

Robotic/Automatic Tool Changer
Quick-Change Standard and Heavy Automation Series

TOOL CHANGERS

Product Description

The Quick-Change provides flexibility to robot applications by allowing the robot to change end-effectors (e.g., grippers, vacuum cup tooling, pneumatic and electric motors, weld guns, etc.) automatically. The Quick-Change consists of a Master plate and a Tool plate.

The Master plate, installed on the robot arm, locks to the Tool plate with a pneumatically-driven locking mechanism. This locking mechanism uses a patented, multi-tapered cam with ball locking technology and a patented fail-safe mechanism. The Master allows for the passage of pneumatic and electrical connections to the Tool plate.

The Tool plate is attached to each end-effector. The Tool plate interfaces with the Master plate's pneumatic and electrical connections and passes them on to the end-effector.

General Tool Changer Advantages

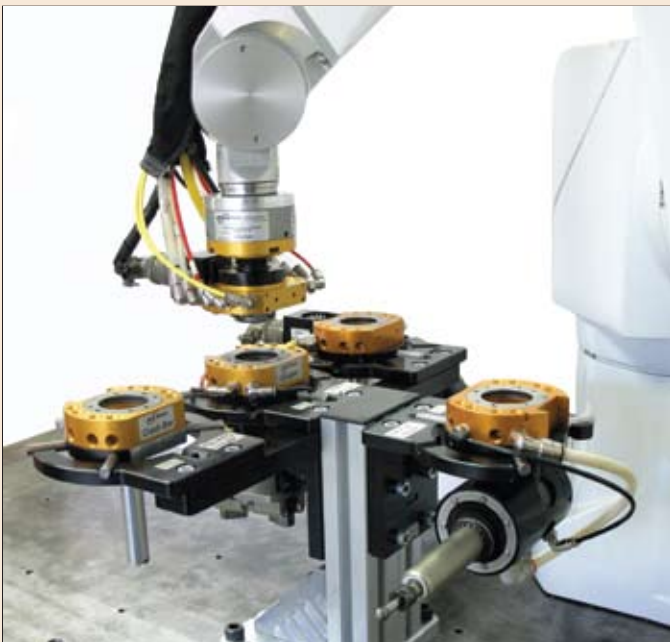
Lines changed in seconds instead of hours.

Operator safety increased by changing tools automatically.

Tools changed in seconds for maintenance and repair.

Increased flexibility of your robots by adding the ability to use more than one end-effector in an application.

Heavy and large multi-tool end-effectors replaced with individual tools that are automatically exchanged.



ATI Tool Changer Advantages

Superior Fail-safe Locking: The locking mechanism has a built-in patented fail-safe feature that keeps the Tool plate secured to the Master plate in the event of pneumatic pressure loss. This fail-safe feature eliminates the need for a spring.

High Rigidity: The Quick-Change has a high moment capacity due to the locking piston's large diameter and second taper. The Quick-Change does not rock during high-inertia moves, preventing locking failure or repeatability problems.

Unmatched Repeatability: The piston acts as a large dowel pin, aligning the Master and Tool with remarkable repeatability. Repeatability specifications are based on million-cycle testing.

No-Touch Locking™ Technology: The Quick-Change can lock successfully with a gap between the Master and Tool plates.

3-Year Warranty: Our warranty is based on years of observation and analysis by our customers in the field and extensive laboratory testing.

Simple Interface: Plate design allows for easy robot mounting.

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“It is highly recommended that ATI’s Tool Changer be considered when looking at any kind of automatic tool disconnect or application using this type of design.”

Joe Mitory
ASME Project Manager



Quick-Change Family (left to right from back row; Master plate is standing, Tool plate is lying flat directly in front of each Master plate or to the right); QC-150; QC-210; QC-110; Middle row: QC-71; QC-60; QC-41; Front row: QC-40; QC-5; QC-11; QC-20.

Quick-Change Tool Changers

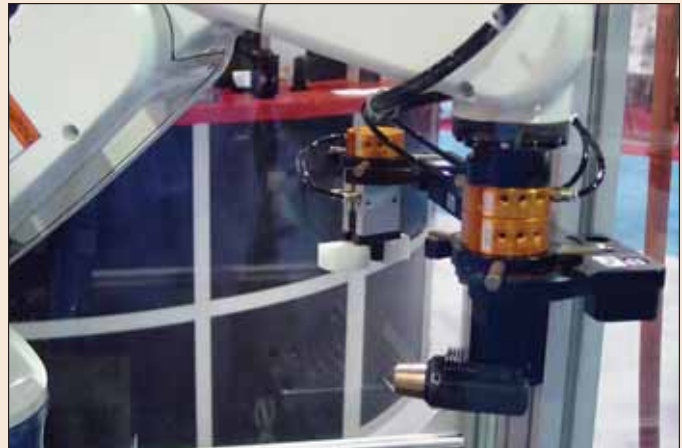
ATI provides two distinct series of its line of Quick-Change Tool Changers: Standard and Heavy Automation. Both feature similar functioning locking mechanisms, but they have different body designs and payload abilities to best suit specific applications.

Standard Series Tool Changers

From the lightest duty to the heaviest duty payload range, the Quick-Change Standard Series Tool Changers typically feature round bodies with an array of integrated pneumatic ports.

This style results in a compact, economical tooling arrangement where a majority of the applications save money and space by utilizing the built-in ports. However, even for applications where additional electrical signals or other utilities need to be coupled, the Standard Series Tool Changers feature one or two additional utility module mounting flats.

Additional options for Standard Series Tool Changers include a Sensor Interface Plate (combined adapter plate and sensor pack for Lock and Unlock status), basic Interface Plates, and modular, highly-customizable Tool Storage Stand arrangements.



Heavy Automation Tool Changers

The Heavy Automation Series Tool Changers feature simple, compact, square Tool Changer bodies designed for heavy-duty applications (e.g., welding). Instead of integrated pneumatic ports, the area of the body is maximized for fitting the largest, strongest locking mechanism possible. Each Tool Changer features built-in Lock/Unlock/Ready-to-Lock sensors, as well as heavy-duty alignment pins. The square shape allows for mounting four or more utility modules to pass pneumatics, fluid, electrical, fiber optic, weld current, and more. This unique series of heavy-duty Tool Changers is also compatible with an economical Tool Stand family that includes compliant drop-off points, Tool Shields, and a highly-customizable array of configurations.



Our patented fail-safe locking mechanism features a unique multi-tapered cam for superior reliability, repeatability, strength, and safety.

Our patented locking mechanism and unique fail-safe feature have been in industrial use for more than fifteen years without failure.

Our No-Touch Locking technology allows plate separation when locking.

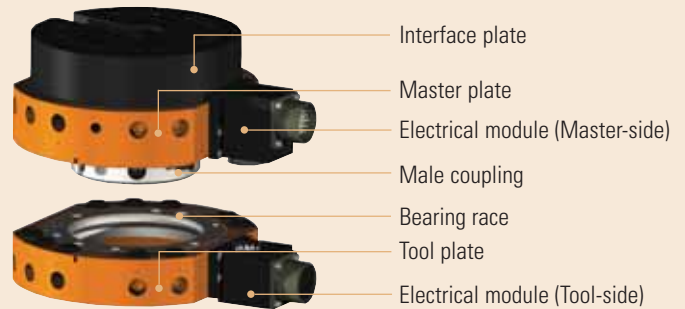


Figure 1: Tool Changer in unlocked position

1st taper (pick-up)

Hardened steel ball is on the first taper of the cam. 1st taper allows Master and Tool to be separate while locking.

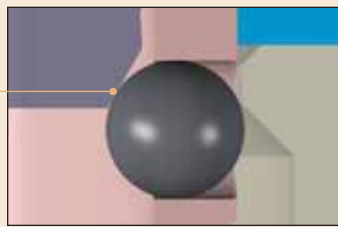


Figure 2a: Close-up of locking ball position with Tool Changer in Ready-to-Lock position

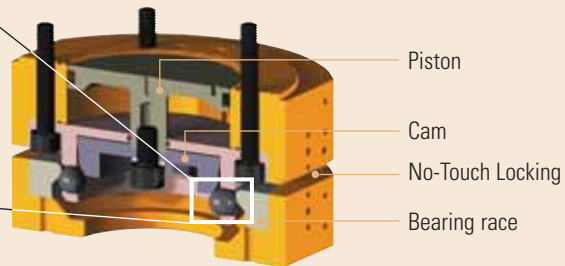


Figure 2b: Section view of Tool Changer in Ready-to-Lock position (interface plate not shown)

2nd taper (locked)

Hardened steel ball is on the second taper of the cam for high repeatability and strength.

Fail-safe conical surface (reverse taper)

First taper

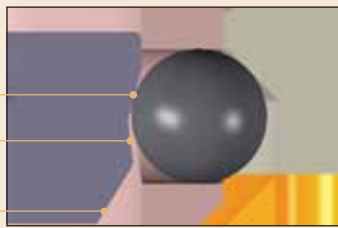


Figure 3a: Close-up of locking ball in locked position

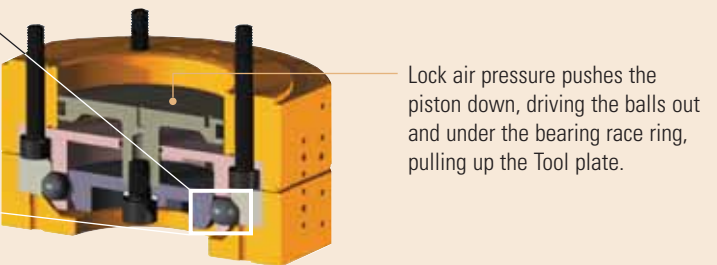


Figure 3b: Section view of Tool Changer in locked position

3rd taper (fail-safe)

Hardened steel ball is on fail-safe conical surface. (reverse taper)

In the event lock air pressure is removed, the balls are trapped by the cam.

The fail-safe prevents the cam and piston from moving due to gravity, vibration or acceleration.

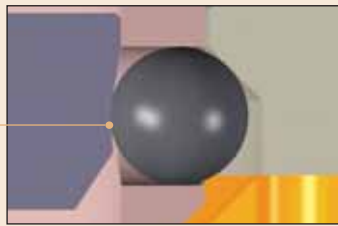


Figure 4a: Close-up of locking ball while in fail-safe position

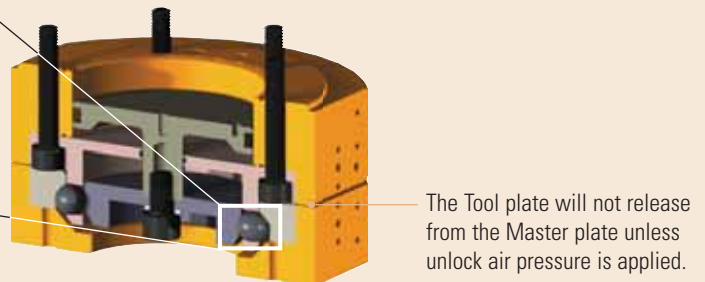


Figure 4b: Section view of Tool Changer in fail-safe position

*Video available on website.

QUICK-VIEW SPECIFICATION TABLE

Description	QC-5	QC-11	QC-20	QC-21	QC-40	QC-41
Suggested Payload Limit	18 lb (8.2 kg)	35 lb (16 kg)	55 lb (25 kg)	55 lb (25 kg)	110 lb (50 kg)	110 lb (50 kg)
Locking Force @ 80 psi (5.5 bar)	160 lb (690 N)	240 lb (1100 N)	520 lb (2300 N)	520 lb (2300 N)	1000 lb (4500 N)	1000 lb (4500 N)
Static Moment Capacity (X and Y)**	110 lbf-in (12 Nm)	220 lbf-in (25 Nm)	500 lbf-in (56 Nm)	500 lbf-in (56 Nm)	1400 lbf-in (160 Nm)	1400 lbf-in (160 Nm)
Static Moment Capacity (Z)	150 lbf-in (17 Nm)	300 lbf-in (34 Nm)	690 lbf-in (78 Nm)	690 lbf-in (78 Nm)	1900 lbf-in (220 Nm)	1900 lbf-in (220 Nm)
Pneumatic pass-through (Quantity) size	(6) M5 or #10-32	(6) M5 or #10-32	(12) M5* or #10-32	(8) 1/8 NPT	(8)* 1/8 NPT	(6) 3/8 NPT (4) 1/8 NPT
Pneumatic Lock and Unlock port size	M5 or #10-32	M5 or #10-32	M5 or #10-32	M5 or #10-32	1/8 NPT	1/8 NPT

Description	QC-60	QC-71	QC-110	QC-150	QC-300
Suggested Payload Limit	160 lb (75 kg)	180 lb (79 kg)	330 lb (150 kg)	440 lb (200 kg)	1000 lb (450 kg)
Locking Force @ 80 psi (5.5 bar)	1700 lb (7400 N)	1800 lb (8100 N)	2700 lb (12,000 N)	3600 lb (16,000 N)	7900 lb (35,000 N)
Static Moment Capacity (X and Y)**	1700 lbf-in (200 Nm)	3500 lbf-in (400 Nm)	6900 lbf-in (780 Nm)	12,000 lbf-in (1400 Nm)	29,000 lbf-in (3300 Nm)
Static Moment Capacity (Z)	2600 lbf-in (290 Nm)	3500 lbf-in (400 Nm)	6900 lbf-in (780 Nm)	10,000 lbf-in (1100 Nm)	25,000 lbf-in (2800 Nm)
Pneumatic pass-through (Quantity) size	(8)* 1/8 NPT	(8)* 1/4 NPT	(8)* 3/8 NPT	(10)* 3/8 NPT	(10)* 3/8 BSPP (G)
Pneumatic Lock and Unlock port size	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT	1/4 BSPP (G)

*Additional pneumatic pass-through ports are available for these models. **All models can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 10–12 times X and Y static moment specifications. †Higher payloads possible with low moment. Metric pass-through ports available on most models, contact ATI for more information.

Description	QC-210	QC-310	QC-510	QC-1210
Suggested Payload Limit	500 lb (220 kg)	1100 lb (510 kg)	1500 lb (700 kg)	2650 lb (1200 kg)
Locking Force @ 80 psi (5.5 bar)	7000 lb (31,000 N)	8600 lb (38,000 N)	14,000 lb (62,000 N)	21,000 lb (93,450 N)
Static Moment Capacity (X and Y)**	24,000 lbf-in (2700 Nm)	29,000 lbf-in (3300 Nm)	43,000 lbf-in (4900 Nm)	48,000 lbf-in (5400 Nm)
Static Moment Capacity (Z)	20,000 lbf-in (2300 Nm)	28,000 lbf-in (3200 Nm)	31,000 lbf-in (3500 Nm)	48,000 lbf-in (5400 Nm)

Pneumatic pass-through ports are available for these models. **All models can handle a dynamic moment 3 times higher than the static moment capacity. †Higher payloads possible with low moment.

How to Select a Robotic Tool Changer

1. Sizing - Fast method: If the expected moment exerted on the Tool Changer is low or moderate, select a Quick-Change model with a payload rating similar to that of your robot. If the expected moment is high, or if you prefer to use a QC model better suited to the application, see the next section below.

More exact method: Moment capacity is a critical factor in selecting the proper Quick-Change model. Use the following to approximate the worst-case moment:

- Find the approximate center-of-gravity (CG) of the heaviest end-effector to be used.
- Calculate the distance (D) from the CG to the bottom of the Tool plate (example below).
- Calculate the weight (W) of the heaviest end-effector.
- Multiply W by D to get an approximate static moment (M) (or a moment based on one G of acceleration).
- Select a Quick-Change with a moment capacity equal to or greater than M.

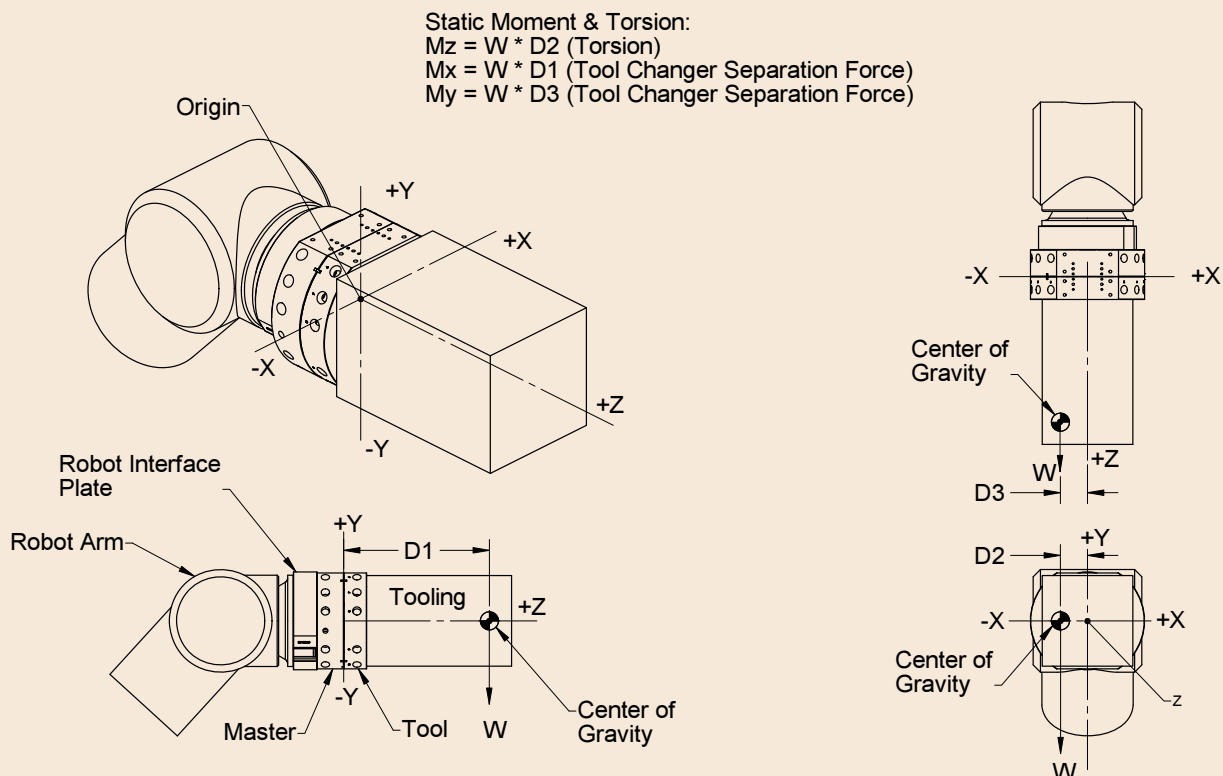
Robots may produce moments two-to-three times higher than M due to their potentially high acceleration. The Quick-Change models are designed to handle dynamic moments three times higher than their static moment ratings.

2. Pneumatic and Electrical: Determine the number and size of pneumatic ports and electrical contacts needed. Larger Quick-Change models have a greater number of pneumatic ports and electrical contacts.

3. Temperature and Chemicals: The Quick-Change uses nitrile bushings to pass pneumatics to the Tool plate, and Buna-N O-rings to seal the pneumatic locking mechanism. Not only is this rubber material resistant to most chemicals, it is able to withstand temperatures ranging from -20°F to 150°F. Please contact your ATI Account Manager for information regarding temperatures or chemicals for particular environments.

4. Precision Applications: Be sure to refer to the specifications when dealing with applications that require high repeatability.

Remember: A Tool Changer affects robot moment capacity, payload, size, and repeatability. For comparable payloads, the Quick-Change is designed to exceed the robot's specifications. Contact your ATI Account Manager for more information.



How to Select a Module

The flexibility of our Quick-Change Tool Changers is due in part to the large number of utility modules that are available for passing pneumatics, water, power, electrical signals, and more. The following is a list of considerations when trying to determine what module you may need. Refer to pages 38–41 for a list of Standard Series Tool Changer Modules and pages 56–61 for a list of Heavy Automation Tool Changer Modules.

Common Considerations for all Modules

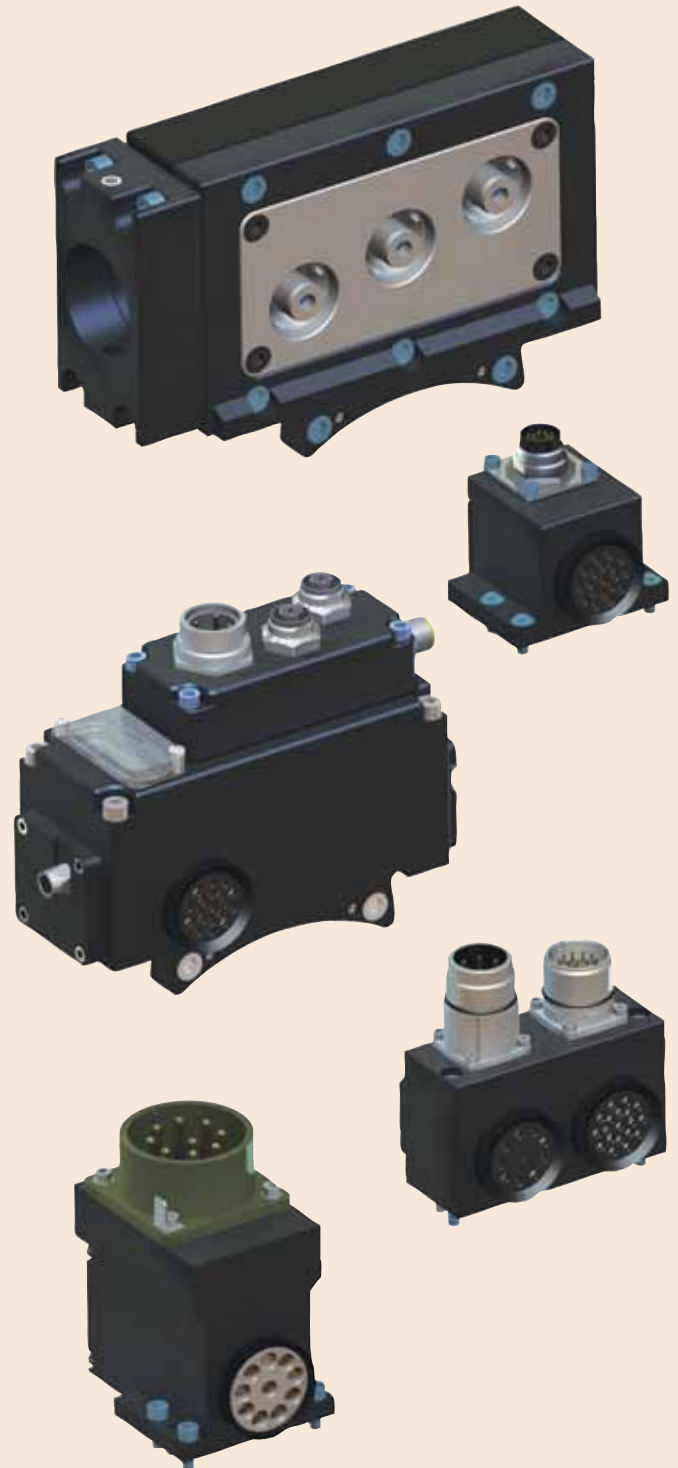
General Considerations

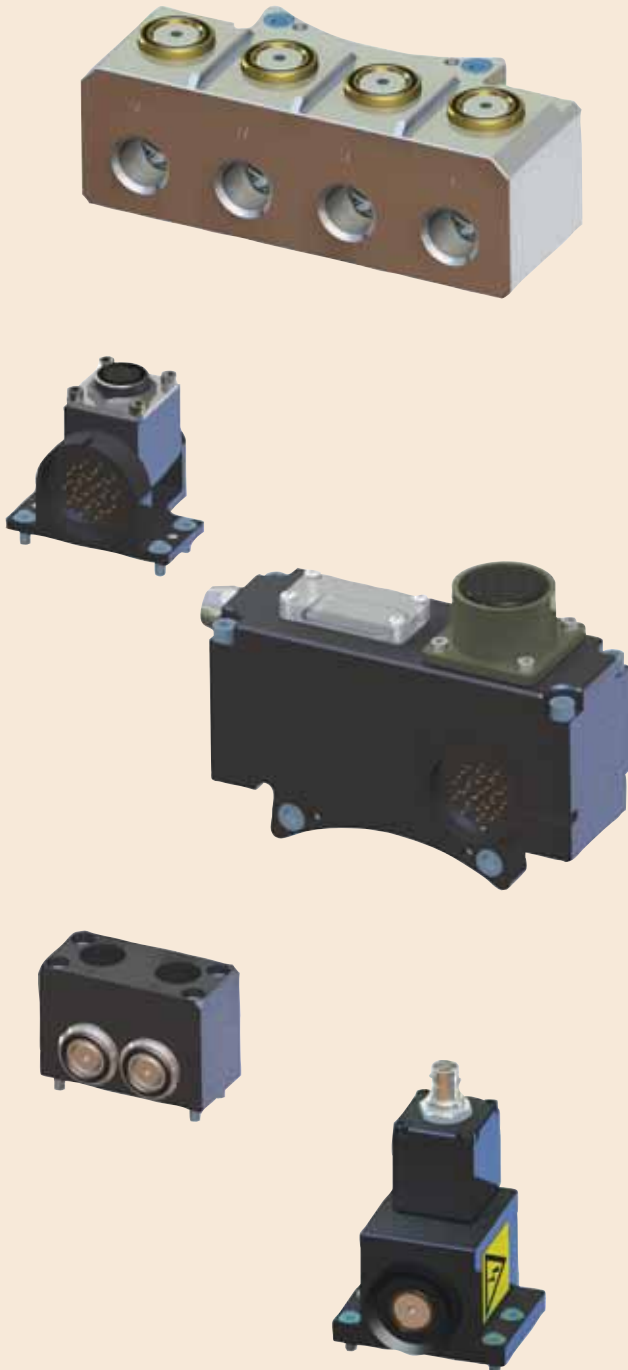
There are many considerations that are applicable to all of our utility modules. Use these as a starting point:

- **Environment:** Depending on the application environment, Ingress Protection (IP) may be needed. Contact ATI if solvents will be used around the application or if protection higher than IP65 is needed. Uncoupled modules are subject to debris; care should be taken to protect exposed contacts and connections.
- **Tool Changer Size:** Certain modules are only compatible with specific Tool Changer models. Having some flexibility in your Tool Changer model size will increase the number of available modules. Most modules are meant to be mounted on a Tool Changer. ATI also has modules available for non-Tool Changer applications. Contact ATI for more information.

Electrical Signals

- **Ingress Protection (IP):** Many of our electric modules are sealed to protect the contacts against dust and moisture (IP65-rated) when coupled.
- **Connection Type:** Determine what type of connector or connection is needed. We offer a variety of connection options, such as Miniature MS quick-disconnect, D-sub, threaded, and cable-ready.
- **Connector Direction:** ATI offers connectors in straight, right-angle, and multi-position orientations to accommodate special dress packages.
- **Amperage and Voltage:** Determine what maximum amperage and voltage rating is needed.
- **Number of Pins:** Determine the number of pins required to pass the signals.
- **Tool-ID Available:** Some of our electric modules have a tool-ID option available to distinguish between different tools that are being used.





Pneumatics

ATI offers self-sealing port versions of most of our pneumatic pass-through modules. Contact ATI for more information or visit www.ati-ia.com for a complete list of available modules.

- **Number of Pass-Through Connections:** Determine the number of pneumatic pass-through connections needed. Many of our Tool Changer models have additional pass-through ports in the body of the Tool Changer.
- **Port Size:** Determine what port size and thread standard is needed.

Contact ATI if your air pressure requirements are greater than 150 psi.

Fluid

All ATI fluid modules are sealed on the Master- and Tool-sides. Contact ATI if you need to pass fluids that may negatively interact with Buna-N seals.

- **Port Size:** Determine what port size and thread standard is needed.
- **Pressure and Flow Rate:** Determine the maximum pressure required and Cv (flow capacity).

Control/Bus Signals

ATI offers a wide selection of modules that offer control and signal pass-through from the robot, through the Tool Changer to the tooling. Discrete, DeviceNet™, Ethernet, PROFIBUS™, PROFINET™, INTERBUS™, and Fiber Optic are just some of the supported bus systems.

Specialty Modules

We have a variety of modules that can pass utilities, such as ultrasonic welding, camera, vision, video, and more. Contact ATI to select the right module for your application. Visit www.ati-ia.com for a complete list of available modules.

Product Advantages

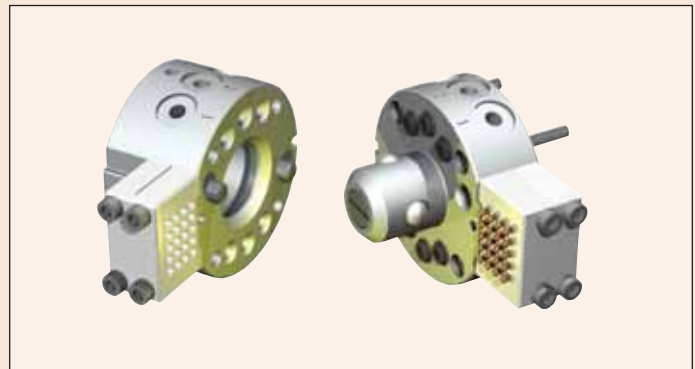
Master Forces Separation of Tool to prevent sticking while unlocking—a common problem when working with light payloads.

Extremely High Repeatability

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

Long-life Bushings for Pneumatic Pass-through



QC-5 Master and Tool plate with E2A electrical module

Specifications	Values	Comments
Suggested Payload Limit	18 lb (8.2 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	160 lb (690 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	110 lbf-in (12 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	150 lbf-in (17 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0004 in (0.010 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	0.81 lb (0.37 kg)	Master plate 0.60 lb (0.27 kg); Tool plate 0.21 lb (0.10 kg)
Minimum/Maximum distance between Master and Tool plate before locking	0.06 in/0.12 in 1.5 mm/3.0 mm	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(6) M5 or #10-32	Max pressure of 100 psi (7 bar)



Note:

Modules and options available. See pg. 38.

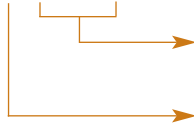
Tool Stand and components are available for this model. See pg. 18.



QC-5 with B15 electrical module

HOW TO ORDER

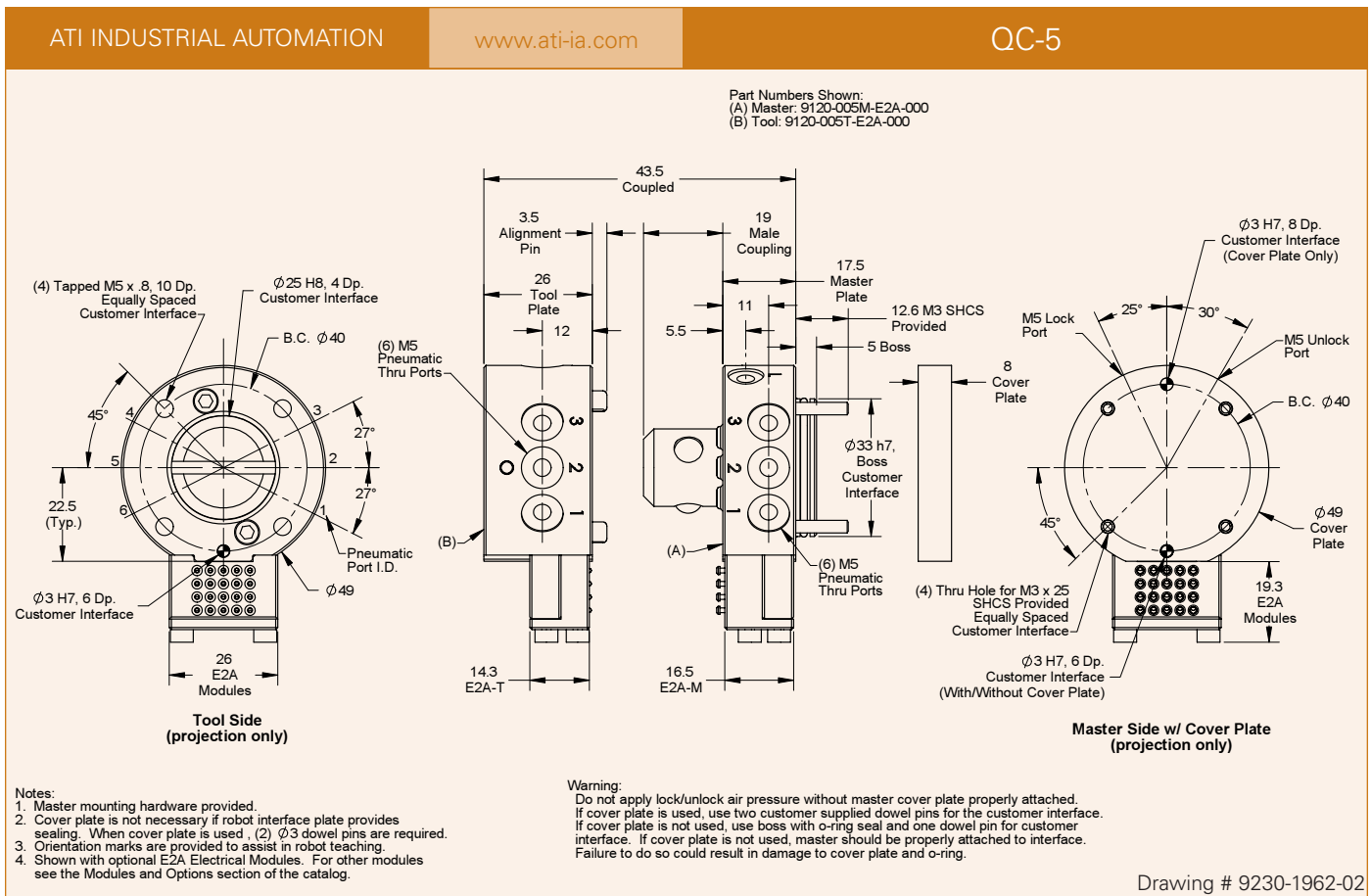
9120-005□-□□□-000



QC-5		Example:
Flat 'A' (000 = no option)	M: Master	9120-005M-000-000 (QC-5 Master plate, no options)
	T: Tool	9120-005T-E2A-000 (QC-5 Tool plate w/ E2A electrical module)

"In our years of experience with these Tool Changers, we have been impressed with a number of features. Reliability...Simplicity...Durability and Repeatability... Good job, ATI!"

Alex Zalucky
Robotic Development



Product Advantages

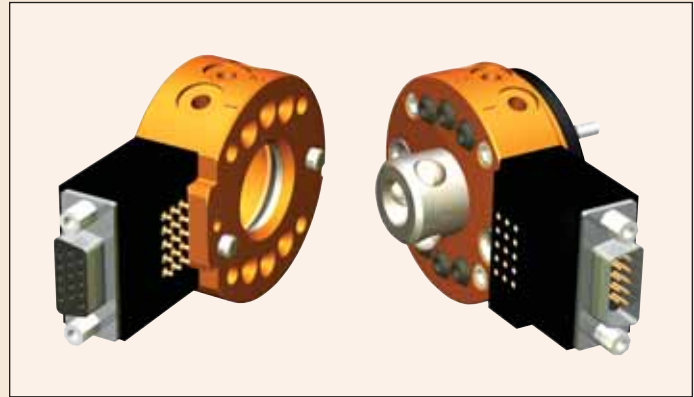
Lightweight and Small Size with a high-strength locking mechanism.

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

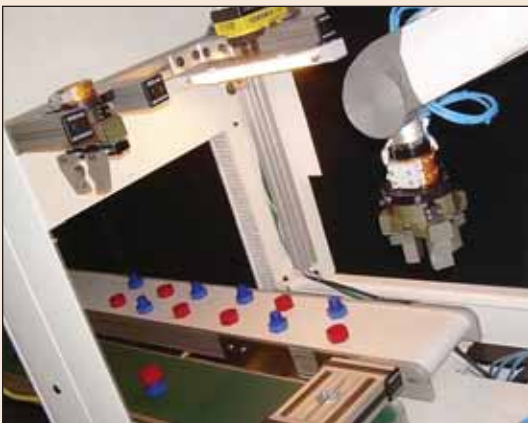
- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-11 with A15 electrical module

Specifications	Values	Comments
Suggested Payload Limit	35 lb (16 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	240 lb (1100 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	220 lbf-in (25 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	300 lbf-in (34 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0004 in (0.010 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	0.46 lb (0.21 kg)	Master plate 0.28 lb (0.13 kg); Tool plate 0.18 lb (0.08 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(6) M5 or #10-32	Max pressure of 100 psi (7 bar)



QC-11 with E20 electrical module

Note:

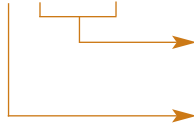
Modules and options available. See pg. 38.

For payloads less than 2 lbs. (.9 kg), use the QC-5 Tool Changer.

Tool Stand and components are available for this model. See pg. 18.

HOW TO ORDER

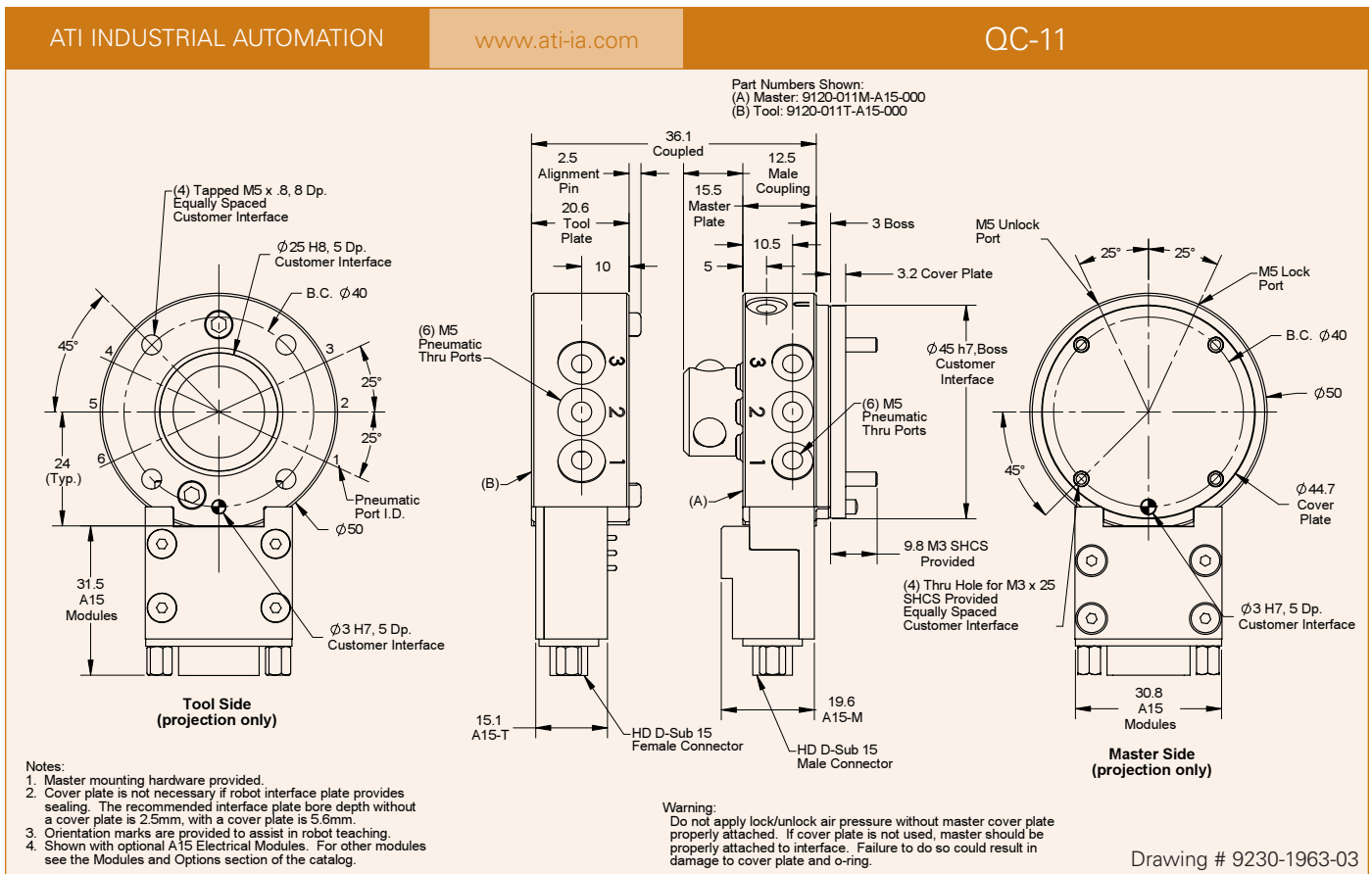
9120-011□-□□□-000



QC-11	Example:
Flat 'A' (000 = no option)	9120-011M-000-000 (QC-11 Master plate, no options)
M: Master T: Tool	9120-011T-A15-000 (QC-11 Tool plate w/ A15 electrical module)

“ATI’s QC-11 coupler will allow our engineers to keep our endtool design small and maneuverable without sacrificing quality. ATI engineers have been great to work with during every step of the selection process.”

Denise Carlini
Prime Automation



Product Advantages

Large Number of Pass-through Pneumatic Ports

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-20 Master and Tool plate with K19 electrical module

Specifications	Values	Comments
Suggested Payload Limit	55 lb (25 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	520 lb (2300 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	500 lbf-in (56 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	690 lbf-in (78 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	1.8 lb (0.8 kg)	Master plate 1.1 lb (0.5 kg); Tool plate 0.7 lb (0.3 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(12) M5 or #10-32	Max pressure of 100 psi (7 bar)



QC-20 with K26 electrical module

Note:

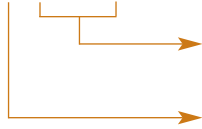
Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 18.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

HOW TO ORDER

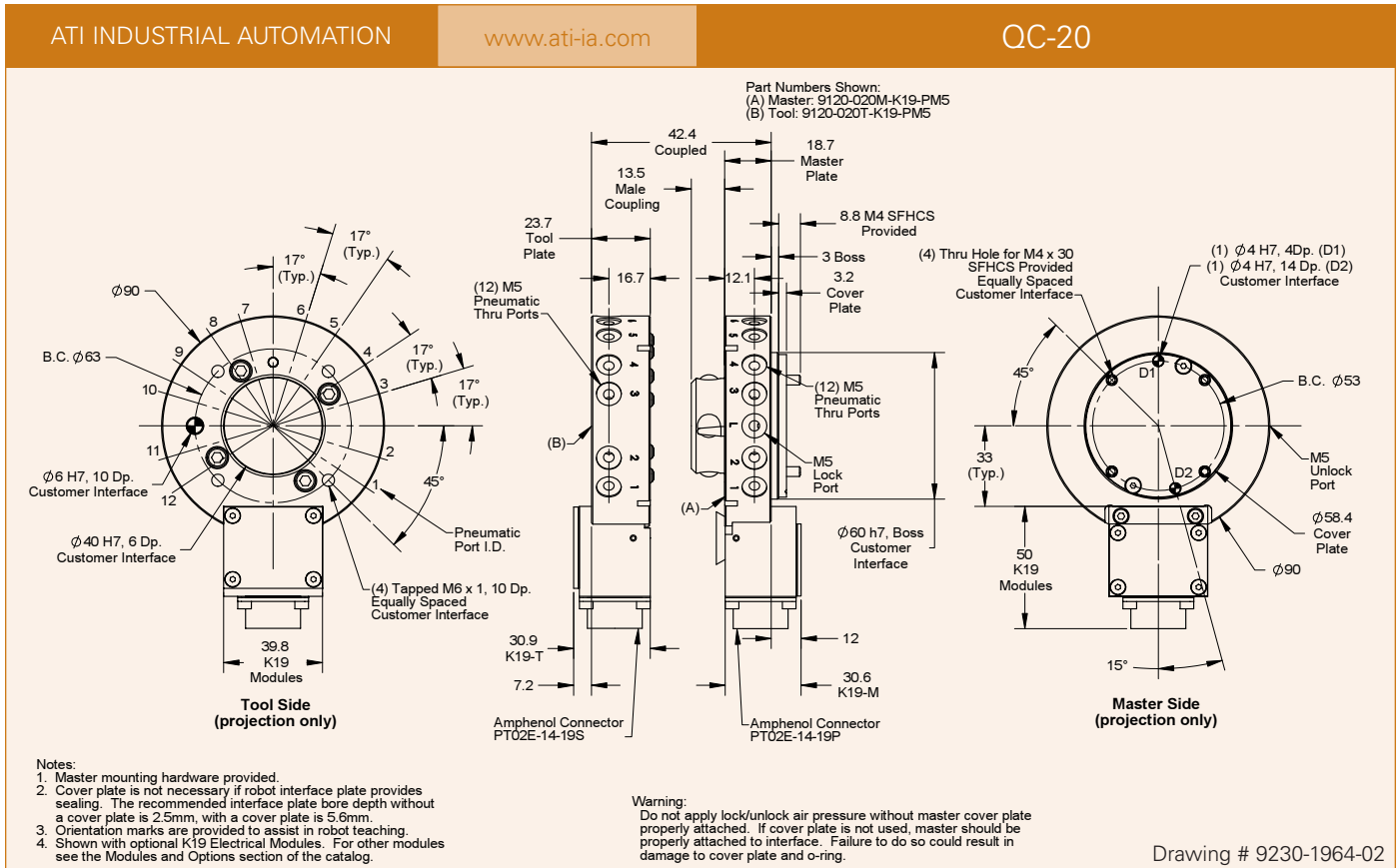
9120-020□-□□□-PM5



QC-20	Example:
Flat 'A' (000 = no option)	9120-020M-000-PM5 (QC-20 Master plate, no options)
M: Master T: Tool	9120-020T-K19-PM5 (QC-20 Tool plate w/ K19 electrical module)

"What originally drew us to use the ATI Tool Changer was the low profile and hardened locating features. ATI also provides the greatest number of air and electrical connections through the Tool Changer. We continue to use ATI's Tool Changers because we know they work, and we can get the service we need from ATI as a vendor."

Jim Williams
Project Engineer



Product Advantages

Large 1/8 NPT Ports in a small lightweight package

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-21 Master and Tool plate with K19 electrical module

Specifications	Values	Comments
Suggested Payload Limit	55 lb (25 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	520 lb (2300 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	500 lbf-in (56 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	690 lbf-in (78 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	1.8 lb (0.8 kg)	Master plate 1.1 lb (0.5 kg); Tool plate 0.7 lb (0.3 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(8) 1/8 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



QC-21 with KM14 electrical module

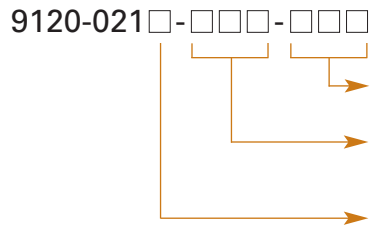
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 18.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

HOW TO ORDER



QC-21		Example:
Flat 'B' (000 = no option)		9120-021M-000-000 (QC-21 Master plate, no options)
Flat 'A' (000 = no option)		9120-021T-K19-000 (QC-21 Tool plate w/ K19 electrical module)
M: Master		
T: Tool		

"ATI units have the best locking mechanism in event of air failure."

Matthew Cygler
Robotic Automation PTY LTD

ATI INDUSTRIAL AUTOMATION
www.ati-ia.com
QC-21

Part Numbers Shown:
(A) Master: 9120-021M-K19-000
(B) Tool: 9120-021T-K19-000

Notes:

1. Master mounting hardware provided.
2. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
3. Orientation marks are provided to assist in robot teaching.
4. Shown with optional K19 Electrical Modules. For other modules see the Modules and Options section of the catalog.

Warning:
Do not apply lock/unlock air pressure without master cover plate properly attached. If cover plate is not used, master should be properly attached to interface. Failure to do so could result in damage to cover plate and o-ring.

Drawing # 9230-1965-02

TSS Modular Tool Stand System

The ATI TSS (Tool Stand Small) Modular Tool Stand System is compatible with the small range of ATI Tool Changers—models QC-5 through QC-21. The Tool Stand System is designed for maximum flexibility to fit most customer applications. The TSS system provides a unique option to either use interface plates or empty pneumatic ports on the Tool Changer as attachment points for your tooling.

Product Advantages

Modular System allows for customization.

V-Grooves provide repeatable tool drop-off location.

Use Extruded Rail and Base, or mount the racks on your own platform.

Durable Stainless Steel Interface Pins

Proximity Sensor Option

Use Optional Interface Plate or thread pins in unused ports to save stack height.

Locking Mounting Block option for secure tool storage or horizontal orientation.

Product Features

Interface Plate

The TSS Interface Plate Assembly provides an interface between your tool and the Tool Changer. The Interface plates are sized specifically to correspond with the Tool Changer and TSS Rack.

Rack Assembly

The TSS Rack Assembly includes a rigid U-shaped plate with V-grooves that interface with stainless steel alignment pins mounted to the tooling. This groove-pin combination allows for compliance in the horizontal plane, and also provides repeatable tool positioning.

Tool Presence Sensing

Tool Presence Sensing uses an 8 mm diameter proximity sensor. This option is highly recommended to detect when the tool is properly nested in a Rack.

Mounting Block

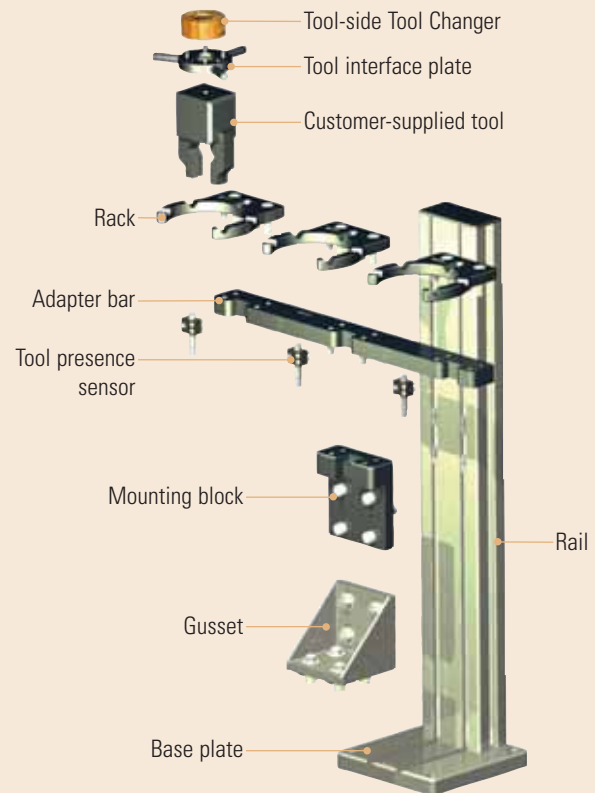
The TSS Mounting Block Assembly mounts to the Rail. It can be positioned anywhere along the rail to the desired height. Then the TSS Rack, or 3, 4, or 5 Position Tool Adapter Bars can mount to the Block.

Base Assembly

The TSS Base Assembly consists of a square, aluminum, machined base plate, and hardware that attaches to the TSS Rail and TSS Gusset Assembly. The base provides a secure foundation on which to build the Tool Stand System.

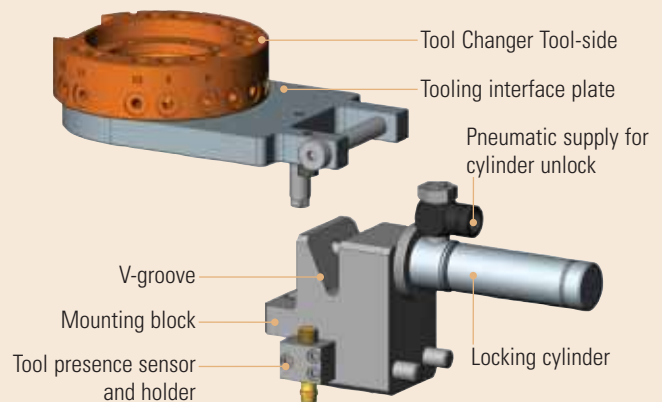
Rail and Gusset Assemblies

The TSS Rail and Gusset Assemblies mount to the Base Assembly and include alignment and mounting hardware.



Locking Tool Stand Mounting Block

The Locking Small Tool Stand Mount is a secure option for tool storage. It includes a steel, machined block with a rigid V-shaped groove and center hole that interfaces with the Tool plate. The assembly also features a locking pneumatic cylinder. Supplying air pressure to the cylinder unlocks the Mounting Block, releasing the tool from the V-block. After the robot uncouples from the Tool Changer, the locking cylinder can be energized to keep the tool fully secured in the stand. This locking feature is ideal for applications that require non-horizontal tool storage, have offset tool center-of-gravity, and applications where tooling hoses and cables work against the weight of the tool during normal tool storage situations.



Quick-Change TSS Tool Stand Interfacing

Option #1: Use Interface Plates					
QC Model	QC-5	QC-11	QC-20	QC-21	QC-21 (Euro)
Rack Assembly	9120-TSS-3310	9120-TSS-3310	9120-TSS-3313	9120-TSS-3313	9120-TSS-3313
Interface Plate Assy.	9120-TSS-3314	9120-TSS-3314	9120-TSS-3319	9120-TSS-3319	9120-TSS-3319
Alignment Pin	3700-20-3303	3700-20-3303	3700-20-3303	3700-20-3303	3700-20-3303
Notes	See Note 3	See Note 3	See Note 3	See Note 3	See Note 3
Tool Presence Sensor	Yes	Yes	Yes	Yes	Yes
Customer Drawing	9230-20-1656	9230-20-1658	9230-20-1659	9230-20-1660	9230-20-1662

Option #2 Use QC Pneumatic Ports					
QC Model	QC-5	QC-11	QC-20	QC-21	QC-21 (Euro)
Rack Assembly	9120-TSS-3312	9120-TSS-3310	9120-TSS-3305	9120-TSS-3313	9120-TSS-3313
Pin Block	none	none	none	9120-TSS-3317	9120-TSS-3360
Alignment Pin	3700-20-3303	3700-20-3303	3700-20-3303	3700-20-3316	3700-20-3320
Notes				See Note 5	See Note 5
Tool Presence Sensor	Yes	No	Yes	Yes	Yes
Customer Drawing	9230-20-1656	9230-20-1658	9230-20-1659	9230-20-1660	9230-20-1662

Option #3 Locking Mounting Block				
QC Model	QC-5, 11	QC-20, 21, 21E	Horizontal Rail Modules	
Mounting Block	9120-TSS-5028	9120-TSS-5028	Horiz. Module 36"	Horiz. Module 18"
Interface Plate Assy.	9120-TSS-5029	9120-TSS-5030	9120-TSM-HM-3317	9120-TSM-HM-3323
Notes	See Notes 7, 8	See Notes 7, 8	See Note 1	See Note 1
Tool Presence Sensor	Yes, Note 6	Yes, Note 6		
Customer Drawing	9230-20-2476	9230-20-2501	9230-20-1900	9230-20-1901

Configurable Tool Stand Module System – Overview Drawing # 9230-20-1675						
Module Name	Post Rail 610mm	Post Rail 914mm	Post Rail 1220mm	3-Tool Adapter Bar	4-Tool Adapter Bar	5-Tool Adapter Bar
Part Number	9120-TSS-1020	9120-TSS-3324	9120-TSS-3325	9120-TSS-3308	9120-TSS-3431	9120-TSS-3570
Notes	See Note 1	See Note 1	See Note 1			
Customer Drawing	9230-20-1675	9230-20-1912	9230-20-1913	9230-20-1675	9230-20-1775	9230-20-1914
Module Name	Gusset	Forward Adapter	Prox. Holder	Base	Mounting Block	Alignment Pins:
Part Number	9120-TSS-1030	9120-TSS-3361	9120-TSS-3315	9120-TSS-3311	9120-TSS-3306	
Notes			See Notes 2,6			See Note 4
Customer Drawing	9230-20-1675	9230-20-1679	9230-20-1675	9230-20-1675	9230-20-1675	
						3700-20-3303 3700-20-3316 3700-20-3320

- Notes: 1. May specify other rail lengths—cut charge will apply.
 2. Sensor Holder will fit any 8mm Diameter Sensor.
 3. 3 Pins come standard with Tool Interface Plates.
 4. Alignment Pins are available individually.
 5. Alignment Pins not included in Pin Block.
 6. Compatible Prox. Sensors and Cables:
 8590-9909999-08 - PNP 3 Wire DC
 8590-9909999-09 - NPN 3 Wire DC
 8590-9909999-07 - 5 Meter Cable
 8590-9909999-12 - 2 Meter Cable
 7. Mounts to Horizontal Rail
 8. Cylinder Position Sensor: 8590-9909999-75
 Also need Switch Track: 3690-0000054-30

Complete assembled custom configurations are available, contact ATI for more information.

Product Advantages

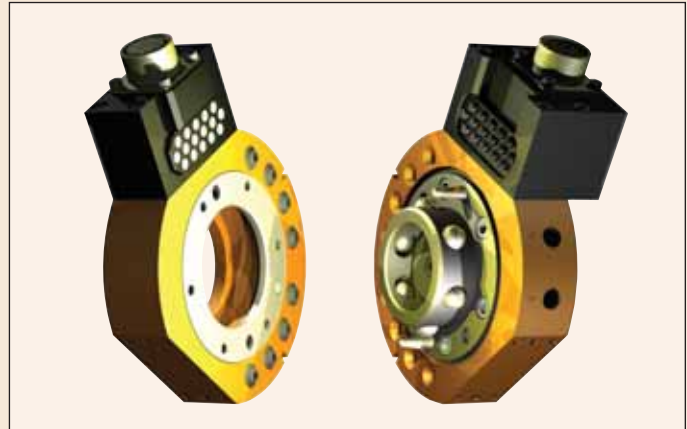
Twice the Strength of the QC-20

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

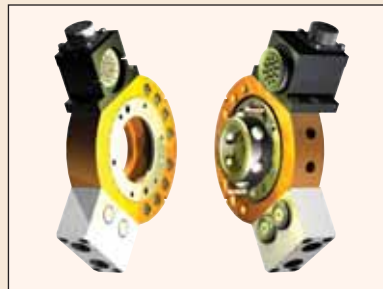
- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-40 Master and Tool plate with J16 electrical module

Specifications	Values	Comments
Suggested Payload Limit	110 lb (50 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	1020 lb (4500 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	1400 lbf-in (160 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	1900 lbf-in (220 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	3.8 lb (1.7 kg)	Master plate 2.5 lb (1.1 kg); Tool plate 1.3 lb (0.6 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(8) 1/8 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



QC-40 with R19 electrical module and FN2 fluid module

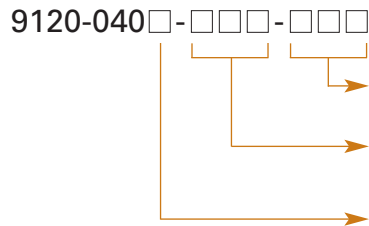
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 32.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

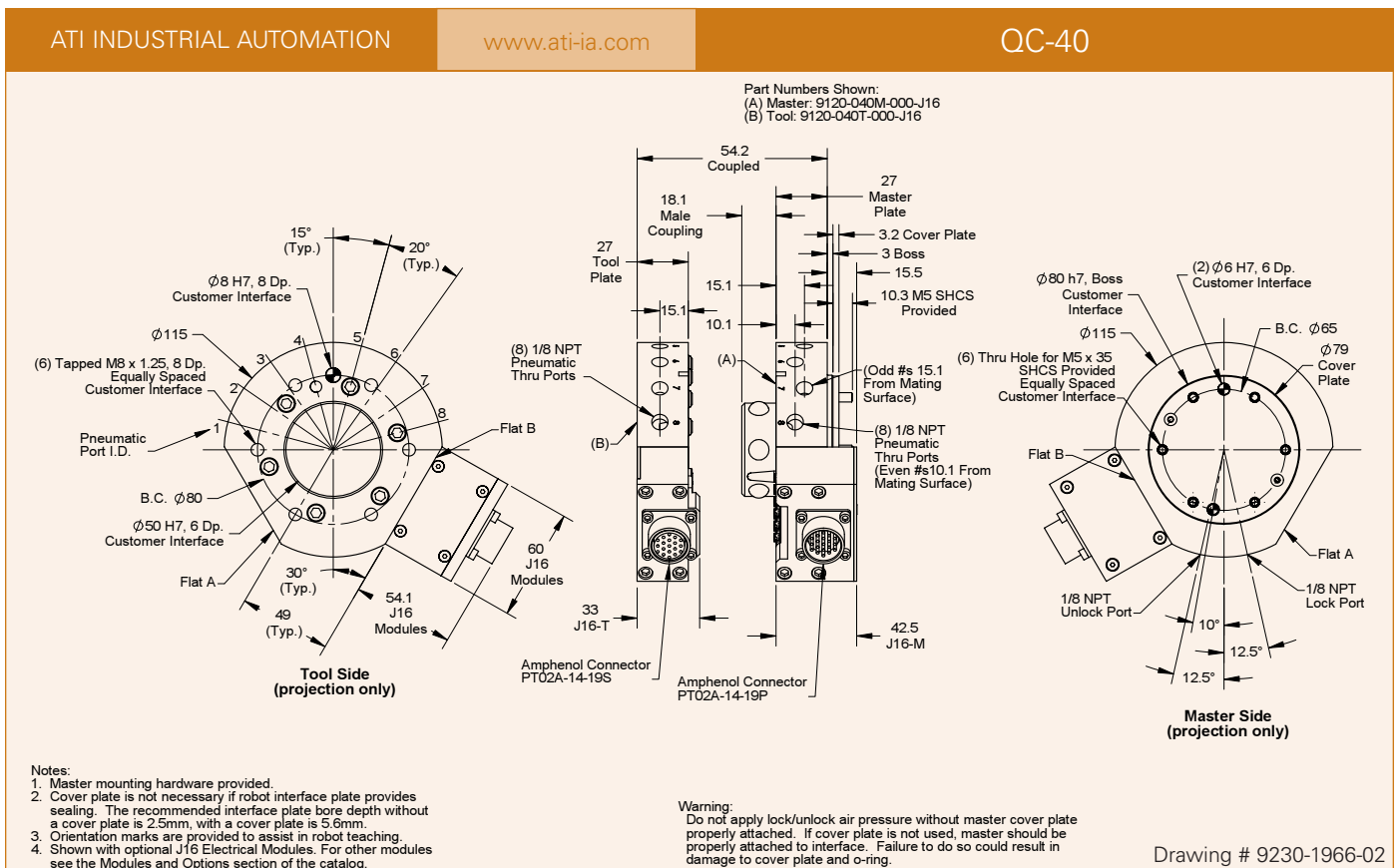
HOW TO ORDER



QC-40	Example:
Flat 'B' (000 = no option)	9120-040M-000-000 (QC-40 Master plate, no options)
Flat 'A' (000 = no option)	9120-040T-T19-000 (QC-40 Tool plate w/T19 electrical module)
M: Master T: Tool	9120-040M-R19-FN2 (QC-40 Master plate w/ R19 electrical module and FN2 self-sealing fluid module)

"Our customers using medium payload robots select the QC-40 for flexibility, compactness and 100% uptime reliability."

Steve Tatem
TIA



Product Advantages

Large 3/8 NPT Ports

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-41 Master and Tool plate with R19 electrical module

Specifications	Values	Comments
Suggested Payload Limit	110 lb (50 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	1000 lb (4500 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	1400 lbf-in (160 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	1900 lbf-in (220 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	4.6 lb (2.1 kg)	Master plate 3 lb (1.4 kg); Tool plate 1.6 lb (0.7 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(6) 3/8 NPT (4) 1/8 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



QC-41 with G19 electrical module

Note:

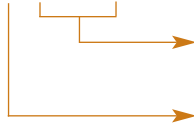
Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 32.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

HOW TO ORDER

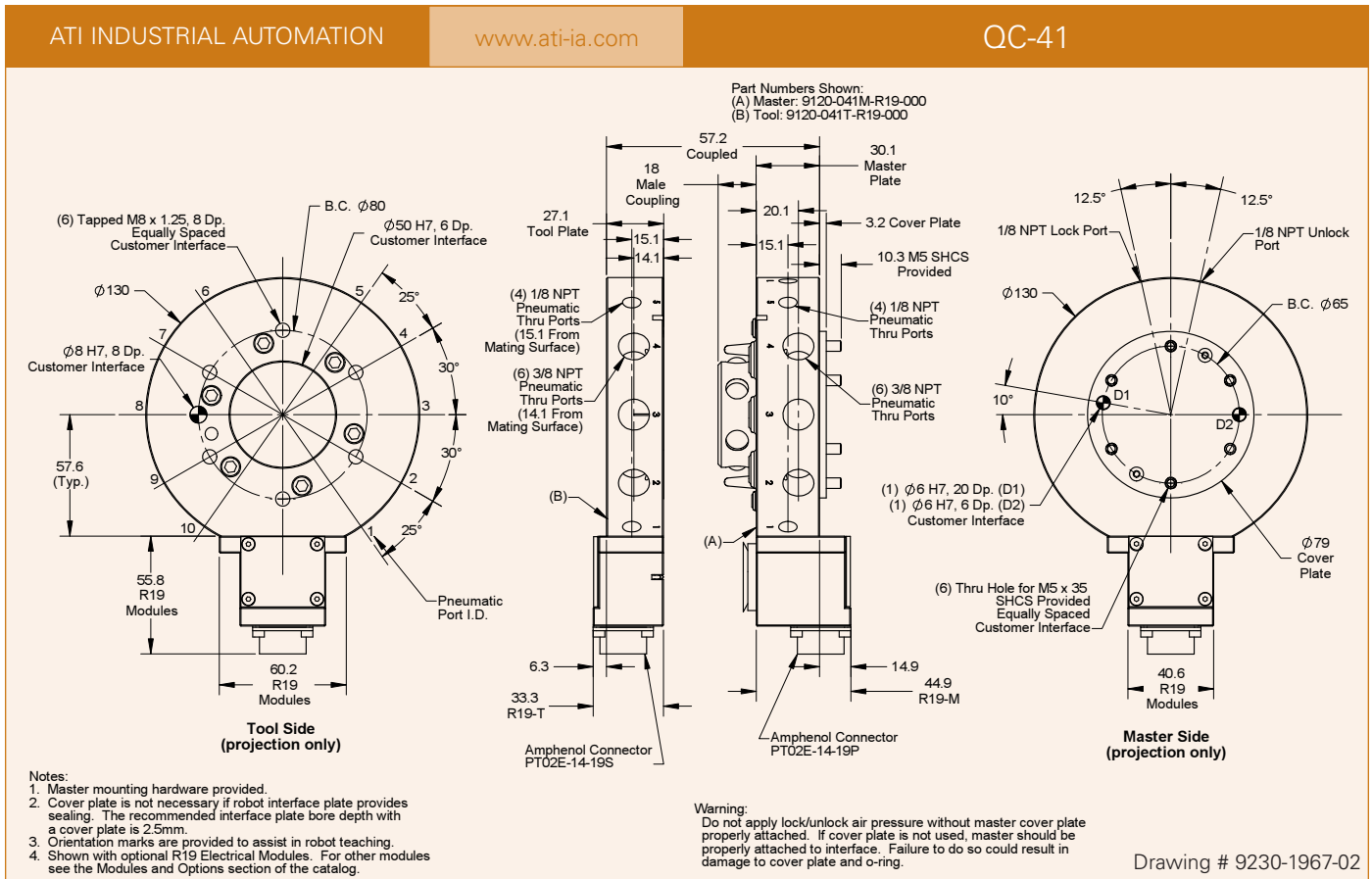
9120-041□-□□□-000



QC-41	Example:
Flat 'A' (000 = no option)	9120-041M-000-000 (QC-41 Master plate, no options)
M: Master T: Tool	9120-041T-R19-000 (QC-41 Tool plate w/ R19 electrical module)

"A well-built durable product that is easily integrated."

Tom Washburn
RPT



Product Advantages

Lightweight Design with High Strength

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

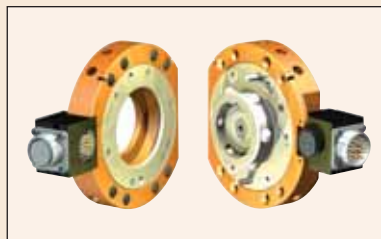
- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-60 Master and Tool plate with K19 electrical module

Specifications	Values	Comments
Suggested Payload Limit	160 lb (75 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	1700 lb (7400 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	1700 lbf-in (200 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	2600 lbf-in (290 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	4.4 lb (2.0 kg)	Master plate 2.9 lb (1.3 kg); Tool plate 1.5 lb (0.7 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(8) 1/8 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



QC-60 with K26 electrical module

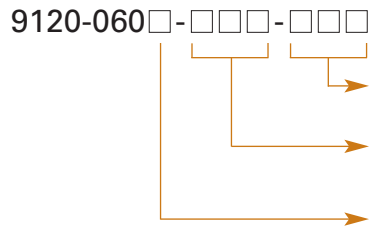
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 32.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

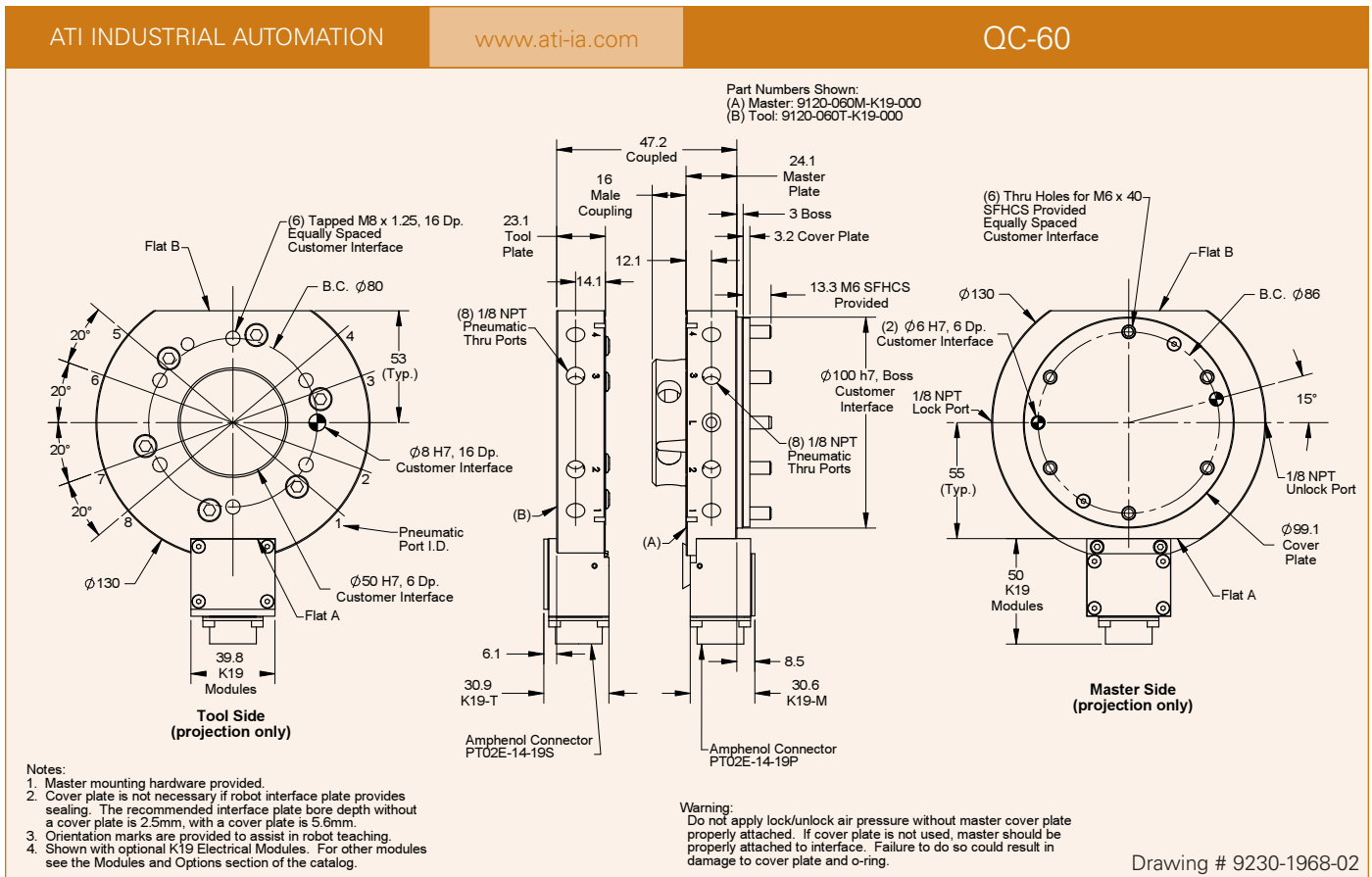
HOW TO ORDER



QC-60	Example:
Flat 'B' (000 = no option)	9120-060M-000-000 (QC-60 Master plate, no options)
Flat 'A' (000 = no option)	9120-060T-K19-000 (QC-60 Tool plate w/ K19 electrical module)
M: Master T: Tool	9120-060M-D15-000 (QC-60 Master plate w/ D15 electrical module)

"Four years of problem-free operation in both arc welding and material handling environments."

Greg Terry
Calsonic Yorozu Corporation



Product Advantages

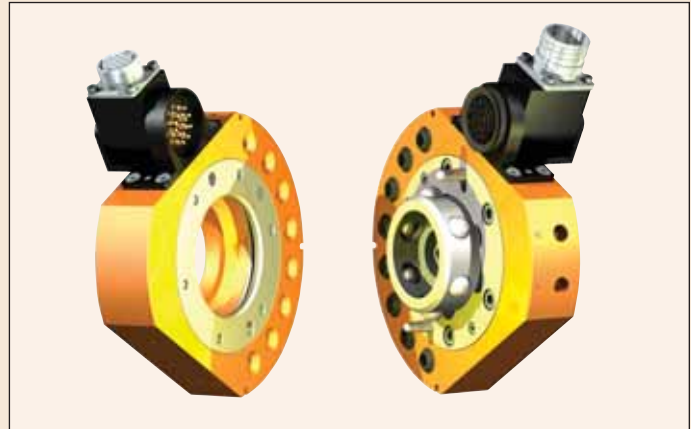
Lightweight Design with High Strength

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-71 Master and Tool plate with G19 electrical module

Specifications	Values	Comments
Suggested Payload Limit	180 lb (79 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	1800 lb (8100 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X,Y, and Z)	3500 lbf-in (400 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	6.7 lb (3.1 kg)	Master plate 3.9 lb (1.8 kg); Tool plate 2.8 lb (1.3 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(8) 1/4 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



QC-71 with MT8 electrical module

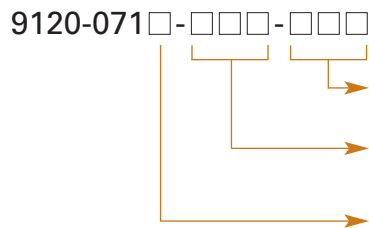
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 32.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

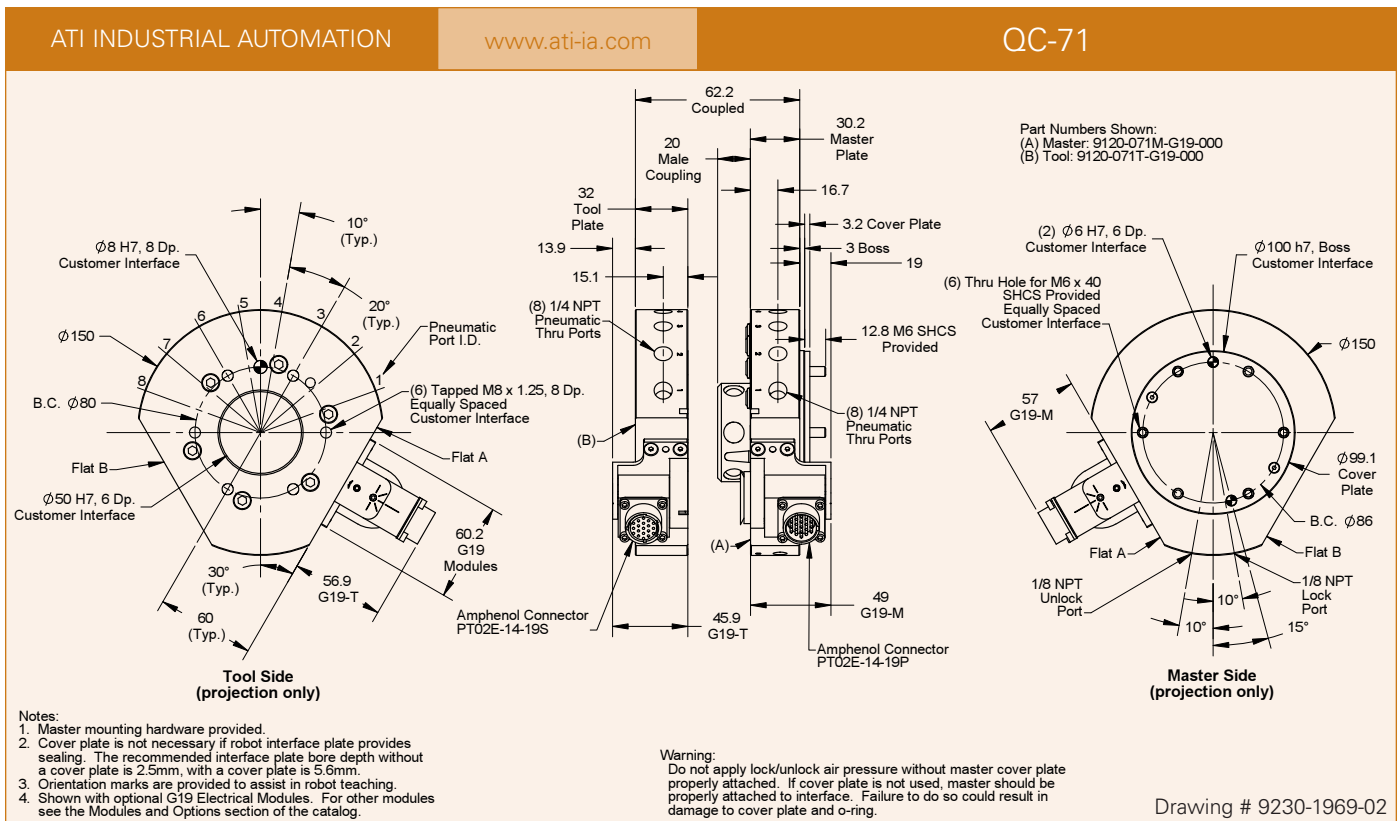
HOW TO ORDER



QC-71	Example:
Flat 'B' (000 = no option)	9120-071M-000-000 (QC-71 Master plate, no options)
Flat 'A' (000 = no option)	9120-071T-G19-000 (QC-71 Tool plate w/ G19 electrical module)
M: Master T: Tool	9120-071T-FN2-000 (QC-71 Tool plate w/ FN2 module)

"ATI has the widest range of units from the very small to the very large payloads, which perfectly suits our robotic industry."

Matthew Cygler
Robotic Automation
PTY LTD



Product Advantages

The QC-110 was introduced in the Fall of 2004. Its predecessors, the QC-100 and QC-100i, are still available. Specifications for those models can be found at www.ati-ia.com.

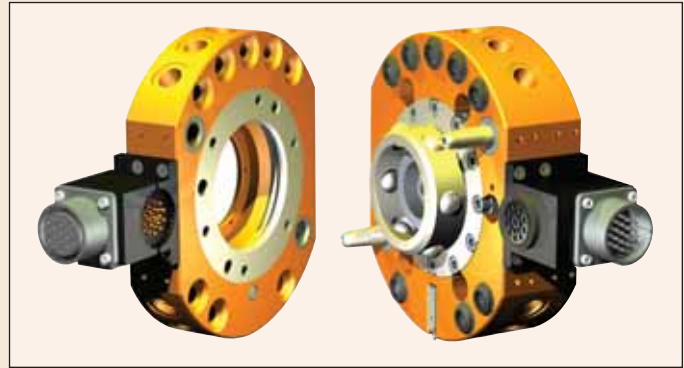
Excellent Strength-to-Weight Ratio

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_c58 stainless steel.

Supports DeviceNet Electrical Modules



QC-110 Master and Tool plate with T19 electrical module

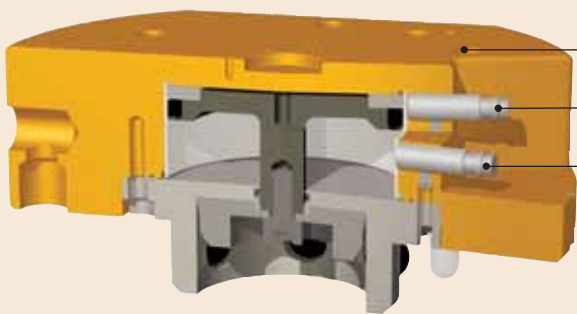
Internal Lock/Unlock Sensing

- Reduced stack height.
- No SIP required.

Bolts Directly to 125 mm Bolt Circle

Interface Plates available for other Bolt Circles.

Specifications	Values	Comments
Suggested Payload Limit	330 lb (150 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	2700 lb (12,000 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X,Y, and Z)	6900 lbf-in (780 Nm)	Dynamic moment capacity 3x higher than static moment capacity.
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	13.0 lb (5.9 kg)	Master plate 8.5 lb (3.9 kg); Tool plate 4.5 lb (2.0 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(8) 3/8 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



Standardized mounting pattern - Bolts directly to most 125 mm ISO robot flanges.

Internal Lock/Unlock sensing - Optional Lock/Unlock sensing built into the body of the Tool Changer

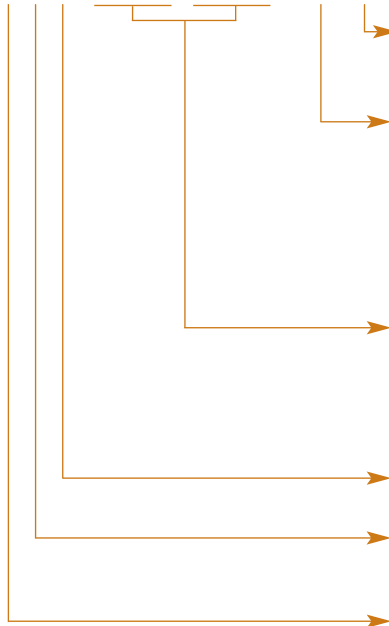
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 32.

HOW TO ORDER

9120-110□-□-□□□-□□□□-□-□

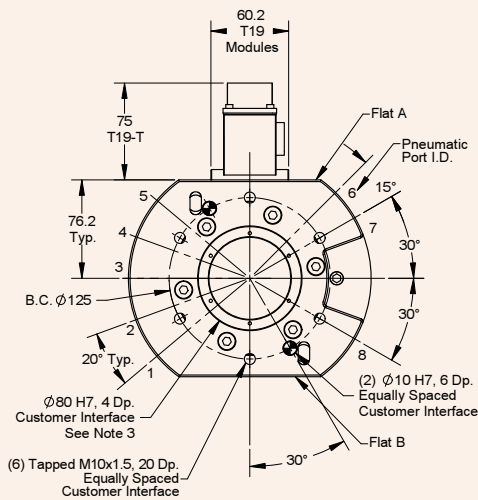


QC-110
<p>Thread version E: G thread version (Euro) Blank: NPT</p>
<p>Standard Proximity Switch designation (Master only) D: PNP Quick-disconnect with 5m cables E: NPN Quick-disconnect no cables F: NPN Quick-disconnect with 5m cables G: PNP Quick-disconnect no cables Blank: No Sensors</p>
<p>Optional Modules - Flat 'A' and Flat 'B' DeviceNet, Wired Signal or Control Modules must mount to Flat "A" and have an "R" designation on the Master (000 = no option)</p>
<p>M: Master T: Tool</p>
<p>P: Prepared for DeviceNet/Control Module No space: DeviceNet/Control Module is not needed</p>
<p>A: No Boss Master Only (Default for Master) B: 50mm Boss/Recess C: 56mm Boss/Recess D: 60mm Boss/Recess E: 63mm Boss/Recess F: 80mm Boss/Recess (Default for Tool)</p>
<p>Note: Ready-to-Lock Sensors are standard with DeviceNet/Control module only. RTL can be ordered as a separate line item for all other applications.</p>

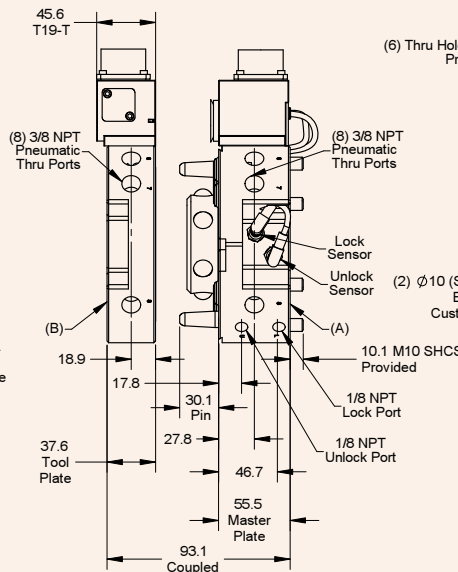
ATI INDUSTRIAL AUTOMATION

www.ati-ia.com

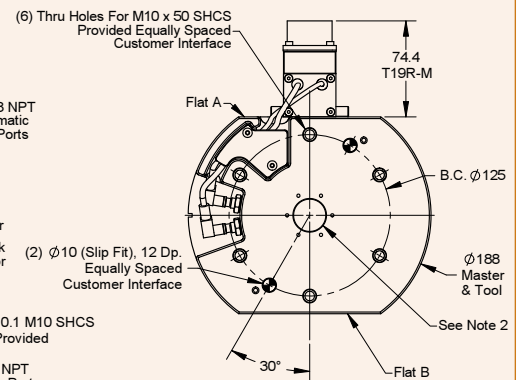
QC-110



**Tool Side
(projection only)**



Part Numbers Shown:
(A) Master: 9120-110AM-T19R-000-SG
(B) Tool: 9120-110FT-T19-000



**Master Side
(projection only)**

Drawing # 9230-2043-03

Product Advantages

Extremely Strong Locking Mechanism

No-Touch Locking technology allows up to 0.12 inches (3.0 mm) plate separation when locking.

Patented Fail-safe Locking Mechanism

- Locking Mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts made of R_C58 stainless steel.

Long-life Bushings for Pneumatic Pass-through



QC-150 Master and Tool plate with G19 electrical module and FN2 self-sealing fluid module.

Specifications	Values	Comments
Suggested Payload Limit	440 lb (200 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	3600 lb (16,000 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity – (X and Y)	12,000 lbf-in (1400 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	10,000 lbf-in (1100 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	16.5 lb (7.5 kg)	Master plate 10.5 lb (4.8 kg); Tool plate 6.0 lb (2.7 kg)
Maximum distance between Master and Tool plate before locking	0.12 in (3.0 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(10) 3/8 NPT	Max pressure of 100 psi (7 bar), metric ports available, contact ATI for more information.



QC-150 with T19 electrical module

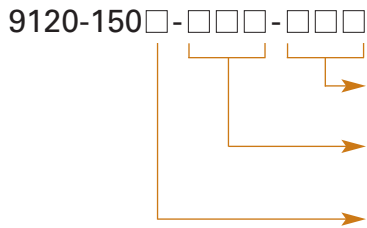
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 32.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

HOW TO ORDER



QC-150		Example:
Flat 'B' (000 = no option)	Flat 'A' (000 = no option)	9120-150M-000-000 (QC-150 Master plate, no options)
M: Master T: Tool		9120-150T-G19-FN2 (QC-150 Tool plate w/ G19 electrical module and FN2 fluid module)
		9120-150M-R19-000 (QC-150 Master plate w/ R19 electrical module)

"ATI has been FANUC Robotics North America, Inc. preferred Tool Changer since 1996."

Peter H. Stephan
Program Manager for Stamping

ATI INDUSTRIAL AUTOMATION
www.ati-ia.com
QC-150

Tool Side (projection only)

Part Numbers:
(A) Master: 9120-150M-G19-FN2
(B) Tool: 9120-150T-G19-FN2

Master Side (projection only)

Notes:

1. Master mounting hardware provided.
2. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
3. Orientation marks are provided to assist in robot teaching.
4. Optional modules shown listed below. Consult catalog for other options.
G19- Electrical Modules
FN2- Fluid/Air Modules

Warning:
Do not apply lock/unlock air pressure without master cover plate properly attached. If cover plate is not used, master should be properly attached to interface. Failure to do so could result in damage to cover plate and o-ring.

Drawing # 9230-1971-04

TSM Modular Tool Stand System

The ATI TSM (Tool Stand Medium) Modular Tool Stand System is compatible with the medium range of Tool Changers—QC-40 through QC-150. The Stand is designed for maximum flexibility to fit most customer applications. The modular system allows you to build your own tool storage rack based on the number of tools, positioning, orientation, and mounting arrangements required. The TSM provides a unique option to utilize a complete arrangement of modules, or use only the tooling-interface Pins and V-blocks and mount them on your own fixture.

Product Advantages

Modular System allows for customization.

V-blocks – 4140 Hardened Tool Steel Pin Blocks provide repeatable tool drop-off.

Use Extruded Rails and Base, or mount the racks on your own platform.

Proximity Sensor Option

Adapts to TSL or TSS Modules as well.

Product Features

V-Blocks and Pins

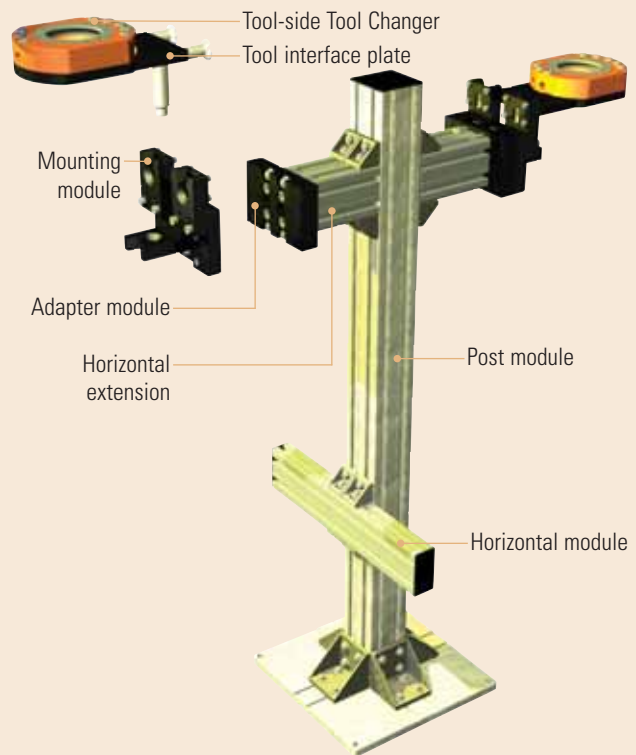
The TSM utilizes V-shaped 4140 Hardened Steel Blocks that receive corresponding steel alignment pins. The V-blocks are designed to mount to extruded railing components or bolt directly onto custom fixtures. The mating alignment pins are included with the TSM Tooling Plate assemblies which attach to the tool. The Alignment Pins are also sold separately as replacement parts or for custom applications.

Mounting Modules

The TSM Mounting Modules are specifically designed to interface with the Tooling Plate assemblies for each corresponding Tool Changer. Mounting Modules mount onto the included TSM Rail components, or you may use the existing bolt patterns to mount to your custom fixture. Mounting Modules come in 2 configurations: Horizontal or Vertical orientation. See the TSM Product Index for tool interfacing option details.

Tooling Plate Assemblies

The TSM Tooling Plate Assemblies attach to your tooling. Alignment Pins are included with the Tooling Plates. Customers can either specify their tool attachment requirements at the time of purchase or choose Blank Tooling Plates and opt to machine their tooling Bolt Patterns in later.



Post and Rail Modules

Choose from several TSM Post and Rail Modules to build your specific Stand configuration. The Post Modules, Horizontal Modules, and Horizontal Extensions are aluminum-extruded rails (Bosch-series). Alignment and mounting hardware is included. Basic standard rail lengths are offered, but customers may specify other lengths.

Adapter Modules







TSM Adapter Modules are specifically designed adapter plates with mounting hardware included that attach Mounting Modules to Rail or Post Modules. Adapter Modules extend the flexibility of the Tool Stand System to cover a myriad of configuration options.


Spring Plate Module


The TSM Spring Plate Module is an option to help stabilize long end-effector tooling while in the stand by applying a spring-generated preload on the Tooling Plate. The preload reduces slack in the fit between the alignment pins and the stand, resulting in less tilt and a more repeatable drop-off and pick-up location. The TSM Spring Plate Module attaches directly to the TSM Vertical Mounting Module.

Quick-Change TSM Tool Stand Interfacing







Option #1: Horizontal QC Orientation						
QC Model	QC-40	QC-41	QC-60	QC-71	QC-110	QC-150
Mounting Module	9120-TSM-MM-3597	9120-TSM-MM-3597	9120-TSM-MM-3597	9120-TSM-MM-3597	9120-TSM-MM-4018	9120-TSM-MM-4018
Tooling Plate	9120-TSM-TP-4055	9120-TSM-TP-4056	9120-TSM-TP-4057	9120-TSM-TP-4058	9120-TSM-TP-4059	9120-TSM-TP-4060
Sensor Module	9120-TSM-SM-4206	9120-TSM-SM-4206	9120-TSM-SM-4206	9120-TSM-SM-4206	9120-TSM-SM-4205	9120-TSM-SM-4205
Notes	See Note 1,11	See Note 1,11	See Note 1,11	See Note 1,11	See Note 1,12	See Note 1,12
Customer Drawing	9230-20-1892	9230-20-1893	9230-20-1894	9230-20-1895	9230-20-1896	9230-20-1897






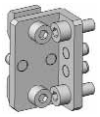
Option #2: Vertical QC Orientation		
QC Model	QC-40, -41, -60, -71	
Mounting Module	9120-TSM-MM-4068	
Tooling Plate	9120-TSM-TP-4069	
Sensor Module	9120-TSM-SM-4206	
Notes	See Note 1	
Customer Drawing	9230-20-1919	

Option #2: Vertical QC Orientation		
QC Model	QC-110, -150	
Mounting Module	9120-TSM-MM-4070	
Tooling Plate	9120-TSM-TP-4071	
Sensor Module	9120-TSM-SM-4205	
Notes	See Note 1	
Customer Drawing	9230-20-1920	






Configurable Tool Stand Module System – Overview Drawing # 9230-20-1880						
Module Name	Post Module 48"	Post Module 72"	Horiz. Module 36"	Horiz. Module 18"	Horiz. Ext. 6"	Horiz. Ext. 10"
Part Number	9120-TSM-PM-3318	9120-TSM-PM-3322	9120-TSM-HM-3317	9120-TSM-HM-3323	9120-TSM-HE-3320	9120-TSM-HE-3321
Notes	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2
Customer Drawing	9230-20-1898	9230-20-1899	9230-20-1900	9230-20-1901	9230-20-1902	9230-20-1903

Module Name	Adapter Module	Spring Plate	Receiver Block	Receiver Block	Dowel Plate	Dowel Plate
Part Number	9120-TSM-AM-4019	9120-TSM-SP-5093	9120-TSM-RB-3591	9120-TSM-RB-3595	9120-TSM-DP-4203	9120-TSM-DP-4204
Notes	See Note 3	See Note 10	See Note 5,7,13	See Note 6,7,14	See Note 9	See Note 9
Customer Drawing	9230-20-1904	9230-20-2514	9230-20-1906	9230-20-1907	9230-20-2039	9230-20-2039

Module/Part Name	Debris Shield Actuator	Debris Shield	Shield Arm	Sensor Module	Tooling Pins - 9230-20-2041
Part Number	9120-TSM-DSA-4249	9120-TSM-DS-4250	3700-20-3376	9120-TSM-SM-4205	3700-20-3590 (M12 Thread) 3700-20-3594 (M10 Thread)
Notes	Shield System Requires: Actuator, Shield and Arm			See Note 4	3700-20-4016 (M10 Thread) 3700-20-4017 (M12 thread)
Customer Drawing	9230-20-2102	9230-20-2102	9230-20-2102	9230-20-1905	

- Notes:
1. Tooling Plate listed has blank customer interface. Custom bolt pattern is available upon request and will require new part number.
 2. May specify shorter rail lengths. Cut charge applies.
 3. Adapts MM-3597 or MM-4018 to vertical rail, and rail ends
 4. Barrel Prox. 8590-9909999-45 (M18x1.0 thread) Sold Separately.
 5. Uses Pin 3700-20-3590, or 3700-20-4017.
 6. Uses Pin 3700-20-3594, or 3700-20-4016.
 7. Receiving Block mounts to rail; bolted or welded to any structure.
 8. Adapts Mounting Module to Large Tool Stand Post Weldment.
 9. Dowel Plate recommended for Rail-to-Rail Positional Repeatability.
 10. Attaches to Vertical Mounting Module 9120-TSM-MM-4068.
 11. V-Block Plate 3700-20-4096 included (2).
 12. V-Block Plate 3700-20-4097 included (2).
 13. Uses Back Plate 3700-20-4096 Sold Separately.
 14. Uses Back Plate 3700-20-4097 Sold Separately.

Complete assembled custom configurations are available, contact ATI for more information.

SENSOR INTERFACE PLATE SYSTEM

The Sensor Interface Plate (SIP) system has been designed to provide Lock and Unlock sensing inside the Robot Interface Plate. The SIP consists of Lock and Unlock sensors, detection shaft, sensing plate, and interface plate. The SIP system is compatible with all of the Standard Series Tool Changer models except the QC-5 and QC-110. Figures 1 through 4 show how the SIP works.

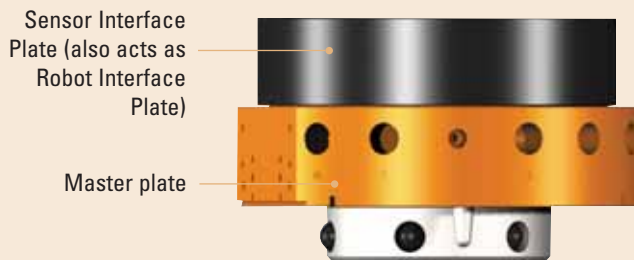


Figure 1: Side view of Master plate with Sensor Interface Plate (SIP) system.

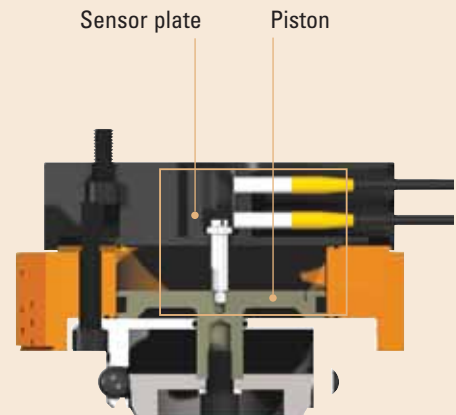


Figure 2: Section view of Figure 1 showing position of SIP system when locked without Tool plate. Neither the Lock nor Unlock sensors are activated. In this position, this is described as a missed Tool condition.

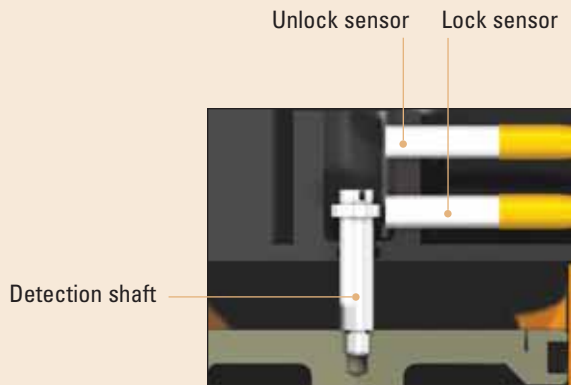


Figure 3: Close-up of SIP in Lock position with the Tool plate. Lock sensor activated by the detection shaft.

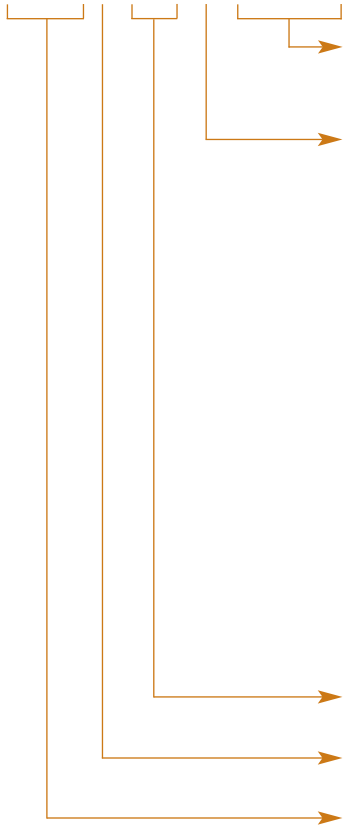


Figure 4: Close-up of SIP in Unlock position. Unlock sensor activated by the detection shaft. Lock sensor is not activated.

HOW TO ORDER

The SIP is factory-installed when ordered with the Master plate. The SIP may also be ordered separately.

9120-□□□M-SIP-□-□□□□



9120-□□□M-SIP-□-□□□□	
	Number representing the interface plate modeled to fit mounting flange (contact ATI for a list of these interface plates).
	Type of proximity switch: A: NPN hardwired 5m cables B: PNP hardwired 5m cables C: 125 VAC switch D: PNP Quick-disconnect switch with 5m cables E: NPN Quick-disconnect switch with no cables F: NPN Quick-disconnect switch with 5m cables G: PNP Quick-disconnect switch with no cables H: PNP with cable combining both lock and unlock into one cable K: 12-24 DC 2-wire switch with 2m cables L: Hall effect sensor M: PNP Quick-disconnect switch with 90 degree cables N: 2-wire sensor (lock only) P: PNP hard-wired sensor with 2m cable w/ male M8 connector Q: 4mm PNP sensor 10 in. cable with Nano connector for QC-11, -20 and -21 QN: 4mm NPN sensor 10 in. cable with Nano connector for QC-11, -20 and -21
	Indicates Sensor Interface Plate
	M: Master
	QC Model

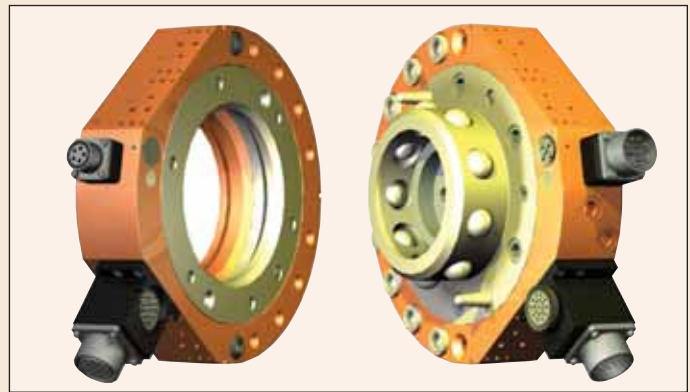
Product Advantages

Built-in Electrical Module has five pins that may be used for tool-ID. The Master connector contains the signals for the detection sensor.

No-Touch Locking technology allows up to 0.1 inches (2.5 mm) plate separation when locking.

Detection Sensor detects when the Tool plate is within 0.6 inches (1.5 mm) of the Master plate, signaling Ready-to-Lock.

Self-sealing Pneumatic Ports on the Master-side seal when the Master and Tool separate.



QC-300 Master and Tool plate with T19 electrical module

Specifications	Values	Comments
Suggested Payload Limit	1000 lb (450 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi (5.5 bar)	7900 lb (35,000 N)	Fail-safe takes over when load exceeds locking force.
Static Moment Capacity –(X and Y)	29,000 lbf-in (3300 Nm)	Dynamic moment capacity 3x higher than static moment capacity. Tests show failure point at 12x X and Y static moment specifications.
Static Moment Capacity – (Z)	25,000 lbf-in (2800 Nm)	
Positional Repeatability – (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at one million cycles.
Weight – when coupled (no accessory modules)	42 lb (19.0 kg)	Master plate 26 lb (11.8 kg); Tool plate 16 lb (7.3 kg)
Maximum distance between Master and Tool plate before locking	0.10 in (2.5 mm)	No-Touch Locking technology allows Master and Tool plates to lock with plate separation.
Pneumatic pass-through Ports (qty) size	(10) 3/8 BSPP (G)	Max pressure of 100 psi (7 bar), (8) self-sealing ports, metric ports available, contact ATI for more information.



QC-300 with G19, FN2 and V34 electrical modules.

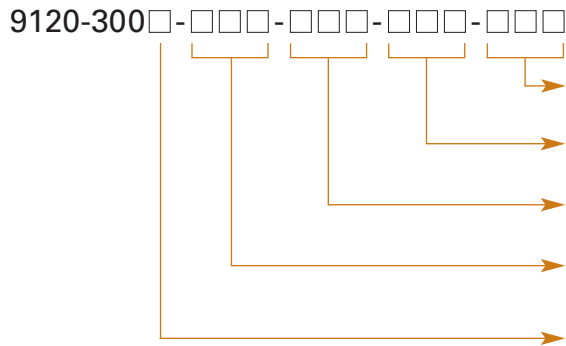
Note:

Modules and options available. See pg. 38.

Tool Stand and components are available for this model. See pg. 51.

Lock/Unlock Sensors with robot interface plate are available for this model. See pg. 34.

HOW TO ORDER



QC-300	
Flat 'B2'	(000 = no option)
Flat 'B1'	(000 = no option)
Flat 'A2'	(000 = no option)
Flat 'A1'	(000 = no option)
M:	Master
T:	Tool

"I have found the ATI QC Tool Changer to be very reliable and robust for robot end-of-arm tooling applications."

Vipin Patel
FANUC Robotics

ATI INDUSTRIAL AUTOMATION
www.ati-ia.com
QC-300

Tool Side (projection only)

Notes:

- Master mounting hardware provided.
- Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 5.5mm, with a cover plate is 8.6mm.
- Orientation marks are provided to assist in robot teaching.
- Shown with optional T19 Electrical Modules. For other modules see the Modules and Options section of the catalog.

Part Numbers Shown:
(A) 9120-300M-000-000-T19-000
(B) 9120-300T-000-000-T19-000

Master Side (projection only)

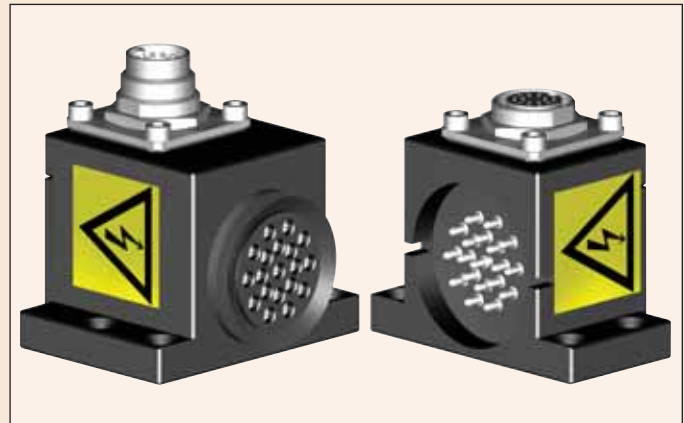
Warning:
Do not apply lock/unlock air pressure without master cover plate properly attached. If cover plate is not used, master should be properly attached to interface. Failure to do so could result in damage to cover plate and o-ring.

Drawing # 9230-1973-03

STANDARD SERIES MODULES AND OPTIONS

Electrical and Signal Modules

A variety of Electrical Modules are available that enable one to pass discrete signals through the Tool Changer. Some modules are also available supporting Tool Changer I/O, such as Lock, Unlock, and Ready-to-Lock proximity sensors, as well as tool-ID. Military-style or M16 connectors are standard on most electrical modules. Custom versions are available upon request. All of our Standard Series Electrical and Signal Modules are compatible with our Heavy Automation Tool Changers with an adapter block. Contact ATI for more information. Visit www.ati-ia.com for a complete list of available modules.



RF19 Master- and Tool-side electrical modules with M16 screw-on connectors.

For Tool Changer Models: QC-5

Part #	# Pins	Voltage	Connector Type
B15-M/T	15	3A/50VAC	high-density D-sub connector
E10-005-M/T	10	3A/50VAC	solder conn., miniature size
E2A-M/T	20	3A/50VAC	solder conn., miniature size
E3A-M/T	30	3A/50VAC	solder conn., miniature size

For Tool Changer Models: QC-11

Part #	# Pins	Voltage	Connector Type
A15-M/T	15	3A/50VAC	high-density D-sub connector
E10-010-M/T	10	3A/50VAC	solder conn., miniature size
E20-010-M/T	20	3A/50VAC	solder conn., miniature size

For Tool Changer Models: QC-20, 21 and 60

Part #	# Pins	Voltage	Connector Type	Notes
K12-M/T	12	3A/50VAC	12 mm industrial connector	12 pins available for customer use
KM14-M/T	14	5A/250VAC	mini. MS quick-disconnect	14 pins available for customer use, 12 pins at 5 amps and 2 pins at 13 amps
D15-M/T	15	3A/50VAC	high-density D-sub connector	15 pins available for customer use
K19-M/T	19	3A/50VAC	mini. MS quick-disconnect	19 pins available for customer use
K14-T	14	3A/50VAC	mini. MS quick-disconnect	19 pins (14 available for customer use), 16 tool-IDs, mates with K19-M
KF19-M/T	19	3A/50VAC	M16 screw-on connector	19 pins available for customer use, Cables available.
KG19-M/T	19	3A/50VAC	mini. MS quick-disconnect	Swivel connector provides 5 unique positions across 180 degrees
K26-M/T	26	3A/50VAC	mini. MS quick-disconnect	26 pins available for customer use

For Tool Changer Models: QC-40, 41, 71, 110, 150, and 300 - M16 Screw-On Connectors

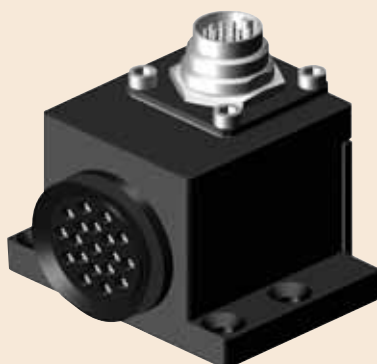
Part #	# Pins	Voltage	Connector Type	Notes
GF19-M/T	19	3A/125VAC	M16 screw-on connector	Swivel connector provides 5 unique positions across 180 degrees, Cables available.
RF19-M/T	19	3A/125VAC	M16 screw-on connector	19 pins available for customer use, Right-angled connector, Cables available.
RF14-T	14	3A/125VAC	M16 screw-on connector	19 pins (14 available for customer use), RF19 module with (0-9) tool-ID, mates with RF19-M or any G, R, S or T series modules with 19 pins, Cables available
SF19-M/T	19	3A/125VAC	M16 screw-on connector	19 pins available for customer use, Inline connector, Cables available.

For Tool Changer Models: QC-40, 41, 71, 110, 150, and 300 - Miniature MS Quick-Disconnect Connectors

Part #	# Pins	Voltage	Connector Type	Notes
J16-M/T	16	3A/250VAC	mini. MS quick-disconnect	16 pins available for customer use, Right-angled connector
R19-M/T	19	5A/250VAC	mini. MS quick-disconnect	19 pins available for customer use, Right-angled connector
R10-T	10	5A/250VAC	mini. MS quick-disconnect	19 pins (10 available for customer use), R19 module with (0–99) tool-ID, mates with R19-M or any G, R, S or T series modules with 19 pins
R14-T	14	5A/250VAC	mini. MS quick-disconnect	19 pins (14 available for customer use), R19 module with (0–9) tool-ID, mates with R19-M or any G, R, S or T series modules with 19 pins
S19-M/T	19	5A/250VAC	mini. MS quick-disconnect	19 pins available for customer use, Inline connector
S14-T	14	5A/250VAC	mini. MS quick-disconnect	19 pins (14 available for customer use), S19 module with (0–9) tool-ID, mates with S19-M or any G, R, S or T series modules with 19 pins
G19-M/T	19	5A/250VAC	mini. MS quick-disconnect	19 pins available for customer use, Swivel Connector Provides 5 unique positions across 180 degrees
R26-M/T	26	3A/250VAC	mini. MS quick-disconnect	26 pins available for customer use, Right-angled connector
R21-T	21	3A/250VAC	mini. MS quick-disconnect	26 pins (21 available for customer use), R26 module with (0–9) tool-ID, mates with R26-M or any G, R, S or T series modules with 26 pins
R17-T	17	3A/250VAC	mini. MS quick-disconnect	26 pins (17 available for customer use), R26 module with (0–99) tool-ID, mates with any R26-M or any G, R, S or T series modules with 26 pins
S26-M/T	26	3A/250VAC	mini. MS quick-disconnect	26 pins available for customer use, Inline connector
S21-T	21	3A/250VAC	mini. MS quick-disconnect	26 pins (21 available for customer use), S26 module with (0–9) tool-ID, mates with S26-M or any G, R, S or T series modules with 26 pins
G26-M/T	26	3A/250VAC	mini. MS quick-disconnect	26 pins available for customer use, Swivel Connector Provides 5 unique positions across 180 degrees
R32-M/T	32	3A/250VAC	mini. MS quick-disconnect	32 pins available for customer use, Right-angled connector
R38-M/T	19 +19	5A/250VAC	mini. MS quick-disconnect	(2) R19 modules mounted side-by-side on adapter plate
R52-M/T	26 +26	3A/250VAC	mini. MS quick-disconnect	(2) R26 modules mounted side-by-side on adapter plate
R47-T	26 +21	3A/250VAC	mini. MS quick-disconnect	(1) R26 and (1) R21 module mounted side-by-side on adapter plate, mates with R52-M

Note: Use W option to add Lock/Unlock sensor cables to G, K, R, S and T Master electrical modules. For the QC-110 model use R option to add Lock/Unlock sensor cables to G, K, R, S and T Master electrical modules. (Example: G19W or S19R)
 All QC-40, 41, 71, 110, 150, and 300 electrical and signal modules are compatible with QC-60 model with an adapter plate.

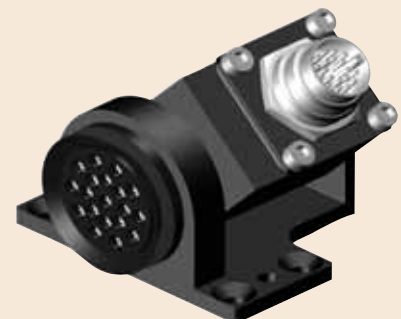
All of ATI's G, R, S, and T series modules having the same number of pins are compatible with each other (i.e., a G19 Master is compatible with a R19 Tool).



RF19 right-angled connector



SF19 inline connector



GF19 swivel connector

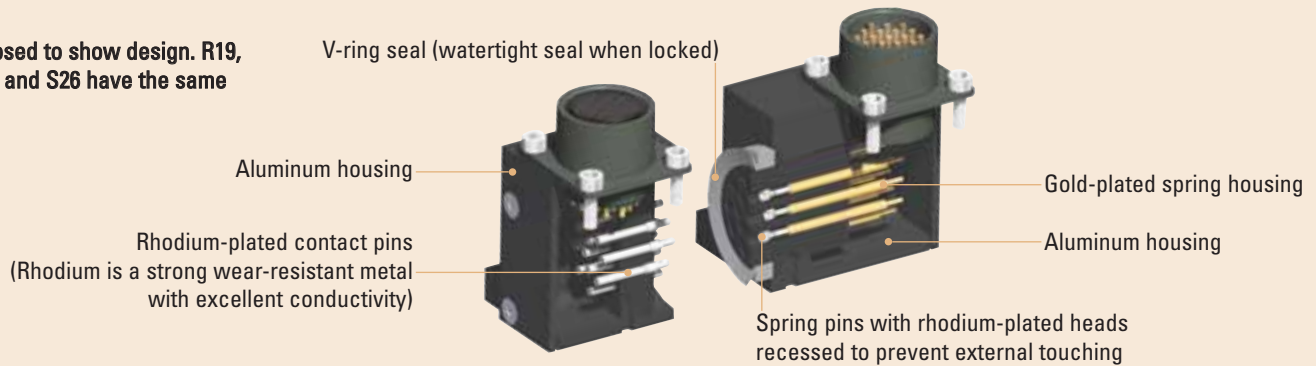
STANDARD SERIES MODULES AND OPTIONS

Electrical and Signal Modules (cont.)

For Tool Changer Models: QC-40, 41, 71, 110, 150, and 300 - MS Threaded Connectors

Part #	# Pins	Voltage	Connector Type	Notes
T19-M/T	19	5A/250VAC	MS threaded connector	19 pins available for customer use, Right-angled connector
T14-T	14	5A/250VAC	MS threaded connector	19 pins (14 available for customer use), T19 module with (0-9) tool-ID, mates with T19-M or any G, R, S, or T series modules with 19 pins
T10-T	10	5A/250VAC	MS threaded connector	19 pins (10 available for customer use), T19 module with (0-99) tool-ID, mates with T19-M or any G, R, S, or T series modules with 19 pins
T26-M/T	26	3A/250VAC	MS threaded connector	26 pins available for customer use

T19 exposed to show design. R19, R26, S19 and S26 have the same design.

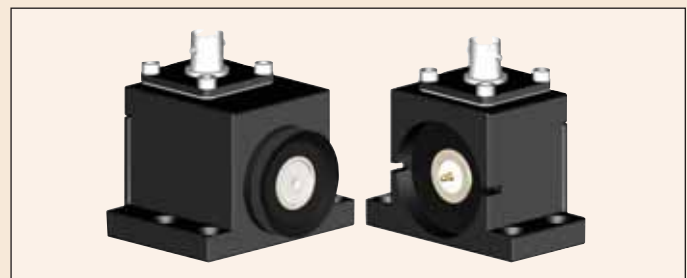


For Tool Changer Models: QC-40, 41, 71, 110, 150, and 300 - High-Power - MS Threaded Connectors

Part #	# Pins	Voltage	Connector Type	Notes
MT8-M/T	8	20A/500VAC/700VDC	MS threaded connector	High-power module
MT8L-M/T	8	20A/500VAC/700VDC	MS threaded connector	Connector relocated 180 degrees from standard MT8
MT9-M/T	9	28A/500VAC/700VDC	MS threaded connector	Compatible only with QC-100 or larger to handle maximum rated current
MT14-M/T	14	13A/500VAC/700VDC	MS threaded connector	MT14A-M (Master-side) MT14-T (Tool-side)
MTR14-M/T	14	13A/500VAC/700VDC	MS threaded connector	Modified MT14 with connector relocated to mount with connector flange parallel to mounting flat

Special Application Modules

We have a variety of modules that can pass utilities such as ultrasonic welding, video, camera signals, and more. Contact ATI to select the right module for your application. We welcome the opportunity to design a module for your application. Visit www.ati-ia.com for a complete list of available modules.

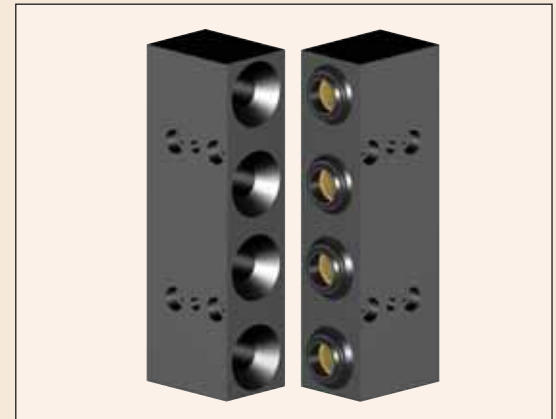


X7B coax cable module

Part #	Description
X7B-M/T	Coax cable module, single 75 Ohm contact, BNC connector, compatible QC models: 40, 41, 71, 110, 150, 300
X7C-M/T	High voltage module for ultrasonic welding applications, SHV connector, 3A/2000VAC, 30kHz, compatible QC models: 40, 41, 71, 110, 150, 300
X7D-M/T	Coax power module with BNC connectors (for use with Branson ultrasonic equipment) 5A/500VAC, compatible QC models: 40, 41, 71, 110, 150, 300
BP-M/T	PROFIBUS pass-through module, 10 pins, 5A/24VAC, compatible with QC-110
RX12-M/T	Camera module for Sony XC series camera, Hirose 12-pin connector, compatible QC models: 40, 41, 71, 110, 150, 300

Pneumatic, Fluid, and Vacuum Modules

ATI offers a variety of modules to pass pneumatic, vacuum, and fluid utilities. Pneumatic service modules are available with self-sealing or pass-through ports, both having anodized-aluminum bodies. Pass-through pneumatic ports utilize rubber bushings to achieve a durable and reliable seal. They are suitable for both vacuum and pressure service. High-flow ports for vacuum service utilize rubber V-rings for sealing and cannot support positive pressures. Fluid/Pneumatic modules are made from stainless steel materials and utilize self-sealing ports with U-cup seals. This minimizes fluid/air loss during a tool change and prevents corrosion. Self-sealing ports cannot support vacuum service. Visit www.ati-ia.com for a complete list of available modules.



P38A pneumatic module

Pneumatic Modules

Part #	Port Size	# Ports	Cv Rating	Compatible QC Models	Notes
P18-M/T	1/8 NPT	4	0.65	40, 41, 60*, 71, 110, 150, 300	Pass-through ports
P186-M/T	1/8 NPT	6	0.65	40, 41, 60*, 71, 110, 150, 300	Pass-through ports
P186A-M/T	1/8 NPT	6	0.65	40, 41, 60*, 71, 110, 150, 300	Pass-through ports, Ported axially
P186A-E-M/T	1/8 BSPP (G)	6	0.65	40, 41, 60*, 71, 110, 150, 300	Pass-through ports, Ported axially
P05-M/T	M5	10	0.25	40, 41, 60*, 71, 110, 150, 300	Pass-through ports
P14-M/T	1/4 NPT	2	1.03	40, 41, 60*, 71, 110, 150, 300	Pass-through ports
P238-M/T	3/8 NPT	2	2.45	40, 41, 60*, 71, 110, 150, 300	Pass-through ports
P38-M/T	3/8 NPT	4	2.45	110, 150, 300	Pass-through ports, Adapter plate required
P38A-M/T	3/8 NPT	4	2.45	41, 60*, 71, 110, 150, 300	Pass-through ports, Ported axially
P38-E-M/T	3/8 BSPP (G)	4	2.45	110, 150	Pass-through ports, Includes adapter plates

All pass-through pneumatic ports support air and vacuum. *Requires adapter plate

Fluid/Pneumatic Modules

Part #	Port Size	# Ports	Cv Rating	Compatible QC Models	Notes
FG2-M/T	3/8 BSPP (G)	2	1.4	40, 41, 71, 110, 150, 300	Self-sealing ports, Replaces F02-E
FG2A-T	3/8 BSPP (G)	2	1.4	40, 41, 71, 110, 150, 300	Pass-through ports, mates with FG2-M
FN2-M/T	3/8 NPT	2	1.4	40, 41, 71, 110, 150, 300	Self-sealing ports, Replaces F02-N
FN2A-T	3/8 NPT	2	1.4	40, 41, 71, 110, 150, 300	Pass-through ports, mates with FN2-M
FG4-M/T	3/8 BSPP (G)	4	1.4	71, 110, 150, 300	Self-sealing ports, Replaces F04-E
FG4A-T	3/8 BSPP (G)	4	1.4	71, 110, 150, 300	Pass-through ports, mates with FG4-M
FN4-M/T	3/8 NPT	4	1.4	71, 110, 150, 300	Self-sealing ports, Replaces F04-N
FN4A-T	3/8 NPT	4	1.4	71, 110, 150, 300	Pass-through ports, mates with FN4-M

Can add Viton as an option for FN/FG 2 or 4 - should add V at the end of the module number before -M or -T. No dashes between V and module number.

Vacuum Modules

Part #	Port Size	# Ports	Cv Rating	Compatible QC Models	Notes
V34-M/T	1-3/4 BSPP (G)	1	8.0 (est.)	40, 41, 60*, 71, 110, 150, 300	Pass-through port, vacuum only

*Requires adapter plate

Robotic Tool Changers for Heavy Automation

The Heavy Automation Robotic Tool Changer line has been developed for the resistance welding market and medium- to heavy-duty material handling. Because these Tool Changers use modules to pass utilities (e.g., water, electrical, pneumatic, etc.), they are able to handle numerous applications by simply selecting the appropriate modules. These Tool Changers have extremely high moment capacity for use in demanding applications.

Product Advantages

Modular Design: Power, coolant, servo, and control/signal features are built into separate modules making maintenance easy. Module housings use a common mounting design for use on the QC-210, QC-310, QC-510, and QC-1210, increasing flexibility in configuring the Tool Changer.

Extremely High Moment Capacity: Many Tool Changers with high moment loads gap (separate between the Master and Tool plates) during high-speed moves, causing disruption to utilities such as Fieldbus networks and servo lines. The Heavy Automation series from ATI can take on dynamic moment loads and maintain utility functions during full range of motion.



QC-210 Heavy Automation Tool Changer

In-the-Body Sensing: Lock/Unlock/Ready-to-Lock sensors have been integrated into the body of the Tool Changer. This design provides the advantages of reduced stack height and reduced weight without sacrificing the strength of the unit. Two Ready-to-Lock sensors in the body afford the robot programmer the ability to better teach Master-to-Tool coupling.

Integrated Solution for Control/Signal Modules: Control/Signal modules support an integrated valve that is internally-ported and interfaces with internal cable routing in the Tool Changer body.

Easy Dress: The modules are designed to place electrical, pneumatic, and water ports in-line, affording the customer an easy dress-out.

Integrated Bolt Circle Patterns: Common, industry-standard bolt circle patterns have been integrated directly into the Tool Changer body of these models, often eliminating the need for an interface plate, which reduces stack height.

Battery Backup for Servo: The servo module has a battery backup option on the Tool-side to allow the servo to hold information while disconnected from the robot.

Strong Power and Servo Module Housings: High-strength aluminum and FR4/G10 composite insulating material are used for the primary current and servo modules to prevent damage from crashes and cable stress.

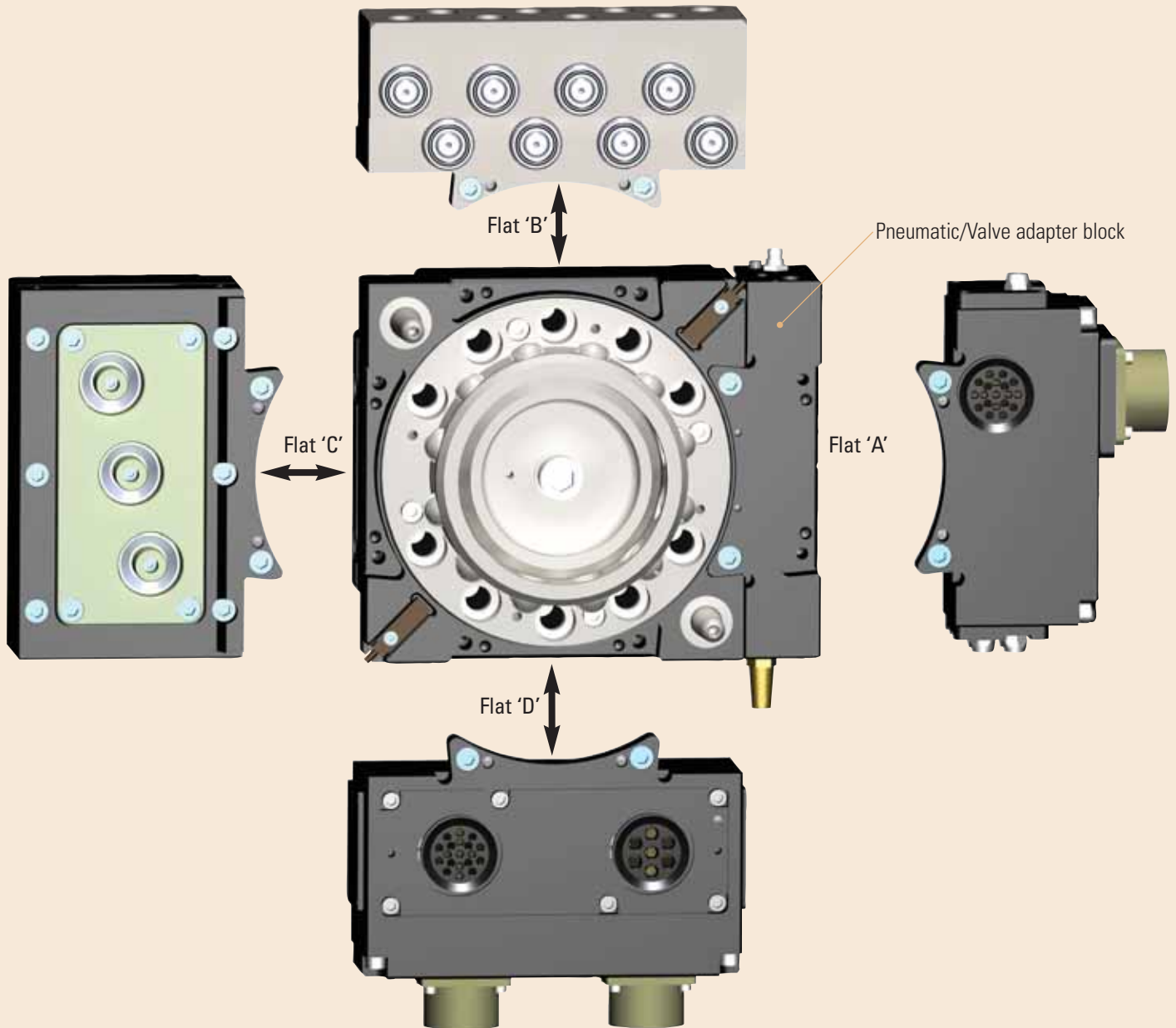
Weight and Size Reduction: Weight and size are kept as small as possible without reducing reliability or performance.

No-Touch Contacts Increase Safety: 200-amp power and signal modules have contacts that are not touchable on the Master-side—increasing safety and world-wide acceptance.

High-flow Fluid Module: The Fluid/Pneumatic module has a Cv of 3.1 allowing for better weld gun and transformer cooling.

Common Utility Module Mounting

Modules mount from the Tool Changer face to provide extra support for applications with heavy dress packages. All modules use a common mounting pattern so they can be swapped between the QC-210, QC-310, and QC-510 models and located on any of three available flats ('B', 'C', or 'D'). Flat 'A' on the Master-side must always have a Lock/Unlock Pneumatic and Valve Mounting Adapter. Control/Signal Modules can be located on flat 'A' and are piggybacked on the Lock/Unlock Pneumatic and Valve Mounting Adapter.



Product Advantages

No-Touch Locking technology allows up to 0.1 inches (2.5 mm) plate separation when locking.

Ready-to-Lock Sensors (2) detect when the Tool plate is within 0.06 inches (1.5 mm) of the Master plate, ensuring that the Tool plate and Master plate are parallel.

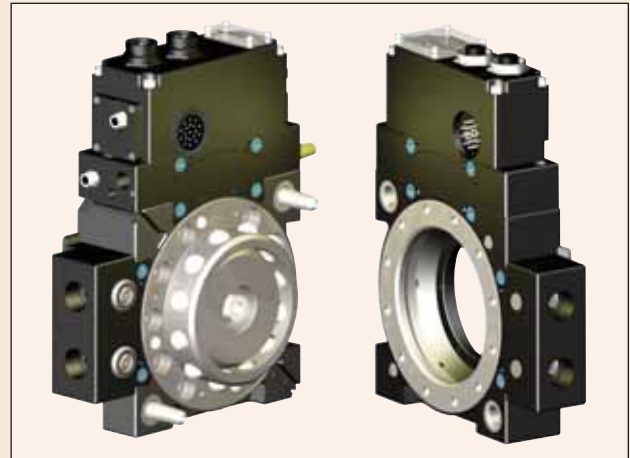
Patented Fail-safe Locking Mechanism

- Locking mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts are made of R_c58 stainless steel.

Integrated Lock/Unlock Sensing Proximity Sensors to indicate Lock/Unlock position for safe Coupling/Uncoupling.

Mounts Directly to most 200 kg Robots

(no SIP plate required, see stack height below).



QC-210 with pneumatic module and control module

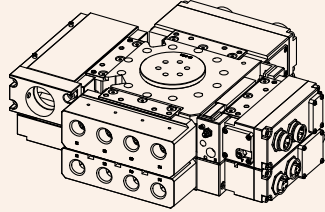
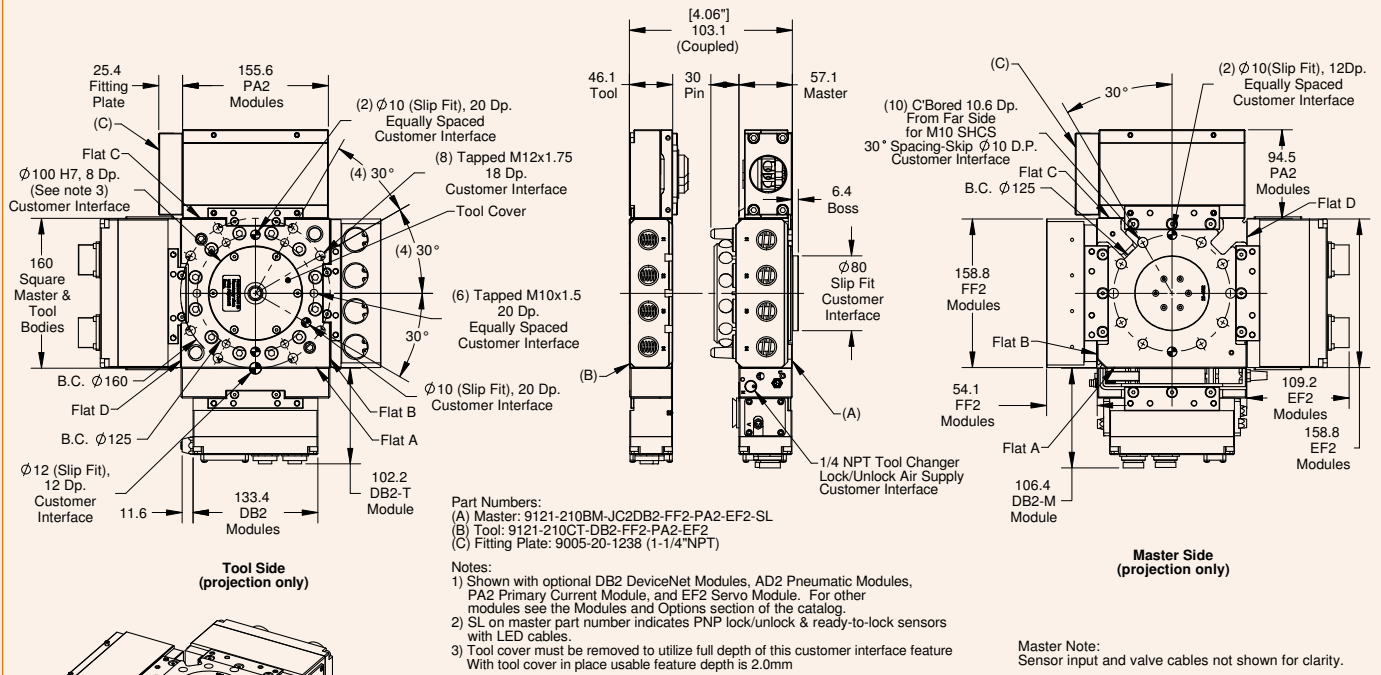
Specifications	Values	Comments
Suggested Payload Limit	500 lbs (220 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi	7000 lbs (31,000 N)	Axial holding force.
Static Moment Capacity (X and Y)	24,000 lbf-in (2700 Nm)	Higher dynamic moment possible depending on module selection. Failure test exceeded 120,000 lbf-in (13,560 Nm) moment.
Static Moment Capacity (Z)	20,000 lbf-in (2300 Nm)	(Torsion) Higher dynamic moment possible depending on module selection. Failure test exceeded 100,000 lbf-in (11,300 Nm) moment.
Positional Repeatability (X,Y, and Z)	0.0006 in (0.015 mm)	Repeatability tested at rated load at over one million cycles.
Weight (when coupled) (no accessory modules)	17.0 lbs (7.7 kg)	Master: 11.6 lbs (5.3 kg) Tool: 5.4 lbs (2.4 kg)
Stack height when locked	3.43 in (103 mm)	Stack height for 125 mm ISO pattern
	4.06 in (120 mm)	Stack height for 160 mm ISO pattern (includes IP)
Body size (no modules)	6.3 x 6.3 in (160 x 160 mm)	Size of body prior to module mounting.
Maximum allowable distance between Master and Tool plates before locking	0.1 in (2.5 mm)	Normal recommended locking distance. Locking distance varies depending on module selection, lock pressure, pay load, etc.
Sensor Information, signal name	L/U/RTL (Lock/Unlock/ R1 and R2)	Lock/Unlock sensors (2) integrated into the body of the Tool Changer. (2) Ready-to-Lock Sensors, 180 degrees apart, afford easier teaching for the robot programmer.

Note:

Modules and options available. See pg. 56.

Tool Stand and components are available for this model. See pg. 51.

How to order information is available on pg. 50.



Scale 1:4

Drawing # 9230-20-2815-01



Product Advantages

No-Touch Locking technology allows up to 0.1 inches (2.5 mm) plate separation when locking.

Ready-to-Lock Sensors (2) detect when the Tool plate is within 0.06 inches (1.5 mm) of the Master plate, ensuring that the Tool plate and Master plate are parallel.

Patented Fail-safe Locking Mechanism

- Locking mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts are made of R_c58 stainless steel.

Integrated Lock/Unlock Sensing Proximity Sensors to indicate Lock/Unlock position for safe Coupling/Uncoupling.

Mounts Directly to most 500 kg Robots

(no SIP required; see stack height below).



QC-310 with pneumatic module and control module

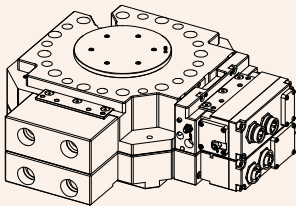
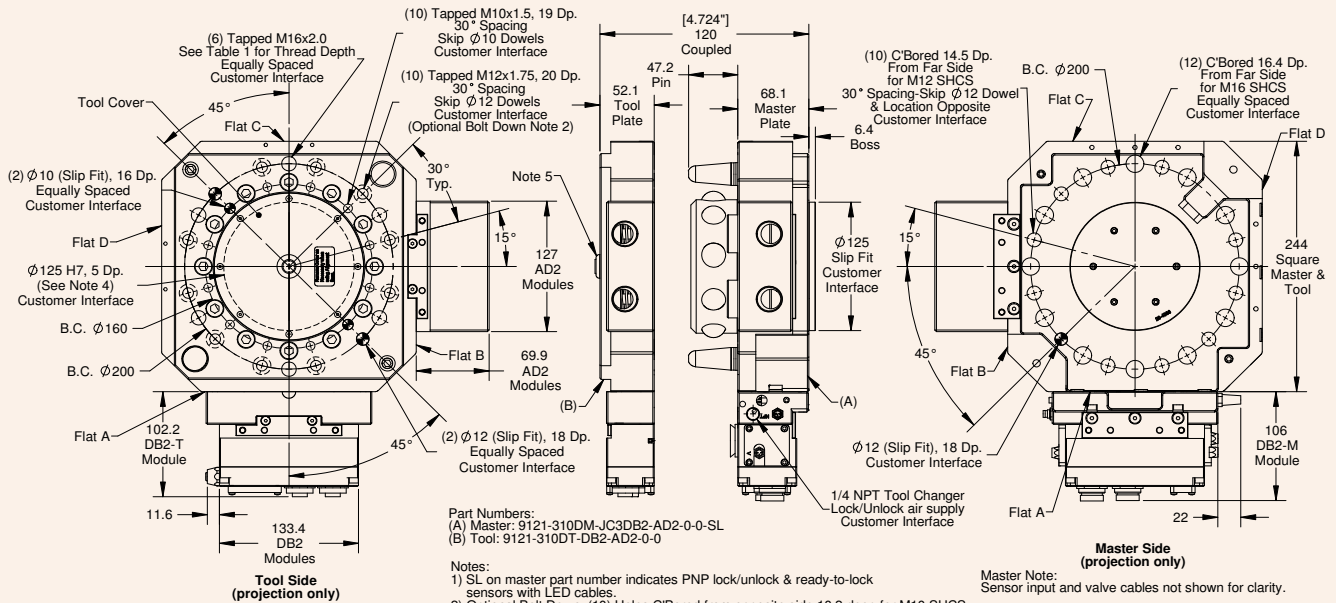
Specifications	Values	Comments
Suggested Payload Limit	1100 lbs (510 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi	8600 lbs (38,000 N)	Axial holding force.
Static Moment Capacity (X and Y)	29,000 lbf-in (3300 Nm)	Higher dynamic moment possible depending on module selection. Failure test exceeded 180,000 lbf-in (20,340 Nm) moment.
Static Moment Capacity (Z)	28,000 lbf-in (3200 Nm)	(Torsion) Higher dynamic moment possible depending on module selection. Failure test exceeded 100,000 lbf-in (11,300 Nm) moment.
Positional Repeatability (X,Y, and Z)	.0006 in (.015 mm)	Repeatability tested at rated load at over one million cycles.
Weight (when coupled) (no accessory modules)	44.0 lbs (20.0 kg)	Master: 27.5 lbs (12.5 kg) Tool: 16.5 lbs (7.5 kg)
Stack height when locked	4.72 in (120.0 mm)	Stack height - 200 mm ISO pattern
Body size (no modules)	9.6 x 9.6 in (244 x 244 mm)	Size of body prior to module mounting.
Maximum allowable distance between Master and Tool plates before locking	0.1 in (2.5 mm)	Normal recommended locking distance. Locking distance varies depending on module selection, lock pressure, pay load, etc.
Sensor Information, signal name	L/U/RTL (Lock/Unlock/ R1 and R2)	Lock/Unlock sensors (2) integrated into the body of the Tool Changer. (2) Ready-to-Lock Sensors, 180 degrees apart, afford easier teaching for the robot programmer.

Note:

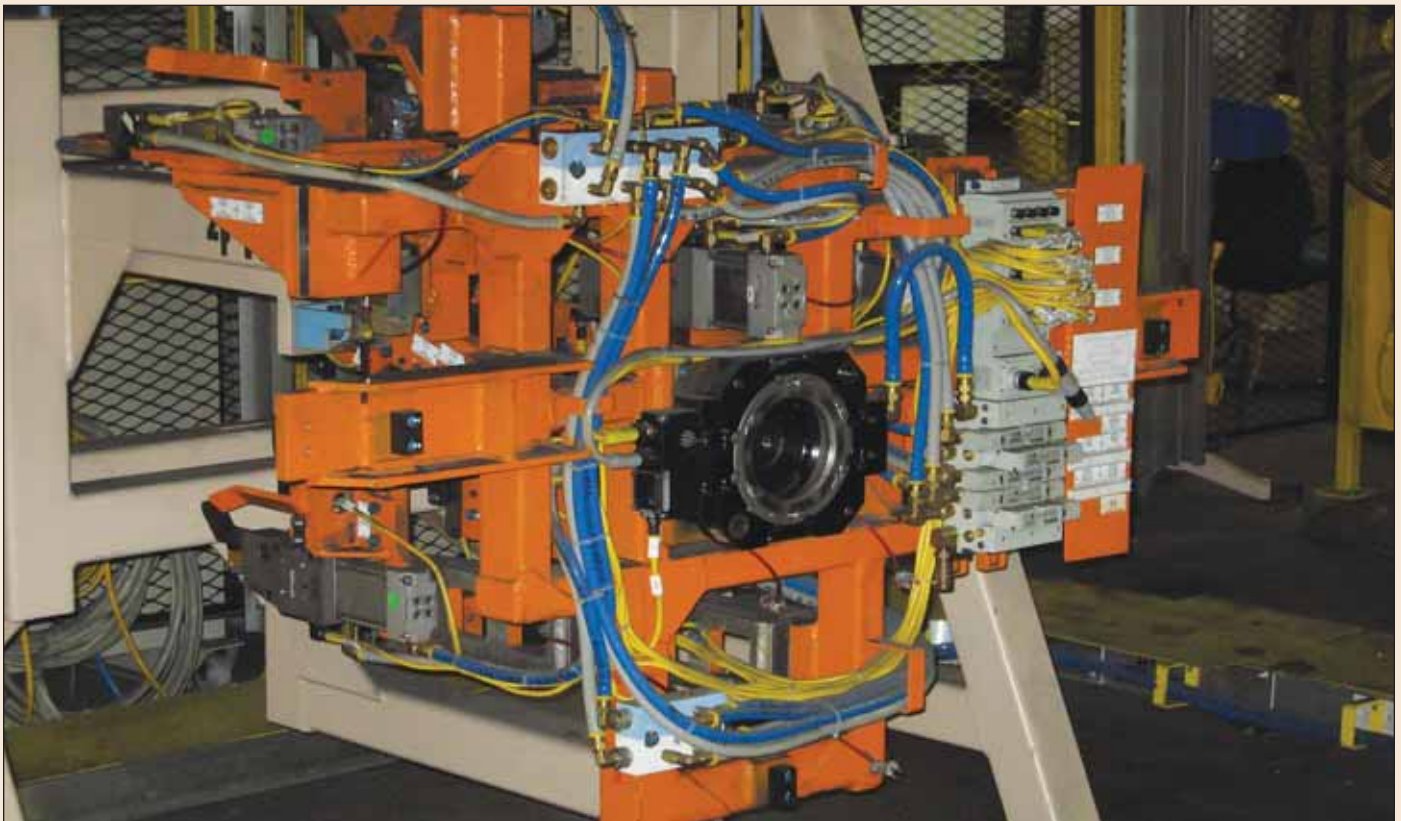
Modules and options available. See pg. 56.

Tool Stand and components are available for this model. See pg. 51.

How to order information is available on pg. 50.



Drawing # 9230-2816-01



Product Advantages

No-Touch Locking technology allows up to 0.1 inches (2.5 mm) plate separation when locking.

Ready-to-Lock Sensors (2) detect when the Tool plate is within 0.06 inches (1.5 mm) of the Master plate, ensuring that the Tool plate and Master plate are parallel.

Patented Fail-safe Locking Mechanism

- Locking mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts are made of R_C58 stainless steel.

Integrated Lock/Unlock Sensing Proximity Sensors to indicate Lock/Unlock position for safe Coupling/Uncoupling.

Mounts Directly to most 600+ kg Robots

(no SIP required; see stack height below).



QC-510 with pneumatic module and control module

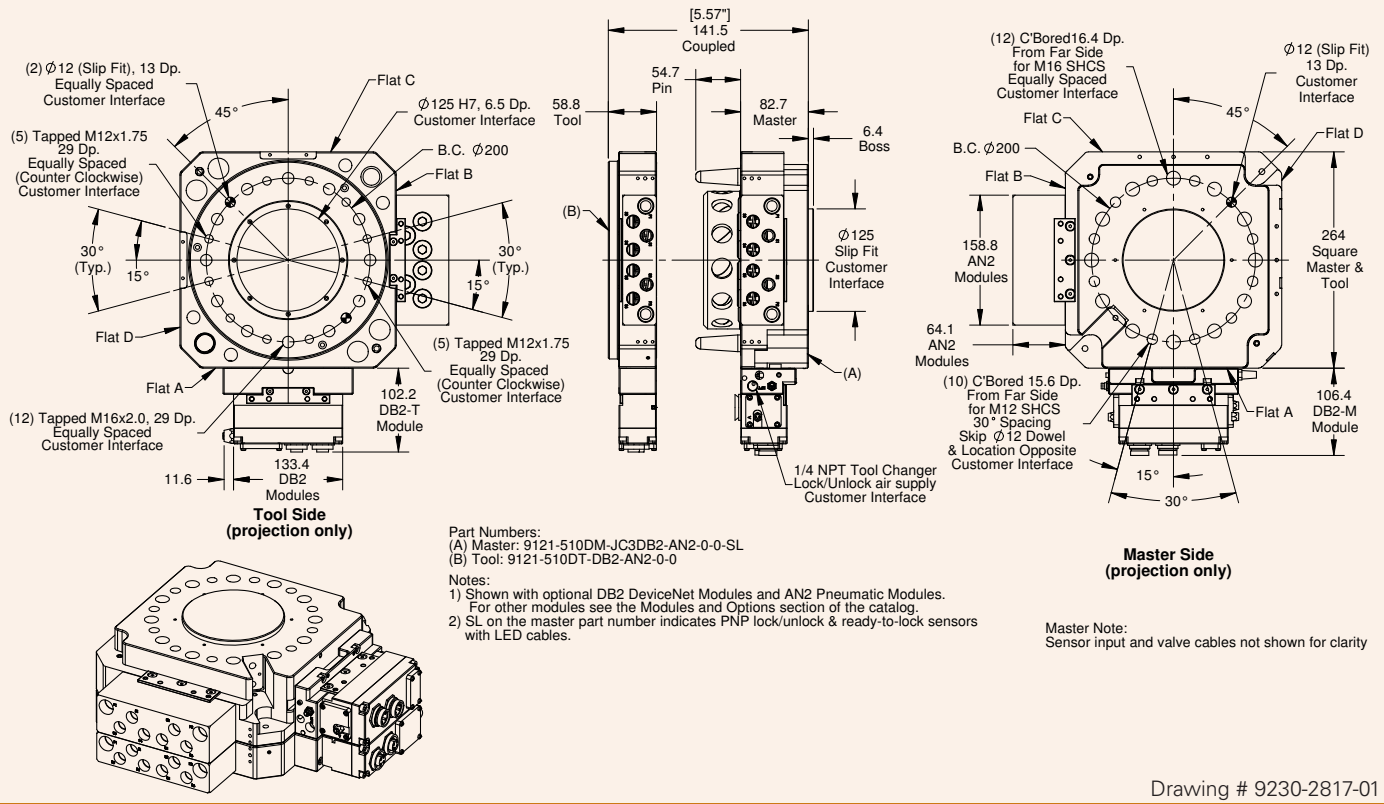
Specifications	Values	Comments
Suggested Payload Limit	1500 lbs (700 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi	14,000 lbs (62,000 N)	Axial holding force.
Static Moment Capacity (X and Y)	43,000 lbf-in (4900 Nm)	Higher dynamic moment possible depending on module selection. Failure test exceeded 250,000 lbf-in (28,250 Nm) moment.
Static Moment Capacity (Z)	31,000 lbf-in (3500 Nm)	(Torsion) Higher dynamic moment possible depending on module selection. Failure test exceeded 150,000 lbf-in (16,950 Nm) moment.
Positional Repeatability (X,Y, and Z)	.0006 in (.015 mm)	Repeatability tested at rated load at over one million cycles.
Weight (when coupled) (no accessory modules)	61.7 lbs (28.0 kg)	Master: 42.6 lbs (19.3 kg) Tool: 19.1 lbs (8.7 kg)
Stack height when locked	5.6 in (142 mm)	Stack height - 200 mm ISO pattern
Body size (no modules)	10.4 x 10.4 in (264 x 264 mm)	Size of body prior to module mounting.
Maximum allowable distance between Master and Tool plates before locking	0.1 in (2.5 mm)	Normal recommended locking distance. Locking distance varies depending on module selection, lock pressure, pay load, etc.
Sensor Information, signal name	L/U/RTL (Lock/Unlock/ R1 and R2)	Lock/Unlock sensors (2) integrated into the body of the Tool Changer. (2) Ready-to-Lock Sensors, 180 degrees apart, afford easier teaching for the robot programmer.

Note:

Modules and options available. See pg. 56.

Tool Stand and components are available for this model. See pg. 51.

How to order information is available on pg. 50.



HOW TO ORDER QC-210, QC-310 AND QC-510

9121-□10□□- - - -S□

Flat 'A' Flat 'B' Flat 'C' Flat 'D'

QC-210, QC-310, and QC-510

Standard Proximity Switch designation

L: PNP Quick-disconnect switch with LED cables
E: NPN Quick-disconnect switch
 For information on other switches, contact ATI Sales.

Optional Modules

Refer to pages 56–61 for information needed to select the proper module for your application. A comprehensive list is available at www.ati-ia.com.

Note: Flat 'A' Master must always have a **Jxx** Lock/Unlock Pneumatic and Valve Mounting Adapter. Control/Signal Modules can be located on flat 'A' and are piggybacked on the 'Jxx' Lock/Unlock Pneumatic and Valve Mounting Adapter. When a Control/Signal Module is specified, the first set of place takers is comprised of a combination of Lock/Unlock Pneumatic and Valve Adapter and Signal Module, e.g.,

9121-210BM-**JC2DB2**-AA2-0-0-SL

Jxx: Lock/Unlock Pneumatic and Valve Mounting Adapter ('A' Flat Only)
Axx: Pneumatic Module (Anodized Aluminum, No fluid)
Dxx: Fieldbus Module
Exx: Servo Module
Fxx: Fluid/Pneumatic Module (Stainless steel, self-sealing ports)
Pxx: Power Module
Sxx: Discrete Signal Module
Vxx: Discrete Signal Module with Integrated Valve
 '0' Represents a flat with no module

M: Master
T: Tool

Boss/Recess

A: No Boss (Master) or Recess (Tool)
B: 80 mm Boss/Recess (only available on 210)
C: 100 mm Boss/Recess (only available for 210, 310)
D: 125 mm Boss/Recess (only available for 310, 510)
E: 160 mm Boss (only available for 510)
F: 63 mm Boss (only available on 210)

Model Designation

2: QC-210
3: QC-310
5: QC-510

TSL Modular Tool Stand System

The ATITSL (Tool Stand, Large) Modular Tool Stand System is compatible with larger ATI Tool Changers. The Stand is designed for durability, longevity, and maximum flexibility to fit most customer applications. The configurable system allows you to specify tool height, offset, shielding, and sensing. To save space, the TSL can even store two tools on the same post. ATITSLs are currently in use in major automotive plants around the world.

Product Advantages

Compliant Tool Interface Option to help prevent damage to equipment and allow for robot over-travel and programming flexibility.

Compact Tool Hooks and Hangers to minimize stack height and provide a simple and effective drop-off method.

Robust Steel Weldment to ensure long-term durability in the most severe plant conditions.

Sensors and Switches are offered for tool presence, shield status, and Tool Stand Interlock.

Optional Shield Guards for protecting your equipment from dust, weld slag, and other harmful debris.

Job-Specific Tool Integration: ATI Engineers will work with you to design custom interfaces to your tooling that are job-specific. Contact ATI for more information.

Product Features

Tooling Interface Options

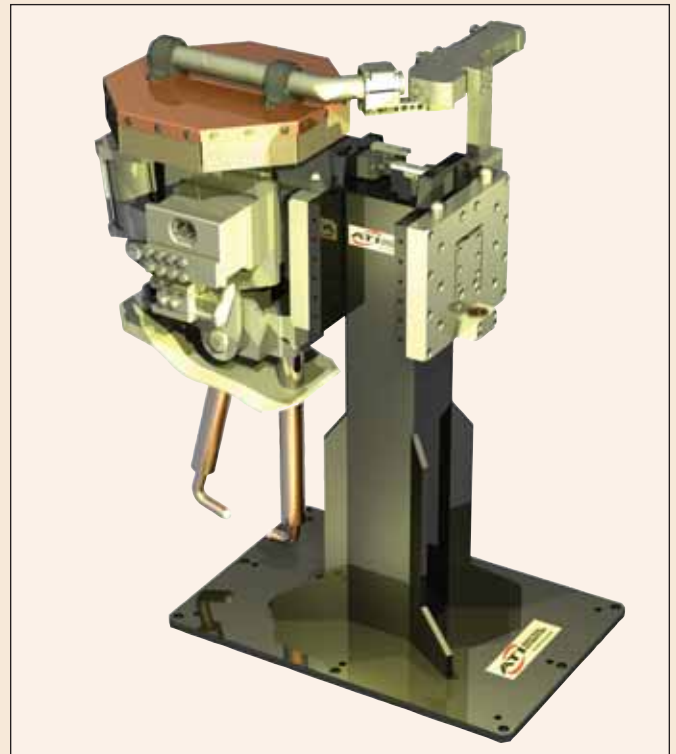
Compact Tool Hooks attach directly to the side of the Tool Changer Tool body, freeing up valuable stack height, and allowing for a simple, direct interface with the Stand. Tooling interface brackets are also available to be equipped with heavy-duty alignment pin and bushings that directly couple with the post module. Custom brackets and tooling interface options are available upon request.

Debris Protection

Debris protection is an important feature and there are many options to choose from for the TSL product line. Fully-actuated shields are available in a wide range of styles and sizes with foam seals or leather side guards. Use the stand-alone Tool covers and have your robot pick them up and attach them to the tooling as a cost effective method of protection.

Post Module

The ATI TSL Post Module includes a welded steel vertical post, a large base plate, and an optional compliant interface for your tool hooks or pin/bushing brackets. Compliance stiffness can be specified for standard- or heavier-duty applications. Single-sided or dual-sided post modules are offered.



Horizontal Extension Module

The TSL Horizontal Extension Module is an option that provides more tool clearance than the standard TSL Post Module. ATI offers right-angle or custom versions. Attach the extension to the standard post or directly to your fixture.

Sensor / Switch Options

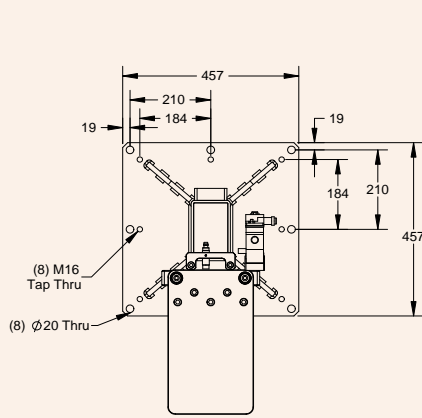
The TSL product line features sensor modules for tool presence sensing. The standard model mounts directly to the post compliant interface and can feature a collision guard. Tool Stand Interlock kits are also offered, as well as integrated shield position sensing.

TOOL STANDS FOR QC-210 TO QC-510

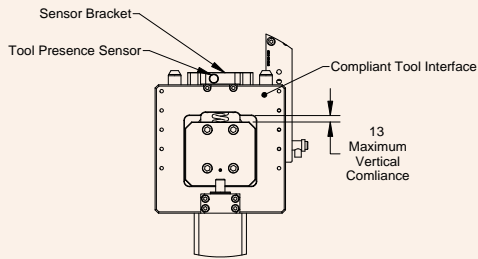
ATI INDUSTRIAL AUTOMATION

www.ati-ia.com

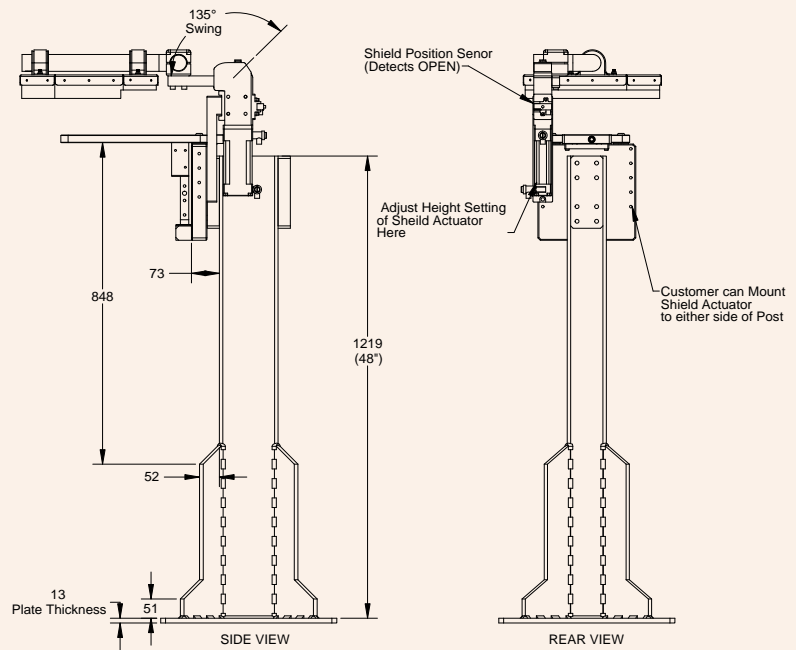
TSL Pin-Bushing Arrangement



TOP VIEW



DETAIL A
SCALE 1 : 6



SIDE VIEW

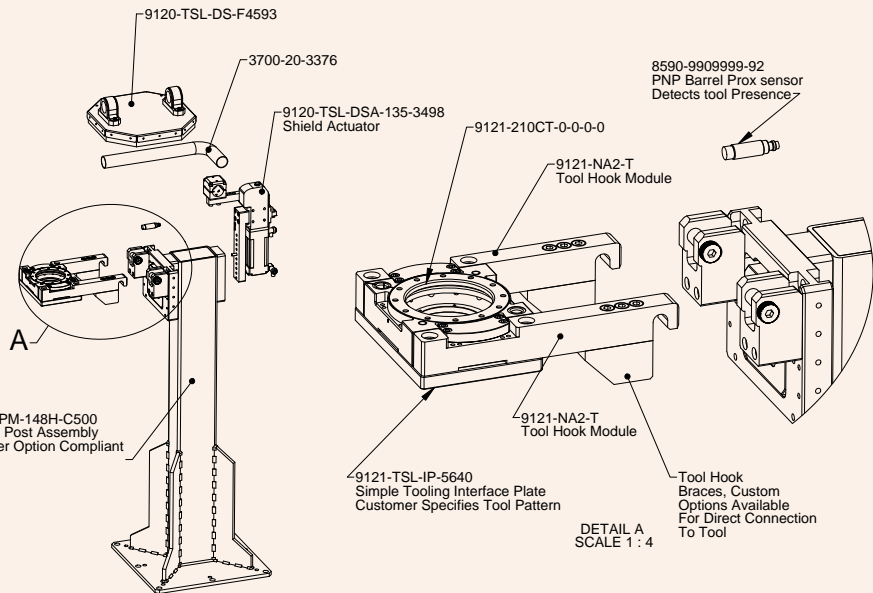
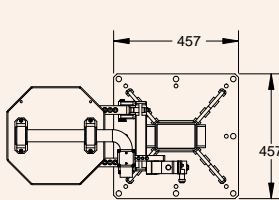
REAR VIEW

Drawing # 9230-2800-01

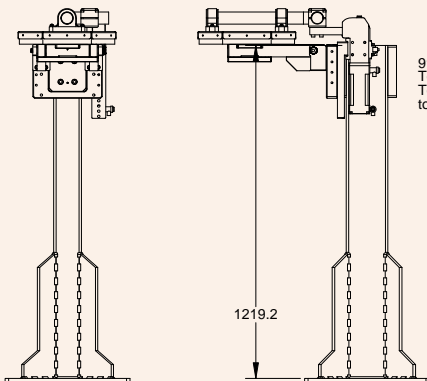
ATI INDUSTRIAL AUTOMATION

www.ati-ia.com

TSL Integrated Hook Arrangement



DETAIL A
SCALE 1 : 4






9120-TSL-PM-148H-C500
Tool Stand Post Assembly
Tool Hanger Option Compliant
to 500lbs




Drawing # 9230-2803-01

Quick-Change TSL Tool Stand Interfacing

Tooling Interface Configurations			
QC Model	200-210 Series		210 Series
Tool Interface Style	Horizontal L-Bracket		Integral Hooks
Assembly Number	9120-TSL-TP-4104		9121-NA2-T/NA3-T
Customer Drawing	9230-20-1990		9230-20-2801
Notes	1		1, 5, 6, 7 **Requires 9121-TSL-IP-5640
			
			200-300 Series
			Integral Hooks
			9121-TSL-TH-5641
			9230-20-2804
			1, 8
			
Nest Interface	Pin and Bushing		Hanger
Assembly Number	9120-TSL-CMB-C500		9120-TSL-CMH-C500
Customer Drawing	9230-20-2799		9230-20-2802
Notes	2, 4		2, 4
			
Post Style Options	Post Module (Pin Style)		Post Module - Hook
Assembly Number	9120-TSL-PM-148B-		9120-TSL-PM-148H-
Customer Drawing	9230-20-2800		9230-20-2803
Notes	3, 4		3, 4
			
			Post Module - Hook
			9120-TSL-PM-148H-
			9230-20-2806
			3, 4, 8
			

TSL Sensor / Switch Options			
QC Model	200 Series		Any Series
Tool Presence Sensing	Sensor Module		Barrel Prox.
Assembly Number	9120-TSL-SMA-5077		8590-9909999-92
Customer Drawing	9230-20-2808		9230-20-2809
Notes	9, 10, 17		9, 10, 17
			
TSI Switch Options	TSI Switch Assembly		TSI Switch Assembly
Assembly Number	9120-TSL-SS-3435		9120-TSL-SS-5634
Customer Drawing	9230-20-1813		9230-20-2810
Notes	10, 11, 17		10, 11, 17
			
			TSI Switch Assembly
			9120-TSL-SS-5635
			9230-20-2811
			10, 11, 17
			
			RFID System
			9121-TSL-KT-5841
			9230-20-2924
			16
			

TSL Debris Protection			
QC Model	Any Tool Changer		Any Tool Changer
Debris Protection	Stand Alone Covers		Actuated Covers
Assembly Number	9120-DC-201-09		9120-TSL-DS-14-B3337
Customer Drawing	9230-20-2735		9230-20-1953
Notes	2, 13		10, 12, 14
			
			Any Tool Changer
			Actuators
			9120-TSL-DSA-135-3498
			9230-20-1953
			10, 17
			

TSL Standoff and Extension Options			
QC Model	Any Post		Any Post
Standoff/Extension	Horizontal Extension		Standoff/Brace
Assembly Number	9120-TSL-HE12RH-C500		9120-TSL-PS-5636
Customer Drawing	9230-20-1812		9230-20-1813
Notes	10, 15		10
			
			Any Post
			Custom Arrangements
			9120-TSL-ASY-XXXX
			9230-20-1814
			16
			

- Notes:
- Tooling Plate listed has blank customer interface. Custom bolt pattern is available. Other brackets available, See ATI website.
 - Stand Alone units mount to customer-supplied structure.
 - Customer can specify single- or dual-sides.
 - Customer can specify rigid or compliant version.
 - For use with QC-210 Tool Body
 - NA2-T is the right-hand version, NA3-T is the left-hand version.
 - Use corresponding NA2-M Master-side spacer unless unit is mounted on Flat A.
 - For Material Handling Applications. Customization is available upon request.
 - Prox. Sensor Detects Tool Presence. Sensor Shown is PNP, Shielded.
 - Other versions available upon request. See ATI web site.
 - Switch and Trip Dogs are also available separately.
 - Requires Shield Arms, such as 3700-20-4874.
 - Stand Alone Covers require robot to pick up and move.
 - Actuated Shields are available with leather side guards or foam inserts. See ATI web site for more information.
 - Horizontal Extension attaches Nest Interface Assembly to Post Weldment
 - ATI can design custom complete tool storage arrangements, job-specific that are integrated with your tooling. Contact ATI for more information.
 - Mating cables include: 9120-C-4EM-4EF-010, 9120-C-4EM-4EF-020

Product Advantages

No-Touch Locking technology allows up to 0.1 inches (2.5 mm) plate separation when locking.

Ready-to-Lock Sensors (3) detect when the Tool plate is within 0.06 inches (1.5 mm) of the Master plate, ensuring that the Tool plate and Master plate are parallel.

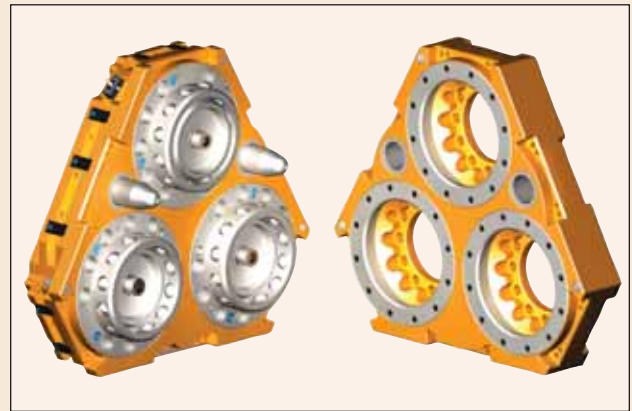
Patented Fail-safe Locking Mechanism

- Locking mechanism design results in low force acting on the piston.
- Large piston diameter and outward ball travel increase moment capacity.
- All locking parts are made of R_c58 stainless steel.

Integrated Lock/Unlock Sensing Proximity Sensors to indicate Lock/Unlock position for safe Coupling/Uncoupling.

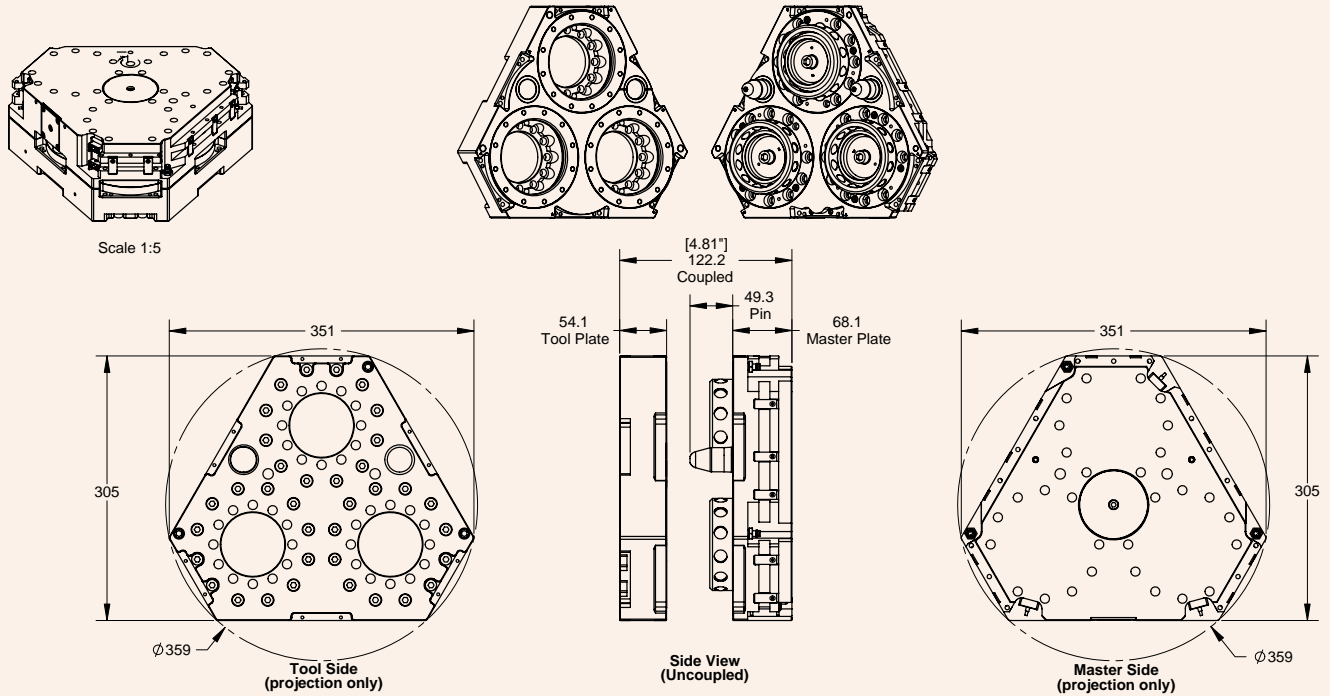
Mounts Directly to most 1200 kg Robots

(no SIP required; see stack height below).



QC-1210

Specifications	Values	Comments
Suggested Payload Limit	2650 lbs (1200 kg)	Higher payloads possible with lower moment rating.
Locking Force @ 80 psi	21,000 lbs (93,450 N)	Axial holding force.
Static Moment Capacity (X and Y)	48,000 lbf-in (5400 Nm)	Higher dynamic moment possible depending on module selection.
Static Moment Capacity (Z)	48,000 lbf-in (5400 Nm)	(Torsion) Higher dynamic moment possible depending on module selection.
Positional Repeatability (X,Y, and Z)	.0006 in (.015 mm)	Repeatability tested at rated load at over one million cycles.
Weight (when coupled) (no accessory modules)	62 lbs (28 kg)	Master: 40.6 lbs (18.4 kg) Tool: 21.4 lbs (9.7 kg)
Stack height when locked	4.81 in (122.2 mm)	Does not include required interface plate.
Body size (no modules)	12.0 x 13.8 in (305 x 351 mm)	Size of body prior to module mounting.
Maximum allowable distance between Master and Tool plates before locking	0.1 in (2.5 mm)	Normal recommended locking distance. Locking distance varies depending on module selection, lock pressure, pay load, etc.
Sensor Information, signal name	(3) Lock sensors (3) Unlock sensors (3) Ready-to-Lock sensors	PNP proximity sensors - other sensors available upon request.



Notes:

1. Suggested Payload Limit: 1200 kg [2650 lbs].
2. Tool Changer shown without adapter plates. Adapter plates will be determined according to desired robot specifications.
3. Tool Changer consists of three locking mechanisms and share a common lock and unlock air supply.
4. Tool Changer capable of detecting 'Lock' and 'Unlock' for each locking mechanism.
5. Tool Changer capable of detecting 'RTL' (Ready-to-Lock) using (3) proximity sensors.
6. SG on Master part number indicates PNP Lock/Unlock and RTL sensors.
7. Sensor cables not shown for clarity.

Drawing # 9230-20-2831-02

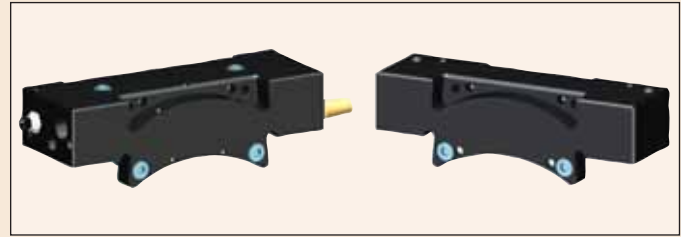
Note:
 Modules and options available. See pg. 56.
 Contact ATI for part numbers and ordering information.

Lock/Unlock Pneumatic and Valve Adapters

The Lock/Unlock Pneumatic and Valve Adapters provide an interface for the customer to supply the necessary pneumatics for actuation of the Tool Changer locking mechanism.

Basic arrangements come outfitted with a Lock/Unlock Pneumatic adapter mounted to Flat 'A' of the Tool Changer Master providing separate Lock and Unlock ports for customer connection. In this case, the customer is responsible for controlling the pneumatic signal supplied to the Tool Changer to either Lock or Unlock the Tool Changer.

More advanced units come outfitted with integrated single- or double-solenoid valves mounted to Flat 'A' of the Tool Changer Master. In this case, a pneumatic supply connection is provided for customer-interface.



Lock/Unlock air and valve adapter

An electrical connection is also provided for customer-interface and control of the valve. In most cases, control of the integrated valve is accomplished through an accessory Control/Signal module.

Valve Adapters with Valve Signal Pass-through (JR2-M, JU2-M, etc.) incorporate a small, internal pin block to transmit the Lock/Unlock signal from the Control/Signal Module to the valve. This results in a protected connection between the valve and the Control/Signal module. Visit www.ati-ia.com for a complete list of available adapters.

Part #	Description
JA□-M	Lock/Unlock Pneumatic Adapter Master, NPT Ports*
JB□-M	Lock/Unlock Pneumatic Adapter Master, BSPP (G) Ports*
JC□-M	Valve Adapter Master, Single Solenoid, NPT Ports*
JD□-M	Valve Adapter Master, Single Solenoid, BSPP (G) Ports*
JE□-M	Valve Adapter Master, Double Solenoid, NPT Ports*
JF□-M	Valve Adapter Master, Double Solenoid, BSPP (G) Ports*
JG□-M	A/C Valve Adapter Master, Single Solenoid, NPT Ports*
JR□-M	Valve Assembly, Single Solenoid, NPT Ports, w/Valve Pass-Through*
JS□-M	Valve Adapter, Single Solenoid, BSPP (G) Ports, w/Valve Pass-Through*
JT□-M	Valve Assembly, Double Solenoid, NPT Ports, w/Valve Pass-Through*
JU□-M	Valve Adapter, Double Solenoid, BSPP (G) Ports, w/Valve Pass-Through*

* □ = 2 - QC-210 or 3 - QC-310 and QC-510

Standard Series Module Mounting Adapter

The Standard Series Module Mounting Adapter is designed to work with a variety of accessory modules from the ATI Standard Series Tool Changers. A complete list of compatible modules is available online at www.ati-ia.com.

Part #	Description
JJ2-M/T	Single or Dual Master and Tool Mounting Adapter Assembly for Standard Series Modules

Control/Signal Modules - Discrete

A variety of electrical modules are available that enable one to pass discrete signals through the Tool Changer. Some of these modules work with an integrated double- or single-solenoid valve for Lock/Unlock control of the Tool Changer. Some modules are also available supporting Tool Changer I/O, such as Lock, Unlock, and Ready-to-Lock proximity sensors, as well as tool-ID.

Military-style connectors are standard on most electrical modules. Custom versions are available upon request. Visit www.ati-ia.com for a complete list of available modules.



VB2 discrete signal modules

Part #	# Pins	Voltage	Connector Type	Notes
SA2-M	19	5A/250VAC	MS threaded connector	26 pins (19 pins available for customer use), Supports L/U/R1/R2 sensors, not intended for use with an integrated valve, mates with SA Tool-side modules
VA2-M	19	5A/250VAC	MS threaded connector	26 pins (19 pins available for customer use), Supports L/U/R1/R2 sensors, integrated valve and TSI on Master, mates with SA Tool-side modules
SA2-T	19	5A/250VAC	MS threaded connector	19 pins available for customer use, mates with SA2-M or VA2-M
SA3-T	15	5A/250VAC	MS threaded connector	19 pins (15 available for customer use) with (0–9) tool-ID, mates with SA2-M or VA2-M
SA4-T	11	5A/250VAC	MS threaded connector	19 pins (11 available for customer use) with (0–99) tool-ID, mates with SA2-M or VA2-M
SA5-T	7	5A/250VAC	MS threaded connector	19 pins (7 available for customer use) with (0–999) tool-ID, mates with SA2-M or VA2-M
VB2-M	19	5A/250VAC	MS threaded connector	26 pins (19 pins available for customer use), Supports L/U/R1/R2 sensors, integrated valve and TSI on Tool, compatible with VB Tool-side modules
VB2-T	16	5A/250VAC	MS threaded connector	19 pins (16 available for customer use), Supports TSI, mates with VB2-M
VB3-T	12	5A/250VAC	MS threaded connector	19 pins (12 available for customer use) with (0–9) tool-ID, Supports TSI, mates with VB2-M
VB4-T	8	5A/250VAC	MS threaded connector	19 pins (8 available for customer use) with (0–99) tool-ID, Supports TSI, mates with VB2-M
VD2-M	19	5A/250VAC	MS threaded connector	26 pins (19 available for customer use), Supports L/U/R1/R2 sensors, integrated valve and TSI on Tool, Remote I/O connection, mates with VD2-T
VD2-T	19	5A/250VAC	MS threaded connector	19 pins available for customer use, Supports TSI, Remote I/O connection, mates with VD2-M
SD2-M	17	5A/250VAC	M23 connector	19 pins (17 pins available for customer use), Supports PROFIBUS I/O block and TSI on Tool, mates with SD2-T
SD2-T	17	5A/250VAC	M23 connector	19 pins (17 pins available for customer use), Supports PROFIBUS I/O block and TSI, mates with SD2-M

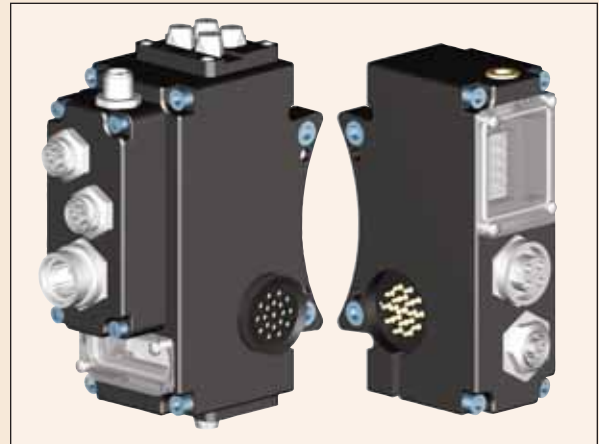
Control/Signal Modules - Fieldbus

An array of electrical control modules are available that offer Fieldbus interface for the Tool Changer. These modules work with a double- or single-solenoid valve module for Lock/Unlock control of the Tool Changer. Fieldbus modules support Tool Changer I/O, such as Lock, Unlock, and Ready-to-Lock proximity sensors, as well as up to 5-digit tool-ID. ATI modules natively support DeviceNet, EtherNet/IP™, and PROFINET.

ATI Tool Changers can support other bus systems such as PROFIBUS, INTERBUS, and more.

There are many benefits to using a Fieldbus module over a discrete module to control the Tool Changer. The Fieldbus module CPU provides additional diagnostics and monitoring beyond that of a discrete control module, making fault diagnosis and realization simpler. The use of network cabling reduces the amount of wiring necessary to interface to the Tool Changer.

TSI (Tool Stand Interlock) with feedback (a hardwire interlock of the unlatch solenoid valve circuit which prevents uncoupling of the tooling when not safely nested in the tool stand) and other safety-related circuits are natively supported in ATI Fieldbus modules. Industry-standard connectors are used, eliminating the need for costly and/or unique connector interfaces.



DK8 Master and DK4 Tool ethernet modules

There is an integrated web server available in some Fieldbus modules to provide configuration, status, and troubleshooting information. Fieldbus modules are available in a wide variety of configurations to support many different control schemes. Visit www.ati-ia.com for a complete list of available modules.

Control/Signal Modules - DeviceNet

Part #	Connector Type	Notes
DA2-M/T	4 and 5 pin mini connectors	Quick-Connect Capable DeviceNet Module, Supports integrated valve, TSI on Master, paired tool-ID switches for line, robot, and tool number on Tool, ODVA™ Compliant
DB2-M/T	4 and 5 pin mini connectors	Quick-Connect Capable DeviceNet Module, Supports integrated valve, TSI on Tool, ODVA Compliant
DR2-M/T	4 and 5 pin mini connectors	Pass-through module for DeviceNet and auxiliary power, ODVA Compliant

Control/Signal Modules - InstaTool (used when Quick-Connect robots are not available and you need a fast reconnect time)

Part #	Connector Type	Notes
DH3-M	4 and 5 pin mini connectors	InstaTool Module, Supports TSI on Tool, ODVA Compliant, mates with DH2-T
DH2-T	4 and 5 pin mini connectors	InstaTool Module, Mechanical Switch TSI (TSI on Tool not used when a DHC-M module is specified), 5-digit tool-ID, ODVA Compliant, mates with DH3-M or DHC-M
DHC-M	4 and 5 pin mini connectors	InstaTool Module, Supports TSI on the Master, Independent RTL sensors, ODVA Compliant, mates with DH2-T

Control/Signal Modules - EtherNet

Part #	Connector Type	Notes
DK8-M	4 pin mini and "D" coded M12 connectors	EtherNet/IP Module, Supports integrated valve, 5-digit tool-ID and L/U/R1/R2 sensors, mates with DK4-T
DK4-T	4 pin mini and "D" coded M12 connectors	EtherNet/IP pass-through module with tool-ID, mates with DK8-M or DKA-M
DKA-M	4 pin mini and "D" coded M12 connectors	EtherNet/IP Module, Supports DHCP, 5-digit tool-ID and L/U/R1/R2 sensors, mates with DK4-T
DKC-M	4 pin mini and "D" coded M12 connectors	EtherNet/IP Module, Supports DHCP, DeviceNet pass-through and L/U/R1/R2 sensors, mates with DKC-T
DKC-T	4 and 5 pin mini and "D" coded M12 connectors	EtherNet/IP Module, Supports DHCP, DeviceNet pass-through and (0-9) tool-ID, mates with DKC-M

Primary Power Modules

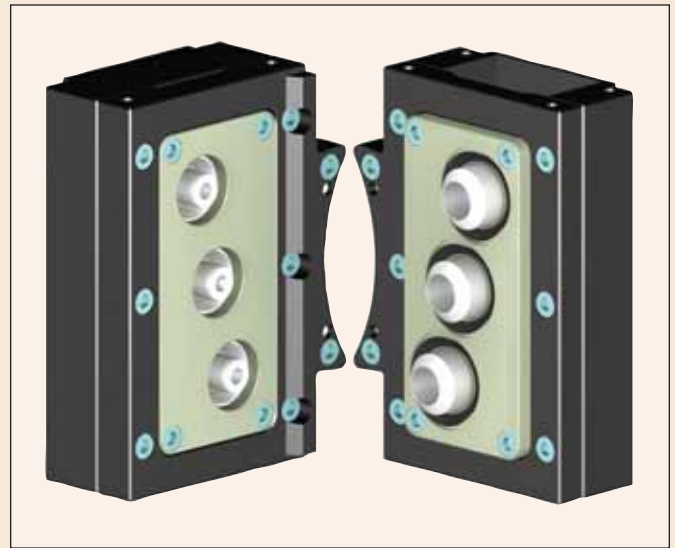
The Primary Power Module is designed to carry current from a power supply to customer tooling. It consists of three rhodium-plated, copper contacts, using advanced, patented, cone-mating technology. Each contact is capable of carrying 200 amps at up to 600 volts. To avoid arcing, never uncouple the Tool Changer without first turning off the power supply to the Master. The installation of over-current protection in the primary power circuit is recommended.

Safety Features

The contact tips on the Master-side are recessed to prevent accidental human contact. Module components in proximity to the conductors are made of high-dielectric material. The central contact on the Tool-side module is extended for use as a first-make/last-break contact.

Cable Installation

Below the removable protective cover are split-bolt nuts allowing the customer to securely attach up to #2 AWG cable. Customer-supplied cord grips secure the power cable to the module using optional fitting plates. Plates are available in PG29, 1-1/2 NPT, and 1-1/4 NPT. Visit www.ati-ia.com for a complete list of available modules.

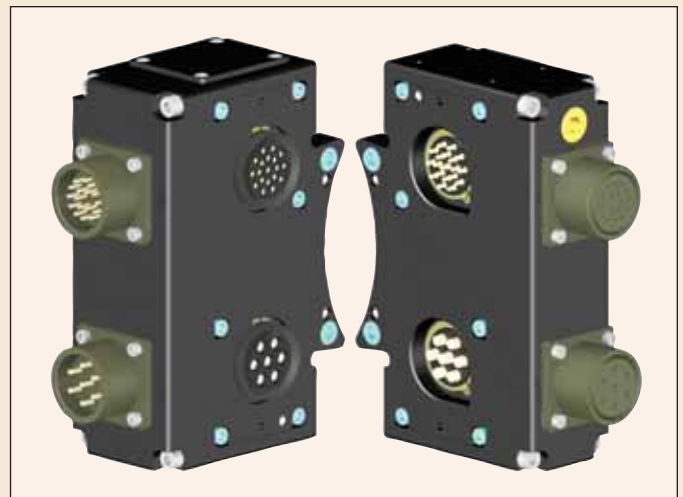


PA2 primary power modules

Part #	Voltage	# of Contacts	Wire Size	Notes
PA2-M/T	200A/600VAC	3	#2 wire	Primary Power module
PAA-T	-	-	-	Protective bracket for Tool-side, used when no PA2 on Tool-side of Tool Changer
PB2-M/T	200A/600VAC	2	#2 wire	Primary Power module

Servo Modules

A Servo Module may be provided on the Tool Changer to support connections to a servomotor. By design, both the signal and motor power circuits are separated and electrically-isolated from each other and from the Tool Changer. Servo applications may involve motors and position feedback devices from different vendors. ATI addresses this by utilizing a modular design incorporating separate customer-specified power and signal connectors and wiring. The Master-side contacts are recessed to prevent accidental contact. The circuits also have EMI/RF shielding to protect them from noise. To avoid damage to the contacts, never uncouple the unit without first disconnecting and discharging power. Contact ATI to determine if there is already a design meeting your requirements. We welcome the opportunity to design a module for your application.



EF2 servo modules

HEAVY AUTOMATION SERIES MODULES AND OPTIONS

Fluid, Pneumatic, and Vacuum Modules

ATI offers a variety of modules to pass pneumatic, vacuum, and fluid utilities. Pneumatic service modules are available with self-sealing or pass-through ports, both having anodized-aluminum bodies. Pass-through pneumatic ports utilize rubber bushings to achieve a durable and reliable seal. They are suitable for both vacuum and pressure service. High-flow ports for vacuum service utilize rubber V-rings for sealing and cannot support positive pressures. Fluid/Pneumatic modules are made from stainless steel materials and utilize self-sealing ports with U-cup seals. This minimizes fluid/air loss during a tool change and prevents corrosion. Self-sealing ports cannot support vacuum service. Visit www.ati-ia.com for a complete list of available modules.



AA2 pneumatic modules

Pneumatic Modules

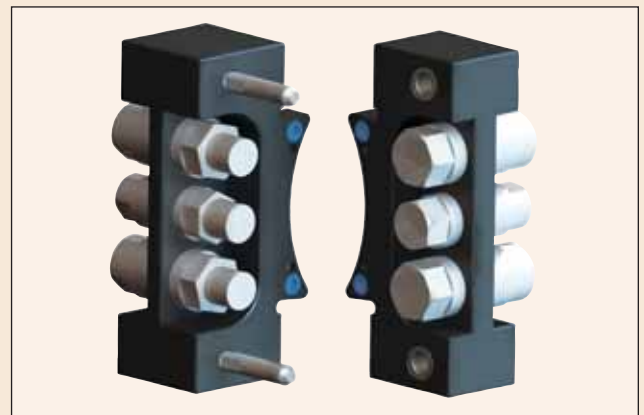
Part #	Port Size	# Ports	Cv Rating	Notes
AJ2-M/T	1/4 NPT	10	1.4	Self-sealing ports, Air only module
AK2-M/T	1/4 BSPP (G)	10	1.4	Self-sealing ports, Air only module
AR2-M/T	1/4 BSPT (R)	10	1.4	Self-sealing ports, Air only module
AC2-M/T	3/8 + 3/4 NPT	4+2	1.6	(4) 3/8 NPT self-sealing ports and (2) 3/4 NPT vacuum ports
AG2-M/T	3/8+3/4 BSPP(G)	4+2	1.6	(4) 3/8 BSPP (G) self-sealing ports and (2) 3/4 BSPP (G) vacuum ports
AE2-M/T	3/8 NPT	8	1.6	Pass-through ports, Air only module
AH2-M	3/8 BSPP (G)	8	1.6	Self-sealing ports, Air only module, mates with AH Tool-side modules
AH2-T	3/8 BSPP (G)	8	1.6	(4) self-sealing ports, (4) pass-through ports, Air only module, mates with AH2-M
AH3-T	3/8 BSPP (G)	8	1.6	Pass-through ports, Air only module, mates with AH2-M
AH4-T	3/8 BSPP (G)	8	1.6	Self-sealing ports, Air only module , mates with AH2-M
AB2-M	3/8 NPT	8	1.6	Self-sealing ports, Air only module, mates with AB Tool-side modules
AB2-T	3/8 NPT	8	1.6	(4) self-sealing ports, (4) pass-through ports, Air only module, mates with AB2-M
AB3-T	3/8 NPT	8	1.6	Pass-through ports, Air only module, mates with AB2-M
AB4-T	3/8 NPT	8	1.6	Self-sealing ports, Air only module , mates with AB2-M
AA2-M/T	1/2 NPT	2	1.6	Self-sealing ports, Air only module
AA-3-T	1/2 NPT	4	1.6	Pass-through ports, Air only module, mates with AA2-M
AM2-M/T	1/2 BSPP (G)	2	1.6	Self-sealing ports, Air only module
AM3-T	1/2 BSPP (G)	2	1.6	Pass-through ports, Air only module, mates with AM2-M
AN2-M/T	3/8 + 1/2 NPT	6+2	1.6/4.0	(6) 3/8 NPT self-sealing ports and (2) 1/2 NPT pass-through ports
AP2-M/T	1/2 NPT	4	3.1	Self-sealing ports, Air only module
AQ2-M/T	1/2 BSPP (G)	4	3.1	Self-sealing ports, Air only module
AD2-M/T	3/4 NPT	2	8.0 (est.)	Self-sealing ports, Air only module
AL2-M/T	3/4 BSPP (G)	2	8.0 (est.)	Self-sealing ports, Air only module

Fluid/Pneumatic Modules

Part #	Port Size	# Ports	Cv Rating	Notes
FB2-M	3/8 NPT	8	1.6	Self-sealing ports, mates with FB Tool-side modules
FB2-T	3/8 NPT	8	1.6	(4) self-sealing ports, (4) pass-through ports, mates with FB2-M
FB3-T	3/8 NPT	8	1.6	Pass-through ports, mates with FB2-M
FB4-T	3/8 NPT	8	1.6	Self-sealing ports, mates with FB2-M
FC2-M	3/8 BSPP (G)	8	1.6	Self-sealing ports, mates with FC Tool-side modules
FC2-T	3/8 BSPP (G)	8	1.6	(4) self-sealing ports, (4) pass-through ports, mates with FC2-M
FC3-T	3/8 BSPP (G)	8	1.6	Pass-through ports, mates with FC2-M
FC4-T	3/8 BSPP (G)	8	1.6	Self-sealing ports, mates with FC2-M
FF2-M/T	1/2 NPT	4	3.1	Self-sealing ports
FH2-M/T	1/2 BSPP (G)	4	3.1	Self-sealing ports

Hydraulic Modules

ATI offers a variety of hydraulic pass-through modules utilizing stainless steel, flush-face, self-sealing valves on both Master- and Tool-sides. These modules are available in a variety of coupling sizes and pressure ranges. Due to size and hydraulic separation forces, these modules are limited to use on larger ATI Tool Changers. Pressure accumulators must be used and pressure must be interrupted during tool changes to insure proper coupler performance. Contact ATI for application notes and for custom applications. Visit www.ati-ia.com for a complete list of available modules.

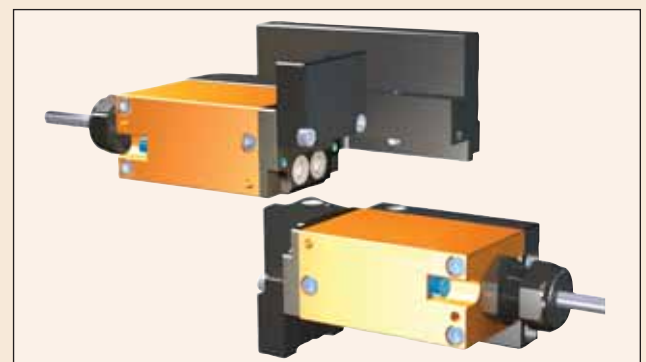


HB2 hydraulic modules

Part #	Port Size	# Ports	Pressure (Max)	Cv Rating	Notes
HB2-M/T	3/8+1/4 BSPP (G)	2+1	2300 psi	1.23/0.46	Hydraulic module
HB3-M/T	3/8 BSPP (G)	2	2300 psi	(2) 1.23	Hydraulic module
HB6-M/T	3/8 BSPP (G)	2	7200 psi	(2) 1.23	High-pressure Hydraulic module

Fiber Optic Modules

A fiber optic module may be provided on the Tool Changer to support high-speed data connections to a tool. Fiber optic applications may involve INTERBUS or PROFIBUS communication hardware. ATI Fiber Optic modules incorporate specific designs for plug-and-play operations with this equipment. Lens coupler debris shields and rugged IP65 housings result in higher durability and better performance. Contact ATI to determine if there is already a design meeting your requirements. We welcome the opportunity to design a module for your application.



TA2 fiber optic modules

Teaching Aids

The QC-210 and QC-310 Teaching Aids were developed to help customers reduce the time required to teach the robot to pick-up and drop-off the Tool. Use of the Teaching Aids can also reduce unnecessary wear resulting from improper alignment of the Tool- and Master-side Tool Changer. Provides for easy X, Y, and Z alignment of the Tool-side and Master-side Tool Changer. Does not require tools or fasteners to set-up or use.



QC-310 teaching aid

Stand Alone Dust Covers

The Stand-Alone Dust Cover is provided to protect the mating face of the Tool Changer Tool-side when not in use. It is designed to cover not only the locking components of the Tool Changer, but also the mating faces of the optional modules. Available for the QC-110, QC-210, and QC-310 Tool Changers in a variety of sizes and shapes.



QC-310 Tool Changer dust cover

Connector Mates and Cables

ATI offers a variety of connection options for our electrical utility modules. ATI can provide commercial mating cable assemblies in both straight and right-angle configurations for products such as our RF19 series of modules. For products using Amphenol connectors, we offer both straight and right-angle connector mates allowing the customer to develop their own custom cables. Please consult our web site and contact ATI to learn what options are available.



Right-angled and straight connector mates



M16 cable connector for RF, SF and GF electrical modules

Spacers

ATI has designed a series of Tool Changer Spacers to be used in applications that don't currently require changing tools. When tool changing is required, the spacer can be easily exchanged for a Tool Changer and shouldn't require any programming changes for the original application. Spacers are available for QC-210, QC-310, and QC-510 Heavy Automation Tool Changers.



QC-210 Tool Changer Spacer

UTILITY COUPLERS

Product Description

ATI's Utility Couplers were designed for heavy-duty industrial applications where there is a need to change tools that pass utilities, such as air and electrical signals in automated applications. The modular body design is capable of mounting any of ATI's standard add-on modules and is designed to improve cycle time and add flexibility to any production cell. The Master-side connection features a unique compliance mechanism that allows for large tooling misalignments. A Utility Coupler can be provided with an ATI locking mechanism or a drive cylinder.

Product Features

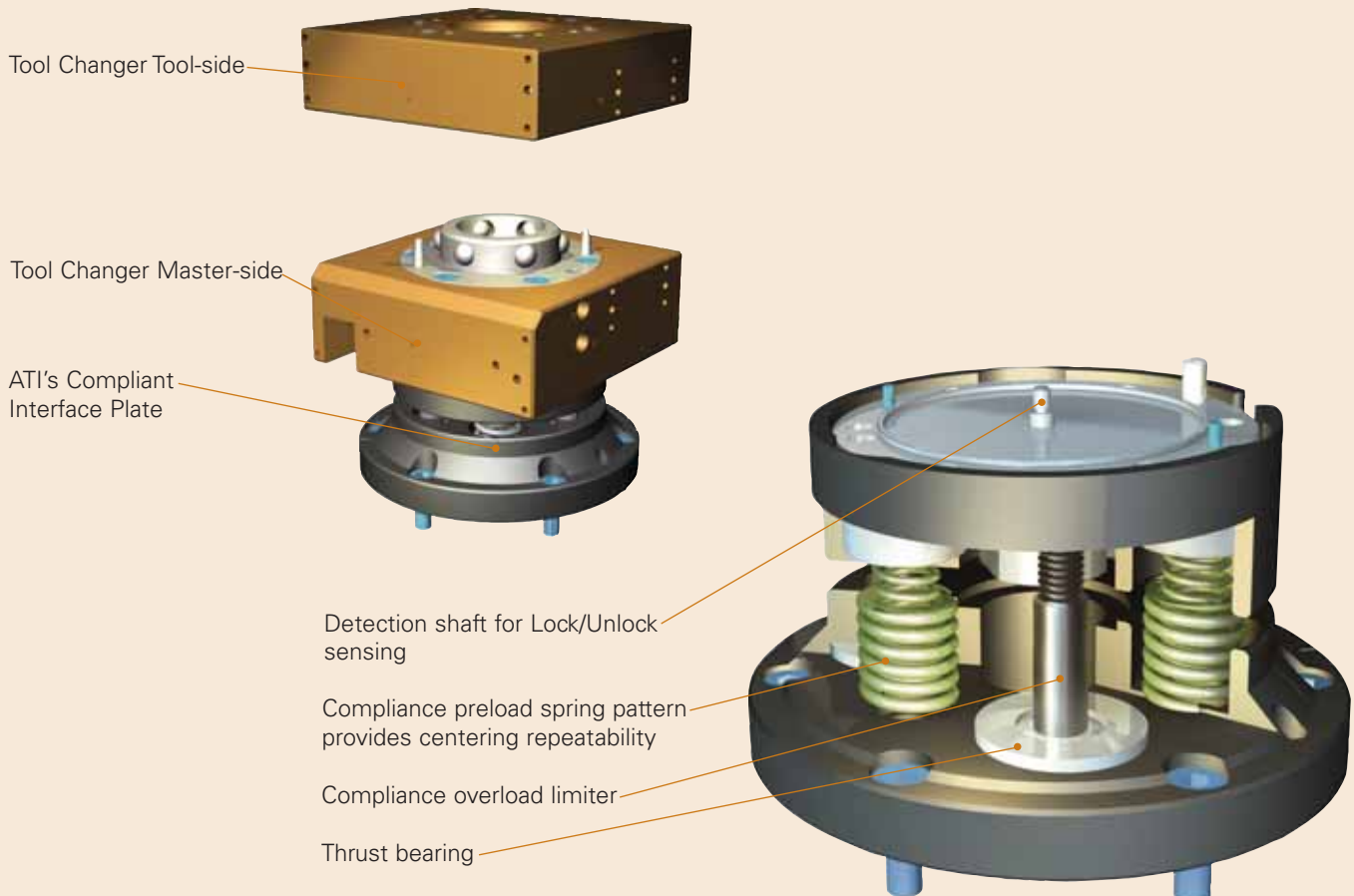
- Common mounting flats attach standard ATI modules
- Integrated fluid/air ports are available
- Engineered compliance to ensure flush mating
- DeviceNet compatible
- Optional drive cylinders
- Low-cost design

The following products are different variations of Utility Couplers that were engineered for specific applications. Contact ATI to determine if there is already a design that meets your requirements. We welcome the opportunity to design a Utility Coupler for your application.

Compliant Interface Plates

A locking mechanism is used with the Compliant Interface Plate that complies to allow the Tool-side to mate with the Master-side evenly with just the weight of the tooling.

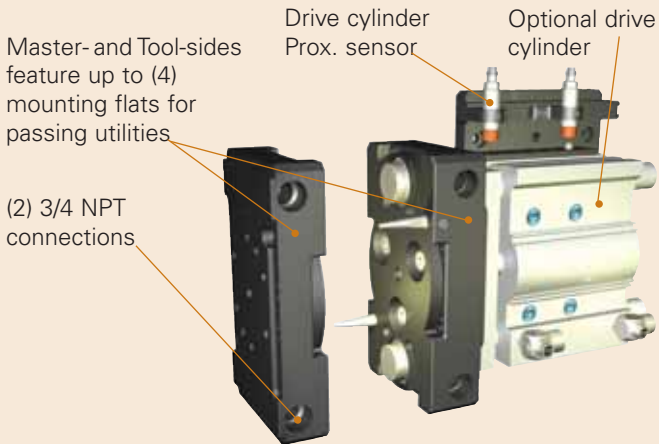
The Compliant Interface Plate, along with ATI's patented locking mechanism, eliminates time-consuming and costly manual fixture adjustments in various automated applications.



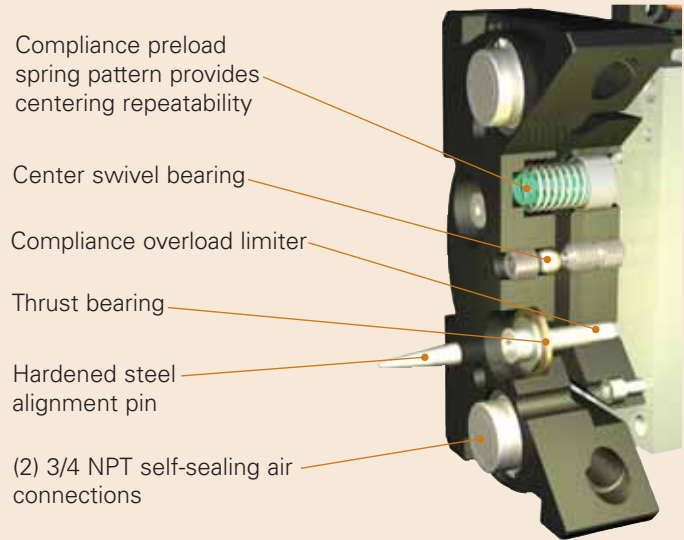
UTILITY COUPLERS

G2 Compliant Utility Coupler

The **G2 Compliant Utility Coupler** meets the aggressive demands of changing tooling for framing gates. The Master-side features an optional guided cylinder to provide the coupling force, and a unique compliance swivel joint that allows for severe misalignment of the Tool-side prior to coupling. There are also two optional 3/4 NPT self-sealing ports integrated into the body of the coupler.



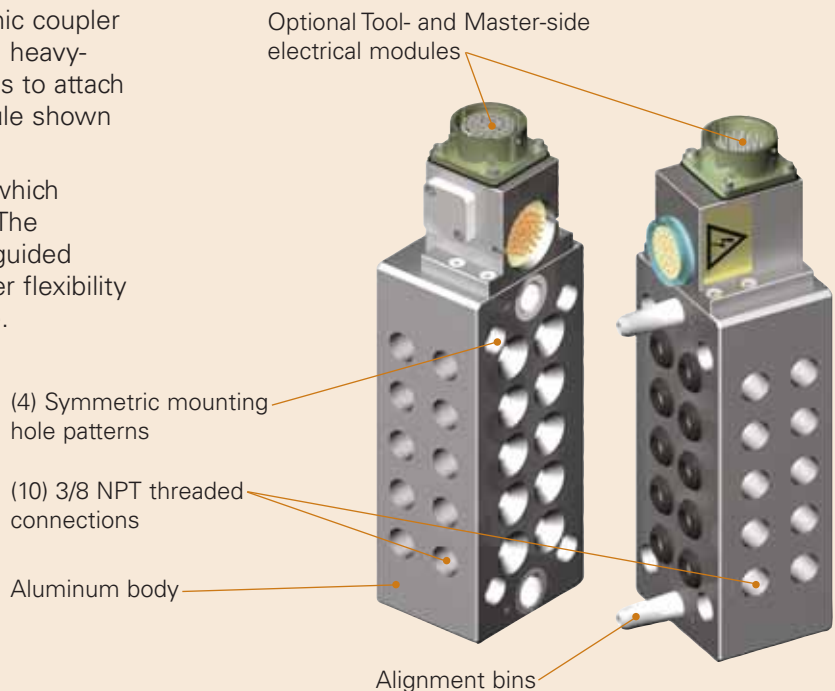
The rectangular body shape allows for easy mounting of additional peripheral utility modules, such as DeviceNet, Fluid/Air, or Electrical. Because this coupler does not have a locking mechanism, it offers greater flexibility enabling reduced tooling costs and cycle time. Other port, compliance, and size options are available. Contact ATI for more information.



GA2 Utility Coupler

The **GA2 Utility Coupler** is a simple, economic coupler that features (10) integrated 3/8 NPT air ports, heavy-duty alignment features, and (2) mounting flats to attach additional utility modules (R19 electrical module shown attached as an example).

The GA2's mounting pattern is symmetrical, which allows for right-hand and left-hand mounting. The coupler is also compatible with our series of guided cylinders. The simple design also offers greater flexibility enabling reduced tooling costs and cycle time.

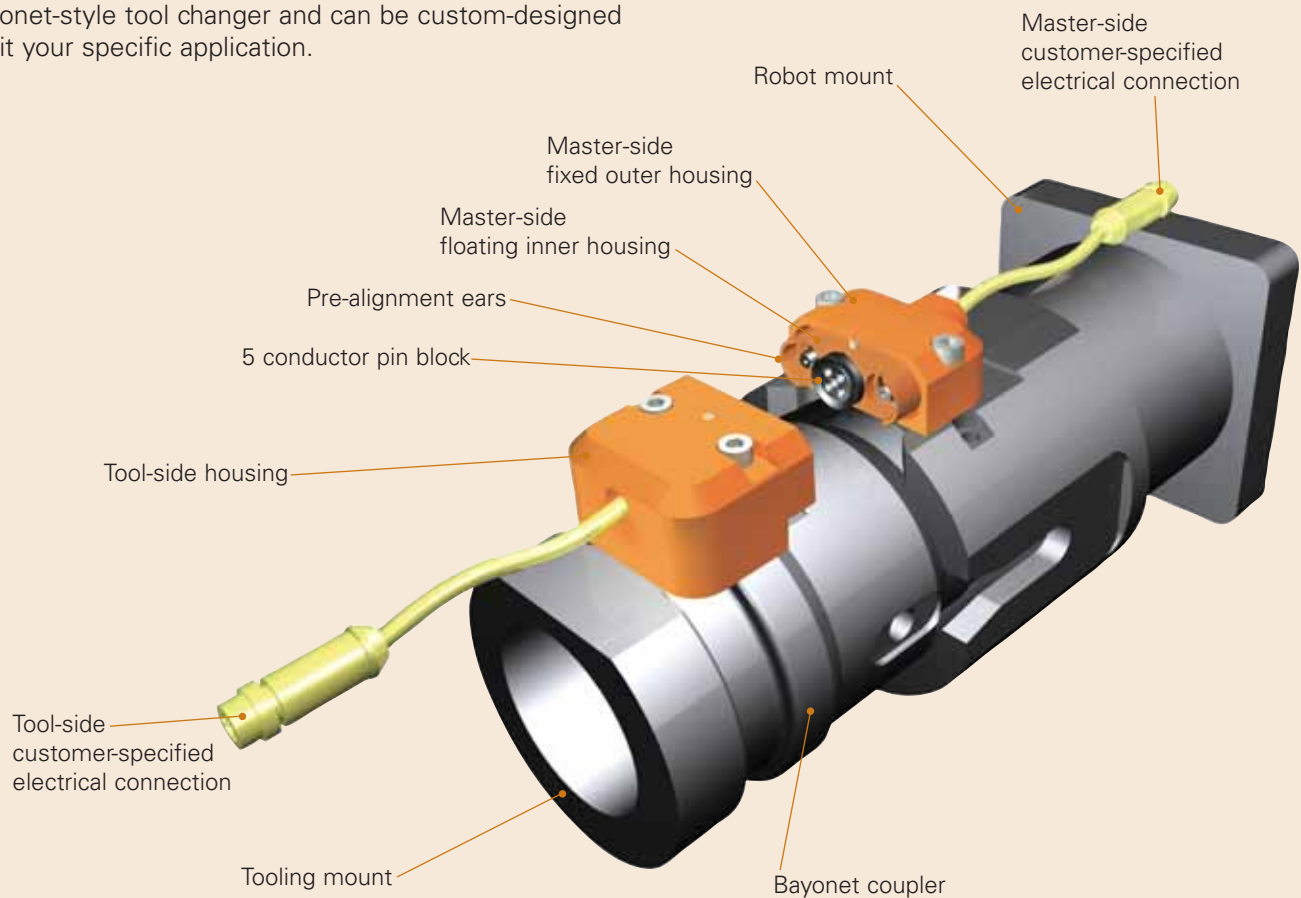


C5C Compliant Electrical Module

ATI Industrial Automation has developed a new line of electrical modules that are compliant in the X, Y, and Z directions for those demanding manual tool coupler applications. The **C5C Compliant Electrical Module** features a 5 pin, 5 amp capability with custom length, pre-wired cable connectors. Other versions are available. The unit features a patent-pending compliance feature that allows the pin block to float inside its housing, guaranteeing a reliable connection, even in extreme end-effector loading conditions.

The C5C series of electrical modules can mount to any bayonet-style tool changer and can be custom-designed to fit your specific application.

Initially developed for bayonet-style manual tool change applications, compliant electrical modules that feature the new self-centering compliance feature are seeing an increasing demand. ATI's Engineering department, the largest of its kind for an end-effector company, can quickly design a custom compliant module to fit your application.

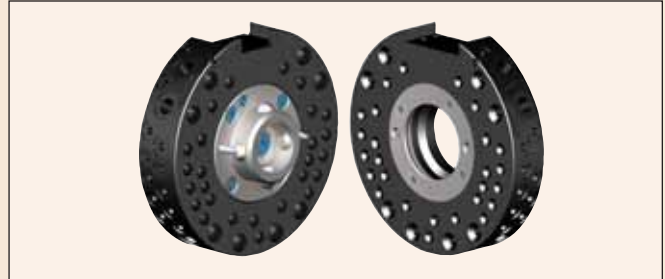


SPECIAL APPLICATION TOOL CHANGERS

The following are a select few of the special application Tool Changers that ATI's engineering team has created. ATI is dedicated to developing cost-effective, state-of-the-art products and solutions that improve robotic productivity. We welcome the opportunity to design a Tool Changer for your application.

QC-25 Tool Changer with 34 Pass-through Ports

The QC-25 Tool Changer was designed for a 34 pound (15.1 kg) payload. It has a small 4.7 inch (120 mm) outer diameter and features (26) M5 air connections, and (8) 1/8 BSPP (G) threaded connections. The QC-25 also features a mounting flat for the attachment of additional electrical modules.



QC-25 Master and Tool

QC-35 Through-Hole Changer

The QC-35 Tool Changer uses a 3-locking mechanism design to allow a 1.77 inch (45 mm) diameter through-hole that is sealed when coupled. Allowing for a maximum 100 pound (45.4 kg) payload, this small Tool Changer is only 6 inches (152 mm) in diameter and also allows for the mounting of up to two additional utility modules.



QC-35 Master and Tool

QC-62 Square Body Tool Changer for Non-robotic Fixture Docking

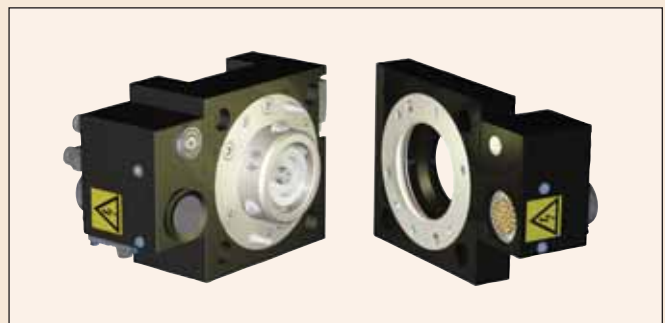
The QC-62 is a small square body Tool Changer designed for docking fixtures in severe plant conditions. It can accept ATI DeviceNet modules, and allows for 160 pound (72.6 kg) payloads. The QC-62 is only 5.25 inches (133 mm) square, and also features optional air blow-off modules and attachment of an optional compliant interface plate.



QC-62 Master and Tool with DeviceNet Modules

QC-73 Custom Rail Changer

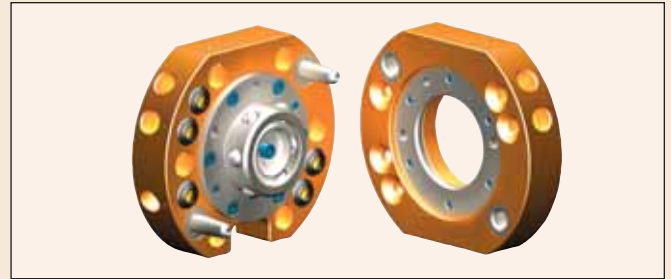
The QC-73 Tool Changer features a 4.6 inch (117 mm) square body, Lock/Unlock and Ready-to-Lock sensing, and allows for the attachment of a specialized utility module that passes self-sealing air, as well as electrical signals. These utilities are passed along the axis of the Tool Changer allowing for simple hose routing. The QC-73 features a custom square mounting pattern, and allows for 180 pound (81.6 kg) payloads.



QC-73 Master and Tool

QC-76 Lightweight Tool Changer

The QC-76 Tool Changer features a lightweight package of only 8.15 pounds (3.7 kg) while allowing for 240 pound (108.9 kg) payloads. It features (5) 3/8 NPT pass-through air connections and a stack height of only 2.56 inches (65 mm). The QC-76 also features internal Lock/Unlock and Ready-to-Lock sensing.



QC-76 Master and Tool

QC-80 Tool Changer for Lightweight Servo Welding

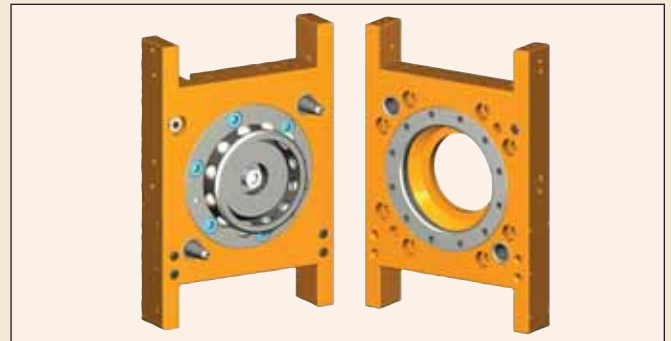
The QC-80 was developed for lightweight servo welding applications. Its compact design features integrated, square robot mounting patterns and internal Lock/Unlock and Ready-to-Lock sensors. The new lightweight locking mechanism allows for 180 pound (81.6 kg) payloads. Lightweight weld current, servo, and fluid modules were also developed for this application. Entire package weighs only 13.2 pounds (6 kg).



QC-80 Master and Tool

QC-203 "H" Body Tool Changer

The QC-203 "H" Body Tool Changer was developed for an application that required the mounting of up to six utility modules. It allows for 450 pound (204 kg) payloads and is compatible with ATI Heavy Automation DeviceNet modules. The QC-203 also features (4) 1/4 NPT pass-through air ports and internal Lock/Unlock and Ready-to-Lock sensing.



QC-203 Master and Tool

QC-220 Electric Tool Changer

The QC-220 Electrically-Actuated Tool Changer from ATI (patents pending) was designed for heavy-duty applications where air supply is either not available or not desired. The low-voltage, low-current inputs allow for easy integration into electric body shops. Virtually the same size as the existing QC-210 series pneumatic version, this electric version Master mates with pre-existing QC-210 Tool-side plates. The Electric Tool Changer also features up to five accessory module mounting flats for demanding material handling or servo welding applications.



QC-220 Master and Tool

Other ATI Products

Robotic Collision Sensor

Designed to prevent damage to robotic end-effectors resulting from robot crashes. Features include: Automatic reset, high-repeatability, and large moment rotation.

Robotic and CNC Deburring Tools

These air-driven robotic tools cover a wide variety of automated deburring and finishing applications with fast cycle times and clean, accurate cuts. The Radially-Compliant Deburring Tool is designed for removal of parting lines and flash. The Axially-Compliant Deburring Tool is specially designed for edge deburring and chamfering. The Axially-Compliant Finishing Tool is designed for material finishing operations on aluminum, plastic, steel, and more.

Robotic Rotary Joint

A device that allows unlimited rotation of end-of-arm tooling without tangling or twisting robot tooling utility lines. Utilizes advanced slip-ring technology to pass electrical and pneumatic signals from robot to tooling.

Multi-Axis Force/Torque Sensor

Measures the full six components of force and torque. High overload protection and high signal-to-noise ratio. Used in robotic and research applications.

Automated Assembly Alignment Device

An insertion device using Remote Center Compliance technology that helps assembly machines automatically align close-fitting parts, preventing jamming and galling.

Company Profile

ATI Industrial Automation is a world-leading developer of Automatic Tool Changers, Multi-Axis Force/Torque Sensing Systems, Compliance Devices, Robotic Collision Sensors, Robotic Deburring Tools, and Robotic Rotary Joints. Our products are found in thousands of successful applications around the world.

Since 1982, our engineers have been developing cost-effective, state-of-the-art products and solutions to improve manufacturing productivity.

Our Mission is to provide customers around the world with high-quality robotic peripheral devices, tooling, and sensors that enhance customer profitability by increasing the effectiveness, flexibility, safety, and productivity of their automation applications. We accomplish this through continuous improvement of existing products, product customization, and new product innovation.

Our engineering-centric staff focuses on providing customer solutions to robotic, automation, and sensing applications.

Our Quality Policy

ATI Industrial Automation strives to provide customer satisfaction through continual improvement of on-time delivery, quality and reliability, and a constant focus on innovation and profitability.



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