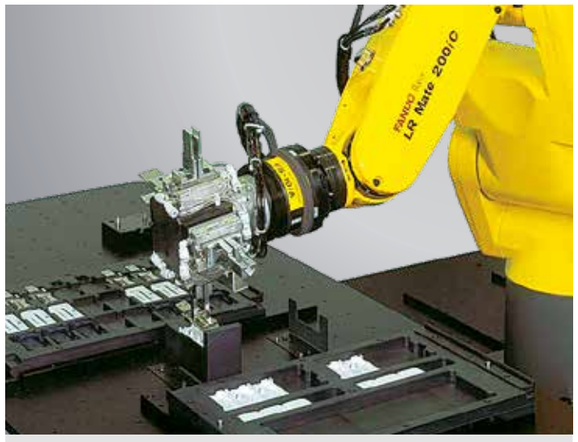
Application examples



Bin picking

Visual tracking

Visual inspection after assembling



Precise assembling of small parts

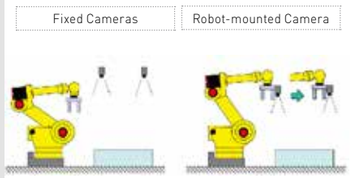
Dimension check of holes
(Gage insertion by force control)

Force controlled deburring

Integrated Robot Vision - *i*RVision®

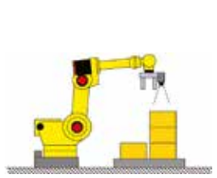
WATCH THE VIDEO

Key functions



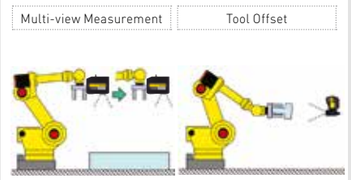
2D single-/multi-view vision process function

Allows the robot to locate a large rigid object precisely by combining the results from multiple snapped images.



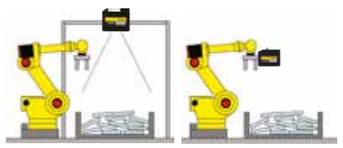
Depalletising vision process function

Allows a single camera to estimate Z height of each palletised part using the scale information on an image,and outputs X, Y, Z and rotation detected.



3D Laser Vision Sensor function

Allows the robot to detect 3D position and posture of a target object to recognize a large part by multi-view measurement and to conduct tool offset for gripping errors.

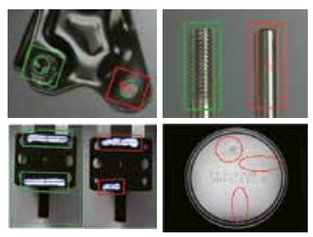


Bin picking function

Allows the robot to pick randomly piled objects by the sensor measurement along with avoiding interference.

Visual tracking function (*i*RPickTool)

Allows the robot to track objects on moving linear/ circular conveyors. Dynamic load balancing among multiple robots is also available.

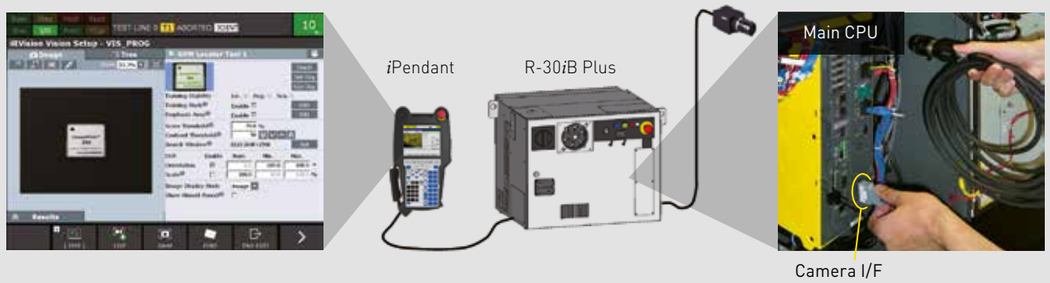


Anti-Defect vision process function

Allows robotised automation to carry out error-proofing and flaw detection.

System configuration and setup of *i*RVision

The *i*RVision function and a dedicated camera port are integrated in the robot controller. The function can easily be set up with the graphical user interface on *i*Pendant. The *i*Pendant can also serve as a runtime monitoring screen.



Specifications

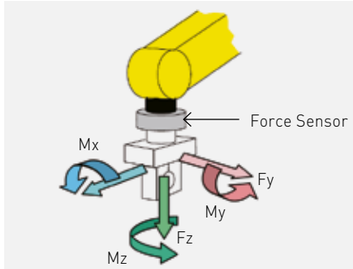
2D Camera		Image Type	Grayscale / Colour
		LED Light for 2D Detection	Red / White / None
		Image Resolution	Grayscale:1280×1024 / Colour: 640×512
		Focal Length [mm]	8 / 12 / 16 / 25
		Outer Dimension [mm]	80×131.8×74
		Mass [kg]	0.6
3D Laser Vision Sensor		Measurement Method	3D measurement with structured laser slit beams
		Measurement Range [mm]	219×175×100
		LED Light for 2D Detection	Red / None
		Outer Dimension [mm]	187.6×145.8×88.7
		Mass [kg]	0.8
3D Vision Sensor 3DV/400, 3DV/600		Measurement Method	3D measurement with a single pattern light
		Measurement Range [mm]	3DV/400: 268×262×500 3DV/600: 575×499×500
		Maximum 3D Points	1104×950
		LED Light for 2D Detection	Blue
		Outer Dimension [mm]	154×133×51
		Mass [kg]	1.1
3D Vision Sensor 3DV/1600		Measurement Method	3D measurement with a single pattern light
		Measurement Range [mm]	1280×1200× 2000
		Maximum 3D Points	2208×1920
		LED Light for 2D Detection	Blue
		Outer Dimension [mm]	234 × 198.2 × 70
		Mass [kg]	3.2
Common specifications		LED Power Supply	R-30*i*B Plus Integrated
		Operating Temperature [°C]	0 to 45
		Protection Class	IP67
		Robot Mountable	Yes
		Connectable Number	Up to 27

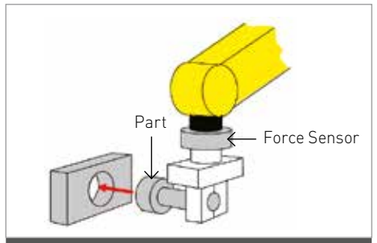
Force Sensor

WATCH THE VIDEO

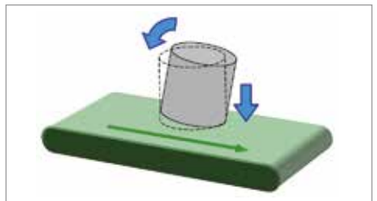
Key functions

- Force sensor detects both force and torque applied to a robot end-effecter in Fx, Fy, Fz, Mx, My and Mz simultaneously.
- Realises H7/h7 JIS tolerance insertion.
- Robotises various applications requiring an intentional contact of two objects, such as face matching and contouring.



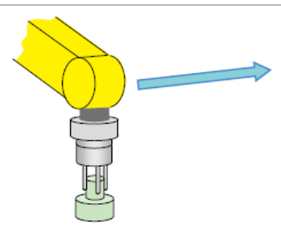


Precise Insertion



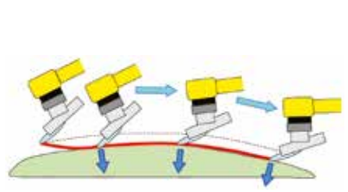
(Raw material grinding with belt sander)

Face matching / Constant pushing

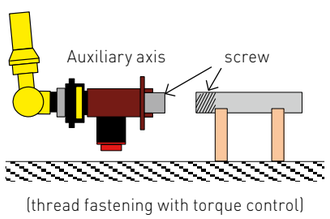


Mass measurement in motion

Insertion with position searching and phase matching



Contouring



(thread fastening with torque control)

Thread fastening

* Force control performance of a robot depends on the robot type, gripper design/weight, parts shape/weight to be handled as well as parts fixing method.
The feasibility and applicability of a force sensor should be determined through testing with the actual production conditions.

Specifications		**FS-15*i*Ae**	**FS-15*i*A**	**FS-40*i*A**	**FS-100*i*A**	**FS-250*i*A**
		for a mini robot (3-axis)	for a mini robot	for a small robot	for a medium robot	for a large robot
Dimensions		φ90 × 36 mm	φ94 × 43 mm	φ105 × 47 mm	φ155 × 59 mm	φ198 × 85 mm
Mass [kg]		0.31	0.57	0.87	3.2	6.9
Rated load	Fx, Fy, Fz	147 N (Fz)	147 N	392 N	980 N	2500 N
	Mx, My, Mz	11.8 Nm (Mx,My)	11.8 Nm	39.2 Nm	156 Nm	500 Nm
Static overload	Fx, Fy, Fz	1570 N (Fz)	1570 N	3920 N	9800 N	25000 N
	Mx, My, Mz	125 Nm (Mx, My)	125 Nm	392 Nm	1560 Nm	5000 Nm
Resolution	Fx, Fy, Fz	0.39 N (Fz)	0.39 N	1.0 N	2.0 N	4.9 N
	Mx, My, Mz	0.016 Nm (Mx, My)	0.016 Nm	0.029 Nm	0.08 Nm	0.25 Nm
Accuracy		3% or less	2% or less of the rated load			
Operating Temperature		0 to 45 ° C				
Protection Class		IP67				
Applicable robot		M-1*i*A, M-3*i*A, LR Mate 200*i*D, M-10*i*A		M-20*i*A, M-20*i*B	M-710*i*C	R-2000*i*C

* A part of the above list includes design specifications.

Robot accuracy product suites *i*RCalibration

Functions to improve robot accuracy using the integrated vision

***i*RCalibration**	**Outline**
Vision Mastering	Robot positioning accuracy improvement
Vision Axis Master	Automatic one-axis mastering with vision
Vision TCP Set	Automatic setting of a tool center point
Vision Frame Set	Automatic setting of a user frame
Vision Multi-Cal	Automatic calibration of a multi-arm system
Vision Shift	Man-hours reduction for robot teaching
Mastering Recovery	Mastering condition recovery after maintenance operation as mechanical part replacement

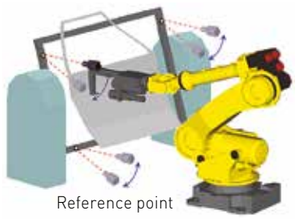
Key functions

Vision Mastering

The function calibrates the robot mechanics. It improves the positioning accuracy of a robot, contributing to an accuracy improvement of TCP setting, vision application and easy utilisation of offline programs.

Vision TCP Set

The function allows you to set a tool frame automatically which was conventionally done by manual operation of the robot. It helps to set TCP accurately.



Vision Shift / Vision Frame Set

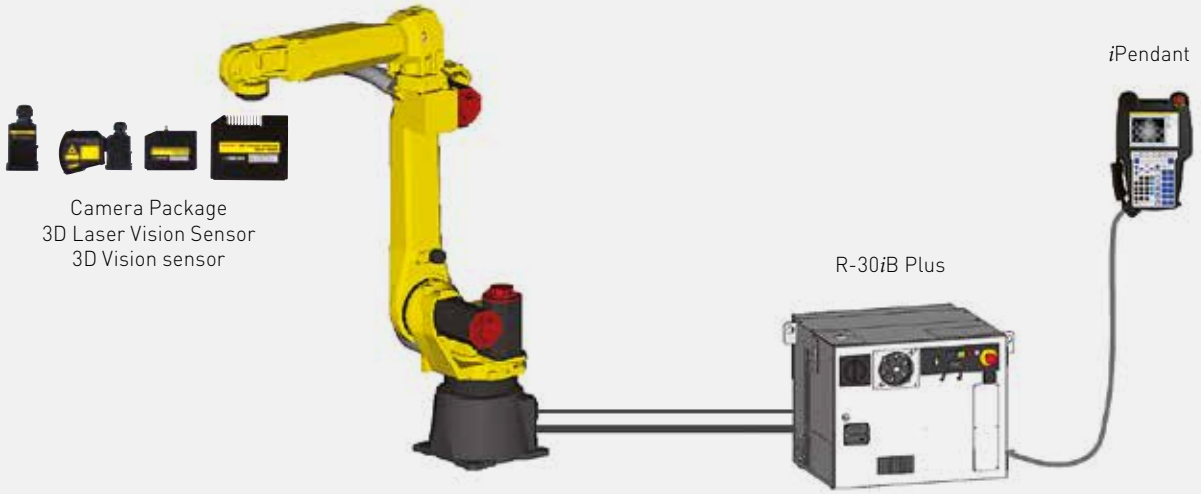
The function guides the robot to measure reference points on a part or its fixture automatically and adjusts programmed points. It helps to save both time and manpower for robot system relocation and offline program utilisation. It can also be used to set a user frame automatically by the measured reference points data.

Vision Multi-Cal

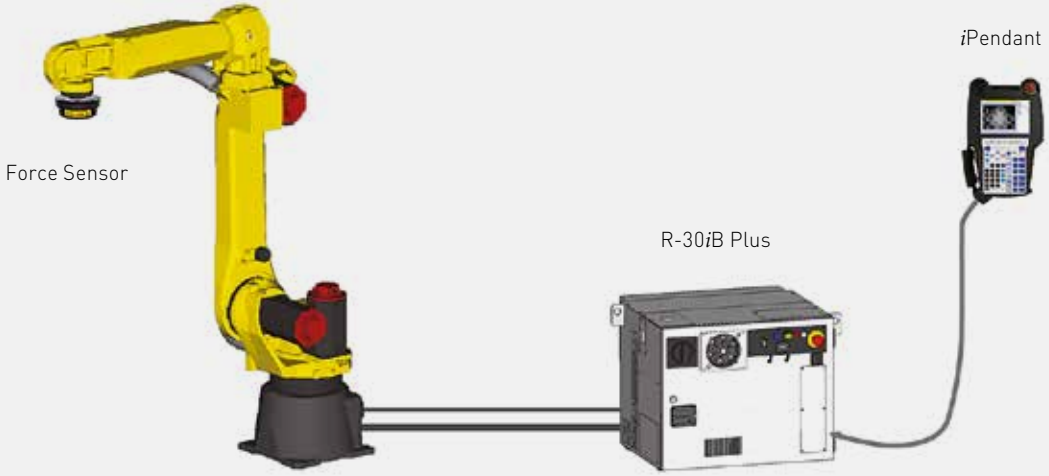
The function calibrates relations between multi-group robots which are under coordinated control. Both two-arm configuration and one-arm and one-positioner configuration are supported. It helps to improve the coordinated motion accuracy.

Basic configurations

*i*RVision®



Force Sensor



*i*RCalibration®

MFL-04300-EN-01/2021