

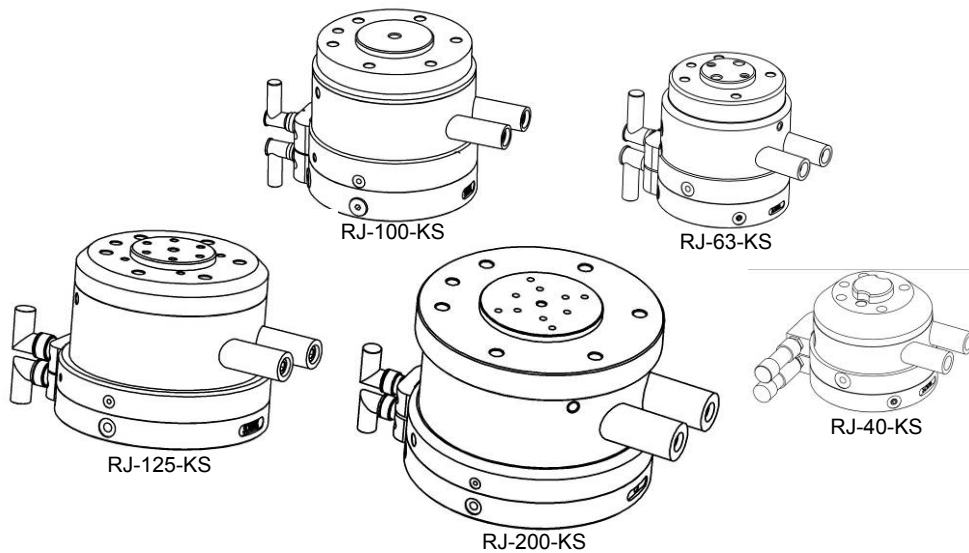


Robotic Rotary Joint

New Connector Block Version

Installation and Operation Manual

Basic Information for all Models



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Engineered Products for Robotic Productivity

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Foreword

This manual contains basic information applicable to the RJ Series of ATI Robotic Rotary Joint devices.

Please contact ATI Industrial Automation with any questions concerning your particular model.



CAUTION: This manual describes the function, application and safety considerations of this product. This manual must be read and understood before any attempt is made to install or operate the product, otherwise damage to the product or unsafe conditions may occur.

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Glossary of Terms

<u>Term</u>	<u>Definition</u>
EOAT	End Of Arm Tooling , referring to the end of the robotic arm.
End-Effector	Tool used by the robot to perform a particular function.
E.E.C.	European Economic Community
Fixed Side	The side of the Rotary Joint attached to the robot.
Rotary Side	The side of the Rotary Joint attached to the end-effector.
Slip Ring	Connection for pneumatic or electrical signals to pass through the Rotary Joint.
Torque Support	Shaft that locates the robot side of the Rotary Joint and keeps it from turning.
BUS Signal	Digital network signal.
RJ	Rotary Joint
RIP	Robot Interface Plate
TIP	Tool Interface Plate

1. Safety

1.1 Explanation of Warnings

The warnings included here are specific to the product(s) covered by this manual. It is expected that the user heed all warnings from the robot manufacturer and/or the manufacturers of other components used in the installation.



Danger indicates that a situation could result in potentially serious injury or damage to equipment.



Caution indicates that a situation could result in damage to the product and/or the other system components.

1.2 Appropriate Use

The unit may only be employed within the restrictions of its technical specifications.

Appropriate use also includes compliance with the conditions the manufacturer has specified for commissioning, assembly, operation, environment, and maintenance. Using the system with disregard to even a minor specification will be deemed inappropriate use. The manufacturer assumes no liability for any injury or damage resulting from inappropriate use.

1.3 Safety Instructions/Precautions

1. The Rotary Joint (RJ) is a sophisticated tool designed for maximum safe operation. However, danger may exist if:
 - The RJ is applied, mounted, or maintained by unskilled personnel.
 - The RJ is not applied, mounted, maintained, or used in the application for which it was designed.
 - The E.E.C. machine standards, the current safety norms and safety regulations, and the operating manual are not considered.
2. Everyone who is in charge of mounting, applying, or maintaining the RJ must have read and understand the complete operating manual, especially this Safety section.
3. Assembly and disassembly of the RJ and proximity switches, connection, and actuation should be done by authorized personnel.
4. Operations which impair function and operation safety of the RJ are not allowed.
5. The RJ may only be used to support end-effectors within its specifications. Applications which surpass these limits are not allowed. The manufacturer is not liable for any damages which may result from such use.
6. The use of the RJ for an application other than that originally intended must be approved in writing by ATI Industrial Automation.
7. Remove the power source before any mounting, changing, or adjusting of the RJ.
8. For maintenance, changes, or attachments, we recommend removing the RJ from the application and to do this work outside the danger zone.
9. Make sure that the RJ won't be actuated by accident by the operator or any other person during mounting, connecting, adjustment, starting, or testing.
10. Additional bores, threads, or attachments, which are not offered as an accessory, may only be added with the permission of ATI Industrial Automation.
11. The Rotary Joint must be maintained as described in the operating manual. The maintenance intervals refer to use under normal circumstances and correspond to the technical data of the specific Rotary Joint. Any application of the Rotary Joint in an environment with abrasive dirt, acid, or any aggressive fumes and fluids must be authorized by ATI Industrial Automation.
12. Standard regulations for safety and prevention of accidents must always be observed.

1.4 Precautions



DANGER: Power and air should always be removed prior to maintenance or repair.



CAUTION: The Rotary Joint system is only to be used for intended applications and applications approved by the manufacturer.

2. Product Description

The Rotary Joint device (RJ) allows electrical and pneumatic lines from the robot to feed through to the tool—keeping air and electrical lines on the robot from twisting. The Rotary Joint has two components: Fixed and rotating. The rotating component consists of the robot adapter (base plate), tool adapter, and a central connecting core. It is mounted to the robot and passes through to the tool side. The fixed component is a central ring, which is held stationary by a torque shaft attached to a fixed part of the robot arm.

Lines are attached between the fixed component and your robot press package. As the robot moves, the fixed lines do not twist, but follow with the robot housing. Advanced slip ring technology is used to pass fixed lines to the rotating component and then to your tool—so as your robot moves, electrical signals and pneumatic pressure pass from the robot to the tool preventing the lines from twisting. With many different sizes, this device can be easily integrated onto almost any robot.

2.1 Benefits and Features

- Prevents damage and increases life of robot electrical and pneumatic lines. Normal twisting action can fatigue electrical lines or damage pneumatic lines.
- Compact, light-weight design with a high load capacity.
- Constructed of anodized high-strength aluminum alloy with easy-to-use electrical and pneumatic interface.
- Angle of rotation is unlimited (360°+).
- Suitable for speeds of up to 120 rpm and for payloads of 18,000 N (4,050 lb.) and 820 Nm (7,260 lb-in.). Larger models are available on request.
- Allows 2 to 4 pneumatic feed-through lines at a maximum of 10 bar (150psi).
- Allows 4 to 10 electrical signals at a maximum of 60V and 1A.
- Suitable for BUS/digital signal transmission.
- Tested to operate beyond one million rotations.
- New design includes two sets of ball bearings for increased strength (models RJ-40-1-KS, RJ-50-1-KS, and above).

3. Installation



DANGER: Before starting assembly of the RJ, the power supply must be switched off. Please also consider the safety hints 7, 8, 9, 10, 11, 12, and 13 in Section 1 of this manual.

3.1 Mounting the RJ on an Industrial Robot

(Item numbers are shown in the assembly drawings, Figures 3.2, 5.1, 5.2, and 5.3.)

1. Attach the Robot Interface Plate (Item 83) to the robot using screws (Item 91) from the pack supplied. Use the dowel pin inserted into the RIP.
2. Insert the dowel pin (Item 20) into the RIP.
3. Place the pre-assembled main assembly on the plate.



CAUTION: It is not necessary to take the pre-assembled unit apart!

4. Screw the main assembly and plate together using screws (Items 30, 31, 34, or 75 depending on the model—See Figures 5.1, 5.2, and 5.3).
5. If used, fit the seals (Item 26). Seals only used when making a tubeless air connection to the bottom of the RJ. If using radial air connections, skip to Step 6.
6. Insert cylindrical pins (Item 92—Figure 3.2 only. See Separate Parts Kit) into the main body assembly.
7. Fix the TIP to the main assembly using the screws provided (Included with purchased Item 82).

To dismantle the RJ, follow the instruction in reverse order.

If the customer chooses to design and build a tool interface plate, the following should be considered:

- The interface plate should be designed to include bolt holes for mounting, dowel pins, and a boss for accurate positioning on the tool and RJ.
- The thickness of the interface plate must be great enough to provide the necessary thread engagement for the mounting bolts.
- The interface plate must be properly designed to provide rigid mounting to the RJ boss area.
- If making a tubeless air connection on the downside of the RJ, the interface plate must have a recess for the o-rings (Item 10—Figure 3.2 only. See Separate Parts Kit).

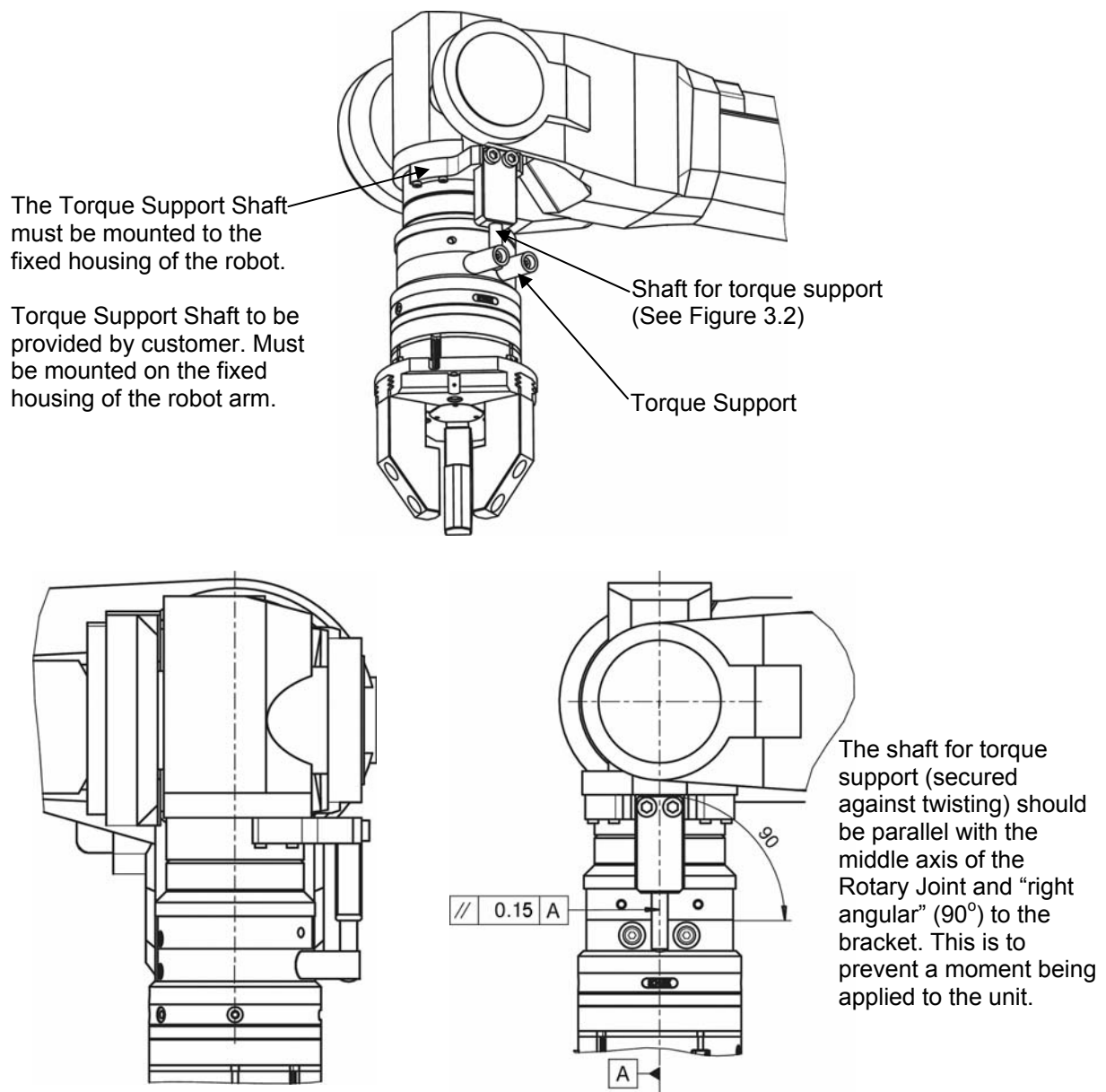


Figure 3.1—RJ Mounting

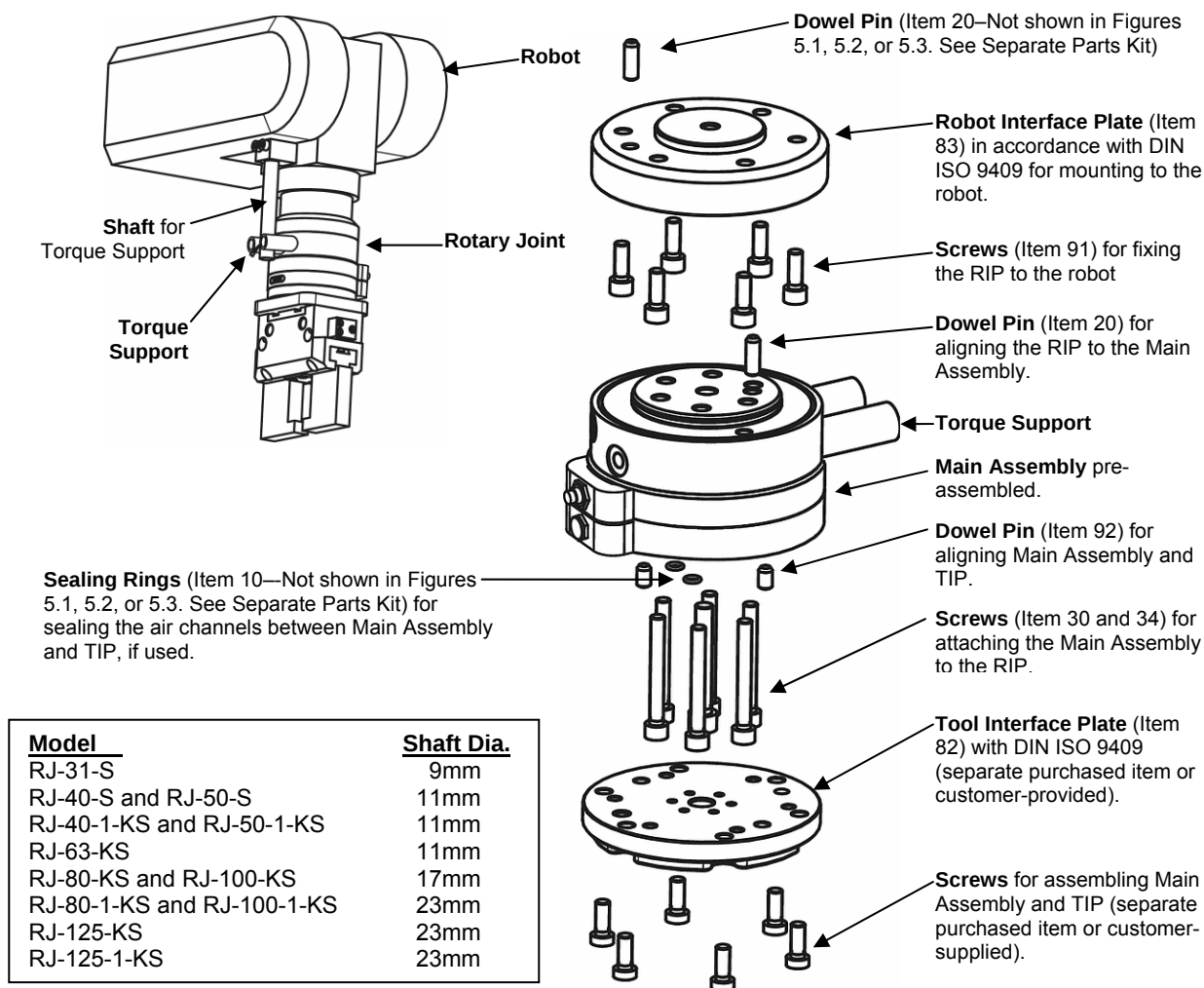


Figure 3.2—Assembling the RJ

3.2 Air Connection



DANGER: Before connection, the power supply must be switched off. Please also consider the safety hints 7, 8, and 9 in Section 1 of this manual.

NOTE: Means of pressure: Compressed air filtered (10 microns), dry, lubricated or non-lubricated.

Only open the connections that you require for your application. Close the air connections that you do not use with a suitable plug.

NOTE: Purge air should be clean and non-lubricated, 7–14 psi (0.5–1 bar).

If you should need more information on the exact positions and possibilities of how to connect the air connections, please see our catalog.

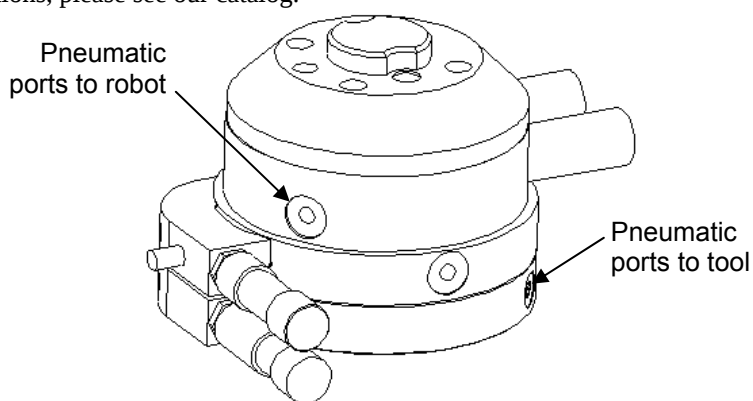
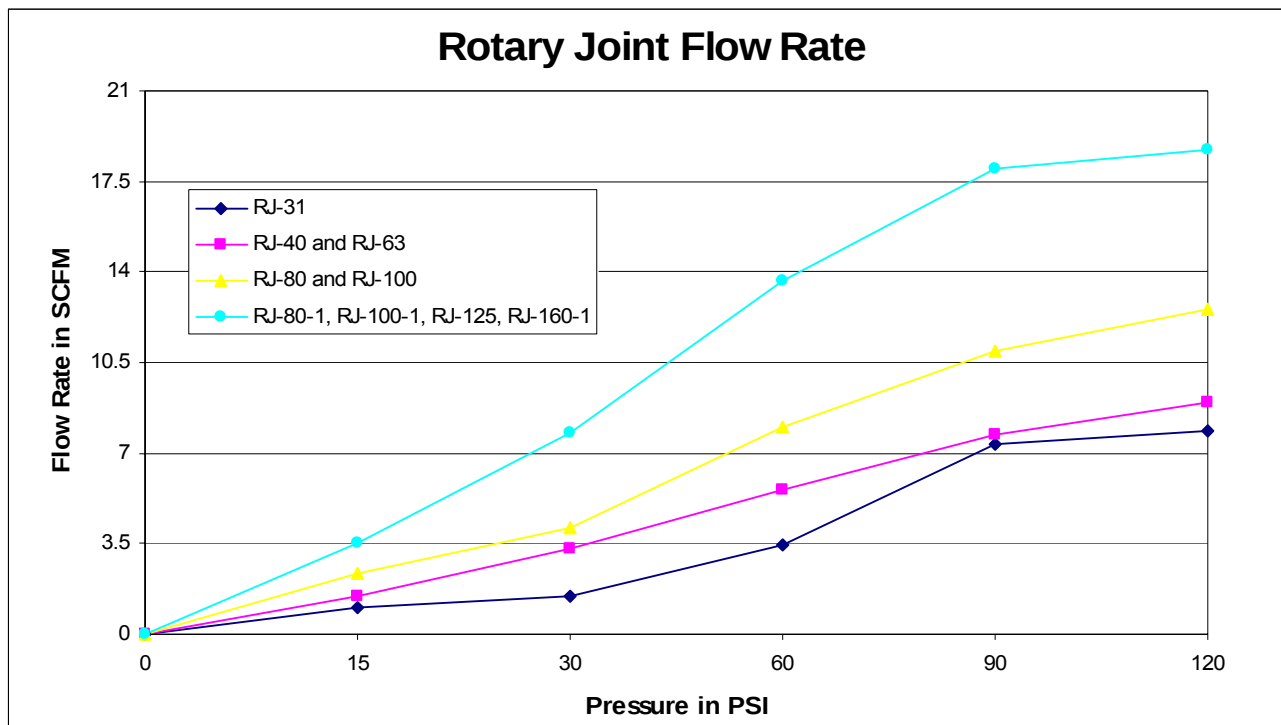


Figure 3.3—Air Connections



3.3 Power Supply



DANGER: Ensure that the power supply is switched off before connecting. Please also see safety instructions 7, 8, and 9 of Section 1 of this manual.

NOTE: Electricity supply: Max. 60V, 1A and BUS/digital signals.



DANGER: The cables at the cable exit point must have proper strain-relief to prevent cable damage. The last cable clip must be 100–300mm away from the cable exit point. The minimum bend radius for the cables is 15x cable diameter. The bend radius may be smaller if the cables are laid so that they are rigid.

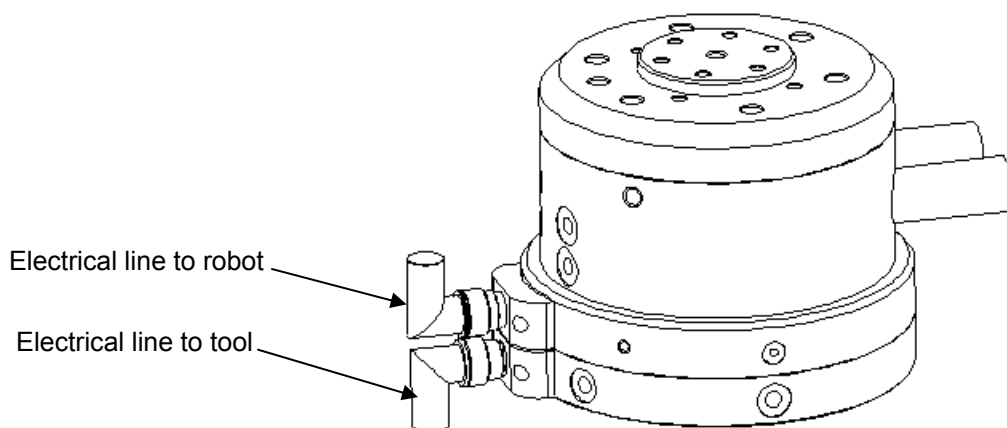


Figure 3.4—Cable Connections with Connector Block

4. Pinout Information

All the connectors are wired sequentially (1 to 1, 2 to 2, A to A, respectively). Face side shown below.

4.1 Rotary Joints with 4 Electrical Connections

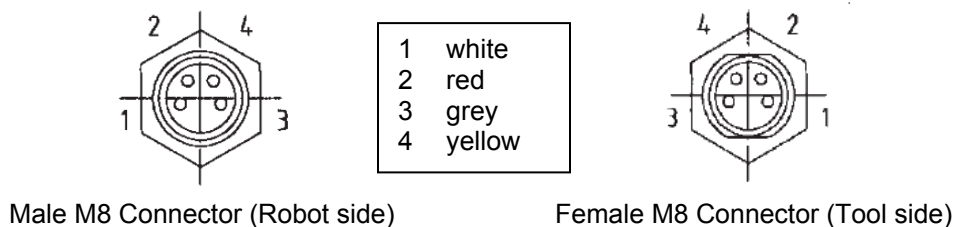


Figure 4.1—RJ-31-S, RJ-40-S, and RJ-50-S

4.2 Rotary Joints with 6 x Electrical Connections

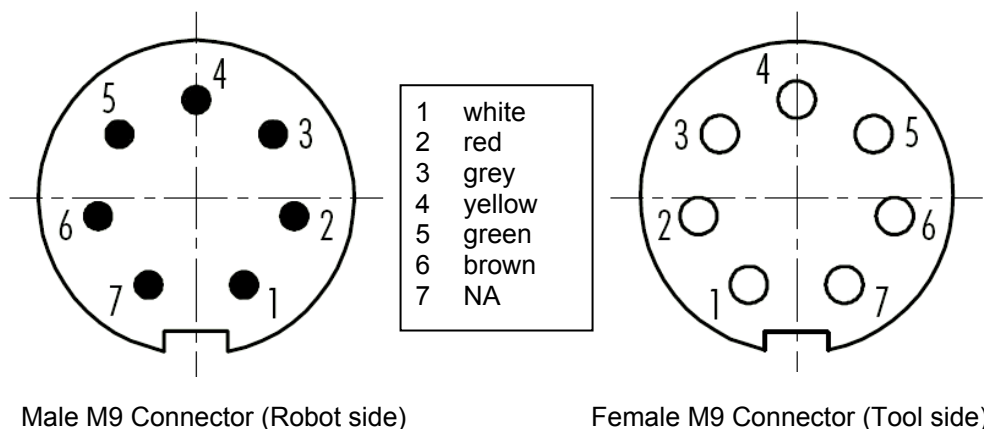


Figure 4.2—RJ-40-1-KS, RJ-50-1-KS, and RJ-63-KS, RJ-80-KS, and RJ-100-KS

4.3 Rotary Joints with 10 x Electrical Connections

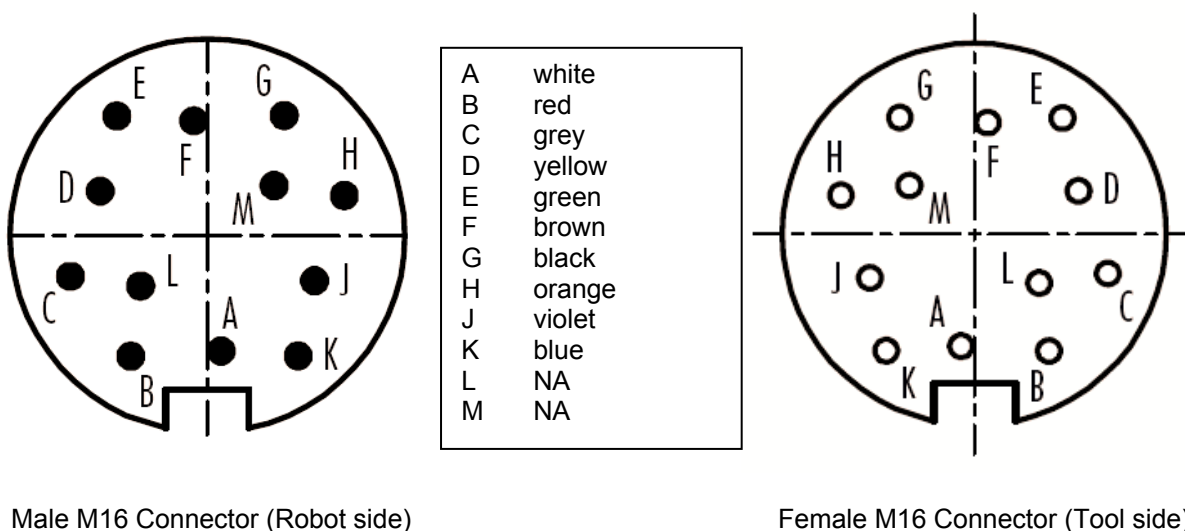


Figure 4.3—RJ-80-1-KS, RJ-100-1-KS, RJ-125-KS, RJ-125-1-KS, and RJ-160-KS,
RJ-160-1-KS, and RJ-200-KS

5. Maintenance



DANGER: Please follow the safety instructions in Section 1 of this manual.

Please note the following, to ensure correct function of the RJ:

1. The compressed air must be filtered (10 μm), dry, lubricated or non-lubricated.
2. Non-finished external components made of steel must be lubricated with oil or greased.
3. Carry out maintenance on the RJ every 1.5 million revolutions. During maintenance, the following parts must be coated with oil or grease before they are installed:
 - a. Treat all sliding surfaces with Fin Assembly Grease from Interflon or another Teflon-based lubricant of the same quality.
 - b. All seals are treated with Dow Corning BG20 or G-4500 or a lubricant of the same quality.
4. Always replace all seals each time the Rotary Joint is maintained. A complete set of seals can be obtained from ATI (see list of seal kits for each model, *Section 7—Specifications, Recommended Spare Parts, and Drawings*).
5. If not otherwise specified, all screws and nuts must be secured using Loctite 242[®] or equivalent, and tightened to a torque setting in accordance with specifications.

5.1 Dismantling the RJ

(Item numbers are shown in the assembly drawings, **Figures 3.2, 5.1, 5.2, and 5.3.**)



DANGER: Please follow the safety instructions in *Section 1—Safety* of this manual, especially points 7, 8, 9 and 12, and the notes at the start of this section. Take care not to damage any seals during assembly. Do not touch the slip ring electrical contacts. Handle them with great care.

1. Remove the pneumatic lines and disconnect the cables.
2. Undo the screws (Included with Item 82 when purchased or customer-supplied), remove them and take the TIP (Item 82, purchased separately or customer-supplied) off the main assembly. NOTE: The TIP (Item 82) and the main assembly (Item 81) are aligned using pins (Included with Item 82 when purchased or customer-supplied).
3. If used, remove the seals (Item 10—Figure 3.2 only. See Separate Parts Kits).
4. Remove the screws completely (Items 30, 31, 34, or 75 depending on the model—See Figures 5.1, 5.2, and 5.3).
5. Pull the main assembly off the RIP (Item 83). NOTE: RIP (Item 83) and main assembly are connected by means of pins (Item 20). Take the safety ring (Item 40) off the main assembly.
6. Remove the ring assembly (Item 84) carefully from the main shaft (Item 81).



DANGER: Do not allow the slip ring unit electrical contacts to come into contact with the main assembly (Item 81) or to be touched.

7. Remove all seals as per the list of sealing sets (see *Section 7—Specifications, Recommended Spare Parts, and Drawings*).
8. Clean all components (except for slip ring contacts in the housing cover thoroughly and check all components for possible defects and wear.
9. Clean the slip ring tracks in the main assembly using a clean cloth, and oil them.
10. Replace all the seals as per the list of sealing sets (see *Section 7—Specifications, Recommended Spare Parts, and Drawings*). A complete set of seals can be obtained from ATI. For assembly, follow the instructions in reverse order.

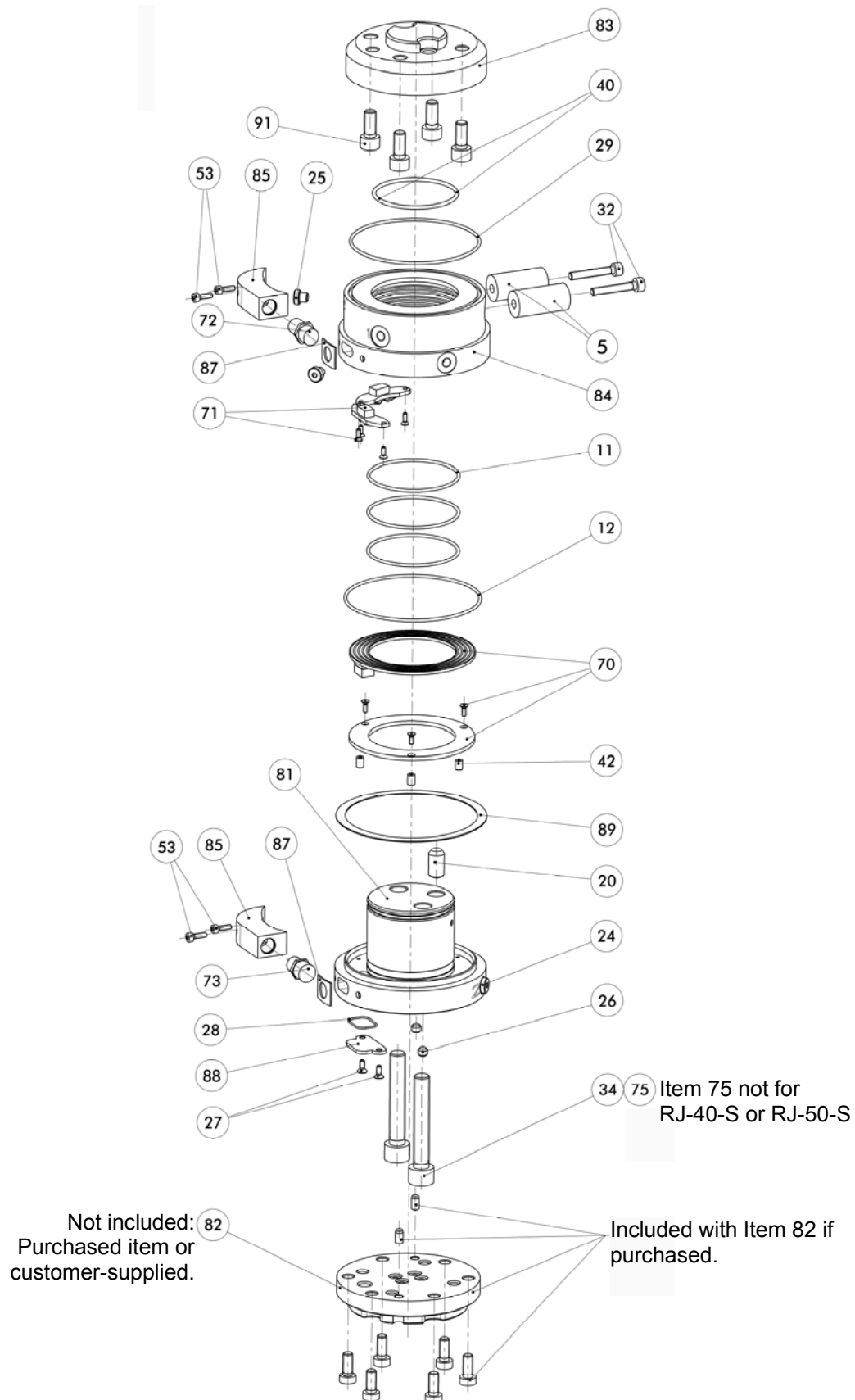


Figure 5.1—RJ 31-S, 40-S, and 50-S

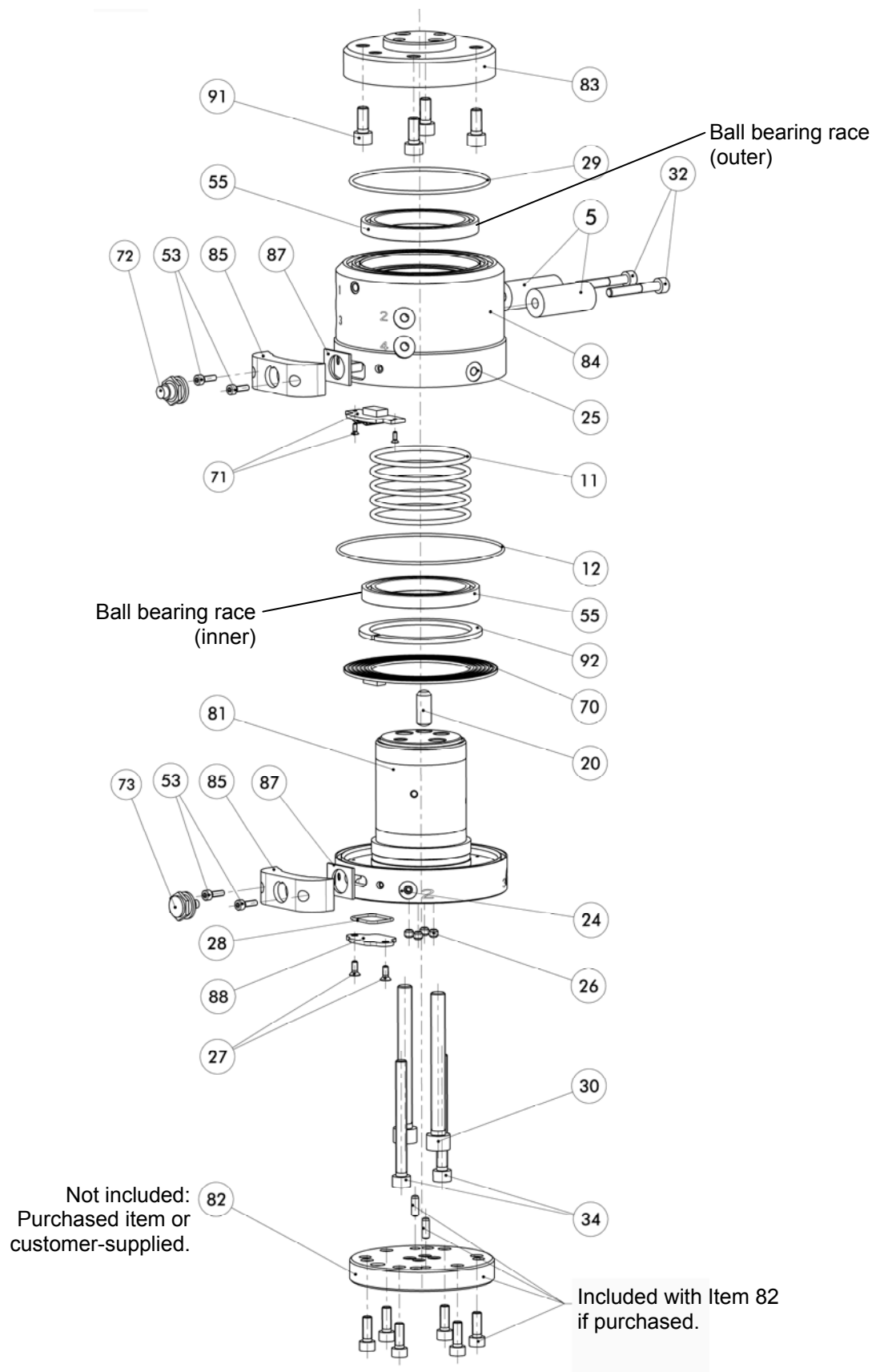


Figure 5.2—RJ 40-1-KS, 50-1-KS, and 63-KS

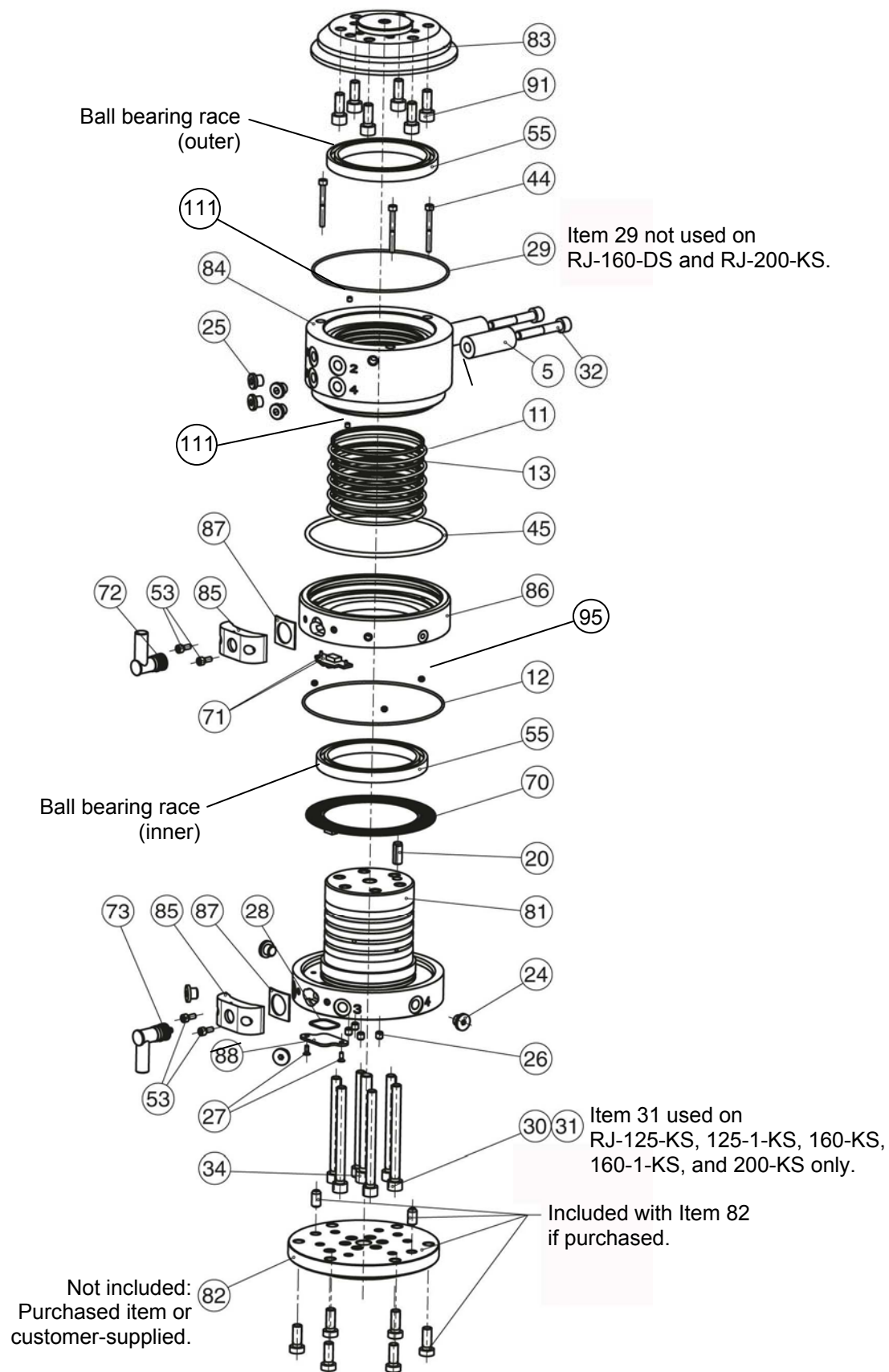


Figure 5.3—RJ 80-KS, 80-1-KS, 100-KS, 100-1-KS, 125-KS, 125-1-KS, 160-KS, 160-1-KS, and 200-KS

6. Troubleshooting

Symptom	Possible Cause / Correction
Air is escaping from the RJ when not in use	Verify that connections are fitted correctly Verify that connections that are not being used have been plugged.
Air is escaping from the RJ when in operating mode	Please return the RJ to ATI for testing.
Signals not being received	Verify that cables are connected correctly Verify that connectors are not mixed up.

7. Specifications, Recommended Spare Parts, and Drawings

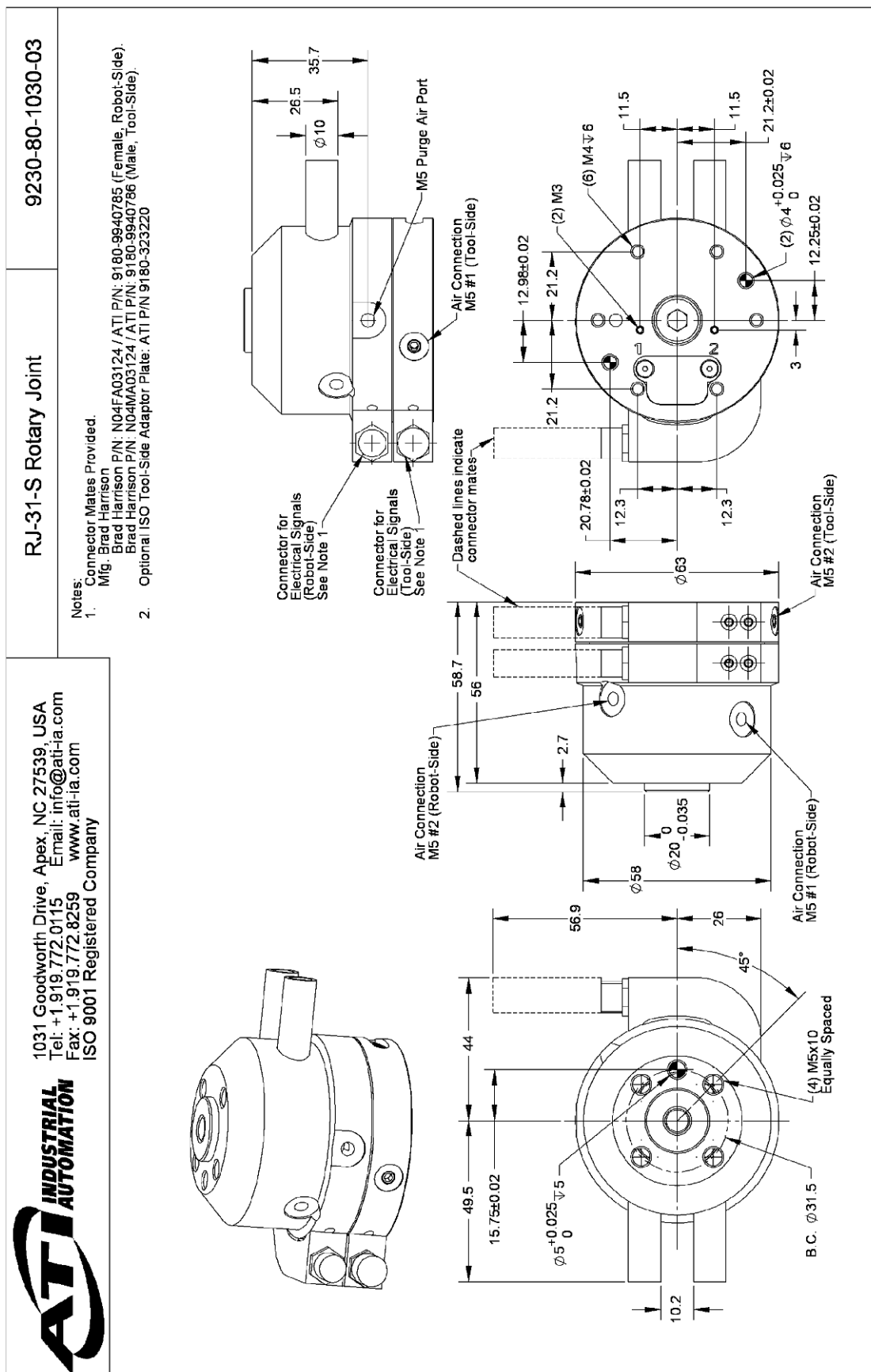
7.1 RJ-31-S

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
450 (2000)	177 (20)	1.1 (0.5)	120 (720)	22	8.9 (1.0)	13.3 (1.5)	2 @ 145 (10)	4 @ 60 (1)	0.35 (9)

Seal Kit Lists # 9180-371032				Separate Parts Kit #9180-5516-043 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 054	O-ring Ø 3 x 1 (Tool side adapter plate)	4	10	9611 054	O-ring Ø 3 x 1 (Tool side adapter plate)	2
11	9942 215	O-ring Ø 29.87 x 1.78	3	91	9907 484	Screw M5 x 10	4
12	9611 263	O-ring Ø 54 x 1.5	1	92	9682 017	Dowel Pin Ø M6 x 12	1
28	9611 001	O-ring Ø 13 x 1	1				
29	9611 118	O-ring Ø 50 x 1.5	1	Separate Parts Kit #9180-5516-033 (see #103 Spare Parts)			
87	9940 568	Flat seal	2	101	9940785	Right-angle plug	1
				102	9940786	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0307767-5	5M, 4 Pin, Robot side
9180-C-0307768-10	10M, 4 Pin, Robot side
Connectors	
9180-9940785	Female, Robot side, Brad Harrison N04FA03124
9180-9940786	Male, Tool side, Brad Harrison N04MA03124
Adapter Plates – Tool Side	
9180-323220	Adapter Plate
Seal Kit	
9180-371032	Seal Kit for RJ-31-S



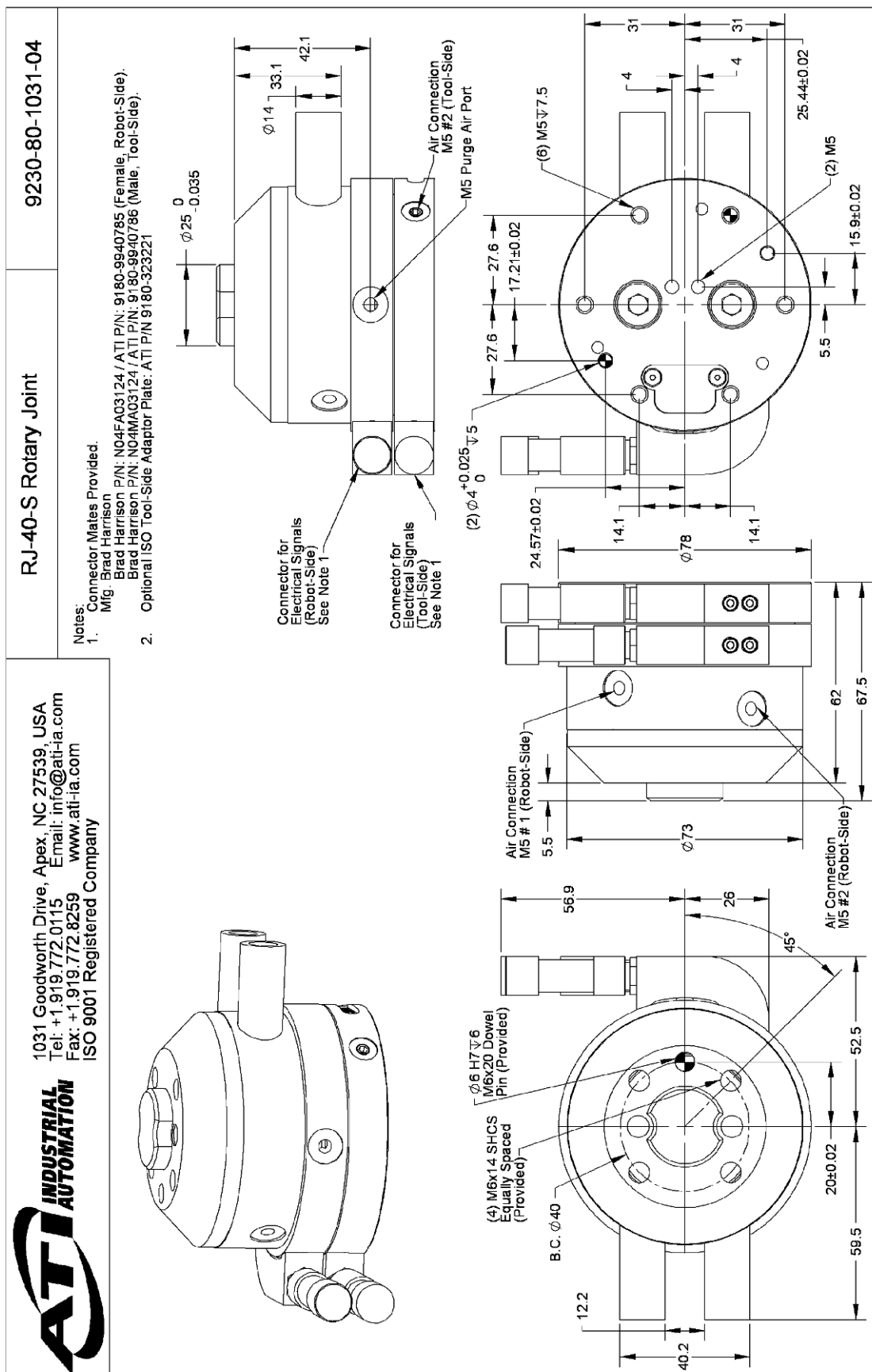
7.2 RJ-40-S

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
900 (4000)	620 (70)	1.9 (0.9)	120 (720)	22	13.3 (1.5)	22.1 (2.5)	2 @ 145 (10)	4 @ 60 (1)	0.43 (11)

Seal Kit Lists # 9180-371033				Separate Parts Kit #9180-5516-044 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 227	O-ring Ø 5 x 1 (Tool side adapter plate)	4	10	9611 112	O-ring Ø 4 x 1.5 (Tool side adapter plate)	4
11	9942 216	O-ring Ø 45 x 2	3	91	9907 487	Screw M6 x 14	4
12	9940 506	O-ring Ø 68 x 1.5	1	92	9681 001	Dowel Pin Ø M6 x 20	1
28	9611 001	O-ring Ø 13 x 1	1				
29	9939 232	O-ring Ø 65 x 1.5	1	Separate Parts Kit #9180-5516-033 (see #103 Spare Parts)			
87	9940 568	Flat Seal	2	101	9940 785	Right-angle plug	1
				102	9940 786	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0307767-5	5M, 4 Pin, Robot side
9180-C-0307768-10	10M, 4 Pin, Robot side
Connectors	
9180-9940785	Female, Robot side, Brad Harrison N04FA03124
9180-9940786	Male, Tool side, Brad Harrison N04MA03124
Adapter Plates – Tool Side	
9180-323221	Adapter Plate
Seal Kit	
9180-371033	Seal Kit for RJ-40-S and RJ-50-S



7.3 RJ-40-1-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
900 (4000)	975 (110)	4.4 (2.0)	110 (660)	22	53.1 (6.0)	70.8 (8.0)	4 @ 145 (10)	6 @ 60 (1)	0.43 (11)

Seal Kit Lists # 9180-371034				Separate Parts Kit #9180-5516-044 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 227	O-ring Ø 5 x 1 (Tool side adapter plate)	4	10	9611 112	O-ring Ø 4 x 1.5 (Tool side adapter plate)	4
11	9942 217	O-ring Ø 50.47 x 2.62	5	91	9907 487	Screw M6 x 14	4
12	9940 507	O-ring Ø 89 x 2	1	92	9681 001	Dowel Pin Ø M6 x 20	1
28	9935 429	O-ring Ø 19 x 1.5	1				
29	9911 199	O-ring Ø 66.4 x 1.78	1	Separate Parts Kit # 9180-5516-034 (see #103 Spare Parts)			
87	9940 569	Flat seal	2	101	9940 787	Right-angle plug	1
				102	9940 788	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323001-2	2M, 6 Pin, Robot side
9180-C-0323002-2	2M, 6 Pin, Tool side
9180-C-0323003-5	5M, 6 Pin, Robot side
9180-C-0323004-5	5M, 6 Pin, Tool side
Connectors	
9180-9940787	Male, Tool side, Binder 712 99-0421-70-07
9180-9940788	Female, Robot side, Binder 712 99-0422-70-07
Adapter Plates – Tool Side	
9180-323221	Adapter Plate
Seal Kit	
9180-371034	Seal Kit for RJ-40-1-KS and RJ-50-1-KS

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7.4 RJ-50-S

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
900 (4000)	620 (70)	2.1 (0.95)	120 (720)	22	13.3 (1.5)	22.1 (2.5)	2 @ 145 (10)	4 @ 60 (1)	0.43 (11)

Seal Kit Lists # 9180-371033				Separate Parts Kit #9180-5516-045 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 227	O-ring Ø 5 x 1 (Tool side adapter plate)	4	10	9611 112	O-ring Ø 4 x 1.5 (Tool side adapter plate)	4
11	9942 216	O-ring Ø 45 x 2	3	91	9907 487	Screw M6 x 14	4
12	9940 506	O-ring Ø 68 x 1.5	1	92	9681 001	Dowel Pin Ø M6 x 20	1
28	9611 001	O-ring Ø 13 x 1	1				
29	9939 232	O-ring Ø 65 x 1.5	1	Separate Parts Kit #9180-5516-033 (see #103 Spare Parts)			
87	9940 568	Flat seal	2	101	9940 785	Right-angle plug	1
				102	9940 786	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0307767-5	5M, 4 Pin, Robot side
9180-C-0307768-10	10M, 4 Pin, Robot side
Connectors	
9180-9940785	Female, Robot side, Brad Harrison N04FA03124
9180-9940786	Male, Tool side, Brad Harrison N04MA03124
Adapter Plates – Tool Side	
9180-323222	Adapter Plate
Seal Kit	
9180-371033	Seal Kit for RJ-40-S and RJ-50-S



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ISO 9001 Registered Company

RJ-50-S Rotary Joint

9230-80-1033-05

Notes:

1. Connector Mates (Provided):

Mfg.: Brad Harrison

Brad Harrison P/N: N04FA03124 / ATI P/N 9180-9940785 (Female, Robot Side)

Brad Harrison P/N: N04MA03124 / ATI P/N 9180-9940786 (Male, Tool Side)

2. Optional ISO Tool Side Adapter Plate: ATI P/N 9180-323222

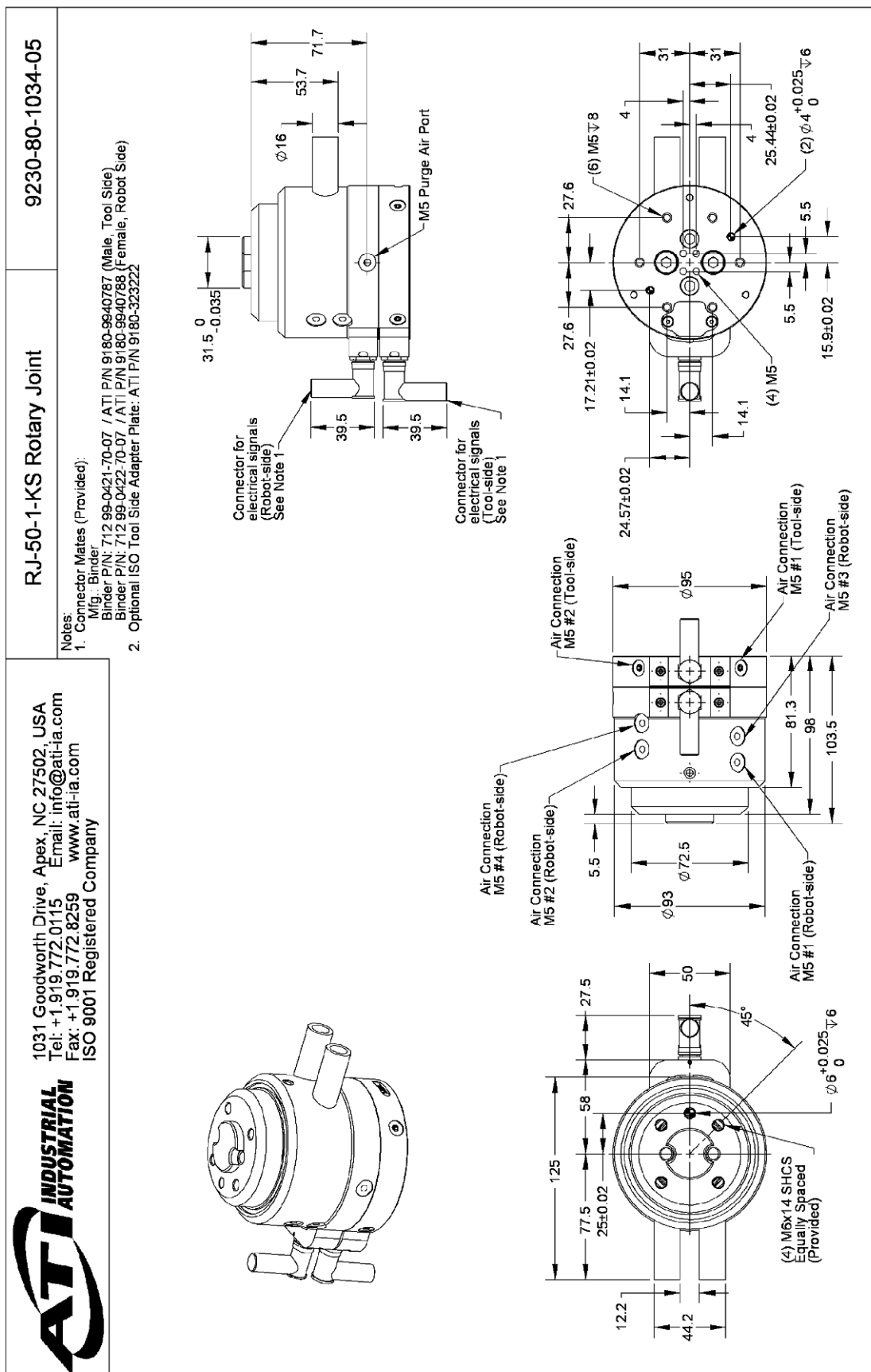
7.5 RJ-50-1-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
900 (4000)	975 (110)	4.6 (2.1)	110 (660)	22	53.1 (6.0)	70.8 (8.0)	4 @ 145 (10)	6 @ 60 (1)	0.43 (11)

Seal Kit Lists # 9180-371034				Separate Parts Kit #9180-5516-045 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 227	O-ring Ø 5 x 1 (Tool side adapter plate)	4	10	9611 112	O-ring Ø 4 x 1.5 (Tool side adapter plate)	4
11	9942 217	O-ring Ø 50.47 x 2.62	5	91	9907 487	Screw M6 x 14	4
12	9940 507	O-ring Ø 89 x 2	1	92	9681 001	Dowel Pin Ø M6 x 20	1
28	9935 429	O-ring Ø 19 x 1.5	1				
29	9911 199	O-ring Ø 66.4 x 1.78	1	Separate Parts Kit #9180-5516-034 (see #103 Spare Parts)			
87	9940 569	Flat seal	2	101	9940 787	Right-angle plug	1
				102	9940 788	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323001-2	2M, 6 Pin, Robot side
9180-C-0323002-2	2M, 6 Pin, Tool side
9180-C-0323003-5	5M, 6 Pin, Robot side
9180-C-0323004-5	5M, 6 Pin, Tool side
Connectors	
9180-9940787	Male, Tool side, Binder 712 99-0421-70-07
9180-9940788	Female, Robot side, Binder 712 99-0422-70-07
Adapter Plates – Tool Side	
9180-323222	Adapter Plate
Seal Kit	
9180-371034	Seal Kit for RJ-40-1-KS and RJ-50-1-KS



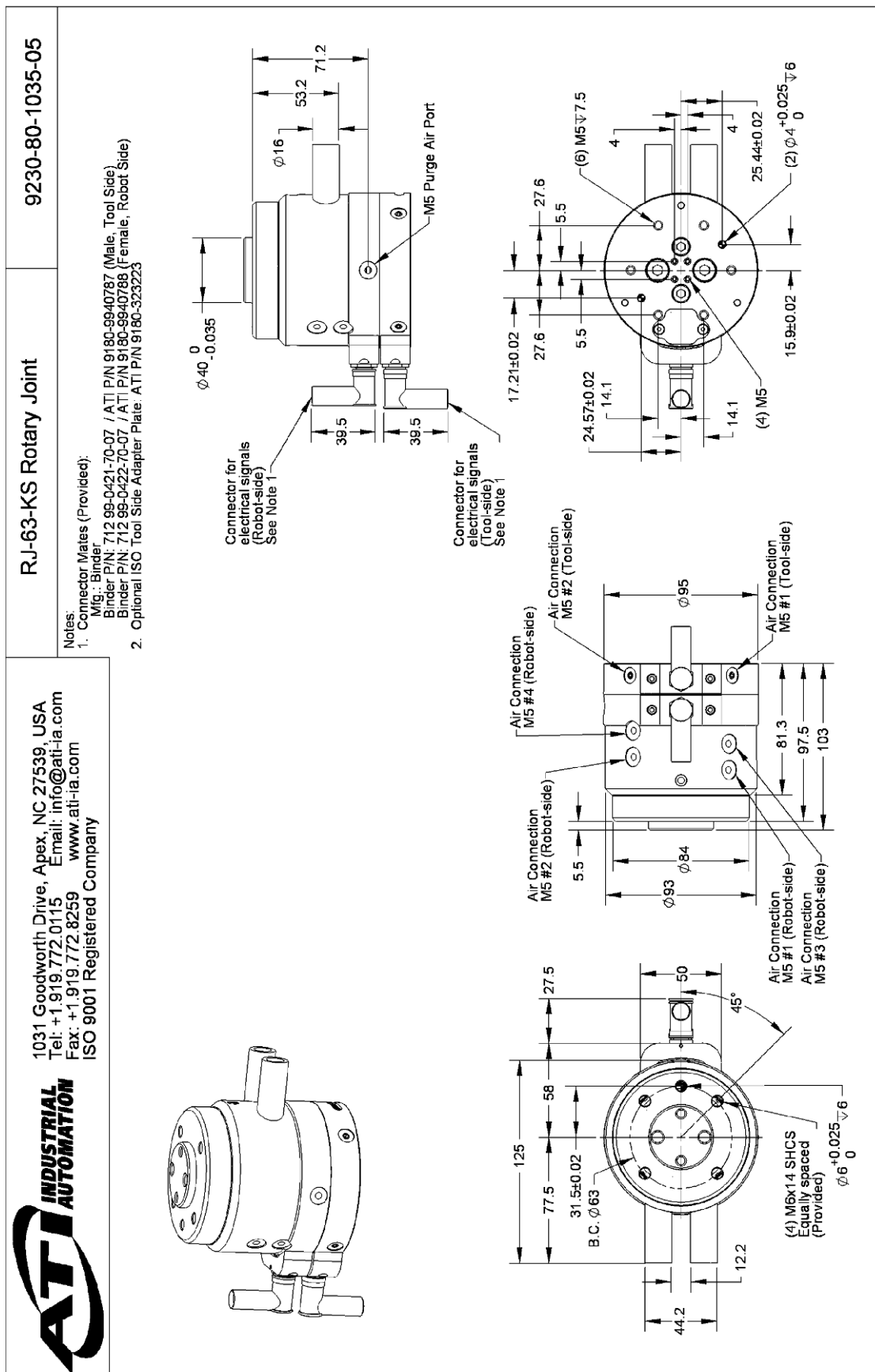
7.6 RJ-63-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
1350 (6000)	1062 (120)	4.9 (2.2)	110 (660)	22	53.1 (6.0)	70.8 (8.0)	4 @ 145 (10)	6 @ 60 (1)	0.43 (11)

Seal Kit Lists # 9180-371035				Separate Parts Kit #9180-5516-046 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 227	O-ring $\varnothing$ 5 x 1 (Tool side adapter plate)	4	10	9611 227	O-ring $\varnothing$ 5 x 1 (Tool side adapter plate)	4
11	9942 217	O-ring $\varnothing$ 50.47 x 2.62	5	91	9907 487	Screw M6 x 14	4
12	9940 507	O-ring $\varnothing$ 89 x 2	1	92	9681 001	Dowel Pin $\varnothing$ M6 x 20	1
28	9935 429	O-ring $\varnothing$ 19 x 1.5	1				
29	9981 771	O-ring $\varnothing$ 75 x 2.5	1	Separate Parts Kit #9180-5516-034 (see #104 Spare Parts)			
87	9940 569	Flat seal	2	101	9940 787	Right-angle plug	1
				102	9940 788	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323001-2	2M, 6 Pin, Robot side
9180-C-0323002-2	2M, 6 Pin, Tool side
9180-C-0323003-5	5M, 6 Pin, Robot side
9180-C-0323004-5	5M, 6 Pin, Tool side
Connectors	
9180-9940787	Male, Tool side, Binder 712 99-0421-70-07
9180-9940788	Female, Robot side, Binder 712 99-0422-70-07
Adapter Plates – Tool Side	
9180-323223	Adapter Plate
Seal Kit	
9180-371035	Seal Kit



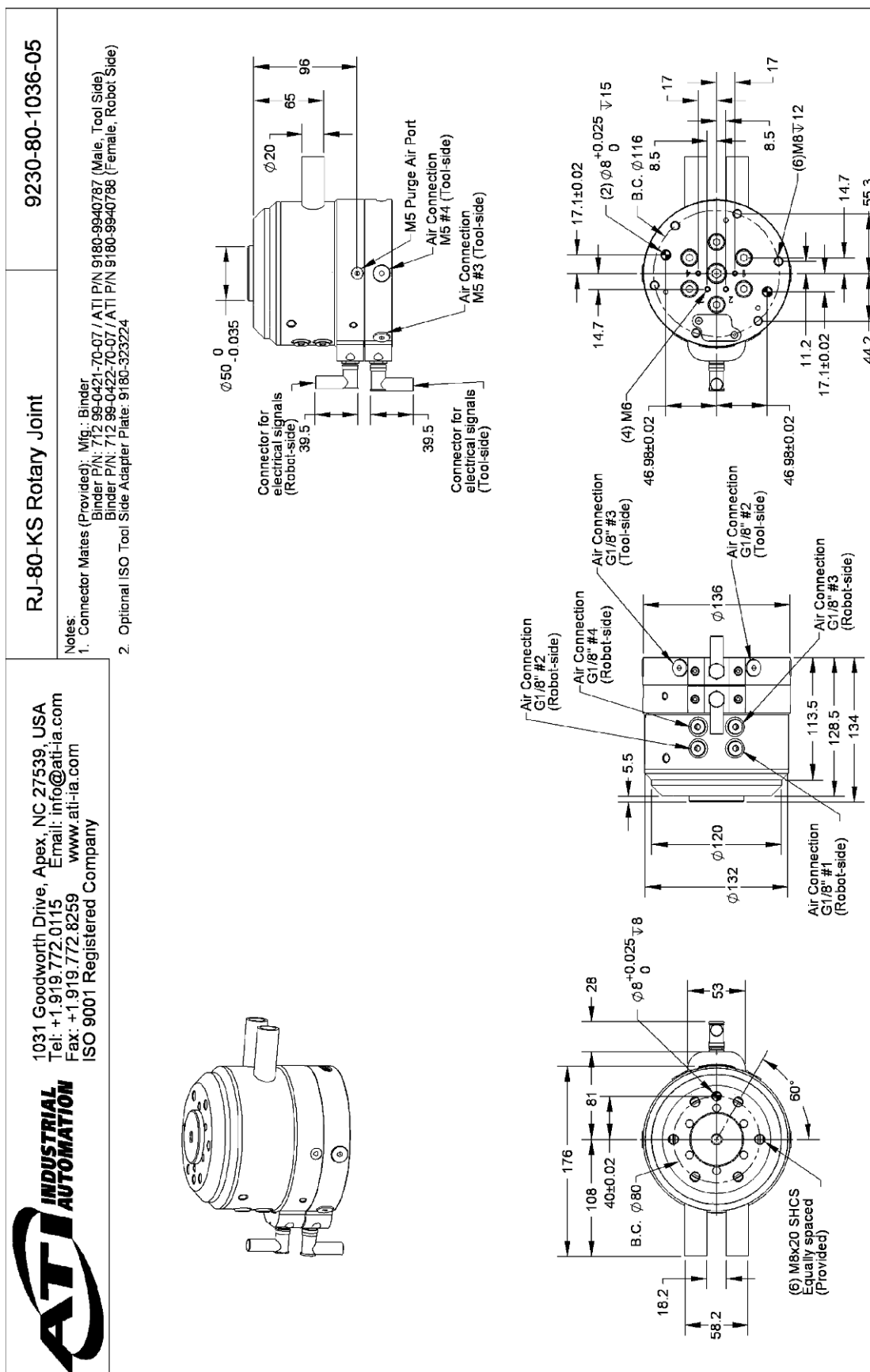
7.7 RJ-80-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
2700 (12000)	2570 (290)	11.9 (5.4)	100 (600)	22	177.0 (20.0)	283.2 (32.0)	4 @ 145 (10)	6 @ 60 (1)	0.67 (17)

Seal Kit Lists # 9180-5516845				Separate Parts Kit #9180-5516-047 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4	10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4
11	9942 382	Sealing ring $\varnothing$ 80 x 82.75 x 83.5 x 3	5	91	9907 432	Screw M8 x 20	6
12	9938 711	O-ring $\varnothing$ 124 x 3	1	92	9682 033	Dowel Pin $\varnothing$ M6 x 24	1
13	9942 379	O-ring $\varnothing$ 83.8 x 2.62	5				
28	9611 096	O-ring $\varnothing$ 22 x 1.5	1				
29	9980 454	O-ring $\varnothing$ 122 x 3	1	Separate Parts Kit #9180-5516-034 (see #103 Spare Parts)			
45	9940 508	O-ring $\varnothing$ 120 x 3	1	101	9940 787	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 788	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323001-2	2M, 6 Pin, Robot side
9180-C-0323002-2	2M, 6 Pin, Tool side
9180-C-0323003-5	5M, 6 Pin, Robot side
9180-C-0323004-5	5M, 6 Pin, Tool side
Connectors	
9180-9940787	Male, Tool side, Binder 712 99-0421-70-07
9180-9940788	Female, Robot side, Binder 712 99-0422-70-07
Adapter Plates – Tool Side	
9180-323224	Adapter Plate
Seal Kit	
9180-5516845	Seal Kit



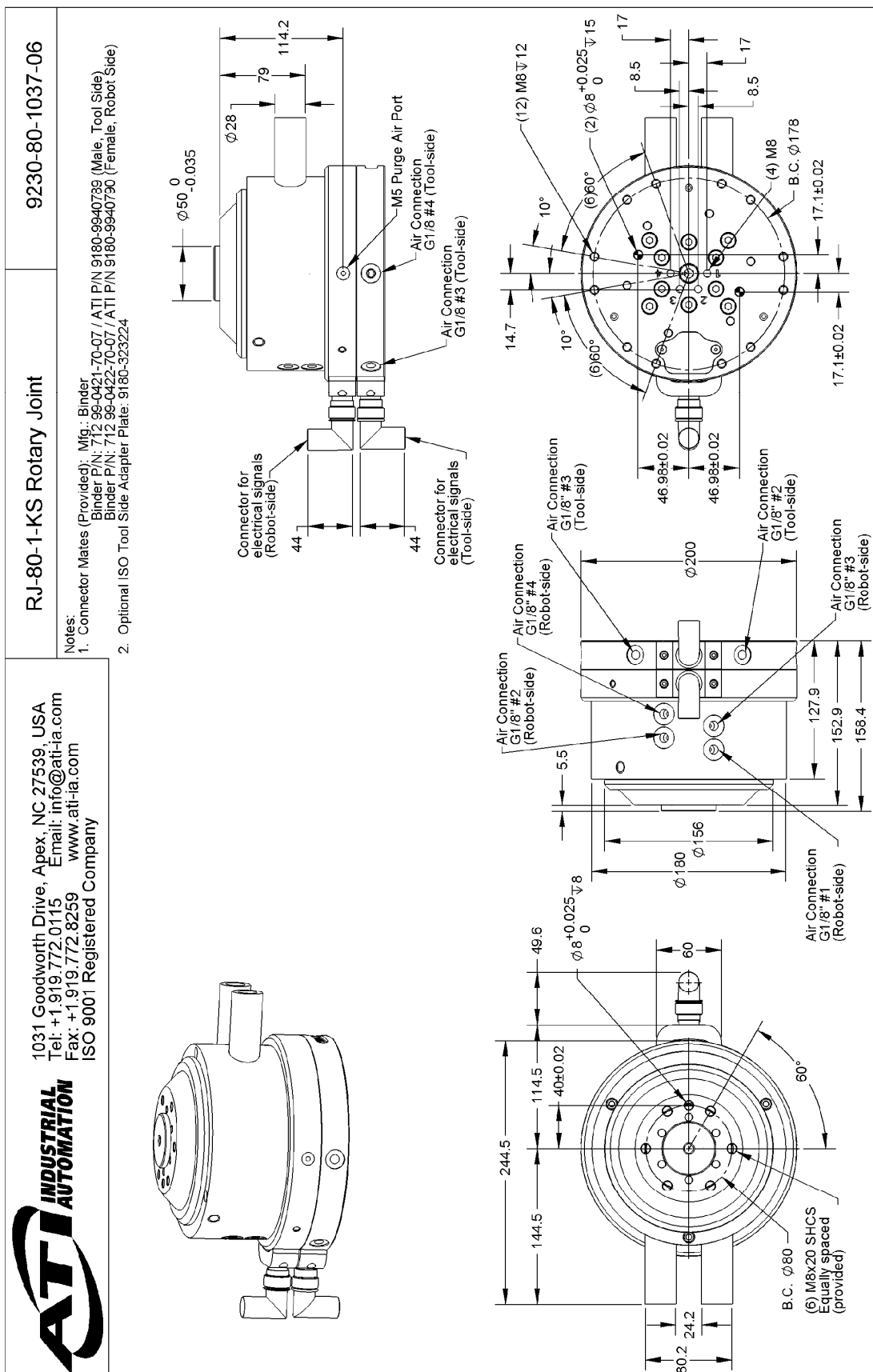
7.8 RJ-80-1-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
2700 (12000)	4430 (500)	24.3 (11)	90 (540)	17	371.7 (42.0)	531.0 (60.0)	4 @ 145 (10)	10 @ 60 (1)	0.91 (23)

Seal Kit Lists # 9180-5516847				Separate Parts Kit #9180-5516-052 (see #97 Parts List)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4	10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4
11	9942 383	Sealing ring $\varnothing$ 110 x 114.7 x 116 x 4	5	91	9660 432	Screw M8 x 20	6
12	9907 437	O-ring $\varnothing$ 185 x 5	1	92	9682 033	Dowel Pin $\varnothing$ M6 x 24	1
13	9942 380	O-ring $\varnothing$ 115 x 3.5	5				
28	9611 053	O-ring $\varnothing$ 35 x 1.5	1				
29	9980 057	O-ring $\varnothing$ 144 x 3	1	Separate Parts Kit #9180-5516-035 (see #103 Parts List)			
45	9907 401	O-ring $\varnothing$ 148 x 3	1	101	9940 789	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 10 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323224	Adapter Plate
Seal Kit	
9180-5516847	Seal Kit



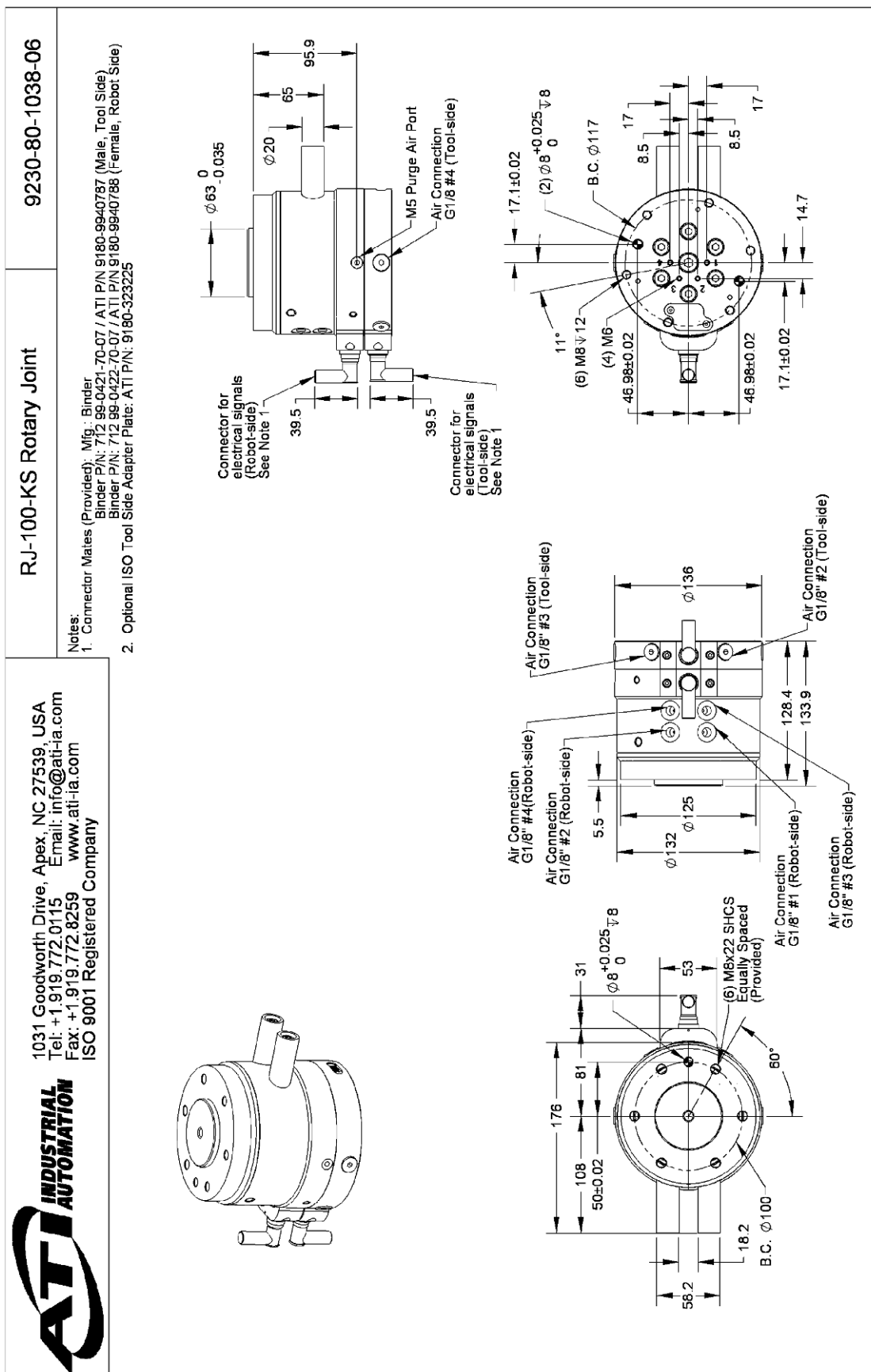
7.9 RJ-100-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
2700 (12000)	2570 (290)	12.3 (5.6)	100 (600)	22	177.0 (20.0)	283.2 (32.0)	4 @ 145 (10)	6 @ 60 (1)	0.67 (17)

Seal Kit Lists # 9180-5516846				Separate Parts Kit #9180-5516-048 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4	10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4
11	9942 382	Sealing ring $\varnothing$ 80 x 82.75 x 83.5 x 3	5	91	9660 430	Screw M8 x 22	6
12	9938 711	O-ring $\varnothing$ 124 x 3	1	92	9682 033	Dowel Pin $\varnothing$ M6 x 24	1
13	9942 379	O-ring $\varnothing$ 83.8 x 2.62	5				
28	9611 096	O-ring $\varnothing$ 22 x 1.5	1				
29	9980 454	O-ring $\varnothing$ 122 x 3	1	Separate Parts Kit #9180-5516-034 (see #103 Spare Parts)			
45	9940 508	O-ring $\varnothing$ 120 x 3	1	101	9940 787	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 788	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323001-2	2M, 6 Pin, Robot side
9180-C-0323002-2	2M, 6 Pin, Tool side
9180-C-0323003-5	5M, 6 Pin, Robot side
9180-C-0323004-5	5M, 6 Pin, Tool side
Connectors	
9180-9940787	Male, Tool side, Binder 712 99-0421-70-07
9180-9940788	Female, Robot side, Binder 712 99-0422-70-07
Adapter Plates – Tool Side	
9180-323225	Adapter Plate
Seal Kit	
9180-5516846	Seal Kit



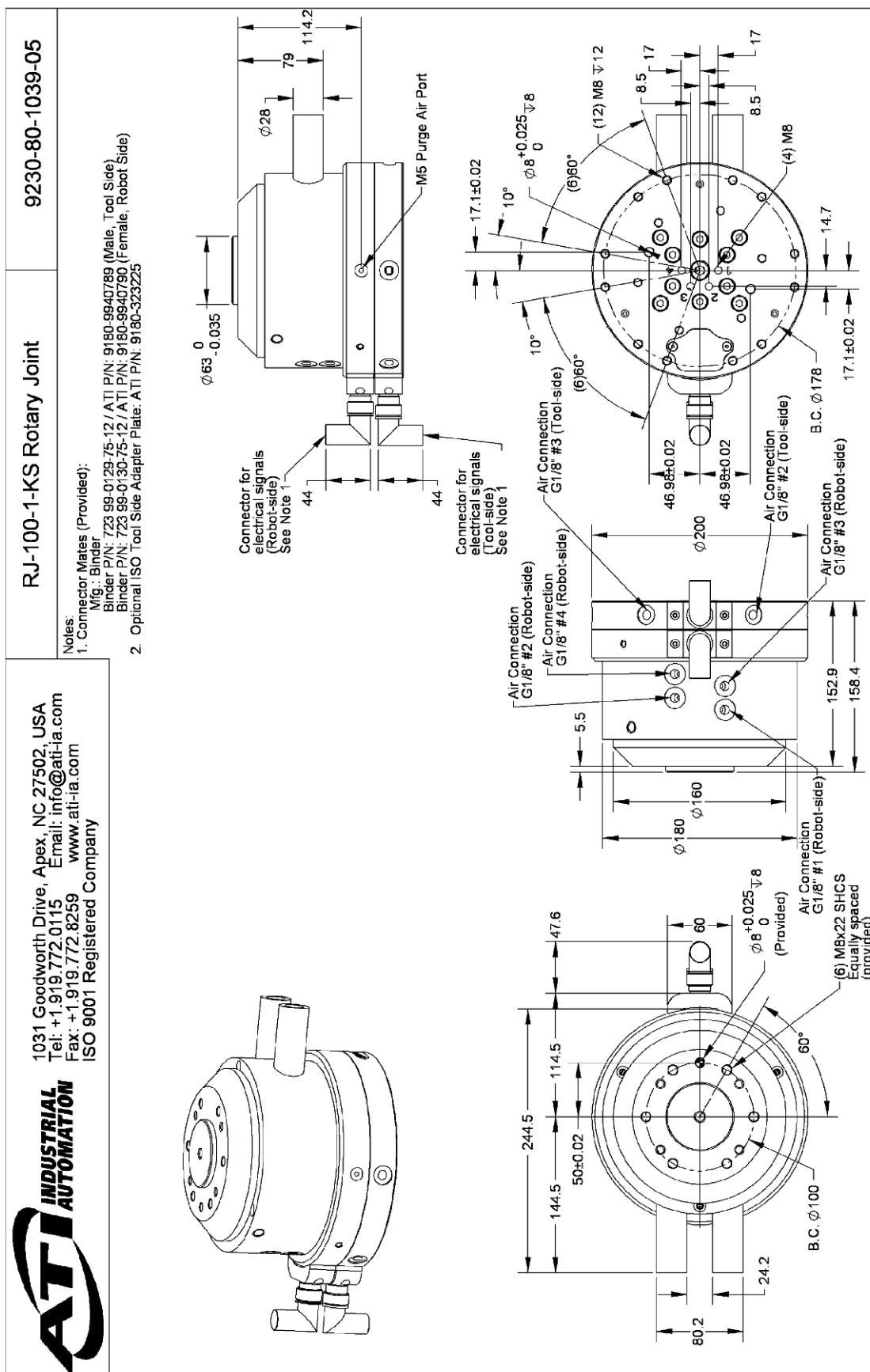
7.10 RJ-100-1-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
2700 (12000)	4430 (500)	24.9 (11.3)	90 (540)	17	371.7 (42.0)	531.0 (60.0)	4 @ 145 (10)	10 @ 60 (1)	0.91 (23)

Seal Kit Lists # 9180-5516847				Separate Parts Kit #9180-5516-053 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 083	O-ring $\varnothing$ 6 x 2	4	10	9611 083	O-ring $\varnothing$ 6 x 2 (Tool side adapter plate)	4
11	9942 383	Sealing ring $\varnothing$ 110 x 114.7 x 116 x 4	5	91	9660 430	Screw M8 x 22	6
12	9907 437	O-ring $\varnothing$ 185 x 5	1	92	9682 033	Dowel Pin $\varnothing$ M6 x 24	1
13	9942 380	O-ring $\varnothing$ 115 x 3.5	5				
28	9611 053	O-ring $\varnothing$ 35 x 1.5	1				
29	9980 057	O-ring $\varnothing$ 144 x 3	1	Separate Parts Kit #9180-5516-035 (see #103 Spare Parts)			
45	9607 401	O-ring $\varnothing$ 148 x 3	1	101	9940 789	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 10 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323225	Adapter Plate
Seal Kit	
9180-5516847	Seal Kit



7.11 RJ-125-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
4050 (18000)	4870 (550)	29.8 (13.5)	90 (540)	17	371.7 (42.0)	531.0 (60.0)	4 @ 145 (10)	10 @ 60 (1)	0.91 (23)

Seal Kit Lists # 9180-5516849				Separate Parts Kit #9180-5516-049 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 055	O-ring Ø 8 x 2 (Tool side adapter plate)	4	10	9611 055	O-ring Ø 8 x 2 (Tool side adapter plate)	4
11	9942 383	Sealing ring Ø 110 x 114.7 x 116 x 4	5	91	9660 095	Screw M10 x 30	6
12	9907 437	O-ring Ø 185 x 5	1	92	9937 580	Dowel Pin Ø M6 x 30	1
13	9942 380	O-ring Ø 115 x 3	5				
28	9611 053	O-ring Ø 35 x 1.5	1				
29	9907 404	O-ring Ø 145 x 3	1	Separate Parts Kit #9180-5516-035 (see #103 Spare Parts)			
45	9907 401	O-ring Ø 148 x 3	1	101	9940 789	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 10 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323226	Adapter Plate
Seal Kit	
9180-5516849	Seal Kit

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RJ-125-KS Rotary Joint

9230-80-1040-07

Notes:

- Connector Mates (Provided):
 Mfg.: Binder
 Binder P/N: 723 99-0129-75-12 / ATI P/N 9180-9940789 (Male, Tool Side)
 Binder P/N: 723 99-0130-75-12 / ATI P/N 9180-9940790 (Female, Robot Side)
 2. Optional ISO Tool Side Adapter Plate: ATI P/N 9180-323226

Technical drawing of the RJ-125-KS Rotary Joint, showing three views: isometric, front, and top.

Isometric View: Shows the overall shape of the rotary joint. Key features include the air connections (G1/8" #2, #3, #4) and electrical connections (G1/8" #2, #3, #4) on the top flange. The dimensions shown are 144.5, 114.5, 49.6, 62.5±0.02, 80.2, 24.2, and 80.2.

Front View: Shows the top flange with 12 air connections (6 on each side) and 12 electrical connections. The dimensions shown are 244.5, 144.5, 114.5, 49.6, 62.5±0.02, 80.2, 24.2, and 80.2. The air connections are labeled G1/8" #2 (Robot-side), G1/8" #3 (Tool-side), and G1/8" #4 (Robot-side). The electrical connections are labeled G1/8" #2 (Tool-side), G1/8" #3 (Robot-side), and G1/8" #4 (Robot-side). The top flange has a B.C. Ø125.

Top View: Shows the side profile of the rotary joint. Key features include the air connections (G1/8" #2, #3, #4) and electrical connections (G1/8" #2, #3, #4) on the top flange. The dimensions shown are 144.5, 114.5, 49.6, 62.5±0.02, 80.2, 24.2, and 80.2. The air connections are labeled G1/8" #2 (Robot-side), G1/8" #3 (Tool-side), and G1/8" #4 (Robot-side). The electrical connections are labeled G1/8" #2 (Tool-side), G1/8" #3 (Robot-side), and G1/8" #4 (Robot-side). The top flange has a B.C. Ø125.

Dimensions:

- Overall length: 244.5
- Flange thickness: 144.5
- Flange diameter: 114.5
- Flange hole diameter: 49.6
- Flange hole spacing: 62.5±0.02
- Flange hole diameter: 80.2
- Flange hole spacing: 24.2
- Flange hole diameter: 80.2

Connections:

- Air Connection G1/8" #2 (Robot-side)
- Air Connection G1/8" #3 (Tool-side)
- Air Connection G1/8" #4 (Robot-side)
- Air Connection G1/8" #2 (Tool-side)
- Air Connection G1/8" #3 (Robot-side)
- Air Connection G1/8" #4 (Robot-side)
- Electrical Connection G1/8" #2 (Tool-side)
- Electrical Connection G1/8" #3 (Robot-side)
- Electrical Connection G1/8" #4 (Robot-side)

Other Features:

- Connector for electrical signals (Robot-side) See Note 1
- Connector for electrical signals (Tool-side) See Note 1
- M5 Purge Air Port
- Ø80 -0.035
- Ø28
- 83
- 118.3
- 10°
- 10°
- 10°
- 17.1±0.02
- (6) Ø60°
- (12) M8
- 17
- 8.5
- 8.5
- 17
- 46.98±0.02
- (4) M8
- B.C. Ø178
- (2) Ø8 -0.025
- 15
- 17.1±0.02
- 14.7

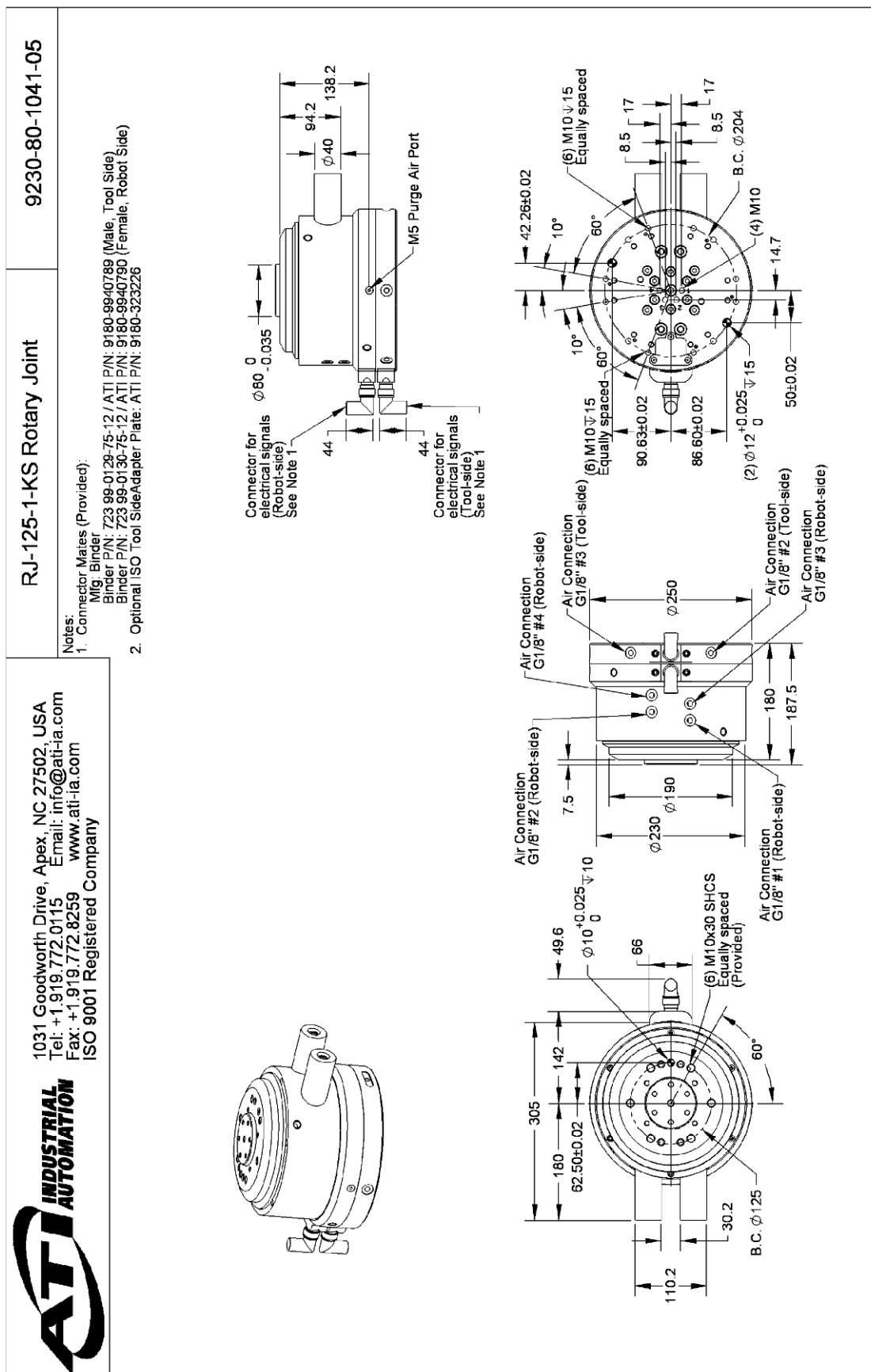
7.12 RJ-125-1-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
4050 (18000)	7260 (820)	46.3 (21.0)	70 (420)	15	575.3 (65.0)	840.8 (95.0)	4 @ 145 (10)	10 @ 60 (1)	1.14 (29)

Seal Kit Lists # 9180-5516851				Separate Parts Kit #9180-5516-054 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 079	O-ring $\varnothing$ 10 x 2 (Tool side adapter plate)	4	10	9611 055	O-ring $\varnothing$ 8 x 2 (Tool side adapter plate)	4
11	9942 384	Sealing ring $\varnothing$ 150 x 154.6 x 155.5 x 4	5	91	9660 095	Screw M10 x 30	6
12	9966 388	O-ring $\varnothing$ 230 x 5	1	92	9937 580	Dowel Pin $\varnothing$ M6 x 30	1
13	9942 381	O-ring $\varnothing$ 155 x 3.5	5				
28	9611 260	O-ring $\varnothing$ 40 x 1.5	1				
29	9966 390	O-ring $\varnothing$ 195 x 4	1	Separate Parts Kit #9180-5516-035 (see #103 Spare Parts)			
45	9940 509	O-ring $\varnothing$ 98 x 5	1	101	9940 789	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 10 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323226	Adapter Plate
Seal Kit	
9180-5516851	Seal Kit



7.13 RJ-160-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
4050 (18000)	4870 (550)	30.9 (14.0)	90 (540)	15	371.7 (42.0)	531.0 (60.0)	4 @ 145 (10)	10 @ 60 (1)	0.91 (23)

Seal Kit Lists # 9180-5516850				Separate Parts Kit #9180-5516-050 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 055	O-ring $\varnothing$ 8 x 2 (Tool side adapter plate)	4	10	9611 055	O-ring $\varnothing$ 8 x 2 (Tool side adapter plate)	4
11	9942 383	Sealing ring $\varnothing$ 110 x 114.7 x 116 x 4	5	91	9660 095	Screw M10 x 30	6
12	9907 437	O-ring $\varnothing$ 185 x 5	1	92	9937 580	Dowel Pin $\varnothing$ M6 x 30	1
13	9942 380	O-ring $\varnothing$ 115 x 3.5	5				
28	9611 053	O-ring $\varnothing$ 35 x 1.5	1				
45	9907 401	O-ring $\varnothing$ 148 x 3	1	Separate Parts Kit #9180-5516-035 (see #103 Spare Parts)			
87	9940 570	Flat seal	2	101	9940 789	Right-angle plug	1
				102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 10 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323227	Adapter Plate
Seal Kit	
9180-5516850	Seal Kit



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ISO 9001 Registered Company

RJ-160-KS Rotary Joint

9230-80-1042-05

Notes:

1. Connector Mates (Provided): Mfg.: Binder
Binder P/N: 723 99-0129-75-12 / ATI P/N: 9180-99-40789 (Male, Tool Side)
Binder P/N: 723 99-0130-75-12 / ATI P/N: 9180-99-40790 (Female, Robot Side)
2. Optional ISO Tool Side Adapter Plate: ATI P/N: 9180-323227

Technical specifications and dimensions from the drawings:

- Air Connections:** G1/8" #2 (Robot-side), G1/8" #4 (Robot-side), G1/8" #3 (Tool-side), G1/8" #2 (Tool-side), G1/8" #3 (Robot-side), G1/8" #1 (Robot-side).
- Electrical Contacts:** (6) M10x30 SHCS Equally spaced (Provided), (6) 60°, (12) M8, (4) M8.
- Dimensions:**
 - Overall Diameter: $\phi 200$, $\phi 180$
 - Contact Circle Diameter: B.C. $\phi 160$
 - Mounting Flange Thickness: 24.2
 - Body Height: 80.2
 - Air Connection Heights: 156.9, 164.4
 - Front View Spacing: 114.5, 80±0.02
 - Side View Spacing: 17.1±0.02, 14.7

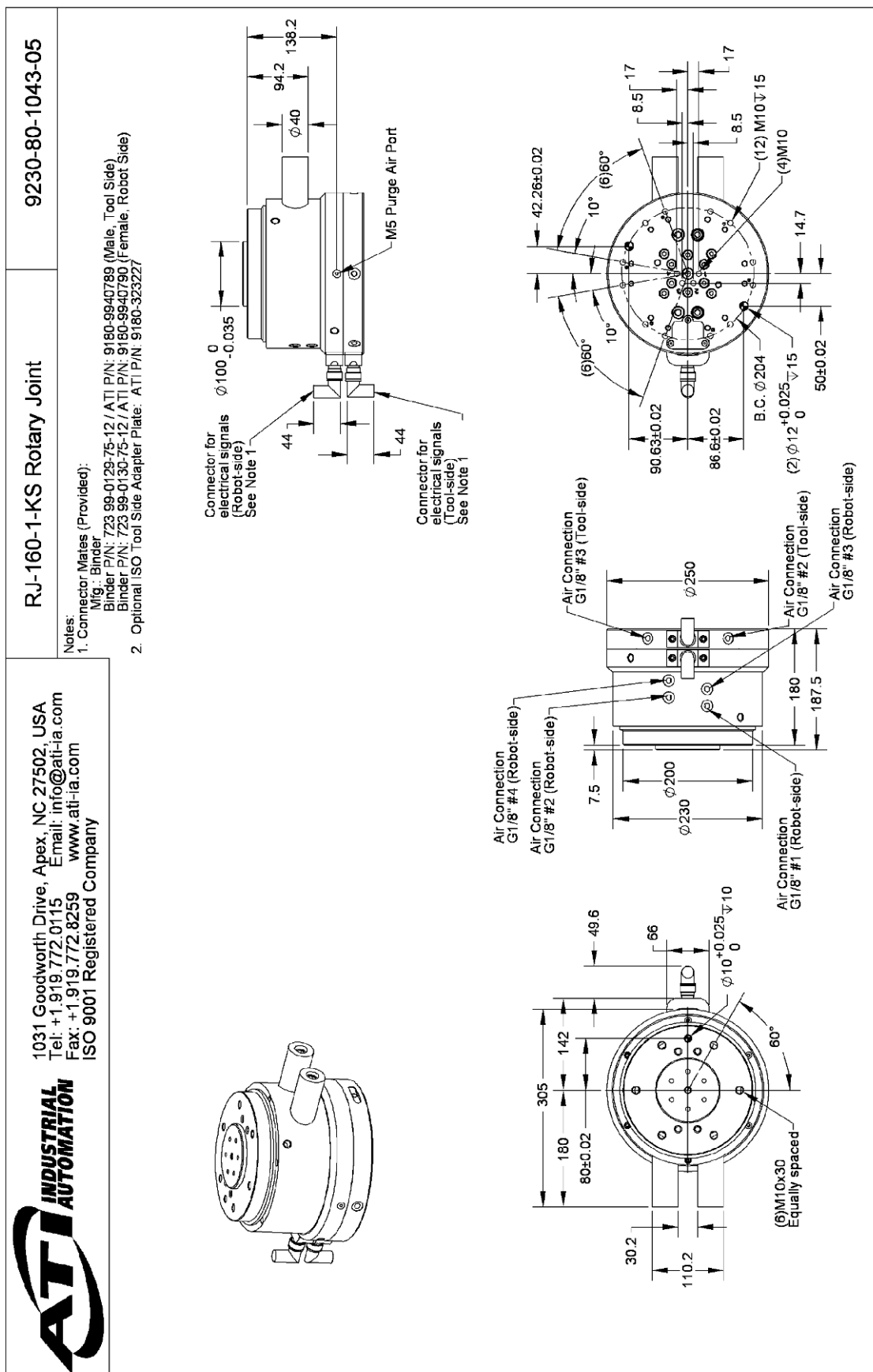
7.14 RJ-160-1-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
4050 (18000)	7260 (820)	48.5 (22.0)	70 (420)	15	575.3 (65.0)	840.8 (95.0)	4 @ 145 (10)	10 @ 60 (1)	1.14 (29)

Seal Kit Lists # 9180-5516852				Separate Parts Kit #9180-5516-055 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 079	O-ring $\varnothing$ 10 x 2 (Tool side adapter plate)	4	10	9611 055	O-ring $\varnothing$ 8 x 2 (Tool side adapter plate)	4
11	9942 384	Sealing ring $\varnothing$ 150 x 154.6 x 155.5 x 4	5	91	9660 095	Screw M10 x 30	6
12	9966 388	O-ring $\varnothing$ 230 x 5	1	92	9937 580	Dowel Pin $\varnothing$ M6 x 30	1
13	9942 381	O-ring $\varnothing$ 155 x 3.5	5				
28	9611 260	O-ring $\varnothing$ 40 x 1.5	1				
29	9966 390	O-ring $\varnothing$ 195 x 4	1	Separate Parts Kit #9180-5516-035 (see #103 Spare Parts)			
45	9940 509	O-ring $\varnothing$ 98 x 5	1	101	9940 789	Right-angle plug	1
87	9940 570	Flat seal	2	102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 1 0 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323227	Adapter Plate
Seal Kit	
9180-5516852	Seal Kit



7.15 RJ-200-KS

Specifications									
Max Fz +lb (+N)	Max Mxy +in-lb (+N-m)	Weight lb (kg)	Max speed rpm (deg/s)	Max accel m/s**	Const. torque +in-lb (+N-m)	Start torque in-lb (N-m)	# pass-thru air psi (bar)	# elec. signals V (A)	Torque sup. dia* in (mm)
4050 (18000)	7260 (820)	48.9 (22.2)	70 (420)	15	573.3 (65.0)	840.8 (95.0)	4 @ 145 (10)	10 @ 60 (1)	1.14 (29)

Seal Kit Lists # 9180-5516854				Separate Parts Kit #9180-5516-051 (see #97 Spare Parts)			
Item	Part Number 9180-	Description	Qty/ Unit	Item	Part Number 9180-	Description	Qty/ Unit
10	9611 114	O-ring Ø 12 x 2 (Tool side adapter plate)	4	10	9611 114	O-ring Ø 12 x 2 (Tool side adapter plate)	4
11	9942 384	Sealing ring Ø 150 x 154.6 x 155.5 x 4	5	91	9660 046	Screw M12 x 35	6
12	9966 388	O-ring Ø 230 x 5	1	92	9936 319	Dowel Pin Ø M6 x 30	1
13	9942 381	O-ring Ø 155 x 3.5	5				
28	9611 260	O-ring Ø 40 x 1.5	1				
45	9940 509	O-ring Ø 98 x 5	1	Separate Parts Kit #9180-5516-035 (see #103 Spare Parts)			
87	9940 570	Flat seal	2	101	9940 789	Right-angle plug	1
				102	9940 790	Right-angle socket	1

* Specifications include standard interface plates.

Cables	
9180-C-0323005-5	5M, 10 Pin, Robot side
9180-C-0323006-5	5M, 10 Pin, Tool side
Connectors	
9180-9940789	Male, Tool side, Binder 723 99-0129-75-12
9180-9940790	Female, Robot side, Binder 723 99-0130-75-12
Adapter Plates – Tool Side	
9180-323228	Adapter Plate
Seal Kit	
9180-5516854	Seal Kit

[illegible]

8. Terms and Conditions

The following Terms and Conditions are a supplement to and include a portion of ATI's Standard Terms and Conditions, which are on file at ATI and available upon request.

ATI warrants to Purchaser that Robotic Tool Changer products purchased hereunder will be free from defects in material and workmanship under normal use for a period of three (3) years from the date of shipment. This warranty does not cover components subject to wear and tear under normal usage or those requiring periodic replacement. ATI will have no liability under this warranty unless: (a) ATI is given written notice of the claimed defect and a description thereof within thirty (30) days after Purchaser discovers the defect and in any event not later than the last day of the warranty period; and (b) the defective item is received by ATI not later ten (10) days after the last day of the warranty period. ATI's entire liability and Purchaser's sole remedy under this warranty is limited to repair or replacement, at ATI's election, of the defective part or item or, at ATI's election, refund of the price paid for the item. The foregoing warranty does not apply to any defect or failure resulting from improper installation, operation, maintenance, or repair by anyone other than ATI.

ATI will in no event be liable for incidental, consequential, or special damages of any kind, even if ATI has been advised of the possibility of such damages. ATI's aggregate liability will in no event exceed the amount paid by purchaser for the item which is the subject of claim or dispute. ATI will have no liability of any kind for failure of any equipment or other items not supplied by ATI.

No action against ATI, regardless of form, arising out of or in any way connected with products or services supplied hereunder, may be brought more than one (1) year after the cause of action accrued.

No representation or agreement varying or extending the warranty and limitation of remedy provisions contained herein is authorized by ATI, and may not be relied upon as having been authorized by ATI, unless in writing and signed by an executive officer of ATI.

Unless otherwise agreed in writing by ATI, all designs, drawings, data, inventions, software, and other technology made or developed by ATI in the course of providing products and services hereunder, and all rights therein under any patent, copyright, or other law protecting intellectual property, shall be and remain ATI's property. The sale of products or services hereunder does not convey any express or implied license under any patent, copyright, or other intellectual property right owned or controlled by ATI, whether relating to the products sold or any other matter, except for the license expressly granted below.

In the course of supplying products and services hereunder, ATI may provide or disclose to Purchaser confidential and proprietary information of ATI relating to the design, operation, or other aspects of ATI's products. As between ATI and Purchaser, ownership of such information, including without limitation any computer software provided to Purchaser by ATI, shall remain in ATI and such information is licensed to Purchaser only for Purchaser's use in operating the products supplied by ATI hereunder in Purchaser's internal business operations.

Without ATI's prior written permission, Purchaser will not use such information for any other purpose or provide or otherwise make such information available to any third party. Purchaser agrees to take all reasonable precautions to prevent any unauthorized use or disclosure of such information.

Purchaser will not be liable hereunder with respect to disclosure or use of information which: (a) is in the public domain when received from ATI; (b) is thereafter published or otherwise enters the public domain through no fault of Purchaser; (c) is in Purchaser's possession prior to receipt from ATI; (d) is lawfully obtained by Purchaser from a third party entitled to disclose it; or (f) is required to be disclosed by judicial order or other governmental authority, provided that, with respect to such required disclosures, Purchaser gives ATI prior notice thereof and uses all legally available means to maintain the confidentiality of such information.