Vision and Force
Catalog

FANUC

Advanced sensor technologies

Provides the robot with the senses of touch and sight

Like a human hand, Force Control provides the sense of touch and Vision provides the sense of sight. Achieve greater flexibility and efficiency by combining both Force Control and Vision for your automation needs.

FANUC

The automation of work

FANUC robots, outfitted with advanced sensors from FANUC, can automate intricate tasks that would typically require master craftsmen or elaborate fixtures. By automating these complex tasks, you will increase productivity, enhance quality, and reduce costs.

FORCE CONTROL

Features

Force Control is a system that operates in a closed loop. This system uses force and torque data from a sensor attached to the robot's wrist to guide the robot's position and trajectory, all while maintaining a specified force.

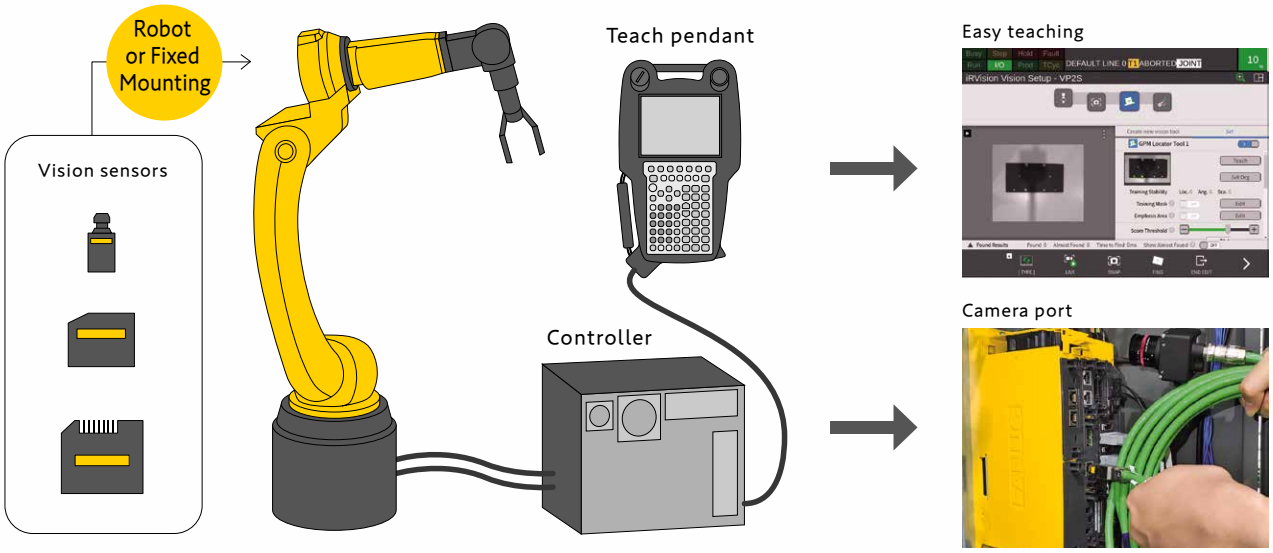
Benefits

A variety of Force Control functions make it possible to perform intricate tasks such as deburring, polishing, and assembly, which were previously performed by skilled workers or specialized machines.

Vision Sensor Functions

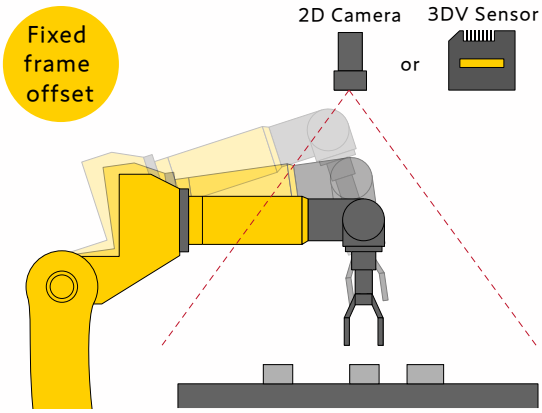
Easy connection

The FANUC vision system is fully integrated into the controller. Cameras and sensors connect directly to the controller. Integrated vison software allows vision to be seamlessly integrated into robot programming and to be taught through the robot teach pendant without the need for a PC.



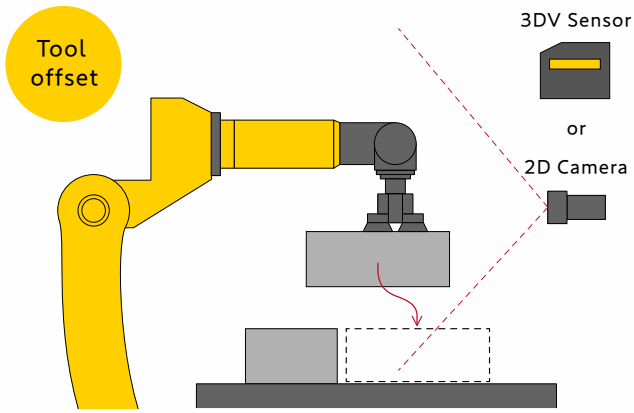
Fixed frame offset

Locates loose workpieces using a 2D camera or 3D Vision Sensor and provides the workpiece position to the robot.



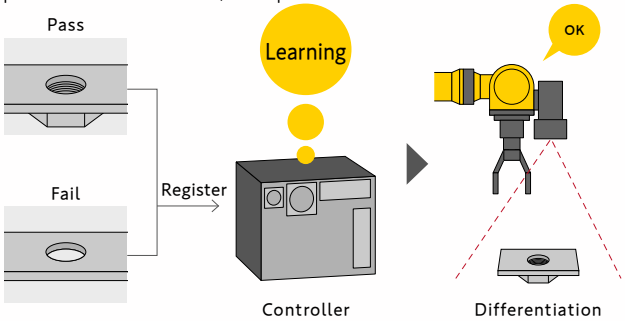
Tool offset

Locates the workpiece relative to the gripper and provides an offset to correct for deviation in picking.



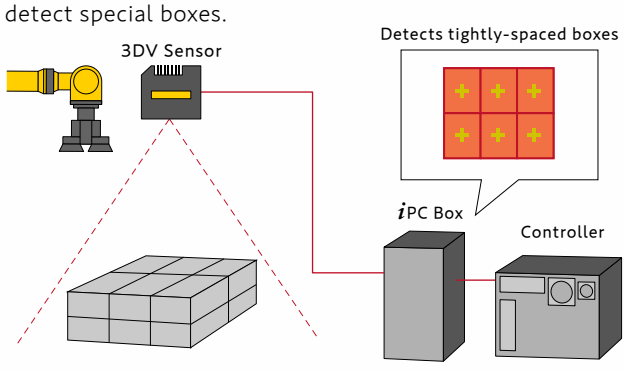
AI Error Proofing

AI learns to differentiate between OK and NG workpieces using operator labeled images. This can be used to determine Pass or Fail of a process, workpiece presence or absence, and part orientation.



AI Box Locator iPC Box

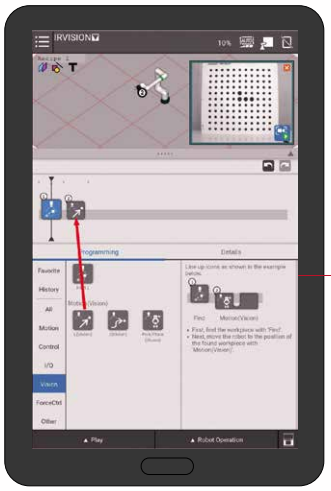
Pretrained AI is able to detect boxes of various sizes on a pallet. AI training can be improved by the user to detect special boxes.



Easy teaching

Icon-based programming on the Tablet TP allows for easy programming of the robot and vision in a single interface. Easily create programs to locate and pick workpieces or locate machine tools for machine tending.

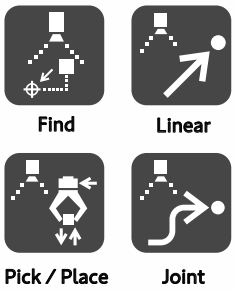
Editor Screen



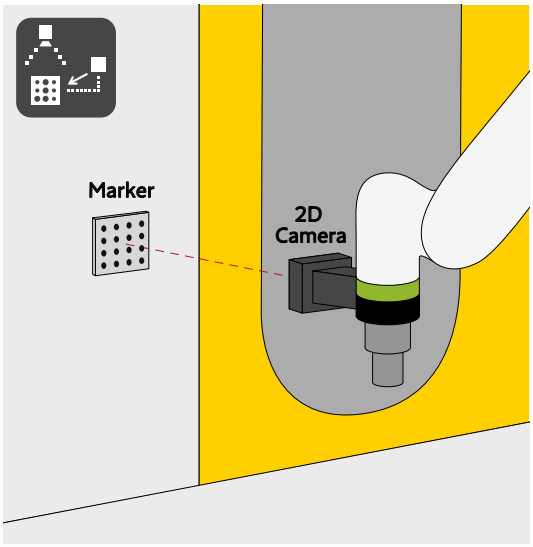
Easy operation

Easy teaching

Icons

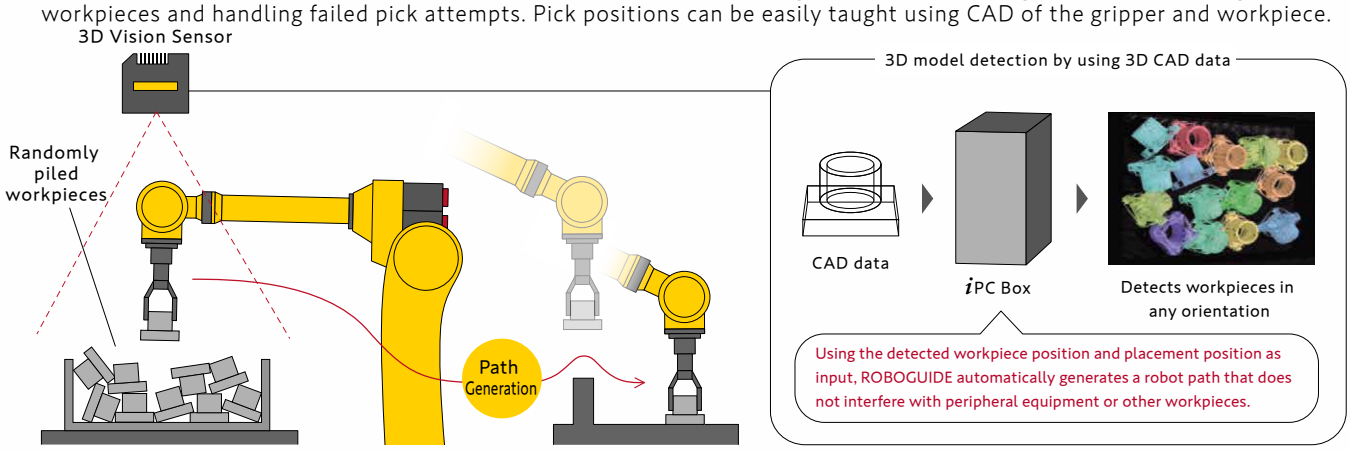


Icons are for the Tablet TP only and cannot be used on the *i*Pendant.



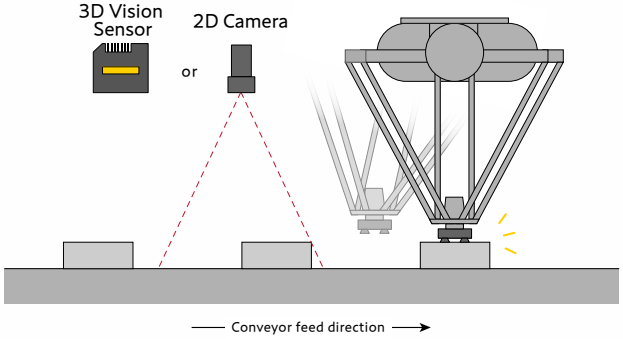
Bin Picking Function *i*PC Box

Pick randomly loaded-workpieces from a container using a 3D Vision Sensor. Integrated Interference Avoidance prevents collisions between the robot and the container or workpieces. The integrated Part List Manager allows for picking multiple workpieces and handling failed pick attempts. Pick positions can be easily taught using CAD of the gripper and workpiece.



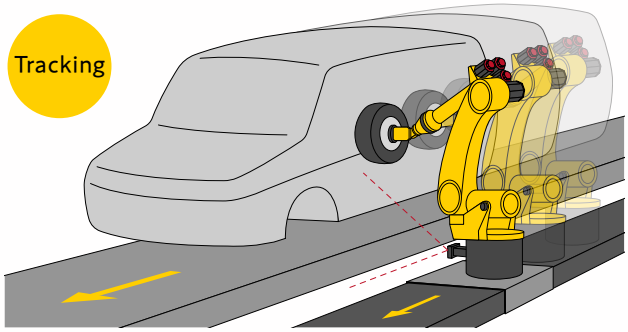
Visual Tracking Function

Enables the robot to track workpieces on moving linear or circular conveyors. A pulsecoder enables the robot to track the workpiece found by vision along the conveyor.



Realtime Visual Tracking Function *i*PC Box

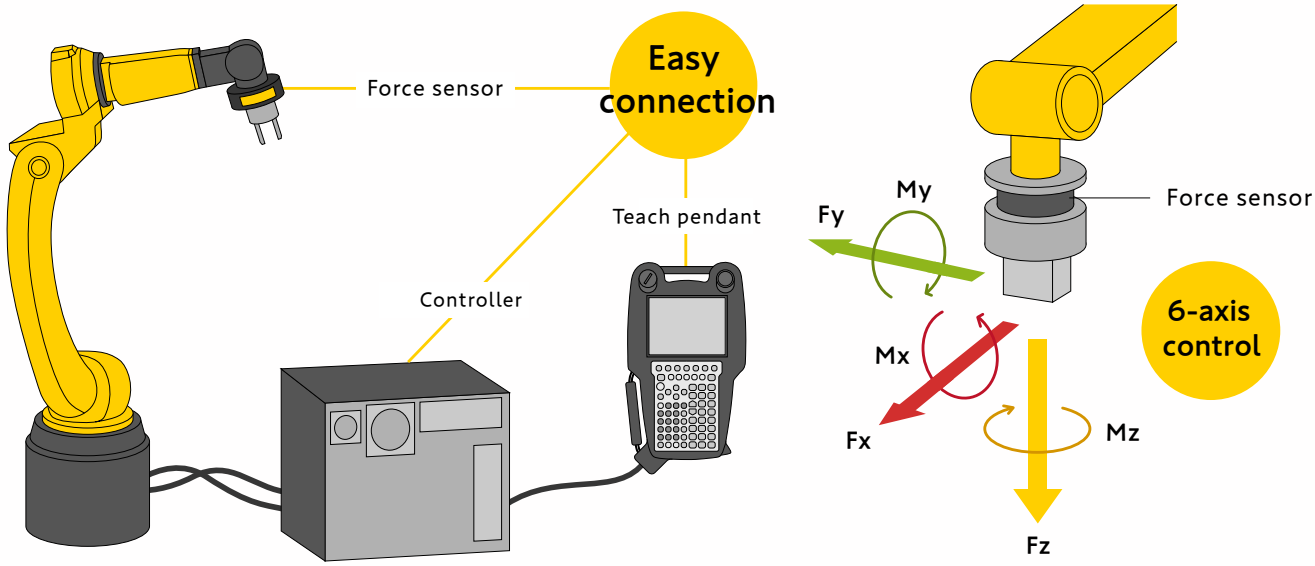
Enables the robot to track workpieces without the use of a pulsecoder by using a vision camera, allowing the robot to perform assembly operations.



Force Control Functions

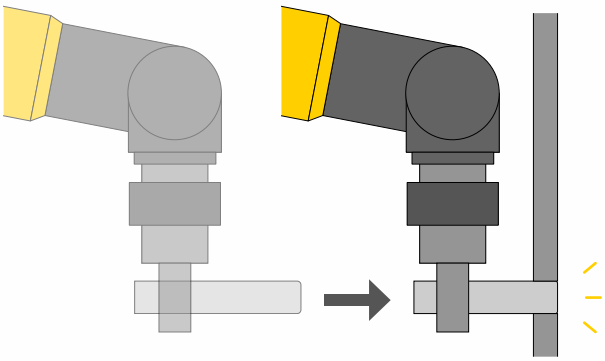
Easy connection

The FANUC Force Control system is fully-integrated with a force sensor that is connected to the controller, eliminating the need for a personal computer.



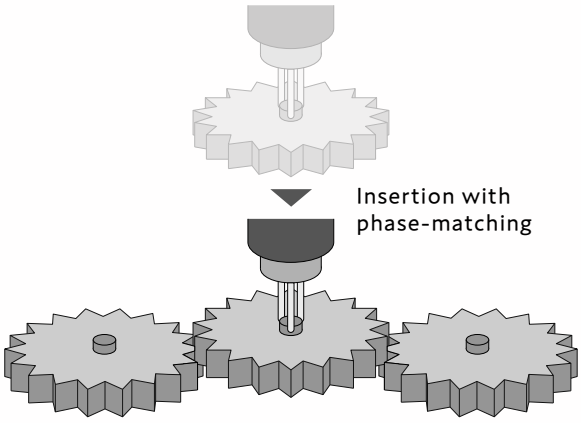
Precise insertion

Designed for applications that insert a component to a depth. A practical example is the insertion of a shaft into a hole with a fit tolerance of 10 micrometers or more.



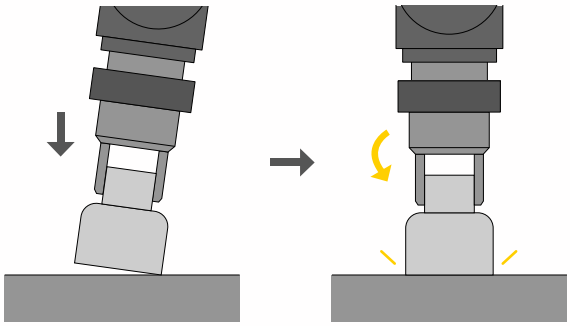
Insertion with phase-matching

Designed to ensure the alignment of a keyed shaft with a keyway, facilitating gear engagement.



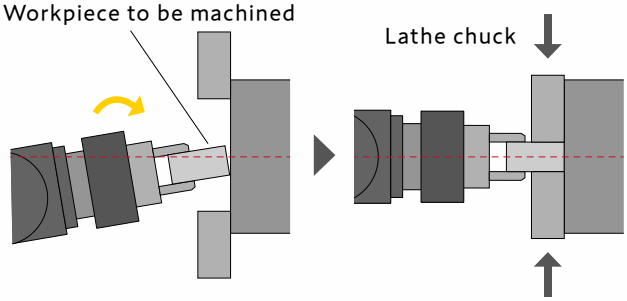
Face matching

Designed to match two flat surfaces.



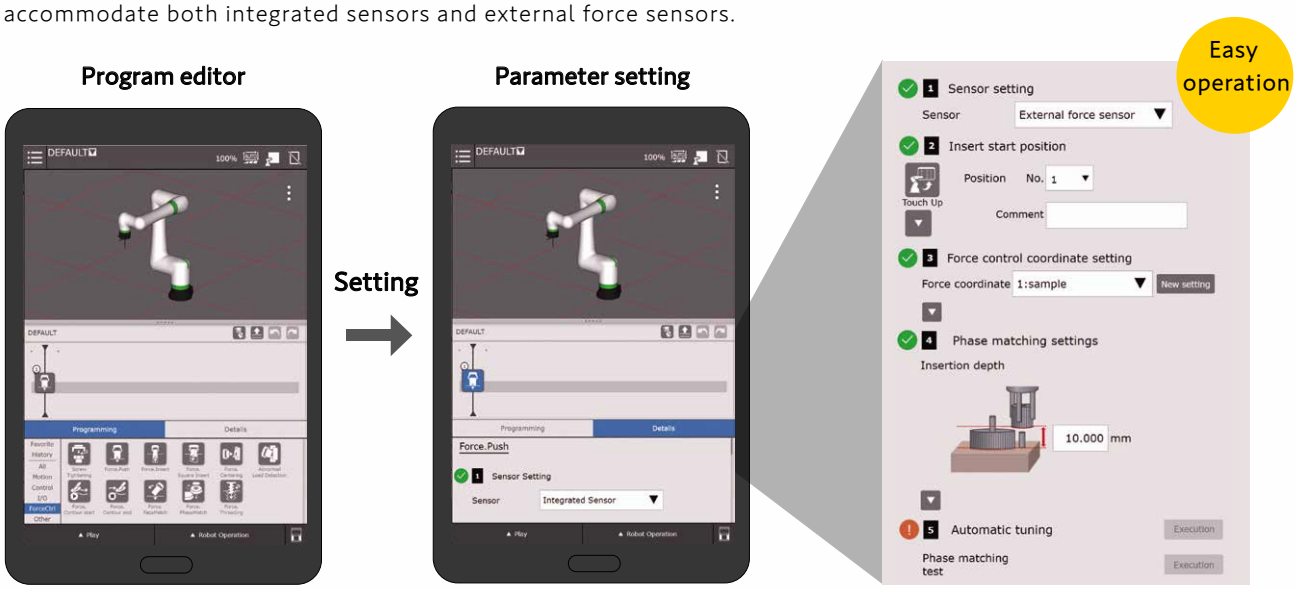
Centering

Designed to accurately center and align parts with a lathe chuck.



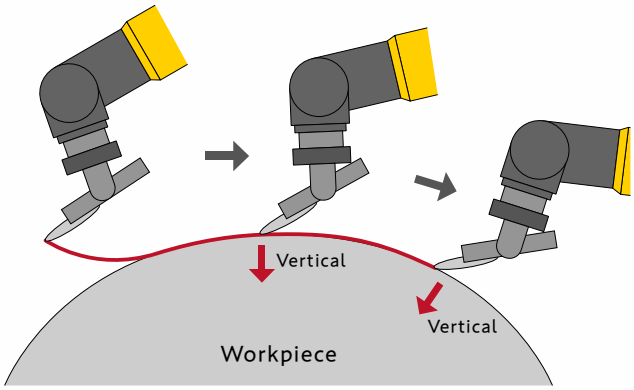
Easy teaching

The process of creating force control programs can be effortlessly accomplished by sequentially setting the force control parameters. Force control parameters can be easily set using auto-tuning. The CRX is also designed to accommodate both integrated sensors and external force sensors.



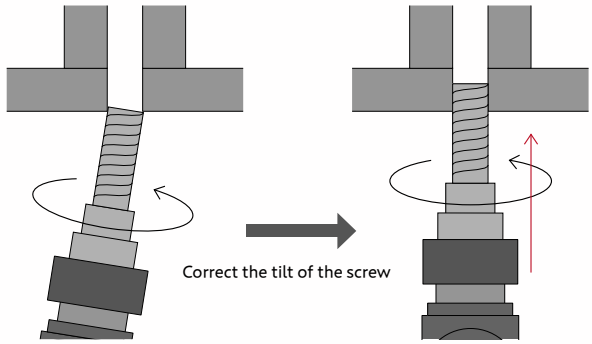
Contouring (deburring, polishing)

The purpose of contouring is to apply a constant force relative to the component's surface while following a programmed path. Contouring is commonly used for tasks such as deburring, sanding, grinding, and polishing.



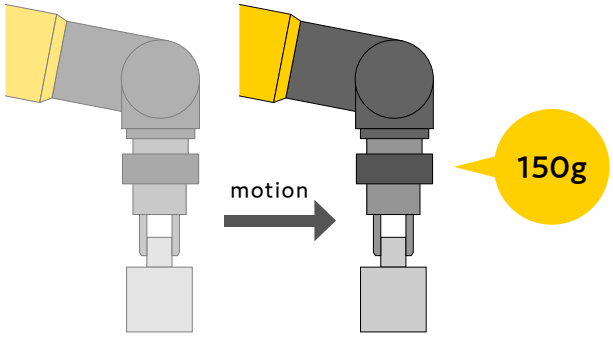
Threading

Threading is designed to correct errors in position and orientation while tightening a screw.



Weighing on-the-fly

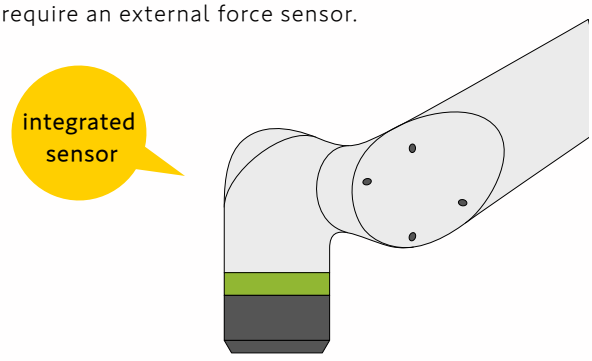
This function weighs a component while the robot is moving.



Force control with integrated sensor

CRX series

Force Control with integrated sensors is exclusive to the CRX series of collaborative robots, and does not require an external force sensor.



VISION SENSOR

Features

Vision allows the robot to accurately locate a workpiece in a variety of scenarios using both fixed and robot-mounted cameras and 3DV sensors. Vision provides offsets to guide the robot and adjust for workpiece movement.

Benefits

Utilizing vision gives robots greater flexibility and eliminates the need for fixturing when staging workpieces.
Vision allows robots to perform applications such as bin picking, depalletizing, line tracking, inspection, pick and place, and assembly.

Specifications

Complete product lineup for a variety of force control and vision applications

Vision sensor

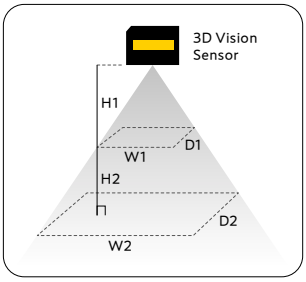
Items	2D Camera
Image Type	Grayscale/ Color
Image Resolution [pixel]	Grayscale 2432×2048 Color 1216×1024
Focal Length [mm]	8 / 12 / 16 / 25
LED Light for 2D Detection	Red/White/None
Max. Number of Cameras	Up to 28
Robot Mountable	Yes
Outer Dimension[mm]	75×75×123
Mass[kg]	0.6
Protection Class	IP67
Operating Temperature[℃]	0 to 45

Items	3D Vision Sensor 3DV / 70, 3DV / 200, 3DV / 400, 3DV / 600	3D Vision Sensor 3DV / 1600
Measurement Method	Single Snap 3D Imaging	
Maximum 3D Points	3DV / 70 : 870×950 3DV / 200 : 1060×950 3DV / 400 : 1104×950 3DV / 600 : 1104×950	1104×960
Measurement Range[mm]* W1 x D1 x H1, W2 x D2 x H2	3DV/70 : 55×70×167,83×92×56 3DV/200 : 123×123×302,219×198×190 3DV/400 : 268×262×646,527×460×500 3DV/600 : 575×499×1247,805×698×500	Near mode 806 x 814 x 1000, 1491 x 1380 x 700 Standard mode 1245 x 1178 x 1448, 3203 x 2797 x 2000 Far mode 1491 x 1380 x 1700, 3740 x 3239 x 2300
LED Light for 2D Detection	Blue	
Max. Number of Sensors	Up to 16	Up to 4
Robot Mountable	Yes	
Outer Dimension[mm]	156×123×51	234×198.2×70
Mass[kg]	1.1	3.2
Protection Class	IP67	
Operating Temperature[℃]	0 to 45	

*i*PC Box

Items	
Input Voltage	100V AC to 240V AC Single-phase
Outer Dimension[mm]	500×200×320
Mass[kg]	19
Protection Class	IP54
Operating Temperature[℃]	0 to 45

*Measurement Range



Force sensor

Items		FS-15*i*Ae	FS-15*i*A	FS-40*i*A	FS-100*i*A	FS-250*i*A
Rated load	Fx, Fy, Fz	147N (Fz)	147N	392N	980N	2500N
	Mx, My, Mz	11.8Nm (Mx,My)	11.8Nm	39.2Nm	156Nm	500Nm
Static overload	Fx, Fy, Fz	1570N (Fz)	1570N	3920N	9800N	25000N
	Mx, My, Mz	125Nm (Mx,My)	125Nm	392Nm	1560Nm	5000Nm
Resolution	Fx, Fy, Fz	0.39N (Fz)	0.39N	1.0N	2.0N	4.9N
	Mx, My, Mz	0.016Nm (Mx,My)	0.016Nm	0.029Nm	0.08Nm	0.25Nm
Accuracy		3% or less	2% or less of the rated load	2% or less of the rated load	2% or less of the rated load	2% or less of the rated load
Outer Dimension[mm]		φ90×36	φ94×43	φ105×47	φ155×59	φ198×85
Mass[kg]		0.31	0.57	0.87	3.2	6.9
Protection Class		IP67				
Operating Temperature[℃]		0 to 45				

FANUC CORPORATION

●Headquarters 3580, Shibokusa, Oshino-mura, Minamitsuru-gun Yamanashi, 401-0597, JAPAN
Phone: (+81)555-84-5555 https://www.fanuc.co.jp/

●Overseas Affiliated Companies

FANUC America Corporation	Phone: (+1)248-377-7000	https://www.fanucamerica.com/
FANUC Europe Corporation, S.A.	Phone: (+352)727777-1	https://www.fanuc.eu/
SHANGHAI-FANUC Robotics CO., LTD.	Phone: (+86)21-5032-7700	https://www.shanghai-fanuc.com.cn/
KOREA FANUC CORPORATION	Phone: (+82)55-278-1200	https://www.fkc.co.kr/
TAIWAN FANUC CORPORATION	Phone: (+886)4-2359-0522	https://www.fanuctaiwan.com.tw/
FANUC INDIA PRIVATE LIMITED	Phone: (+91)80-2852-0057	https://www.fanucindia.com/
FANUC SINGAPORE PTE. LTD.	Phone: (+65)6567-8566	https://www.fanuc.com/fsp/
FANUC THAI LIMITED	Phone: (+66)2-714-6111	https://www.fanuc.com/fth/
FANUC MECHATRONICS (MALAYSIA) SDN. BHD.	Phone: (+60)3-3082-1222	https://www.fanuc.com/fmm/
PT. FANUC INDONESIA	Phone: (+62)21-4584-7285	https://www.fanuc.com/fin/
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