



TSM Tool Stand

Manual



Document #: 9610-20-1114

Engineered Products for Robotic Productivity

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Foreword

Please contact ATI Industrial Automation with any questions concerning a 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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Table of Contents

Foreword	2
Glossary	7
1. Safety	8
1.1 Explanation of Notifications	8
1.2 General Safety Guidelines	8
1.3 Safety Precautions	9
2. Product Overview	10
2.1 TSM System with Pin and Bushing Style Mounting	10
2.1.1 Post Module Kits	11
2.1.2 Horizontal Modules.....	11
2.1.3 Horizontal Extensions.....	11
2.1.4 TSM Adapter Module.....	11
2.1.5 Pin and Bushing Mounting Module.....	12
2.1.6 Tooling Interface Plates	12
2.1.7 Retrofit Locking Assembly	12
2.1.8 Pin and Bushing Locking Mounting Module	13
2.1.9 Tooling Interface Plates Locking.....	13
2.1.10 Proximity Sensor Modules.....	13
2.2 TSM System with V-Block Style Mounting	14
2.2.1 Post Module Kits	15
2.2.2 Horizontal Modules.....	15
2.2.3 Horizontal Extensions.....	15
2.2.4 TSM Adapter Module.....	15
2.2.5 Mounting Modules	16
2.2.6 Tooling Interface Plates	16
2.2.7 Vertical Mounting Module	17
2.2.8 Vertical Tooling Interface Plate	17
2.2.9 Sensor Holders.....	17
2.2.10 Proximity Sensor	17
2.3 TSM System with Tool Hanger Mounting Module	18
2.3.1 Post Module Kits	18
2.3.2 Horizontal Modules.....	18
2.3.3 Tool Hanger Mounting Modules.....	19
2.3.4 Tool Hangers	19
2.3.5 Proximity Sensor and Cables for Tool Hanger Mounting Module.....	19
2.4 Post Module Components	20
2.4.1 Base Plate	20

2.4.2	Rail Assemblies	20
2.4.3	Gusset Assembly	20
2.5	Determining The Tool Stand Configuration	21
2.5.1	Configuring a TSM System with Horizontal Mounting	22
2.5.2	Configuring a TSM System with Pin and Bushing Mounting	22
2.5.3	Configuring a TSM System with Vertical Mounting	23
2.5.4	Configuring a TSM System with Tool Hanger Mounting	23
3.	Installation	24
3.1	Installing Base, Rail, and Gusset assemblies	24
3.2	Installing Pin and Bushing or Horizontal V-Block Mounting Module to Tool Stand	26
3.3	Installing Vertical V-Block Mounting Module to Tool Stand	28
3.4	Installing Tool Hanger Mounting Module to Tool Stand	29
3.5	Installing Horizontal Extension to Tool Stand	30
3.6	Installation of Proximity and Photoelectric Sensor (for Pin and Bushing).....	31
3.7	Proximity Sensor Installation for V-Block (Sensor Holder 9120-TSM-SM-4205)	32
3.8	Proximity Sensor Installation for V-Block (Sensor Holder 9120-TSM-SM-4206)	33
3.9	Proximity Sensor installation for TSM Tool Hanger.....	34
4.	Operation	35
4.1	TSM System with Pin and Bushing Style Mounting Operation.....	35
4.2	TSM V-Block Systems Operation.....	36
4.3	TSM Tool Hanger System Operation	36
5.	Maintenance.....	37
5.1	All TSM Systems	37
5.2	Pin and Bushing TSM Systems.....	38
5.2.1	Clean, Lubricate, and Replace Alignment Pins and Bushings	38
5.3	TSM V-Block Systems.....	39
5.4	TSM Tool Hanger Systems	40
6.	Troubleshooting	41
7.	Serviceable Parts	42
7.1	Part Number Cross Reference	43
7.1.1	TSM V-Block Systems.....	43
8.	Specifications	44
8.1	Common TSM System Components	44
8.2	TSM Pin and Bushing System Components.....	44
8.3	TSM V-Block System Components.....	44
8.4	TSM Tool Hanger System Components	44

9. Drawings	45
9.1 Pin and Bushing Mounting Module	45
9.2 Mounting Module 3597.....	46
9.3 Mounting Module 4018.....	47
9.4 Pin and Bushing QC-50 Tooling Plate	48
9.5 Pin and Bushing QC-76 Tooling Plate	49
9.6 Pin and Bushing QC-110 Tooling Plate	50
9.7 Pin and Bushing Horizontal Blank Tooling Plate	51
9.8 Pin and Bushing Vertical Blank Tooling Plate	52
9.9 Pin and Bushing J16 Tooling Plate.....	53
9.10 TSM Pin & Bushing Mounting Module - Rigid - Locking	54
9.11 Pin and Bushing Retrofit Locking Assembly.....	55
9.12 Horizontal Tooling Interface Plate-Blank (Locking)	56
9.13 Tooling Interface Plate for QC 40- Blank- MA03 (Locking).....	57
9.14 Vertical Tooling Interface Plate - Blank (Locking)	58
9.15 Pin and Bushing QC-50 Tooling Plate	59
9.16 Mounting Module 3597.....	60
9.17 Mounting Module 4018.....	61
9.18 QC-40 Tooling Interface Plate	62
9.19 QC-41 Tooling Interface Plate	63
9.20 QC-60 Tooling Interface Plate	64
9.21 QC-62 Tooling Interface Plate	65
9.22 QC-71 Tooling Interface Plate	66
9.23 QC-76 Tooling Interface Plate	67
9.24 QC-100 Tooling Interface Plate	68
9.25 Blank Tooling Interface Plate	69
9.26 Vertical Mounting Module 4068.....	70
9.27 Vertical Mounting Module 4070.....	71
9.28 Vertical Tooling Interface Plate - Blank	72
9.29 Vertical Tooling Interface Plate - Blank (Large)	73
9.30 Tool Hanger Module 5496	74
9.31 Tool Hanger Module 5891	75
9.32 Tool Hanger Module 5923	76
9.33 Tool Hanger Module 5497	77
9.34 Post Modules	78
9.35 TSM Rail Adapter Module - V-Block Style	79

9.36	Sensor Holders	82
9.37	Receiver Blocks.....	85
9.38	Tooling Pins	86
9.39	Medium Tool Stand General Overview	87
10.	Terms and Conditions of Sale	88

Glossary

Term	Definition
Alignment Pins	The alignment pin attaches to the tooling interface plate or a tool hanger module.
Adapter module	The adapter module provides a mounting surface for a mounting module to be attached to a post module or end of a horizontal extension.
End-Effector	A tool or other device attached to the robot arm in order to perform a task.
Horizontal module	A horizontal rail that supports multiple tool positions.
Master plate	The half of the Tool Changer that is mounted to an interface plate, robot, or end-effector adjacent to the robot.
Modules	Optional components that can be added to the Master and Tool plates to enhance the capabilities of the Tool Changer, e.g. Fluid/Air, Electrical, DeviceNet, Servo, High-Current, etc.
Mounting module	Provides a mount on the tool stand for the tooling interface plate or can mount the Tool Changer Tool plate directly for some specific models.
Pin and Bushing Mounting	A Tool Stand configuration that uses mounting modules with alignment pins and a bushing to support and accurately locate the Tool plate and customer tooling.
Post module	Combines the base, vertical rail, and gusset assemblies into a group of components.
Proximity Sensor	Provides a signal indicating the tool is located in the tool stand.
Sensor Holder	The sensor holder provides a mounting on the tool stand for the proximity sensor.
Tooling Interface Plate	A machined plate that adapts the Tool body to an end-effector and provides mounting features for a tool stand.
Tool Hanger	The half of the Tool Changer that is installed to a mounting flat on the Tool Changer.
Tool plate	The half of the Tool Changer that is mounted to a tooling interface plate or customer-supplied tooling.
Tool Stand	A fixture supplied by ATI for holding of the Tool plate when not in use.
Horizontal Extension	A fixture that provides more tool clearance for customer tooling than the standard TSM post module.
Vertical Mounting module	A mount on the tool stand for the vertical tooling interface plate. The Tool Changer can mount directly for some specific models.
Vertical Tooling Interface Plate	A machined plate with a vertical surface that adapts the customer tooling and provides mounting features for a tool stand.

1. Safety

The safety section describes general safety guidelines to be followed with this product, explanations of the notifications found in this manual, and safety precautions that apply to the product. Product specific notifications are imbedded within the sections of this manual (where they apply).

1.1 Explanation of Notifications

These notifications are used in all ATI manuals and are not specific to this product. The user should heed all notifications from the robot manufacturer and/or the manufacturers of other components used in the installation.



DANGER: Notification of information or instructions that if not followed will result in death or serious injury. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.



WARNING: Notification of information or instructions that if not followed could result in death or serious injury. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.



CAUTION: Notification of information or instructions that if not followed could result in moderate injury or will cause damage to equipment. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.

NOTICE: Notification of specific information or instructions about maintaining, operating, installing, or setting up the product that if not followed could result in damage to equipment. The notification can emphasize, but is not limited to: specific grease types, best operating practices, and maintenance tips.

1.2 General Safety Guidelines

This system is intended for use in industrial applications for tool changing and storage and therefore requires the use of a Tool Changer.

Prior to purchase and installation, the customer should verify that the Tool Changer selected is rated for the maximum loads and moments expected during operation. Refer to the applicable Tool Changer manual or contact ATI for assistance.



WARNING: The customer is responsible for ensuring that the area between the Tool and the Tool Stand is clear of foreign objects during tool drop-off. Failure to do so may result in serious injury to personnel.



WARNING: The gap between the Master and Tool sides is a pinch point. All personnel should be prevented from placing any part of their body or clothing in the gap, especially during actuation of the tool hanger mechanism.

1.3 Safety Precautions



WARNING: Do not perform maintenance or repair(s) on the Tool Changer or modules unless the Tool is safely supported or placed in the tool stand, all energized circuits (e.g. electrical, air, water, etc.) are turned off, pressurized connections are purged and power is discharged from circuits in accordance with the customer specific safety practices and policies. Injury or equipment damage can occur with the Tool not placed and energized circuits on. Place the Tool in the tool stand, turn off and discharge all energized circuits, purge all pressurized connections, and verify all circuits are de-energized before performing maintenance or repair(s) on the Tool Changer or modules.



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



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

2. Product Overview

The ATI TSM (Tool Stand Medium) system is compatible with ATI Tool Changer sizes QC-20 through QC-110. The stand is designed to fit most customer applications. The modular system allows for a user to essentially “build their own” tool storage rack based on the number of tools, desired positioning, and mounting arrangements. Three types of TSM systems are available, and an overview of each is in the following sections:

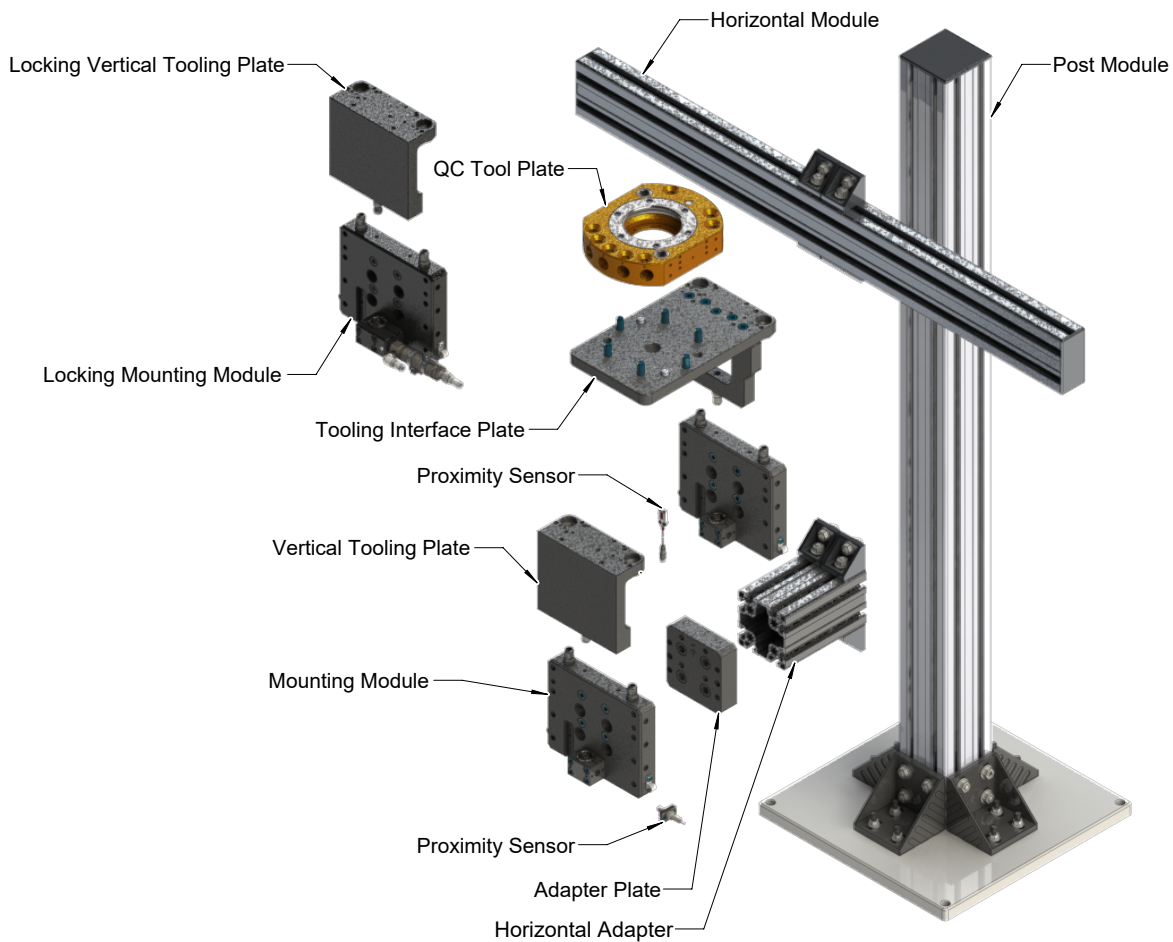
- [Section 2.1—TSM System with Pin and Bushing Style Mounting](#)
- [Section 2.2—TSM System with V-Block Style Mounting](#)
- [Section 2.3—TSM System with Tool Hanger Mounting Module](#)

For the most current product information on TSM systems, click the following link to the ATI website: [TSM Systems](#).

2.1 TSM System with Pin and Bushing Style Mounting

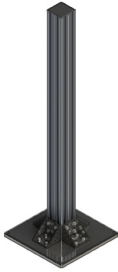
A pin and Bushing module adapts to either a horizontal or vertical interface plate that attaches to the ATI Tool plate and customer tooling. Pin and bushing module configuration examples are in the following figure:

Figure 2.1—TSM System with Pin and Bushing Style Mounting



2.1.1 Post Module Kits

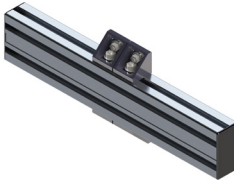
The post module kit is a common component to all TSM systems. The post module kit is available in different post heights and combines the base, rail, and gusset assemblies into a group of components.



Item	Part Number	Refer to Drawing in:
Post module kit 914 mm (36") ^{1,2}	9120-TSM-PM-3317	Section 9.34—Post Modules
Post module kit 1016 mm (40") ^{1,2}	9120-TSM-PM-3382	
Post module kit 1220 mm (48") ^{1,2}	9120-TSM-PM-3325	
Post module kit 1520 mm (60") ^{1,2}	9120-TSM-PM-3353	
Post module kit 1828 mm (72") ^{1,2}	9120-TSM-PM-3322	
Notes:		
1. May specify other rail lengths – cut charge will apply.		
2. The post module is available factory assembled - an assembly charge will apply.		

2.1.2 Horizontal Modules

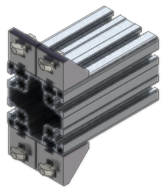
The horizontal module mounts to the post module and can be adjusted vertically or horizontally using the rail gussets to accommodate customer tooling. The rail is an aluminum extrusion and comes in standard lengths. Multiple Tool plate assemblies can be added to the rail, depending on the tool spacing requirements.



Item	Part Number	Refer to Drawing in:
Horizontal module 300 mm (12") ¹	9120-TSM-HM-3362	Section 9.39—Medium Tool Stand General Overview
Horizontal module 457 mm (18") ¹	9120-TSM-HM-3323	
Horizontal module 612 mm (24") ¹	9120-TSM-HM-1020	
Horizontal module 914 mm (36") ¹	9120-TSM-HM-3317	
Horizontal module 1220 mm (48") ¹	9120-TSM-HM-3325	
Horizontal module 1520 mm (60") ¹	9120-TSM-HM-3353	
Notes:		
1. May specify other rail lengths – cut charge will apply.		

2.1.3 Horizontal Extensions

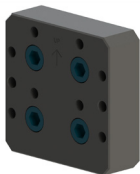
The horizontal extension is used when customer tooling requires extra clearance from the rail or other tooling. The horizontal extension mounts to the post module.



Item	Part Number	Refer to Drawing in:
TSM Horizontal Extension, 3.15"	9120-TSM-HE-3403	Section 9.39—Medium Tool Stand General Overview
TSM Horizontal Extension, 6"	9120-TSM-HE-3320	
TSM Horizontal Extension, 10"	9120-TSM-HE-3321	

2.1.4 TSM Adapter Module

To install a mounting module on a horizontal extension, use an adapter module.



Item	Part Number	Refer to Drawing in:
TSM Adapter Module - Mounting Module to TSM HE ¹	9120-TSM-AM-9982	Section 9.33—Tool Hanger Module 5497
Notes:		
1. Adapts to the TSM horizontal extension.		

2.1.5 Pin and Bushing Mounting Module

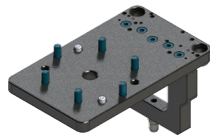
Pin and bushing modules include two vertical alignment pins and one vertical bushing. The module includes mounting fasteners and is designed to mount to a post module, horizontal module, or horizontal extension. The pin and bushing modules can be supplied as a stand alone unit and can be integrated with customer specific fixtures. The module provides mounting features for the sensor modules.



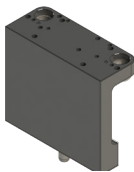
Item	Part Number	Refer to Drawing in:
Pin and Bushing Mounting module, Rigid. ^{1,2}	9120-TSM-MMB-8432	Section 9.1—Pin and Bushing Mounting Module
Notes:		
1. Used with Tooling Interface Plates: 9120-TSM-HBQ-8439, 9120-TSM-VBB-8441, 9120-TSM-VBQ-8442.		
2. Used with sensor modules: 9120-TSM-SMA-8437 and 9120-TSM-SMA-8439.		

2.1.6 Tooling Interface Plates

There are two types of interface plates: tooling interface plates and vertical tooling interface plates. The tooling interface plate attaches horizontally to the Tool Changer and the customer tooling. The vertical tooling plate attaches to the customer tooling and the Tool Changer is attached to the customer tooling, either directly or using an interface plate. Both types of interface plates have two bushings and one alignment pin to position the tooling interface plate to the pin and bushing mounting module.



Item	Part Number	Refer to Drawing in:
TSM Tooling Interface Plate for QC-50 - Blank. ¹	9120-TSM-HBQ-9566	Section 9.4—Pin and Bushing QC-50 Tooling Plate
TSM Tooling Interface Plate for QC-76 - Blank ¹	9120-TSM-HBQ-9224	Section 9.5—Pin and Bushing QC-76 Tooling Plate
TSM Tooling Interface Plate for QC-110 - Blank ¹	9120-TSM-HBQ-8439	Section 9.6—Pin and Bushing QC-110 Tooling Plate
TSM Tooling Interface Plate - Blank ¹	9120-TSM-HBB-9223	Section 9.7—Pin and Bushing Horizontal Blank Tooling Plate
Vertical Tooling Interface Plate		
TSM Tooling Interface Plate - Blank ¹	9120-TSM-VBB-8441	Section 9.8—Pin and Bushing Vertical Blank Tooling Plate
TSM Tooling Interface Plate - J16 Pattern ¹	9120-TSM-VBQ-8442	Section 9.9—Pin and Bushing J16 Tooling Plate
Notes:		
1. Used with mounting modules: 9120-TSM-MMB-8432.		



2.1.7 Retrofit Locking Assembly

The retrofit locking assembly includes a replacement alignment pin and a replacement bushing block with air cylinder for 9120-TSM-MMB-8432. For installation instructions refer to [Section 9.10—TSM Pin & Bushing Mounting Module - Rigid - Locking](#).



Item	Part Number	Refer to Drawing in:
Pin and Bushing Retrofit Locking Assembly	9005-20-8444	Section 9.33—Pin and Bushing Retrofit Locking Assembly

2.1.8 Pin and Bushing Locking Mounting Module

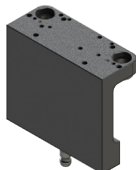
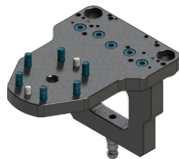
Pin and bushing locking modules include two vertical alignment pins and one vertical bushing with an air cylinder. The module includes mounting fasteners, and is designed to mount to a post module, horizontal module, or horizontal extension. The pin and bushing locking modules can be supplied as a stand alone unit and can be integrated with customer specific fixtures. The module includes two sensors on the air cylinder.



Item	Part Number	Refer to Drawing in:
Pin and Bushing Locking Mounting module, Rigid. ¹	9120-TSM-MMBL-8432	Section 9.10—TSM Pin & Bushing Mounting Module - Rigid - Locking
Notes:		
1. Used with Tooling Interface Plates: 9120-TSM-HBBL-9223, 9120-TSM-HBQL-10189, 9120-TSM-VBBL-8441		

2.1.9 Tooling Interface Plates Locking

There are two types of interface plates, tooling interface plates and vertical tooling interface plates. The tooling interface plate attaches horizontally to the Tool Changer and the customer tooling. The vertical tooling plate attaches to the customer tooling and the Tool Changer is attached to the customer tooling either directly or using an interface plate. Both types of interface plates have two bushings and one alignment pin to position the tooling interface plate to the pin and bushing mounting module. The tooling interface plates can be integrated with customer specific features, including a locking mechanism that secures tools in the tool stand, preventing unintentional tool drops, wear, and potential damage.



Item	Part Number	Refer to Drawing in:
TSM Tooling Interface Plate - Blank-Locking ¹	9120-TSM-HBBL-9223	Section 9.10—TSM Pin & Bushing Mounting Module - Rigid - Locking
TSM Tooling Interface Plate for QC 40- Locking-MA03 ¹	9120-TSM-HBQL-10189	Section 9.13—Tooling Interface Plate for QC 40- Blank- MA03 (Locking)
Vertical Tooling Interface Plate		
TSM Tooling Interface Plate - Blank-Locking ¹	9120-TSM-VBBL-8441	Section 9.12—Horizontal Tooling Interface Plate-Blank (Locking)
Notes:		
1. Used with mounting modules:9120-TSM-MMBL-8432		

2.1.10 Proximity Sensor Modules

The proximity sensor mounts directly to the mounting module. The proximity sensor provides a signal indicating the Tool is located in the tool stand.



Item	Part Number	Refer to Drawing in:
TSM Sensor module, PNP, 8 mm Barrel ¹	9120-TSM-SMA-8439	Section 9.36—Sensor Holders
TSM Sensor module, NPN, 8 mm Barrel ¹	9120-TSM-SMA-8437	
Photoelectric Sensor Kit ¹	9005-20-2152	N/A
Notes:		
1. Used with mounting module: 9120-TSM-MMB-8432.		

2.2 TSM System with V-Block Style Mounting

The system is compatible with QC-20 through QC-110 Tool Changers. The tool stand can be equipped with vertical mounting modules, horizontal modules, or with use of an adapter module to a horizontal extension and can be positioned anywhere along the rail. This system combines the ease of the V-block mounting module with adjustable tool spacing to accommodate customer tooling. There is an optional sensor holder that can attach to the mounting module.

Options are limited to the lengths of horizontal modules to accommodate multiple tool mounts depending on the size of the tooling. Contact ATI for more information.

Figure 2.2—TSM System with V-Block Horizontal Mounting

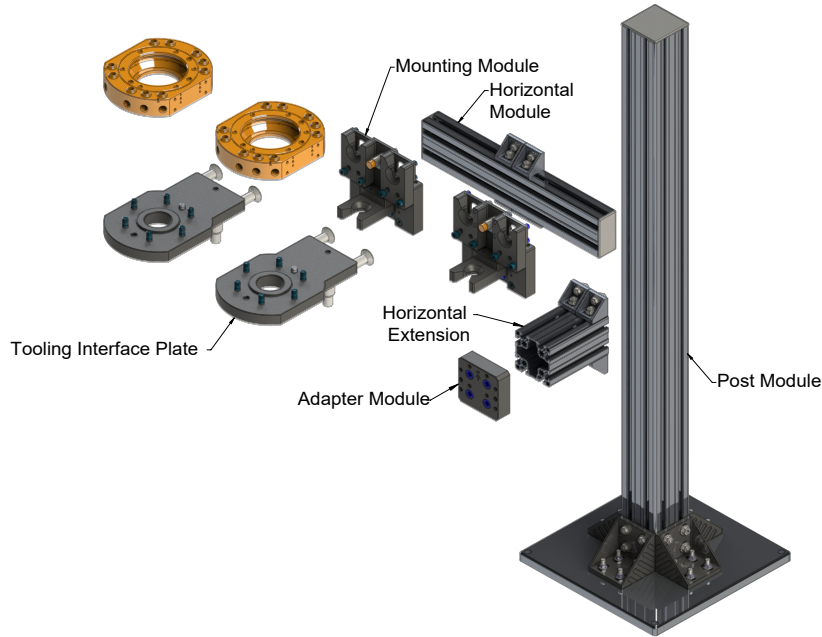
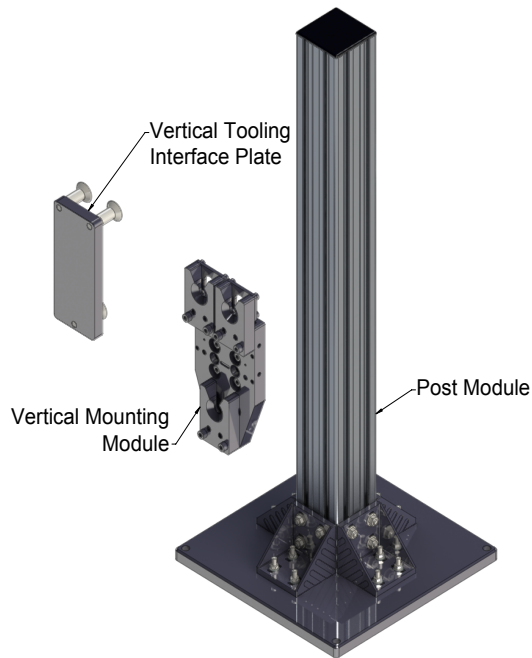
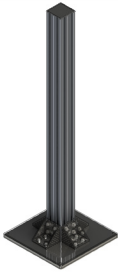


Figure 2.3— TSM System with V-Block Vertical Mounting



2.2.1 Post Module Kits

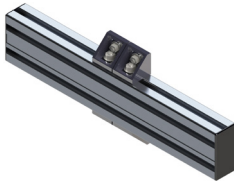
The post module kit is a common component to all TSM systems. The post module kit is available in different post heights and combines the base, rail, and gusset assemblies into a group of components.



Item	Part Number	Refer to Drawing in:
Post module kit 914 mm (36") ^{1,2}	9120-TSM-PM-3317	Section 9.34—Post Modules
Post module kit 1016 mm (40") ^{1,2}	9120-TSM-PM-3382	
Post module kit 1220 mm (48") ^{1,2}	9120-TSM-PM-3325	
Post module kit 1520 mm (60") ^{1,2}	9120-TSM-PM-3353	
Post module kit 1828 mm (72") ^{1,2}	9120-TSM-PM-3322	
Notes:		
1. May specify other rail lengths – cut charge will apply.		
2. The post module is available factory assembled - an assembly charge will apply.		

2.2.2 Horizontal Modules

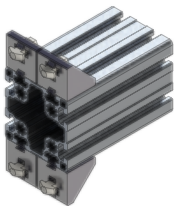
The horizontal module mounts to the post module and can be adjusted vertically or horizontally using the rail gussets to accommodate customer tooling. The rail is an aluminum extrusion and comes in standard lengths. Multiple Tool plate assemblies can be added to the rail depending on the tool spacing requirements.



Item	Part Number	Refer to Drawing in:
Horizontal module 300 mm (12") ¹	9120-TSM-HM-3362	Section 9.39—Medium Tool Stand General Overview
Horizontal module 457 mm (18") ¹	9120-TSM-HM-3323	
Horizontal module 612 mm (24") ¹	9120-TSM-HM-1020	
Horizontal module 914 mm (36") ¹	9120-TSM-HM-3317	
Horizontal module 1220 mm (48") ¹	9120-TSM-HM-3325	
Horizontal module 1520 mm (60") ¹	9120-TSM-HM-3353	
Notes:		
1. May specify other rail lengths – cut charge will apply.		

2.2.3 Horizontal Extensions

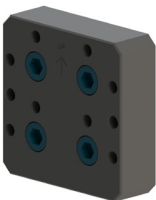
The horizontal extension is used when customer tooling requires extra clearance from the rail or other tooling.



Item	Part Number	Refer to Drawing in:
TSM Horizontal Extension, 3.15"	9120-TSM-HE-3403	Section 9.39—Medium Tool Stand General Overview
TSM Horizontal Extension, 6"	9120-TSM-HE-3320	
TSM Horizontal Extension, 10"	9120-TSM-HE-3321	

2.2.4 TSM Adapter Module

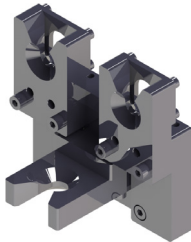
To install a mounting module on a horizontal extension, use an adapter module.



Item	Part Number	Refer to Drawing in:
TSM Adapter Module - Mounting Module to TSM HE ¹	9120-TSM-AM-9982	Section 9.35—TSM Rail Adapter Module - V-Block Style
Notes:		
1. Adapts to the TSM horizontal extension.		

2.2.5 Mounting Modules

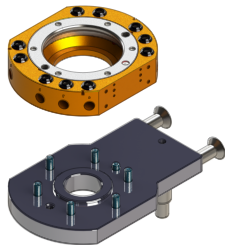
The mounting module includes three pin receivers. The assembly includes mounting fasteners, and is designed to mount to the horizontal module or with use of an adapter module to the post module or end of a horizontal extension. The mounting modules can be positioned anywhere along the rail to accommodate customer tooling. A mounting module is required for each tool position. The mounting module provides mounting holes for an optional sensor holder (see [Section 2.2.9—Sensor Holders](#)).



Item	Part Number	Refer to Drawing in:	QC-Models
Mounting module ^{1,3}	9120-TSM-MMV-3597	Section 9.16—Mounting Module 3597	QC-40 ~ QC-76
Mounting module ^{2,4}	9120-TSM-MMV-4018	Section 9.17—Mounting Module 4018	QC-100 ~ QC-110
Notes:			
1. Uses Sensor Holder 9120-TSM-SM-4205			
2. Uses Sensor Holder 9120-TSM-SM-4206			
3. Used with Tooling Interface Plates 9120-TSM-HVQ-XXXX except 9120-TSM-HVQ-4059.			
4. Used with Tooling Interface Plates 9120-TSM-HVQ-4059 and 9120-TSM-HVB-7961.			

2.2.6 Tooling Interface Plates

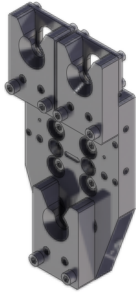
The tooling interface plate provides an interface from the customer tooling and Tool Changer to the tool stand. The tooling interface plate attaches to the Tool Changer and provides a mounting surface for the customer tooling. The tooling interface plate uses three tooling pins to position the tooling interface plate to the mounting module. Tooling interface plates listed in table below require a machined mounting pattern for customer tooling. Custom machined tooling interface plates are available, contact ATI for more information.



Item	Part Number	Refer to Drawing in:	QC-Models
Tooling Interface Plate ²	9120-TSM-HVQ-4055	Section 9.18—QC-40 Tooling Interface Plate	QC-40
Tooling Interface Plate ^{1,2}	9120-TSM-HVQ-4627	Section 9.18—QC-40 Tooling Interface Plate	QC-40 Euro
Tooling Interface Plate ²	9120-TSM-HVQ-4056	Section 9.19—QC-41 Tooling Interface Plate	QC-41
Tooling Interface Plate ²	9120-TSM-HVQ-4057	Section 9.20—QC-60 Tooling Interface Plate	QC-60
Tooling Interface Plate ²	9120-TSM-HVQ-6660	Section 9.21—QC-62 Tooling Interface Plate	QC-62
Tooling Interface Plate ²	9120-TSM-HVQ-4058	Section 9.22—QC-71 Tooling Interface Plate	QC-71
Tooling Interface Plate ²	9120-TSM-HVQ-7290	Section 9.23—QC-76 Tooling Interface Plate	QC-76
Tooling Interface Plate ³	9120-TSM-HVQ-4059	Section 9.24—QC-100 Tooling Interface Plate	QC-100
Tooling Interface Plate ^{3,4}	9120-TSM-HVB-7961	Section 9.25—Blank Tooling Interface Plate	QC Blank
Notes:			
1. Euro Tool Changer only			
2. Used with mounting module 9120-TSM-MMV-3597			
3. Used with mounting module 9120-TSM-MMV-4018			
4. Blank - No QC boss or QC mounting pattern.			

2.2.7 Vertical Mounting Module

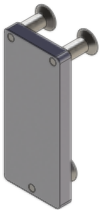
The vertical mounting module includes three pin receivers. The mounting module includes mounting fasteners, and is designed to mount to the horizontal module, horizontal extension, or directly to the post module. The mounting module can be positioned anywhere along the rail to accommodate customer tooling. A mounting module is required for each tool position. The mounting module provides mounting holes for an optional sensor holder (see [Section 2.2.9—Sensor Holders](#)).



Item	Part Number	Refer to Drawing in:	QC-Models
Vertical Mounting module ^{2,3}	9120-TSM-MMV-4068	Section 9.26—Vertical Mounting Module 4068	QC-40 ~ QC-76
Vertical Mounting module ^{1,4}	9120-TSM-MMV-4070	Section 9.27—Vertical Mounting Module 4070	QC-100 ~ QC-110
Notes:			
1. Uses Sensor Holder 9120-TSM-SM-4205			
2. Uses Sensor Holder 9120-TSM-SM-4206			
3. Used with Vertical Tooling Interface Plates 9120-TSM-VVB-4069			
4. Used with Vertical Tooling Interface Plates 9120-TSM-VVB-4071			

2.2.8 Vertical Tooling Interface Plate

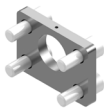
The vertical tooling interface plate provides an interface from the tool and Tool Changer to the TSM system. The tooling interface plate attaches to a flat on the customer tooling or Tool Changer. The tooling interface plate uses the (3) tooling pins to position the tooling interface plate with the mounting module.



Item	Part Number	Refer to Drawing in:	QC-Models
Vertical Tooling Interface Plate-Blank ¹	9120-TSM-VVB-4069	Section 9.29—Vertical Tooling Interface Plate - Blank (Large)	QC-40 ~ QC-76
Vertical Tooling Interface Plate-Blank (Large) ²	9120-TSM-VVB-4071	Section 9.29—Vertical Tooling Interface Plate - Blank (Large)	QC-100 ~ QC-110
Notes:			
1. Used with mounting module 9120-TSM-MMV-4068			
2. Used with mounting module 9120-TSM-MMV-4070			

2.2.9 Sensor Holders

The TSM sensor holders accommodate barrel-type proximity sensors with 18 x 1.0 thread. For operation, thread the sensor into the desired position to detect the surface of the TSM tooling interface plate as it is dropped off in the stand. ATI offers the following proximity sensor (see [Section 2.2.10—Proximity Sensor](#)).



Item	Part Number	Refer to Drawing in:	QC-Models
Sensor Holder	9120-TSM-SM-4206	Section 9.36—Sensor Holders	QC-40 ~ QC-76
Sensor Holder	9120-TSM-SM-4205		QC-100 ~ QC-110

2.2.10 Proximity Sensor

The proximity sensor screws directly into the sensor holder. The proximity sensor provides a signal indicating the Tool is located in the tool stand.

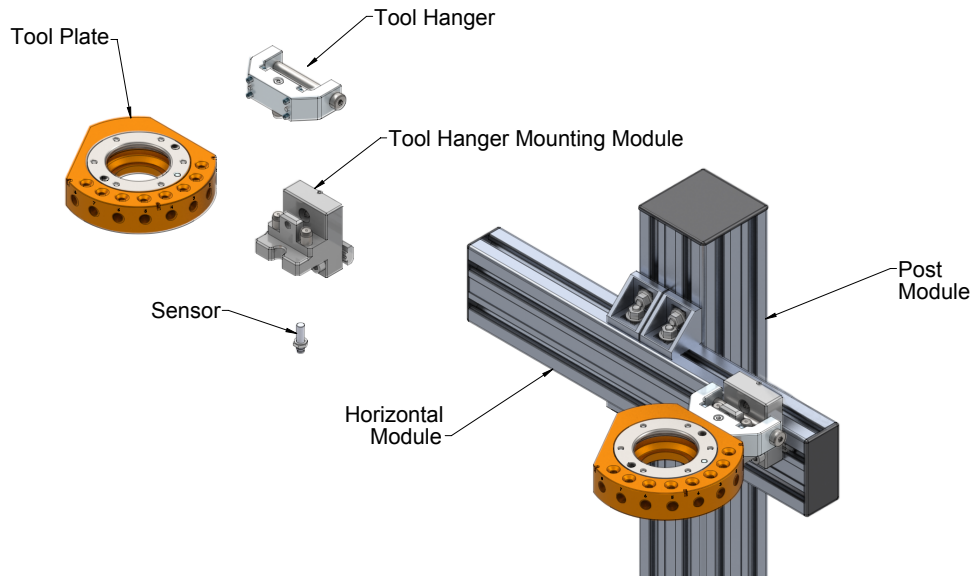


Item	Part Number	Refer to Drawing in:	QC-Models
PNP 3-Wire DC Sensor	8590-9909999-45	Section 9.36—Sensor Holders	QC-40 ~ QC-110

2.3 TSM System with Tool Hanger Mounting Module

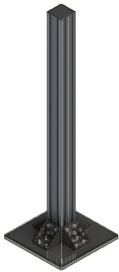
The tool hanger mounting module is compatible with QC-20 through QC-71 Tool Changers and includes a rigid block that interfaces with the tool hanger. The mount assembly includes the mounting fasteners, and is designed to mount to extruded rail components and the flats on the Tool Changer. The assembly can be mounted to any other surface that has the corresponding mounting features.

Figure 2.4—Tool Hanger Mounting



2.3.1 Post Module Kits

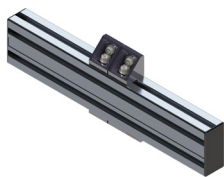
The post module kit is a common component to all TSM systems. The post module kit is available in different post heights and combines the base, rail, and gusset assemblies into a group of components.



Item	Part Number	Refer to Drawing in:
Post module kit 914 mm (36") ^{1,2}	9120-TSM-PM-3317	Section 9.34—Post Modules
Post module kit 1016 mm (40") ^{1,2}	9120-TSM-PM-3382	
Post module kit 1220 mm (48") ^{1,2}	9120-TSM-PM-3325	
Post module kit 1520 mm (60") ^{1,2}	9120-TSM-PM-3353	
Post module kit 1828 mm (72") ^{1,2}	9120-TSM-PM-3322	
Notes:		
1. A customer may specify other rail lengths – cut charge will apply.		
2. The post module is available factory assembled - an assembly charge will apply.		

2.3.2 Horizontal Modules

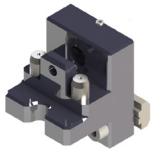
The horizontal module mounts to the post module and can be adjusted vertically or horizontally using the rail gussets to accommodate customer tooling. The rail is an aluminum extrusion and comes in standard lengths. Multiple Tool plate assemblies can be added to the rail depending on the tool spacing requirements.



Item	Part Number	Refer to Drawing in:
Horizontal module 300 mm (12") ¹	9120-TSM-HM-3362	Section 9.39—Medium Tool Stand General Overview
Horizontal module 457 mm (18") ¹	9120-TSM-HM-3323	
Horizontal module 612 mm (24") ¹	9120-TSM-HM-1020	
Horizontal module 914 mm (36") ¹	9120-TSM-HM-3317	
Horizontal module 1220 mm (48") ¹	9120-TSM-HM-3325	
Horizontal module 1520 mm (60") ¹	9120-TSM-HM-3353	
Notes:		
1. A customer may specify other rail lengths – cut charge will apply.		

2.3.3 Tool Hanger Mounting Modules

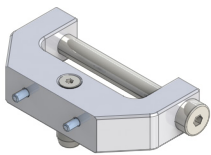
The tool hanger mounting module includes a rigid block with locating pins.



Item	Part Number	Refer to Drawing in:	QC-Models
Tool Hanger Mounting module	9120-TSM-MM-5496	Section 9.30—Tool Hanger Module 5496	QC-20 ~ QC-71
Note: 1. Used with 9120-TSM-TH-5891, 9120-TSM-TH-5923, and 9120-TSM-TH-5497			

2.3.4 Tool Hangers

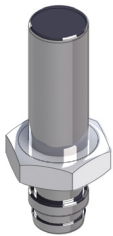
The tool hanger provides an interface between the Tool Changer and mounting module. The tool hangers are sized and designed to correspond with the Tool Changer module flats. The tool hanger also includes (2) steel alignment features—a shoulder bolt that aligns with the mounting module groove and a locating pin to align with the corresponding slot in the mounting module.



Item	Part Number	Refer to Drawing in:	QC-Models
Tool Hanger ³	9120-TSM-TH-5891	Section 9.31—Tool Hanger Module 5891	QC-20 ¹ , QC-21 ¹ , QC-21E ¹
Tool Hanger ³	9120-TSM-TH-5923	Section 9.32—Tool Hanger Module 5923	QC-21 ² , QC-21E ²
Tool Hanger ³	9120-TSM-TH-5497	Section 9.33—Tool Hanger Module 5497 Section 2.3—TSM System with Tool Hanger Mounting Module	QC-40 ^{1,2} , QC-40Q ^{1,2} , QC-41 ¹ , QC-71 ^{1,2}
Notes: 1. Mounts to Flat A 2. Mounts to Flat B 3. Used with mounting module 9120-TSM-MM-5496			

2.3.5 Proximity Sensor and Cables for Tool Hanger Mounting Module

The proximity sensor can be screwed into the tool hanger mounting module. The proximity sensor provides a signal indicating the Tool is located in the tool stand. Sensor cables are available in various lengths. This proximity sensor is not compatible with the V-block mounting module.

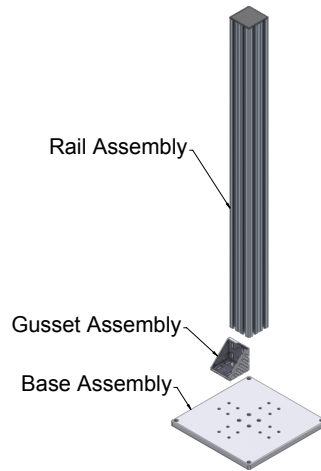


Proximity Sensor		
Item	Part Number	QC-Models
Proximity Sensor PNP 3 wire DC	8590-9909999-34	QC-20 ~ QC-71
Sensor Cables		
Item	Part Number	QC-Models
2 meter female	8590-9909999-07	QC-20 ~ QC-71
5 meter female	8590-9909999-12	QC-20 ~ QC-71

2.4 Post Module Components

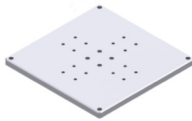
The post module is a common component to all TSM systems. The post module is available in different post heights and combines the base, rail, and gusset assemblies into a group of components.

Figure 2.5—Post module Components



2.4.1 Base Plate

The base plate consists of a square aluminum machined plate. The base provides a secure foundation on which to build the TSM system.



Item	Part Number	Refer to Drawing in:
Base Plate	3700-20-3589	Section 9.34—Post Modules

2.4.2 Rail Assemblies

The rail assembly mounts to the base assembly. The standard rail is an aluminum extrusion and is available in a variety of lengths. Customers can request custom lengths when ordering.



Item	Part Number	Refer to Drawing in:
Post Rail 914 mm (36")	3710-20-3435	Section 9.34—Post Modules
Post Rail 1016 mm (40")	3710-20-3382	
Post Rail 1220 mm (48")	3710-20-3318	
Post Rail 1520 mm (60")	3710-20-3334	
Post Rail 1828 mm (72")	3710-20-3322	
Note:		
1. The customer may specify other rail lengths – cut charge will apply.		

2.4.3 Gusset Assembly

The gusset assembly provides structural support at the base of the post module. The gusset assembly mounts to the base of the post module and includes mounting fasteners. Note: Remove tabs from the gusset so that the surface of the gusset is flush with the base assembly.

NOTICE: Remove the tabs from the gusset so that the back surface of the gusset is flush with the base assembly surface.



Item	Part Number	Refer to Drawing in:
Gusset	9120-TSS-GA-1030	Section 9.34—Post Modules

2.5 Determining The Tool Stand Configuration

Determining the components needed for a tool stand requires knowledge of the system being designed. When determining the tool stand components, consider the following questions:

- What model Tool Changer will be used, and are Tool Changer modules required?
- How many tools must the stand accommodate?
- What are the dimensions and weight of the tooling that will be used?
- What is the size, reach, and capability of the robot being used?
- How much floor space is available to accommodate the tool stand?
- How much area between tool positions are required for pneumatic fittings, hoses, electrical cabling and other utilities?

Figure 2.6—Tool Stand and Tool Spacing

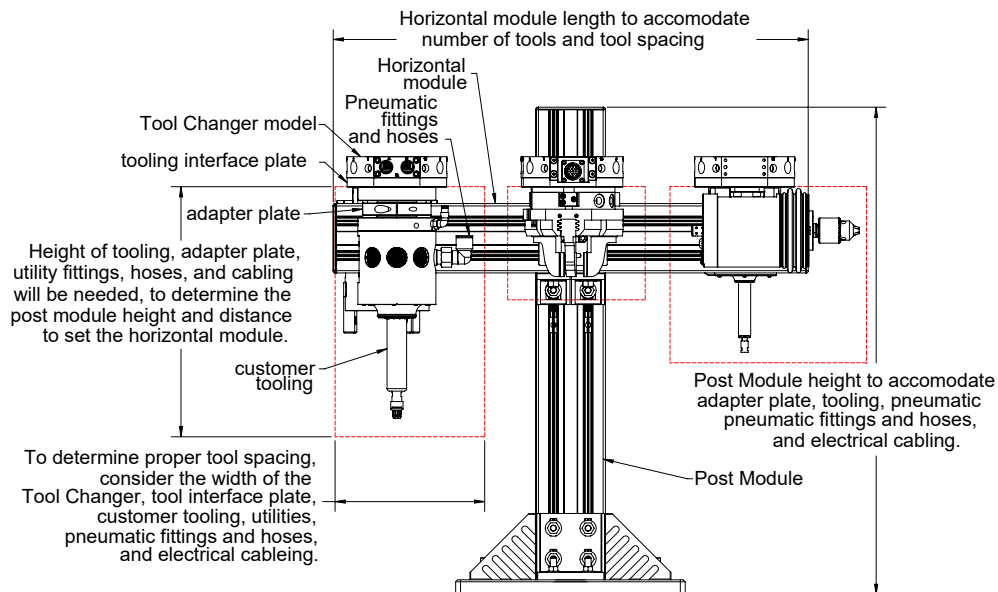
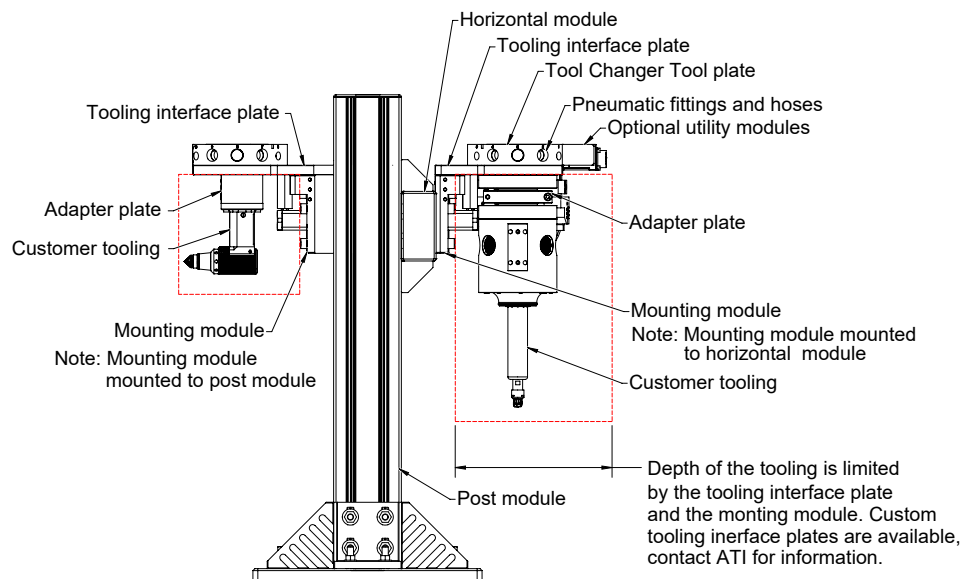


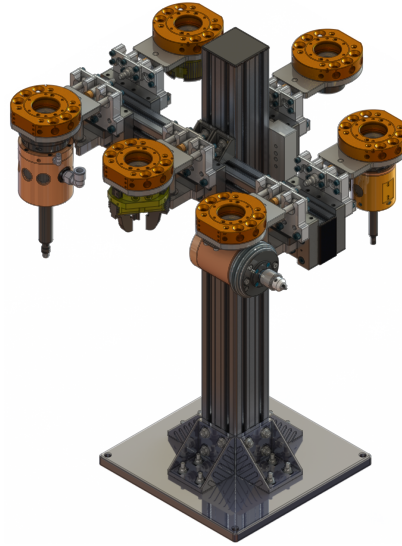
Figure 2.7—Tool Stand Configurations



2.5.1 Configuring a TSM System with Horizontal Mounting

A TSM system with horizontal mounting provides variable spacing tool positions and tool sensing options for Tool Changer models QC-40 through QC-110. The mounting module can mount to the post module using an adapter module for up to two tool positions, or mount to an optional horizontal module to accommodate multiple tool positions. For detailed information, refer to the [Drawing in Section 9](#).

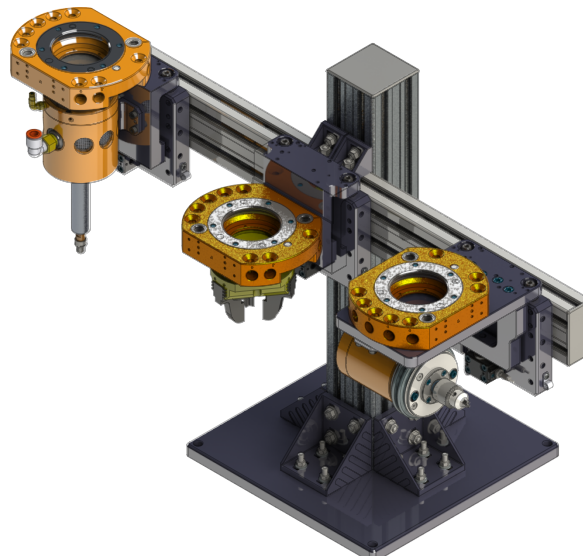
Figure 2.8—Horizontal Mounting System Configurations



2.5.2 Configuring a TSM System with Pin and Bushing Mounting

A TSM system with pin and bushing mounting provides variable spacing tool positions and tool sensing options for Tool Changer models. The mounting module can mount to the post module using an adapter module for up to two tool positions, or mount to an optional horizontal module to accommodate multiple tool positions. Refer to the [Drawing in Section 9](#) for detailed information.

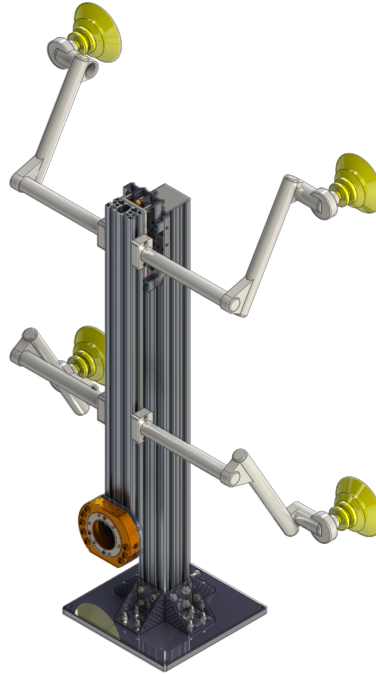
Figure 2.9—Pin and Bushing Mounting System Configurations



2.5.3 Configuring a TSM System with Vertical Mounting

A TSM system with vertical mounting can mount directly to the post module for up to two tool positions or mount to an optional horizontal module to accommodate multiple tool positions. Refer to [Drawing in Section 9](#) for detailed information.

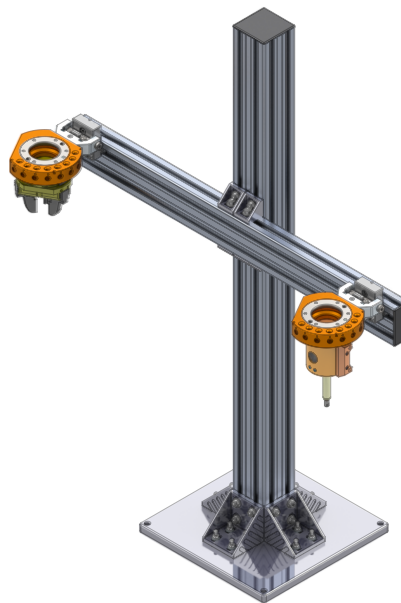
Figure 2.10—Vertical Mounting Configurations



2.5.4 Configuring a TSM System with Tool Hanger Mounting

Tool hanger mounting provides multiple tool positions for Tool Changer models QC-20 through QC-71. The mounting module is mounted to the horizontal module or vertical post. Optional proximity sensors can be added for Tool presence sensing.

Figure 2.11—Tool Hanger Configurations



3. Installation

The tool stand is shipped unassembled. The customer must perform the final assembly and determine the proper location for the tool stand.



WARNING: All pneumatic fittings and tubing must be capable of withstanding the repetitive motions of the application without failing. The routing of electrical and pneumatic lines must minimize the possibility of over stressing, pullout, or kinking the lines. Failure to do so can cause critical electrical and/or pneumatic lines to malfunction and might result in injury to personnel or damage to equipment.



CAUTION: Improper cable routing can result in wires and cables being pinched in the joint between the Tool Changer plates and premature failure of the electrical connectors. Properly route and secure all cables, particularly on the Master side.



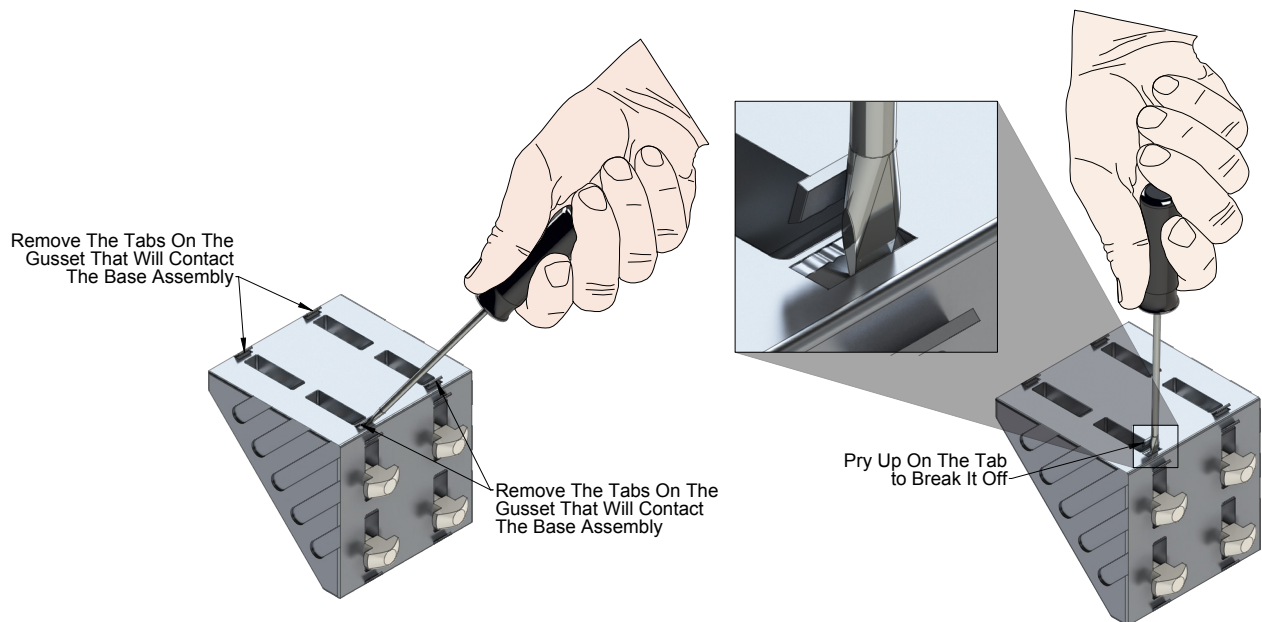
CAUTION: Thread locker applied to fasteners must not be used more than once. Fasteners might become loose and cause equipment damage. Always apply new thread locker when reusing fasteners.

3.1 Installing Base, Rail, and Gusset assemblies

Tools required: 6 mm and 10 mm hex key, 13 mm socket wrench, screw driver, torque wrench

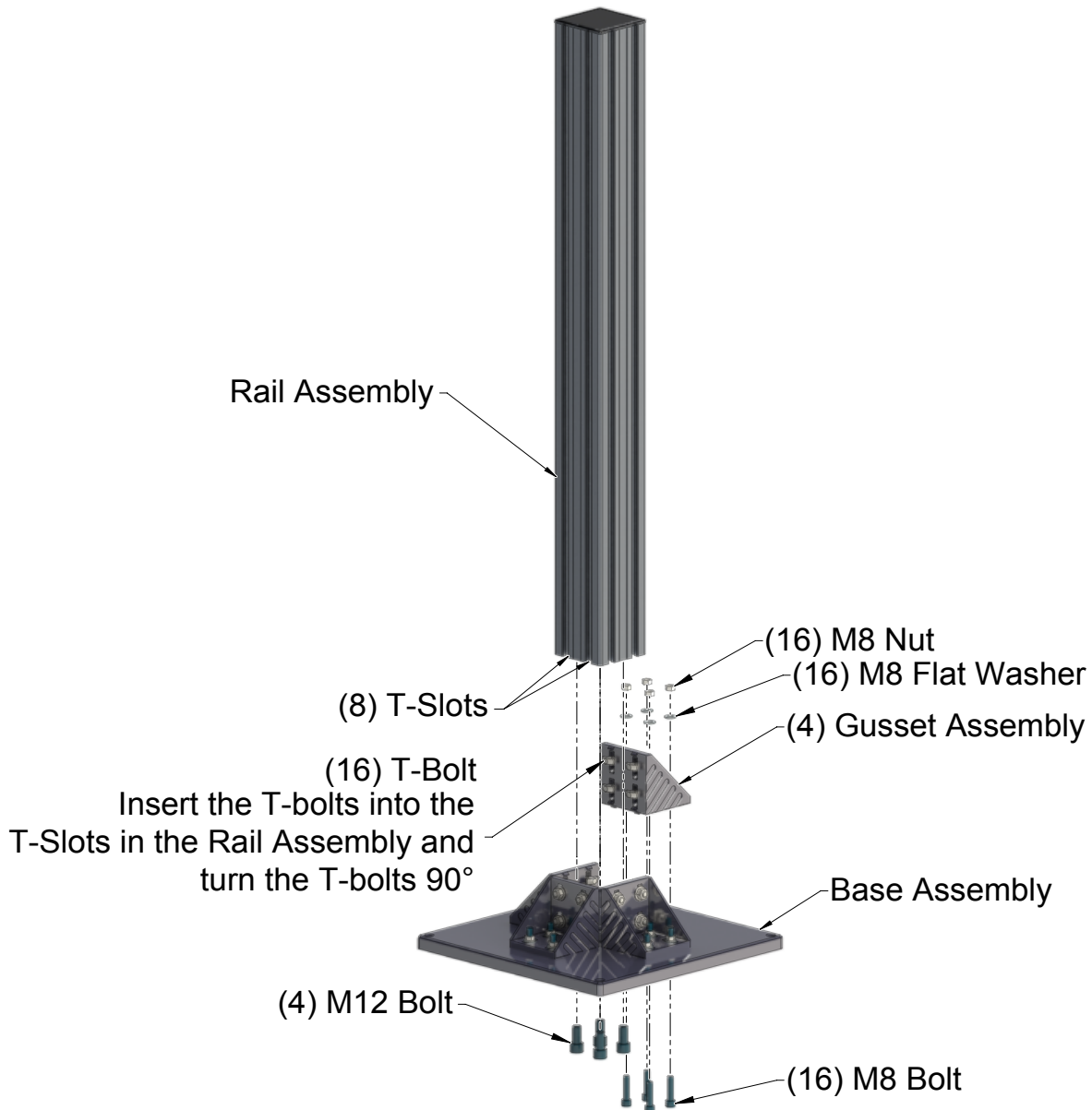
1. Determine the proper location and configuration of the tool stand. Assemble the base, rail and gusset assemblies prior to anchoring the TSM base.
2. Assemble the gussets to the rail by inserting the T-bolts into the T-slots in the rail and turning the T-bolts 90°.
3. Insert a screw driver into the slot under the tab.
4. Pry up on the tab to break it off.
5. Remove any burrs that may not allow flush contact to the base assembly.

Figure 3.1—Removing Tabs on Gussets Using Screw Driver



- Assemble the rail to the base with the (4) M12 socket head cap screws using a 10 mm hex key, refer to [Section 9—Drawings](#) for specific details on torque and thread tool hanger requirements.
- Insert the M8 socket head cap screws through the base and gussets. Secure with the M8 flat washer and nut. Using a 6 mm hex key, tighten the nuts on the T-bolts holding the gussets to the rail using a 13 mm socket wrench. Refer to [Section 9—Drawings](#) for specific details on torque and thread requirements.

Figure 3.2—Installing Base, Rail, and Gusset assemblies



- Anchor the TSM base to a smooth flat surface using the (4) 13 mm through holes provided (fasteners not included).
- To continue installation, refer to the following sections:
 - [Section 3.2—Installing Pin and Bushing or Horizontal V-Block Mounting Module to Tool Stand](#)
 - [Section 3.3—Installing Vertical V-Block Mounting Module to Tool Stand](#)
 - [Section 3.4—Installing Tool Hanger Mounting Module to Tool Stand](#)
 - [Section 3.5—Installing Horizontal Extension to Tool Stand](#)

3.2 Installing Pin and Bushing or Horizontal V-Block Mounting Module to Tool Stand

Tools required: 6 mm hex key, 13 mm socket wrench, torque wrench

1. For information to assemble the model, refer to [Section 9—Drawings](#). The drawings provide torque, thread, and other specific requirements.
2. Assemble the horizontal module to the post module by inserting the T-bolts into the T-slots in the rail. Turn the T-bolts 90° and torque.
3. Adjust the height of the horizontal module to accommodate the tooling and tighten the nuts on the T-bolts to secure the vertical position of the rail, further adjustments to horizontal module may be required using a 13 mm socket wrench.
4. Remove the horizontal module end cap and assemble the mounting module to the horizontal module by sliding the T-nuts into the T-slots on the horizontal module.
5. Install additional mounting modules if needed.
6. Position the horizontal module and the mounting modules to accommodate the tool spacing desired and tighten the T-bolts for the horizontal position of the rail. Tighten the M8 socket head cap screws to secure the mounting modules using a 6 mm hex key.
7. Place the end cap on the horizontal module.

Figure 3.3—Installing Tooling Interface Plates (V-Block Shown)

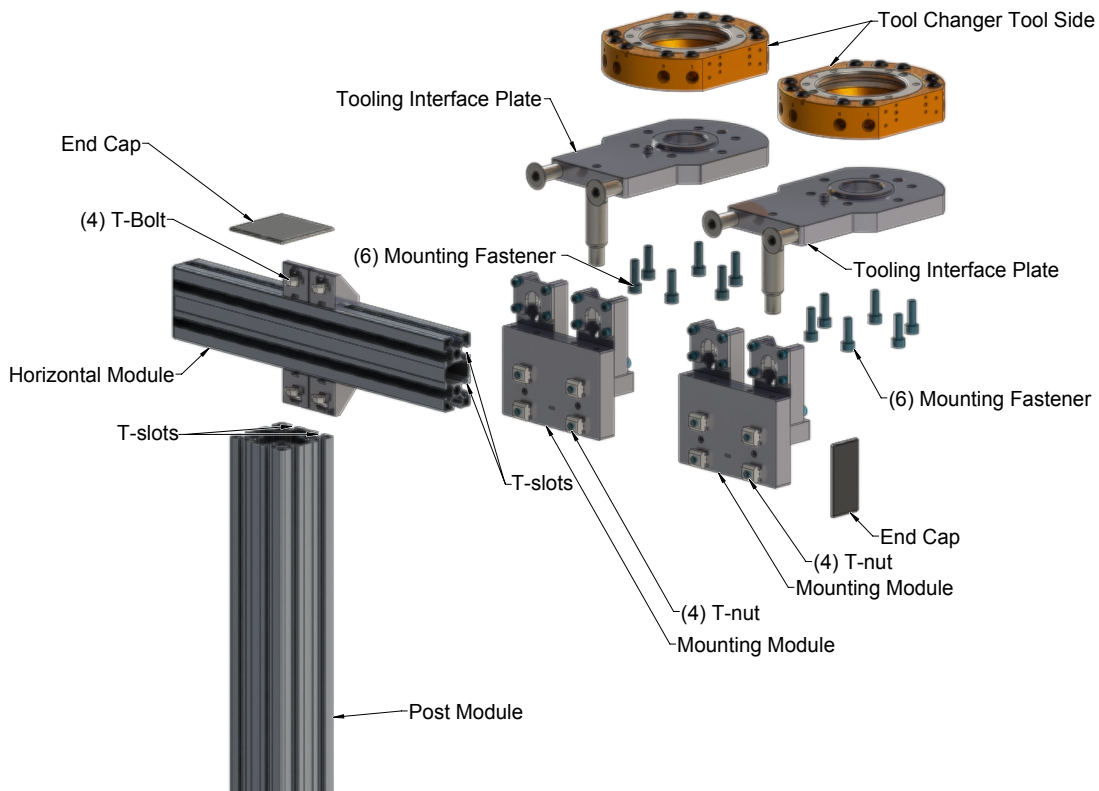
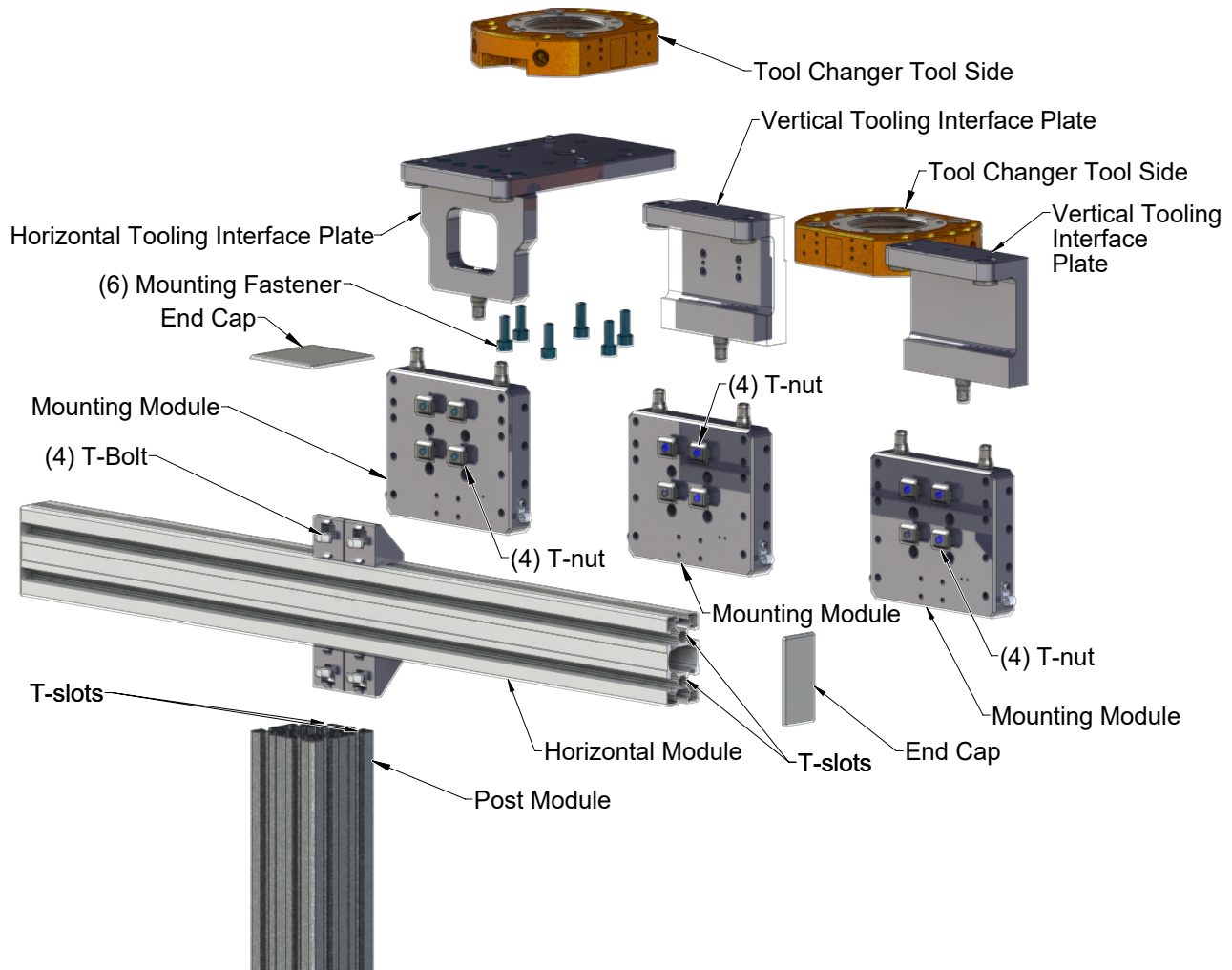


Figure 3.4—Installing Tooling Interface Plates (Pin and Bushing Shown)



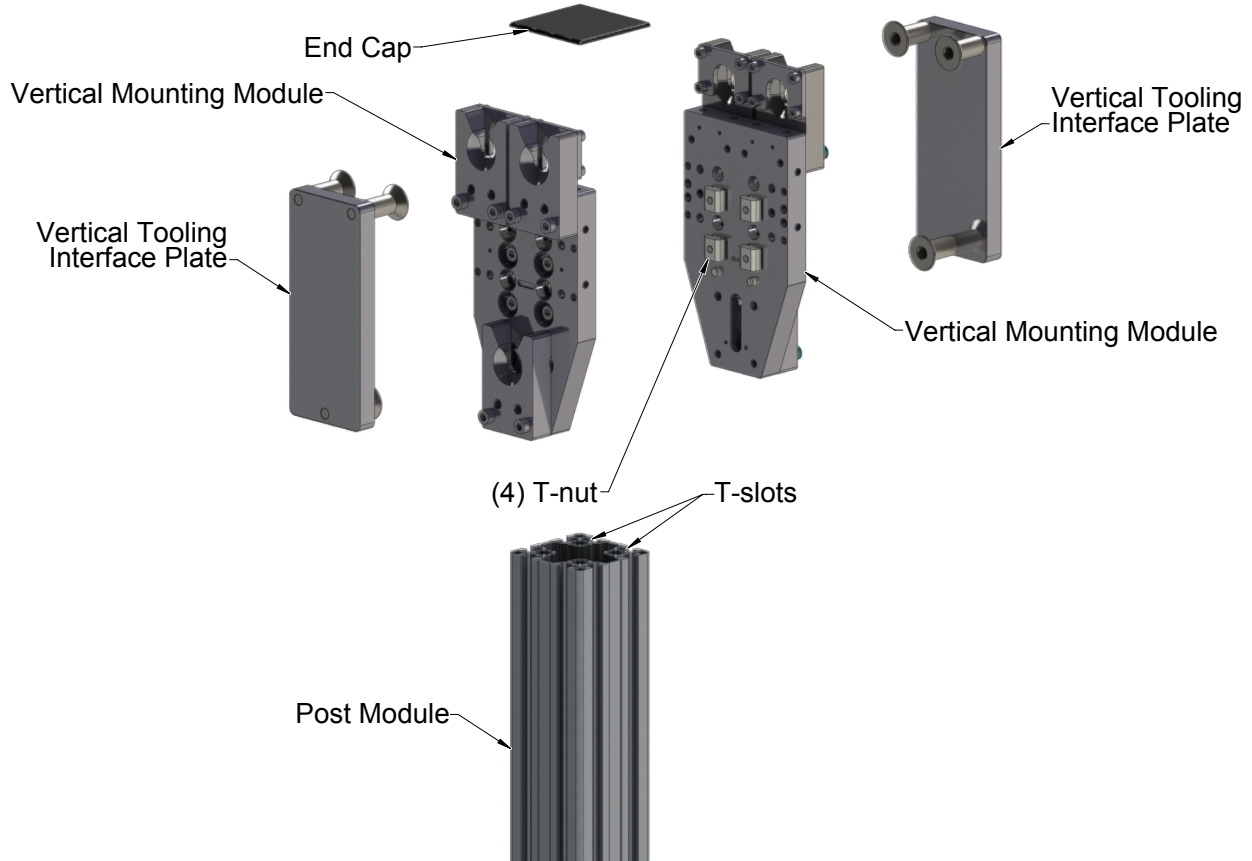
8. If equipped, install the optional proximity sensor to the mounting module. Refer to [Section 3.6—Installation of Proximity and Photoelectric Sensor \(for Pin and Bushing\)](#) and [Section 3.7—Proximity Sensor Installation for V-Block \(Sensor Holder 9120-TSM-SM-4205\)](#).
9. If the tooling interface plate is a blank plate, it will need to be machined with the mounting pattern for the Tool Changer and/or customer tooling desired. Refer to [Section 9—Drawings](#) for the specific Tool Changer being used for the mounting pattern required.
10. Assemble the customer tooling and Tool Changer to the tooling interface plate assembly. Then place on the mounting module. Refer to the appropriate Tool Changer manual for proper installation of the tooling interface plate.

3.3 Installing Vertical V-Block Mounting Module to Tool Stand

Tools required: 6 mm hex key, torque wrench

1. For information to assemble the model, refer to [Section 9—Drawings](#). The drawings provide torque, thread, and other specific requirements.
2. Remove the post module end cap. Refer to [Figure 3.5](#).
3. Assemble the mounting module to the post module by sliding the T-nuts into the T-slots in the rail.
4. Adjust the height of the mounting module or horizontal module to accommodate the tooling for the application and tighten the M8 socket head cap screws using a 6 mm hex key.
5. Place the end cap on the post module.
6. If the tooling interface plate is a blank plate it will need to be machined with the mounting pattern for the Tool Changer and/or customer tooling desired. Refer to [Section 9—Drawings](#) for the specific Tool Changer being used for the mounting pattern required.
7. Assemble the customer tooling and/or Tool Changer to the tooling interface plate. Then place on the mounting module.

Figure 3.5—Installing Vertical Tooling Interface Plates



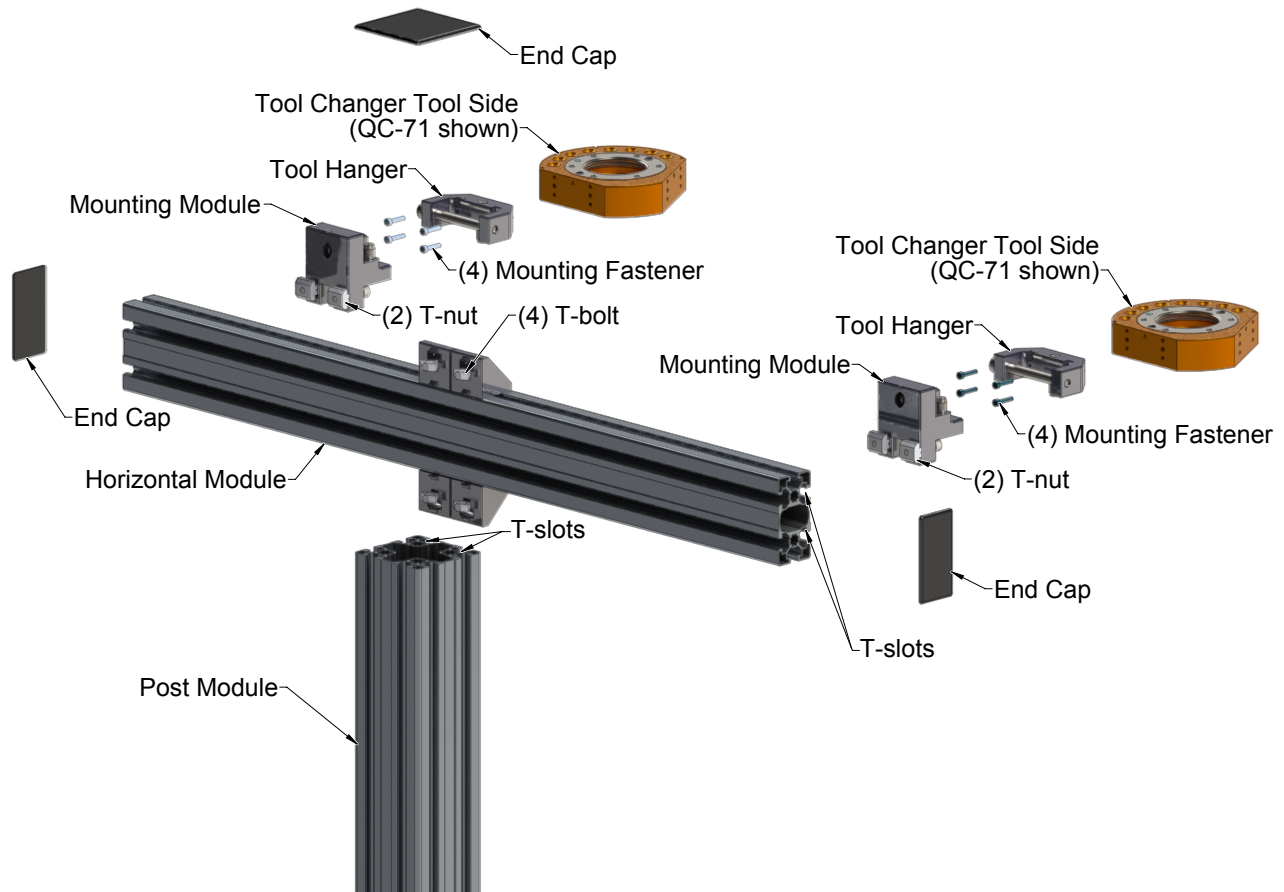
8. If equipped, install the optional sensor holder and proximity sensor. Refer to [Section 3.7—Proximity Sensor Installation for V-Block \(Sensor Holder 9120-TSM-SM-4205\)](#).

3.4 Installing Tool Hanger Mounting Module to Tool Stand

Tools required: 6 mm hex key, 13 mm socket wrench, torque wrench

1. For information to assemble the model, refer to [Section 9—Drawings](#). The drawings provide torque, thread, and other specific requirements.
2. Assemble the horizontal module to the post module by inserting the T-bolts into the T-slots in the rail. Turn the T-bolts 90° and torque.
3. Adjust the height of the horizontal module to accommodate the tooling for the application and tighten the nuts on the T-bolts to secure the vertical position of the rail using a 13 mm socket wrench. Further adjustments to horizontal module may be required.
4. Remove the horizontal module end cap and assemble the mounting module to the horizontal module by sliding the T-nuts into the T-slots on the horizontal module.
5. Adjust the height of the mounting module to accommodate the tooling for the application and tighten the M8 socket head cap screws.
6. Place the end cap on the horizontal module.
7. Assemble the customer tooling and Tool Changer to the tool hanger. Then place on the mounting module.

Figure 3.6—Installing Tool Hanger Mounting Modules



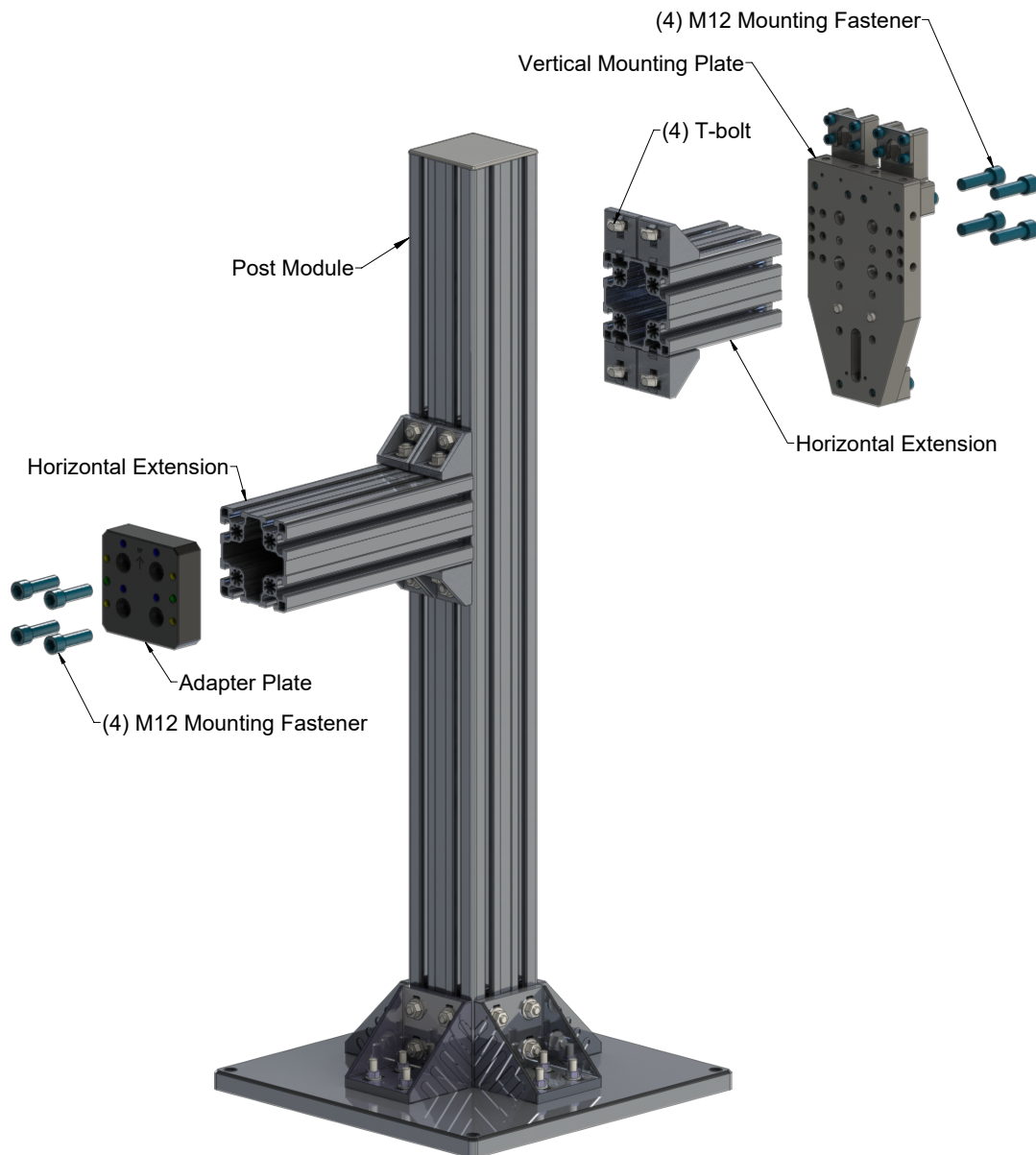
8. If equipped, install the optional proximity sensor. Refer to [Section 3.9—Proximity Sensor installation for TSM Tool Hanger](#)

3.5 Installing Horizontal Extension to Tool Stand

Tools required: 6 mm and 10 mm hex key, 13 mm socket wrench, torque wrench

1. For information to assemble the model, refer to [Section 9—Drawings](#). The drawings provide torque, thread, and other specific requirements.
2. Assemble the horizontal extension to the rail by inserting the T-bolts into the T-slots in the rail. Turn the T-bolts 90° and finger tighten.
3. Adjust the height of the horizontal extension to accommodate the tooling for the application and tighten the nuts to proper torque on the T-bolts to secure the vertical position of the extension using a 13 mm socket wrench.
4. Assemble the adapter module or vertical mounting plate to the end of the horizontal extension with the M12 mounting fasteners using a 10 mm hex key.

Figure 3.7—Installing Horizontal Extension



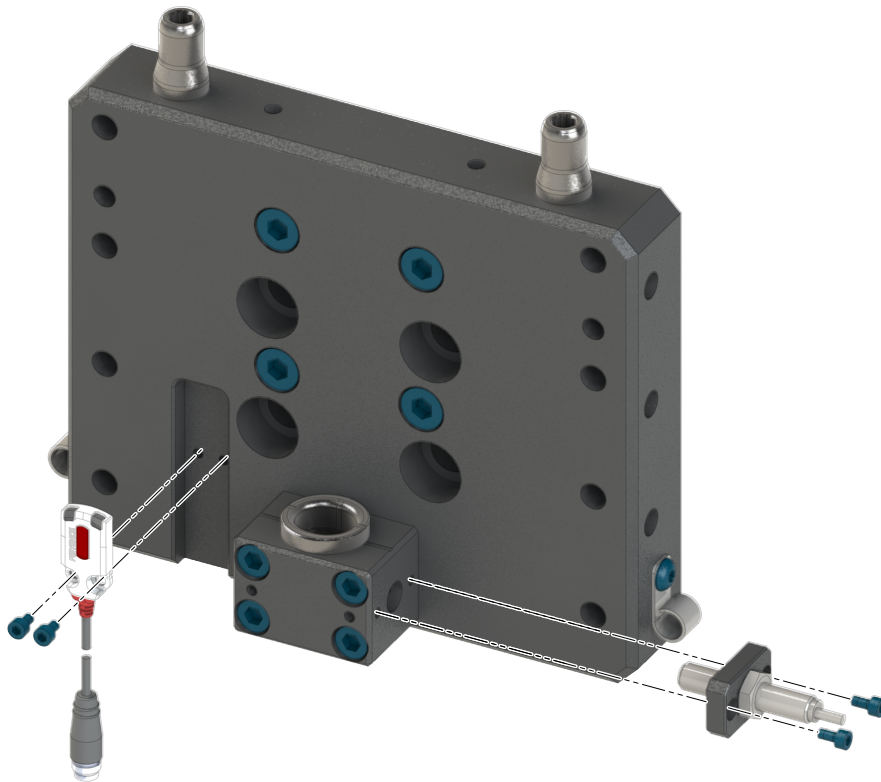
3.6 Installation of Proximity and Photoelectric Sensor (for Pin and Bushing)

Tools required: 2.5 mm hex key, torque wrench

Supplies required: Loctite® 222™

1. Install the barrel proximity sensor:
 - a. Apply Loctite® 222™ to the threads of the (2) M3 socket head cap screws.
 - b. Use a 2.5 mm hex key to install the (2) M3 socket head cap screws that secure the sensor holder to the block on the mounting module. Tighten to 50 in-lbs (5.6 Nm).
2. (Optional) Install the photoelectric sensor:
 - a. Apply Loctite® 222™ to the threads of the (2) M3 socket head cap screws.
 - b. Use a 2.5 mm hex key to install the (2) M3 socket head cap screws that secure the sensor to the slot on the mounting module. Tighten to 10 in-lbs (1.1 Nm).
 - c. Attach the sensor cable to the sensor connector.

Figure 3.8—Installation of Sensor for Pin and Block



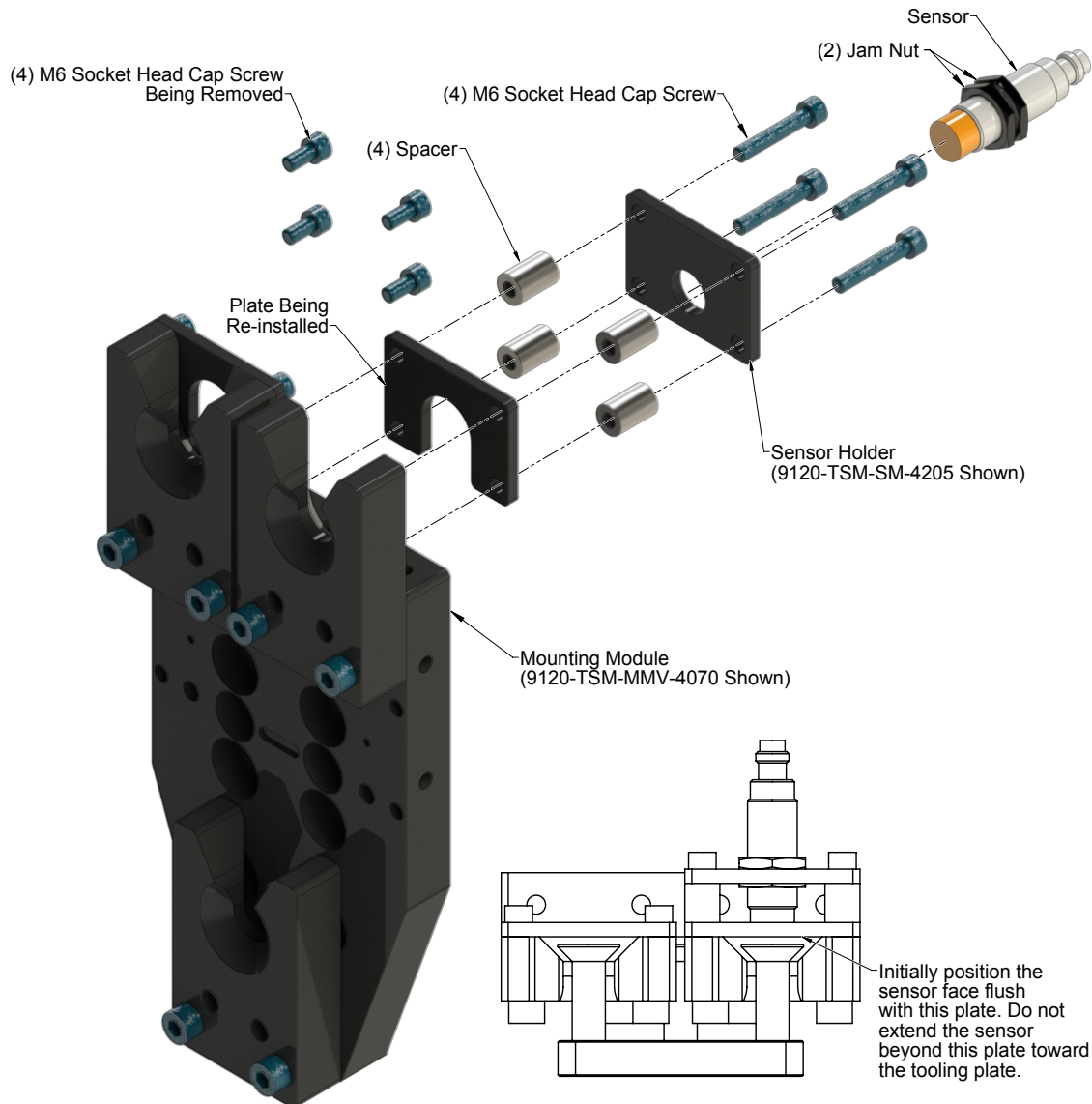
3.7 Proximity Sensor Installation for V-Block (Sensor Holder 9120-TSM-SM-4205)

Tools required: 5 mm hex key, 24 mm wrench, torque wrench

Supplies required: Loctite® 222™

1. Remove the (2) M6 socket head cap screws using a 5 mm hex key from the inside of each of the top pin receivers on the mounting module.
2. Apply Loctite® 222™ or similar to the (4) M6 socket head cap screws used to mount the proximity sensor holder.
3. Attach the proximity sensor holder to the mounting module with the (4) M6 socket head cap screws using a 5 mm hex key and spacers if required. Tighten to 6 in-lbs (0.68 Nm).
4. Screw the proximity sensor into the holder and initially position so the face of the sensor is flush with the plate being reinstalled as shown in *Figure 3.9*. Do not extend the sensor beyond the face of the plate toward the tooling plate.
5. Turn the jam nuts finger-tight, and connect the sensor cable.
6. Adjust sensing distance, as needed, and tighten the jam nuts using a 24 mm wrench.

Figure 3.9—Proximity Sensor Position for V-Block (Sensor Holder 9120-TSM-SM-4205)



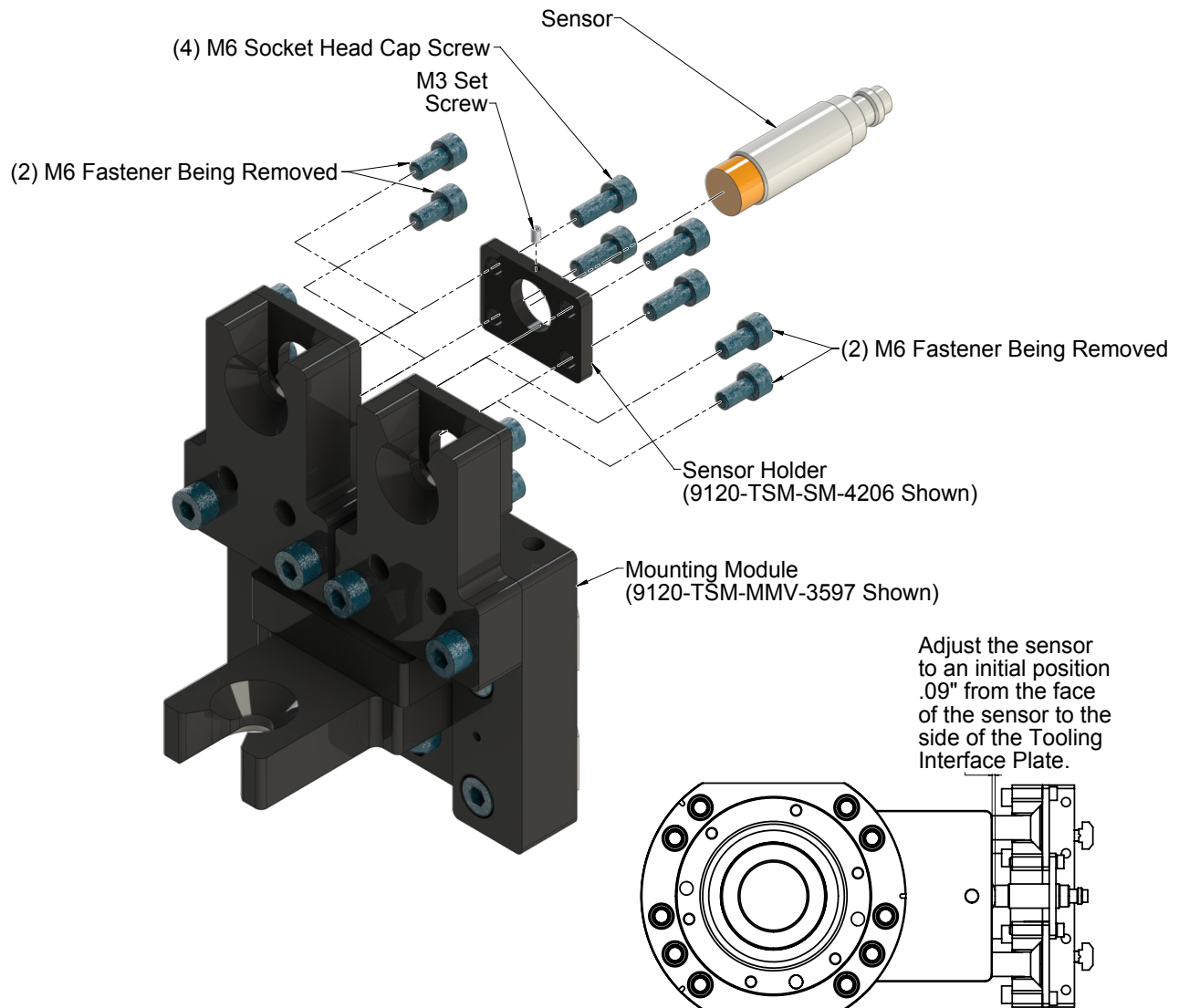
3.8 Proximity Sensor Installation for V-Block (Sensor Holder 9120-TSM-SM-4206)

Tools required: 2.5 mm and 5 mm hex key, torque wrench

Supplies required: Loctite® 222™

1. Remove the (2) M6 socket head cap screws using a 5 mm hex key from the inside of each of the top pin receivers on the mounting module.
2. Apply Loctite® 222™ (or similar) to the (4) M6 socket head cap screws using a 5 mm hex key to mount the proximity sensor holder.
3. Attach the proximity sensor holder to the mounting module with the (4) M6 socket head cap screws and spacers (if required). Tighten to 6 in-lbs (0.68 Nm) using a 5 mm hex key.
4. Screw the proximity sensor into the holder and initially position so the face of the sensor is .09" from the side of the tooling interface plate as shown in [Figure 3.10](#).
5. Tighten the M3 set screw using 2.5 mm hex key and connect the sensor cable.
6. Adjust sensing distance as needed.

Figure 3.10—Proximity Sensor Position for V-Block (Sensor Holder 9120-TSM-SM-4206)

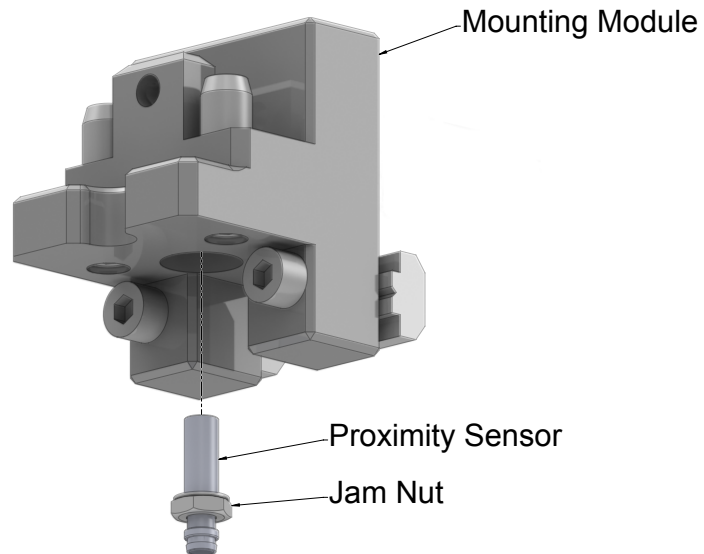


3.9 Proximity Sensor installation for TSM Tool Hanger

Tools required: 13 mm socket wrench, torque wrench

1. Attach the proximity sensor to the mounting module by screwing the sensor into the bottom of the mounting module. Tighten to 6 in-lbs (0.68 Nm).
2. Position the sensor so the sensor face is flush with the surface of the mounting module.
3. Adjust sensor position as needed.
4. Tighten the jam nut on the sensor against the mounting module using a 13 mm wrench.
5. Attach the sensor cable to the proximity sensor.

Figure 3.11—Proximity Sensor Position for TSM Tool Hanger



4. Operation

The ATI TSM system is intended for use with Tool Changer sizes QC-20 through QC-110.

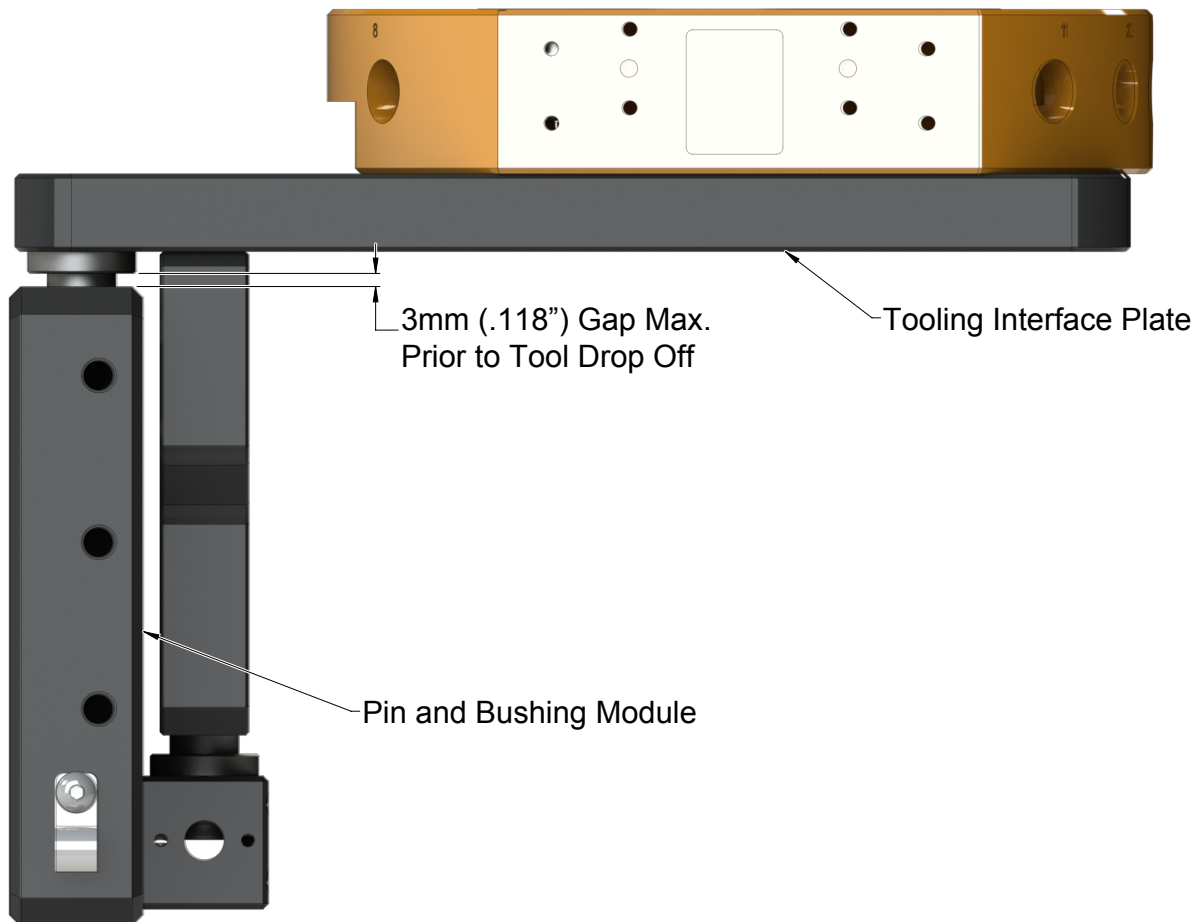


CAUTION: Damage will occur if contact is made between the TSM pin and bushing tooling Plate and the mounting module prior to tool drop-off

4.1 TSM System with Pin and Bushing Style Mounting Operation

For proper tool drop-off, ATI recommends 3 mm (0.118") maximum clearance between TSM pin and bushing mounting module contact surfaces and the TSM tooling interface plate contact surface. See [Section 9.28—Vertical Tooling Interface Plate - Blank](#) for reference.

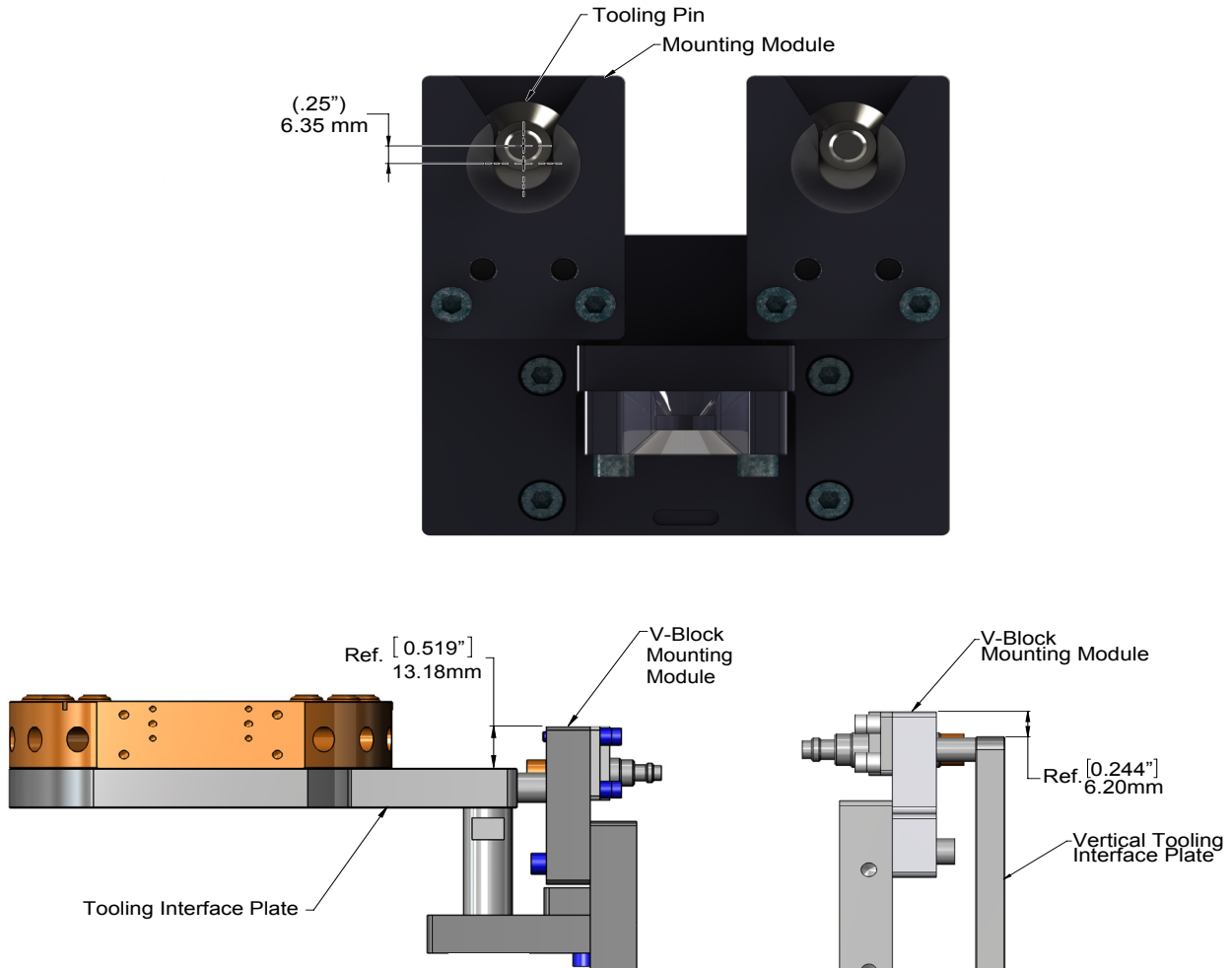
Figure 4.1—Maximum Clearance for Proper Tool Drop-off for Pin and Bushing Style Mounting



4.2 TSM V-Block Systems Operation

For proper tool drop-off, ATI recommends 6.35 mm (.25") maximum distance from the center point of the tooling pin on the interface plate and the center point of the pin slot on the pin receiver. A reference dimension is shown (refer to [Figure 4.2](#)) for ease of measuring.

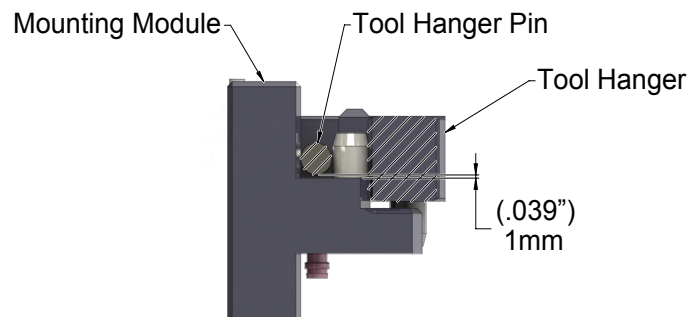
Figure 4.2—Proper Clearance for V-Block Tool Drop-off



4.3 TSM Tool Hanger System Operation

For proper tool drop-off, ATI recommends 1 mm maximum clearance between the TSM tool hanger mounting module contact surfaces and the tool hanger contact surfaces. A reference dimension is shown (refer to [Figure 4.3](#)) for ease of measuring.

Figure 4.3—Tool Hanger Systems Maximum Clearance for Proper Tool Drop-off



5. Maintenance



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

It is recommended to check the following areas at least once every 100,000 cycles. Earlier intervention may be necessary if a problem is identified prior to the scheduled maintenance checks.

5.1 All TSM Systems

- Verify that the horizontal module or extension has not loosened. Tighten if required. Refer to [Section 3.2—Installing Pin and Bushing or Horizontal V-Block Mounting Module to Tool Stand](#) and [Section 3.5—Installing Horizontal Extension to Tool Stand](#).
- Verify that the mounting module has not loosened. Tighten if required. Refer to [Section 3.2—Installing Pin and Bushing or Horizontal V-Block Mounting Module to Tool Stand](#), [Section 3.4—Installing Tool Hanger Mounting Module to Tool Stand](#), and [Section 3.3—Installing Vertical V-Block Mounting Module to Tool Stand](#)
- Verify that the gussets have not loosened. Tighten if required. [Section 3.1—Installing Base, Rail, and Gusset assemblies](#)
- Verify that the base has not loosened. Tighten if required. [Section 3.1—Installing Base, Rail, and Gusset assemblies](#)
- Verify that the proximity sensor and holder have not loosened. Tighten if required. [Section 3.7—Proximity Sensor Installation for V-Block \(Sensor Holder 9120-TSM-SM-4205\)](#), and [Section 3.9—Proximity Sensor installation for TSM Tool Hanger](#)
- Inspect sensor cables and all utility lines for wear.
- Inspect and wipe clean all sensor faces to ensure proper function.

5.2 Pin and Bushing TSM Systems

Clean and lubricate pin and bushing module. Check the (3) alignment pins for looseness, wear, and damage. If components are loose, apply threadlocker and tighten; if components are worn or damaged, replace.

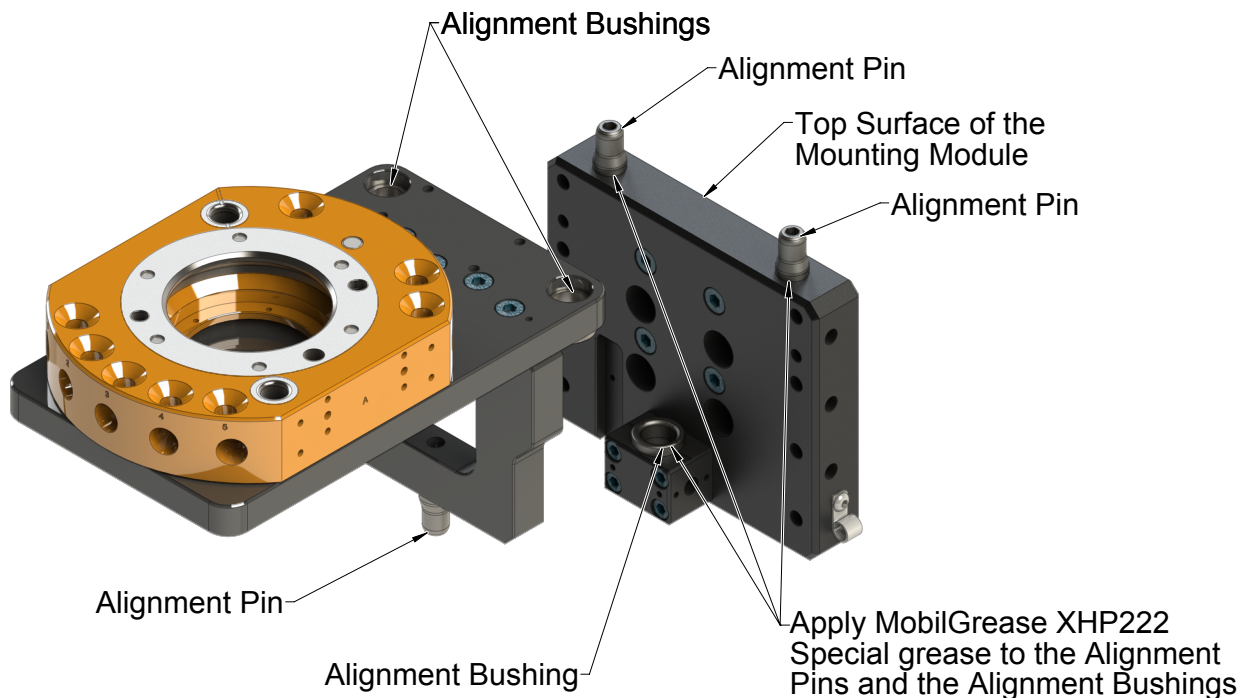
5.2.1 Clean, Lubricate, and Replace Alignment Pins and Bushings

Parts required: Refer to [Section 9—Drawings](#).

Supplies required: Clean rag, MobilGrease XHP222

1. Remove the Tool from the tool stand.
2. Using a lint free rag, remove the debris from the alignment pins, alignment bushing, and top surface of the mounting module. Also remove the debris from the (2) bushings and alignment pin in the tooling interface plate shown in [Section Figure 5.1—Clean and Lubricate the Alignment Pins and Alignment Bushings](#).

Figure 5.1—Clean and Lubricate the Alignment Pins and Alignment Bushings

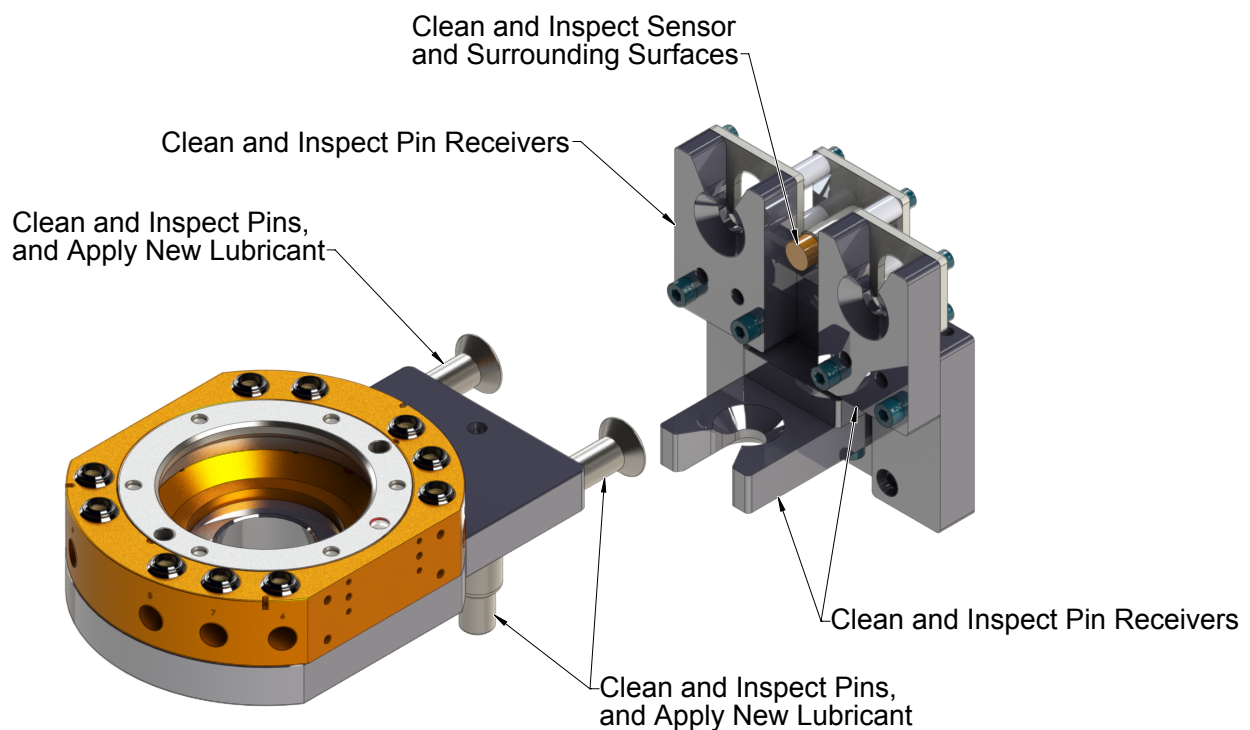


3. Inspect the (3) alignment pins for looseness, wear, or damage.
 - a. If worn or damaged remove, discard, and replace with new alignment pin. Apply Loctite® 242™ to the threads of the new pin and thread into the mounting module. Tighten to 80 in-lbs (9.04 Nm).
 - b. If loose, remove and apply Loctite® 242™ to the threads. Thread into the mounting module. Refer to [Section 9—Drawings](#) for torque.
4. Inspect the (3) alignment bushings for wear or damage. If worn or damaged remove, discard, and replace with new alignment bushing. Press out old bushing using an arbor press, then press in new bushing.
5. Apply liberal amounts of MobilGrease® XHP222 Special grease to the alignment pins and the alignment bushing on the mounting module as shown in [Section Figure 5.1—Clean and Lubricate the Alignment Pins and Alignment Bushings](#)
6. Place the Tool in the tool stand.

5.3 TSM V-Block Systems

- Inspect the tooling pins and pin receivers for cracks and wear. Replace if necessary.
- Lubricate tooling pins and pin receivers, see *Section Figure 5.2—Sensor Cleaning and Lubrication Locations (V-Block System)* and *Section 9—Drawings* for details.
- Check the tooling pins for looseness. Refer to *Section Figure 5.2—Sensor Cleaning and Lubrication Locations (V-Block System)* and *Section 9.16—Mounting Module 3597*, *Section 9.17—Mounting Module 4018*, *Section 9.26—Vertical Mounting Module 4068*, *Section 9.27—Vertical Mounting Module 4070* for torque.
- Check to verify that the mounting module has not loosened. Tighten if required. Refer to *Section 3.2—Installing Pin and Bushing or Horizontal V-Block Mounting Module to Tool Stand*, *Section 3.4—Installing Tool Hanger Mounting Module to Tool Stand*, and *Section 3.3—Installing Vertical V-Block Mounting Module to Tool Stand*.

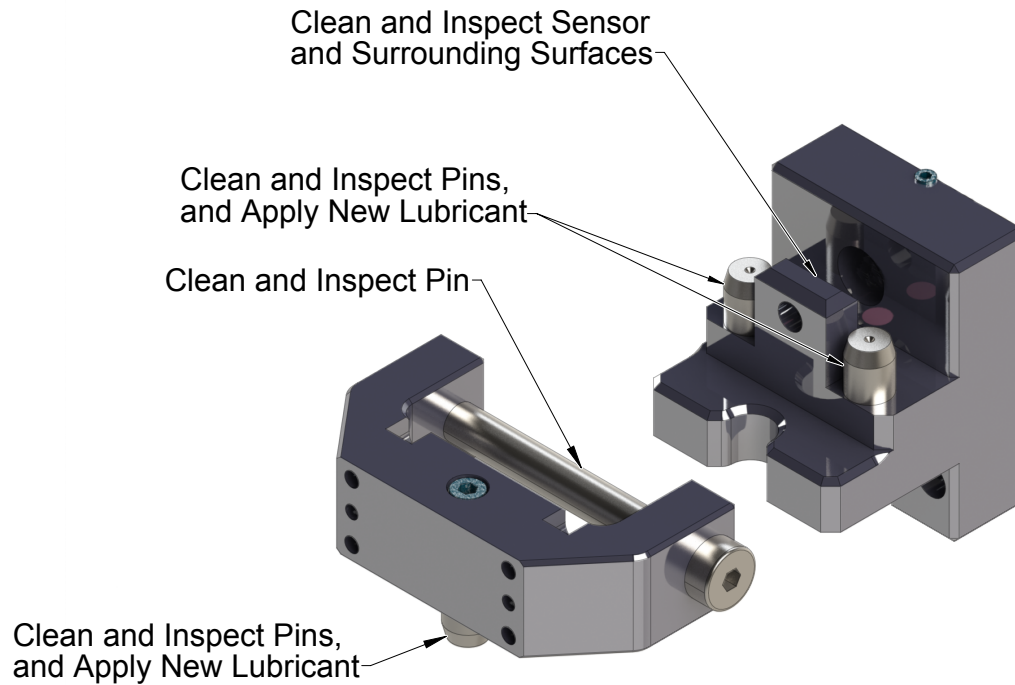
Figure 5.2—Sensor Cleaning and Lubrication Locations (V-Block System)



5.4 TSM Tool Hanger Systems

- Inspect the hanger pins and mounting module for cracks and wear. Replace, if necessary (refer to [Section 7—Serviceable Parts](#), [Section 9.30—Tool Hanger Module 5496](#), [Section 9.31—Tool Hanger Module 5891](#), [Section 9.32—Tool Hanger Module 5923](#), and [Section 9.33—Tool Hanger Module 5497](#)).
- Lubricate the mounting module pins, see [Figure 5.3](#).
- Verify that the mounting module is not loose (refer to [Section 3.4—Installing Tool Hanger Mounting Module to Tool Stand](#)).

Figure 5.3—Sensor Cleaning and Lubrication Locations (Tool Hanger System)



6. Troubleshooting

For troubleshooting information, refer to the following table.

Table 6.1—Troubleshooting		
Symptom	Possible Cause	Correction
Tool drop-off location is no longer repeatable.	Tool alignment pin may be loose or missing.	Tighten or replace if necessary.
Tool position while in storage is no longer straight and parallel.	Tool alignment pin may be loose, worn, damaged, or missing.	Tighten or replace alignment pins if necessary. Refer to Section 5.2.1—Clean, Lubricate, and Replace Alignment Pins and Bushings .
	Alignment bushing may be worn.	Inspect the alignment bushings for wear. Replace if necessary. Refer to Section 5.2.1—Clean, Lubricate, and Replace Alignment Pins and Bushings .
Proximity sensor fails	Debris build up on proximity sensor.	Check for debris build up and clean if necessary.
	Proximity sensor loose or not positioned properly.	Verify that the correct distance between sensing face and target is set. Adjust if necessary. Refer to Section Figure 3.9—Proximity Sensor Position for V-Block (Sensor Holder 9120-TSM-SM-4205) , , and Section 4.1—TSM System with Pin and Bushing Style Mounting Operation .
	Sensor cable broken or damaged.	Inspect sensor cable for damage, test continuity, replace, if damaged.
	Proximity sensor damaged or not functioning.	Inspect proximity sensor for damage, test sensor.
Tool/end effector malfunctioning	Utility lines and cables damaged.	Inspect utility lines and cables for wear. Inspect all connections for damage. Verify Tool Changer for proper function.
	Tool Changer or utility modules not functioning properly.	Verify Tool Changer and utility modules for proper function. Refer to the Tool Changer and Module Installation and Operation manual for troubleshooting.

7. Serviceable Parts

Items that are commonly used as spare parts (for the TSM system) are in the following table (other components are available upon request):

Table 7.1—Serviceable Parts				
Model	Part Number	Name	Used For	Torque Spec.
Common TSM Pin and Bushing System Components (Refer to Section 2.1—TSM System with Pin and Bushing Style Mounting)	3700-20-8434	TSM Pin & Bushing, alignment pin, Dual Taper	All TSM pin and bushing mounting modules	80 in-lbs (9 Nm)
	3700-20-8436 (Elongated) 3700-20-8435 (Round)	Drill Bushing, Flanged, 16 mm ID	All TSM pin and bushing mounting modules	NA
Common TSM V-Block System Components (Refer to Section 2.2—TSM System with V-Block Style Mounting)	3700-20-3594	Tooling Pin - Short	M10 Threaded Tooling Plates	180 in-lbs (20 Nm)
	3700-20-4016	Tooling Pin - Long	M10 Threaded Tooling Plates	80 in-lbs (9 Nm)
	3700-20-3590	Tooling Pin - Short	M12 Threaded Tooling Plates	180 in-lbs (20 Nm)
	3700-20-4017	Tooling Pin - Long	M12 Threaded Tooling Plates	80 in-lbs (9 Nm)
Tool Hanger TSM System Components (Refer to Section 2.3—TSM System with Tool Hanger Mounting Module)	8590-9909999-34	Proximity Sensor	To detect Tool in Tool Stand	NA
	3690-62014001-11	Alignment Pin	Tool hanger mounting modules and Tool hangers.	52 in-lbs (5.8 Nm)
	3500-2069080-11	Socket Cap Shoulder Screw, 10 mm x 80 mm, M8 Thread, Steel	Tool hangers	40 in-lbs (4.5 Nm)

7.1 Part Number Cross Reference

7.1.1 TSM V-Block Systems

The TSM tool stand part numbers and descriptions have been changed to provide a consistent numbering and naming scheme for all components of the tool stand system. The following tables provide a cross reference from the originally used part numbers to the current part numbers.

Original Part Number	Current Part Number	Description
Section 2.2.6—Vertical Tooling Interface Plate		
9120-TSM-TP-4069	9120-TSM-VVB-6604	Vertical Tooling Interface Plate-Blank
9120-TSM-TP-6604	9120-TSM-VVC-6604	Vertical Tooling Interface Plate with (4) 1/4" Counter Bores
9120-TSM-TP-4071	9120-TSM-VVB-4071	Vertical Tooling Interface Plate-Blank (Large)
Section 2.2.6—Tooling Interface Plates		
9120-TSM-TP-4055	9120-TSM-HVQ-4055	Tooling Interface Plate-Blank QC-40
9120-TSM-TP-4627	9120-TSM-HVQ-4627	Tooling Interface Plate-Blank QC-40 Euro
9120-TSM-TP-4056	9120-TSM-HVQ-4056	Tooling Interface Plate-Blank QC-41
9120-TSM-TP-4057	9120-TSM-HVQ-4057	Tooling Interface Plate-Blank QC-60
9120-TSM-TP-6660	9120-TSM-HVQ-6660	Tooling Interface Plate-Blank QC-62
9120-TSM-TP-4058	9120-TSM-HVQ-4058	Tooling Interface Plate-Blank QC-71
9120-TSM-TP-7290	9120-TSM-HVQ-7290	Tooling Interface Plate-Blank QC-76
9120-TSM-TP-4059	9120-TSM-HVQ-4059	Tooling Interface Plate-Blank QC-100
9120-TSM-TP-7961	9120-TSM-HVB-7961	Tooling Interface Plate-Blank

8. Specifications

Weights shown in the following tables are prior to custom machining and additional tooling requirements.

8.1 Common TSM System Components

Part Description	Material	Weight-Mass
TSM Base	T-6 Aluminum	2.4 lbs.
TSM Sensor Holder	Anodized T-6	.3 lbs.
TSM Post	Anodized T-6 Extruded Aluminum	Varies.
TSM Gusset	Cast Aluminum	6.8 lbs.

8.2 TSM Pin and Bushing System Components

Part Description	Material	Weight-Mass
TSM Pin and Bushing Mounting module	Anodized T-6 Aluminum	5.4 lbs.
9120-TSM-MMB-8432	Anodized T-6 Aluminum	5.4 lbs.
TSM Pin and Bushing Tooling Interface Plate	Anodized T-6 Aluminum	3.0 - 5.8 lbs.
9120-TSM-HBQ-9566	Anodized T-6 Aluminum	4.5 lbs
9120-TSM-HBQ-8439	Anodized T-6 Aluminum	5.8 lbs.
9120-TSM-VBB-8441	Anodized T-6 Aluminum	3.1 lbs.
9120-TSM-VBQ-8442	Anodized T-6 Aluminum	3.0 lbs
9120-TSM-MMBL-8432	Anodized T-6 Aluminum	TBD
9120-TSM-HBBL-9223	Anodized T-6 Aluminum	5.5 lbs
9120-TSM-HBQL-10189	Anodized T-6 Aluminum	4 lbs
9120-TSM-VBBI-8441	Anodized T-6 Aluminum	TBD

8.3 TSM V-Block System Components

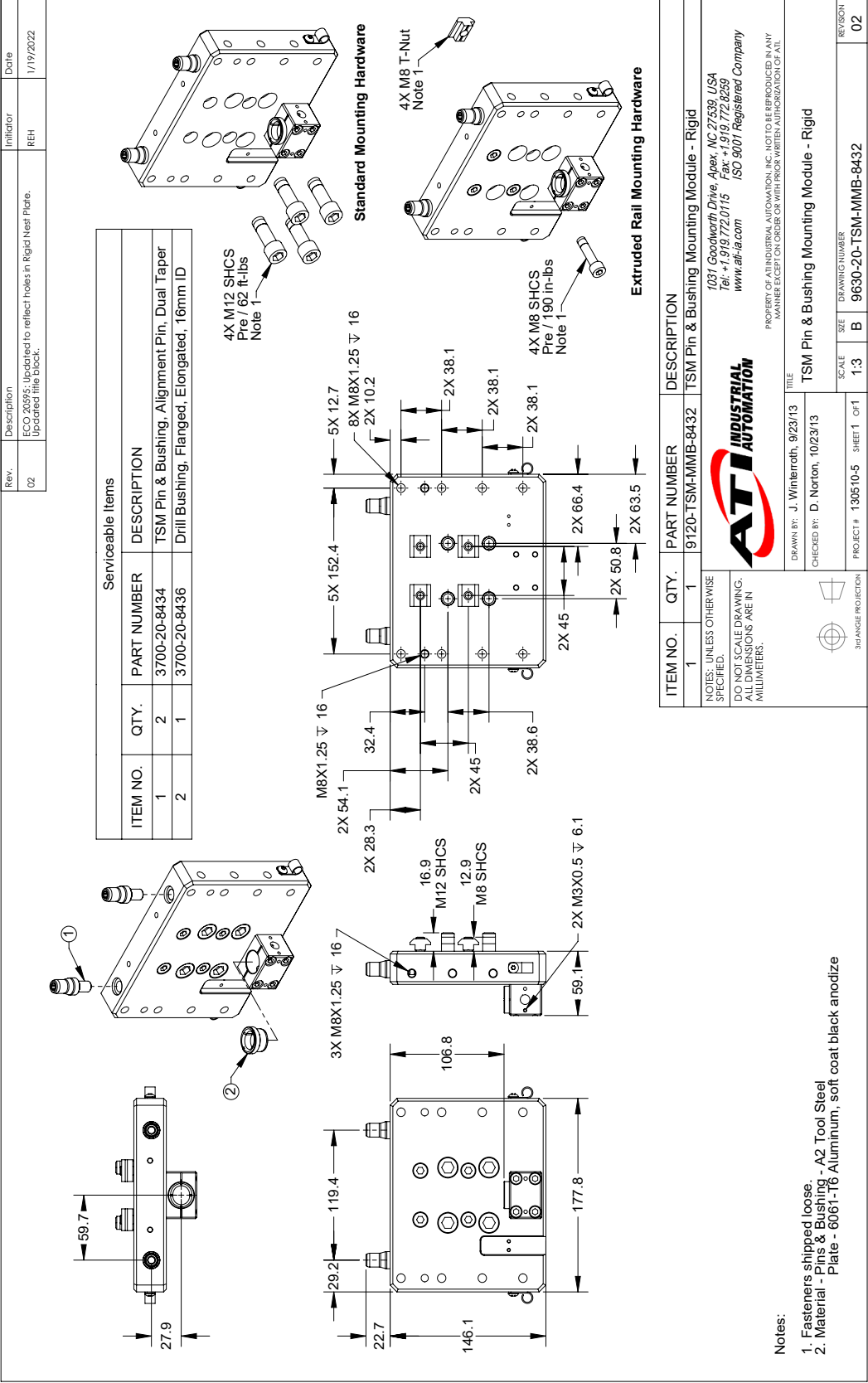
Part Description	Material	Weight-Mass
Tooling Pins	Stainless Steel	.01 - .5 lbs.
TSM Horizontal modules and Extensions	Anodized T-6 Aluminum	Varies.
TSM Pin Receiver	4140 Hardened Steel Black Oxide	1.25 lbs.
TSM Tooling Interface Plate	Anodized T-6 Aluminum	1.6 - 6.6 lbs.
9120-TSM-HVQ-4055	Anodized T-6 Aluminum	1.76 lbs.
9120-TSM-HVQ-4627	Anodized T-6 Aluminum	1.76 lbs.
9120-TSM-HVQ-4056	Anodized T-6 Aluminum	1.95 lbs.
9120-TSM-HVQ-4057	Anodized T-6 Aluminum	2.12 lbs.
9120-TSM-HVQ-6660	Anodized T-6 Aluminum	2.63 lbs.
9120-TSM-HVQ-7290	Anodized T-6 Aluminum	3.03 lbs.
9120-TSM-HVB-7961	Anodized T-6 Aluminum	6.59 lbs.
9120-TSM-VVB-4069	Anodized T-6 Aluminum	1.61 lbs.
9120-TSM-VVB-4071	Anodized T-6 Aluminum	2.70 lbs.
TSM Mounting modules	Anodized T-6 Aluminum	5 - 7 lbs.
TSM Adapter module	Anodized T-6 Aluminum	2.2 lbs

8.4 TSM Tool Hanger System Components

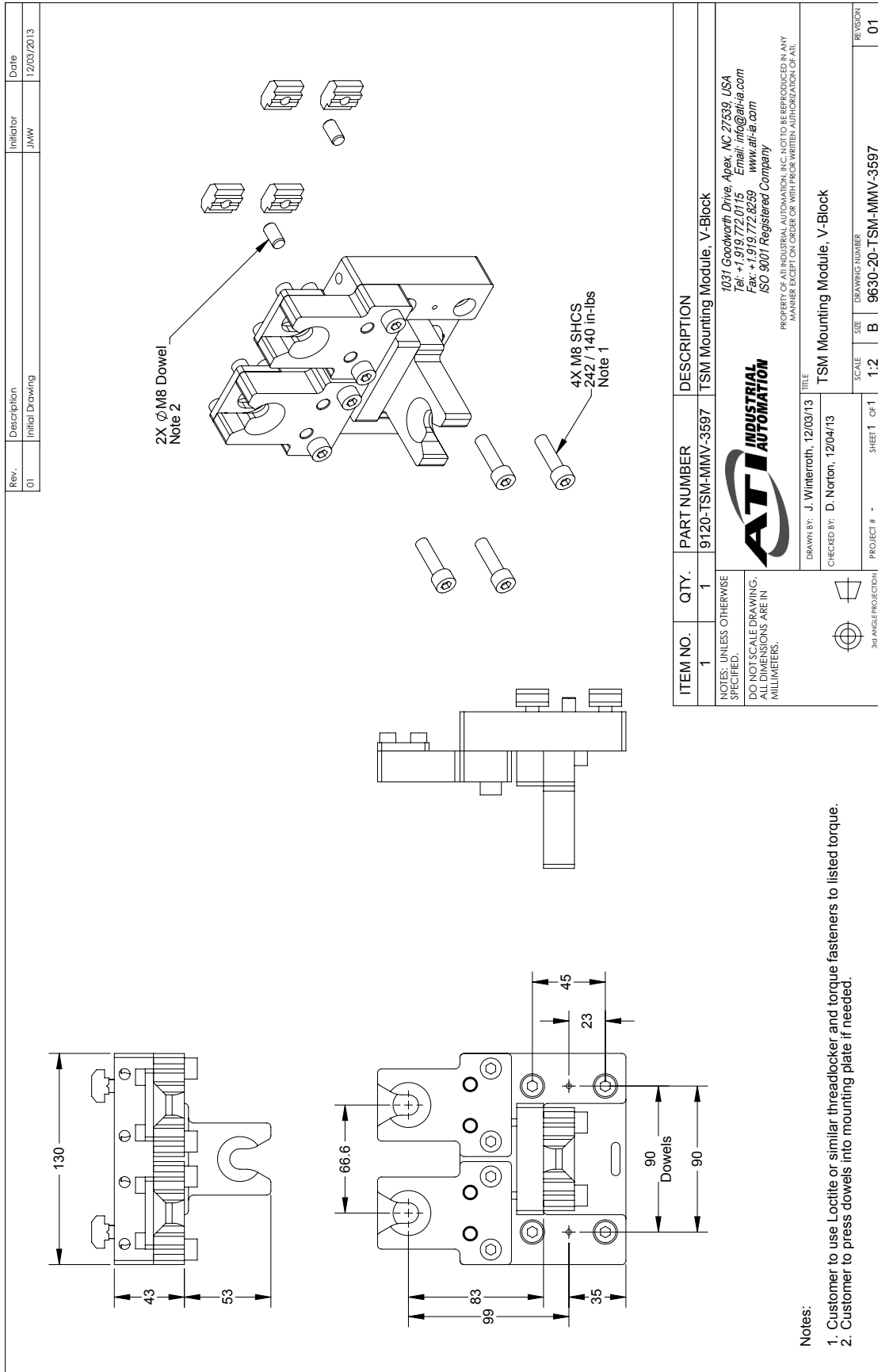
Part Description	Material	Weight-Mass
TSM Tool Hanger Mounting module	Anodized T-6 Aluminum	.8 lbs.
TSM Tool Hanger	Anodized T-6 Aluminum	.5 - .6 lbs.
9120-TSM-TH-5891	Anodized T-6 Aluminum	.531 lbs.
9120-TSM-TH-5923	Anodized T-6 Aluminum	.516 lbs
9120-TSM-TH-5497	Anodized T-6 Aluminum	.563 lbs.
TSM Alignment Pins	Stainless Steel	.036 lbs.

9. Drawings

9.1 Pin and Bushing Mounting Module



9.2 Mounting Module 3597



9.3 Mounting Module 4018

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Rev. 01</td> <td style="width: 50%;">Date 12/03/2013</td> </tr> <tr> <td colspan="2">Description: Initial Drawing</td> </tr> <tr> <td>Initiator: JNW</td> <td></td> </tr> </table>	Rev. 01	Date 12/03/2013	Description: Initial Drawing		Initiator: JNW			<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;">PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.</p>
Rev. 01	Date 12/03/2013							
Description: Initial Drawing								
Initiator: JNW								
<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;">DRAWN BY: J. Winterroth, 12/03/13 CHECKED BY: D. Norton, 12/04/13</p>	<p style="font-size: x-small;">PROJECT # - - SHEET 1 OF 1</p>						
<p style="font-size: x-small;">3/4" ANGLE PROJECTION</p>	<p style="font-size: x-small;">TITLE: TSM Mounting Module, V-Block, Large</p>	<p style="font-size: x-small;">SCALE: 1:2 DRAWING NUMBER: 9630-20-TSM-MMV-4018 REVISION: 01</p>						
<p>Notes:</p> <ol style="list-style-type: none"> 1. Customer to use Loctite or similar threadlocker and torque fasteners to listed torque. 2. Customer to press dowels into mounting plate if needed. 								

9.4 Pin and Bushing QC-50 Tooling Plate

Rev.	Description	Initiator	Date
02	ECO 1.6373: Updated customer drawing to reflect addition of ISM-MAD3 mounting pattern to TSM interface plate.	TBC	1/12/2018

Customer can machine pattern as needed

6X M8 x 20 SHCS
Pre / 190 in-lbs
Note 1

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	3640-0108020-11	8mm x 20mm Dowel Alloy Steel
2	1	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper
3	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID
4	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID

QC-50 Mounting Pattern
See 9630-20-050

R69.9

10 (M8 SHCS) 6.7 (M8 Dowels)

22.8 105.5

128.3 152.1 121.9 147.3

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HBQ-9566	TSM Tooling Interface Plate QC-50 - Blank

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

ATI INDUSTRIAL AUTOMATION

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DRAWN BY: D. Boehle 1/21/2016	CHECKED BY: J. Winterroth 3/1/2016	TITLE	REVISION
		TSM Tooling Interface Plate for QC-50 - Blank	02
PROJECT # 150928-1 SHEET 1 OF 1		SCALE 1:3	DRAWING NUMBER 9630-20-TSM-HBQ-9566

3/4 ANGLE PROJECTION

Notes:
 1. Fasteners & Dowels shipped loose. To be installed by customer.
 2. Plate material: 6061-T6 Aluminum, soft coat black anodize.
 3. Weight: approx. 8.9 lbs.

9.5 Pin and Bushing QC-76 Tooling Plate

Rev. 03	Description ECO 20595; updated to reflect new hole pattern. Updated title block.	Initiator REH	Date 1/19/2022
-------------------	--------------------------------------------------------------------------------------------	-------------------------	--------------------------

Customer can machine pattern as needed

6X M10 x 25 SHCS
Pre / 420 in-lbs
Note 1

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HBQ-9224	TSM Tooling Interface Plate for QC-76 - Blank

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	3540-0110020-11	DOWEL PIN M10 x 20
2	1	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper
3	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID
4	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID

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

3/4 ANGLE PROJECTION

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DRAWN BY: D. Wooden 02/27/15
 CHECKED BY: J. Winterroth 03/04/15

TSM Tooling Interface Plate for QC-76 - Blank

PROJECT # 130510-5 SHEET 1 OF 1

SCALE 1:3
 DRAWING NUMBER 9630-20-TSM-HBQ-9224
 REVISION 03

Notes:
 1. Fasteners & Dowels shipped loose. To be installed by customer.
 2. Plate material: 6061-T6 Aluminum, soft coat black anodize.
 3. Weight: approx. 8.9 lbs.

9.6 Pin and Bushing QC-110 Tooling Plate

Rev. 03	Description ECO 2099-5; Updated to reflect changes in holes in the tooling interface plate. Updated title block.	Initiator REH	Date 1/19/2022
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2X M10 x 20 Dowels
Note 1

6X M10 x 25 SHCS
Pre / 420 in-lbs
Note 1

Customer can machine tool pattern as needed

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	3540-0110020-11	DOWEL PIN M10 x 20
2	1	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper
3	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID
4	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID

Serviceable Items

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HBQ-8439	TSM Tooling Interface Plate for QC-110 - Blank

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HBQ-8439	TSM Tooling Interface Plate for QC-110 - Blank

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

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DRAWN BY: J. Winterroth, 9/23/13
 CHECKED BY: D. Norton, 10/23/13

TSM Tooling Interface Plate for QC-110 - Blank

SCALE: 1:3
 DRAWING NUMBER: 9630-20-TSM-HBQ-8439
 PROJECT #: 130510-5 SHEET 1 OF 1

Notes:

- Fasteners & Dowels shipped loose. To be installed by customer.
- Plate material: 6061-T6 Aluminum, soft coat black anodize.
- Plate weight: approx 6 lbs.

3/4 ANGLE PROJECTION

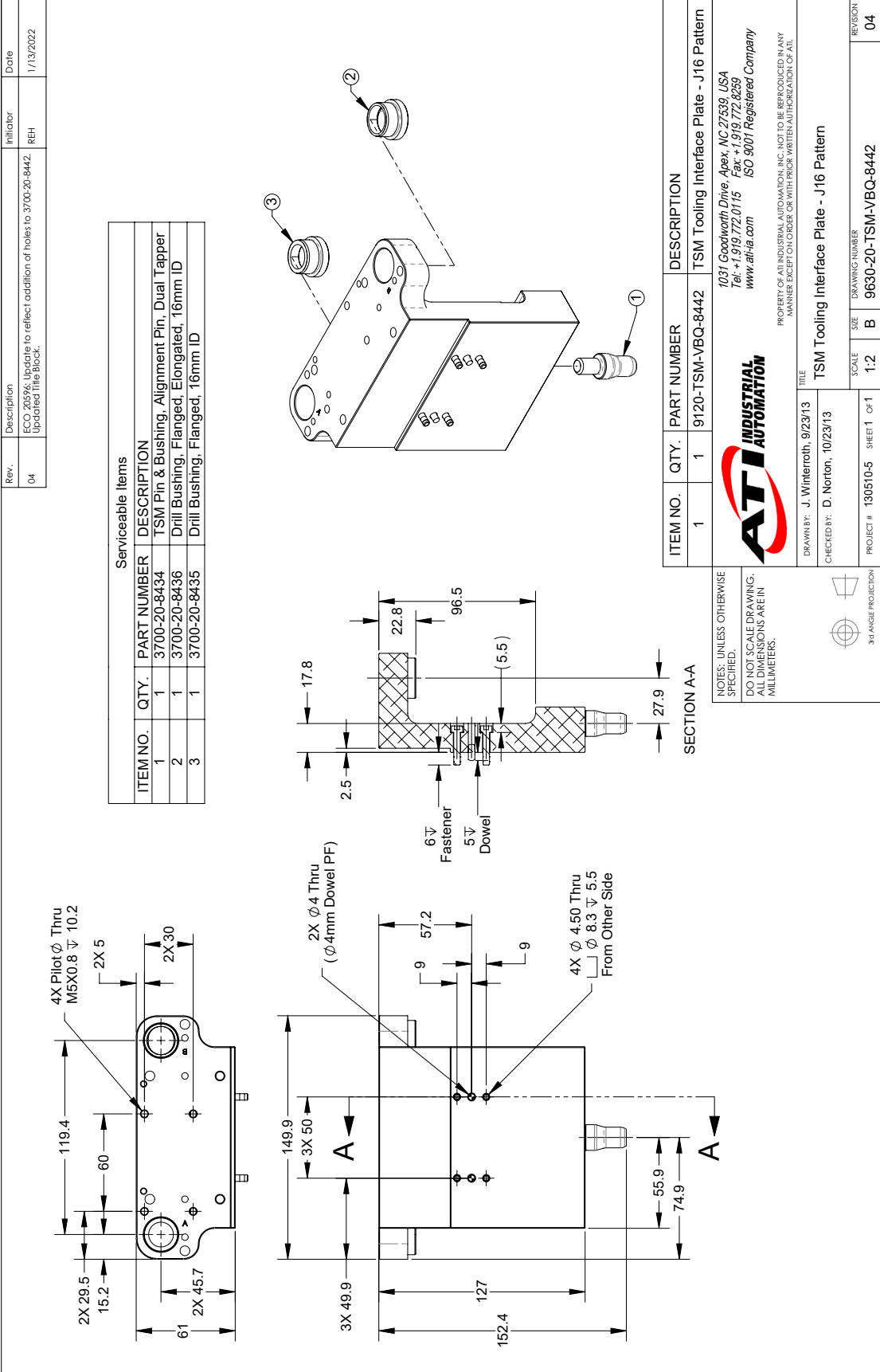
9.7 Pin and Bushing Horizontal Blank Tooling Plate

<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:10%;">Rev.</th> <th style="width:60%;">Description</th> <th style="width:15%;">Initiator</th> <th style="width:15%;">Date</th> </tr> <tr> <td>04</td> <td>ECO 20395: Updated to reflect addition of 2x M40.7 ∇ 32. (see top view)</td> <td>REH</td> <td>1/18/2022</td> </tr> </table>	Rev.	Description	Initiator	Date	04	ECO 20395: Updated to reflect addition of 2x M40.7 ∇ 32. (see top view)	REH	1/18/2022	<p style="text-align: center;">Customer can machine tool pattern as needed</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM NO.</th> <th>QTY.</th> <th>PART NUMBER</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>9120-TSM-HBB-9223</td> <td>TSM Tooling Interface Plate - Blank</td> </tr> </tbody> </table>	ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	1	1	9120-TSM-HBB-9223	TSM Tooling Interface Plate - Blank					
Rev.	Description	Initiator	Date																				
04	ECO 20395: Updated to reflect addition of 2x M40.7 ∇ 32. (see top view)	REH	1/18/2022																				
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION																				
1	1	9120-TSM-HBB-9223	TSM Tooling Interface Plate - Blank																				
		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM NO.</th> <th>QTY.</th> <th>PART NUMBER</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>3700-20-8434</td> <td>TSM Pin & Bushing, Alignment Pin, Dual Taper</td> </tr> <tr> <td>2</td> <td>1</td> <td>3700-20-8435</td> <td>Drill Bushing, Flanged, 16mm ID</td> </tr> <tr> <td>3</td> <td>1</td> <td>3700-20-8436</td> <td>Drill Bushing, Flanged, Elongated, 16mm ID</td> </tr> </tbody> </table>		ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	1	1	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper	2	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID	3	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID				
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		<p>ATI INDUSTRIAL AUTOMATION</p> <p>1031 Goodworth Drive, Apex, NC 27539 USA Tel: +1 919.772.0115 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: 1. Plate material: 6061-T6 Aluminum, soft coat black anodize. 2. Weight: approx 5.5 lbs</p>		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">DRAWN BY: D. Wooden 0224/15</td> <td colspan="2">TITLE: TSM Tooling Interface Plate - Blank</td> </tr> <tr> <td colspan="2">CHECKED BY: J. Winterroth 03/04/15</td> <td colspan="2">SCALE: 1:3</td> </tr> <tr> <td>PROJECT #</td> <td>130510-5</td> <td>SHEET</td> <td>1 OF 1</td> </tr> <tr> <td colspan="2">DRAWING NUMBER</td> <td colspan="2">9630-20-TSM-HBB-9223</td> </tr> <tr> <td colspan="2">REVISION</td> <td colspan="2">04</td> </tr> </table>		DRAWN BY: D. Wooden 0224/15		TITLE: TSM Tooling Interface Plate - Blank		CHECKED BY: J. Winterroth 03/04/15		SCALE: 1:3		PROJECT #	130510-5	SHEET	1 OF 1	DRAWING NUMBER		9630-20-TSM-HBB-9223		REVISION		04	
DRAWN BY: D. Wooden 0224/15		TITLE: TSM Tooling Interface Plate - Blank																					
CHECKED BY: J. Winterroth 03/04/15		SCALE: 1:3																					
PROJECT #	130510-5	SHEET	1 OF 1																				
DRAWING NUMBER		9630-20-TSM-HBB-9223																					
REVISION		04																					

9.8 Pin and Bushing Vertical Blank Tooling Plate

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">Rev.</th> <th style="width: 60%;">Description</th> <th style="width: 15%;">Initiator</th> <th style="width: 15%;">Date</th> </tr> <tr> <td style="text-align: center;">03</td> <td>ECO 20596; Update to reflect addition of holes in 3700-20-8441. Updated Title Block.</td> <td style="text-align: center;">REH</td> <td style="text-align: center;">1/13/2022</td> </tr> </table>	Rev.	Description	Initiator	Date	03	ECO 20596; Update to reflect addition of holes in 3700-20-8441. Updated Title Block.	REH	1/13/2022	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Serviceable Items</th> </tr> <tr> <th style="width: 15%;">ITEM NO.</th> <th style="width: 15%;">QTY.</th> <th style="width: 20%;">PART NUMBER</th> <th style="width: 50%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3700-20-8434</td> <td>TSM Pin & Bushing, Alignment Pin, Dual Taper</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3700-20-8435</td> <td>Drill Bushing, Flanged, 16mm ID</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3700-20-8436</td> <td>Drill Bushing, Flanged, Elongated, 16mm ID</td> </tr> </tbody> </table>	Serviceable Items		ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	1	1	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper	2	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID	3	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID	
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<p>NOTES: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.</p> <p>DO NOT SCALE DRAWING.</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">ITEM NO.</th> <th style="width: 10%;">QTY.</th> <th style="width: 30%;">PART NUMBER</th> <th style="width: 50%;">DESCRIPTION</th> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">9120-TSM-VBB-8441</td> <td>TSM Tooling Interface Plate - Blank</td> </tr> </table>		ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	1	1	9120-TSM-VBB-8441	TSM Tooling Interface Plate - Blank																	
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TITLE																												
DRAWN BY: J. Winterroth, 9/23/13	TSM Tooling Interface Plate - Blank																											
CHECKED BY: D. Norton, 10/23/13																												
PROJECT # 130510-5 SHEET 1 OF 1	SCALE SIZE DRAWING NUMBER REVISION																											
1:2 B	9630-20-TSM-VBB-8441 03																											

9.9 Pin and Bushing J16 Tooling Plate



9.10 TSM Pin & Bushing Mounting Module - Rigid - Locking

Rev.	Description	Initiator	Date
01P	Initial Drawing	JMW	1/08/2016
02P	Updated to use 9005-20-8444.	JMW	1/12/2016
03	Project Release	JMW	6/30/2016
04	ECCO 16.132: Changed torque value from 150 in-lbs to 80 in-lbs for the 3700-20-8434.	TBC	9/20/2017

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	4	3500-1068035-15A	M8-1.25 x 35mm SHCS, Blue, Pre-Applied
2	4	3500-1072035-15A	M12-1.75 x 35mm SHCS, Blue, Pre-Applied
3	2	3500-1164006-21	M5 x 6mm Button Head Socket Cap Screw, SS
4	4	3505-9968000-00	Bosch T-Fastener #3842218993
5	2	3690-0000068-61	Cable Clip, Nylon, Flexible, 1/4" Max Bundle
6	1	3700-20-8432	TSM Pin & Bushing, Alignment Pin, Dual Taper
7	2	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper
8	1	9005-20-8444	TSM Pin & Bushing Retrofit Locking Assembly

NOTES: UNLESS OTHERWISE SPECIFIED,
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DRAWN BY: J. Winterroth, 12/01/15
 CHECKED BY: D. Norton, 1/08/16

TITLE: TSM Pin & Bushing Mounting Module - Rigid - Locking

SCALE: 1:2
 SIZE: B
 DRAWING NUMBER: 9120-TSM-MMBL-8432
 PROJECT #: 140507-1 SHEET 1 OF 1
 REVISION: 04

- Notes:
- Included with 9005-20-8444.
 - If assembling to 9120-TSL-ASY-XXXX use M12 SHCS. Bag M8 SHCS & T-fasteners. Otherwise bag loose items.
 - If assembling to 9120-TSM-ASY-XXXX use M8 SHCS & T-fasteners. Otherwise bag loose items.
 - Bag loose parts.

9.11 Pin and Bushing Retrofit Locking Assembly

Rev.	Description	Initiator	Date
01P	Initial Drawing	JMW	9/17/2015
02	Project Release	JMW	6/30/2016

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	3405-1220030-01	Quick Disconnect Reducer, 8mm to 6mm Tube
2	1	3405-1230018-01	Air Fitting, Straight Male Connector, 1/8" Unifit to 8mm One-Touch
3	1	3405-2230010-01	90° Air Fitting, 1/8" Unifit to 8mm Tube, One-Touch
4	1	3415-1011010-01	SMC Air Cylinder, Double Acting, 3/4" Bore, 1" Stroke, 1/8" NPT Ports, Round Rod Tip
5	4	3500-1066040-15	M6-1 x 40mm SHCS, Blue
6	2	3500-1966008-32	M6 x 8mm Set Screw, Nylon-Tip, Alloy Steel
7	2	3540-0106016-11	6mm x 16mm Dowel, Alloy Steel
8	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID
9	1	3700-20-8444	TSM Pin & Bushing Block for Locking Nest
10	1	3700-20-8443	TSM Pin & Bushing, Alignment Pin, Dual Taper, Locking Recess

NOTES: UNLESS OTHERWISE SPECIFIED,
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ATI INDUSTRIAL AUTOMATION

DRAWN BY: J. Winterroth, 9/22/14
 CHECKED BY: D. Norton, 1/8/16

TITLE: TSM Pin & Bushing Retrofit Locking Assembly

PROJECT # 140507-1 SHEET 1 OF 1
 SCALE 2:3
 DRAWING NUMBER 9005-20-8444
 REVISION 02

Notes:
 1. Package loose items.
 2. Refer to linked work instructions.

9.12 Horizontal Tooling Interface Plate-Blank (Locking)

Rev.	Description	Initiator	Date
03	ECC 20395; Updated to reflect addition of 2 M4x7 ∇ 0.32" holes in top view	REH	1/18/2022

4X M5X0.8 ∇ 10.2
2X 5
2X 30
2X 31.8
149.9
74.9
254

Customer can machine tool pattern as needed

22.8
105.5
200.7

128.3
159.3
121.9
147.3

Serviceable Items	
ITEM NO.	QTY.
1	1
2	1
3	1

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HBBL-9223	Locking

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3RD ANGLE PROJECTION

DRAWN BY: J. Winterroth, 4/18/16	TITLE	REVISION
CHECKED BY: D. Norton, 4/19/16	TSM Tooling Interface Plate - Blank - Locking	03
PROJECT #: 140507-1	SCALE: 1:3	DRAWING NUMBER: 9630-20-TSM-HBBL-9223
SHEET 1 OF 1	SIZE: B	

Notes:

1. Fasteners & Dowels shipped loose. To be installed by customer.
2. Plate material: 6061-T6 Aluminum, soft coat black anodize.
3. Weight: approx 5.5 lbs

9.13 Tooling Interface Plate for QC 40- Blank- MA03 (Locking)

REV.	DESCRIPTION	INITIATOR	DATE
02	ECC-20395: UPDATED TO REFLECT M4 HOLES ADDED INTO TOP FACE. UPDATED TITLE BLOCK.	REH	1/25/2022

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	3700-20-8443	TSM Pin & Bushing, Alignment Pin, Dual Taper, Locking Recess
2	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID
3	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID
4	6	3500-1068025-15A	M8-1.25 x 25mm SHCS, Blue, Pre-Applied
5	2	3540-0108020-11	8mm x 20mm Dowel Alloy Steel

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3rd ANGLE PROJECTION

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DRAWN BY: J. Winterroth, 2/22/18
 CHECKED BY: D. Norton, 5/09/18

TITLE
 TSM Tooling Interface Plate for QC-40 - Blank - MA03

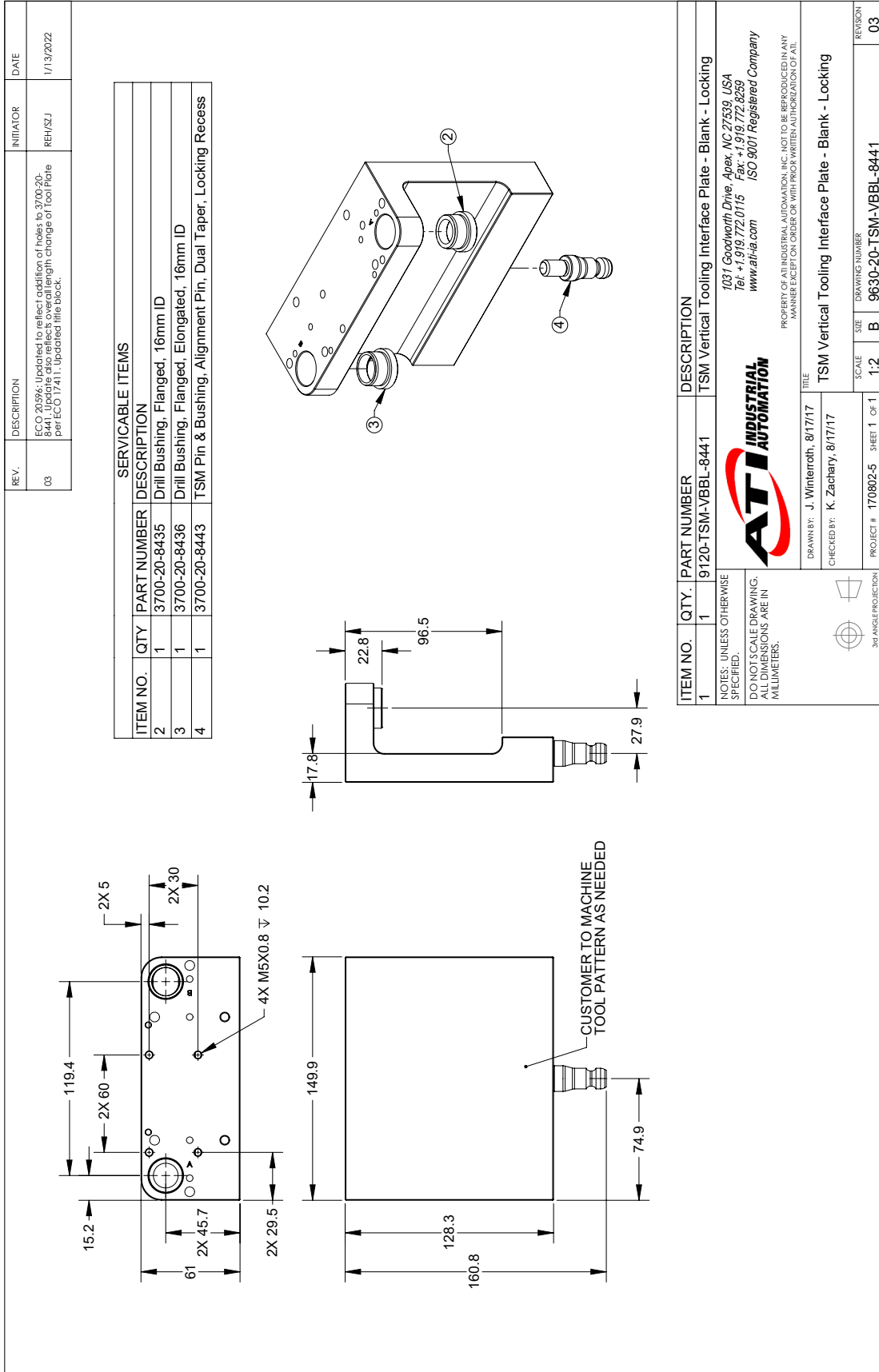
PROJECT # 161215-1 SHEET 1 OF 1

SCALE 1:3 B SIZE DRAWING NUMBER 9630-20-TSM-HBQL-10189 REVISION 02

NOTES:

- FASTENERS AND DOWELS SHIPPED LOOSE. TO BE INSTALLED BY CUSTOMER.
- PLATE MATERIAL: 6061-T6 ALUMINUM, SOFT COAT BLACK ANODIZE.
- PLATE WEIGHT: APPROX 4.1 LBS

9.14 Vertical Tooling Interface Plate - Blank (Locking)



9.15 Pin and Bushing QC-50 Tooling Plate

Rev.	Description	Initiator	Date
02	ECO 1.6373: Updated customer drawing to reflect addition of ISM-MAD3 mounting pattern to TSM interface plate.	TBC	1/12/2018

Customer can machine pattern as needed

6X M8 x 20 SHCS
Pre / 190 in-lbs
Note 1

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	3640-0108020-11	8mm x 20mm Dowel Alloy Steel
2	1	3700-20-8434	TSM Pin & Bushing, Alignment Pin, Dual Taper
3	1	3700-20-8435	Drill Bushing, Flanged, 16mm ID
4	1	3700-20-8436	Drill Bushing, Flanged, Elongated, 16mm ID

Serviceable Items

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HBQ-9566	TSM Tooling Interface Plate QC-50 - Blank

NOTES: UNLESS OTHERWISE SPECIFIED,
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3/4 ANGLE PROJECTION

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 Fax: +1 919 772 8259 www.ati-ia.com
 ISO 9001 Registered Company

ATI INDUSTRIAL AUTOMATION

DRAWN BY: D. Boehle 1/21/2016
 CHECKED BY: J. Winterroth 3/1/2016

TITLE
 TSM Tooling Interface Plate for QC-50 - Blank

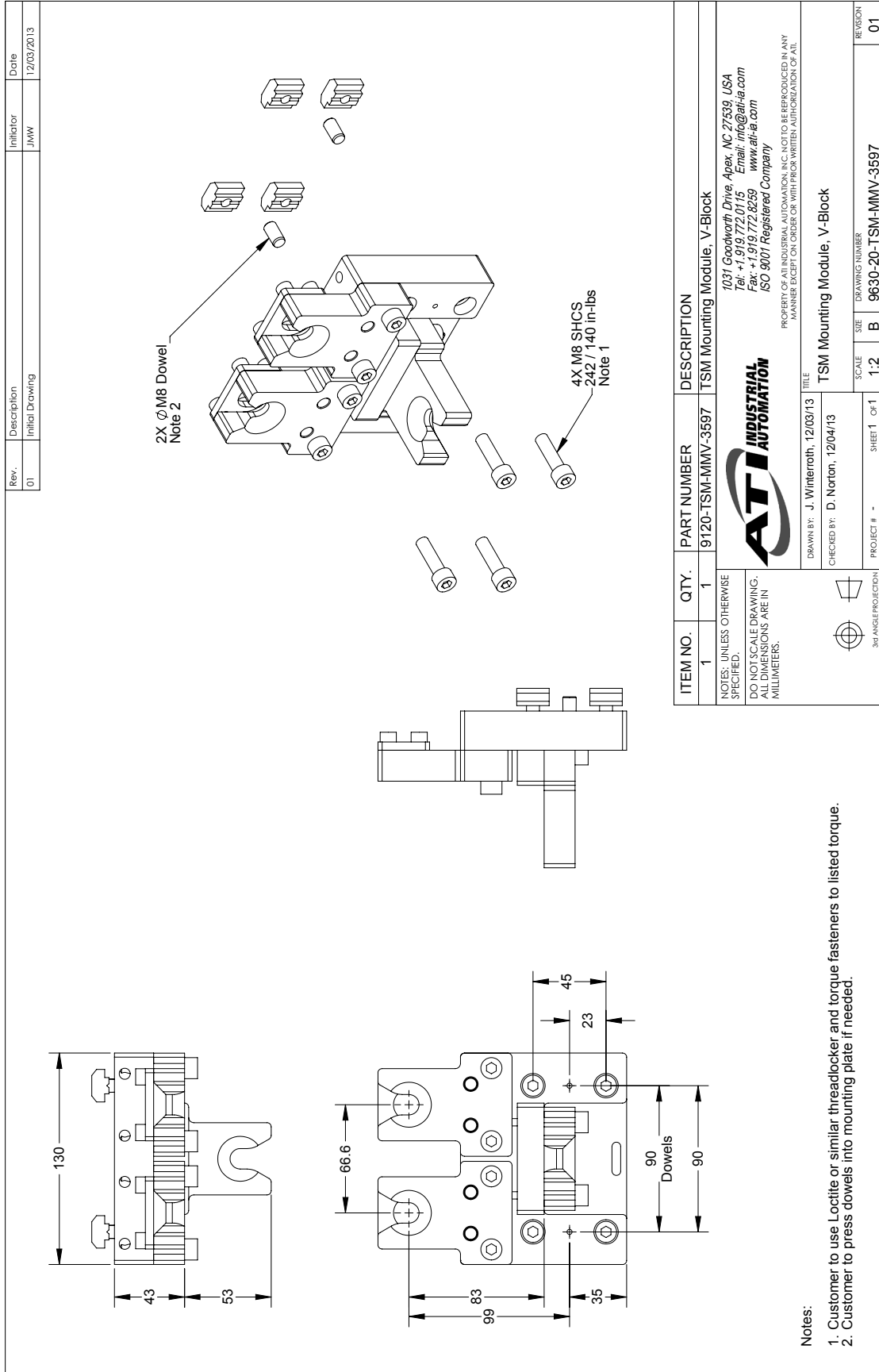
SCALE SIZE B 1:3
 PROJECT # 150928-1 SHEET 1 OF 1

DRAWING NUMBER 9630-20-TSM-HBQ-9566
 REVISION 02

Notes:

1. Fasteners & Dowels shipped loose. To be installed by customer.
2. Plate material: 6061-T6 Aluminum, soft coat black anodize.
3. Weight: approx. 8.9 lbs.

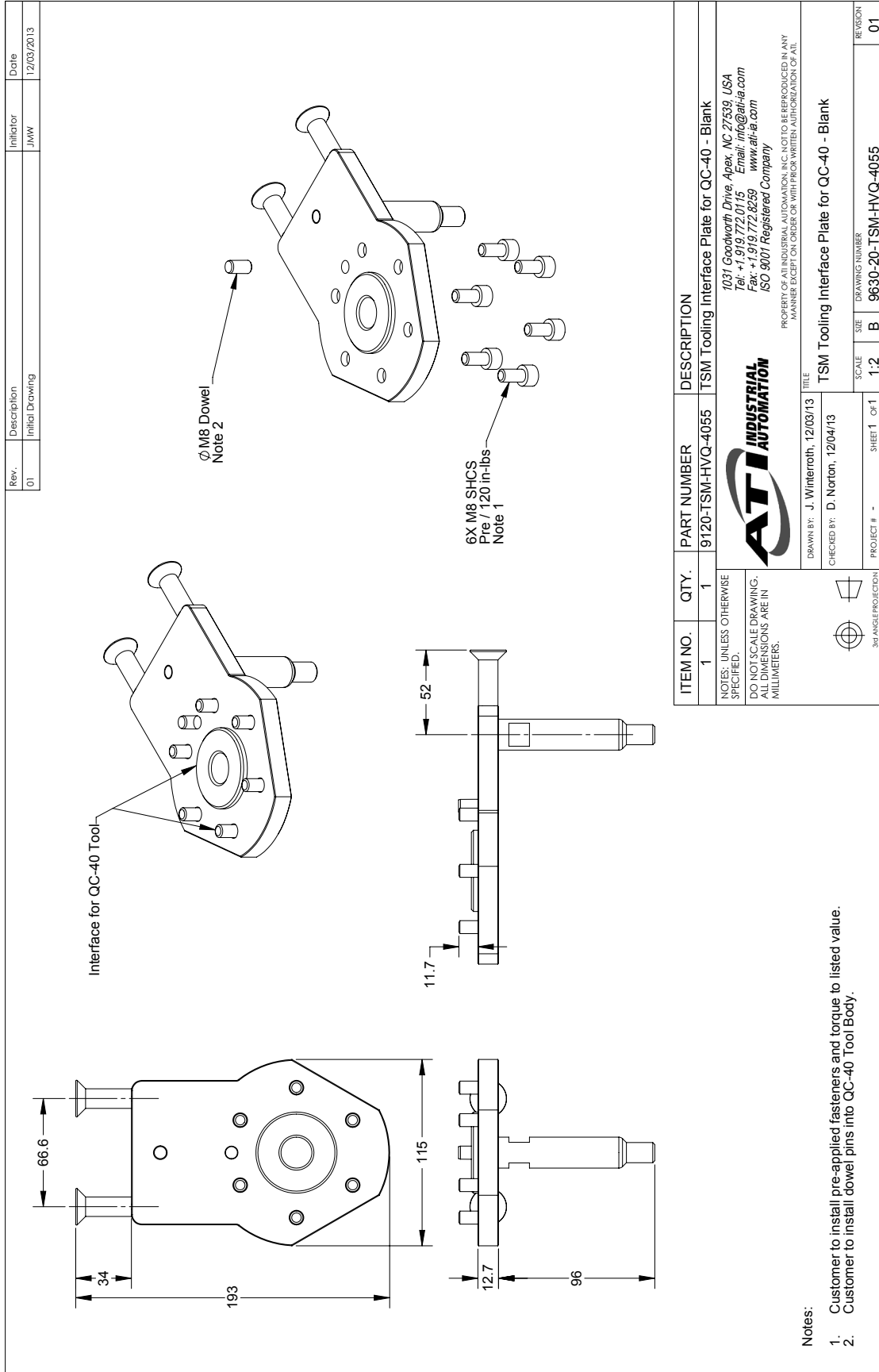
9.16 Mounting Module 3597



9.17 Mounting Module 4018

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Rev. 01</td> <td style="width: 50%;">Date 12/03/2013</td> </tr> <tr> <td colspan="2">Description: Initial Drawing</td> </tr> <tr> <td>Initiator: JNW</td> <td></td> </tr> </table>	Rev. 01	Date 12/03/2013	Description: Initial Drawing		Initiator: JNW			<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;">PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.</p>
Rev. 01	Date 12/03/2013							
Description: Initial Drawing								
Initiator: JNW								
<p style="font-size: x-small;">NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.</p>		<p style="font-size: small;">DRAWN BY: J. Winterroth, 12/03/13 CHECKED BY: D. Norton, 12/04/13</p> <p style="font-size: small;">PROJECT # - - SHEET 1 OF 1</p> <p style="font-size: small;">SCALE 1:2 DRAWING NUMBER 9630-20-TSM-MMV-4018 REVISION 01</p>						
<p style="font-size: large; font-weight: bold;">ATI INDUSTRIAL AUTOMATION</p>								
<p style="font-size: small;">TSM Mounting Module, V-Block, Large</p>								
<p style="font-size: small;">Notes: 1. Customer to use Loctite or similar threadlocker and torque fasteners to listed torque. 2. Customer to press dowels into mounting plate if needed.</p>								

9.18 QC-40 Tooling Interface Plate



9.19 QC-41 Tooling Interface Plate

Rev. 01	Description Initial Drawing	Initiator JNW	Date 12/03/2013
------------	--------------------------------	------------------	--------------------

Interface for QC-41 Tool

6x M8 SHCS
Pre / 120 in-lbs
Note 1

Ø M8 Dowel
Note 2

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HVQ-4056	TSM Tooling Interface Plate for QC-41 - Blank

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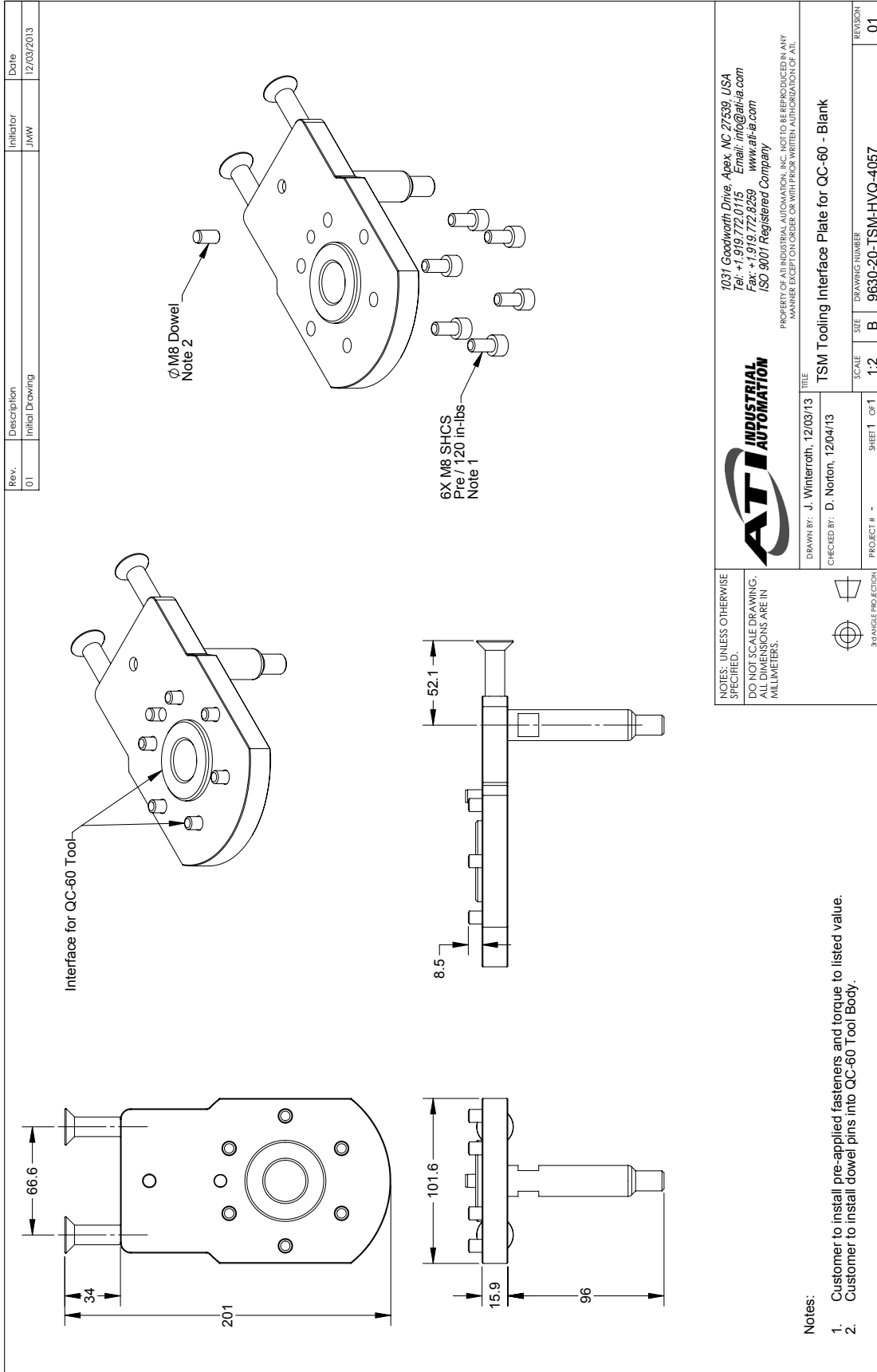
PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

DRAWN BY: J. Winterroth, 12/03/13	TITLE: TSM Tooling Interface Plate for QC-41 - Blank
CHECKED BY: D. Norton, 12/04/13	
PROJECT # - - SHEET 1 OF 1	DRAWING NUMBER: 9630-20-TSM-HVQ-4056
SCALE: 1:2	REVISION: 01

Notes:

- Customer to install pre-applied fasteners and torque to listed value.
- Customer to install dowel pins into QC-41 Tool Body.

9.20 QC-60 Tooling Interface Plate



9.21 QC-62 Tooling Interface Plate

Rev. 01	Description Initial Drawing	Initiator JNW	Date 12/03/2013
------------	--------------------------------	------------------	--------------------

Interface for QC-62 Tool

Notes:

1. Customer to install pre-applied fasteners and torque to listed value.
2. Customer to install dowel pins into QC-62 Tool Body.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HVQ-6660	TSM Tooling Interface Plate for QC-62 - Blank

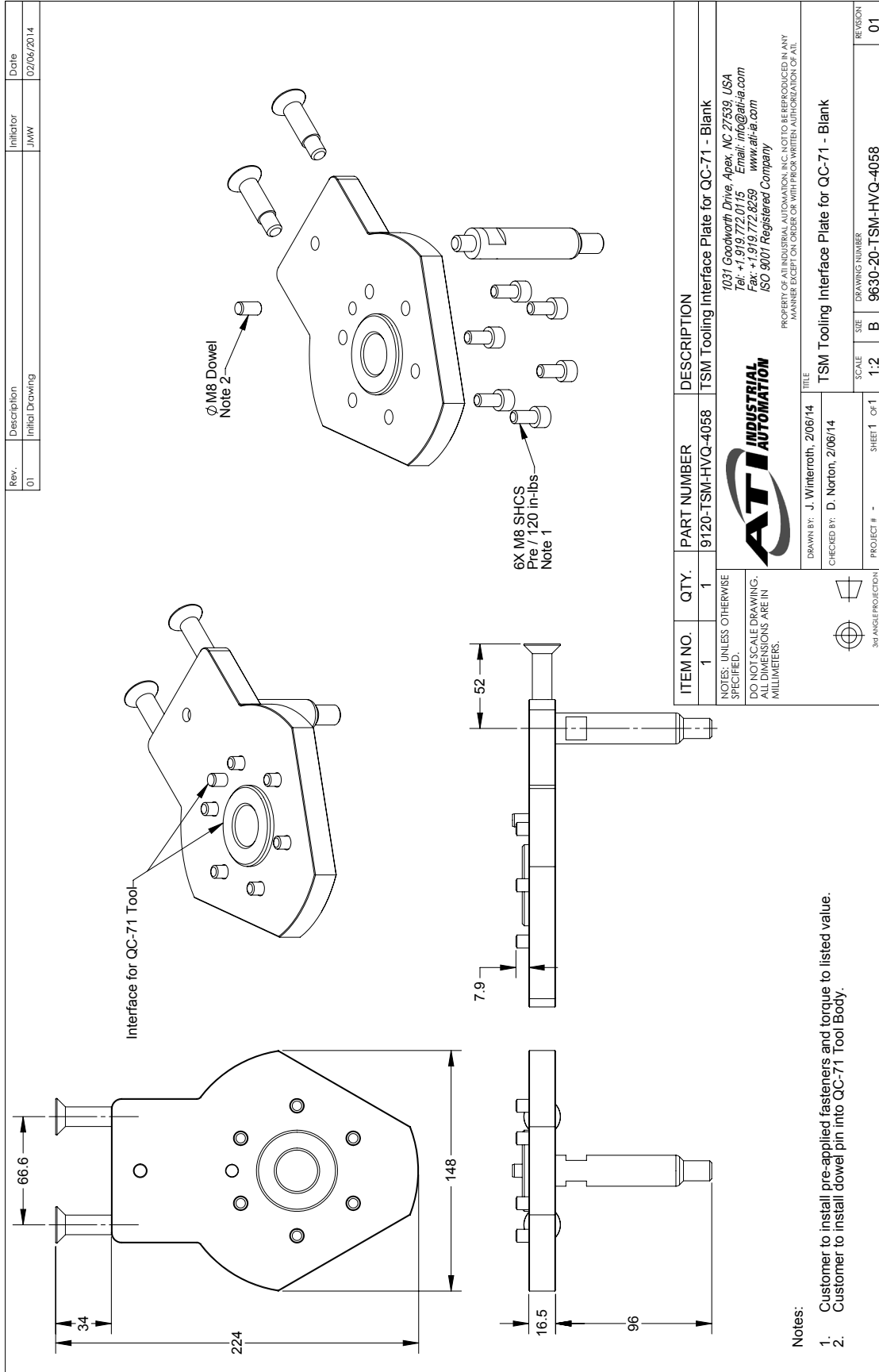
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DRAWN BY: J. Winterroth, 12/03/13
 CHECKED BY: D. Norton, 12/04/13
 TITLE: TSM Tooling Interface Plate for QC-62 - Blank

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PROJECT #	-	SHEET	1	OF	1
SCALE	1:3	DRAWING NUMBER	9630-20-TSM-HVQ-6660		
REVISION	01				

9.22 QC-71 Tooling Interface Plate



9.23 QC-76 Tooling Interface Plate

Rev. 01	Description Initial Drawing	Initiator DAW	Date 1/7/2015
------------	--------------------------------	------------------	------------------

Interface for QC-76 Tool

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-HVQ-7290	TSM Tooling Interface Plate for QC-76 - Blank

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

30° ANGLE PROJECTION

DRAWN BY: D. Wooden 1/7/2015	TITLE TSM Tooling Interface Plate for QC-76 - Blank	SCALE 1:5	SIZE B	DRAWING NUMBER 9630-20-TSM-HVQ-7290	REVISION 01
CHECKED BY: KRZ 1/7/2015		PROJECT # -		SHEET 1 OF 1	

Notes:

- Customer to install pre-applied fasteners and torque to listed value
- Customer to install dowel pins into QC-76 Tool Body.

9.24 QC-100 Tooling Interface Plate

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Rev.</th> <th style="text-align: left;">Description</th> <th style="text-align: left;">Initiator</th> <th style="text-align: left;">Date</th> </tr> <tr> <td style="text-align: center;">01</td> <td>Initial Drawing</td> <td style="text-align: center;">JNW</td> <td style="text-align: center;">02/06/2014</td> </tr> </table>	Rev.	Description	Initiator	Date	01	Initial Drawing	JNW	02/06/2014	<p style="text-align: center;">Interface for QC-100 Tool</p> <p style="text-align: center;">Ø M10 Dowel Note 2</p> <p style="text-align: center;">6X M10 SHCS Pre / 420 in-lbs Note 1</p> <p style="text-align: center;">52.7</p> <p style="text-align: center;">18.9</p> <p style="text-align: center;">101.6</p> <p style="text-align: center;">37.5</p> <p style="text-align: center;">279</p> <p style="text-align: center;">144.8</p> <p style="text-align: center;">16.5</p> <p style="text-align: center;">96.5</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">ITEM NO.</th> <th style="text-align: left;">QTY.</th> <th style="text-align: left;">PART NUMBER</th> <th style="text-align: left;">DESCRIPTION</th> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td>9120-TSM-HVQ-4059</td> <td>TSM Tooling Interface Plate for QC-100 - Blank</td> </tr> </table> <p style="font-size: small;"> NOTES: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS. </p> <p style="text-align: center;"> </p> <p style="font-size: x-small;">3/4 ANGLE PROJECTION</p>	ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	1	1	9120-TSM-HVQ-4059	TSM Tooling Interface Plate for QC-100 - Blank
Rev.	Description	Initiator	Date															
01	Initial Drawing	JNW	02/06/2014															
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION															
1	1	9120-TSM-HVQ-4059	TSM Tooling Interface Plate for QC-100 - Blank															
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DRAWN BY: J. Winterroth, 2/06/14 CHECKED BY: D. Norton, 2/06/14		TITLE TSM Tooling Interface Plate for QC-100 - Blank																
PROJECT # - - SHEET 1 OF 1		SCALE 1:3	DRAWING NUMBER 9630-20-TSM-HVQ-4059															
			REVISION 01															

- Notes:
1. Customer to install pre-applied fasteners and torque to listed value.
 2. Customer to install dowel pin into QC-71 Tool Body.

9.25 Blank Tooling Interface Plate

Rev. 01	Description Initial Drawing	Initiator JNW	Date 12/03/2013
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Top view dimensions: 37, 101.6, 303

Side view dimensions: 24.1, 97, 166

Note 1

53

ITEM NO. 1 QTY. 1

PART NUMBER 9120-TSM-HVB-7961

DESCRIPTION TSM Tooling Interface Plate - Blank

NOTES: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.

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AT I INDUSTRIAL AUTOMATION

DRAWN BY: J. Winterroth, 12/03/13
 CHECKED BY: D. Norton, 12/04/13

TSM Tooling Interface Plate - Blank

SCALE: 1:3
 SIZE: B
 DRAWING NUMBER: 9630-20-TSM-HVB-7961

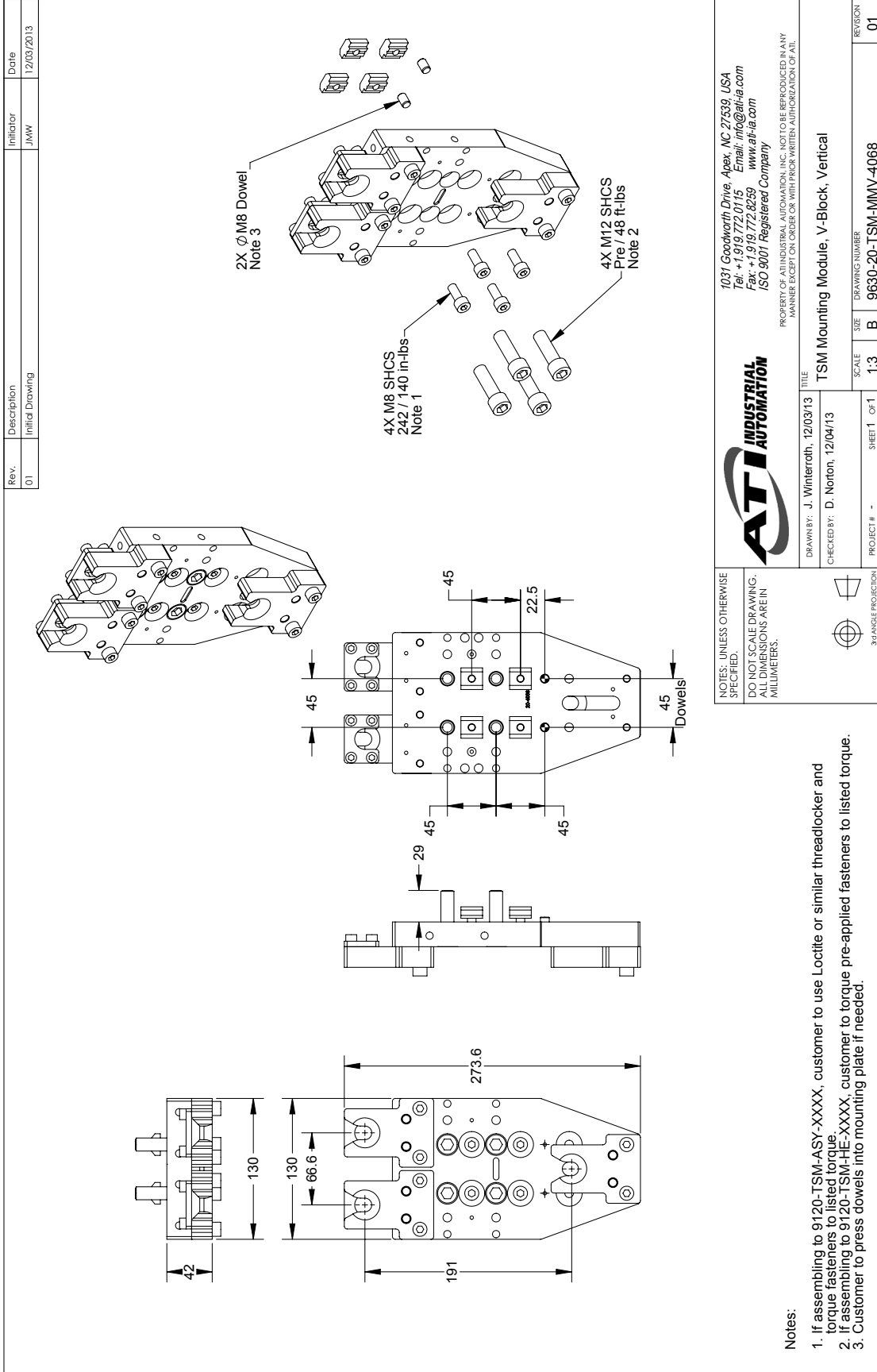
PROJECT # - - SHEET 1 OF 1

REVISION 01

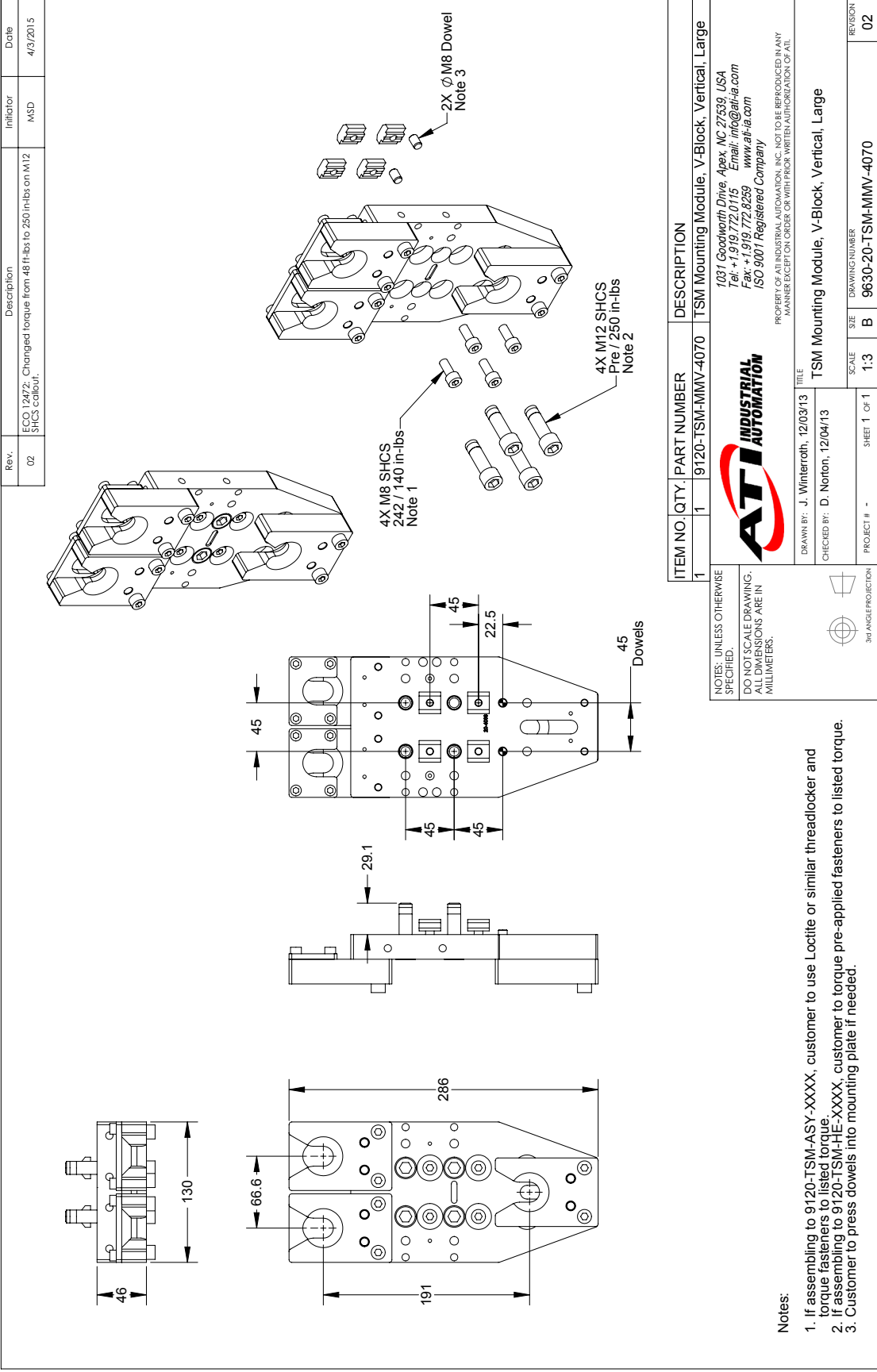
Notes:

1. Customer to add mounting patterns as needed.

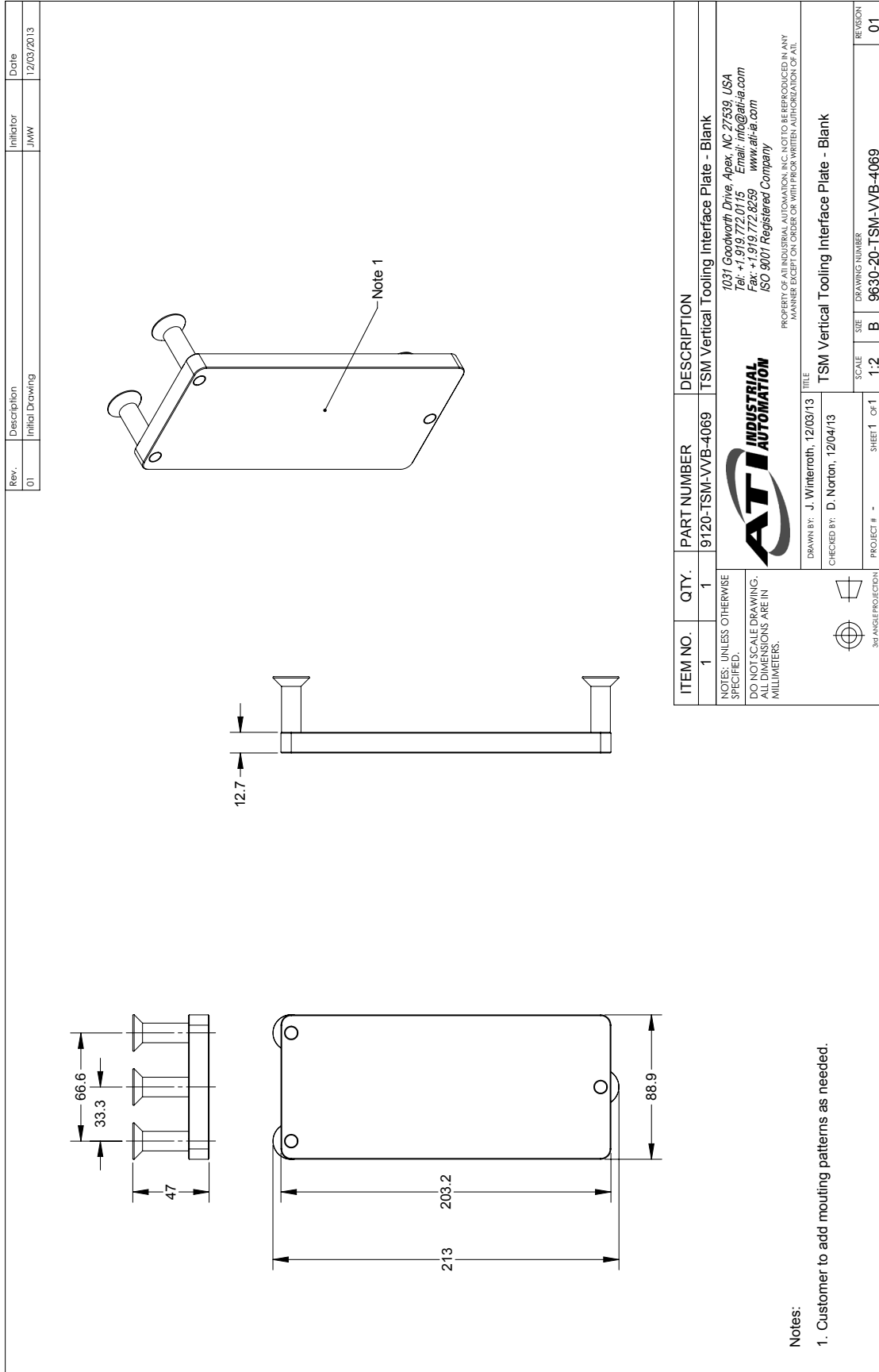
9.26 Vertical Mounting Module 4068



9.27 Vertical Mounting Module 4070



9.28 Vertical Tooling Interface Plate - Blank



9.29 Vertical Tooling Interface Plate - Blank (Large)

Rev. 01	Description Initial Drawing	Initiator JNW	Date 12/03/2013
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ITEM NO. 1 **QTY.** 1 **PART NUMBER** 9120-TSM-VVB-4071 **DESCRIPTION** TSM Vertical Tooling Interface Plate - Blank (Large)

NOTES: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.

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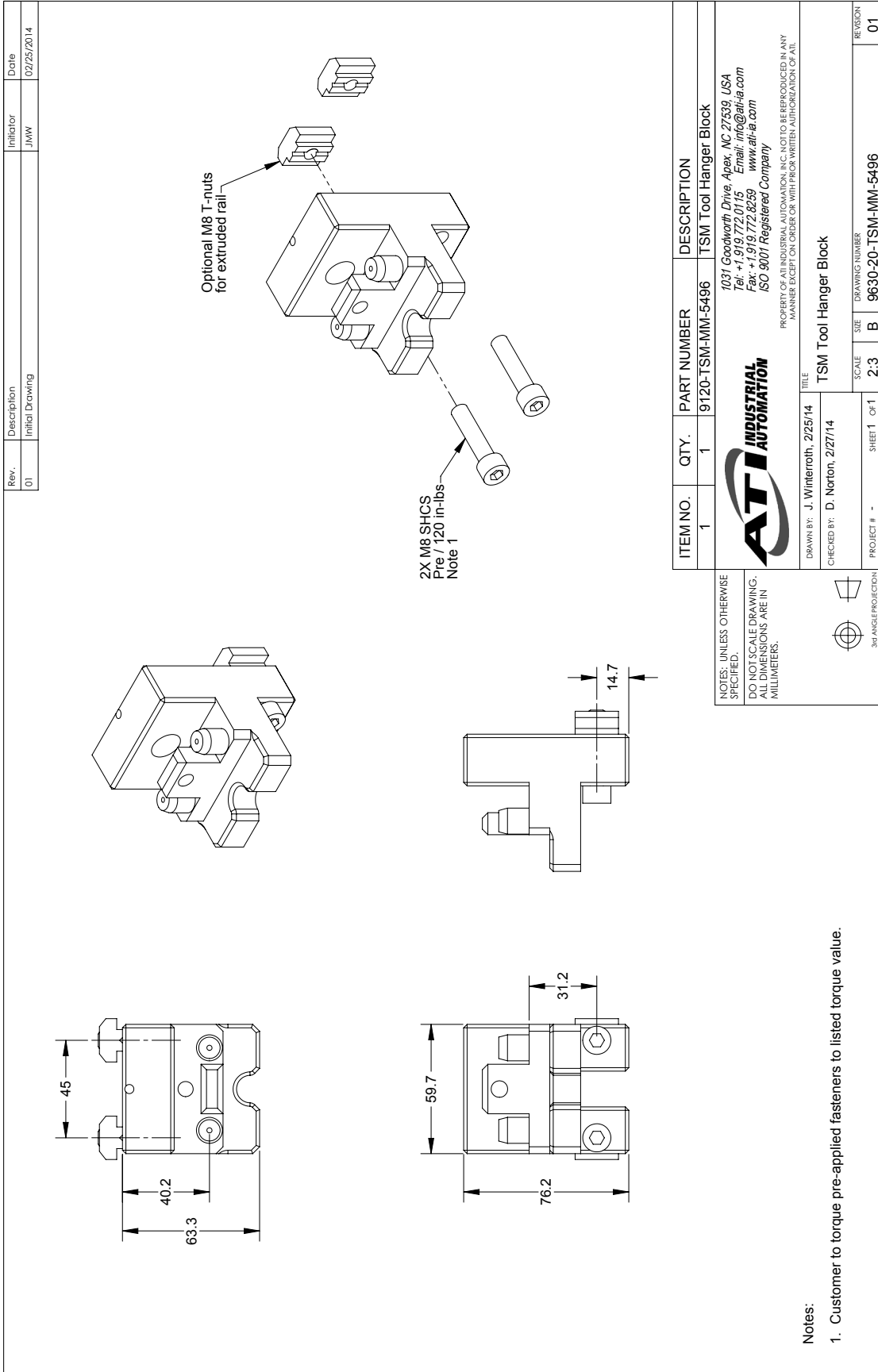
DRAWN BY: J. Winterroth, 12/03/13 **TITLE** TSM Vertical Tooling Interface Plate - Blank (Large)

CHECKED BY: D. Norton, 12/04/13

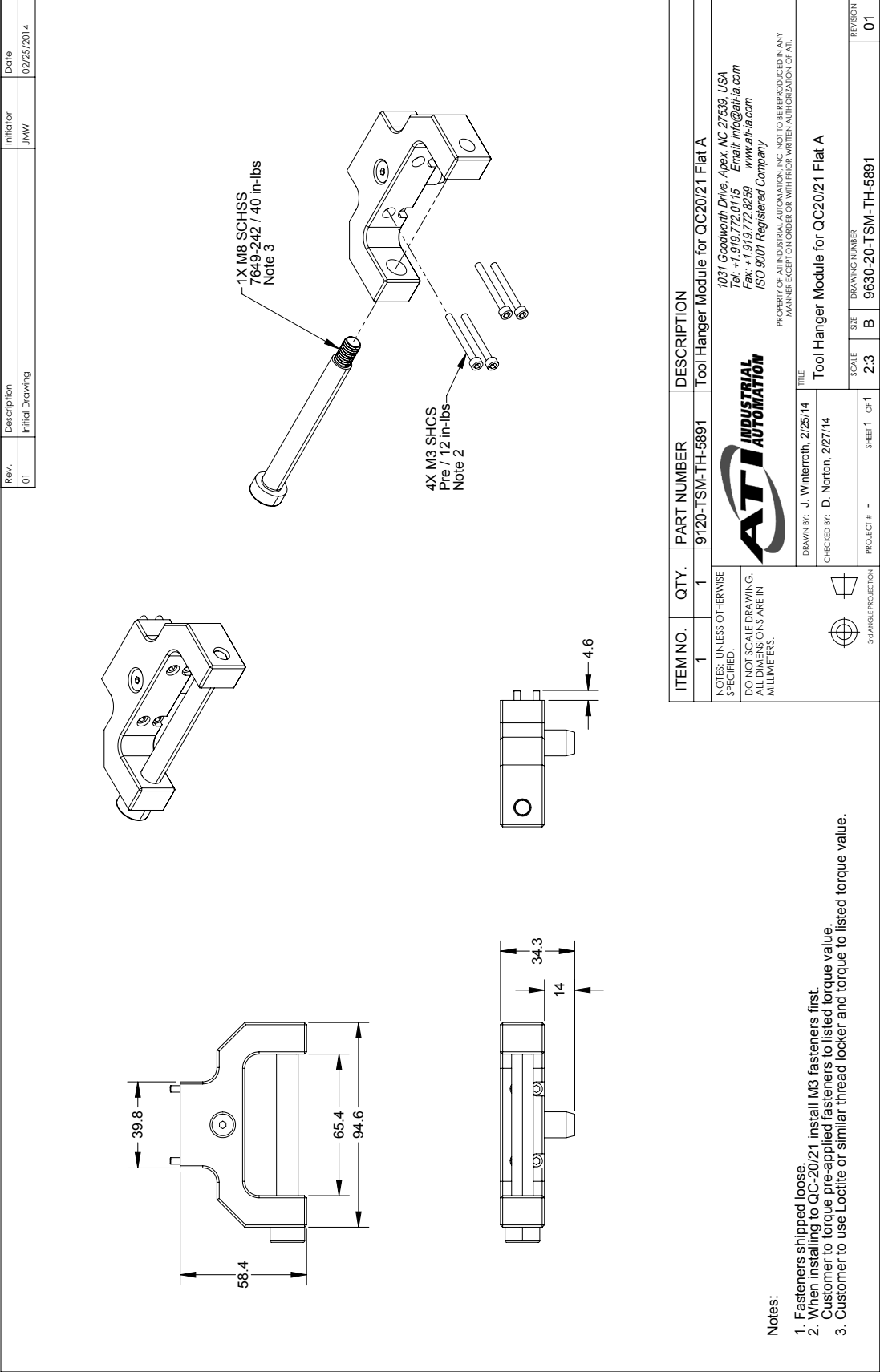
SCALE: 1:2 DRAWING NUMBER: 9630-20-TSM-VVB-4071 REVISION: 01

Notes:
 1. Customer to add mounting patterns as needed.

9.30 Tool Hanger Module 5496

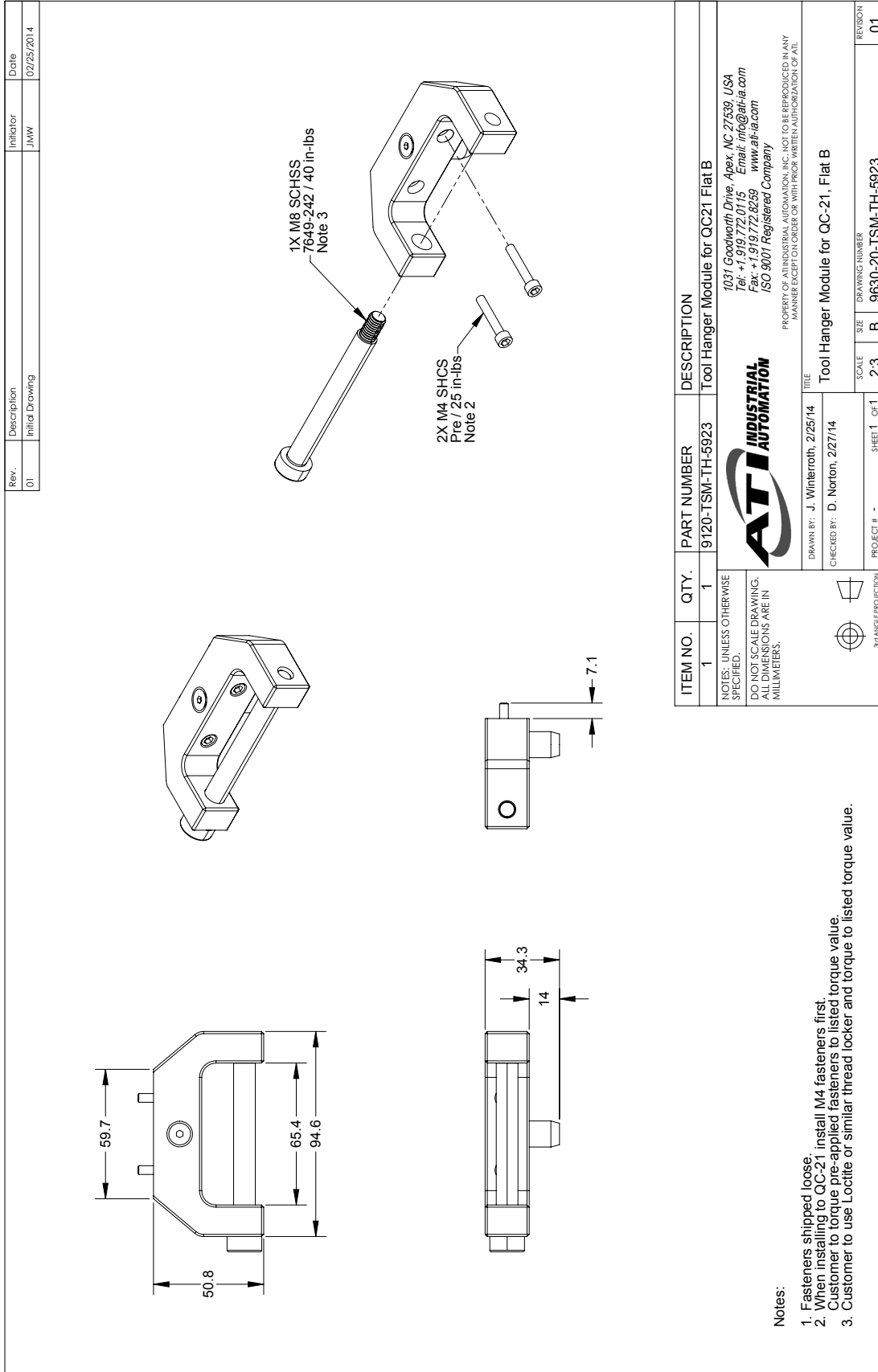


9.31 Tool Hanger Module 5891



- Notes:
1. Fasteners shipped loose.
 2. When installing to QC-20/21 install M3 fasteners first. Customer to torque pre-applied fasteners to listed torque value.
 3. Customer to use Loctite or similar thread locker and torque to listed torque value.

9.32 Tool Hanger Module 5923



Rev.	Description	Initiator	Date
01	Initial Drawing	JMW	02/25/2014

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-TH-5923	Tool Hanger Module for QC21 Flat B

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

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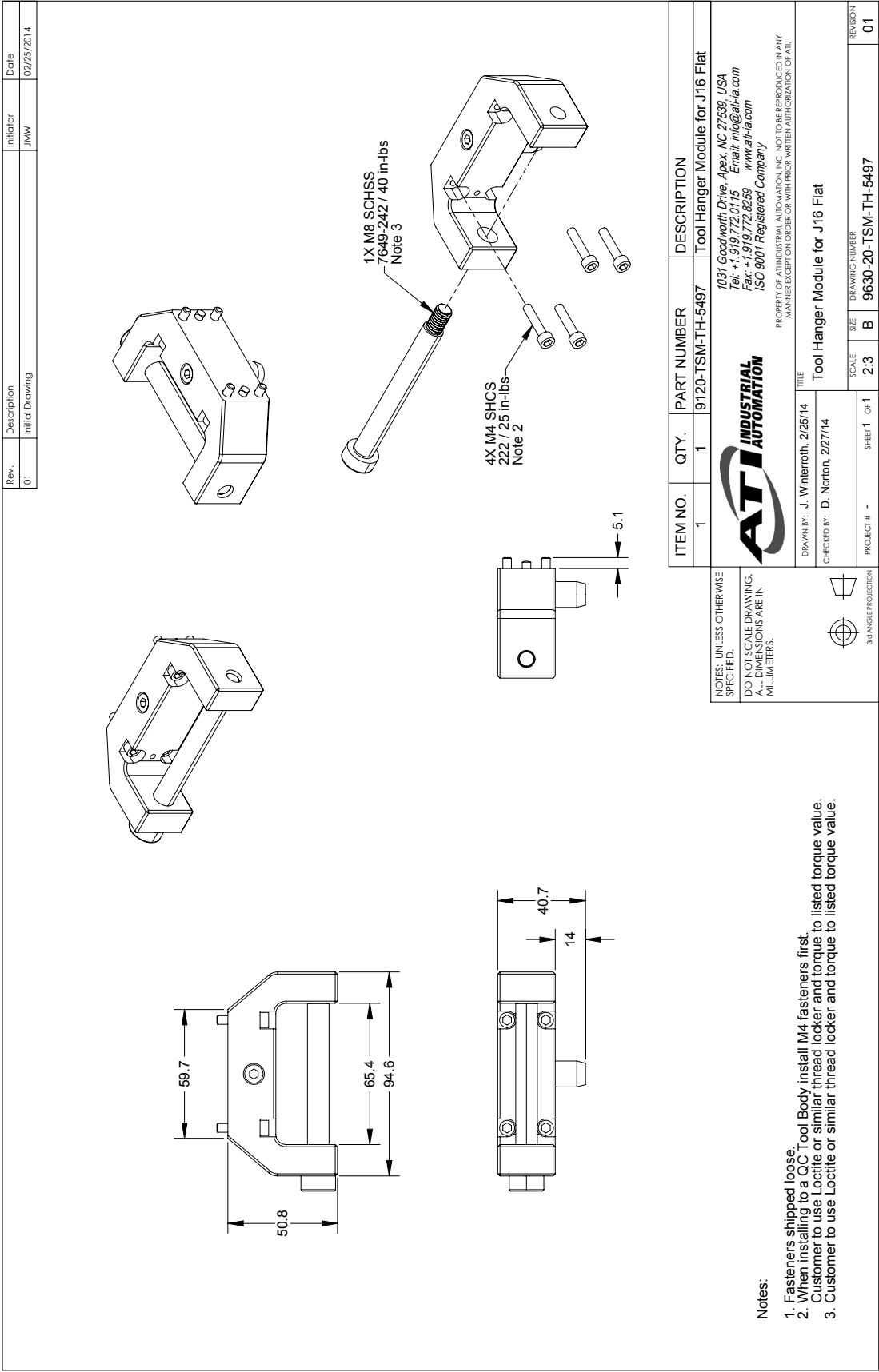
PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER FOR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

TITLE: Tool Hanger Module for QC-21, Flat B
 DRAWN BY: J. Winterroth, 2/25/14
 CHECKED BY: D. Norton, 2/27/14

SCALE: 2:3
 SIZE: B
 DRAWING NUMBER: 9630-20-TSM-TH-5923
 PROJECT #: - SHEET 1 OF 1
 REVISION: 01

- Notes:
- Fasteners shipped loose.
 - When installing to QC-21 install M4 fasteners first.
 - Customer to torque pre-applied fasteners to listed torque value.
 - Customer to use Loctite or similar thread locker and torque to listed torque value.

9.33 Tool Hanger Module 5497



- Notes:
1. Fasteners shipped loose.
 2. When installing to a QC Tool Body install M4 fasteners first.
 3. Customer to use Loctite or similar thread locker and torque to listed torque value.

9.34 Post Modules

Rev.	Description	Initiator	Date
02	ECO 1349Z; Added new Note #1 and renumbered existing Notes; Changed Note #3 on callouts; Added images & Notes detailing tab removal; N/A added to Post Module description.	MSD	10/27/2015

Remove the tabs on the Gusset face that will contact the Base assembly

Pry up on a tab to break it off

4X M8 T-Bolt
242 / 190 in-lbs
Note 2

4X Gusset Kits
included
Note 1

4X M8 SHCS
Pre / 190 in-lbs
Note 3

4X M12 SHCS
Pre / 250 in-lbs
Note 3

356

330

18.8
Plate Thickness

[36.0]
914
Post Height
T.O.P.

Notes:

- Customer to remove Gusset tabs from the mating surface that contacts the base assembly.
- Customer to use Loctite or similar thread locker and torque fasteners to listed torque value.
- Customer to install pre-applied fasteners and torque to listed torque value.

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	9120-TSM-PM-3317	TSM Post Module, 0914mm (36") Post Height - Kit

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

3rd ANGLE PROJECTION

DRAWN BY: D.Brewer, 11/08/13

CHECKED BY: J. Winterroth, 11/21/13

SCALE: 1:6

SIZE: B

PROJECT #: 9630-20-TSM-PM-3317

SHEET 1 OF 1

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9.35 TSM Rail Adapter Module - V-Block Style

REV. 01	DESCRIPTION INITIAL DRAWING	INITIATOR JMW	DATE 3/14/2017
------------	--------------------------------	------------------	-------------------

4X M12 SHCS
PRE / 250 IN-LBS
NOTE 2

4X M8X1.25 ∇ 16

4X M8X1.25 ∇ 16

2X \varnothing 8.059 ∇ 12
(\varnothing 8mm DOWEL SF)

TSM V-BLOCK MOUNTING PATTERN

TSM PIN & BUSHING MOUNTING PATTERN

SHEET	DESCRIPTION
1	9120-TSM-AM-9982 DETAIL
2	9120-TSM-MMB-8432 to 9120-TSM-HE-XXXX
3	9120-TSM-MMV-4018 to 9120-TSM-HE-XXXX

NOTES:
 1. FASTENERS SHIPPED LOOSE.
 2. WHEN INSTALLING TO A TSM HORIZONTAL EXTENSION CUSTOMER TO USE PRE-APPLIED FASTENERS OR USE LOC/TITE OR SIMILAR THREADLOCKER AND TORQUE FASTENERS TO THE LISTED TORQUE VALUE.

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	9120-TSM-AM-9982	TSM Adapter Module - Mounting Module to TSM HE

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

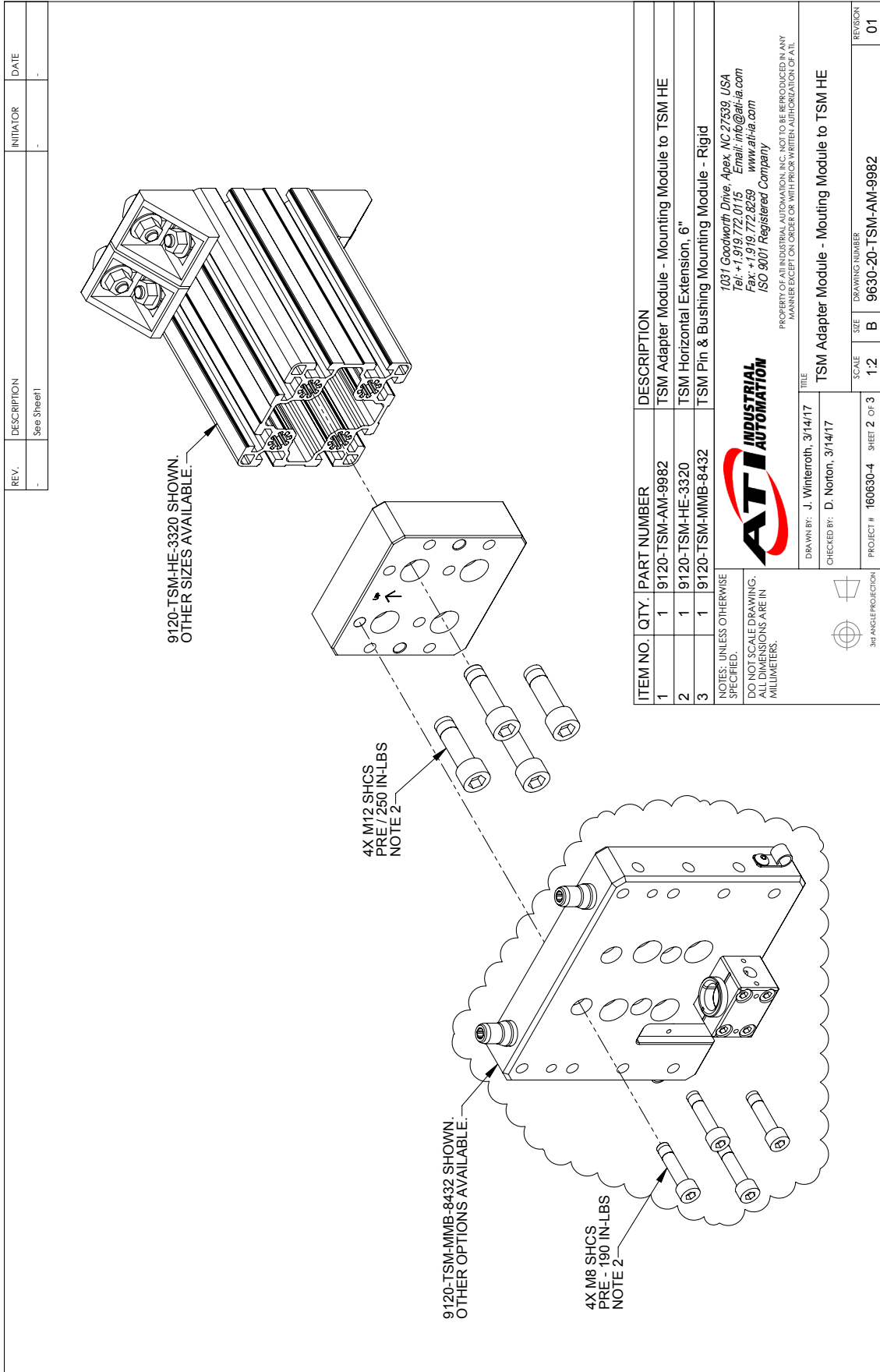
DRAWN BY: J. Winterroth, 3/14/17
 CHECKED BY: D. Norton, 3/14/17

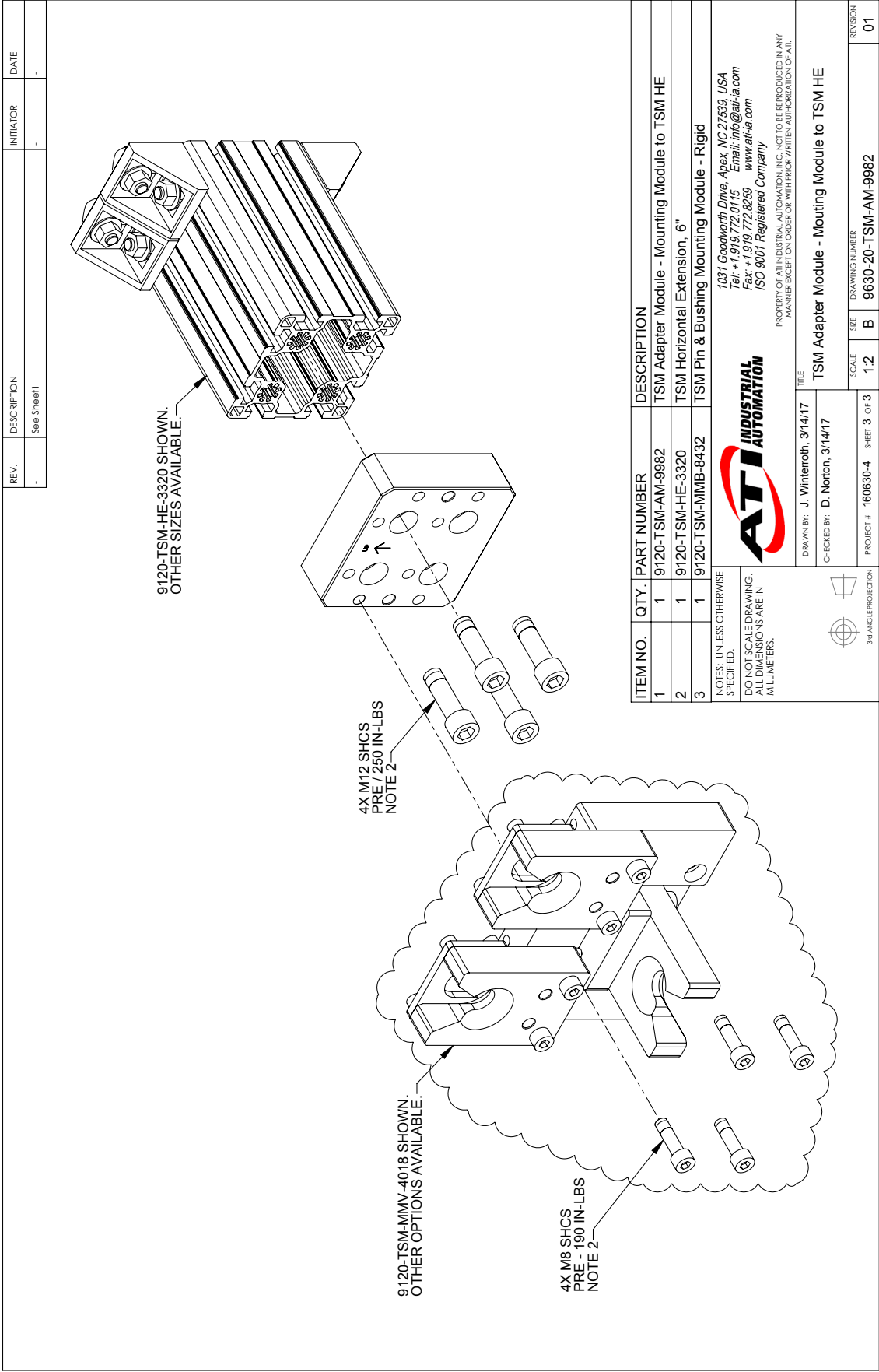
TITLE
 TSM Adapter Module - Mounting Module to TSM HE

SCALE: 1:2
 SIZE: B
 DRAWING NUMBER: 9630-20-TSM-AM-9982

PROJECT # 160630-4 SHEET 1 OF 3

REVISION: 01





REV.	DESCRIPTION	INITIATOR	DATE
-	See Sheet 1	-	-

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9120-TSM-AM-9982	TSM Adapter Module - Mounting Module to TSM HE
2	1	9120-TSM-HE-3320	TSM Horizontal Extension, 6"
3	1	9120-TSM-MMB-8432	TSM Pin & Bushing Mounting Module - Rigid

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TITLE: TSM Adapter Module - Mounting Module to TSM HE

DRAWN BY: J. Winterroth, 3/14/17
 CHECKED BY: D. Norton, 3/14/17

SCALE: 1:2
 SIZE: B
 DRAWING NUMBER: 9630-20-TSM-AM-9982
 PROJECT #: 160630-4 SHEET 3 OF 3
 REVISION: 01

9.36 Sensor Holders

Rev. 03	Description ECO 1829 1: Updated drawing to show sensor changes to 9120-TSM-SMA-8437.	Initiator TBC	Date 9/12/2019
------------	-----------------------------------------------------------------------------------------	------------------	-------------------

2X M6 SHCS
Pre / 50 in-lbs
Note 1

6.4

14.2±0.07
Sensor Depth

21.5

2X 3

Torque jam nut to
15 in-oz

19.8

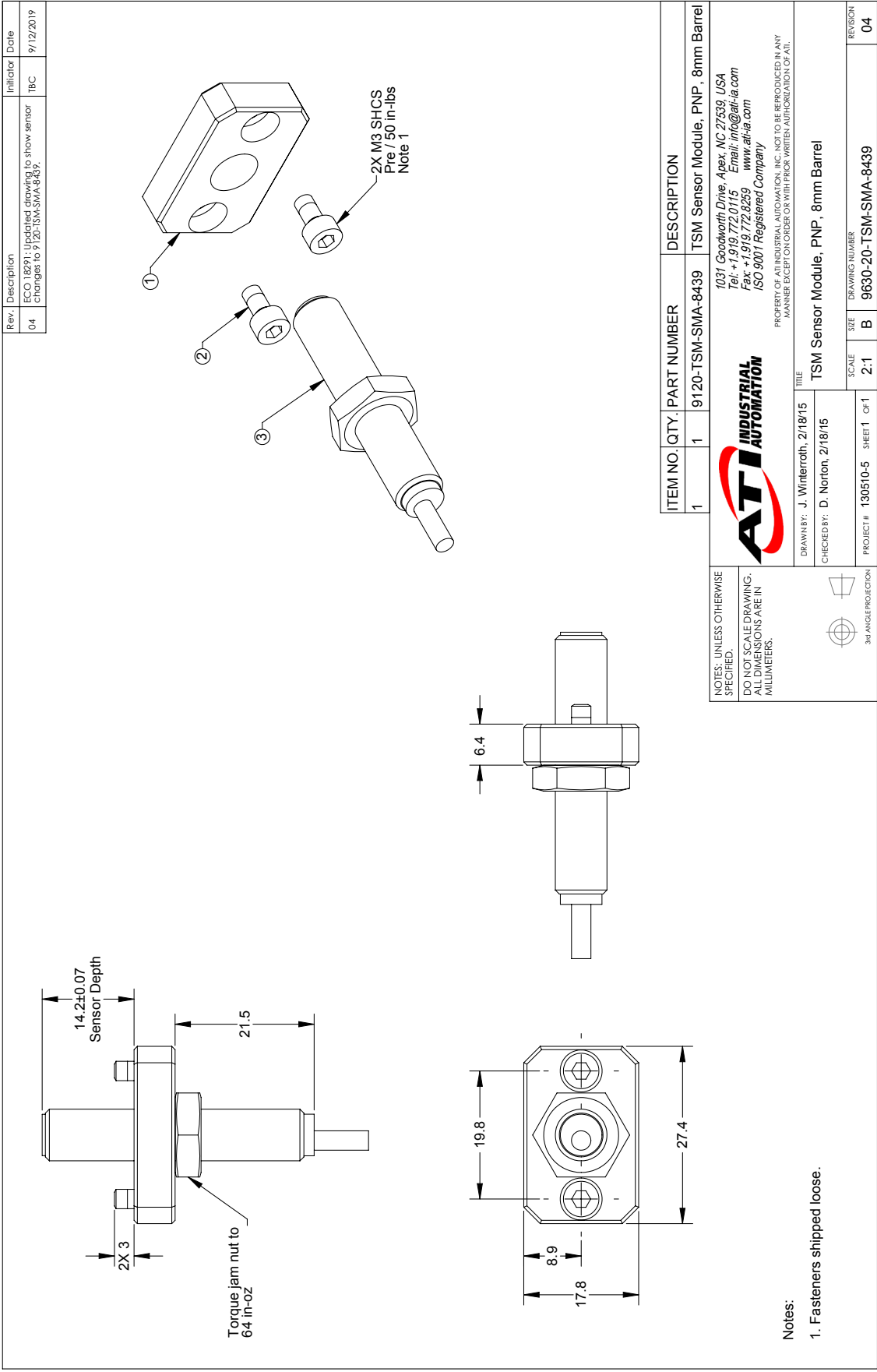
8.9

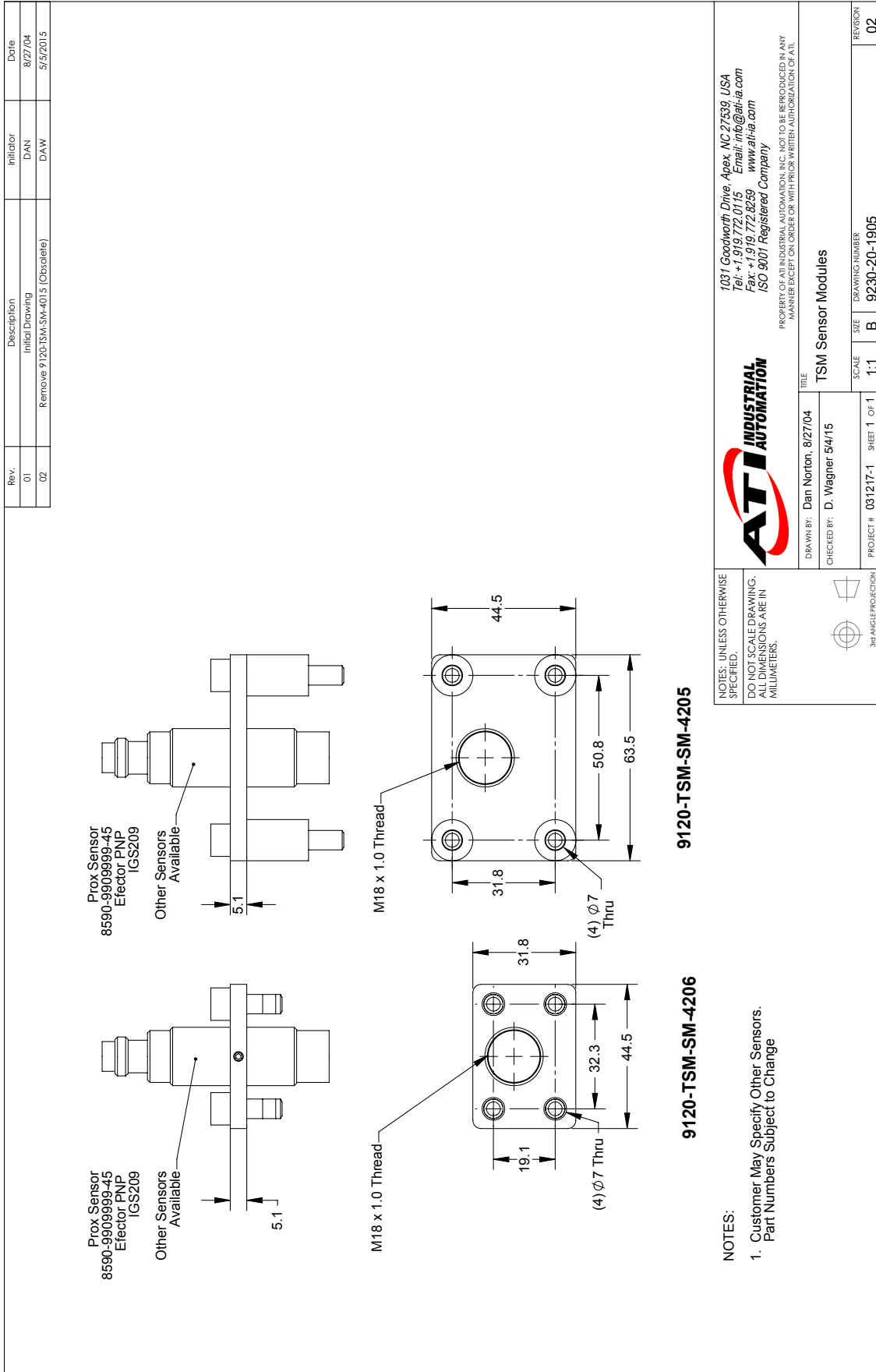
17.8

27.4

ITEM NO. 1	QTY. 1	PART NUMBER 9120-TSM-SMA-8437	DESCRIPTION TSM Sensor Module, NPN, 8mm Barrel
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		DRAWN BY: J. Winterroth, 9/23/13	TITLE TSM Sensor Module, NPN, 8mm Barrel
		CHECKED BY: D. Norton, 10/23/13	SCALE 2:1
		PROJECT #: 130510-5 SHEET 1 OF 1	DRAWING NUMBER 9630-20-TSM-SMA-8437
		3RD ANGLE PROJECTION	REVISION 03

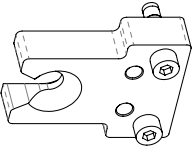
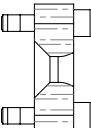
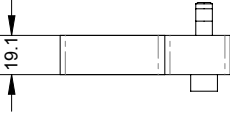
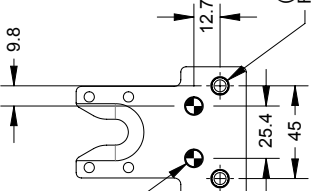
Notes:
 1. Fasteners shipped loose.





9.37 Receiver Blocks

Rev. 01	Description Initial Drawing	Initiator DAN	Date 8/27/04
------------	--------------------------------	------------------	-----------------

NOTES:


1. MATERIAL: 4140 Hardened Steel, Black Oxide

(2) $\phi 8\text{mm}$ Thru Dowel Slip Fit (Dowel Pins Included)


(2) $\phi 9$ Thru For M8 SHCS Hardware Included

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3rd ANGLE PROJECTION

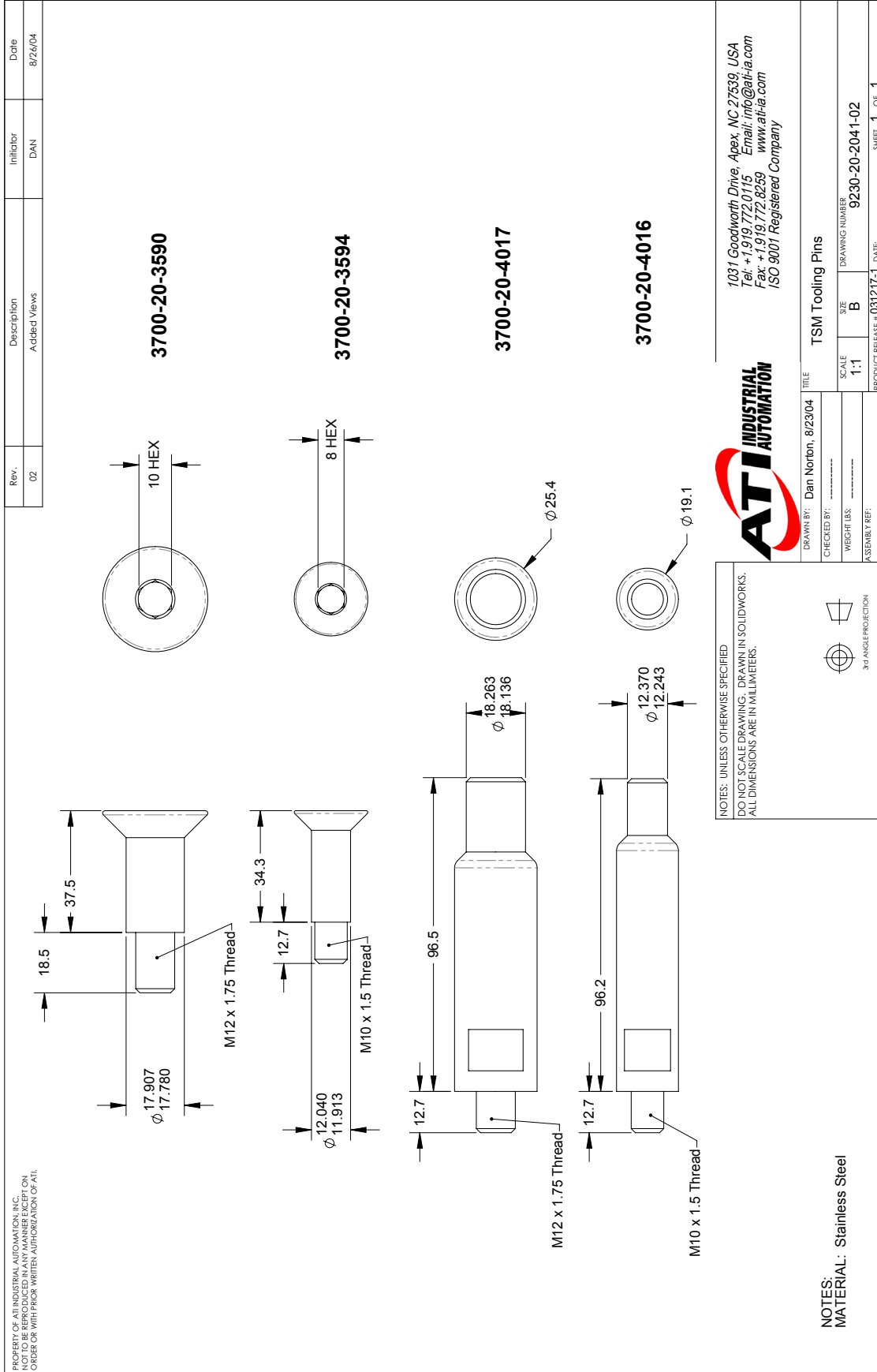


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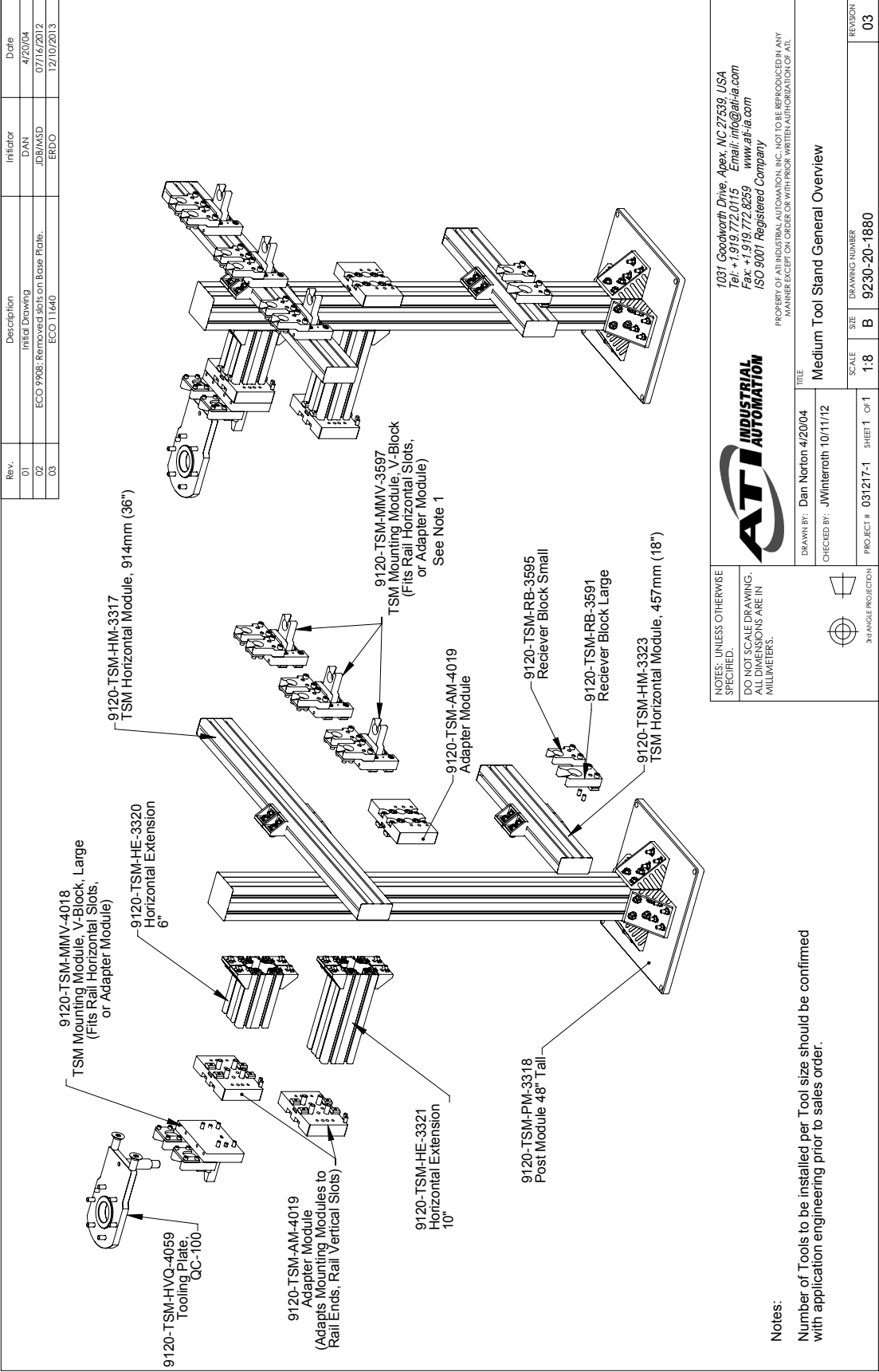
General Dimensions for TSM-RB-3595

DRAWN BY:	Dan Norton, 8/27/04	
CHECKED BY:		
WEIGHT (LBS):	SCALE	DRAWING NUMBER
ASSEMBLY REF:	1:2	9230-20-1907-01
PRODUCT RELEASE # 031217-1		DATE:
		SHEET 1 OF 1


9.38 Tooling Pins



9.39 Medium Tool Stand General Overview




Rev.	Description	Initiator	Date
01	Initial Drawing	DAN	4/20/04
02	ECO 9908: Removed slots on Base Plate.	JDB/MSD	07/16/2012
03	ECO 11640	ERDO	12/10/2013


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TITLE		SCALE	SIZE	DRAWING NUMBER	REVISION
Medium Tool Stand General Overview		1:8	B	9230-20-1880	03
DRAWN BY: Dan Norton 4/20/04		SHEET 1 OF 1		PROJECT # 031217-1	
CHECKED BY: JWinteroth 10/11/12					

NOTES: UNLESS OTHERWISE SPECIFIED:
 DO NOT SCALE DRAWING.
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 3rd ANGLE PROJECTION

Notes:
 Number of Tools to be installed per Tool size should be confirmed with application engineering prior to sales order.

10. 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 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.