

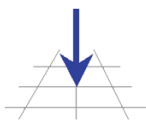
# PRECISEFLEX 400

## World's First Collaborative SCARA Robot

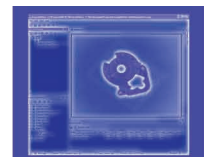
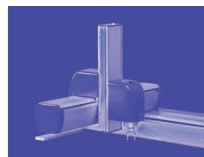
The PF400 is the world's first intrinsically safe four-axis SCARA robot. Unlike many other collaborative robots, that are intrinsically dangerous robots operating in a collaborative mode, the PF400 was specifically designed to limit all collision forces. It will not injure users or equipment even if it collides with them at full speed. This eliminates the need for expensive safety shields and permits the robot to operate safely side-by-side with personnel. Due to its revolutionary combination of safety, capabilities and performance, the PF400 is currently being employed in environments where automation could never go before: working on desktops of analytical labs, in mixed manufacturing assembly applications side by side with operators and in clinical diagnostic environments.

This low-cost, quiet OEM robot has its controller, harnesses and power supplies embedded within its structure to eliminate extra enclosures and simplify installation. This space saving design, together with a novel geometry, allows the PF400 to service many stations in an extremely small workcell. Combined with absolute encoder servo motors, which do not require any motion to home during start-up, and the collaborative aspects of the robot, which eliminate the need for barriers, the PF400 significantly reduces the size and cost of an automated cell. The lightweight PF400 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.

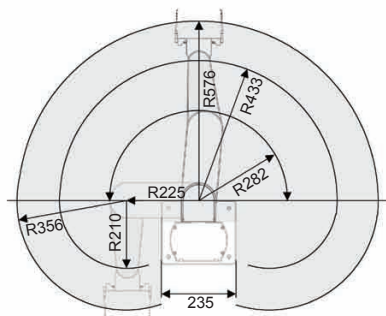
In addition to implementing special algorithms that contribute to the collaborative nature of this robot, Precise's Guidance Motion Controller (embedded in the robot's structure) provides many advanced features such as: kinematics for Cartesian control; gravity balanced free mode teaching that allows the robot to be taught by manually leading the gripper; 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.



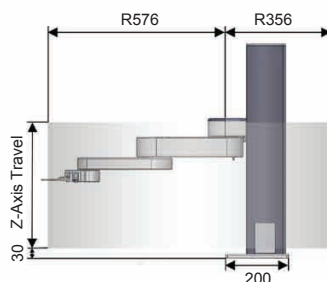
**PRECISE**  
**AUTOMATION**



<b>General Specifications</b>	<b>Range &amp; Features</b>
<b>Range of Motion &amp; Resolution</b>	
J1 (Z) Axis	400 mm standard, 750 mm or 1160 mm options available
J2 Axis	+/- 90 degrees
J3 Axis	+/- 167 degrees
J4/Theta Axis	+/- 970 degrees
Gripper	Standard servo gripper can grip Life Science plates in both portrait and landscape orientations. Software can control squeeze force (between approximately 0-23N for close force, 0-10N for open force) and open/close speed. Safety features include: (1) protection against dropping parts when the robot is powered down or e-stop pressed (gripper provides 7-10N of close force when motor power is off) and (2) detection of when a part is being held by the gripper. Options include gripper fingers and special servo grippers for handling vials and test tubes.
Maximum reach	Standard Reach Version: 576 mm Extended Reach Version: 731 mm
Repeatability	+/- 90 µm overall in x, y & z directions at 18-22 degrees C
<b>Performance and Payload</b>	
Maximum Acceleration	0.2G with 500 gm payload (standard reach, extended reach slightly slower)
Maximum Speed	500 mm/sec with 500 gm payload (standard reach, extended reach slightly slower)
Maximum Payload	1kg including gripper, 0.5kg with typical 0.5kg gripper
Motors	Brushless DC servo motors with absolute encoders on axes J1-J4, no motion during homing.
<b>Interfaces</b>	
General Communications	RS-232 channel, 10/100 Mbps Ethernet port, E-stop input, all available on J1-Axis housing Facilities Panel at the robot base
Digital I/O Channels	One optically isolated input available on J1-Axis housing Facilities Panel. Option available for an additional 12 optically isolated digital inputs and 8 optically isolated digital outputs on J1-Axis housing Facilities Panel. Two digital inputs can be optionally converted to analog inputs. Additional remote I/O available via Precise RIO modules or 3 <sup>rd</sup> 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).
<b>Required Power</b>	Input range: 90 to 264 VAC, single phase, 50-60 Hz, 365 watts maximum
<b>Weight</b>	20 kg for 400 mm travel version
<b>Linear Rail Option</b>	
Configurations	Any model of the PF400 can be mounted on the Linear Rail with all of the robot's interfacing cables routed internally in the Rail.
Repeatability	+/- 50 µm
Maximum Speed	700 mm/sec
Dimensions	1 M travel version – 1.37 m long x 0.23 m deep x 0.12 m high 1.5 M travel version – 1.87 m long x 0.23 m deep x 0.12 m high 2 M travel version – 2.37 m long x 0.23 m deep x 0.12 m high



Standard Reach Version



Standard Reach Version



PF Robot on Linear Rail



*automate with ease*