

Table of Contents

B. Base Utility Coupler	B-3
GKx Series—Compliant Utility Coupler.....	B-3
1. Product Overview	B-3
1.1 9123-GKx Compliant Utility Coupler Master	B-5
1.2 9123-GKx Compliant Utility Coupler Tool	B-6
1.3 9123-GK1 Master Plate Assembly.....	B-7
1.4 9123-GK1 Tool Plate Assembly	B-7
1.5 9123-GK2 Master Plate Assembly.....	B-8
1.6 9123-GK2 Tool Plate Assembly	B-9
2. Installation	B-10
2.1 Utility Coupler Master Installation	B-10
2.2 Utility Coupler Master Removal	B-11
2.3 Utility Coupler Tool Assembly Installation.....	B-11
2.4 Utility Coupler Tool Assembly Removal.....	B-12
2.5 Electrical Connections.....	B-12
2.6 Pneumatic Guided Cylinder Assemblies.....	B-13
2.7 Electric Drive Actuator Sensor Setting Procedure.....	B-13
2.7.1 Electric Drive Actuator Sensor Adjustment.....	B-13
3. Operation	B-14
3.1 Coupling.....	B-14
3.2 Guided Cylinder or Drive Unit Dependency.....	B-14
3.3 Uncoupling.....	B-14
4. Maintenance.....	B-15
4.1 Preventive Maintenance	B-15
4.2 Clean, Inspect, and Lubricate Thrust Bearings for Utility Couplers	B-16
4.3 Pin Block Inspection and Cleaning	B-17
4.4 Clear Dust and Debris from Compliance Springs Area	B-18
5. Troubleshooting and Service Procedures	B-19
5.1 Troubleshooting Procedures	B-19
5.2 Service Procedures.....	B-21
5.2.1 Clean, Inspect, Lubricate, Replace Components for Master Check Port.....	B-21
5.2.2 Clean, Inspect, Lubricate, Replace Components for Tool Check Port	B-23
5.2.3 V-ring Seal Replacement.....	B-25
5.2.4 Tool Presence Sensor Replacement for GK Units	B-26
5.2.5 GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement	B-27

5.2.6	GK2CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement	B-28
5.2.7	GK1CM Compliance Spring Replacement for Utility Coupler (Preferred Method)	B-29
5.2.8	GK1CM Compliance Spring Replacement for Utility Coupler (Alternate Method).....	B-30
5.2.9	GK2CM Compliance Spring Replacement for Utility Coupler (Preferred Method)	B-31
5.2.10	GK2CM Compliance Spring Replacement for Utility Coupler (Alternate Method).....	B-32
5.2.11	Center Swivel Replacement for Utility Coupler	B-33
5.2.12	GK1CM Alignment Pin Replacement.....	B-34
5.2.13	GK2CM Alignment Pin Replacement	B-35
5.2.14	GK-GC-B63S50Z1 Return Spring Replacement.....	B-37
5.2.15	GK-GC-B63S50Z1 Exhaust Muffler Replacement	B-38
6.	Serviceable Parts	B-39
6.1	GK1 Compliant Utility Coupler Master (9123-GK1CM-0-0-0-0).....	B-39
6.2	GK2 Compliant Utility Coupler Master (9123-GK2CM-0-00-0-00-N/E/R)	B-40
6.3	GK1 Compliant Utility Coupler Tool 9123-GK1T-0-0-0-0	B-42
6.4	GK2 Compliant Utility Coupler Tool 9123-GK2T-0-00-0-00-N/E/R	B-42
6.5	Models 9123-GK-GC-B63S50Z1-SG-N	B-43
6.6	Models 9123-GK-GC-B50S75-SG-N, 9123-GK-GC-B63S75-SG-N.....	B-44
6.7	Models 9123-GK-GCE-PM24400-B-SG, 9123-GK-GCE2-PM24600-B-SG	B-44
7.	Specifications	B-45
8.	Drawings	B-47
8.1	GK1 Compliant Utility Coupler Drawings.....	B-47
8.2	GK2-N Compliant Utility Coupler Drawings.....	B-50
8.3	GK2-E Compliant Utility Coupler Drawings	B-53
8.4	GK2-R Compliant Utility Coupler Drawings.....	B-56
8.5	GK-GC-B50S75-SG-N.....	B-59
8.6	GK-GC-B63S50Z1-SG-N.....	B-60
8.7	GK-GC-B63S75-SG-N	B-62
8.8	GK-GCE2-PM24600-B-SG	B-63
8.9	GK-GCE-PM24400-B-SG	B-65

B. Base Utility Coupler

GKx Series—Compliant Utility Coupler

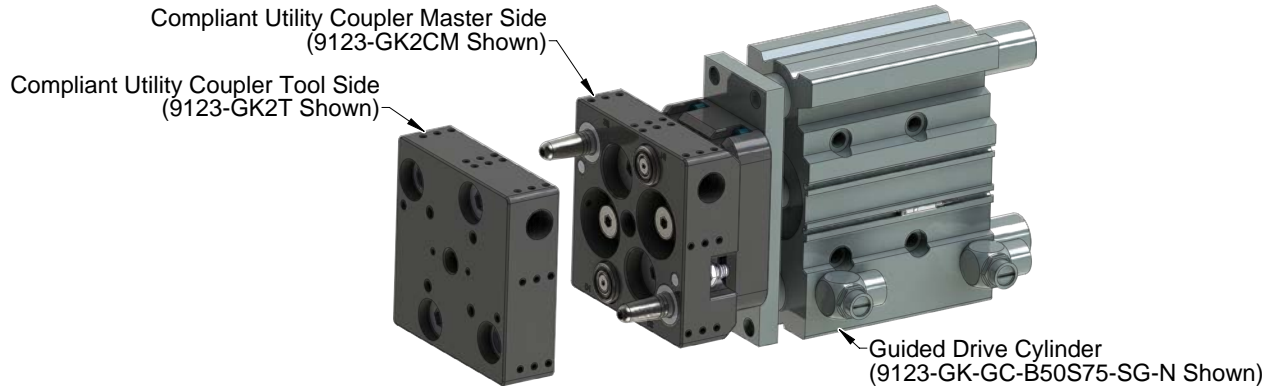
1. Product Overview

The GKx Compliant Utility Coupler is designed for medium-duty industrial applications. The Utility Coupler provides pass through utilities such as air, fluids, and electrical signals from both integrated ports within the body and standard ATI add-on standard rectangular mounted modules. Consult ATI for further details.

This document provides information on the GKx series Utility Couplers listed in [Table 1.1](#).

The Utility Couplers are comprised of a compliant Master side and Tool side. The Master side is equipped with a compliance mechanism that allows for large tooling misalignments. The Utility Coupler depends on force from the guided cylinder assembly to maintain constant coupling pressure. The recommended operating pressure for the guided cylinder is 80 psi (5.52 bar). The unit will work in operating pressures between 60 – 120 psi (4.14 – 8.27 bar).

Figure 1.1—GKx Compliant Utility Coupler with Guided Cylinder Assembly



Some Utility Coupler Master models feature integrated check ports that pass utilities on to the Tool side. Master and Tool bodies are equipped with a standard rectangular mounting feature that enables the coupler to accept up to (4) additional 9120 series Tool Changer utility modules for pass-through air, fluids, and electrical signals. Consult ATI for further details.

Table 1.1—GKx Series Utility Coupler Models				
Base Assembly Part Number	Description	Configuration Part Number	Sensors for Tool Presence	Air Ports
9123-GK1CM-0-0-0-0	GK1 Compliant Utility Coupler Master Base Assembly	9123-GK1CM-0-0-0-0-SE	(2) NPN	N/A
		9123-GK1CM-0-0-0-0-SG	(2) PNP	N/A
9123-GK1T-0-0-0-0	GK1 Utility Coupler Tool Base Assembly	N/A	N/A	N/A
9123-GK2CM-0-00-0-00-N		9123-GK2CM-0-00-0-00-SE-N	(2) NPN	(2) 3/8" NPT Checked Ports
		9123-GK2CM-0-00-0-00-SG-N	(2) PNP	(2) 3/8" NPT Checked Ports
9123-GK2CM-0-00-0-00-E	GK2 Compliant Utility Coupler Master Base Assembly	9123-GK2CM-0-00-0-00-SE-E	(2) NPN	(2) 3/8" BSPP Checked Ports
		9123-GK2CM-0-00-0-00-SG-E	(2) PNP	(2) 3/8" BSPP Checked Ports
9123-GK2CM-0-00-0-00-R		9123-GK2CM-0-00-0-00-SE-R	(2) NPN	(2) 3/8" BSPT Checked Ports
		9123-GK2CM-0-00-0-00-SG-R	(2) PNP	(2) 3/8" BSPT Checked Ports
9123-GK2T-0-00-0-00-N	GK2 Utility Coupler Tool Base Assembly	N/A	N/A	(2) 3/8" NPT Checked Ports
9123-GK2T-0-00-0-00-E				(2) G 3/8" BSPP Checked Ports
9123-GK2T-0-00-0-00-R				(2) Rc 3/8" BSPT Checked Ports

1.1 9123-GKx Compliant Utility Coupler Master

The Master housing assembly includes an anodized aluminum body, (2) hardened stainless-steel alignment pins, proximity sensors, and hardened steel overload pins to limit compliance. There are preloaded springs internal to the housing that forces the main body to self-center on custom chamfered thrust bearings, which allows for 4 mm compliance in any direction in the coupling plane and for ± 3 degrees angular compliance. This system allows for a relatively large misalignment of the Master and Tool prior to coupling.

Figure 1.2—GK1 Compliant Utility Coupler Master Assembly

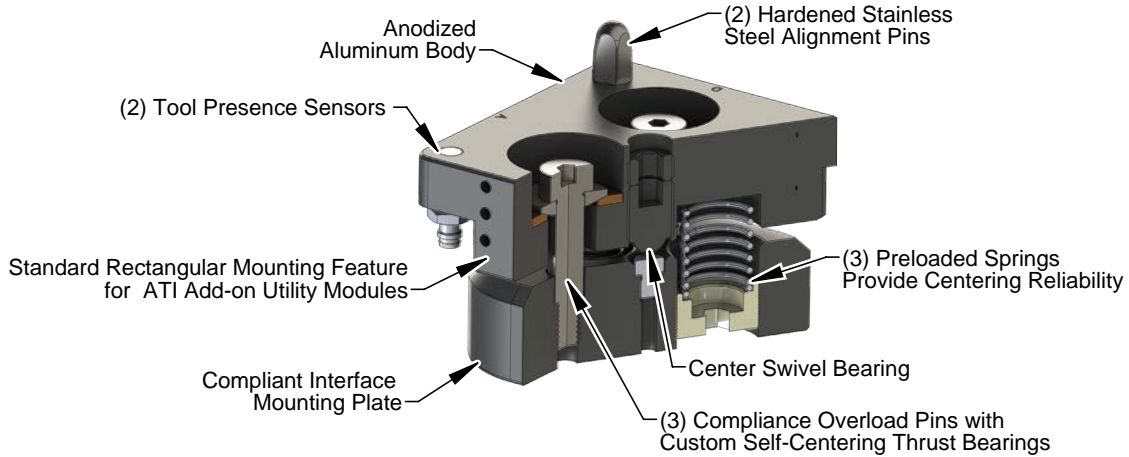
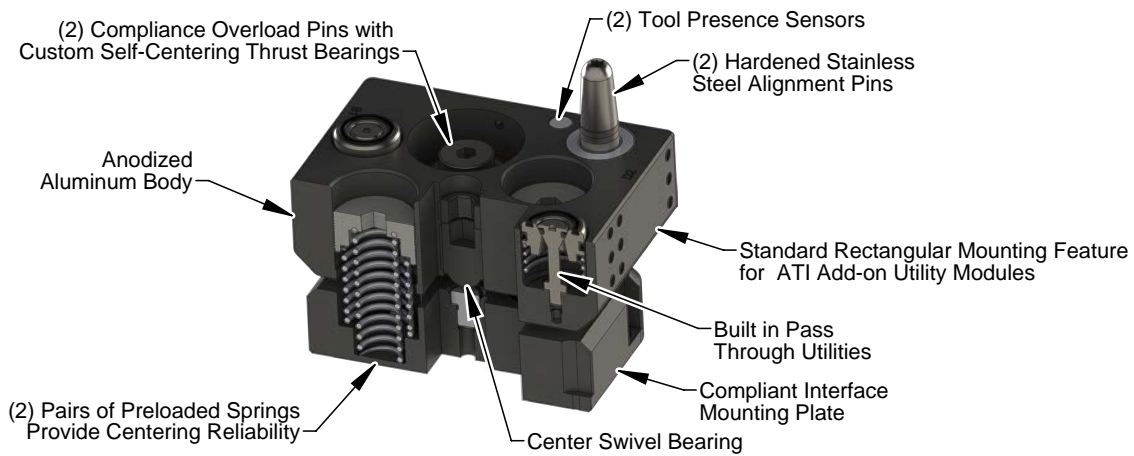


Figure 1.3—GK2 Compliant Utility Coupler Master Assembly



1.2 9123-GKx Compliant Utility Coupler Tool

The Tool housing assembly includes an anodized aluminum body and hardened steel alignment bushings. The Tool body is equipped with steel targets that the proximity sensors in the Master body can use to sense Tool presence.

Some Utility Coupler models have integrated check ports with NPT, BSPP, or BSPT air pneumatic connections. The Tool body has flats with rectangular mounting features that enable the coupler to accept additional 9120 series Tool Changer utility modules for pass through utilities such as air, fluids, and electrical signals. Consult ATI for further details.

Figure 1.4—GK1 Compliant Utility Coupler Tool Assembly

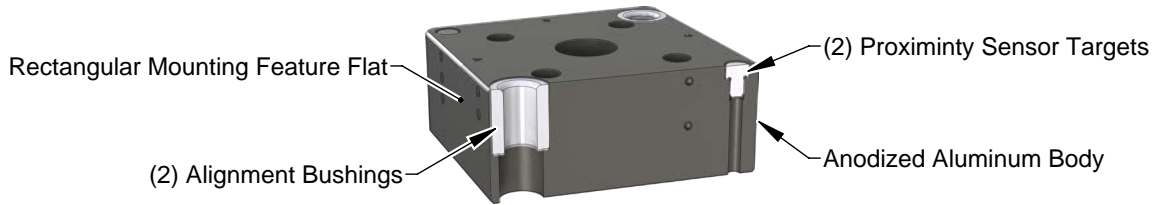
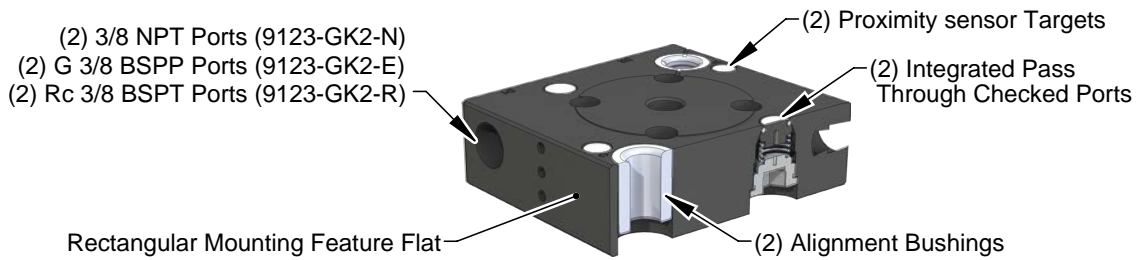


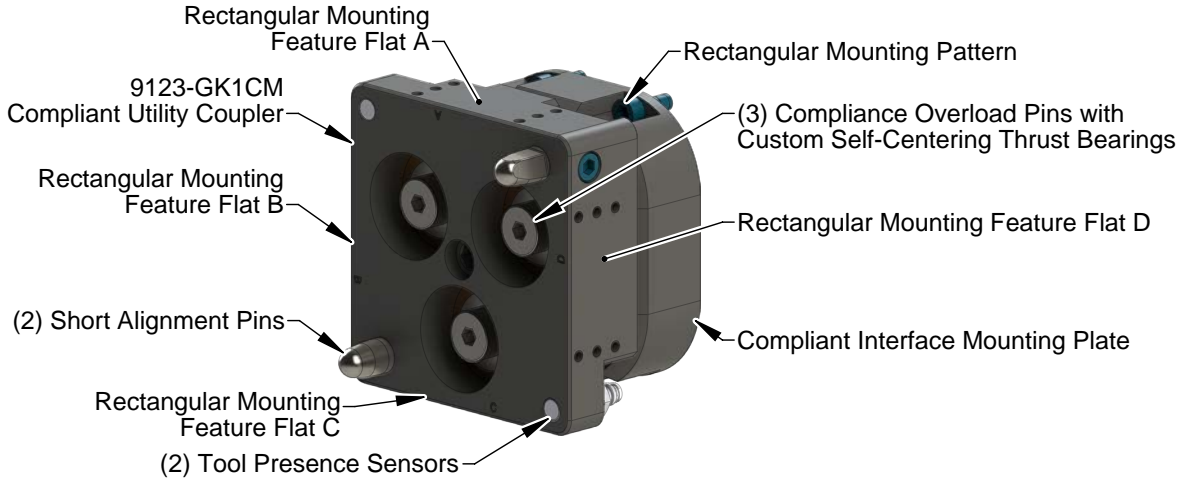
Figure 1.5—GK2 Compliant Utility Coupler Tool Assembly



1.3 9123-GK1 Master Plate Assembly

The GK1 Master plate assembly is equipped with (2) short hardened steel alignment pins. The Master body has no integrated check port but provides (4) flats with rectangular mounting features for pass-through utilities such as air, fluids, and electrical signals. There are (3) preloaded springs internal to the housing that force the main body to self-center on custom chamfered thrust bearings. The access to the preloaded springs is from the back of the interface mounting plate. The compliance is limited by (3) overload pins. The interface mounting plate is equipped with a rectangular mounting pattern to accommodate (4) M6 socket head cap screws and has 4 mm dowel pins which can be used for alignment with the drive cylinder. The Master body has (2) proximity sensors to detect Tool presence.

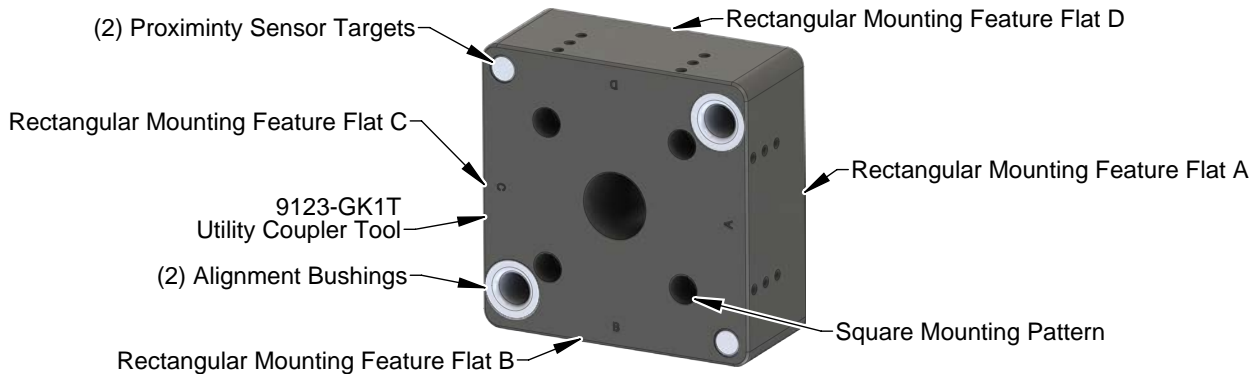
Figure 1.6—GK1 Master Plate Assembly



1.4 9123-GK1 Tool Plate Assembly

The GK1 Tool plate assembly is equipped with (2) hardened steel alignment bushings. The Tool body has no integrated check port but provides (4) flats with rectangular mounting features for pass-through utilities such as air, fluids, and electrical signals. The Tool body is equipped with a square mounting pattern to accommodate (4) M6 socket head cap screws and (2) dowel holes which can be used for alignment with the Tool. The Tool body is equipped with (2) steel targets that the proximity sensors in the Master body can use to sense Tool presence.

Figure 1.7—GK1 Tool Plate Assembly

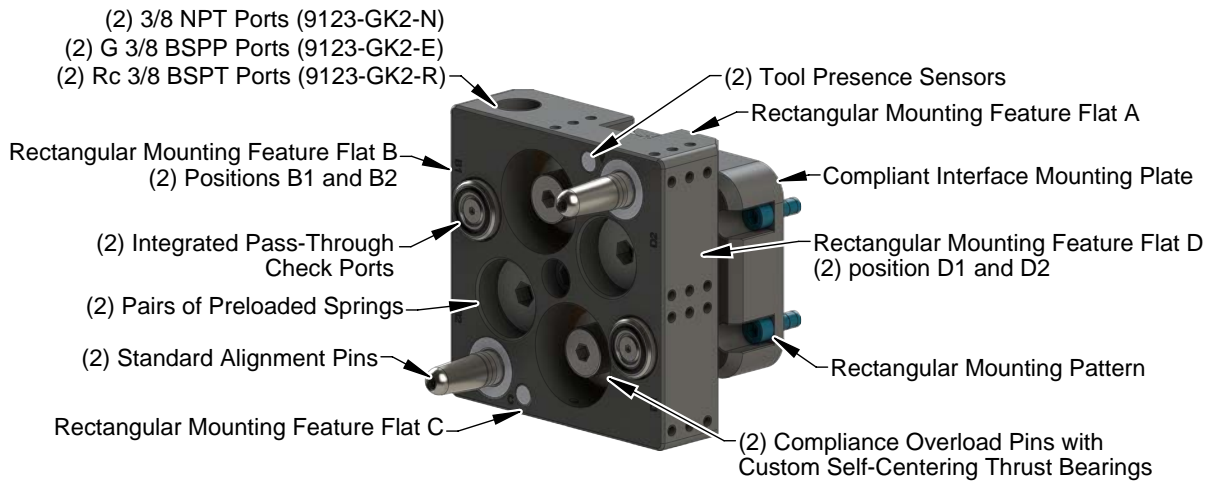


1.5 9123-GK2 Master Plate Assembly

The GK2 Master plate assembly is equipped with (2) standard hardened steel alignment pins. The Master body has (2) integrated check port and provides (4) flats with rectangular mounting features for pass through utilities such as air, fluids, and electrical signals. The 9123-GK2-N model has 3/8 NPT air ports, the 9123-GK2-E model has G 3/8 BSPP air ports, and the 9123-GK-2-R model has Rc 3/8 BSPT air ports that provide the pneumatic connection for the check ports.

There are (2) pairs of preloaded springs internal to the housing that force the main body to self-center on custom chamfered thrust bearings. The access to the preloaded springs is from the front of the Master plate assembly. The compliance is limited by (2) overload pins. The interface mounting plate is equipped with a rectangular mounting pattern to accommodate (4) M6 socket head cap screws and has 4 mm dowel pins which can be used for alignment with the drive cylinder. The Master body has (2) proximity sensors to detect Tool presence.

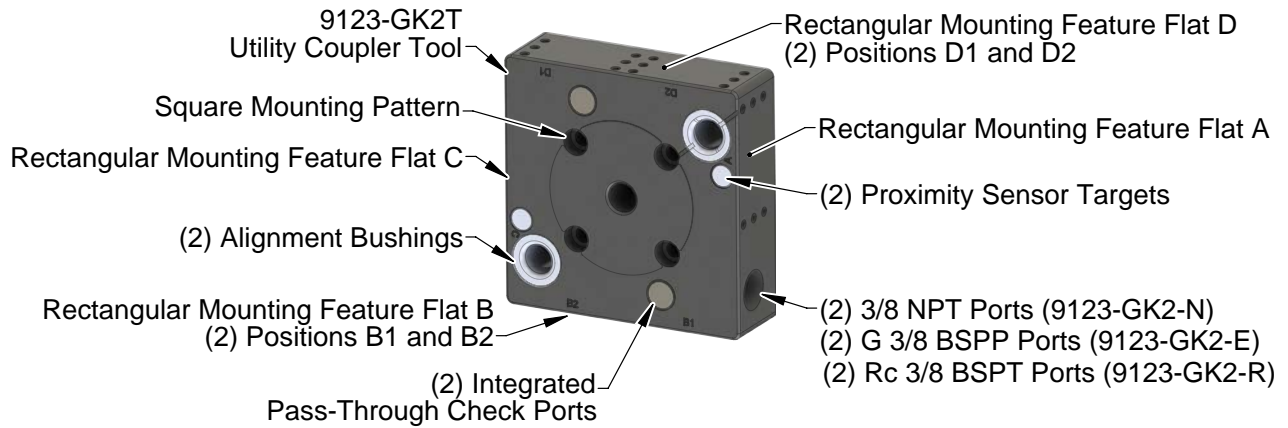
Figure 1.8—GK2 Master Plate Assembly



1.6 9123-GK2 Tool Plate Assembly

The GK2 Tool plate assembly is equipped with (2) hardened steel alignment bushings. The Tool body has (2) integrated check ports and provides (4) flats with rectangular mounting features for pass-through utilities such as air, fluids, and electrical signals. The Tool body is equipped with a square mounting pattern to accommodate (4) M6 socket head cap screws and (2) dowel holes which can be used for alignment with the Tool. The Tool body is equipped with (2) steel targets that the proximity sensors in the Master body can use to sense Tool presence.

Figure 1.9—GK2 Tool Plate Assembly



2. Installation

The Master unit is designed to attach to any compatible drive unit assembly or can be directly mounted to customer geometry. The GKx Utility Coupler and add-on modules are typically installed by ATI prior to shipment. The following steps outline the field installation or removal of the system components. The Compliant Utility Coupler Master assembly is attached to the Guided Drive Cylinder. The Master housing has a rectangular mounting pattern to accommodate (4) M6 socket head cap screws. The Master assembly also comes with 4 mm dowel pins which are used as needed. Unlike most robot arm applications, the 9123-GKx Master Housing is designed specifically for mounting directly to a Guided Cylinder assembly. No adapter plates should be used.



WARNING: Do not perform maintenance or repairs on Utility Coupler or modules unless all energized circuits (e.g. electrical, air, water, etc.) are turned off, pressurized connections purged, and power discharged from circuits in accordance with the customer's safety practices and policies. Injury or equipment damage can occur with energized circuits on. Turn off and discharge all energized circuits, purge all pressurized connections, and verify all energized circuits are de-energized before performing maintenance or repair on Utility Coupler or modules.



CAUTION: Thread locker applied to fasteners must not be used more than once. Fasteners might become loose and cause equipment damage. Always apply new thread locker when reusing fasteners.



CAUTION: Do not use fasteners that exceed the thread depth in the Utility Coupler. Refer to [Section 8—Drawings](#) for details on mounting hole thread depth. Secure the Utility Coupler with the proper length fasteners. This is true for both robot and tool interfaces.

NOTICE: ATI does not guarantee the use of utility couplers that are not mounted aligned with the drive cylinder's axis of travel, or if the couplers are mated by retracting, versus extending, the drive cylinder.

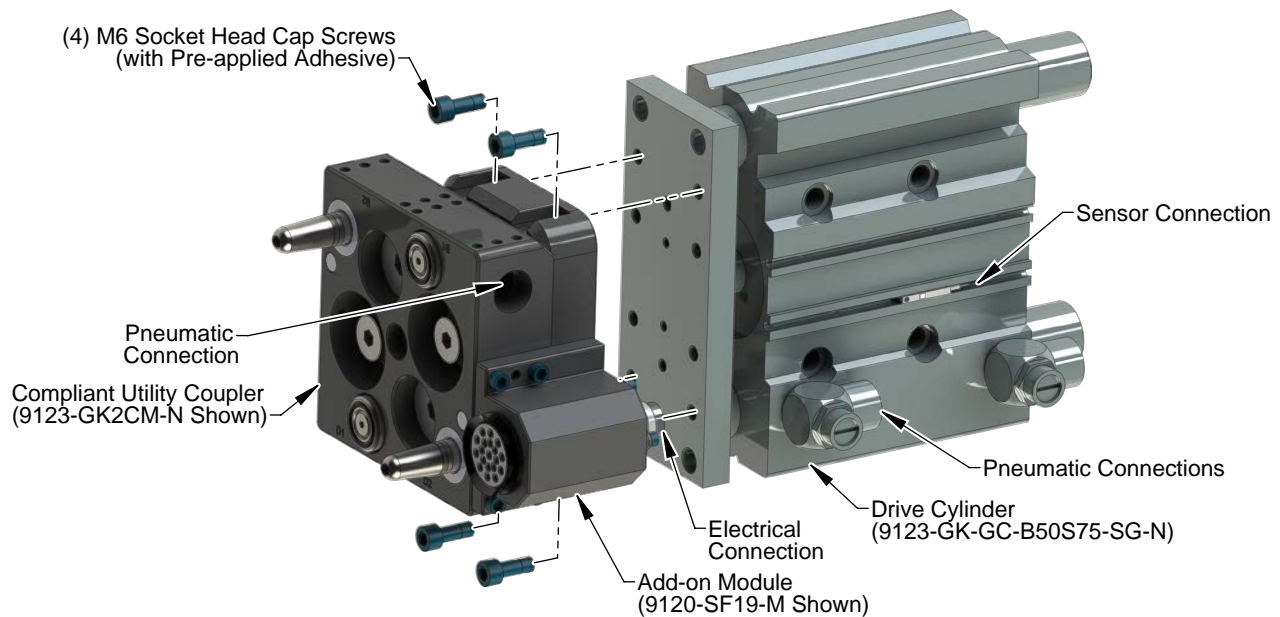
2.1 Utility Coupler Master Installation

Tools Required: 5 mm hex key, Torque wrench

Supplies Required: Clean rag, Loctite® 242

1. Attach the Utility Coupler Master assembly to the drive cylinder. Align the Master assembly using the dowels in the drive cylinder mounting plate.
2. Using a 5 mm Hex key wrench, secure the Master assembly using the (4) M6 x 16 mm socket head cap screws (with pre-applied adhesive) provided. Tighten to 89 in-lbs (10.0 Nm). Note: If fasteners do not have pre-applied thread locker, apply Loctite 242.
3. If add-on modules have not been installed, refer to the module manual for installation instructions.
4. Attach the hoses to the Master body and drive cylinder as required.
5. Power, signal, and sensor cables can be connected to the module and drive cylinder after attaching the module to the Utility Coupler. Ensure that the connectors are cleaned prior to being secured as appropriate.
6. After installation is complete, Master assembly may be put into normal operation.

Figure 2.1—Utility Coupler Master Installation



2.2 Utility Coupler Master Removal

Tools Required: 5 mm hex key

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Depending upon the service or repair being done, the customer connections may or may not need to be disconnected. Remove customer connections as required.
4. Remove the (4) M6 x 16 mm socket head cap screws securing the Master assembly to the drive cylinder using a 5 mm hex key wrench and remove the Master assembly.

2.3 Utility Coupler Tool Assembly Installation

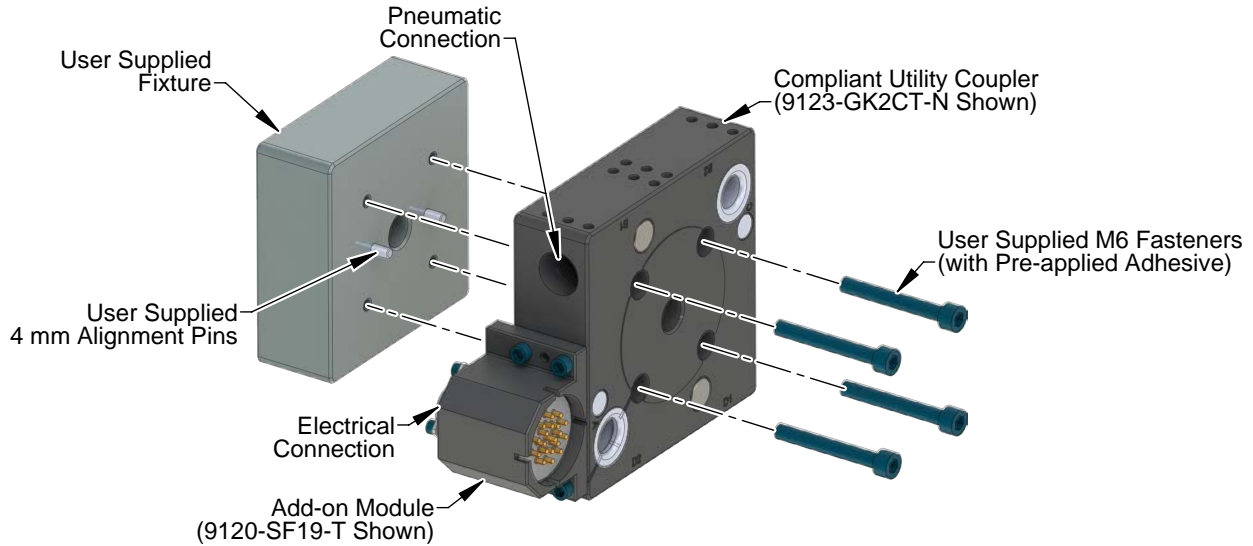
The Tool plate is attached to a customer supplied fixture. The Tool plate is designed with a 100 mm mounting pattern for (4) M6 socket head cap screws and (2) dowel holes. These features are used to accurately position and secure the Utility Coupler Tooling.

Tools Required: 5 mm hex key, Torque wrench

Supplies Required: Clean rag, Loctite 242

1. Using a 5 mm hex key wrench, attach the Utility Coupler Tool assembly to the customer supplied fixture using customer supplied fasteners. Note: Fasteners must be grade 12.9 with pre-applied adhesive, if not using pre-applied adhesive, apply Loctite 242 to fasteners. Tighten fasteners to 89 in-lbs (10.0 Nm).
2. If add-on modules have not been installed, refer to the module manual for installation instructions.
3. Attach the hoses to the Tool plate as required.
4. Power and signal cables can be connected to the modules after attaching the module to the Utility Coupler Tool. Ensure that the connectors are cleaned prior to being secured as appropriate.
5. After installation is complete, Tool assembly may be put into normal operation.

Figure 2.2—Utility Coupler Tool Installation



2.4 Utility Coupler Tool Assembly Removal

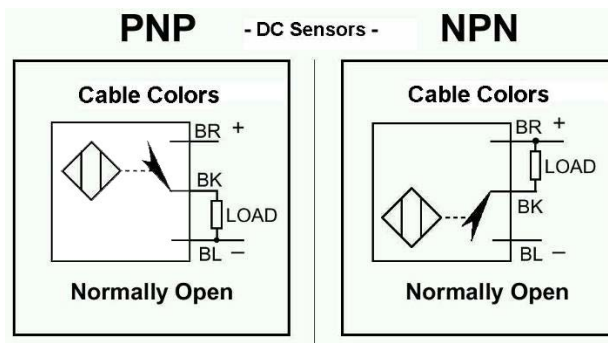
Tools Required: 5 mm hex key

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Depending upon the service or repair being done, the customer connections may or may not need to be disconnected. Remove customer connection as required.
4. Remove the (4) M6 socket head cap screws securing the Tool assembly to the customer supplied fixture using a 5 mm hex key wrench and remove Tool assembly.

2.5 Electrical Connections

The Utility Coupler Master utilizes proximity sensors to detect the position of the piston inside the Master body. The type of sensor is specified by the customer at the time of order. Sensors should be selected to work with the controls used on the customer's equipment. Available sensors include DC PNP sourcing and NPN sinking. The DC sensors operate at a nominal 24 volts (check the labels attached to the installed sensors prior to connecting to any control circuit). Regardless of sensor type specified, ALL sensors must be installed in series with a resistive load to limit current flow. The figures below show the connections for the DC sensors.

Figure 2.3—PNP and NPN Sensors



2.6 Pneumatic Guided Cylinder Assemblies

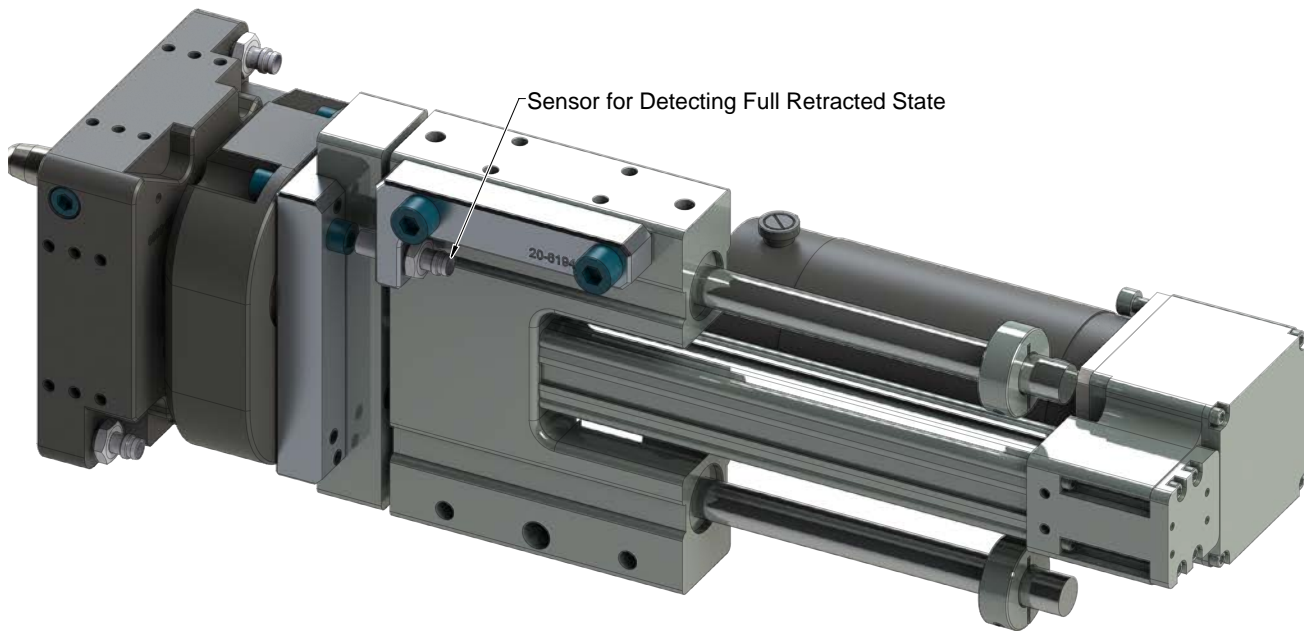
The GK Utility Couplers are designed to be driven together by an actuator. They are compatible with a number of pneumatic guided cylinder assemblies. The required size and driving force of the actuator depends on what utilities are being coupled. Since ATI has a very large array of add-on utility modules, there is an infinite number of possible combinations of modules. As a result, it is recommended that each application be reviewed carefully and the correct drive cylinder be determined based on the required coupling force of the fully configured Utility Coupler for that specific application. ATI offers several pneumatic guided cylinder assemblies that are appropriate for many GK Utility Coupler applications. Contact ATI for assistance.

The air supply used for coupling and uncoupling the device should be clean, dry, and non-lubricated. A supply pressure in the range of 60 –100 psi (4.14 – 6.89 bar) is acceptable for operation of the guided cylinder, with a setting of 80 psi (5.52 bar) suggested. The air should be filtered 40 micron or better.

2.7 Electric Drive Actuator Sensor Setting Procedure

The sensors for the drive cylinder assembly are supplied pre-adjusted to detect the fully retracted state. For wiring information refer to [Section 2.7.1—Electric Drive Actuator Sensor Adjustment](#). To adjust the sensors height or position, refer to the following procedure.

Figure 2.4—Electric Drive Actuator Sensor Setting



2.7.1 Electric Drive Actuator Sensor Adjustment

Tools Required: 1/2" wrench, torque wrench

Supplies Required: Loctite 222

1. Loosen the sensor nut that clamps against the proximity sensor holder.
2. Rotate the sensors as needed. Note: The standard distance that the sensor face protrudes from its mounting bracket is about 0.30 to 0.35".
3. Re-tighten the nut to 20 in-lbs (2.3 Nm). Apply Loctite 222 to the exposed threaded area of the sensor where the lock nut will seat (only this area).

3. Operation

The Master coupling plate is driven to couple and uncouple with the Tool side plate. The Master plate is driven by a guided cylinder assembly.



WARNING: During operation, the area between the Master and Tool must be kept clear. Failure to keep area clear will result in damage to Utility Coupler, add-on modules, or end-of-arm tooling and could cause injury to personnel.



WARNING: During operation, the area between the driver cylinder mounting plate and body must be kept clear. Failure to keep area clear will result in damage to drive cylinder or could cause injury to personnel.

3.1 Coupling

Position the Master to within a pre-determined distance of the Tool and move the Master into locking position. The mating surfaces of the Master and Tool should be parallel and not touching. Make sure that the tapered alignment pins from the Tool block enter the alignment holes on the Master. The alignment pins should be relatively concentric with the alignment holes such that they do not rub against the edge.

For some applications, Cylinder Position Proximity sensing is included, providing the ability to sense Cylinder Retracted and Extended States. The target for the Cylinder and Prox sensors face on the Master housing must be positioned within approximately 5 mm of each other for the sensor to detect the target. A signal is not required to couple the Master and Tool but is recommended as further confirmation of coupling.



CAUTION: The guided cylinder must be in the retracted position when attempting to couple the device. Failure to adhere to this condition may result in damage to the unit and/or the machine.



CAUTION: Never couple or uncouple the unit without first disconnecting and discharging the power that passes through the contacts. This is especially true if high voltage circuits are involved. Arcing and contact damage will occur if this is not observed. Always disconnect and discharge electrical power from both upstream and downstream modules.



CAUTION: Since the system may not have a secondary locking mechanism, it is critical to the operation of the coupler that cylinder pressure is maintained at all times during operation.

3.2 Guided Cylinder or Drive Unit Dependency

For pneumatically-driven units, in the event of air supply loss to the Guided Cylinder, the Utility Coupler will uncouple. A separation between the Master and Tool plates occurs just after air loss and the utilities will disconnect because the integrated air ports have check valve features that react against the force of the guided cylinder in a manner that will pry the Master and Tool apart.

The electrically actuated guided cylinder assembly does have an integrated brake that is energized when power is switched off.

If your application requires a redundant fail-safe feature, please contact ATI and ask about our standard line of Tool Changers. ATI's patented fail-safe design prevents the Tool plate from being released in the event of air-pressure loss to the Lock port, thereby increasing safety and reliability. Positional accuracy may not be maintained during air loss but will be regained once air pressure is re-established to the Lock port.



CAUTION: Drive cylinders can exert thousands of pounds of coupling force. Care is needed to accommodate these coupling forces in the design of the mating customer fixture.

3.3 Uncoupling

The Utility Coupler should be positioned in the same location as that when coupling took place.

4. Maintenance

The GKx Compliant Utility Coupler is designed to provide a long life with little maintenance required. A visual inspection and maintenance schedule is provided in [Section 4.1—Preventive Maintenance](#). Assembly details are provided in [Section 8—Drawings](#) of this manual.



WARNING: Do not perform maintenance or repairs on Utility Coupler or modules unless all energized circuits (e.g. electrical, air, water, etc.) are turned off, pressurized connections purged, and power discharged from circuits in accordance with the customer’s safety practices and policies. Injury or equipment damage can occur with energized circuits on. Turn off and discharge all energized circuits, purge all pressurized connections, and verify all energized circuits are de-energized before performing maintenance or repair on Utility Coupler or modules.

4.1 Preventive Maintenance

The preventive maintenance schedule is based on a general use application with a tool change frequency of less than one per minute. More frequent tool changes or dirty environments will require an increased frequency of the inspection schedule.

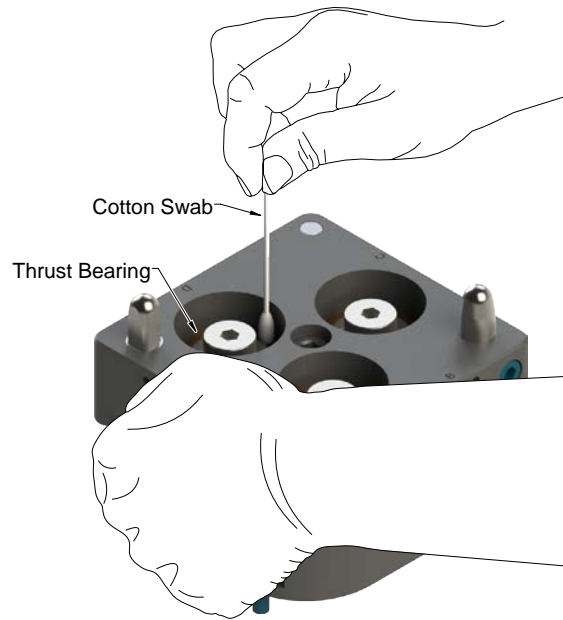
Table 4.1—Maintenance	
Schedule	Checklist
Weekly	<p>Thrust Bearings, Compression Springs, Alignment Pins and bushings, refer to: Section 4.2—Clean, Inspect, and Lubricate Thrust Bearings for Utility Couplers.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clean and lubricate bronze thrust bearing in Master body. <input type="checkbox"/> Inspect /test compliance springs in Master body. <input type="checkbox"/> Inspect alignment pins for wear or damage and proper lubrication in Master body. <input type="checkbox"/> Inspect alignment bushing in Tool body.
	<p>Pin Blocks, Electrical Contacts, and V-ring seals, refer to Section 4.3—Pin Block Inspection and Cleaning.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clean, and inspect pin block and electrical contacts for wear or damage in Master and Tool bodies. <input type="checkbox"/> Inspect V-ring seals on the Master add-on modules, if worn or damaged replace, refer to Section 5.2.3—V-ring Seal Replacement.
Monthly	<p>Mounting Fasteners and Interface Connections in the Master and Tool Modules</p> <ul style="list-style-type: none"> <input type="checkbox"/> Inspect mounting fasteners to verify they are tight and if loose, then tighten to the proper torque. Refer to Section 2—Installation. <input type="checkbox"/> Cable connections should be inspected during maintenance periods to ensure they are secure. Loose connections should be cleaned and tightened as appropriate. <input type="checkbox"/> Inspect cable sheathing for damage, repair or replace damaged cabling. Loose connections or damaged cabling are not expected and may indicate improper routing and/or strain relieving.
	<p>Clean Compliance Springs in the Master</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clean compliance spring area, refer to Section 4.4—Clear Dust and Debris from Compliance Springs Area.
6 Months	<p>Check Ports and Pass Through ports</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clean, Inspect and Lubricate Check Port seals and components in the Master and Tool bodies. Refer to Section 5.2.1—Clean, Inspect, Lubricate, Replace Components for Master Check Port and Section 5.2.2—Clean, Inspect, Lubricate, Replace Components for Tool Check Port.

4.2 Clean, Inspect, and Lubricate Thrust Bearings for Utility Couplers

Supplies Required: Cotton swabs, clean rag, MobilGrease XHP222 Special Grease

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Press on Utility Coupler Master to compress the springs and expose the bronze thrust bearing. Note: This also tests the compliance springs, if springs do not return the Master to the neutral position replace springs. Refer to [Section 5.2.8—GK1CM Compliance Spring Replacement for Utility Coupler \(Alternate Method\)](#).

Figure 4.1—Press on Utility Coupler Master



4. With the thrust bearing exposed from pressing on the Master plate, remove all the grease from the (3) thrust bearings with a cotton swab or clean rag.
5. Inspect the thrust bearings. If thrust bearing is not worn, apply MobilGrease XHP222 Special grease to thrust bearings chamfered edge. If thrust bearing or other components are worn, replace worn components. Refer to [Section 5.2.5—GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement](#) or [Section 5.2.6—GK2CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement](#).
6. Inspect the (2) alignment pins in the Master body for wear or damage. If pins are not worn, apply MobilGrease XHP222 Special grease to alignment pins. If pins are worn or damaged, replace. Refer to [Section 5.2.12—GK1CM Alignment Pin Replacement](#) or [Section 5.2.13—GK2CM Alignment Pin Replacement](#).

NOTICE: Excessive alignment pin/bushing wear may be an indication of poor tool-side position during coupling / uncoupling. Adjust position as needed.

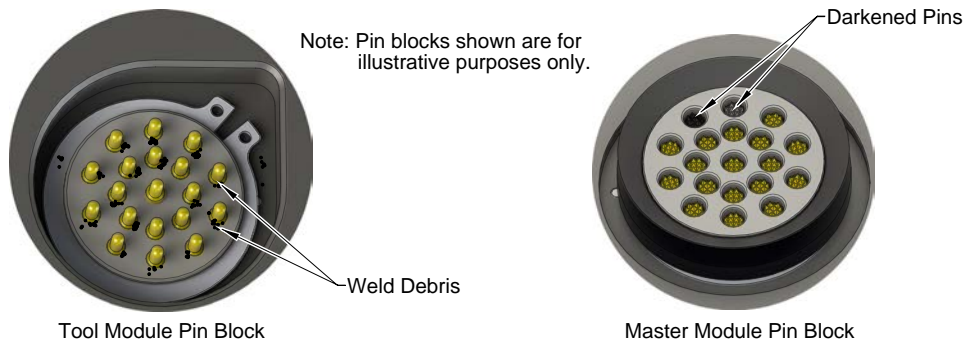
7. If repairs are complete, return circuits to normal operation.

4.3 Pin Block Inspection and Cleaning

Tools required: Nylon Brush (ATI part number 3690-0000064-60)

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. Inspect the Master and Tool pin blocks for debris or darkened pins.

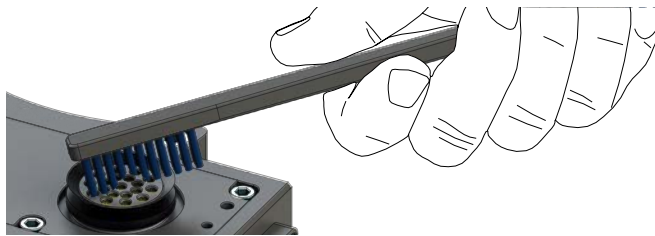
Figure 4.2—Inspect Master and Tool Pin Blocks



5. If debris or darkened pins are present, use a vacuum to remove the debris, and clean using a nylon brush (ATI part number 3690-0000064-60).

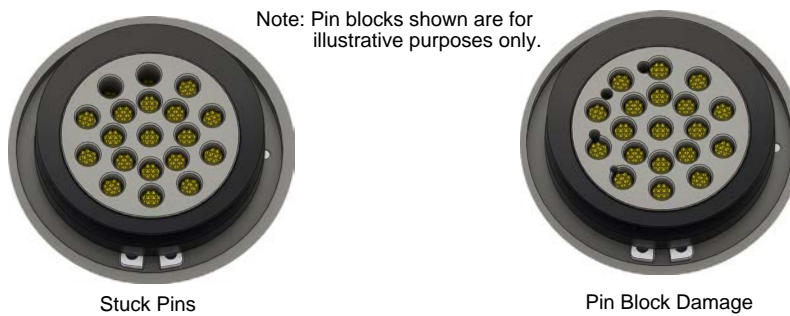
NOTICE: Do not use an abrasive media and/or cleaners or solvents to clean the contact pins. Using abrasive media and/or cleaners or solvents will cause damage to the contact surface or cause pins to stick. Clean contact surfaces with a vacuum or non-abrasive media such as a nylon brush (ATI part number 3690-0000064-60).

Figure 4.3—Clean Pin Blocks with a Nylon Brush



6. Inspect the Master and Tool pin blocks for stuck pins or pin block damage.

Figure 4.4—Stuck Pin and Pin Block Damage



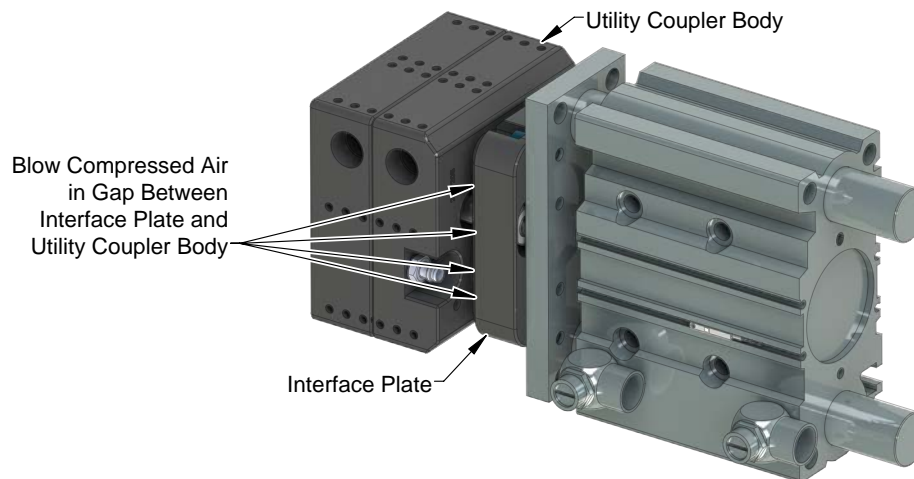
7. If pins become stuck or if there is damage to the pin block, contact ATI for either a possible pin replacement procedure or module replacement.
8. Safely resume normal operation.

4.4 Clear Dust and Debris from Compliance Springs Area

Supplies Required: Compressed air; Clean rag

1. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
2. Clear dust and debris out of spring compliance area by blowing with compressed air in the gap between the interface plate and the Utility Coupler body or the compliance assembly.
3. Wipe off unit with a clean rag.
4. If repairs are complete, return circuits to normal operation.

Figure 4.5—Clear Dust and Debris from Compliance Springs



5. Troubleshooting and Service Procedures

The following section provides troubleshooting and service information to help diagnose conditions and repair the Utility Coupler or control/signal module.



WARNING: Do not perform maintenance or repairs on Utility Coupler or modules unless all energized circuits (e.g. electrical, air, water, etc.) are turned off, pressurized connections purged, and power discharged from circuits in accordance with the customer's safety practices and policies. Injury or equipment damage can occur with energized circuits on. Turn off and discharge all energized circuits, purge all pressurized connections, and verify all energized circuits are de-energized before performing maintenance or repair on Utility Coupler or modules.



CAUTION: Thread locker applied to fasteners must not be used more than once. Fasteners might become loose and cause equipment damage. Always apply new thread locker when reusing fasteners.

5.1 Troubleshooting Procedures

The troubleshooting table is provided to assist in diagnosing issues that may cause the Utility Coupler not to function properly.

Table 5.1—Troubleshooting		
Symptom	Cause	Resolution
Unit will not Couple.	Electric Drive Cylinder not functioning properly	Check to ensure proper voltage is supplied and that all wires and cables are in good condition. Check power supply and power to motor brake. Verify that cylinder guide rods are moving freely. Clean and lubricate as needed to restore smooth operation.
	Object trapped between Master, Tool, add-on modules, or drive cylinder body and mounting plate.	Clear object from between Master, Tool, add-on modules, or drive cylinder Body and mounting plate.
	Pneumatic Drive cylinder has improper air supply.	Verify the air is supplied at a minimum of 60 psi (4.1 bar). Refer to Section 2.6—Pneumatic Guided Cylinder Assemblies .
	Pneumatic Drive cylinder not functioning properly.	Ensure that the drive cylinder pneumatic connections are properly secured and not leaking, if leaking repair connection. Verify that cylinder guide rods are moving freely. Clean and lubricate as needed to restore smooth operation. Verify the drive cylinder is not leaking air from rod seals, if leaking repair or replace drive cylinder.
	Utility Coupler is misaligned beyond the intended specification.	Check fixture alignment and make adjustments as necessary.

Table 5.1—Troubleshooting

Symptom	Cause	Resolution
Reduced air flow to Tool function.	Object trapped between Master and Tool or between modules.	Clear object from between Master and Tool or modules.
	Master or Tool side Check port O-ring seals worn or damaged.	Inspect O-rings seals, if worn or damaged replace. Refer to Section 5.2.1—Clean, Inspect, Lubricate, Replace Components for Master Check Port and Section 5.2.2—Clean, Inspect, Lubricate, Replace Components for Tool Check Port .
	Hose or connector leaking or damage.	Inspect hoses and connectors, if damaged or leaking, repair or replace.
Unit is unlocked but Unlock signal does not read “on”.	Unlock sensor/cable is damaged.	Inspect hoses and connectors, if damaged or leaking, repair or replace.
Communications to Tool intermittent or non existent.	Object trapped between Master and Tool or between modules.	Clear object from between Master and Tool or modules. Inspect V-ring seal for damage, replace damaged seal. Refer to Section 5.2.3—V-ring Seal Replacement .
	Debris between contacts, worn or damaged contact pins.	Inspect pin blocks, refer to Section 4.3—Pin Block Inspection and Cleaning
	Cables or connector loose or damage	Inspect cables and connectors, if connectors are loose, tighten. If cables are damaged, repair or replace.
Pneumatic Cylinder is malfunctioning.	Exhaust muffler is clogged.	Check/Replace exhaust muffler; ensure clean air supply. Refer to Section 5.2.15—GK-GC-B63S50Z1 Exhaust Muffler Replacement .
	No or not enough air pressure on the pneumatic connection.	Make sure Pneumatic connection has minimum pressure, refer to Section 2.6—Pneumatic Guided Cylinder Assemblies .

5.2 Service Procedures

The following service procedures provide instructions for component replacement.

5.2.1 Clean, Inspect, Lubricate, Replace Components for Master Check Port

Parts Required: Refer to *Section 6—Serviceable Parts*

Tools required: 2.5 mm hex key, torque wrench

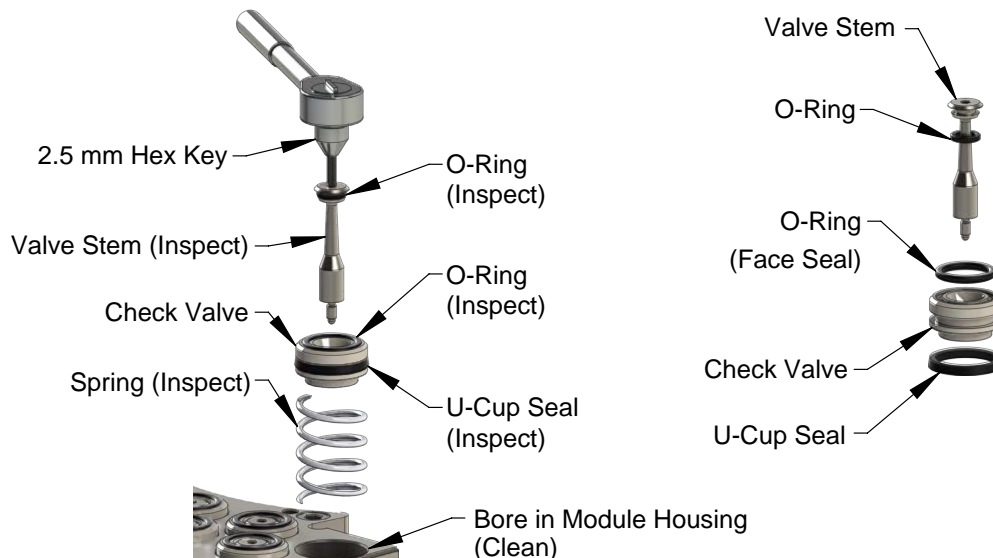
Supplies required: Clean rag, Magnalube G lubricant

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).

NOTICE: Debris can be expelled at high velocity during the purge, take all required safety precautions.

4. Purge and disconnect all customer plumbing connections to the module.
 - a. Turn the supply lines off.
 - b. Cover the valves with a rag for safety.
 - c. Manually actuate the module's self-sealing valves to purge the line pressure. Note: Debris can be expelled at high velocity during the purge, take all required safety precautions.
5. Depending on the type of service or repair, connections to the module might also need to be disconnected.
6. Remove the valve stem using a 2.5 mm hex key. Do not strip the hex on the valve stem during removal.
7. Remove the check valve piston and spring. Clean any lubrication from the check valve piston, valve stem, spring, and bore in the module housing using a clean rag.
8. Inspect the valve stem for straightness, and replace, if bent.
9. Inspect the o-rings and u-cup seal on the valve stem and check valve piston for wear and damage. Replace components that are damaged or worn.
10. Inspect the spring in the assembly and replace if damaged or worn.

Figure 5.1—Master Self-Sealing Valve



11. Lubricate the bore in the module housing with Magnalube G (Teflon/Petroleum based grease).

NOTICE: Do not lubricate the O-ring face seal until after installation. Lubricating the O-ring before installation can cause the O-ring to blow out during coupling and uncoupling.

12. If replacing seals, lubricate the valve stem O-ring and the check valve piston U-cup seal with Magnalube G (Teflon/Petroleum based grease).

13. Install the O-ring on the valve stem.

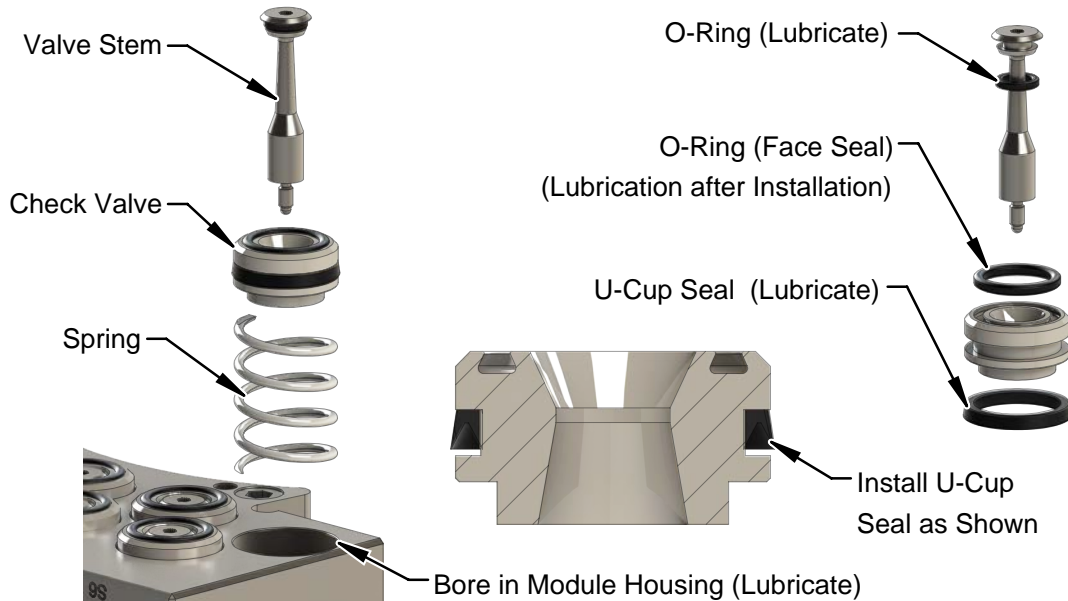
14. Install the U-cup seal on the check valve. Do not get lubrication in the face seal groove in the check valve.

15. Install the non-lubricated O-ring (face seal) into the check valve.

16. Install the spring into the bore in the module housing, seat the check valve on the spring.

17. If the threaded end of the valve stem does not have pre-applied adhesive, apply Loctite 7649 primer and then Loctite 222 or similar thread locker to the threaded end of the valve stem. If the module housing is stainless steel, also add Loctite 7649 primer to the housing threads.

Figure 5.2—Master Self-Sealing Valve Installation



18. Install the valve stem. The check valve piston must be pushed down flush with the mating surface of the Master housing in order to install the threaded end of the valve stem. Do not damage the U-cup seal around the check valve piston. A small, flat-head screwdriver can be used to ensure that the U-cup seal is fully located in the recess and not folded over itself prior to screwing in the valve stem. Tighten the stem to 10 in-lbs (1.1 Nm).

19. Lubricate the installed O-ring (face seal) with Magnalube G (Teflon/Petroleum based grease).

20. After the procedure is complete, resume normal operation.

5.2.2 Clean, Inspect, Lubricate, Replace Components for Tool Check Port

Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools required: 10 mm hex key, Torque wrench

Supplies required: Clean rag, Magnalube G lubricant

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).

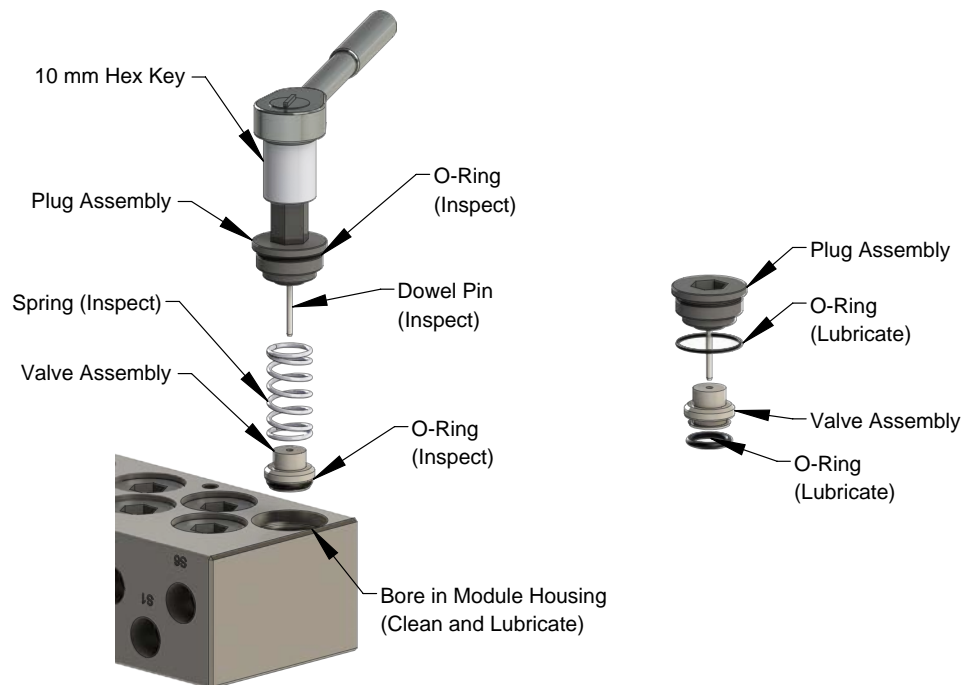
NOTICE: Debris can be expelled at high velocity during the purge, take all required safety precautions.

4. All customer plumbing connections to the module must be purged.
 - a. Verify that the supply lines are turned off.
 - b. Cover the valves with a rag for safety.
 - c. Manually actuate the self-sealing valves to purge the line pressure.
5. If required disconnect connections to the module.

NOTICE: You might need to remove the Tool side module to access the plug.

6. Remove the plug assembly from the bottom of the air module using a 10 mm hex key.
7. Remove the spring and valve assembly from the housing.

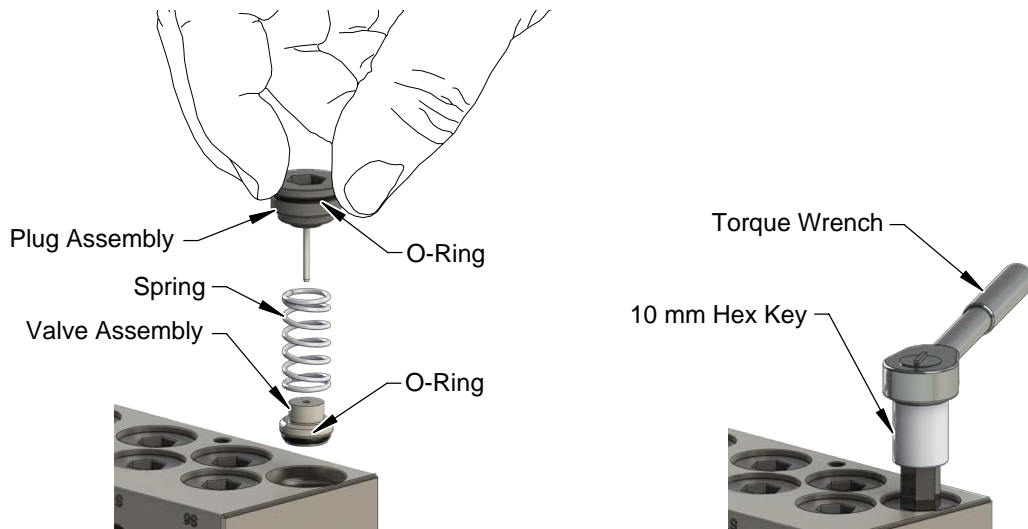
Figure 5.3—Tool Self-Sealing Valve (Disassembly)



8. Clean all lubrication from the plug assembly, valve assembly, spring, and bore in the housing using a clean rag.
9. Inspect the dowel pin that is contained in the plug assembly for straightness. Replace the plug assembly if the dowel pin is bent.
10. Inspect the O-rings on the plug and valve assemblies, replace if worn or damaged.
11. Inspect the spring in the assembly and replace if worn or damaged.

12. If replacing the O-rings, lubricate both new O-rings with Magnalube G (Teflon/Petroleum based grease).
13. Install the O-rings on the plug assembly and the valve assembly.

Figure 5.4—Tool Self-Sealing Valve (Assembly)



14. Install the check valve piston, make sure it is seated properly in the housing.
15. Install the spring into the housing, make sure it is installed over the step on the check valve.



CAUTION: Do not use excess force when installing the plug assembly into the housing. Using excessive force can damage the O-ring and strip the threads on the plug assembly. Thread the plug assembly into the Tool housing by hand, until several threads are engaged into the housing. Then use a 10 mm hex key to complete the installation. Torque the plug to 30 in-lbs (3.39 Nm).

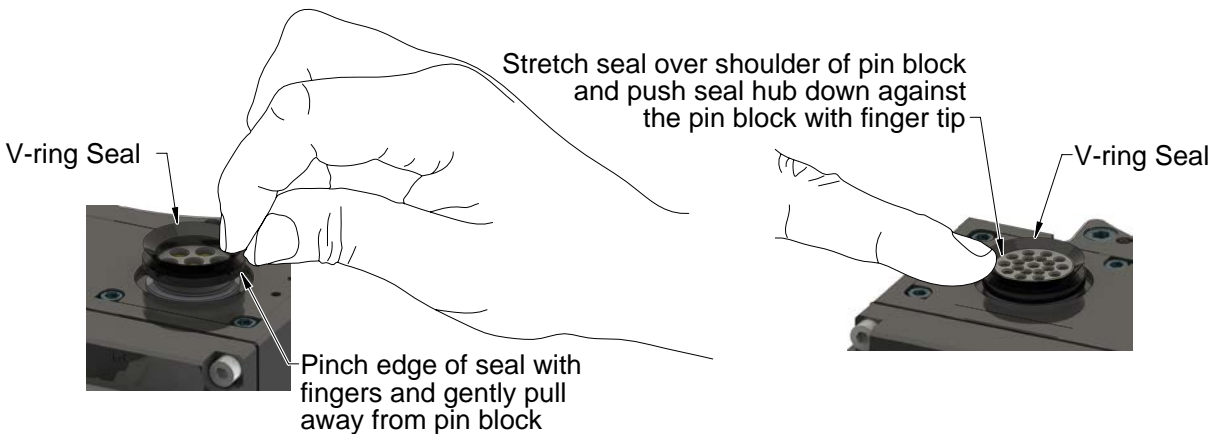
16. Carefully install the plug assembly aligning the dowel pin into the check valve piston. Thread the plug assembly into the housing by hand until several threads are engaged in the housing.
17. Tighten the plug assembly using a 10 mm hex key to 30 in-lbs (3.39 Nm).
18. Verify the check valve piston is seated properly in the housing.
19. Safely resume normal operation.

5.2.3 V-ring Seal Replacement

The seal protects the electrical connection between the Master and Tool module. Replace the seal if it becomes worn or damaged.

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. To remove the existing seal, pinch the edge of the seal and pull the seal away from the pin block on the Master module.
5. To install a new seal, stretch the new seal over the shoulder of the pin block.
6. Push the seal hub down against the pin block.
7. Safely resume normal operation.

Figure 5.5—V-ring Seal Replacement



5.2.4 Tool Presence Sensor Replacement for GK Units

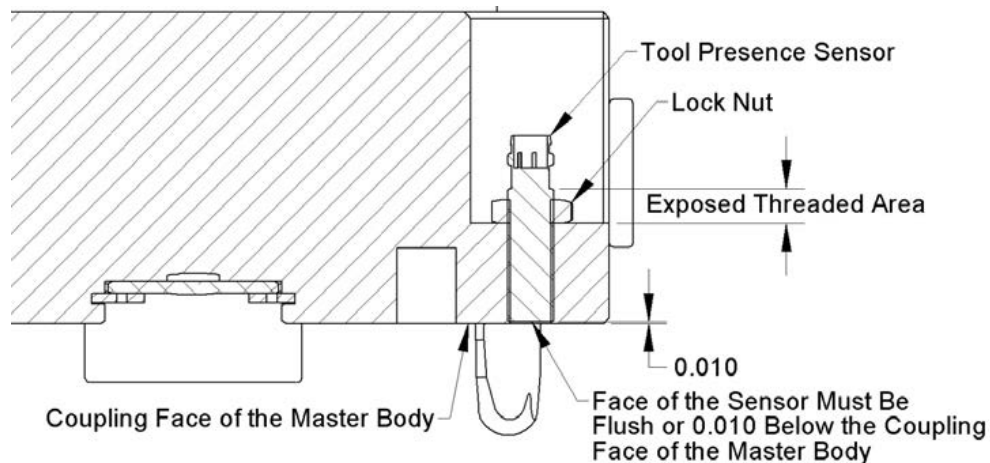
Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 1/2" socket wrench, Torque wrench

Supplies Required: Loctite 222

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Disconnect the sensor cable, loosening the lock nut using a 1/2" socket wrench, and unscrewing the sensor from the body.
4. Check to be sure the female threads on the housing are free and clear of debris, then thread a new sensor into the Tool presence mounting holes until the face of the sensor is flush or 0.010" below flush with the coupling face of the Master assembly.
5. Apply Loctite 222 to the exposed threaded area of the sensor where the lock nut will seat (only this area).
6. Screw the lock nut onto the sensor until it is snug to the Master body using a 1/2" socket wrench. Tighten to 20 in-lbs (2.26 Nm).
7. Connect the sensor cable.
8. If repairs are complete, return circuits to normal operation.

Figure 5.6—Tool Presence Sensor Replacement (GL5CM Shown)



5.2.5 GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement

Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 6 mm hex key, Torque wrench

Supplies Required: Loctite 7649 and 242, Magnalube G lubricant, Clean rag

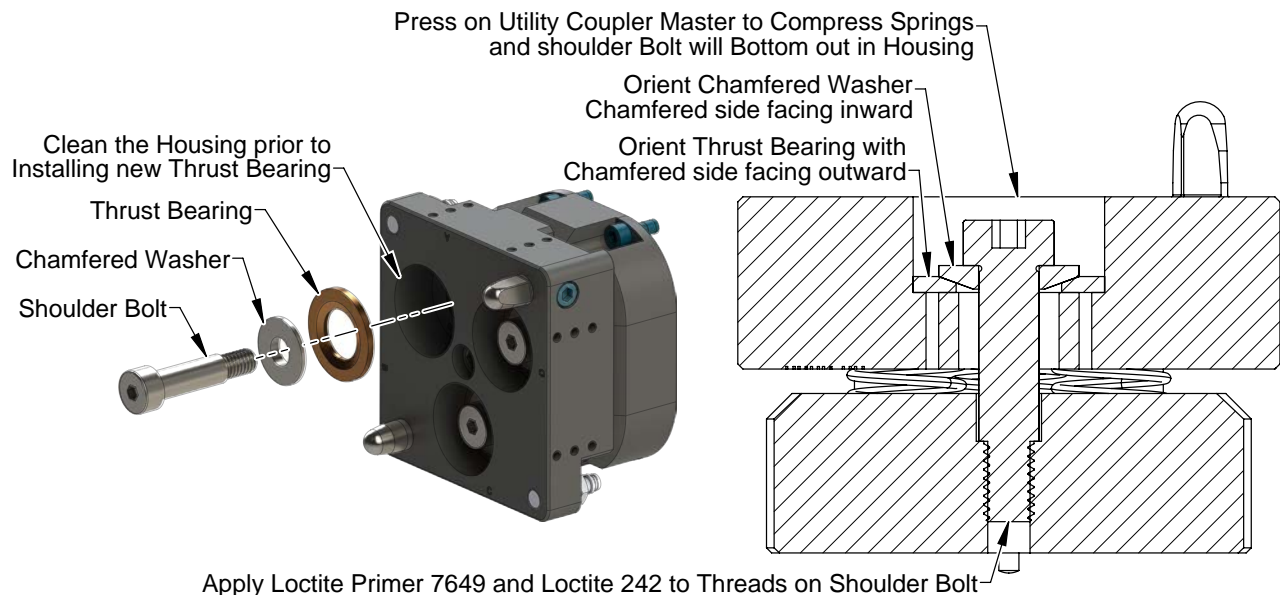
Remove

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Press on Utility Coupler Master to compress the springs and release the pressure on the thrust bearing, chamfered washer and shoulder bolt.
4. Remove the M12 shoulder bolt using a 6 mm hex key wrench.
5. Remove the chamfered washer and thrust bearing. Note: To remove the thrust bearing may require the use of a flat head screw driver (or similar) to push bearing out from the back side.
6. Clean the housing with a rag to remove grease and debris.

Install

7. Apply Loctite Primer 7649 to the threads of the shoulder bolt.
8. Insert the new thrust bearing with the chamfered side facing outward.
9. Apply MobilGrease XHP222 Special grease the chamfered edges of the thrust bearing and the new chamfered washer.
10. Insert the new chamfered washer with the chamfer facing inward.
11. Apply Loctite 242 to the threads of the new shoulder bolt.
12. Press on Utility Coupler Master to compress the springs so that the shoulder bolt will bottom out in the housing and leave the thrust bearing and chamfered washer loose.

Figure 5.7—GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement



13. Insert the new shoulder bolt and tighten the new shoulder bolt using 6 mm hex key wrench to 250 in-lbs (28.25 Nm).
14. If repairs are complete, return circuits to normal operation.

5.2.6 GK2CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement

Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 6 mm hex key, Torque wrench

Supplies Required: Loctite 7649 and 242, Magnalube G lubricant, Clean rag

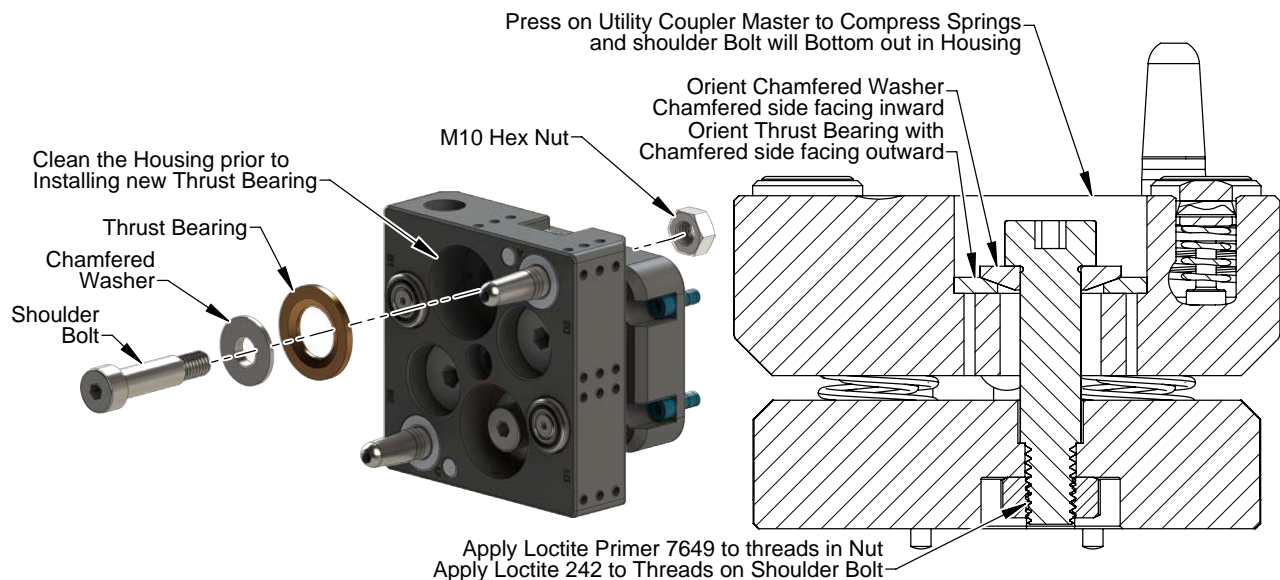
Remove

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Press on Utility Coupler Master to compress the springs and release the pressure on the thrust bearing, chamfered washer and shoulder bolt.
4. Remove the M12 shoulder bolt and M10 hex nut using a 6 mm hex key wrench.
5. Remove the chamfered washer and thrust bearing. Note: To remove the thrust bearing may require the use of a flat head screw driver (or similar) to push bearing out from the back side.
6. Clean the housing with a rag to remove grease and debris.

Install

7. Apply Loctite Primer 7649 to the threads on the new shoulder bolt.
8. Insert the new thrust bearing with the chamfered side facing outward.
9. Apply MobilGrease XHP222 Special grease the chamfered edges of the thrust bearing and the new chamfered washer.
10. Insert the new chamfered washer with the chamfer facing inward.
11. Apply Loctite 242 to the threads of new shoulder bolt.
12. Press on Utility Coupler Master to compress the springs so that the shoulder bolt will bottom out in the housing and leave the thrust bearing and chamfered washer loose.

Figure 5.8—GK2CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement



13. Insert the new shoulder bolt and tighten the new shoulder bolt and hex nut, using 6 mm hex key wrench to 250 in-lbs (28.25 Nm).
14. If repairs are complete, return circuits to normal operation.

5.2.7 GK1CM Compliance Spring Replacement for Utility Coupler (Preferred Method)

This method is preferred for a dirty or gritty environment. The fine threads of the compliant preload pusher can get filled with dirt and grit and be damaged when removing or installing the compliance springs. If the environment is free from debris or grit, use the alternative method. Refer to [Section 5.2.8—GK1CM Compliance Spring Replacement for Utility Coupler \(Alternate Method\)](#).

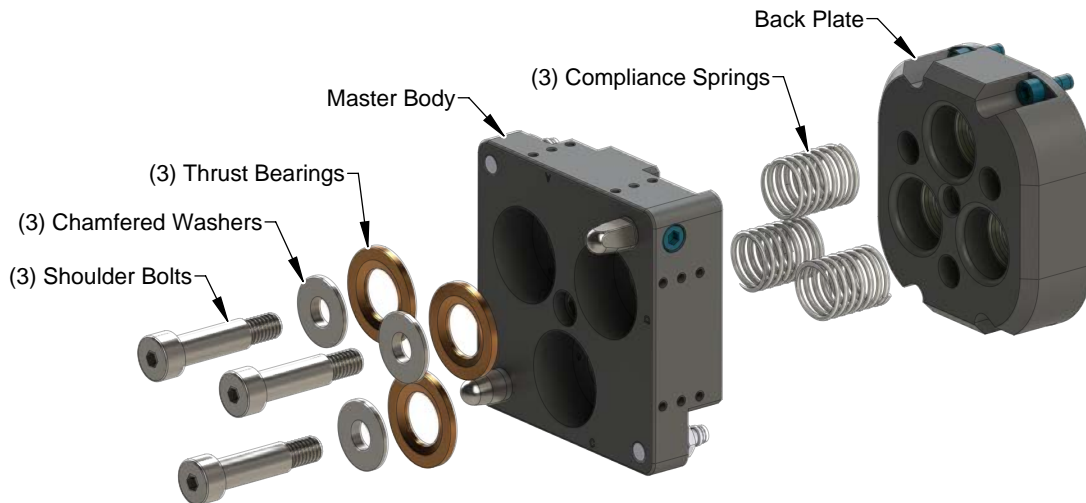
Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 6 mm hex key, Torque wrench

Supplies Required: Loctite 7649 and 242, Magnalube G lubricant, Compressed air, Clean rag

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Remove Utility Coupler Master from drive cylinder refer to [Section 2.2—Utility Coupler Master Removal](#).
4. Clear dust and debris out of spring compliance area by blowing with compressed air in the gap between the interface plate and the Utility Coupler body.
5. Remove the (3) shoulder bolts, thrust washers, and chamfered washers, refer to [Section 5.2.5—GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement \(Remove\)](#).
6. Lift off the Master body to expose the compression springs.

Figure 5.9—GK1CM Compliance Springs Replacement (Preferred Method)



7. Replace compression springs as necessary. Note: If an individual compression spring is worn out or broken it is recommended that all compression spring be replaced.
8. Place the Master body on the compliance interface plate, making sure the compression springs are in the proper recesses in the back of the Master body.
9. Replace the (3) shoulder bolts, thrust washers, and chamfered washers, refer to [Section 5.2.5—GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement \(Install\)](#).
10. Install the Utility Coupler Master to the drive cylinder refer to [Section 2.1—Utility Coupler Master Installation](#).
11. If repairs are complete, return circuits to normal operation.

5.2.8 GK1CM Compliance Spring Replacement for Utility Coupler (Alternate Method)

The alternative method can be used for environments that are free of dirt and grit. The fine threads of the compliant preload pusher can get filled with dirt and grit and be damaged when removing or installing the compliance springs. If environment is dirty or gritty use the preferred method, refer to [Section 5.2.7—GK1CM Compliance Spring Replacement for Utility Coupler \(Preferred Method\)](#).

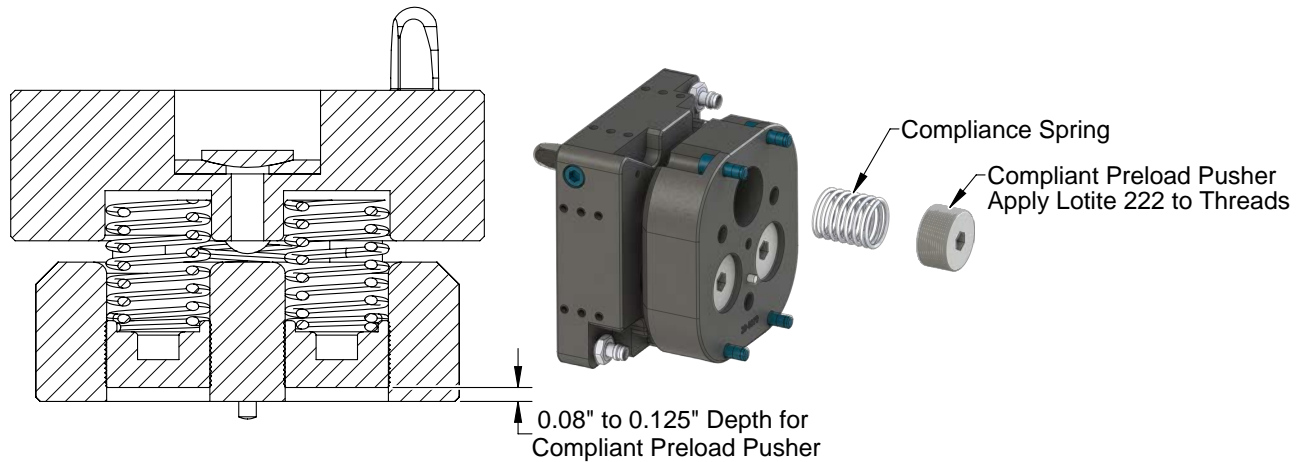
Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 5/16" hex key

Supplies Required: Loctite 222, Compressed air, Clean rag

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Remove Utility Coupler Master from drive cylinder refer to [Section 2.2—Utility Coupler Master Removal](#).
4. Clear dust and debris out of spring compliance area by blowing with compressed air in the gap between the interface plate and the Utility Coupler body.

Figure 5.10—GK1CM Compliance Springs Replacement (Alternative Method)



5. Using a 5/16" hex key wrench, remove the compliant preload pusher from the interface plate.
6. Remove the (2) compression springs.
7. Insert (2) new compression springs.
8. Apply Loctite 222 to the threads of the new compliant preload pusher.
9. Using a 5/16" hex key wrench, tighten the compliant preload pusher until it is 0.08" to 0.125" below the face of the interface plate.
10. Install the Utility Coupler Master to the drive cylinder refer to [Section 2.1—Utility Coupler Master Installation](#).
11. If repairs are complete, return circuits to normal operation.

5.2.9 GK2CM Compliance Spring Replacement for Utility Coupler (Preferred Method)

This method is preferred for a dirty or gritty environment. The fine threads of the compliant preload pusher can get filled with dirt and grit and be damaged when removing or installing the compliance springs. If the environment is free from debris or grit, use the alternative method. Refer to [Section 5.2.10—GK2CM Compliance Spring Replacement for Utility Coupler \(Alternate Method\)](#).

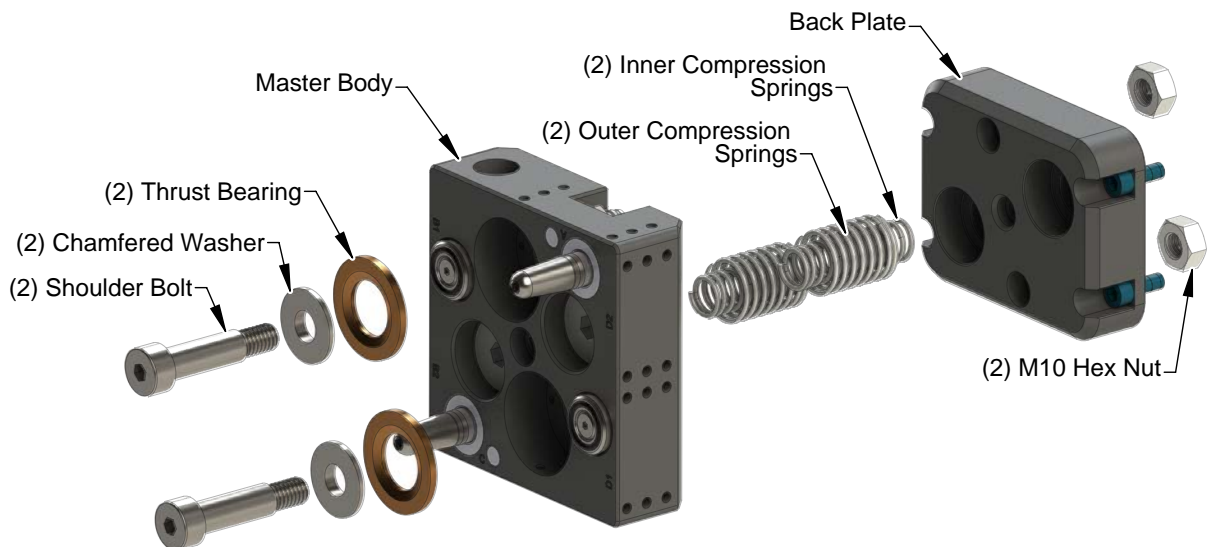
Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 6 mm hex key, Torque wrench

Supplies Required: Loctite 7649 and 242, Magnalube G lubricant, Compressed air, Clean rag

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Remove Utility Coupler Master from drive cylinder refer to [Section 2.2—Utility Coupler Master Removal](#).
4. Clear dust and debris out of spring compliance area by blowing with compressed air in the gap between the interface plate and the Utility Coupler body.
5. Remove the (3) shoulder bolts, thrust washers, and chamfered washers, refer to [Section 5.2.5—GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement](#) (Remove).
6. Lift off the Master body to expose the compression springs.

Figure 5.11—GK2CM Compliance Springs Replacement (Preferred Method)



7. Replace compression springs as necessary. Note: If an individual compression spring is worn out or broken it is recommended that all compression spring be replaced.
8. Place the Master body on the compliance interface plate, making sure the compression springs are in the proper recesses in the back of the Master body.
9. Replace the (3) shoulder bolts, thrust washers, and chamfered washers, refer to [Section 5.2.5—GK1CM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement](#) (Install).
10. Install the Utility Coupler Master to the drive cylinder refer to [Section 2.1—Utility Coupler Master Installation](#).
11. If repairs are complete, return circuits to normal operation.

5.2.10 GK2CM Compliance Spring Replacement for Utility Coupler (Alternate Method)

The alternative method can be used for environments that are free of dirt and grit. The fine threads of the compliant preload pusher can get filled with dirt and grit and be damaged when removing or installing the compliance springs. If environment is dirty or gritty use the preferred method, refer to [Section 5.2.9—GK2CM Compliance Spring Replacement for Utility Coupler \(Preferred Method\)](#).

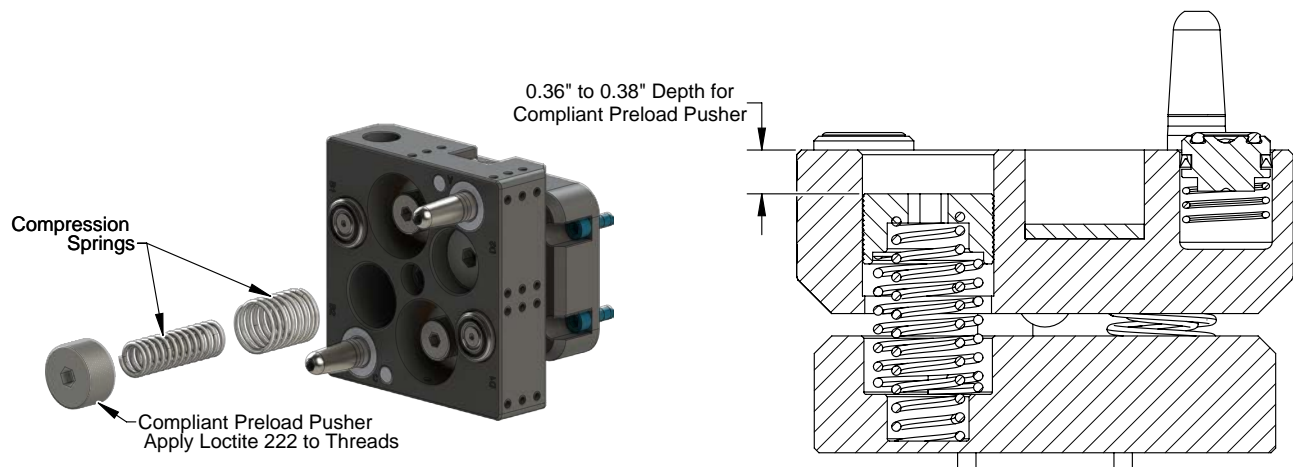
Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 5/16" hex key

Supplies Required: Loctite 222, Compressed air, Clean rag

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Clear dust and debris out of spring compliance area by blowing with compressed air in the gap between the interface plate and the Utility Coupler body.

Figure 5.12—GK2CM Compliance Springs Replacement (Alternative Method)



4. Using a 5/16" hex key wrench, remove the compliant preload pusher from the interface plate.
5. Remove the (2) compression springs.
6. Insert (2) new compression springs.
7. Apply Loctite 222 to the threads of the new compliant preload pusher.
8. Using a 5/16" hex key wrench, tighten the compliant preload pusher until it is 0.36" to 0.38" below the face of the interface plate.
9. If repairs are complete, return circuits to normal operation.

5.2.11 Center Swivel Replacement for Utility Coupler

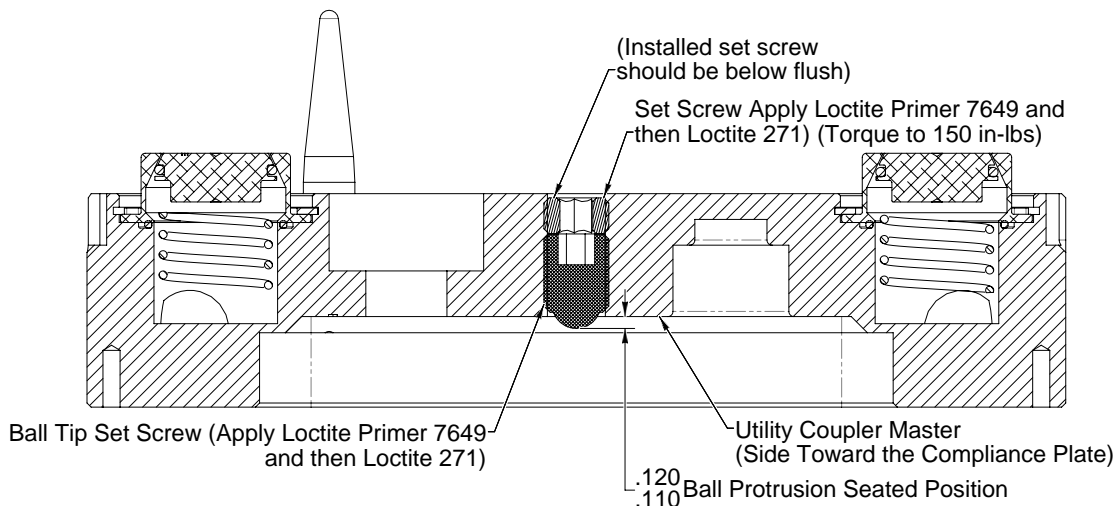
Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools Required: 6 mm hex key, 8 mm hex key wrench, Torque wrench

Supplies Required: Loctite 7649, 242, and 271, Magnalube G lubricant, Compressed air, Clean rag

1. Uncouple the Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Remove Utility Coupler Master from drive cylinder refer to [Section 2.2—Utility Coupler Master Removal](#).
4. Clear dust and debris out of spring compliance area by blowing with compressed air in the gap between the interface plate and the Utility Coupler body, refer to [Section 4.4—Clear Dust and Debris from Compliance Springs Area](#).
5. Remove the (3) shoulder bolts, thrust washers, and chamfered washers, refer to [Section 5.2.5—GKICM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement](#) (Remove).
6. Lift off the Master body to expose the center pivot.
7. Using a 8 mm hex key wrench, remove the set screw and ball tip set screw.

Figure 5.13—Position the Center Swivel



8. Apply Loctite Primer 7649 and then Loctite 271 to the threads of the new ball tip set screw.
9. Using a 8 mm hex key wrench, install the new ball tip set screw. Position the ball tip set screw so that the ball tip protrudes between .110" and .120" from the surface of the Utility Coupler body.
10. Allow 5 minutes for the Loctite to dry before proceeding to the next step.
11. Apply Loctite Primer 7649 and then Loctite 271 to the threads of the set screw.
12. Using a 8 mm hex key wrench, install the set screw. Tighten to 150 in-lbs (16.95 Nm).
13. Place the Master body on the compliance interface plate, making sure the compression springs are in the proper recesses in the back of the Master body.
14. Replace the (3) shoulder bolts, thrust washers, and chamfered washers, refer to [Section 5.2.5—GKICM Thrust Bearing, Chamfered Washer, and Shoulder Bolt Replacement](#) (Install).
15. Install the Utility Coupler Master to the drive cylinder refer to [Section 2.1—Utility Coupler Master Installation](#).
16. If repairs are complete, return circuits to normal operation.

5.2.12 GK1CM Alignment Pin Replacement

Parts Required: Refer to [Section 6—Serviceable Parts](#)

Tools required: 5 mm hex, Torque wrench

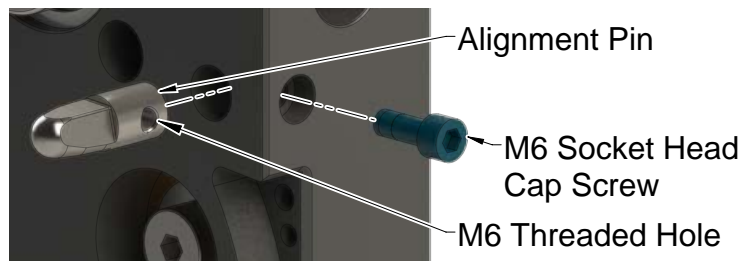
Supplies required: Magnalube G lubricant

1. Uncouple the Utility Coupler and space to allow clear access to the Master and Tool.
2. Turn off all energized circuits (e.g., electrical, air, water, etc.)
3. Remove the M6 socket head cap screw using a 5 mm hex key wrench.
4. Remove the alignment pin from the housing.

NOTICE: If the alignment pin is difficult to remove, it can be knocked out using a 0.1" diameter pin from the back side of the housing.

5. Insert the new alignment pin into the housing, align the tapped hole in the pin with the M6 screw hole in the housing.

Figure 5.14—GK1CM Alignment Pin Replacement



6. Secure the alignment pin with the M6 socket head cap screw using a 5 mm hex key wrench, and tighten to 140 in-lbs (15.82 Nm).
7. Apply MobilGrease XHP222 Special grease to the alignment pin.
8. If repairs are complete, return circuits to normal operation.

5.2.13 GK2CM Alignment Pin Replacement

Refer to [Figure 5.15](#) and [Figure 5.16](#)

Parts required: Refer to [Section 2.1—Utility Coupler Master Installation](#)

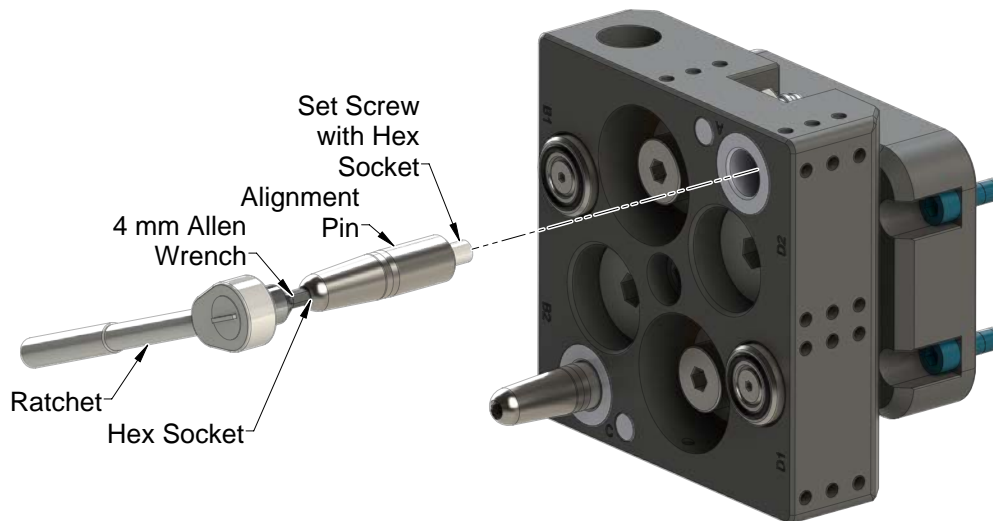
Tools required: 3 mm, 4 mm, and 5 mm hex key, torque wrench

Supplies required: Clean rag, MobilGrease XHP222, Loctite 242

1. Place the Tool safely in the tool stand. Uncouple the Tool Changer to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Unscrew the alignment pin assembly from the Master plate using a 4 mm hex key wrench. If alignment was remove, verify that the assembly (pin and set screw) are intact. If the set screw portion of the assembly did not come out, it will be necessary to remove it separately using the access hole in the back plate of the Master plate go to step 4. If the alignment pin and set screw were removed, go to step 6. If alignment pin cannot be removed using the hex key wrench in the tip, go to step 4.

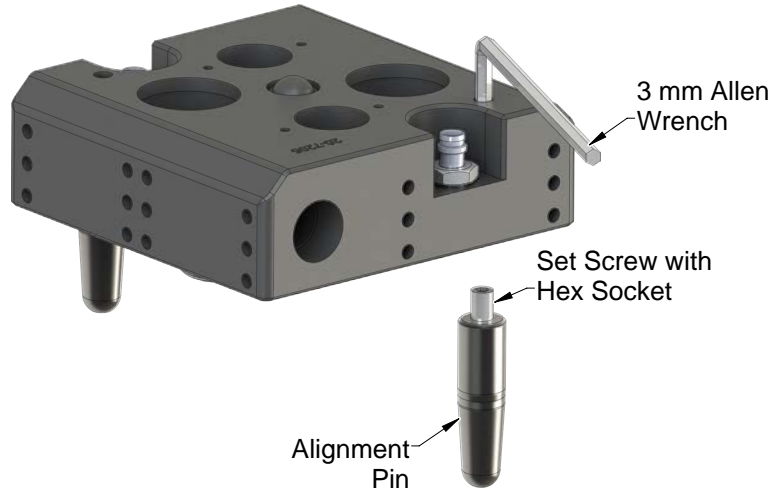
NOTICE: If for any reason the pin cannot be removed using the hex key wrench in the tip, it may be necessary to remove it by other means, such as locking pliers.

Figure 5.15—GK2CM Alignment Pin Replacement



- Another approach would be to use the access hole in the back side of the Master plate. If not already removed, remove the Master plate refer to [Section 2.2—Utility Coupler Master Removal](#). Use a 3 mm hex key wrench to remove the alignment pin from the back side of the Master plate. Refer to [Figure 5.16](#)).

Figure 5.16—GK2CM Alignment Pin Replacement Alternate Method



- Once the alignment pin has been removed, install the Master plate, refer to [Section 2.1—Utility Coupler Master Installation](#).
- Apply Loctite 242 and install the alignment pin assembly into the bushing on the Tool Changer. Tighten to 60 in-lbs (6.8 Nm).
- Apply MobilGrease XHP222 Special grease to the alignment pin (see [Section 4.2—Clean, Inspect, and Lubricate Thrust Bearings for Utility Couplers](#)).
- If repairs are complete, return circuits to normal operation.

5.2.14 GK-GC-B63S50Z1 Return Spring Replacement

NOTICE: It is recommended that both return springs be replaced at the same time.

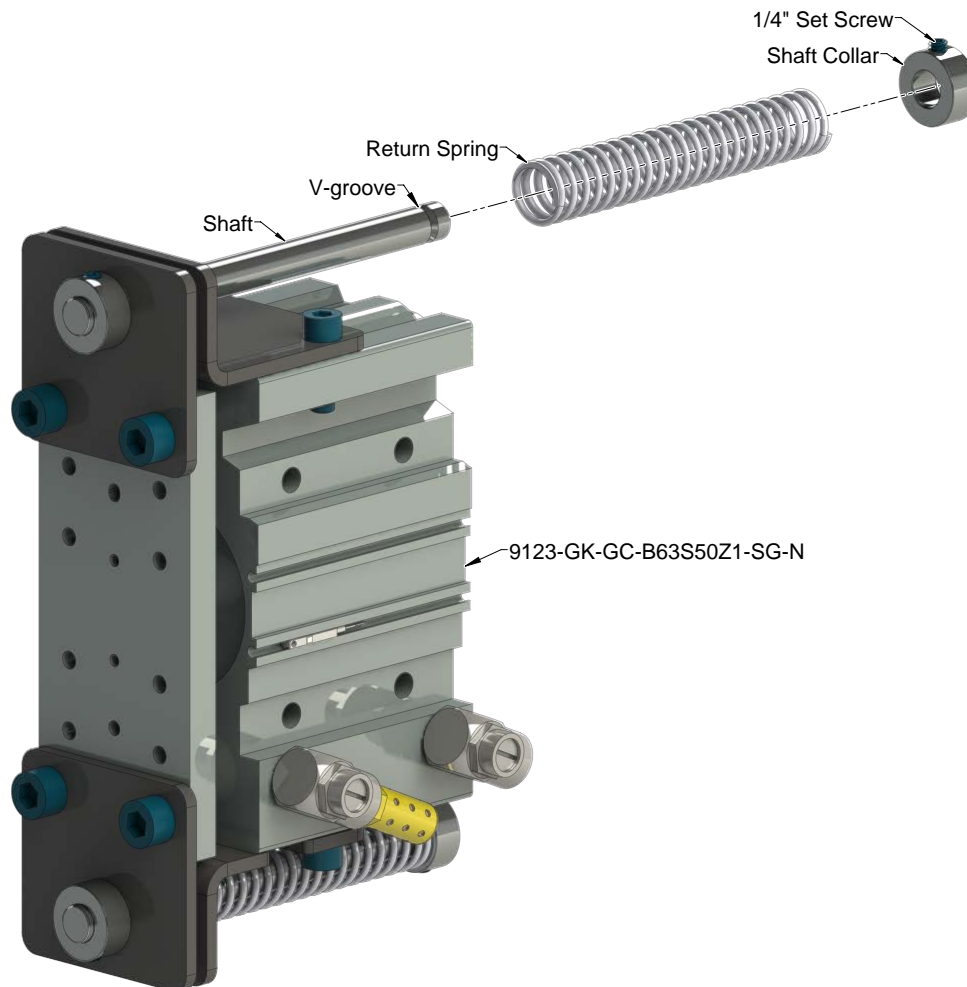
Refer to [Figure 5.17](#)

Parts required: Refer to [Section 6—Serviceable Parts](#)

Tools required: 1/8" hex key, torque wrench

1. Ensure that the cylinder is in the full retracted state.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Using a 1/8" hex key wrench, loosen the 1/4" set screw in the shaft collar toward the rear of the cylinder.
4. Slide the shaft collar off the shaft.
5. Remove the return spring.
6. Install the new return spring onto the shaft.
7. Install the shaft collar onto the shaft and using a 1/8" hex key wrench, tighten the set screw. Ensure the cone point of the set screw is seated in the V-groove on the shaft. Tighten set screw to 25 in-lbs (2.82 Nm).
8. If repairs are complete, return circuits to normal operation.

Figure 5.17—Return Spring Replacement



5.2.15 GK-GC-B63S50Z1 Exhaust Muffler Replacement

The exhaust muffler allows air from the Tool Changer or Utility Coupler locking mechanism to be exhausted to the atmosphere, if the muffler is clogged it may affect the ability to Latch and Unlatch the customer tooling. Remove and check to make sure the exhaust muffler is not clogged.

Parts required: Refer to [Section 6—Serviceable Parts](#)

Tools required: 9/16" wrench

Supplies required: Loctite 569

1. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
2. Remove the exhaust muffler using a 9/16" wrench, blow through the muffler. If it is difficult to blow or you can not blow through it at all replace the exhaust muffler. Discard the exhaust muffler.
3. Apply Loctite 569 to the threads of the new exhaust muffler.
4. Thread the new exhaust muffler into the fitting. Tighten to contact plus a half turn using a 9/16" wrench.

Figure 5.18—Exhaust Muffler Replacement



5. After repair is complete, return all circuits to normal operation (e.g. electrical, air, water, etc.).

6. Serviceable Parts

6.1 GK1 Compliant Utility Coupler Master (9123-GK1CM-0-0-0-0)

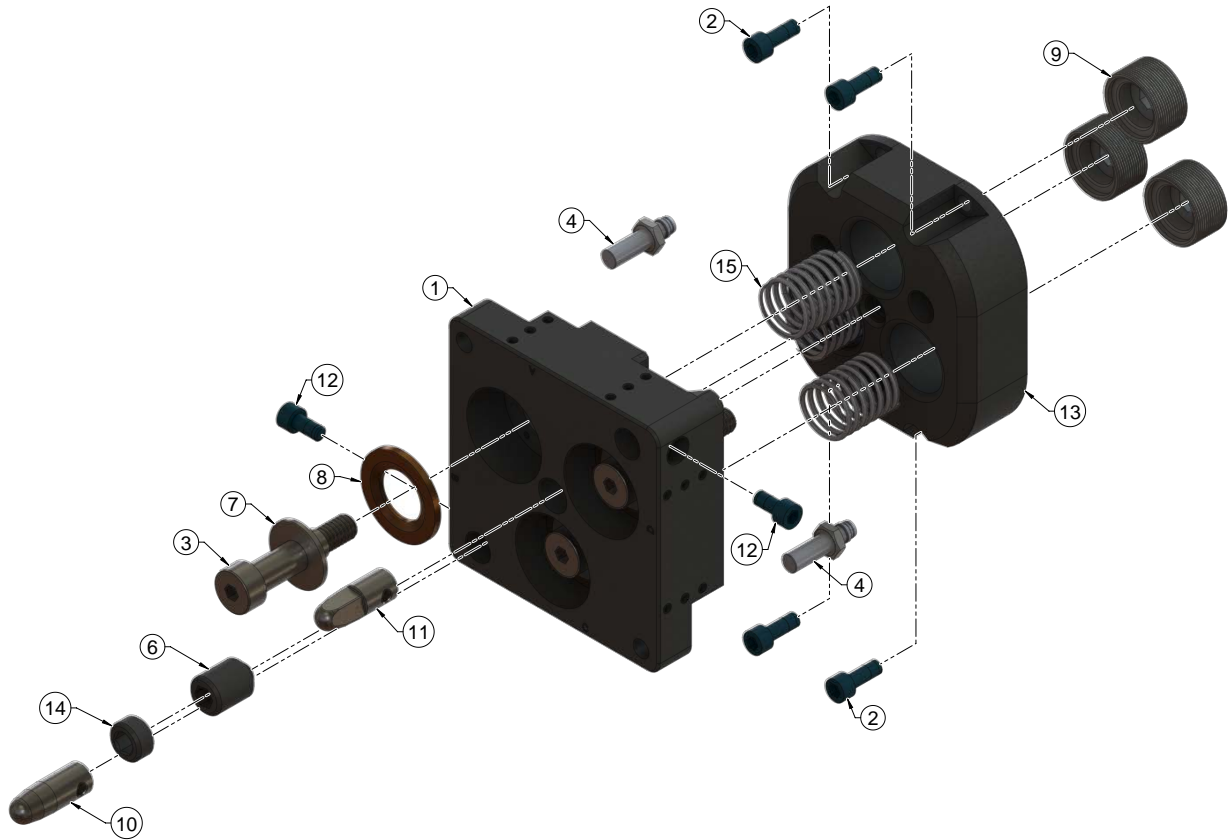


Figure 6.1—Master Plate

Item No.	Qty	Part Number	Description
1	1	9123-GK1CM-0-0-0-0	GK1 Compliance Utility Coupler Base Assembly
2	4	3500-1066016-15A	M6 x 16 mm socket head cap screws Blue Dyed Magni ND Microspheres
3	3	3500-2070035-11	SHCS Shoulder M12 x 35 Shoulder M10 Thread
5	3	3610-2520001-11	Steel Spring 15/16" OD, 2" Long 15.54Rate
6	1	3690-6600900-10	Rolling Ball Tip Set Screw, M16-2.0 x 23.3 mm long, Black Oxide Steel
7	3	3700-20-4675	Custom Chamfered Washer
8	3	3700-20-4676	Custom SAE 841 Bronze Thrust Bearing
9	3	3700-20-4716	Compliant IP Preload Pusher
10	1	3700-20-4875	1/2" Dia. Utility Coupler Alignment Pin 4 mm Taper, Short Diamond
11	1	3700-20-4876	1/2" Dia. Utility Coupler Alignment Pin 4 mm Taper, Short, Round
12	2	3500-1066012-15A	M6 x 12 mm socket head cap screws Blue Dyed Magni ND Microspheres
13	1	3700-20-6070	G4 Master Back Plate
14	1	3700-20-8254	M16-2.0 x 9 mm Set Screw, Hollow Hex
9123-GK1CM-0-0-0-0-SE			
4	2	8590-9909999-120	NPN Proximity Sensor
9123-GK1CM-0-0-0-0-SG			
4	2	8590-9909999-34	PNP Proximity Sensor

6.2 GK2 Compliant Utility Coupler Master (9123-GK2CM-0-00-0-00-N/E/R)

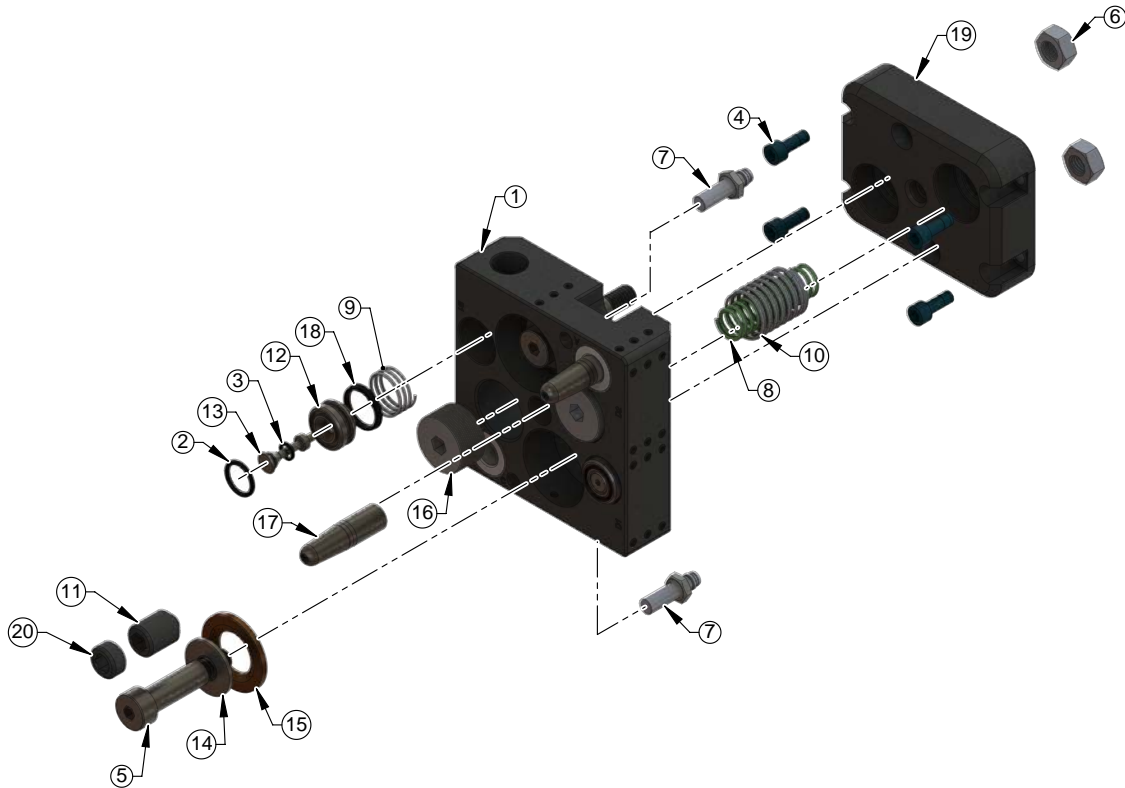


Figure 6.2—Master Plate

Item No.	Qty	Part Number	Description
1	1	9123-GK2CM-0-00-0-00-N	GK2 Compliant Utility Coupler Base Assembly, (2) 3/8 NPT Checked Air Ports
	1	9123-GK2CM-0-00-0-00-E	GK2 Compliant Utility Coupler Base Assembly, (2) G 3/8 BSPP Checked Air Ports
	1	9123-GK2CM-0-00-0-00-R	GK2 Compliant Utility Coupler Base Assembly, (2) Rc 3/8 BSPT Checked Air Ports
2	2	3410-0001065-01	O-Ring 14 mm X 2 mm Buna
3	2	3410-0001183-01	O-Ring 6 mm X 2 mm Buna D90
4	4	3500-1066016-15A	M6 x 16 mm socket head cap screws Blue Dyed Magni ND Microspheres
5	2	3500-2070035-11	SHCS Shoulder M12 x 35 Shoulder M10 Thread
6	2	3505-0870001-12	Hex Nut M10x1.5, 8 mm Tall 17 mm Wide Zinc Plated Steel
8	2	3610-1725001-10	Steel Compression Spring 2-1/2" L, 5/8" OD,.080" Wire
9	2	3610-1907501-21	SS SPRING 7/8 OD
10	2	3610-2520001-11	Steel Spring 15/16" OD, 2" Long 15.54Rate
11	1	3690-6600900-10	Rolling Ball Tip Set Screw, M16-2.0 x 23.3 mm long, Black Oxide Steel
12	2	3700-20-2994	Master Check Valve Piston, FA44
13	2	3700-20-3488	Valve Stem
14	2	3700-20-4675	Custom Chamfered Washer
15	2	3700-20-4676	Custom SAE 841 Bronze Thrust Bearing
16	2	3700-20-4716	Compliant IP Preload Pusher
17	2	9005-20-2241	1/2" Two Piece Pin Assembly
18	2	3410-0001068-01	Mini U-Cup Seal 18 mm ID x 22 mm Buna

Figure 6.2—Master Plate			
Item No.	Qty	Part Number	Description
19	1	3700-20-7206	G4D Master Mount Plate
20	1	3700-20-8254	M16-2.0 x 9 mm Set Screw, Hollow Hex
9123-GK2CM-0-00-0-00-SG			
7	2	8590-9909999-120	NPN Proximity Sensors
9123-GK2CM-0-00-0-00-SE			
7	2	8590-9909999-34	PNP Proximity Sensors

6.3 GK1 Compliant Utility Coupler Tool 9123-GK1T-0-0-0-0

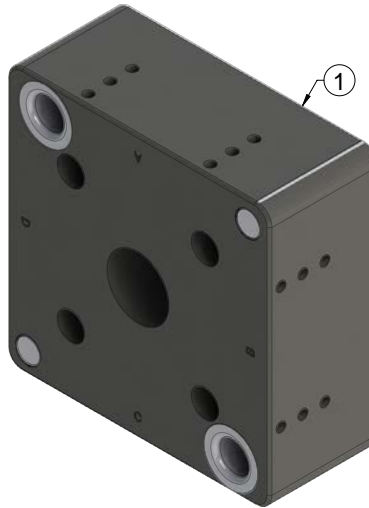


Figure 6.3—Tool Plate

Item No.	Qty	Part Number	Description
1	1	9123-GK1T-0-0-0-0	GK1 Utility Coupler Tool Base Assembly

6.4 GK2 Compliant Utility Coupler Tool 9123-GK2T-0-00-0-00-N/E/R

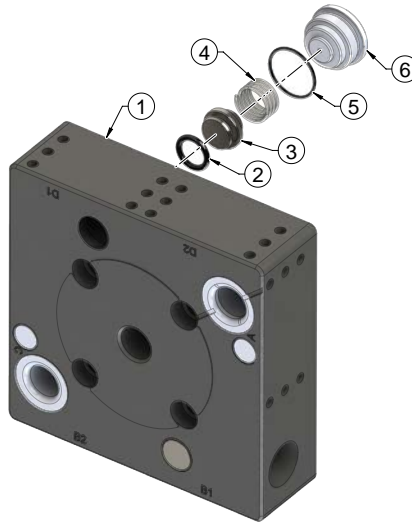


Figure 6.4—Tool Plate

Item No.	Qty	Part Number	Description
1	1	9123-GK2T-0-00-0-00-N	GK2 Utility Coupler Tool with (2) Integrated checked 3/8 NPT Air Ports
	1	9123-GK2T-0-00-0-00-E	GK2 Utility Coupler Tool with (2) Integrated checked G 3/8 BSPP Air Ports
	1	9123-GK2T-0-00-0-00-R	GK2 Utility Coupler Tool with (2) Integrated checked Rc 3/8 BSPP Air Ports
2	2	3410-0001067-01	O-Ring 10 x 2.0 mm Buna-N D90
3	2	3700-20-2303	Check Valve
4	2	3610-6401501-21	SS Spring 14 mm O.D, 13.5#/in

Figure 6.4—Tool Plate

Item No.	Qty	Part Number	Description
5	2	3410-0001284-01	O-Ring .669 ID x .047, 70 Durometer Buna-N
6	2	3700-20-3288	Plug, Tool, Plastic (Threaded Modules)

6.5 Models 9123-GK-GC-B63S50Z1-SG-N

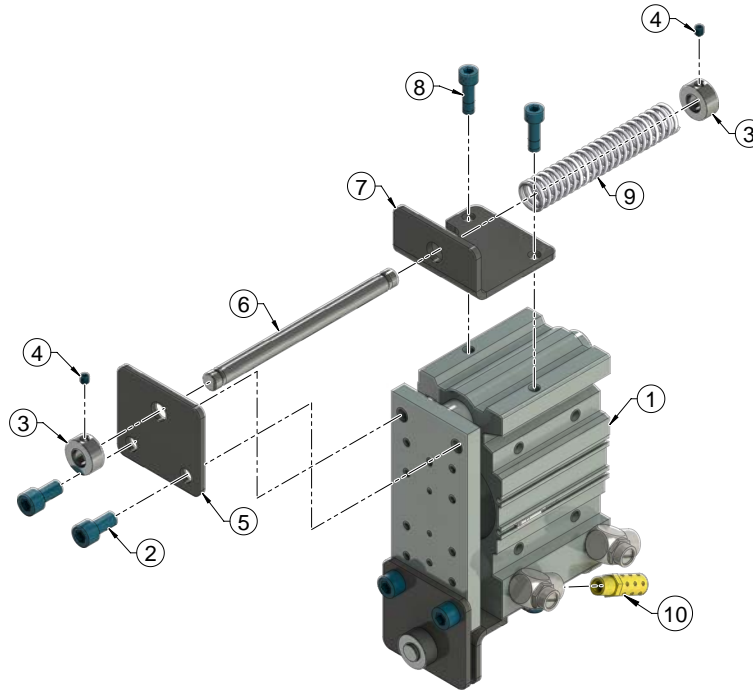


Figure 6.5—Guided Cylinder

Item No.	Qty	Part Number	Description
1	1	9123-GK-GC-B63S50Z1-SG-N	GK Guided Cylinder Assembly, 63 mm Bore, 50 mm Stroke, PNP Sensor to Detect Retract, Custom Spring-Return
2	4	3500-1070020-15	M10 x 20 mm socket head cap screws, Blue Dyed Magni-565
3	4	3690-1604401-10	Shaft Collar, 1" OD x 1/2" ID x 7/16" W, 1/4"-20 Set Screw, Steel, Zinc Plated
4	4	3500-1924031-13	Set Screw 1/4"-20 x 5/16" Alloy Steel, Cone Point
5	2	3700-20-9679	Straight Bracket, Spring-Return GK2 Drive Cylinder
6	2	3690-1666001-10	1/2" Shaft, 6.6" Length, Steel, Hard Chrome, Case Hardened, V-Groove Both Ends
7	2	3700-20-9680	Angle Bracket, Spring-Return GK2 Drive Cylinder
8	4	3500-1068025-15A	M8 x 25 mm socket head cap screws, Blue Dyed Magni-565 w/ ND Microspheres Epoxy
9	2	3610-1956301-10	Compression Spring, .875" OD, 5.63" Free Length, 16 lb/in, Steel, Zn
10	1	3490-1010004-00	MUFFLER, 1/4NPT, H-FLOW

6.6 Models 9123-GK-GC-B50S75-SG-N, 9123-GK-GC-B63S75-SG-N

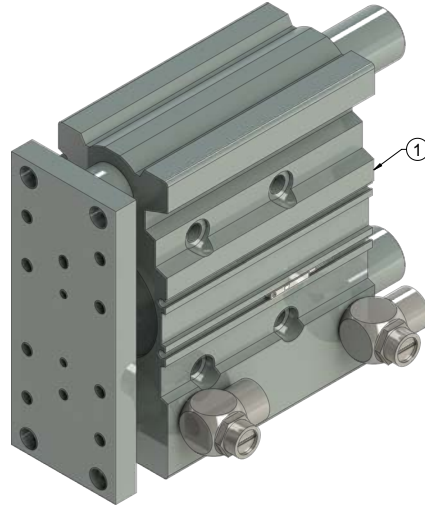


Figure 6.6—Guided Cylinder

Item No.	Qty	Part Number	Description
1	1	9123-GK-GC-B50S75-SG-N	GK Guided Cylinder Assembly, 50 mm Bore, 75 mm Stroke, PNP Sensor to Detect Retract
		9123-GK-GC-B63S75-SG-N	GK Guided Cylinder, Pneumatic, NPT, 63 mm Bore, 75 mm Stroke, PNP 3 Wire Position Sensor

6.7 Models 9123-GK-GCE-PM24400-B-SG, 9123-GK-GCE2-PM24600-B-SG

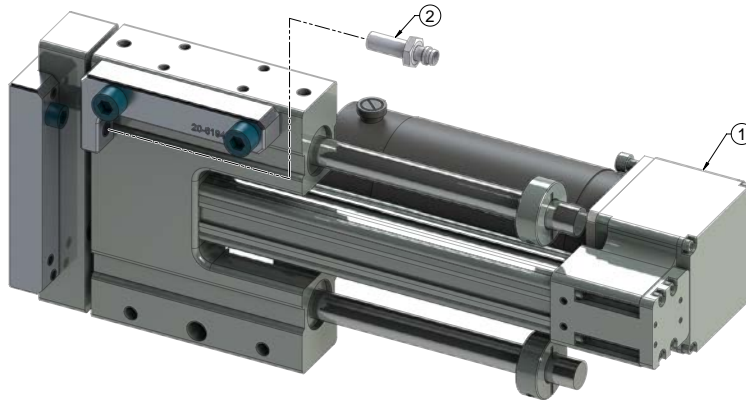


Figure 6.7—Guided Cylinder

Item No.	Qty	Part Number	Description
1	1	9123-GK-GCE-PM24400-B-SG	Utility Coupler Drive Unit, Electric, Perm Magnet Motor, 24VDC, 4.00" Stroke, Brake Opt, (1) DC PNP
		9123-GK-GCE2-PM24600-B-SG	GK Utility Coupler Drive Unit, Electric, Perm Magnet Motor, 24VDC, 6.00" Stroke, Brake Opt, (1) DC P
2	1	8590-9909999-34	True 2 PNP Proximity Sensor

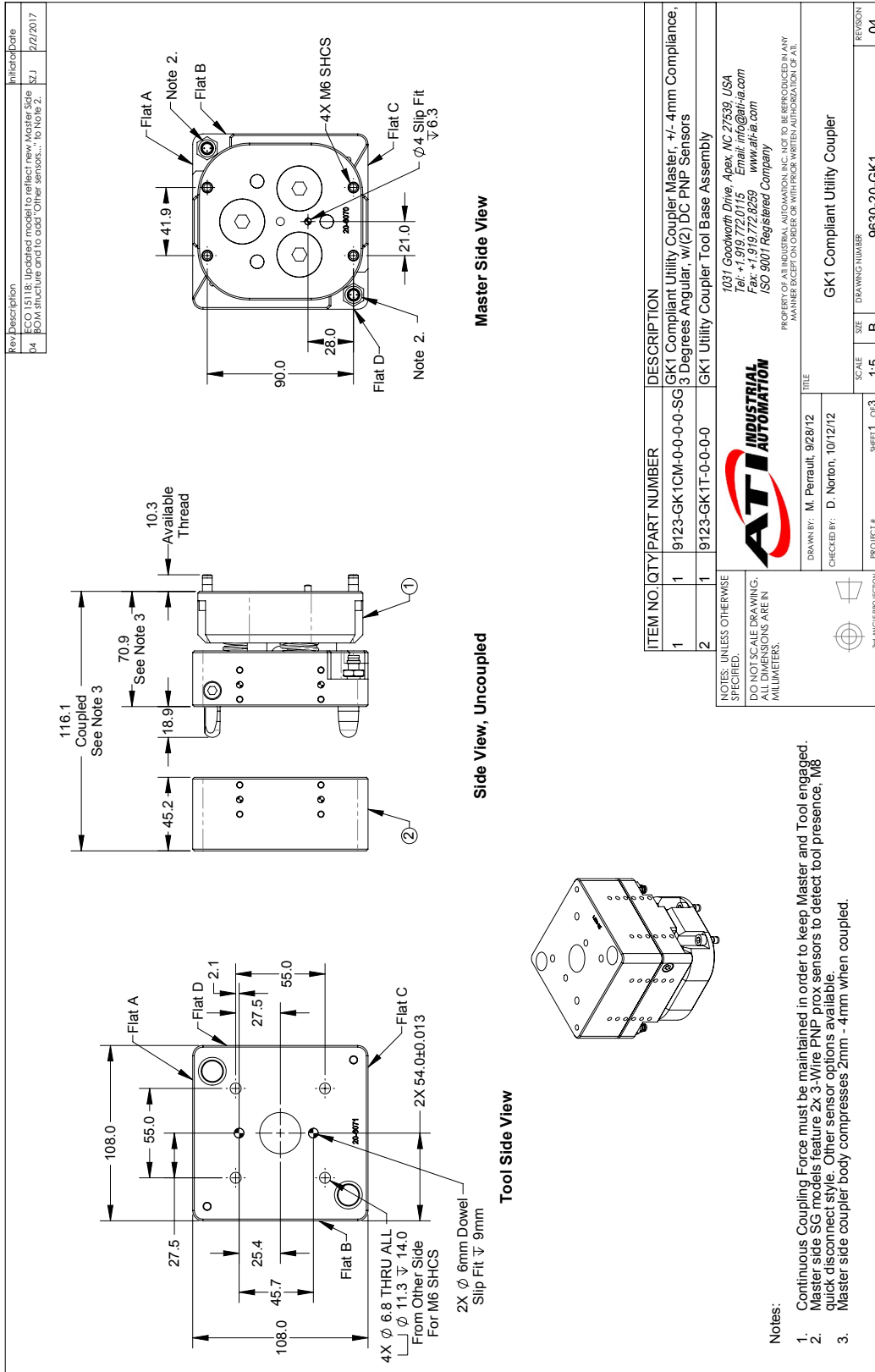
7. Specifications

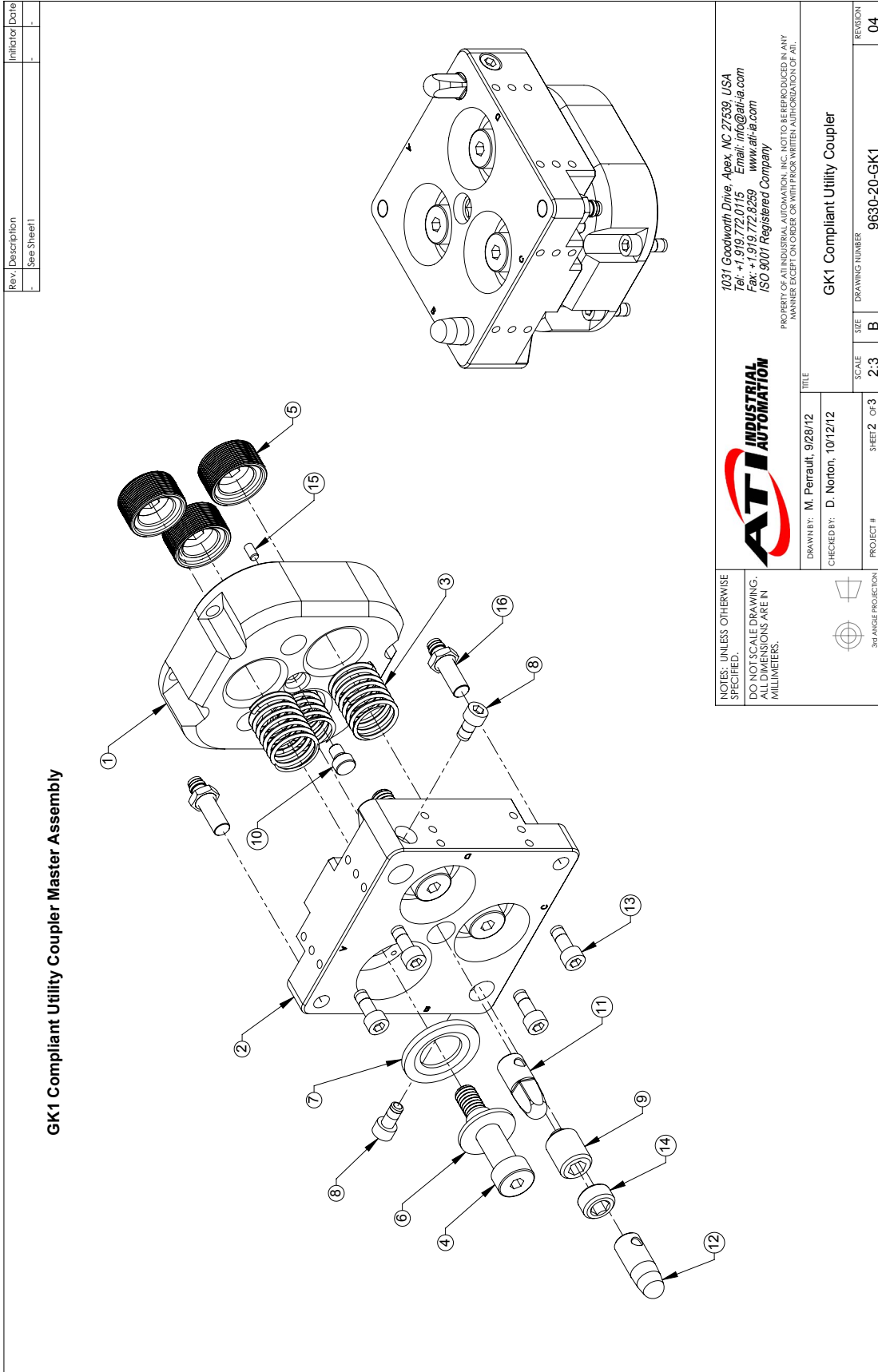
Table 7.1—Utility Couplers		
9123-GK1 - Master and Tool Plates		
Suggested Payload Limit	Not applicable	Fixture weight should be supported independently of the Utility Coupler
Weight (coupled)	6.72 lb (3.05 kg)	Master 3.76 lb, Tool 2.96 lb
Min Recommended distance between Master and Tool plate	1.97 in (50 mm)	
Min Required Force to Couple	40 lbs (18.14 kg)	Base Model only, no modules attached
Mounting Interface	Master and Tool	Rectangular Pattern ,See Section 8.1—GK1 Compliant Utility Coupler Drawings
9123-GK2-N/E/R - Master and Tool Plates		
Suggested Payload Limit	Not applicable	Fixture weight should be supported independently of the Utility Coupler
Weight (coupled)	5.6 lb (2.54 kg)	Master 3.5 lb, Tool 2.1 lb
Min Recommended distance between Master and Tool plate	1.97 in (50 mm)	
Min Required Force to Couple	220 lbs (99.8 kg)	Base Model only, no modules attached. Assuming both integrated checked ports are pressurized to 80 psi.
Integrated Ports	(2) 3/8 NPT	Checked Ports Master and Tool, Air Only
Mounting Interface	Master and Tool	Rectangular Pattern Section 8.2—GK2-N Compliant Utility Coupler Drawings Section 8.3—GK2-E Compliant Utility Coupler Drawings Section 8.4—GK2-R Compliant Utility Coupler Drawings

Table 7.2—Guided Cylinders	
9123-GK-GC-B50S75-SG-N	
Bore Size	50 mm
Max Stroke Length	75 mm
Recommended Stroke Length	50 mm
Max Coupling Force @ 80 psi	240 lbs (109 kg)
Mounting Interface	See Section 8.5—GK-GC-B50S75-SG-N
9123-GK-GC-B63S75-SG-N	
Bore Size	63 mm
Max Stroke Length	75 mm
Recommended Stroke Length	50 mm
Max Coupling Force @ 80 psi	383 lbs (174 kg)
Mounting Interface	See Section 8.7—GK-GC-B63S75-SG-N
9123-GK-GC-B63S50Z1-SG-N	
Bore Size	63 mm
Max Stroke Length	50 mm
Recommended Stroke Length	40 mm
Max Coupling Force @ 80 psi	303 lbs (137 kg)
Mounting Interface	See Section 8.6—GK-GC-B63S50Z1-SG-N
9123-GK-GCE-PM24400-B-SG	
Max Coupling Force @ 24 VDC, 6 Amps	75 lbs Estimated Axial holding force of brake on electrical drive unit.
Max Stroke Length	4 inches
Mounting Interface	See Section 8.9—GK-GCE-PM24400-B-SG
9123-GK-GCE2-PM24600-B-SG	
Max Coupling Force @ 24 VDC, 6 Amps	144 lbs Estimated Axial holding force of brake on electrical drive unit.
Max Stroke Length	6 inches
Mounting Interface	See Section 8.8—GK-GCE2-PM24600-B-SG

8. Drawings

8.1 GK1 Compliant Utility Coupler Drawings





Rev.	Description	Initiator	Date
-	See Sheet 1	-	-

NOTES: UNLESS OTHERWISE SPECIFIED:
 DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.



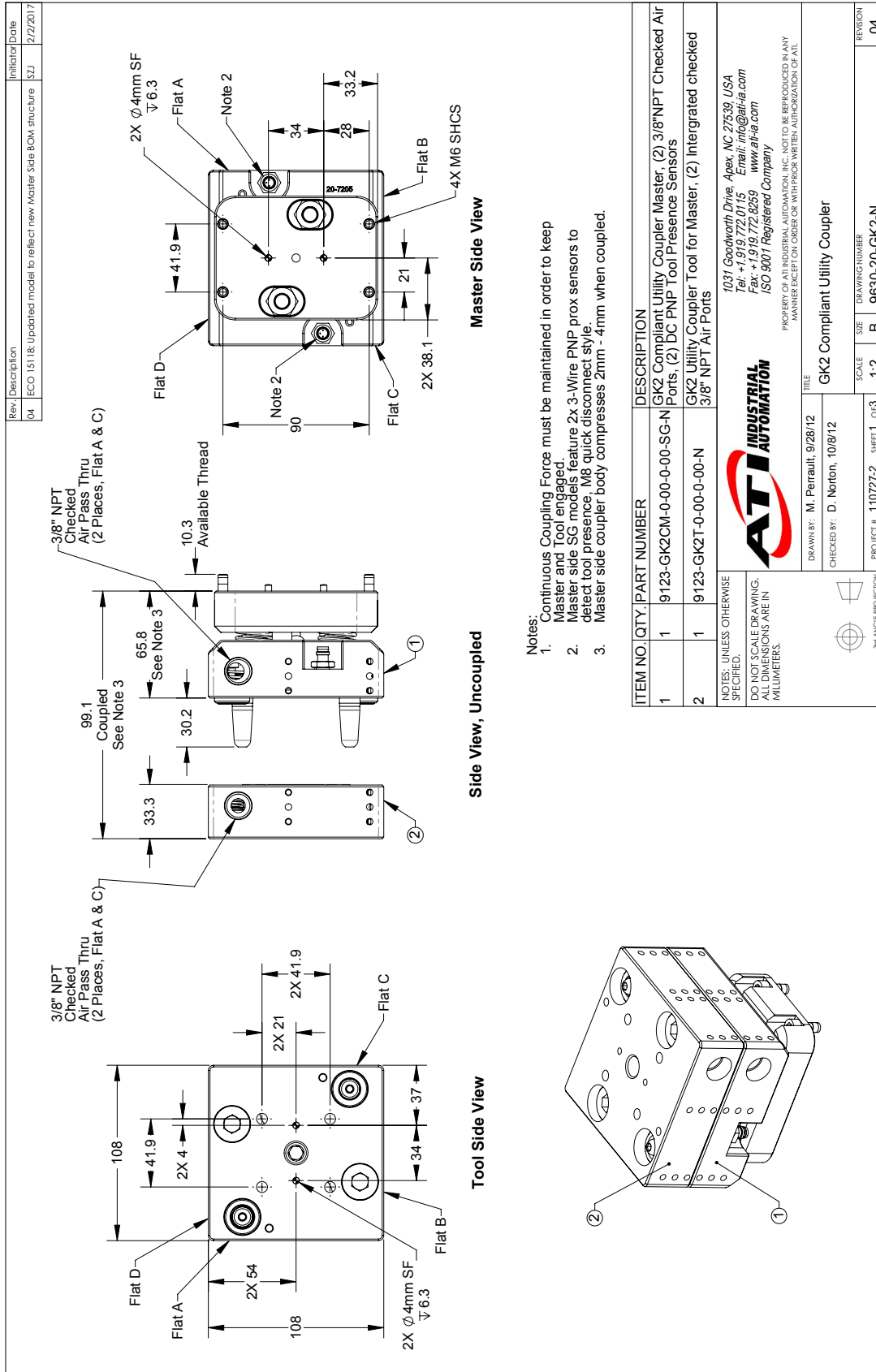
1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919 772 0115 Email: info@ati-ia.com
 Fax: +1 919 772 8259 www.ati-ia.com
 ISO 9001 Registered Company

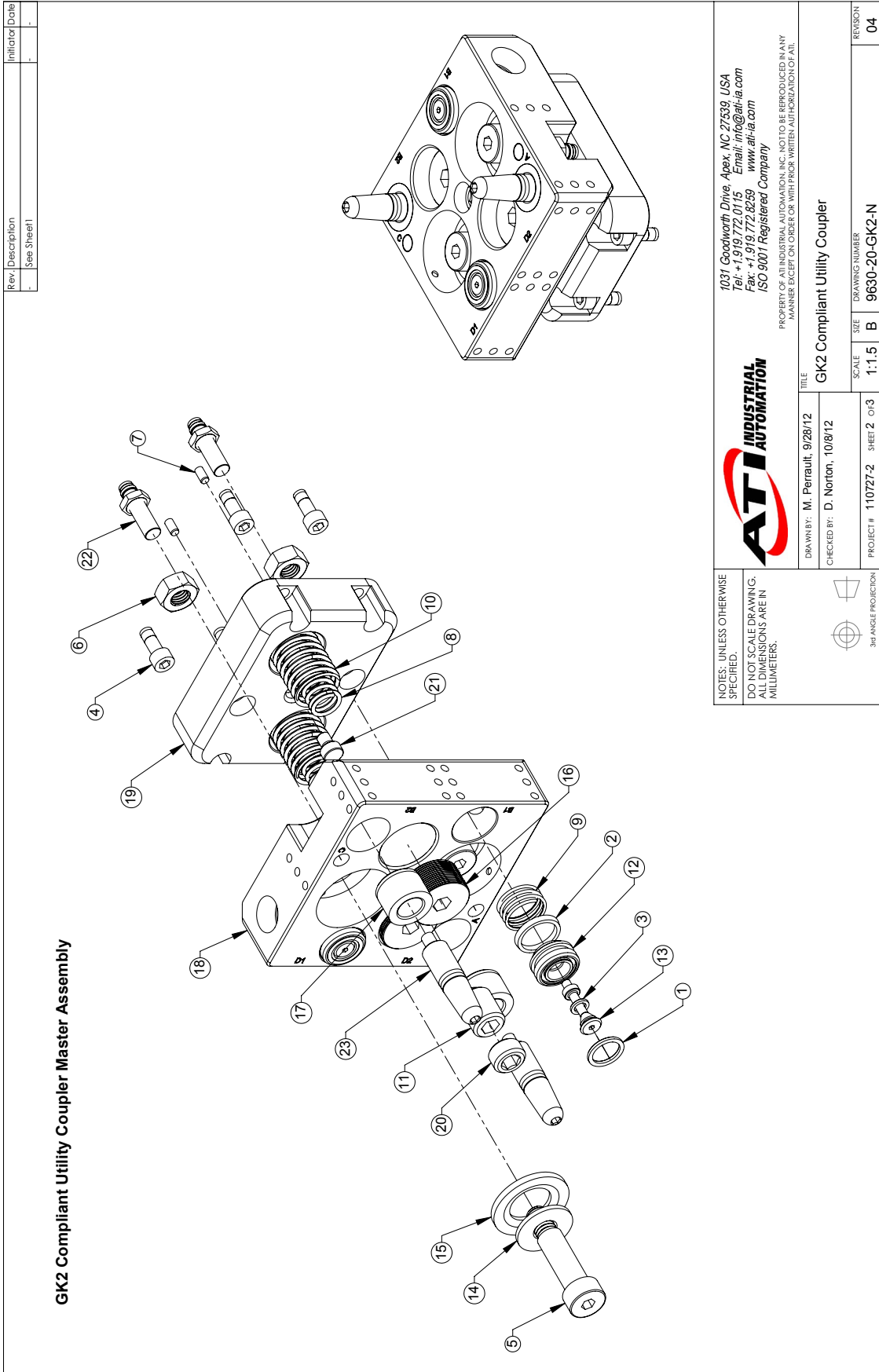
PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

DRAWN BY: M. Perrault, 9/28/12		TITLE	
CHECKED BY: D. Norton, 10/12/12		GK1 Compliant Utility Coupler	
PROJECT #	SHEET 2 OF 3	SCALE	REVISION
		2:3	04
DRAWING NUMBER		SIZE	
9630-20-GK1		B	

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Rev. Description</td> <td style="width: 50%;">Initiator Date</td> </tr> <tr> <td style="text-align: center;">- See Sheet 1</td> <td style="text-align: center;">- - -</td> </tr> </table>	Rev. Description	Initiator Date	- See Sheet 1	- - -	<h3 style="margin: 0;">GK1 Compliant Utility Coupler Tool Assembly</h3>	<p style="font-size: small;">1031 Goodworth Drive, Apex, NC 27539, USA Tel: +1 919-772-0115 Email: info@ati-ia.com Fax: +1 919-772-8259 www.ati-ia.com ISO 9001 Registered Company</p> <p style="font-size: x-small; text-align: center;">PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF AII.</p>
Rev. Description	Initiator Date					
- See Sheet 1	- - -					
<p style="font-size: x-small;">NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.</p>	<p style="font-size: x-small;">3/4 ANGLE PROJECTION</p>	<p style="text-align: center;">ATI INDUSTRIAL AUTOMATION</p> <p style="font-size: x-small;">DRAWN BY: M. Perrault, 9/28/12 CHECKED BY: D. Norton, 10/12/12</p> <p style="text-align: center;">TITLE GK1 Compliant Utility Coupler</p> <p style="font-size: x-small;">SCALE: 1:1 SIZE: B DRAWING NUMBER: 9630-20-GK1</p> <p style="font-size: x-small;">PROJECT # SHEET 3 OF 3</p> <p style="text-align: right;">REVISION 04</p>				

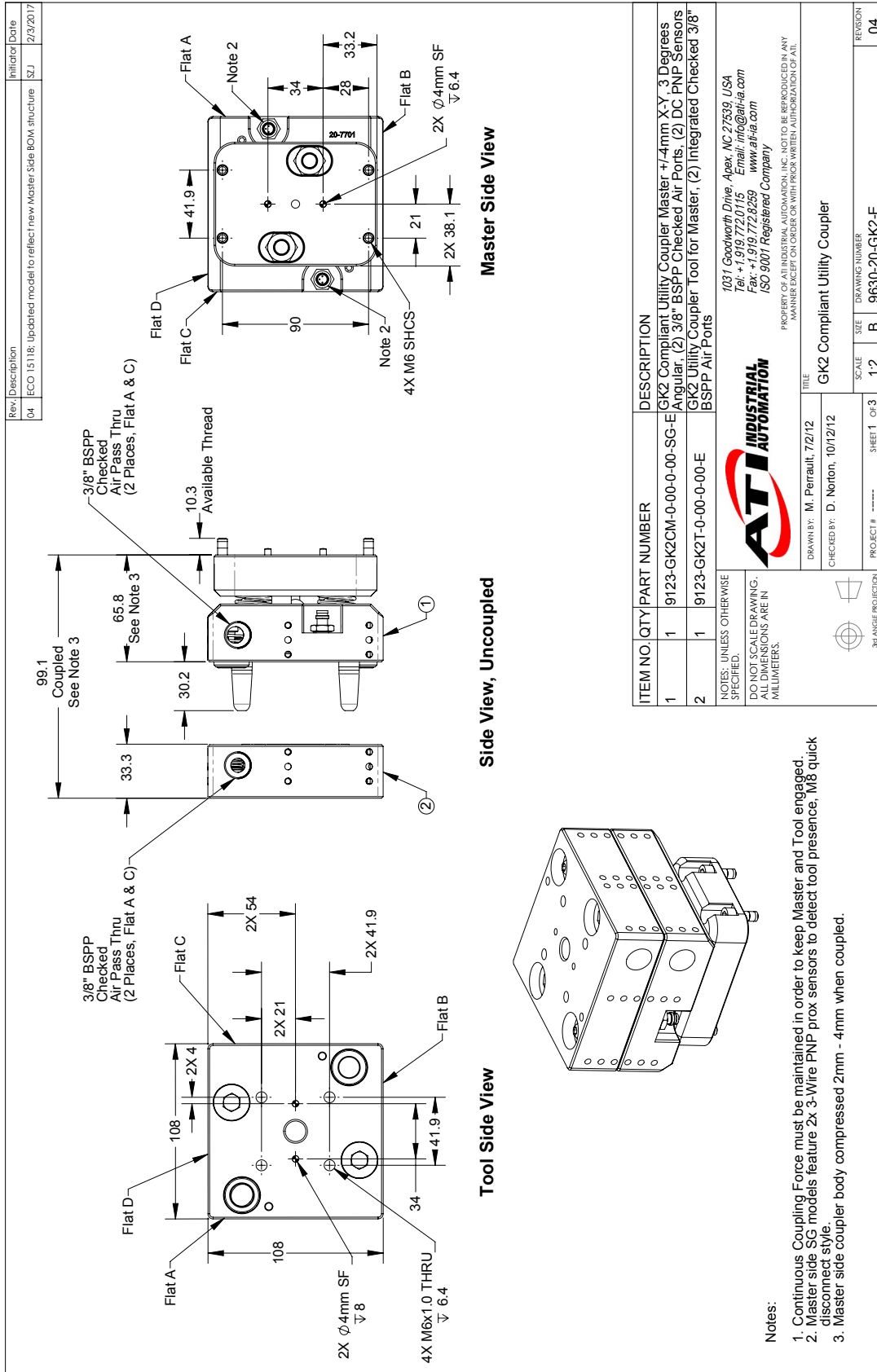
8.2 GK2-N Compliant Utility Coupler Drawings

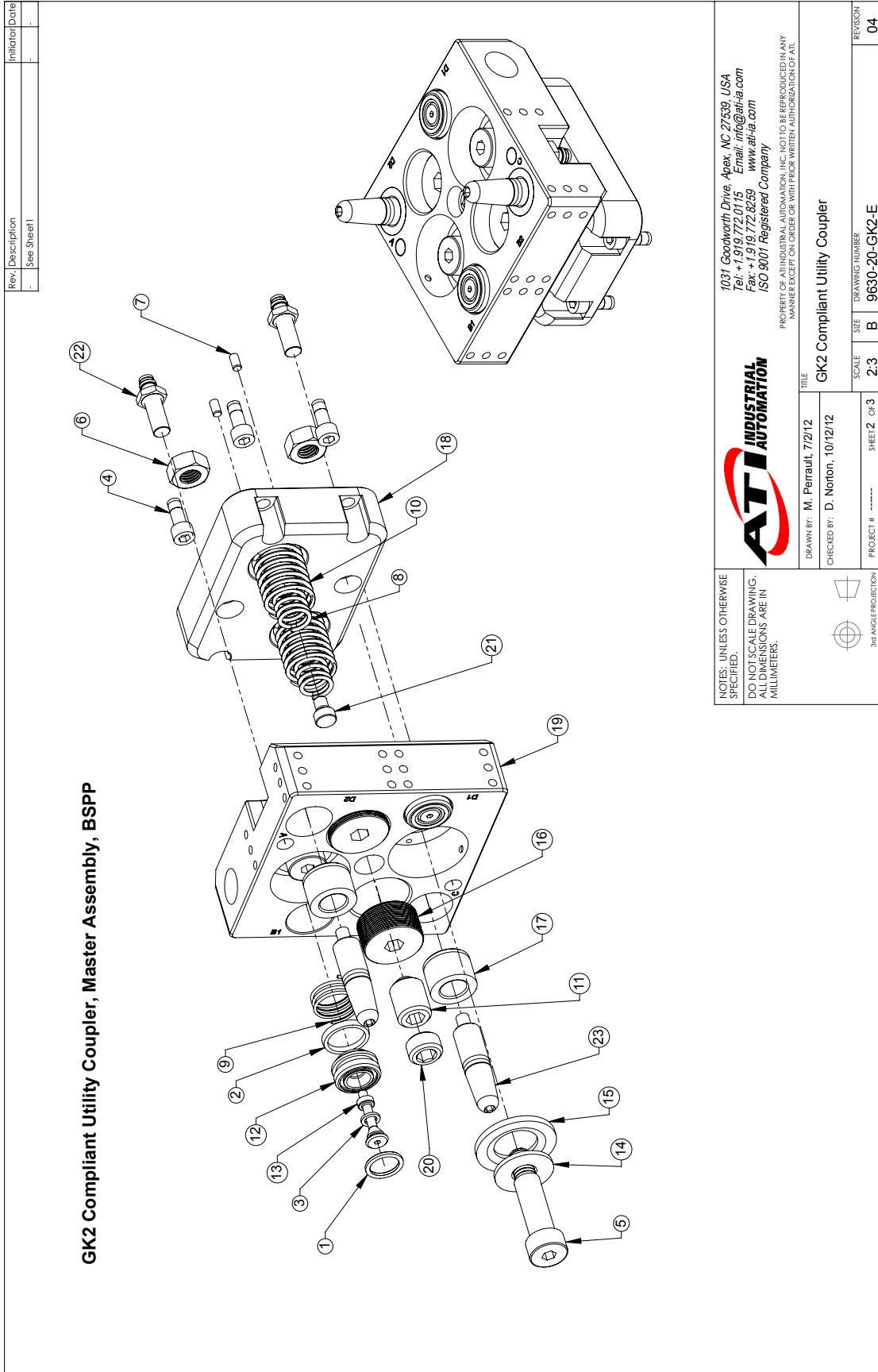




	GK2 Utility Coupler Tool Assembly				
<p>NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.</p>	 3rd ANGLE PROJECTION		<p>1031 Goodworth Drive, Apex, NC 27539, USA Tel: +1 919-772-0115 Email: info@ati-ia.com Fax: +1 919-772-8259 www.ati-ia.com ISO 9001 Registered Company</p> <p>ATI INDUSTRIAL AUTOMATION</p>		
DRAWN BY: M. Peirault, 9/28/12 CHECKED BY: D. Norton, 10/8/12		TITLE: GK2 Compliant Utility Coupler			
PROJECT # 110727-2 SHEET 3 OF 3		SCALE: 1:1.5	SIZE: B	DRAWING NUMBER: 9630-20-GK2-N	REVISION: 04
Rev. Description: See Sheet 1		Initiator Date: -			

8.3 GK2-E Compliant Utility Coupler Drawings





	Rev. Description - See Sheet 1	Initiator Date - -
--	-----------------------------------	-----------------------

GK2 Compliant Utility Coupler, Tool Assembly, BSPP

ATI INDUSTRIAL AUTOMATION

1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919-772-0115 Email: info@ati-ia.com
 Fax: +1 919-772-8259 www.ati-ia.com
 ISO 9001 Registered Company

PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

ATI INDUSTRIAL AUTOMATION

DRAWN BY: M. Perrault, 7/2/12
 CHECKED BY: D. Norton, 10/12/12

PROJECT # - - - - - SHEET 3 OF 3

SCALE: 2:3
 SIZE: B
 DRAWING NUMBER: 9630-20-GK2-E

TITLE: GK2 Compliant Utility Coupler

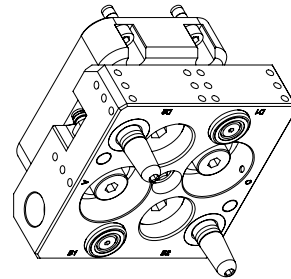
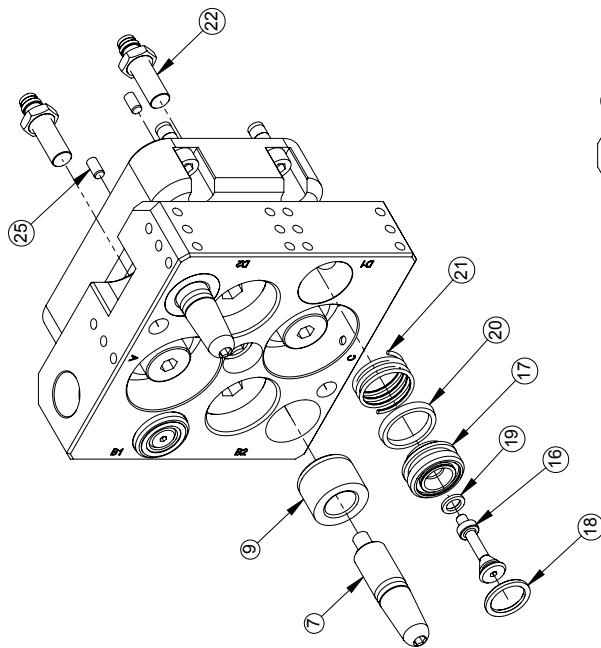
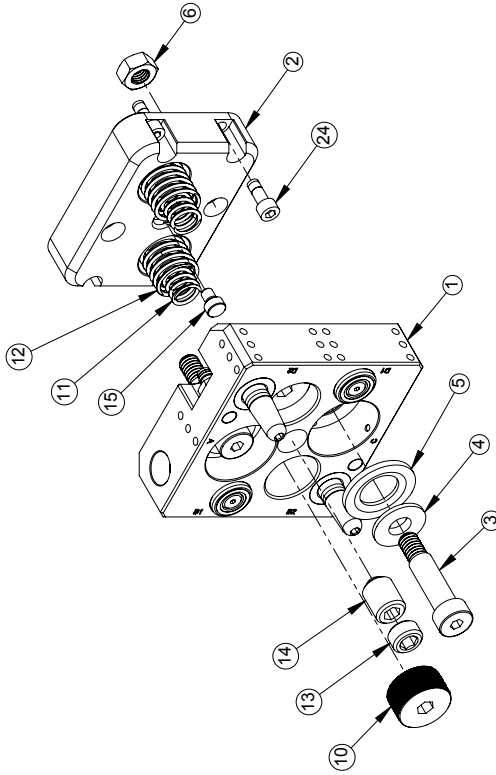
REVISION: 04

NOTES: UNLESS OTHERWISE SPECIFIED,
 DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.

3rd ANGLE PROJECTION

GK2-R COMPLIANT UTILITY COUPLER MASTER ASSEMBLY

Rev.	Description	Initiator	Date
-	See Sheet 1	-	-



NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.

ATI INDUSTRIAL AUTOMATION

1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919 772 0115 Email: info@ati-ia.com
 Fax: +1 919 772 8259 www.ati-ia.com
 ISO 9001 Registered Company

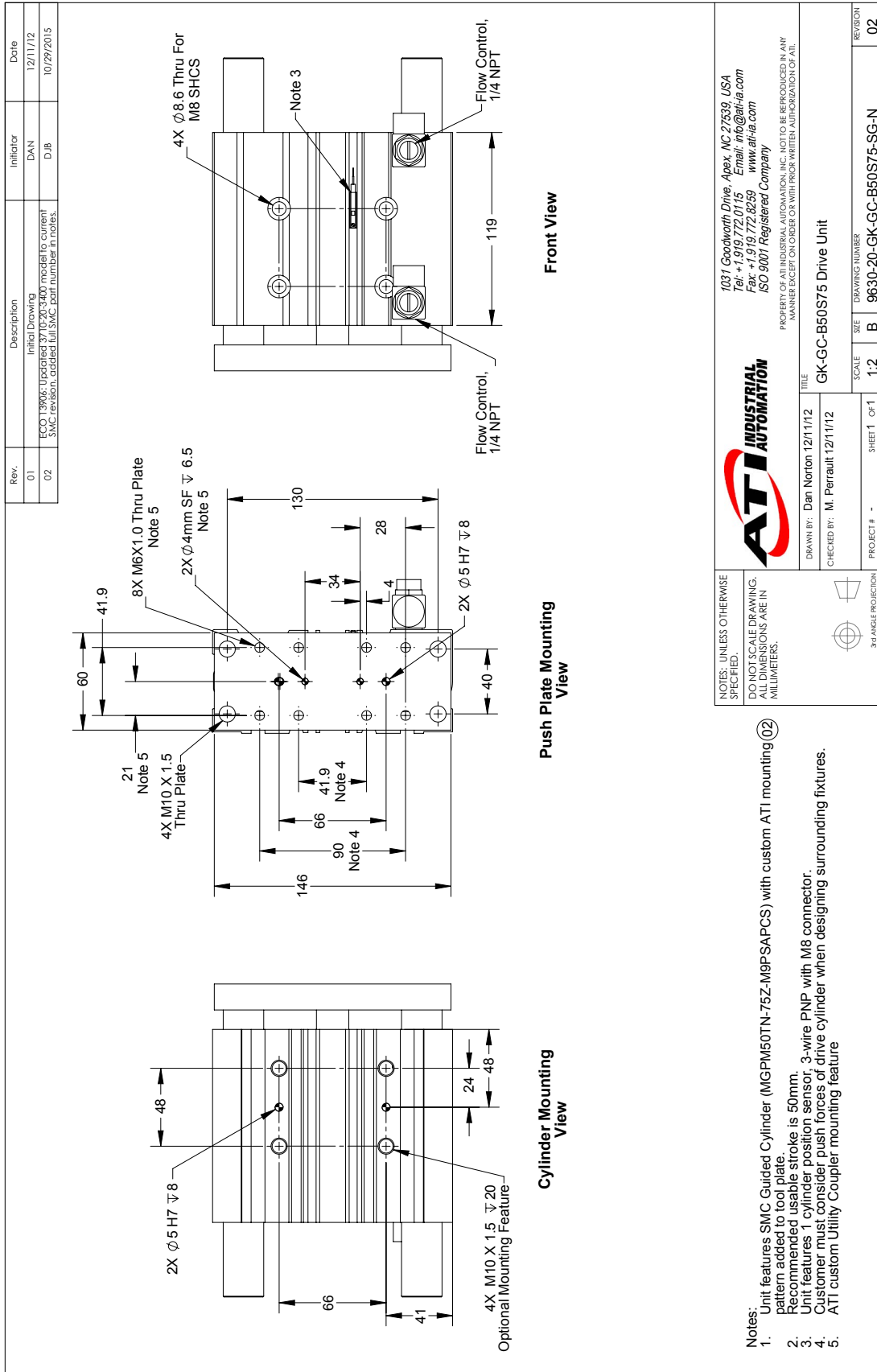
PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

DRAWN BY: K. Zachary	10/12/15	TITLE: GK2-R Compliant Utility Coupler
CHECKED BY: M. Gala	10/14/15	SCALE: 1:2
PROJECT #: 150727-1	SHEET 2 OF 3	DRAWING NUMBER: 9630-20-GK2-R
		REVISION: 03

3rd ANGLE PROJECTION

<p>GK2-R UTILITY COUPLER TOOL ASSEMBLY</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Rev.</td> <td style="width: 25%;">Description</td> <td style="width: 25%;">Initiator</td> <td style="width: 25%;">Date</td> </tr> <tr> <td>-</td> <td>See Sheet 1</td> <td>-</td> <td>-</td> </tr> </table>	Rev.	Description	Initiator	Date	-	See Sheet 1	-	-														
Rev.	Description	Initiator	Date																					
-	See Sheet 1	-	-																					
<p>NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. DIMENSIONS ARE IN MILLIMETERS.</p>		<p>1031 Goodworth Drive, Apex, NC 27539, USA Tel: +1 919-772-0115 Email: info@ati-ia.com Fax: +1 919-772-8259 www.ati-ia.com ISO 9001 Registered Company</p> <p>ATI INDUSTRIAL AUTOMATION</p> <p>PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.</p>																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">DRAWN BY: K. Zachary</td> <td style="width: 25%;">10/12/15</td> <td style="width: 25%;">CHECKED BY: M. Gala</td> <td style="width: 25%;">10/14/15</td> </tr> <tr> <td colspan="2">PROJECT # 150727-1</td> <td colspan="2">SHEET 3 OF 3</td> </tr> </table>		DRAWN BY: K. Zachary	10/12/15	CHECKED BY: M. Gala	10/14/15	PROJECT # 150727-1		SHEET 3 OF 3		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">TITLE</td> <td style="width: 50%;">DRAWING NUMBER</td> </tr> <tr> <td>GK2-R Compliant Utility Coupler</td> <td>9630-20-GK2-R</td> </tr> <tr> <td>SCALE</td> <td>SIZE</td> </tr> <tr> <td>1:1</td> <td>B</td> </tr> <tr> <td colspan="2">3/4 ANGLE PROJECTION</td> </tr> <tr> <td colspan="2" style="text-align: right;">REVISION</td> </tr> <tr> <td colspan="2" style="text-align: right;">03</td> </tr> </table>	TITLE	DRAWING NUMBER	GK2-R Compliant Utility Coupler	9630-20-GK2-R	SCALE	SIZE	1:1	B	3/4 ANGLE PROJECTION		REVISION		03	
DRAWN BY: K. Zachary	10/12/15	CHECKED BY: M. Gala	10/14/15																					
PROJECT # 150727-1		SHEET 3 OF 3																						
TITLE	DRAWING NUMBER																							
GK2-R Compliant Utility Coupler	9630-20-GK2-R																							
SCALE	SIZE																							
1:1	B																							
3/4 ANGLE PROJECTION																								
REVISION																								
03																								

8.5 GK-GC-B50S75-SG-N



ATI INDUSTRIAL AUTOMATION

1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919 772 0115 Email: info@ati-ia.com
 Fax: +1 919 772 8259 www.ati-ia.com
 ISO 9001 Registered Company

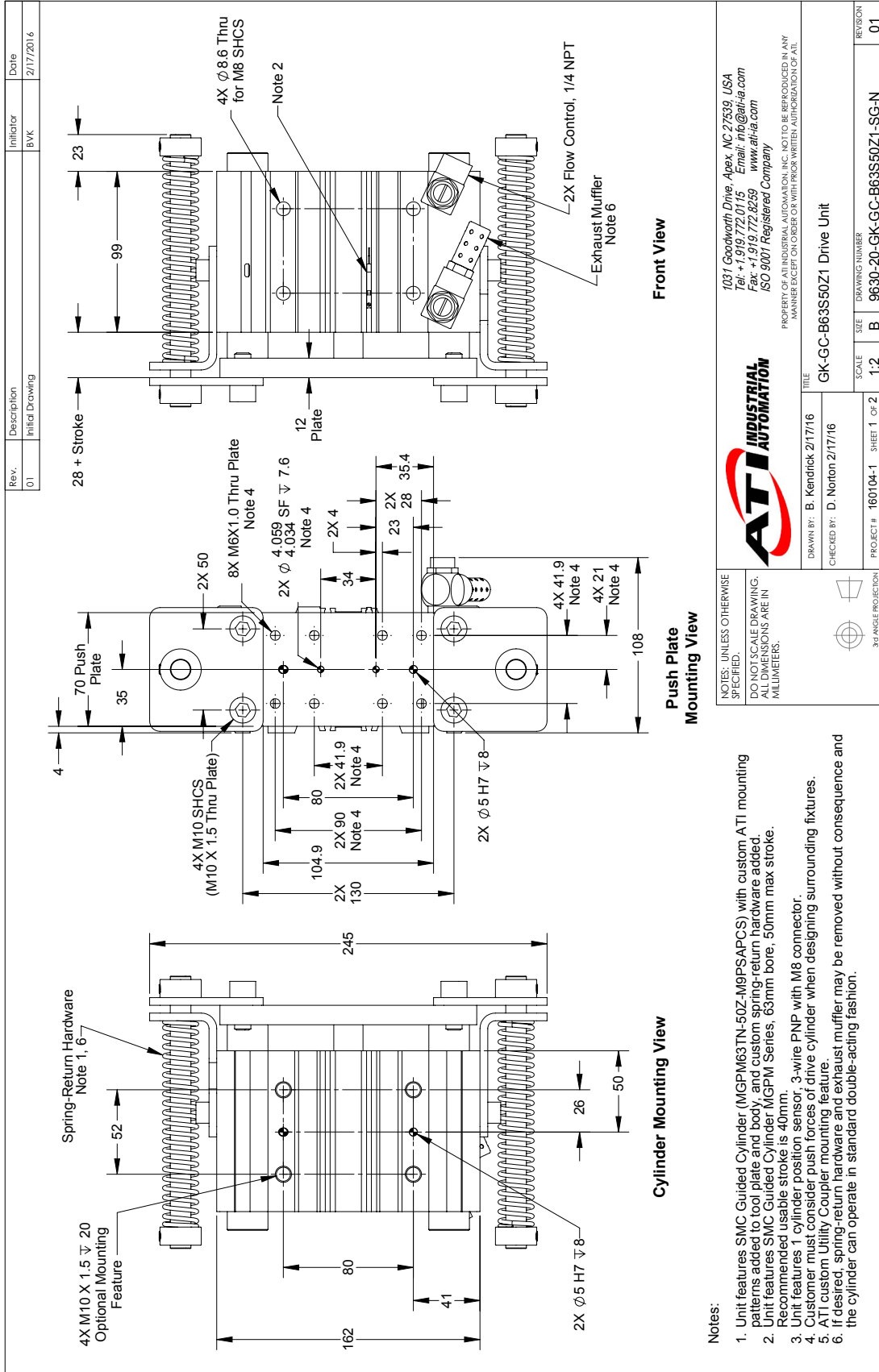
PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF AII.

DRAWN BY: Dan Norton 12/11/12	TITLE: GK-GC-B50S75 Drive Unit	SCALE: 1:2	DRAWING NUMBER: B	REVISION: 02
CHECKED BY: M. Perrault 12/11/12		PROJECT #: -		
SHEET 1 OF 1		DRAWING NUMBER: 9630-20-GK-GC-B50S75-SG-N		

NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.

3rd ANGLE PROJECTION

8.6 GK-GC-B63S50Z1-SG-N



ATI INDUSTRIAL AUTOMATION

1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919 772 0115 Email: info@ati-ia.com
 Fax: +1 919 772 8259 www.ati-ia.com
 ISO 9001 Registered Company

PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

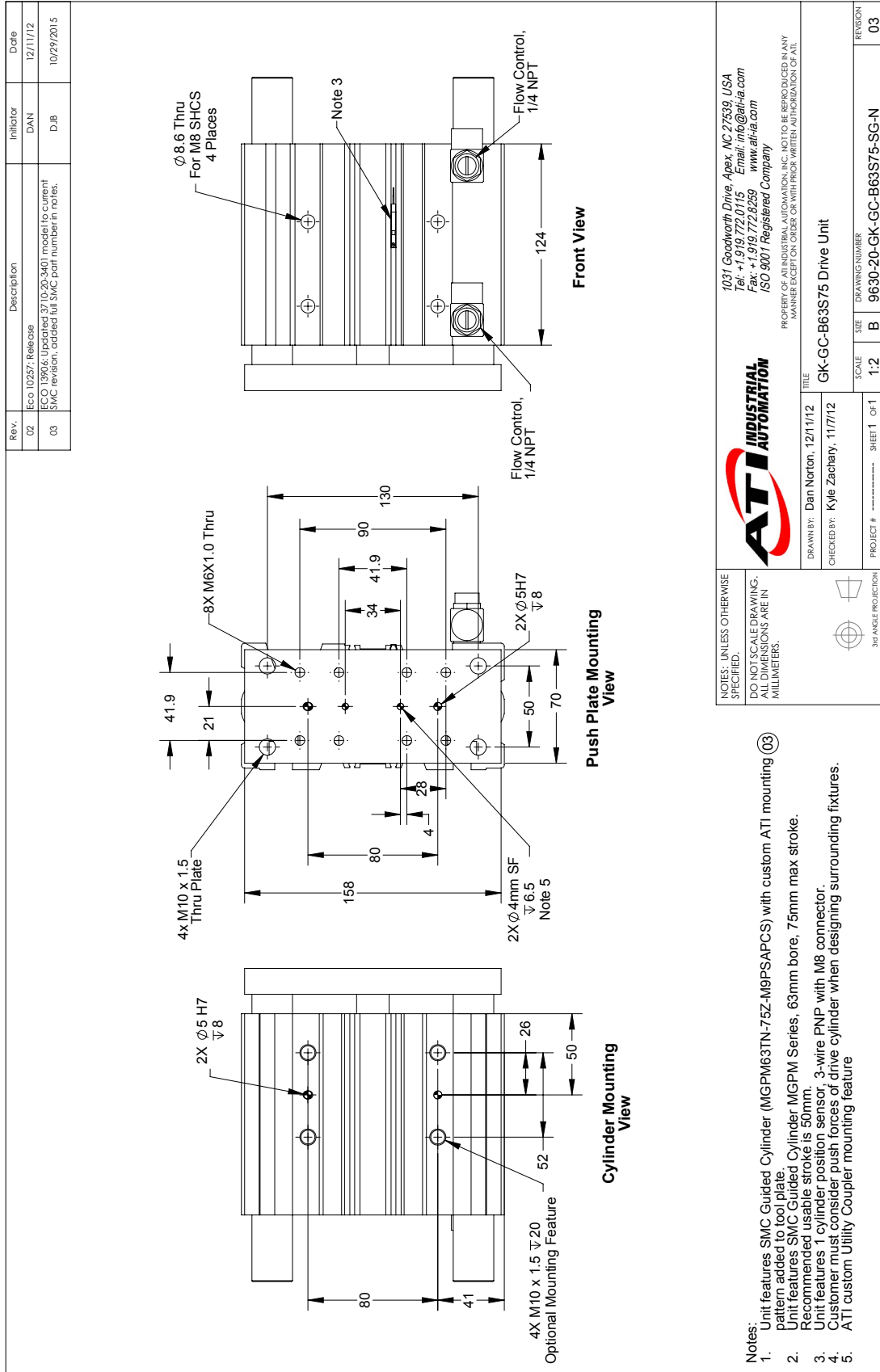
DRAWN BY: B. Kendrick 2/17/16	TITLE
CHECKED BY: D. Norton 2/17/16	GK-GC-B63S50Z1 Drive Unit
PROJECT # 160104-1 SHEET 1 OF 2	SCALE
DRAWING NUMBER	SIZE
9630-20-GK-GC-B63S50Z1-SG-N	B
	REGION
	01

	Rev.	Description See Sheet 1	Initiator	Date

GK Spring-Return Guide Cylinder Assembly

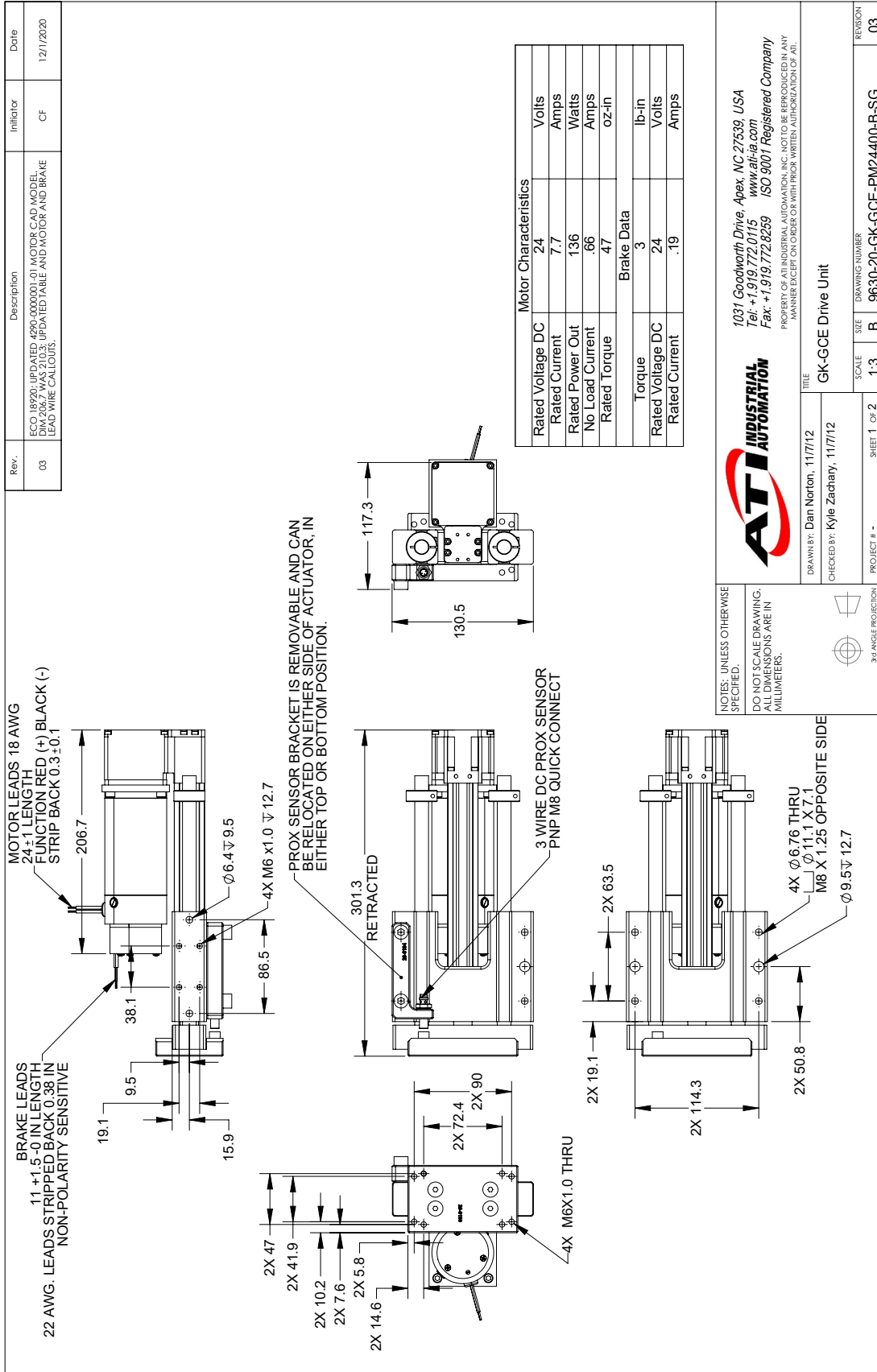
<p>NOTES: UNLESS OTHERWISE SPECIFIED: DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.</p>	<p>3rd ANGLE PROJECTION</p>	<p style="text-align: center;">ATI INDUSTRIAL AUTOMATION</p> <p>1031 Goodworth Drive, Apex, NC 27539, USA Tel: +1 919 772 0115 Email: info@ati-ia.com Fax: +1 919 772 8259 www.ati-ia.com ISO 9001 Registered Company</p> <p>PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.</p>
<p>DRAWN BY: B. Kendrick 2/17/16 CHECKED BY: D. Norton 2/17/16</p>		<p>TITLE GK-GC-B63S50Z1 Drive Unit</p>
<p>PROJECT # 160104-1 SHEET 2 OF 2</p>		<p>SCALE 1:3 SIZE B DRAWING NUMBER 9630-20-GK-GC-B63S50Z1-SG-N</p>
		<p>REVISION 01</p>

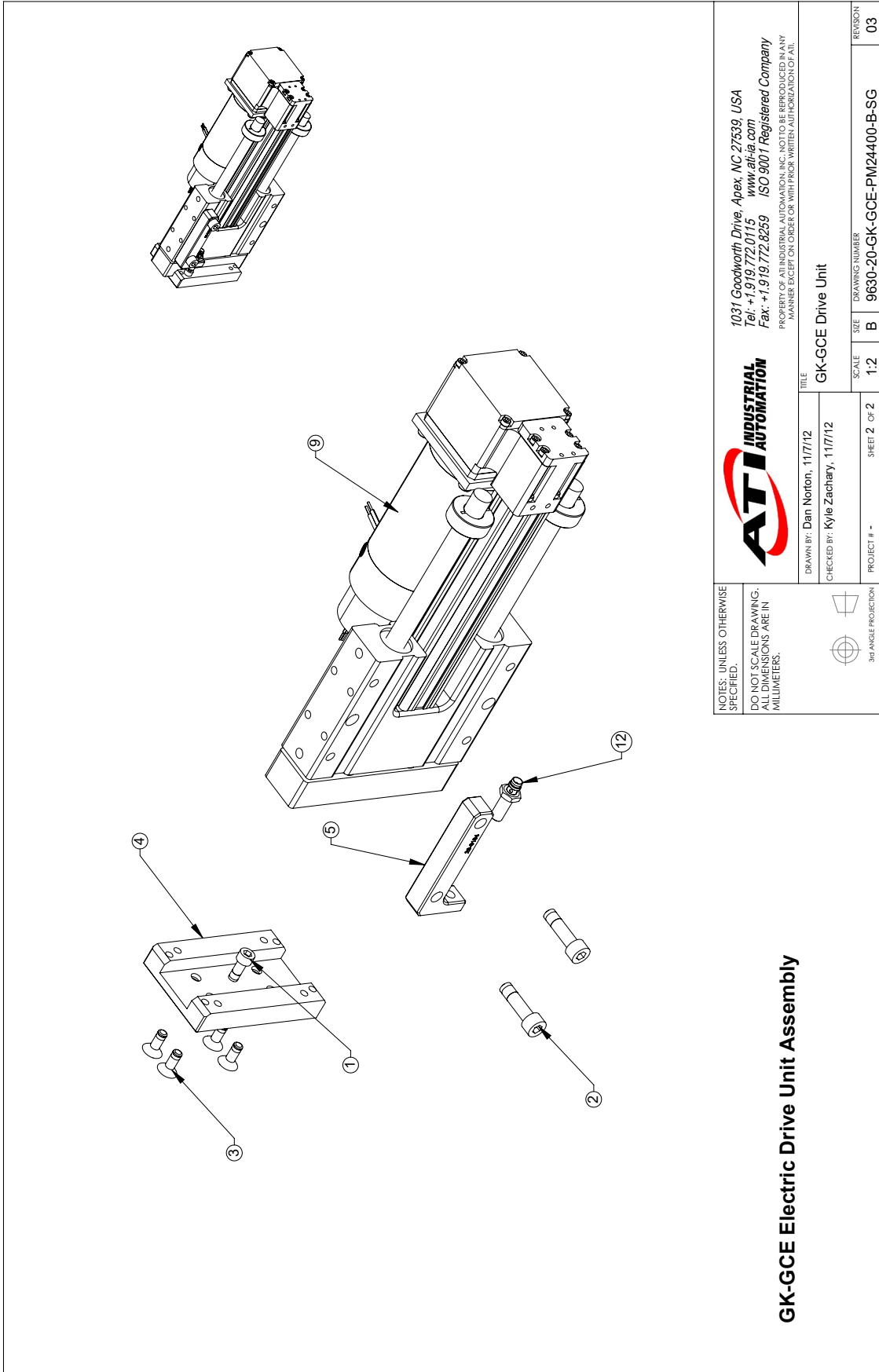
8.7 GK-GC-B63S75-SG-N



Rev. - Description See Sheet 1 Initiator - Date -		<p style="text-align: center;">ATI INDUSTRIAL AUTOMATION</p> <p>1031 Goodworth Drive, Apex, NC 27539, USA Tel: +1 919-772-0115 Email: info@ati-ia.com Fax: +1 919-772-8259 www.ati-ia.com ISO 9001 Registered Company</p> <p>PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.</p> <p>NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.</p> <p>3RD ANGLE PROJECTION</p> <p style="text-align: center;">GK-GCE2 Electric Drive Unit Assembly</p>
TITLE GK-GCE2 Drive Unit DRAWN BY: Dan Norton, 1/17/12 CHECKED BY: Kyle Zachary, 1/17/12		SCALE 1:2 SIZE B DRAWING NUMBER 9630-20-GK-GCE2-PM24600-B-SG PROJECT # - SHEET 2 OF 2 REVISION 02

8.9 GK-GCE-PM24400-B-SG





NOTES: UNLESS OTHERWISE SPECIFIED:
 DO NOT SCALE DRAWING.
 ALL DIMENSIONS ARE IN MILLIMETERS.



1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919-772-0115 www.ati-ia.com
 Fax: +1 919-772-8259 ISO 9001 Registered Company
 PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

DRAWN BY: Dan Norton, 11/7/12		TITLE: GK-GCE Drive Unit		REVISION:
CHECKED BY: Kyle Zachary, 11/7/12		SCALE: 1:2	SIZE: B	03
PROJECT # -		DRAWING NUMBER: 9630-20-GK-GCE-PM24400-B-SG		
SHEET 2 OF 2				

GK-GCE Electric Drive Unit Assembly