



*Protector*TM

U.S. Patent Nos. 6069415 and 6690208

Robotic Collision Sensor

SR-61, 81, 101, 131, 176, and 221

Installation Instructions for Coolant Protection Boot



Document #9610-60-1008-04
November 2007

Engineered Products for Robotic Productivity

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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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Table of Contents

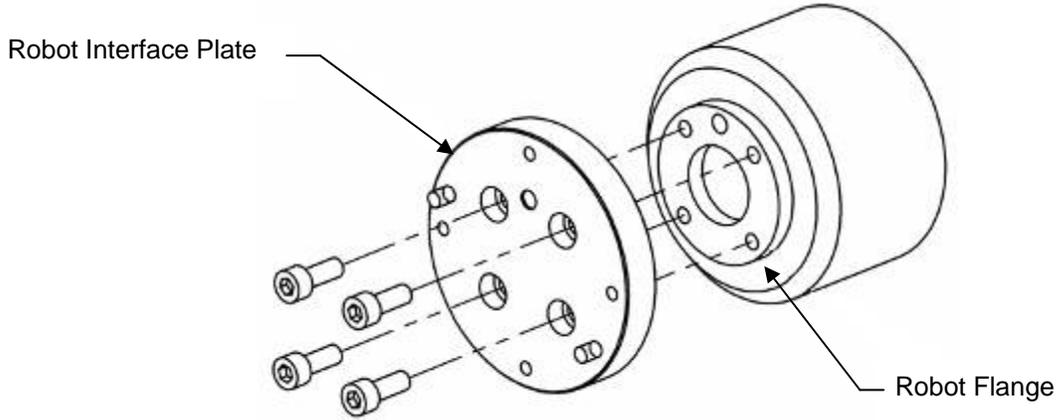
	Page
1. Installation of Coolant Protection Boot.....	5
1.1 Attach Interface Plate to Robot.....	5
1.2 Attach the Collision Protection Device (CPD) to the Robot Interface Plate.....	5
1.3 Attach the Stem Side Interface Plate to the Stem of the CPD	6
1.4 Apply 10–20 psi to CPD to Raise the Stem. This step is not required for spring-loaded units.....	6
1.5 Stretch (1) Garter Spring of the CPD Assembly as Shown	7
1.6 Slide (1) Coolant Sealant Boot over the Stem Side Interface Plate onto the CPD Cover.....	7
1.7 Secure the Coolant Sealant Boot to the CPD by Positioning the Garter Springs in the Spring Grooves on the Boot.....	8
2. Design/Procurement of Interface Plates	9
3. Drawings for Replacement Parts & Interface Plates.....	10
3.1 SR-61.....	10
3.2 SR-81.....	12
3.3 SR-101.....	14
3.4 SR-131.....	16
3.5 SR-176.....	18
3.6 SR-221.....	20
4. Terms and Conditions of Sale	22

Glossary of Terms

Term	Definition
Body	Cylindrical aluminum housing and air pressure chamber. An interface plate to the user's robot is usually attached here.
Collision	The accidental impact between the end of arm tooling and some obstruction in its path.
Cover Plate	Disk-shaped aluminum cover for Protector™ Body.
Crash	The result of a disturbance that displaces the Protector™ components from their standard, working position.
Interface Plate	Optional component used to adapt the Protector™ Body or Stem to the user's robot or tooling.
Piston	The component which, together with the Body, creates a pressure chamber. Varying the pressure in this chamber varies the load required to move the piston.
Stem	Round tapered post containing tapped holes and a dowel pin hole. An interface plate to the user's tooling is usually attached here.

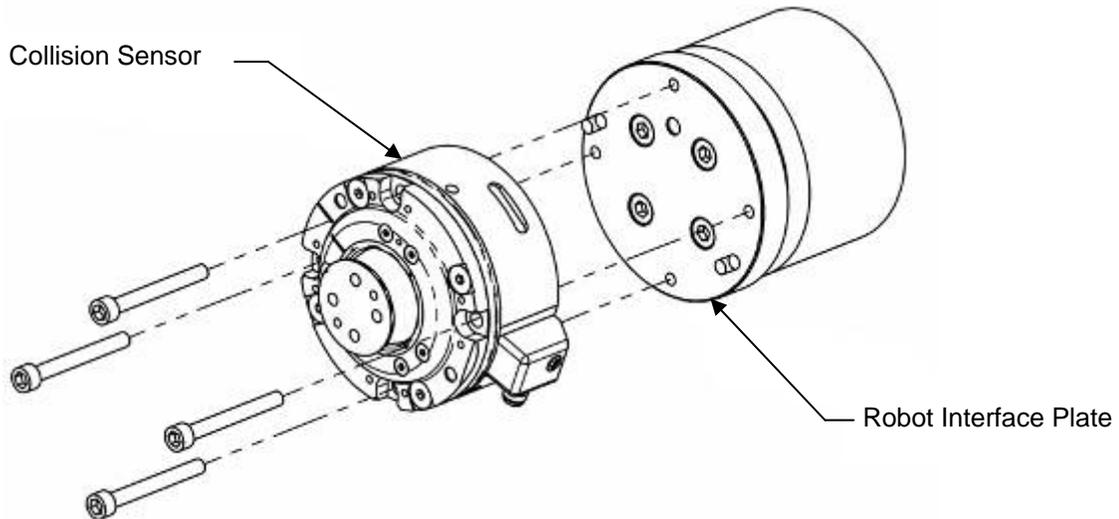
1. Installation of Coolant Protection Boot

1.1 Attach Interface Plate to Robot

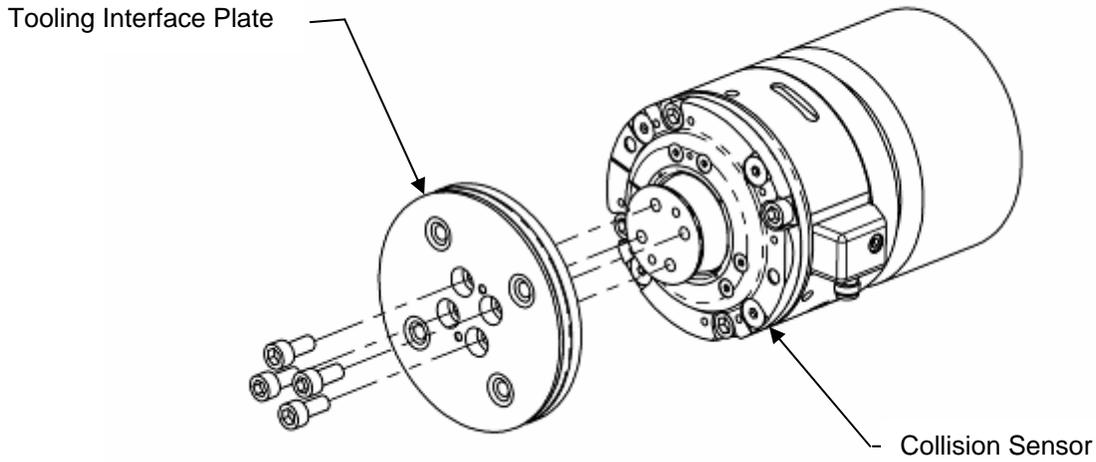


NOTE: A Robot Interface Plate is required. The Robot Interface Plate can be purchased from ATI or manufactured by the customer using ATI approved drawings. The use of Robot Interface Plates supplied by ATI is strongly recommended.

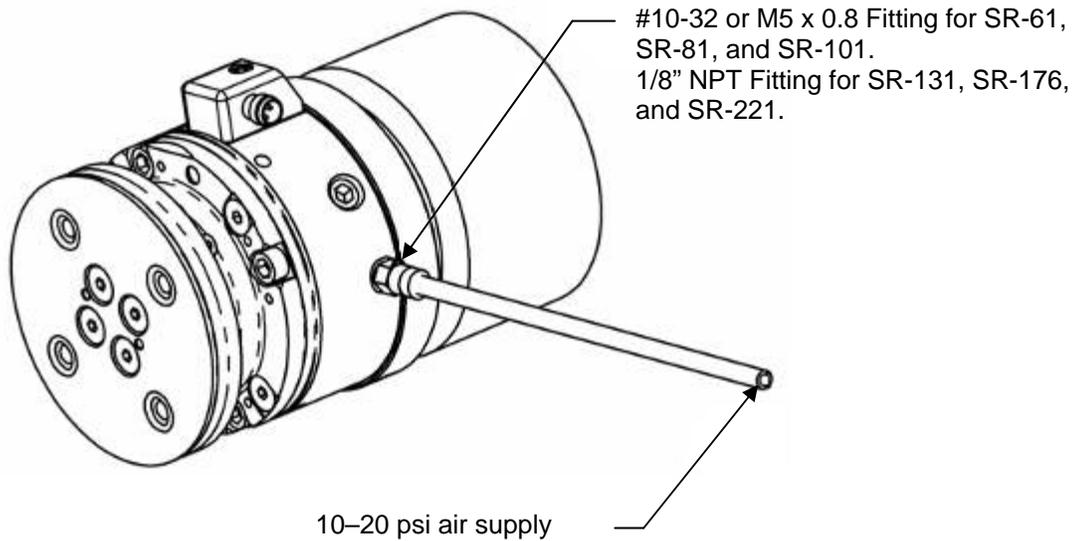
1.2 Attach the Collision Protection Device (CPD) to the Robot Interface Plate



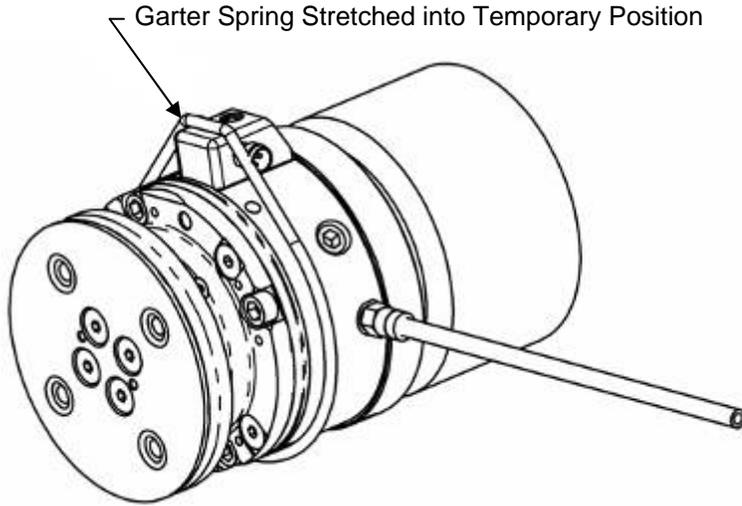
1.3 Attach the Stem Side Interface Plate to the Stem of the CPD



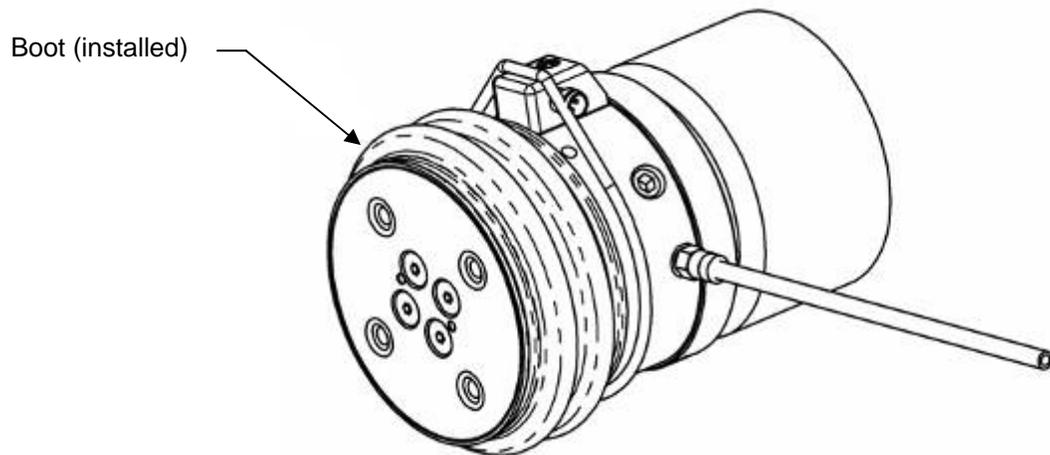
1.4 Apply 10–20 psi to CPD to Raise the Stem. This step is not required for spring-loaded units.



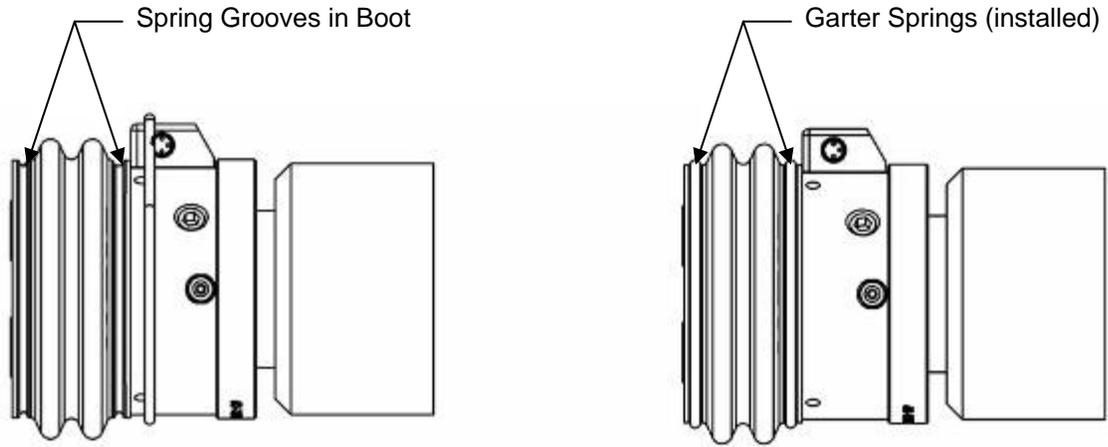
1.5 Stretch (1) Garter Spring of the CPD Assembly as Shown



1.6 Slide (1) Coolant Sealant Boot over the Stem Side Interface Plate onto the CPD Cover



1.7 Secure the Coolant Sealant Boot to the CPD by Positioning the Garter Springs in the Spring Grooves on the Boot



2. Design/Procurement of Interface Plates

This sealing system utilizes a bellows style boot attached to the cover and stem side interface plate and a molded wire channel gasket. In order to insure proper sealing the following items are necessary:

- 1) The unit must have been purchased from the factory with the coolant sealant boot. (This is necessary since the cover must contain the groove for the garter spring and be sealed to the body.)
- 2) Purchase Custom collision sensor interface plates from ATI. Provide the robot and tooling interface patterns to ATI and we will design and manufacture custom interface plates for your application.

or

Purchase blank collision sensor interface plates and modify them as follows:

Tooling to Collision Sensor Stem Interface Plate

- a) The tooling mounting holes in the collision sensor stem to tooling interface plate must be surrounded with o-rings installed in properly sized counterbores.

Robot to Collision Sensor Body Interface Plate

- a) The robot mounting holes and dowel hole(s) in the collision sensor body to robot interface plate must be oriented so that they do not cross the molded wire channel gasket.

Note: See drawings in section 3 for interface plate part numbers and examples of properly modified interface plates.

3. Drawings for Replacement Parts & Interface Plates

3.1 SR-61

Rev.	Description	Initiator	Date
01		DAW	5/16/2007

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	3700-60-1554	Flex Boot, SR-061
2	2	3610-036800-20	Garter Spring, SR-061 Boot
3	3	3500-1062012-15	M4 x 12mm SHCS Blue
4	1	NSS	Blank IPS Stem to Tooling
5	1	3540-0103010-11	3mm x 10mm Dowel Alloy Steel
6	4	3500-1062040-11	M4 x 40mm SHCS Black Oxide
7	2	3540-0104014-11	4mm x 14mm Dowel Alloy Steel
8	1	NSS	Blank IPB Body to Robot

9160-FLEXBOOT-061
 9160-061-IPS-1557 Blank IPS Stem to Tooling
 9160-061-IPB-1479 Blank IPB Robot to Body
 9160-061-IPB-1481 IPB for SR-061 Body to BC40, 4/M6, Boss 25, D6
 9160-061-IPB-1495 IPB for SR-061 Body to BC31.5, 4/M5, Boss 20, D5

NSS - Not sold separately.

SR-061 Collision Sensor
 Customer to Machine Platform of Tapped Holes for Attachment to Tooling (See Sheet 2 for More Details)

NOTE: UNLESS OTHERWISE SPECIFIED
 DO NOT SCALE DRAWING. DRAWN IN SOLIDWORKS.
 ALL DIMENSIONS ARE IN MILLIMETERS.

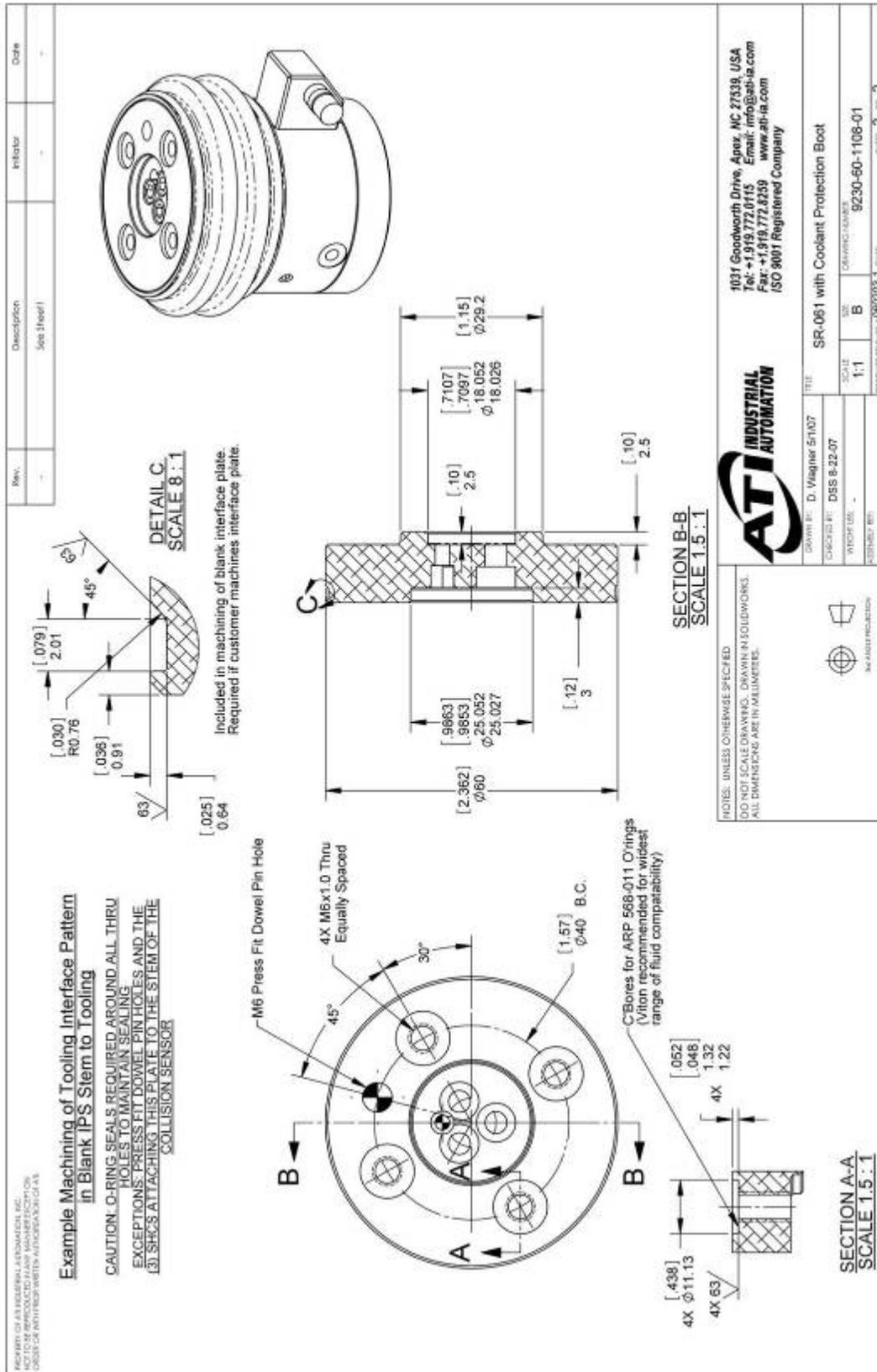
REVISED DRAWING

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SR-061 with Coolant Protection Boot

SCALE: 1:2
 SHEET: B
 DRAWING NUMBER: 9230-60-1108-01
 PROJECT: 9230-60-1108-01
 SHEET 1 OF 2



3.2 SR-81

Rev.	Description	Author	Date
00	Revised Item 2	DAW	2/14/2007
04	added 0703207 extra and detail	DAW	4/3/2007
05	drawing description was "SR-081 with flexible boot"	DAW	8/26/2007

Item No.	Quan.	Part Number	Description
1	1	3700-60-1548	Flexible Boot, SR-081
2	2	3610-0494000-20	Garter Spring, SR-081
3	1	3700-60-1590	Molded Wire Channel Gasket, SR-081
4	4	3500-1064012-15	M5 x 12 SHCS - Grade 12.9 Metric Blue
5	1	NSS	Blank IPS Stem to Tooling
6	2	3540-0103016-11	M3 x 16 Alloy Steel Dowel Pin
7	4	3500-1064045-15	M5 x 45 SHCS - Grade 12.9 Metric Blue
8	2	3540-0106020-11	M5 x 20 Alloy Steel Dowel Pin
9	1	NSS	Blank IPB Body to Robot

NSS - Not sold separately.

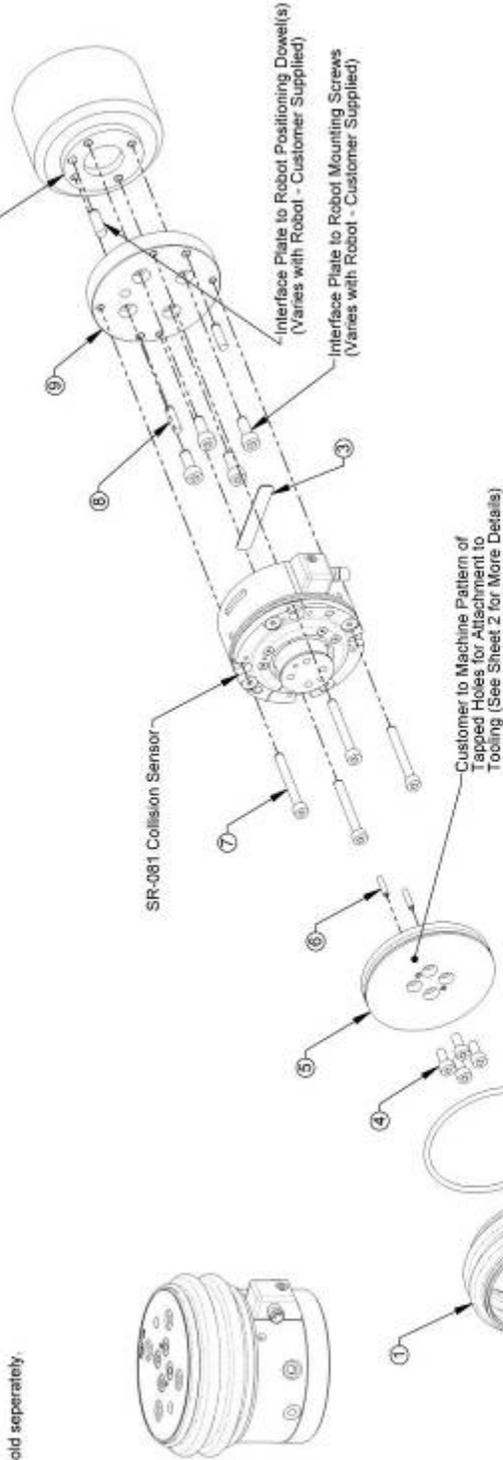
9150-FLEXBOOT-081

9160-081-IPS-1551 Blank IPS Stem to Tooling

9160-081-IPB-1122 Blank IPB Body to Robot

9160-081-IPB-1602 IPB for SR-81 Body to BC40, (4)M6, Boss 25, D8

9160-081-IPB-1604 IPB for SR-81 Body to BC50, (4)M6, Boss 31.5, D6



Customer to Machine Pattern of Tapped Holes for Attachment to Tooling (See Sheet 2 for More Details)

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DESIGNED BY: D. Wagner 8/18/06
 CHECKED BY: DSS 3-30-07
 SCALE: 7:16
 DRAWING NUMBER: 9230-60-1099-05
 PROJECT NUMBER: 066003-1 DAW

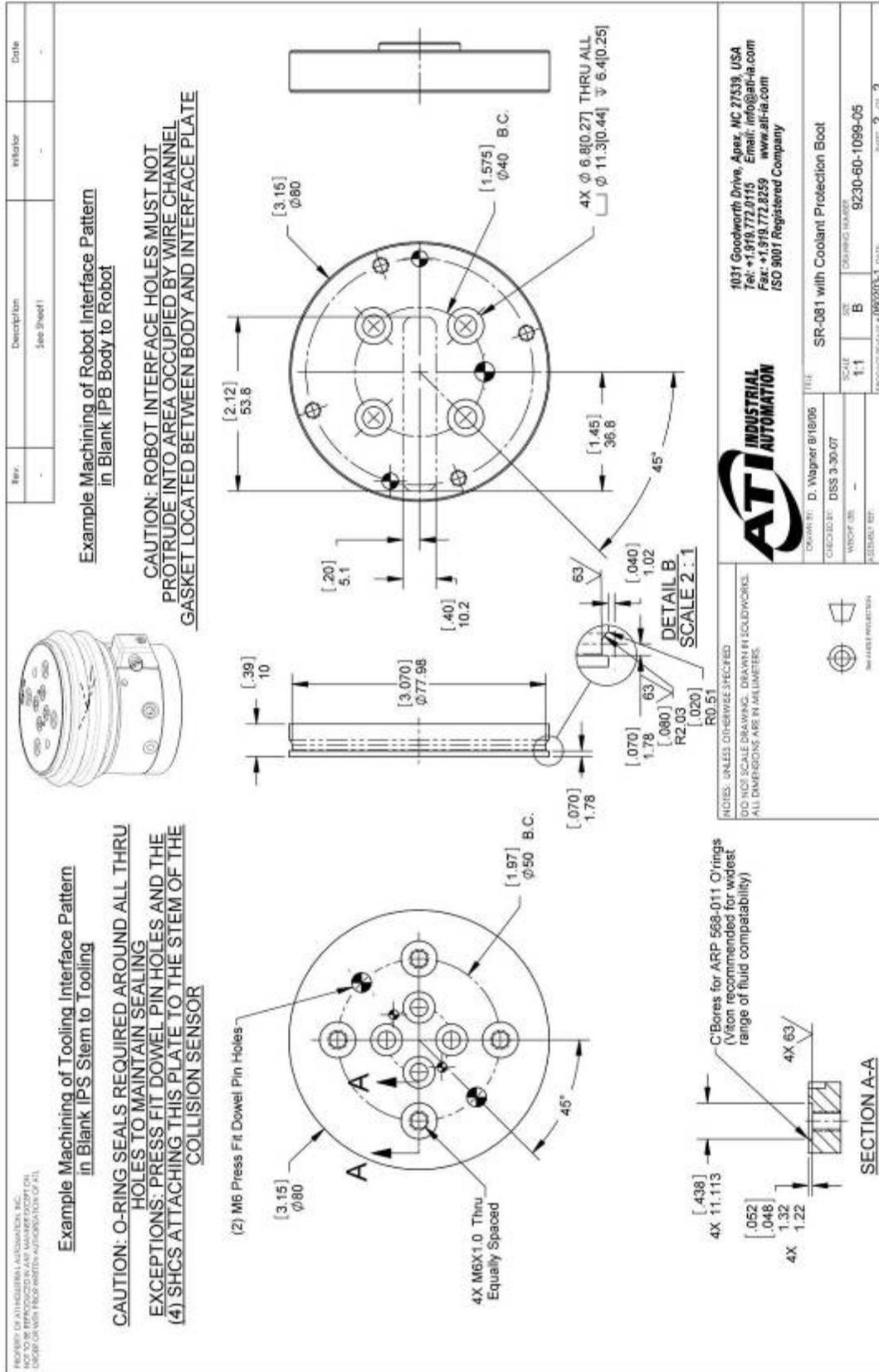
SR-081 with Coolant Protection Boot

908076-01 AT INDUSTRIAL AUTOMATION, INC.
 NOT TO BE REPRODUCED IN ANY MANNER WITHOUT OUR
 WRITTEN PERMISSION. ORDER OR BUY PRICE WITH APPROVAL OF A.P.

NOTES: UNLESS OTHERWISE SPECIFIED
 DO NOT SCALE DRAWING. DIMENSIONS IN SOLIDWORKS
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IN-PLANE INDICATOR

SHEET 1 OF 2



3.3 SR-101

Rev.	Description	Instructor	Date
00	Revised Item 3, absorption of 9160-101-IPB-1669 added dimensions and detail to detail & related drawing (see drawings)	DAW	8/21/07

Item No.	Quan.	Part Number	Description
1	1	3700-60-1558	Flexible Boot, SR-101
2	2	3610-5329200-20	Garter Spring, SR-101
3	1	3700-60-1607	Molded Wire Channel Gasket, SR-081 & SR-101
4	4	3500-1064012-15	M5 x 12 SHCS - Grade 12.9 Metric Blue
5	1	NSS	Blank IPS Stem to Tooling
6	2	3540-0103016-11	M3 x 16 Alloy Steel Dowel Pin
7	4	3500-1064050-15	M5 x 50 SHCS - Grade 12.9 Metric Blue
8	2	3540-0105020-11	M5 x 20 Alloy Steel Dowel Pin
9	1	NSS	Blank IPB Body to Robot

① 9160-FLEXBOOT-101
② 9160-101-IPB-1561 Blank IPS Stem to Tooling
③ 9160-101-IPB-1131 Blank IPB Body to Robot
④ 9160-101-IPB-1669 IPB for SR-101 Body to BC40, (4)M5, Boss 25, D6

NSS - Not sold separately.

Customer to Machine Pattern of Tapped Holes for Attachment to Tooling (See Sheet 2 for More Details)

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FILE: SR-101 with Coolant Protection Boot

DESIGNED BY: D. Wagner 2/15/07

CHECKED BY: DSS 8/23/07

INCHES: —

VERIFIED BY: —

SCALE: 1:2

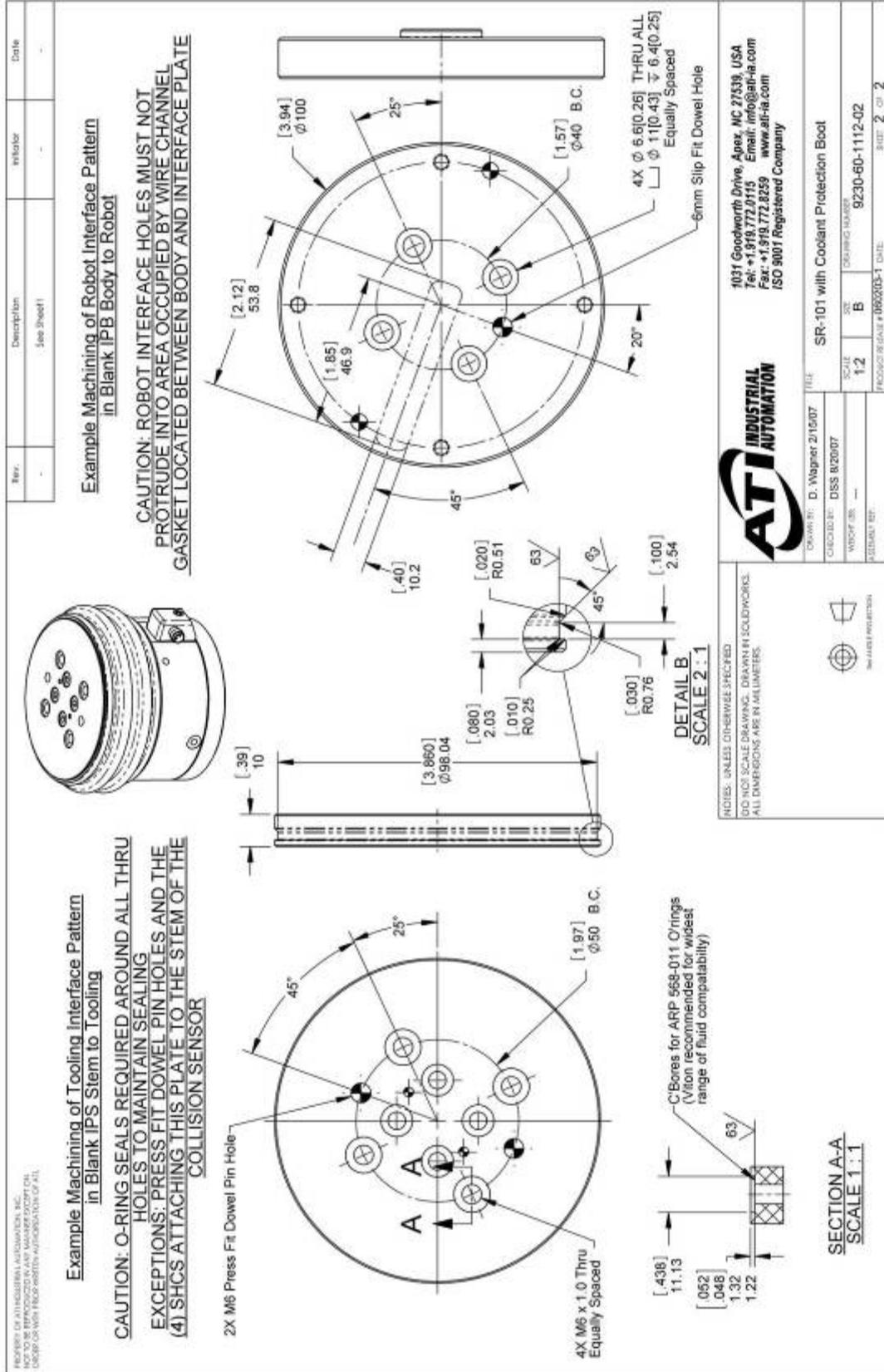
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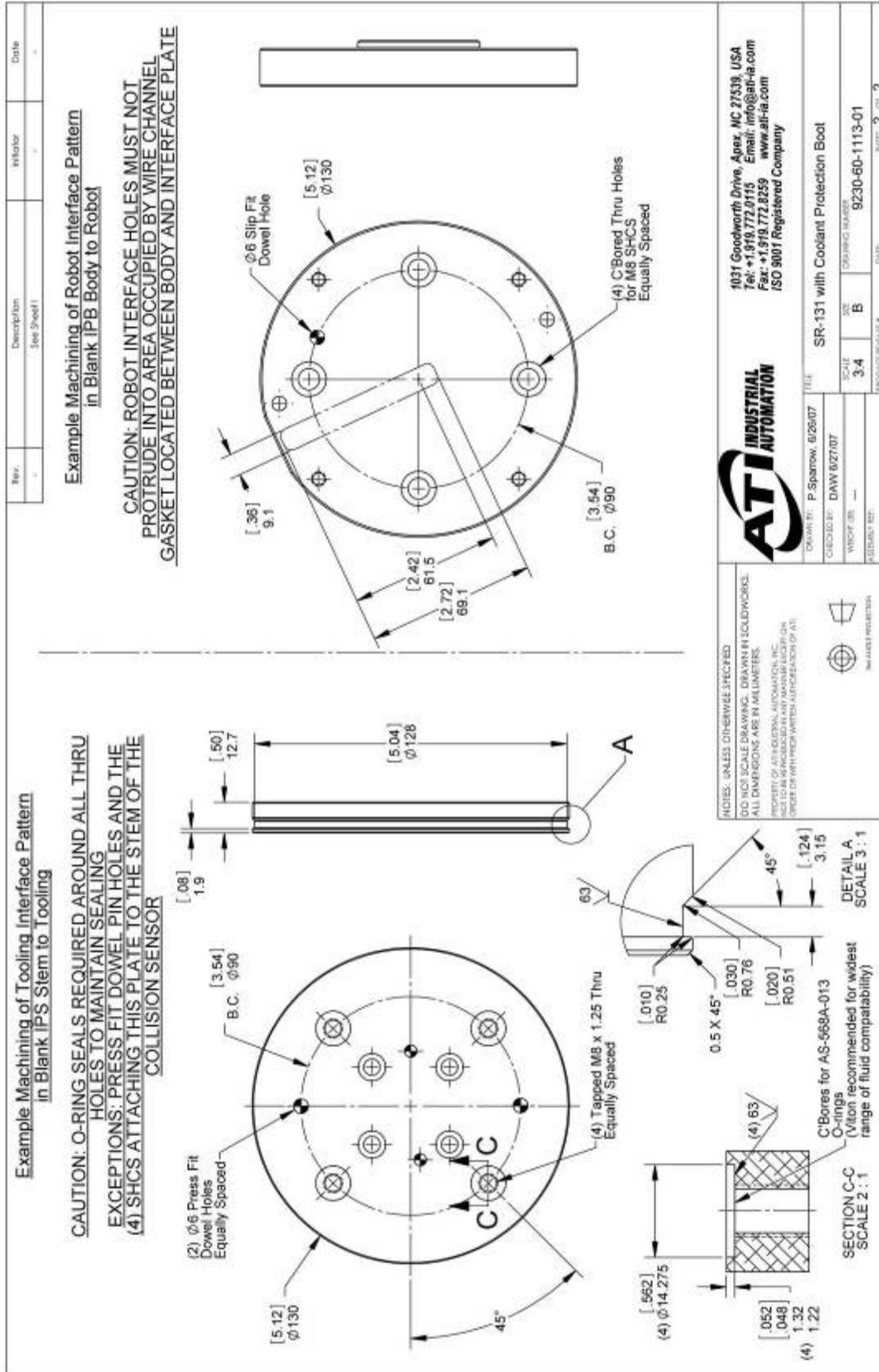
DRAWING NUMBER: 9230-60-1112-02

PROJECT NUMBER: 066203-1 (011)

SHEET: 1 OF 2

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3.5 SR-176

Rev.	01	Description	Inflector	Date
		IPB3 Version	DAW	11/12/2007

Item No.	Quan.	Part Number	Description
1	1	3700-80-1581	Flexible Boot, SR-176
2	2	3610-5551400-20	Garter Spring, SR-176
3	1	3700-80-1684	Molded Wire Channel Gasket, SR-176
4	6	3500-1068020-15	M8 x 20 SHCS Grade 12.9 Metric Blue
5	1	NSS	Blank IPS Stem to Tooling
6	2	3540-0105024-11	M6 x 24 Alloy Steel Dowel Pin
7	4	3500-1068080-15	M8 x 80 SHCS Grade 12.9 Metric Blue
8	2	3640-0106024-11	M6 x 24 Alloy Steel Dowel Pin
9	1	NSS	Blank IPB Body to Robot

9160-FLEXBOOT-176
 9160-176-IPS-1584 Blank IPS Stem to Tooling
 9160-176-IPB-1289 Blank IPB Body to Robot

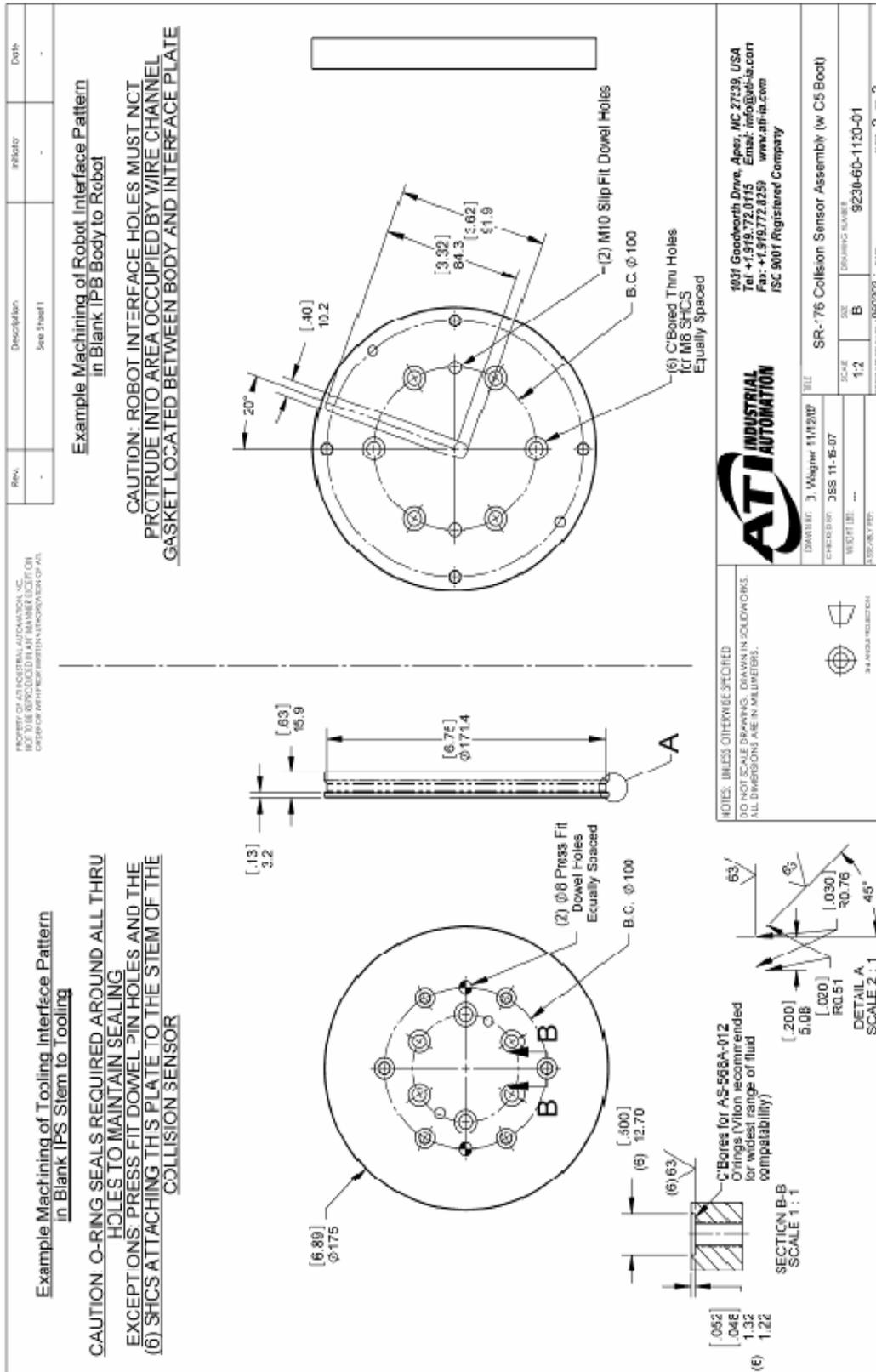
NSS - Not sold separately.

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REVISED BY: D. Wagner 11/12/07	TITLE: SR-176 Collision Sensor Assembly (w C5 Boot)	DRAWING NUMBER: 9230-60-1120-01
CHECKED BY: DSS 11-16-07	SCALE: 1:4	SIZE: B
PROJECT (S):	PRODUCT RELEASE #060203-1 DATE:	SHEET 1 OF 2



3.6 SR-221

Rev.	Description	Initiator	Date
01	Initial Version	DAW	9/26/2007
02	Revised no. of Torque Arms 4 to 1.	DAW	11/15/2007

Item No.	Quan.	Part Number	Description
1	1	3700-60-1585	Flexible Boot, SR-221
2	2	3610-5656400-20	Gender Spring, SR-221
3	1	3700-60-1666	Molded Wire Channel Gasket, SR-221
4	4	3500-1070030-15A	M10 x 30 CHCS, Creeds 12.9 Metric Blue NSS
5	1	3540-0110032-11	M10 x 32 Alloy Steel Dowel Pin
6	2	3500-1070100-15	M10 x 100 SHCS Grade 12.9 Metric Blue NSS
7	4	3540-0110040-11	M10 x 40 Alloy Steel Dowel Pin NSS
8	2		Blank IPB Body to Robot
9	1		Blank IPB Body to Robot

NSS - Note sold separately.

9160-FLEXBOOT-221

9160-221-IPB-1588 Blank IPB Stem to Tooling

9160-221-IPB-1358 Blank IPB Body to Robot

9160-221-IPB-1417 IPB for SR-221 Body to BC-125, (5M10, Boss63, Dowel 10)

Robot Flange

Interface Plate to Robot Positioning Dowels (Varies with Robot - Customer Supplied)

Interface Plate to Robot Mounting Screws (Varies with Robot - Customer Supplied)

Customer to Machine Pattern of Tapped Holes for Attachment to Tooling (See Sheet 2 for More Details)

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DESIGNED BY: D. Wagner 9/26/07

CHECKED BY: DSS 11-9-07

SCALE: 1:5

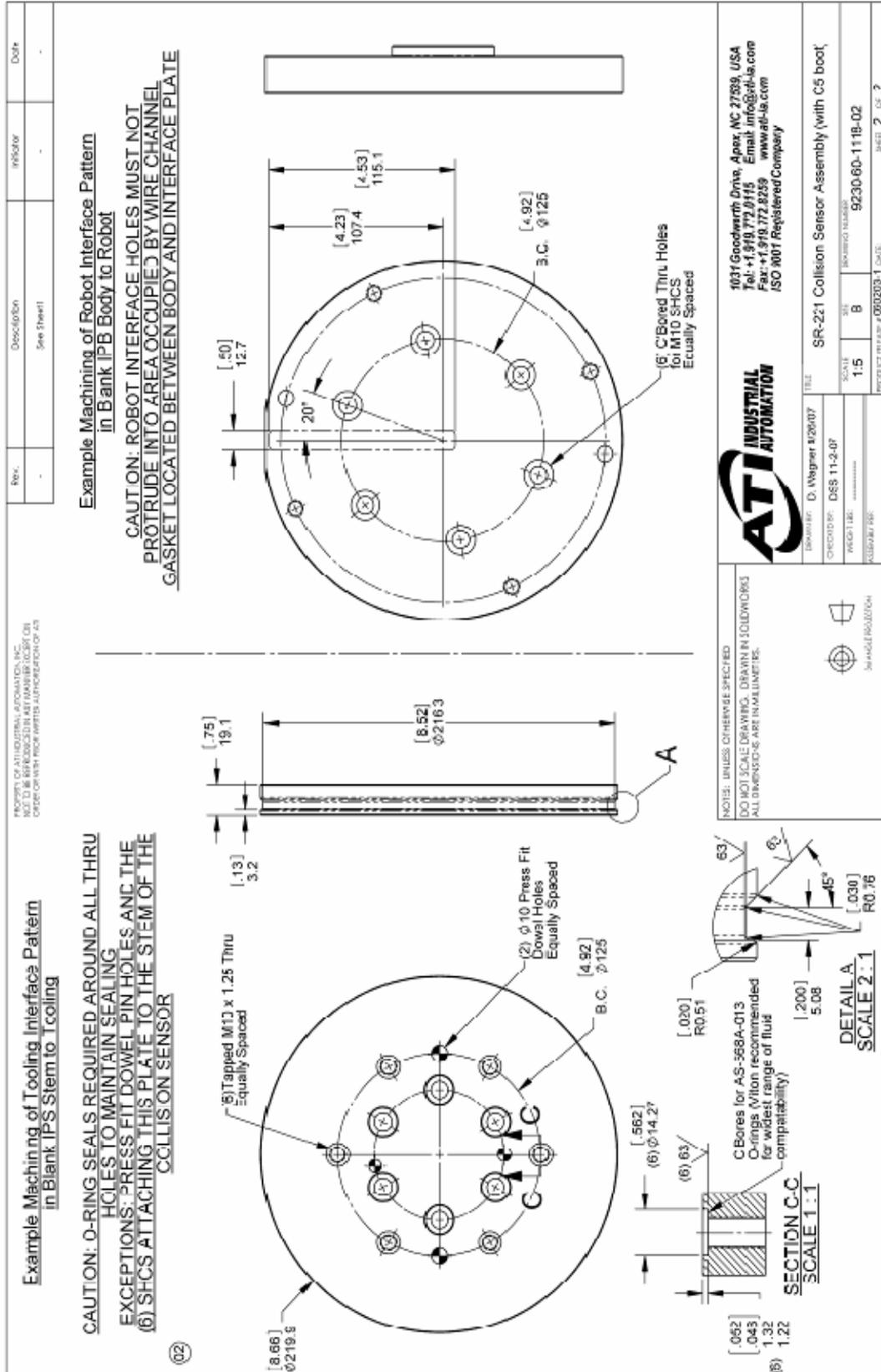
PRODUCT RELEASE #080203-1 DATE: 9/23/07

SR-221 Collision Sensor Assembly (with C5 boot)

9230-60-1118-02

SHEET 1 OF 2

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DESIGNED BY: D. Wagner 1/26/07	FILE: SR-221 Collision Sensor Assembly (with C5 boot)	SCALE: 1:5	DRAWING NUMBER: 9230-60-1118-02
CHECKED BY: DSS 11-2-07		SCALE: 1:5	
WELDING: _____			
ASSEMBLY: _____			

PRODUCT RELEASE #000203.1 DATE: _____ SHEET 2 OF 2

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MAGNIFICATION

C Bores for AS-568A-013 O-rings. (With recommended compatibility)

**SECTION C-C
SCALE 1:1**

**DETAIL A
SCALE 2:1**

4. Terms and Conditions of Sale

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 Protector™ products purchased hereunder will be free from defects in material and workmanship under normal use for a period of one (1) 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 occurred.

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