PrecisePlace100

Collaborative Cartesian Tabletop Robot

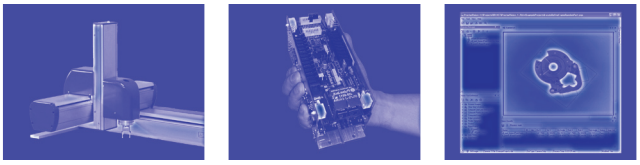
Unlike many other collaborative robots that are intrinsically dangerous but operate in a collaborative mode, the PrecisePlace 100 Cartesian robot (PP100) is intrinsically safe and is designed to limit all collision forces all of the time. This permits users to safely access the robot's active workspace while the robot is operating at full speed without requiring safety barriers. These barriers are expensive, consume a great deal of bench/floor space, obstruct access to equipment and reduce productivity. Furthermore, all control electronics, harnesses and power supplies are built into the PP100's structure, which results in an extremely compact device that saves space and set-up time. This novel collaborative, space saving design combined with a low cost, reliable mechanism and efficient t-bot drive make the PP100 an ideal choice for applications where size, safety, cost, and the combined productivity of automation and personnel are critical.

TUV Certified Collaborative Robot Forces

The lightweight PP100 comes out of the box fully assembled. It can be carried by one person, mounted on a table and, by plugging in just an AC power cord and an Ethernet cable, is ready to operate. Due to its collaborative design, small footprint, embedded controller and absolute encoder servo motors (which do not require any movement at start-up), it can greatly simplify workcell design, integration and implementation.

In addition to implementing special algorithms that enhance the collaborative nature of this robot, Precise's Guidance Motion Controller (which is embedded in the robot base) provides many advanced features such as: kinematics for simplified programming; gravity balanced free mode teaching that allows the robot to be taught by manually leading the end effector; a vision interface for advanced sensing; absolute encoder servo motor control for quiet operation and motionless homing; and an embedded web server that permits the robot to be operated locally via a standard browser executed on a PC, a wireless tablet or remotely from anywhere in the world.

PRECISE AUTOMATION



General Specifications	Range & Features
Range of Motion & Resolution	
X Axis	500 mm standard, 1085 mm option available in XYZ version 685 mm standard, 1270 mm option available in XZ version
Y Axis	350 mm standard
Z Axis	229 mm standard
Theta Axis	+/- 270 degrees
Gripper	Servo gripper that can grip Life Science plates in both portrait and landscape orientations. Software can control squeeze force (from 0-23N for close force, 0-10N for open force) and open/close speed. Safety features include: spring for protection against dropping plates when robot is powered down or e-stop pressed (gripper provides 7-10N of close force when motor power is off)
Repeatability	+/- 100 µm overall in X, Y and Z directions at 18-22 degrees C
Performance and Payload	
Maximum Acceleration	1.0G with 500 gm payload
Maximum Speed	1,500 mm/sec in X/Y
Maximum Payload	2 kg with gripper option. 3 kg with XZ or XYZ configuration without Theta and gripper
Motors	Brushless DC servo motors with absolute encoders on X, Y, Z and Theta axes, no motion during homing.
TUV Certified Collaborative Forces	All Precise collaborative robots have been measured by TUV and certified to exert forces that fall within the force guidelines for collaborative robots as defined by the recent ISO/TS 15066 Standard on Collaborative Robots. Even maximum speed collisions in free space are well under the ISO force limits for operator safety. However, in order to use a robot in an application without safety shields, the application as a whole (including end effectors, operation methods, objects being handled and obstacles in the workcell) must be evaluated for safety. For more information on the evaluation of applications and workcells without safety shields, please contact Precise Automation.
Interfaces	
General Communications	RS-232C interface, 10/100 Mbps Ethernet port, E-stop input, all available on X axis end cap
Digital I/O Channels	Four optically isolated inputs and four optically isolated outputs available on X-axis endcap. Option available for an additional 12 optically isolated digital inputs and 8 optically isolated digital outputs on X-axis back cover. Additional remote I/O available via Precise RIO modules or 3rd party MODBUS/TCP devices
Operator Interface	Web based operator interface supports local or remote control via browser connected to embedded web server
Programming Interface	Three methods available: DIO MotionBlocks (PLC), embedded Guidance Programming Language (standalone, modeled after Visual Basic.Net), PC control using open source TCP/IP Command Server operated via Ethernet connection (TCP).
Required Power	Input range: 90 to 264 VAC, single phase, 50-60 Hz, 365 watts maximum
Weight	20 kg for 635 mm travel version, 32 kg for 1270 mm travel version

XZ Theta PP100
with gripper

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