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C. Control and Signal Modules

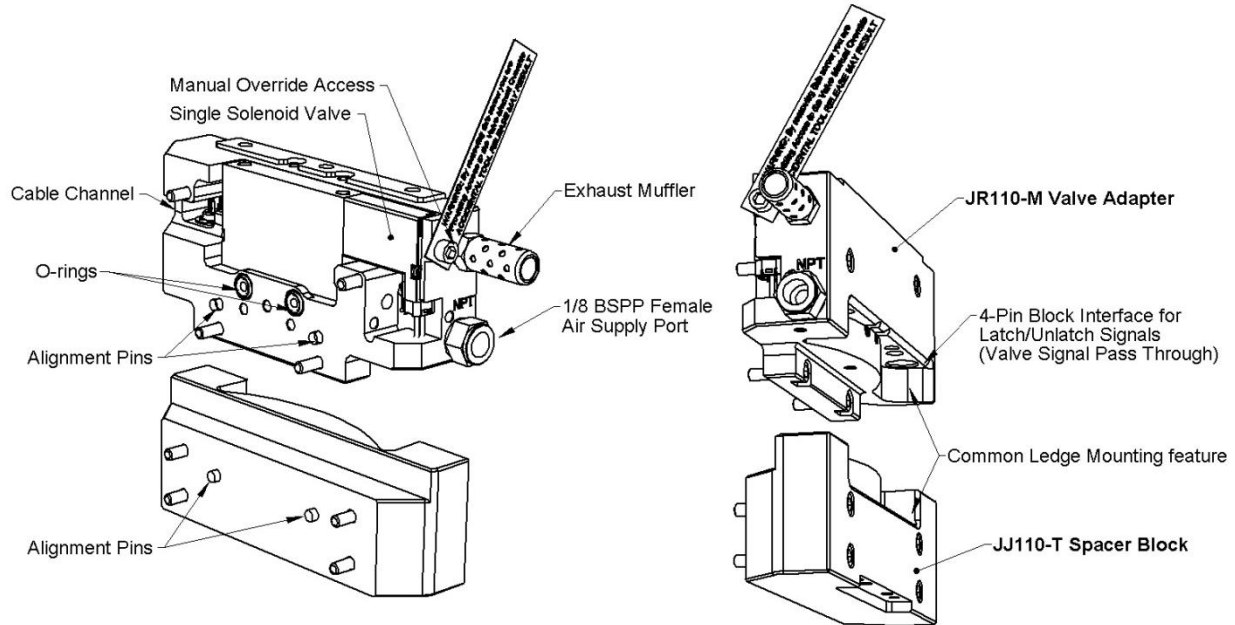
Jx110 Valve Adapter with Valve Signal Pass-through

1. Product Overview

The Jx110 Valve Adapter is required to provide a pneumatic air supply to the Tool Changer Master for actuation of the locking mechanism. The Valve Adapter comes outfitted with an integrated single-solenoid or double-solenoid valve. The Jx110-M valve adapter mounts to Flat 'A' of the QC-110 Master plate and a JJ110-T spacer block mounts to Flat 'A' of the QC-110 Tool plate. The valve adapter provides the common ledge mounting feature to the QC-110 Tool Changer to mount Control/Signal modules with valve pass through.

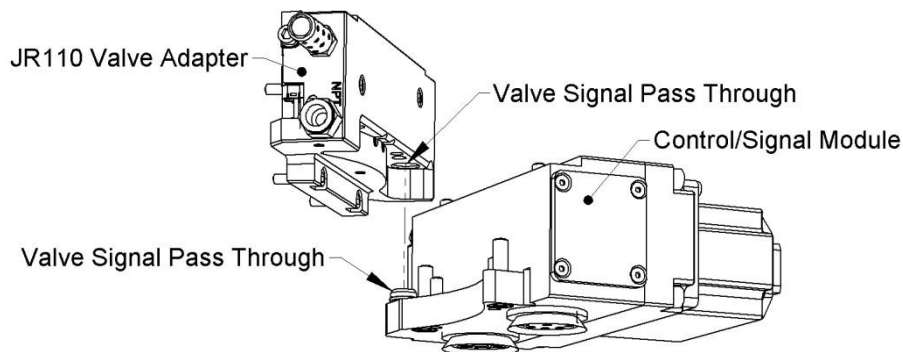
A single 1/8 BSPP female air supply port provides Lock and Unlock air to the Tool Changer. There are two O-rings that seal the connection between the Valve adapter and the Master plate. Access to the solenoid valve manual override is provided on the Valve Adapter. The manual override should be restricted to contingency situation and only when the robot and tool are in the stand or storage location. Actuation of the manual override will result in Tool Changer release.

Figure 1.1—Jx110 Valve Adapter and Spacer Block (JR110 Shown)



The Lock/Unlock signal from the Control/Signal Module to the Valve Adapter is transmitted via a small, internal pin block. [Figure 1.2](#) shows the electrical interface.

Figure 1.2—Valve Signal Pass Through (JR110 Shown)



2. Installation

Valve Adapters are typically installed by ATI prior to shipment. The steps below outline the field installation or removal as required.

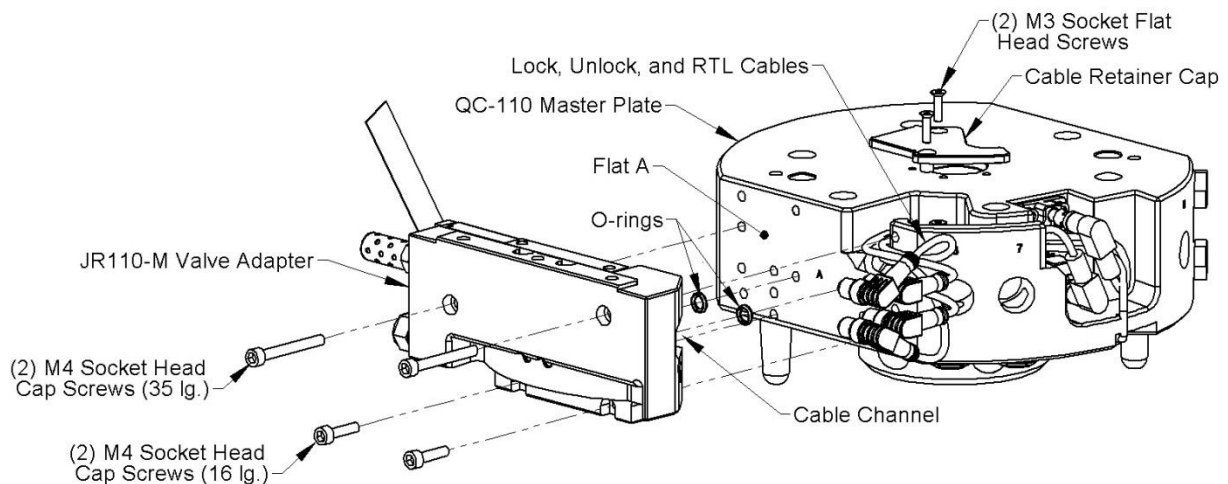


WARNING: Do not perform maintenance or repair on Tool Changer or modules unless the tool is safely supported or docked in the tool stand and all energized circuits (e.g. electrical, air, water, etc.) have been turned off. Injury or equipment damage can occur with tool not docked and energized circuits on. Dock the tool safely in the tool stand and turn off all energized circuits before performing maintenance or repair on Tool Changer or

2.1 Install the Valve Adapter

1. It may be necessary to clean the mounting surface on the tool changer prior to installing the Adapter in order to remove any debris that may be present.
2. Install the Lock, Unlock, and RTL cables prior to mounting the Valve Adapter, route the cables through the QC-110 Master plate as shown in *Figure 2.1*.
3. Install the cable retainer cap to the Tool Changer Body.
4. If fasteners do not have pre-applied adhesive, apply Loctite 222[®] to the supplied M3 socket flat head cap screws. Install the two M3 socket flat head cap screws securing the cable retainer cap to the Tool Changer and tighten to 60 in-oz.
5. Two O-rings are required on the Valve Adapter interface. Make sure these o-rings are present and lightly lubricated.
6. Route Lock, Unlock, and RTL cables through the channel in the Valve Adapter then align the Valve Adapter to Flat A using the two alignment pins.

Figure 2.1—Valve Adapter Installation (JR110 Shown)



7. If fasteners do not have pre-applied adhesive, apply Loctite 222[®] to the supplied M4 SHCS fasteners. Install the three or four M4 socket head screws securing the Valve Adapter to Flat A of the Tool Changer and tighten to 15–18 in-lbs.
8. Make pneumatic connection to the Valve Adapter as required. Ensure that the connection is cleaned prior to being secured as appropriate.

2.2 Remove the Valve Adapter

1. If there is a Control/Signal Module piggy-backed on the Valve Adapter it may need to be removed prior to removal of the Valve Adapter. Disconnect any pneumatic connections to the Valve Adapter as required. Refer to [Section 2.6—Remove the Control/Signal Module](#) for details.
2. Remove the three or four M4 SHCS securing the Valve Adapter to the Tool Changer and pull the adapter off the tool changer. Be careful not to pull on the Lock, Unlock and RTL cables.
3. Make sure that the o-rings are retained at the Valve Adapter mounting interface.

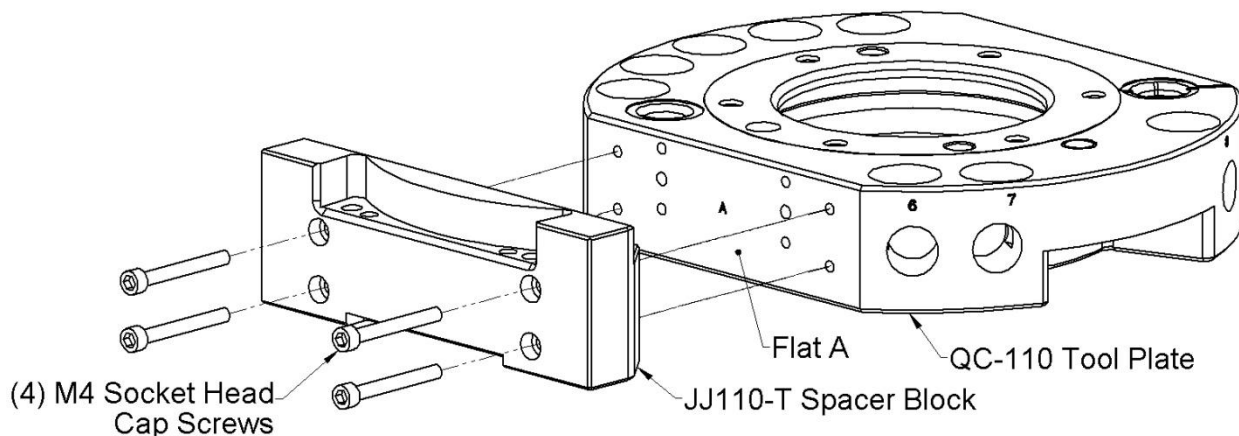


CAUTION: It is recommended, not to use fasteners with pre-applied adhesive more than three times. Fasteners used more than three times may come loose and cause equipment damage. Discard fasteners used more than three times and install new fasteners with pre-applied adhesive.

2.3 Install the Spacer Block

1. It may be necessary to clean the mounting surface on the tool changer prior to installing the Block in order to remove any debris that may be present.
2. If fasteners do not have pre-applied adhesive, apply Loctite 222® to the supplied M4 SHCS fasteners. Install the four M4 socket head screws securing the Valve Adapter to Flat A of the Tool Changer and tighten to 15–18 in-lbs.

Figure 2.2—Spacer Block Installation



2.4 Remove the Spacer Block

1. If there is a Control/Signal Module piggy-backed on the Spacer Block it may need to be removed prior to removal of the Spacer Block. Refer to [Section 2.6—Remove the Control/Signal Module](#) for details.
2. Remove the four M4 SHCS securing the Spacer Block to the Tool Changer and pull the Spacer off the tool changer.

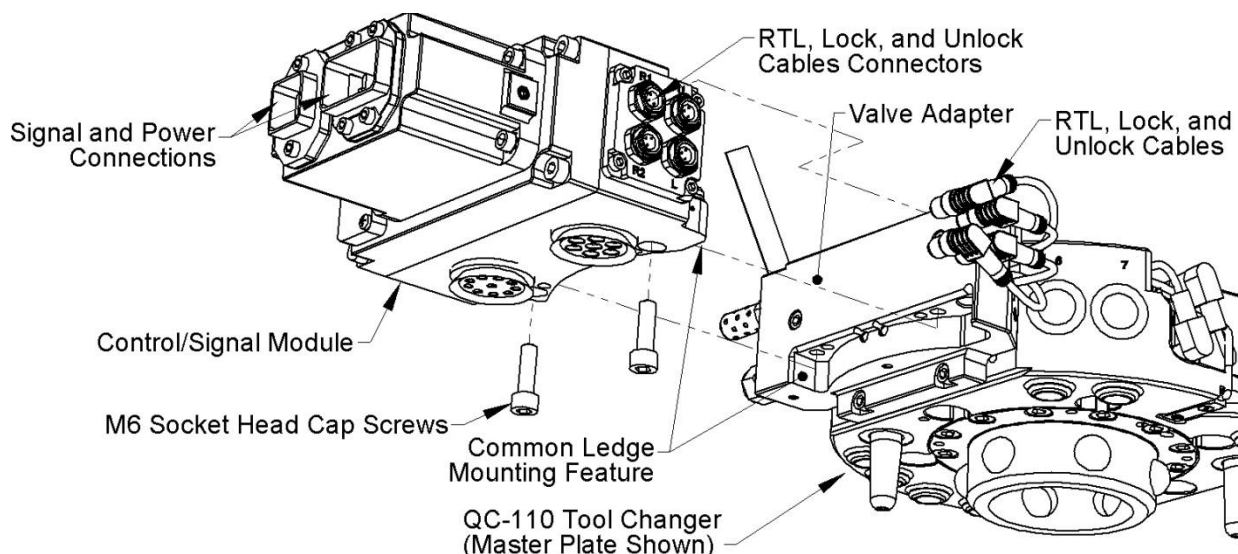


CAUTION: It is recommended, not to use fasteners with pre-applied adhesive more than three times. Fasteners used more than three times may come loose and cause equipment damage. Discard fasteners used more than three times and install new fasteners with pre-applied adhesive.

2.5 Install Control/Signal Module

1. It may be necessary to clean the mounting surface on the Valve Adapter prior to installing the module in order to remove any debris that may be present.
2. Using the ledge feature as a guide place the module into the appropriate location on the Valve Adapter. Align the module with the Valve Adapter using the dowels in the bottom of the ledge feature. Refer to *Figure 2.3*.
3. If fasteners do not have pre-applied adhesive, apply Loctite 242[®] to the supplied M6 SHCS fasteners. Install the two (2) M6 socket head screws securing the module to the Valve Adapter and tighten to 40–70 in-lbs.
4. Power, signal, auxiliary, sensor, and valve cables can be connected to the module after attaching the module to the Tool Changer body. Ensure that the connectors are cleaned prior to being secured as appropriate.

Figure 2.3—Control/Signal Module Installation



2.6 Remove the Control/Signal Module



DANGER: For electrical modules using > 60VDC or 42VAC, NO contact should be attempted before removing power. This includes attaching and disconnecting cables to mating connectors or any contact with the Tool Changer or its components. Arcing and damage will occur if this is not observed. Remove power before attaching, disconnecting any cables or attempting any maintenance of Tool Changer.

1. Prior to removing the module use a marker pen to scribe a line or indication between the Tool Changer and module body as a reminder where the module is to be re-installed.
2. Depending upon the service or repair being done, customer connections up to the module may or may not need to be disconnected.
3. Remove the socket head cap screws and lift the module from the Tool Changer. Refer to *Figure 2.3*.



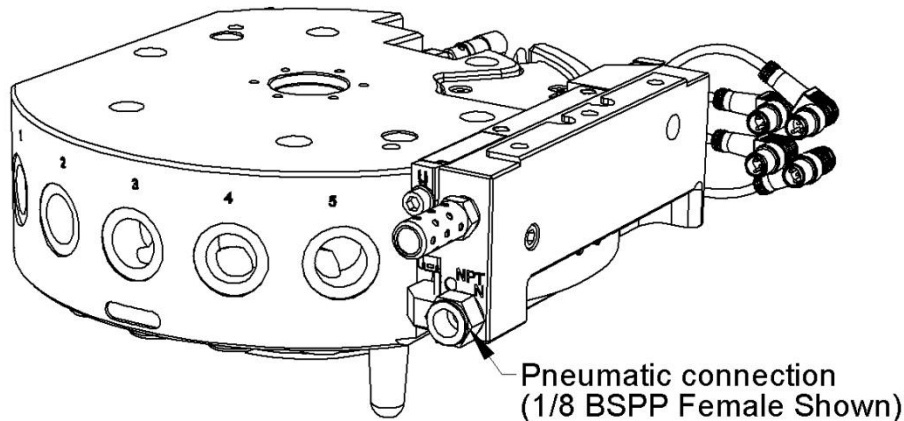
CAUTION: It is recommended, not to use fasteners with pre-applied adhesive more than three times. Fasteners used more than three times may come loose and cause equipment damage. Discard fasteners used more than three times and install new fasteners with pre-applied adhesive.

3. Operation

3.1 Pneumatic Connection

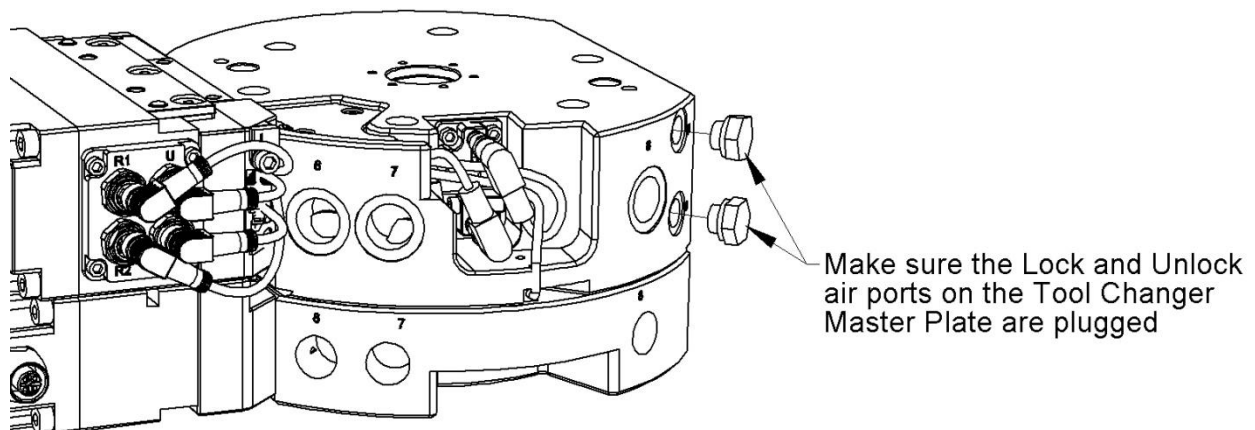
It is important that the Valve Adapter be supplied with clean, dry, non-lubricated air supplied between 60 and 100 psi (4.5–6.9 Bar) and filtered at 50 microns or better. Valve Adapters are supplied with the tool changer to provide a fully integrated solution. The customer is only required to supply the Valve Adapter with a single air supply (see *Figure 3.1*). Some Valve Adapters come equipped with air fitting (1/8 BSPP female), the Valve Adapter body has a 1/8 NPT threaded air supply port.

Figure 3.1—Valve Adapter Air Supply Port (JR110-M Shown)



When using a Valve Adapter make sure the Lock and Unlock ports on the Tool Changer Master plate are plugged. The Valve adapter provides the Lock and Unlock air through ports in the interface between the Valve Adapter and the Tool Changer Master plate.

Figure 3.2—Plug Lock and Unlock Air Ports



3.2 Electrical Connection

The electrical connection for valve control is made through internal pin blocks as described in *Section 1—Product Overview* and detailed in *Section 8—Drawings* of this manual. The control of the single-solenoid valve is integrated with an ATI-supplied Control/Signal Module that is piggy-backed onto the Valve Adapter.

3.3 Solenoid Valve Manual Override Procedure

Access to a valve manual override is provided on the Valve Adapters. Use of the manual override should be restricted to contingency situations and only when the robot and tool are in the stand or storage location. Actuation of the Unlock valve manual override will result in tool changer release.

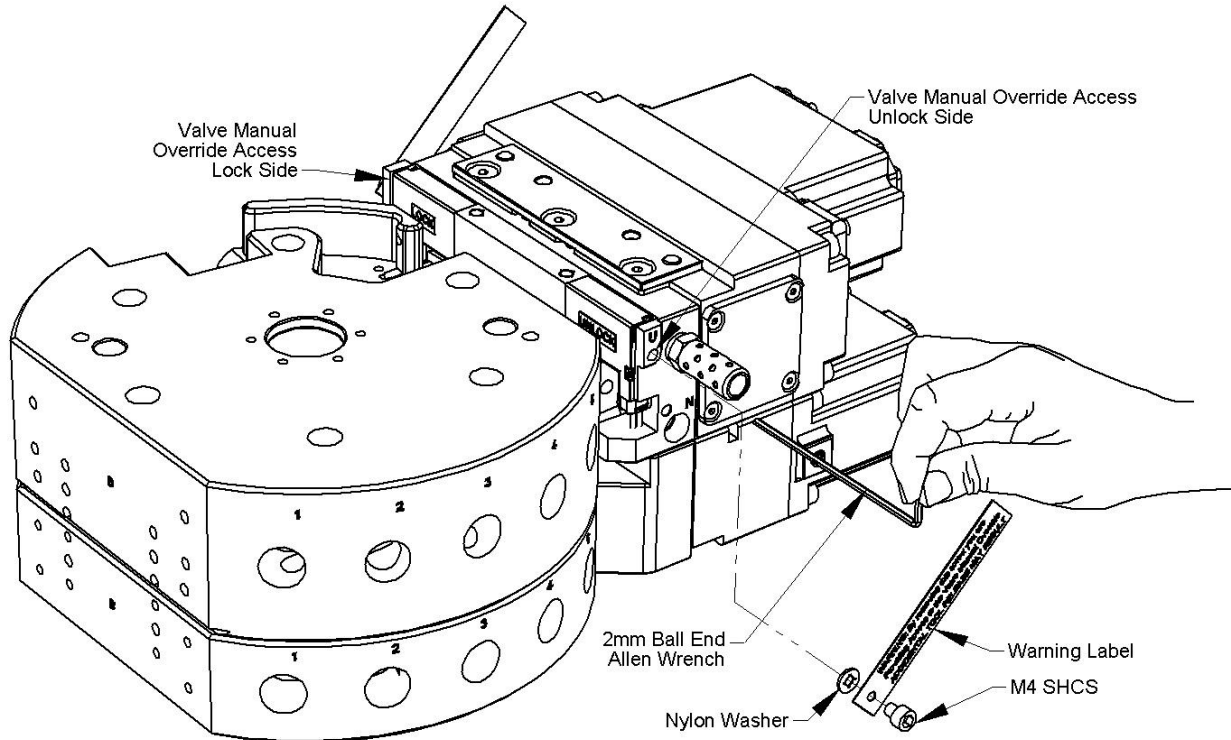


WARNING: Do not use the solenoid valve manual override if the tool is locked to the Master. Using the manual override will release the Tool and may cause bodily injury or damage to equipment. If the Tool is attached to the Master it must be secured in the tool stand or in a location where the tool weight is supported before using the manual override.

The JT110-M Valve adapter uses a double-solenoid valve with a lock and Unlock manual override. Make sure to use the Unlock side of the solenoid valve. Refer to [Figure 3.3](#).


1. Remove the M4 SHCS, warning label, and nylon washer from the Unlock side of the Valve Adapter.
2. Insert a 2mm ball end Allen wrench or similar blunt object in the Unlock valve screw hole and manually depress the valve override. Make sure locking mechanism is fully retracted.
3. Replace the M4 SHCS, warning label, and nylon washer and tighten the screw.

Figure 3.3—Solenoid Valve Manual Override (JT110-M Shown)



4. Maintenance

Little or no maintenance is required for the valve adapters, the only wear components are the solenoid valves and an exhaust muffler. Under normal operating conditions, the valve will last for millions of cycles. It is critical that the exhaust mufflers are not restricted. As a part of a preventative maintenance program the mufflers should be inspected and/or replaced periodically. Inspection and replacement should be more frequent in dirty environments.

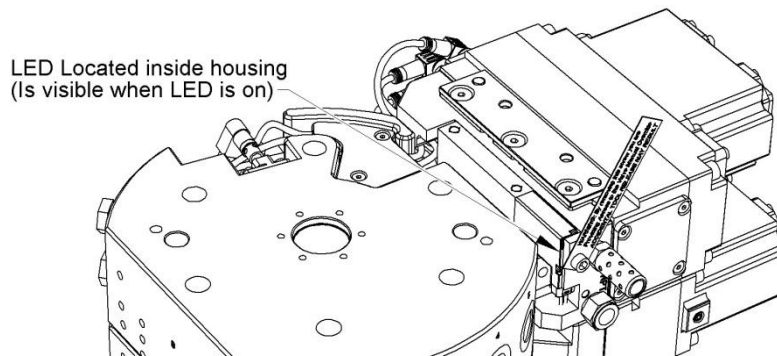


WARNING: Do not perform maintenance or repair on Tool Changer or modules unless the tool is safely supported or docked in the tool stand and all energized circuits (e.g. electrical, air, water, etc.) have been turned off. Injury or equipment damage can occur with tool not docked and energized circuits on. Dock the tool safely in the tool stand and turn off all energized circuits before performing maintenance or repair on Tool Changer or modules.

5. Troubleshooting

Valve Adapters solenoid provides an LED to indicate whether or not power is being supplied to the solenoid valve. This can be a valuable troubleshooting tool. [Figure 5.1](#) shows the location of the LEDs. Note that in a solenoid Valve Adapter, the LED will turn on when power is supplied to the valve.

Figure 5.1—Valve Adapter Solenoid LED Locations (JR110-M Shown)



Follow the suggested actions listed in [Table 5.1](#) when attempting to troubleshoot the Valve Adapter. If issues persist, contact your closest ATI representative.

Table 5.1—Valve Adapter Troubleshooting Measures		
Symptom	Possible Cause	Correction
Changer not locking/unlocking on command	Clogged Muffler	Inspect muffler for debris, if clogged or damaged replace.
	Air leaks	Check for missing or damaged O-rings, install or replace if needed. For installation and removal instruction refer to Section 2—Installation . Check pneumatic connections, plugs, and lines for leaks, if lines leak or are damaged, repair or replace and secure properly.
	Air supply not to specifications	Ensure air supply meets specifications, see Section 3.1—Pneumatic Connection for air supply specifications.
	Electrical connection to solenoid valve damaged or no power supplied	Verify power is supplied to the solenoid valves by observing if the solenoid LED's turn on (refer to Figure 5.1). Check that power is supplied to the control/signal module. If no power present, check back to supply power and correct.
	Solenoid valve malfunctioning	Check valve function, if malfunctioning have valve adapter serviced or replaced as required.

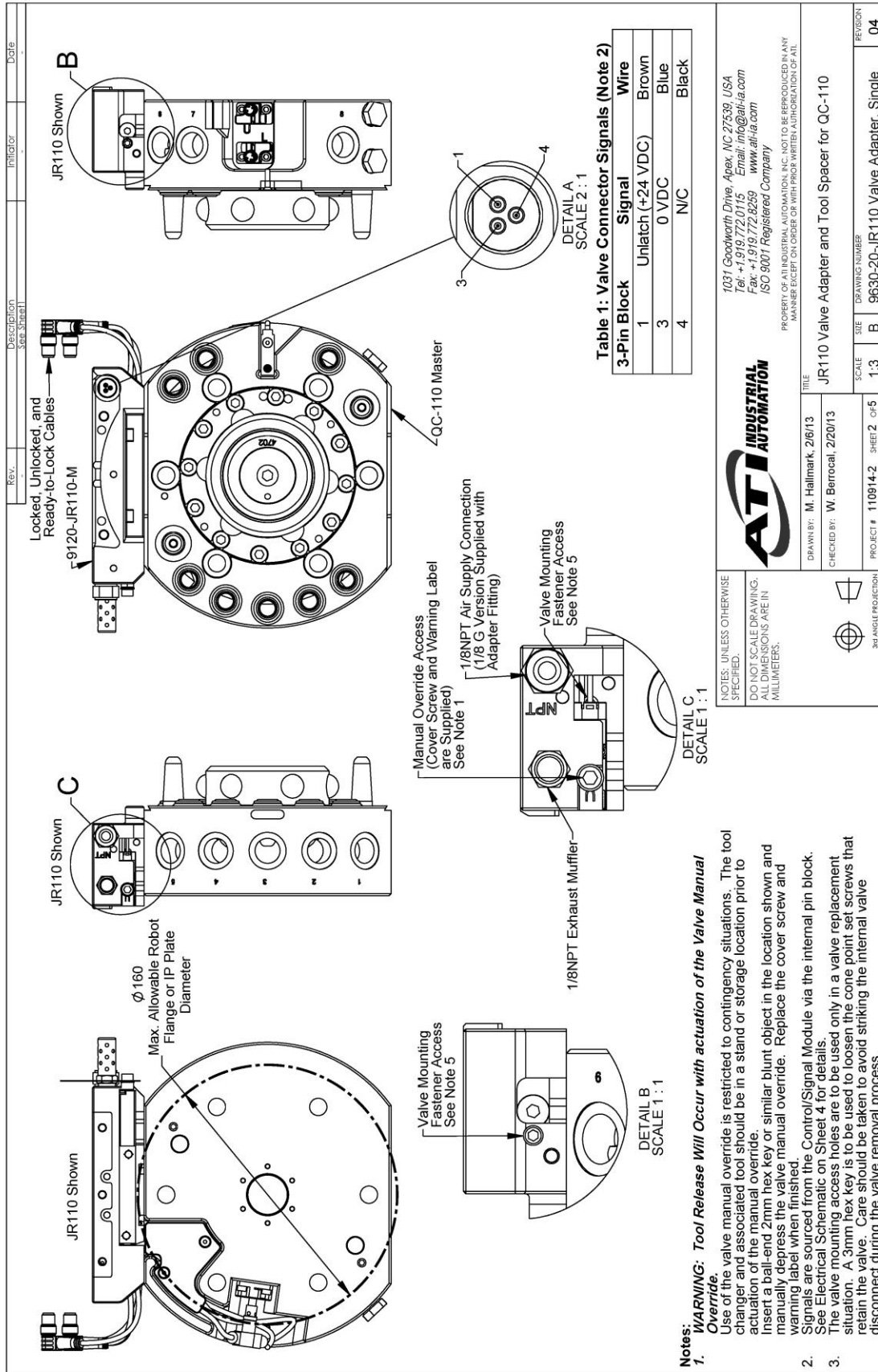
6. Recommended Spare Parts

ATI Part Number	Description
9120-JS110-M	QC-110 Valve Adapter, Ledge Mount Module Compatible, Master side, w/NPT Adapter (Single-Solenoid Valve)
9120-JT110-M	QC-110 Valve Adapter, Ledge Mount Module Compatible, Master side, w/NPT Adapter (Double-Solenoid Valve)
9120-JR110-M	QC-110 Valve Adapter, Ledge Mount Module Compatible, Master side, w/BSPP Adapter (Single-Solenoid Valve)
9120-JU110-M	QC-110 Valve Adapter, Ledge Mount Module Compatible, Master side, w/BSPP Adapter (Double-Solenoid Valve)
9120-JJ110-T	QC-110 Valve Adapter, Ledge Mount Module Compatible, Tool side
3425-000022-01	MAC Series 42 Single Valve w/ LED 6W Coil, Washdown
3425-000025-01	MAC Series 42 Double Valve w/ LED 6W Coil, Washdown
3490-1010007-00	1/8 NPT Exhaust Muffler
3410-0001052-01	O-ring

7. Specifications

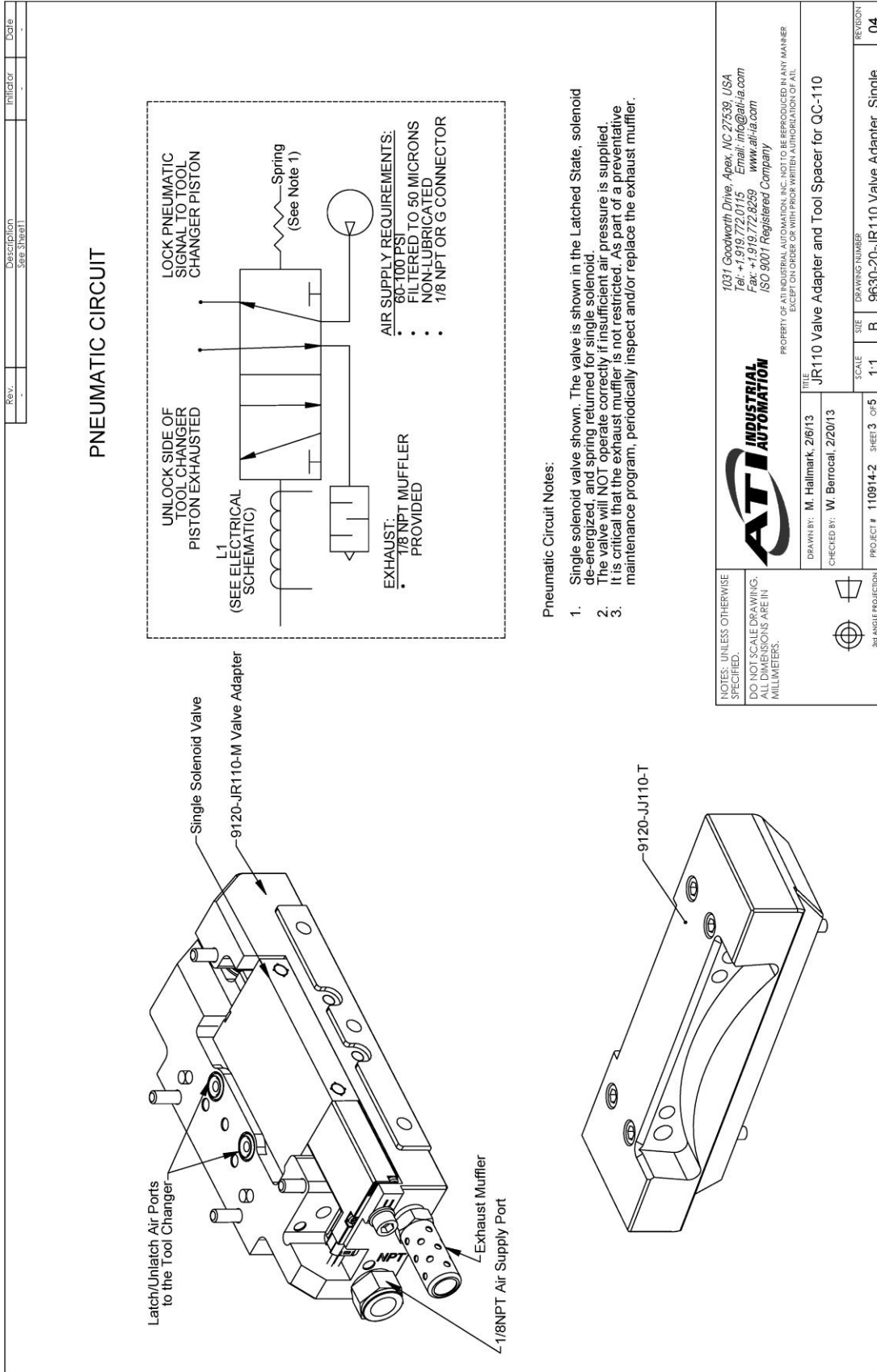
Valve Adapters	
Interface Connections	<u>Solenoid Valve Connector</u> : Internal Valve signal pass through <u>Air Supply Port</u> : 1/8 NPT w/ 1/8 BSPP Female Adapter
Air Pressure	60 - 100 psi (4.5 – 6.9 Bar) clean, dry, non-lubricated air
Air Filtration	50 microns
Environmental Resistance	Dust and water resistant, but not water proof or IP67 compliant
Weight	9120-JR110-M - 1.08 lbs (0.49 kg) 9120-JT110-M – 1.02 lbs (0.46 kg) 9120-JJ110-T – 0.90 lbs (0.41 kg)
Solenoid Valves	
Single Solenoid Valve	MAC Series 42, DC Voltage, 6W Coil, Washdown, 250mA @ 19-29VDC
Double Solenoid Valve	MAC Series 42, DC Voltage, 6W Coil, Washdown, 250mA @ 19-29VDC
Solenoid Resistance	~325KΩ - Typical resistance measured across valve coil (DC versions)
Ambient Temperature	0° F to 120° F

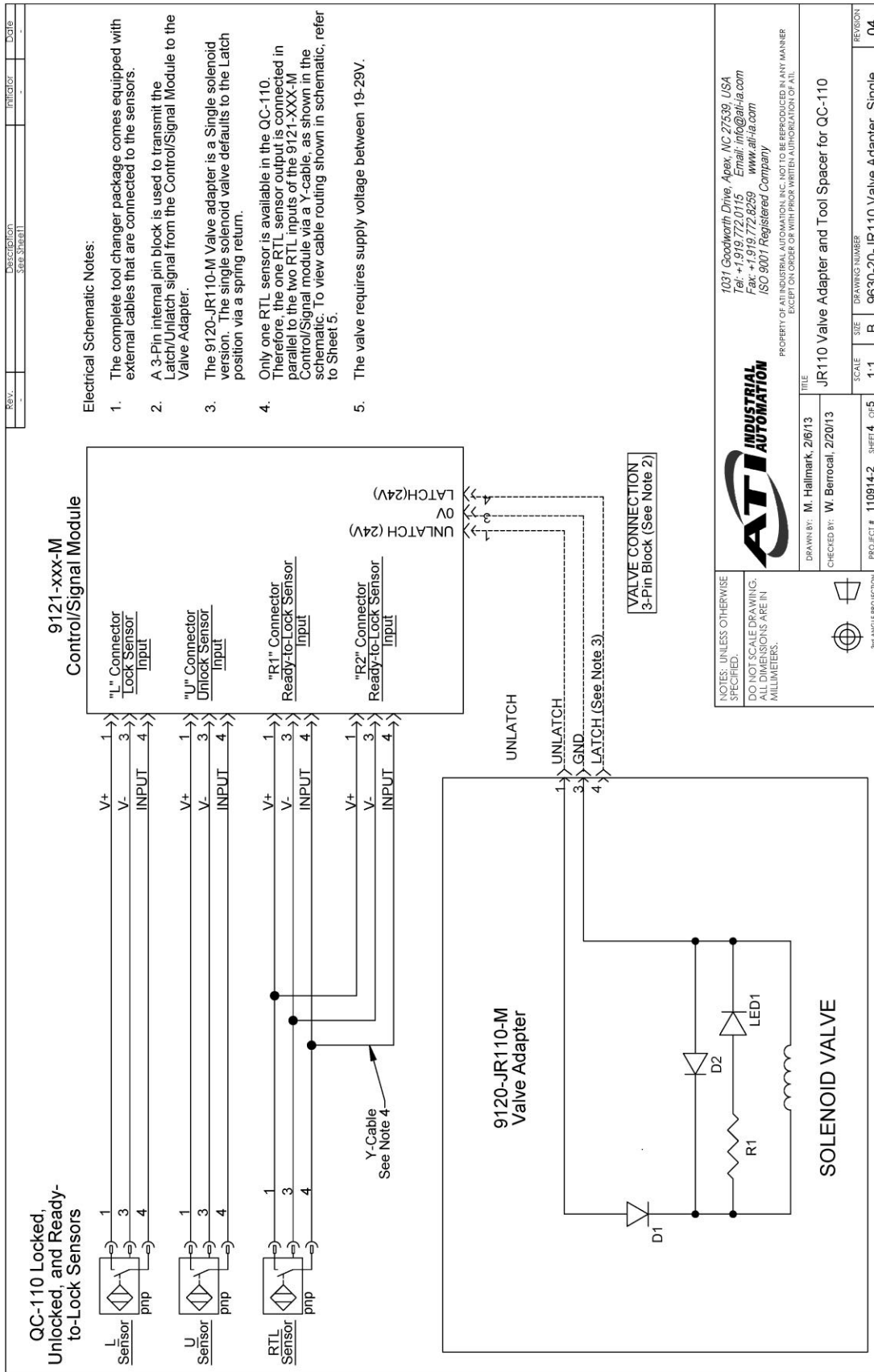
Quick-Change Installation and Operation Manual
 Document #9620-20-c-jx110 air-valve adapters with valve signal pass thru-03



Notes:

- WARNING: Tool Release Will Occur with actuation of the Valve Manual Override**
 Use of the valve manual override is restricted to contingency situations. The tool changer and associated tool should be in a stand or storage location prior to actuation of the manual override.
 Insert a ball-end 2mm hex key or similar blunt object in the location shown and manually depress the valve manual override. Replace the cover screw and warning label when finished.
- Signals are sourced from the Control/Signal Module via the internal pin block. See Electrical Schematic on Sheet 4 for details.
- The valve mounting access holes are to be used only in a valve replacement situation. A 3mm hex key is to be used to loosen the cone point set screws that retain the valve. Care should be taken to avoid striking the internal valve disconnect during the valve removal process.





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PROJECT # 110914-2 SHEET # 4 OF 5

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 CHECKED BY: W. Berrocal, 2/20/13

SCALE 1:1
 SIZE B

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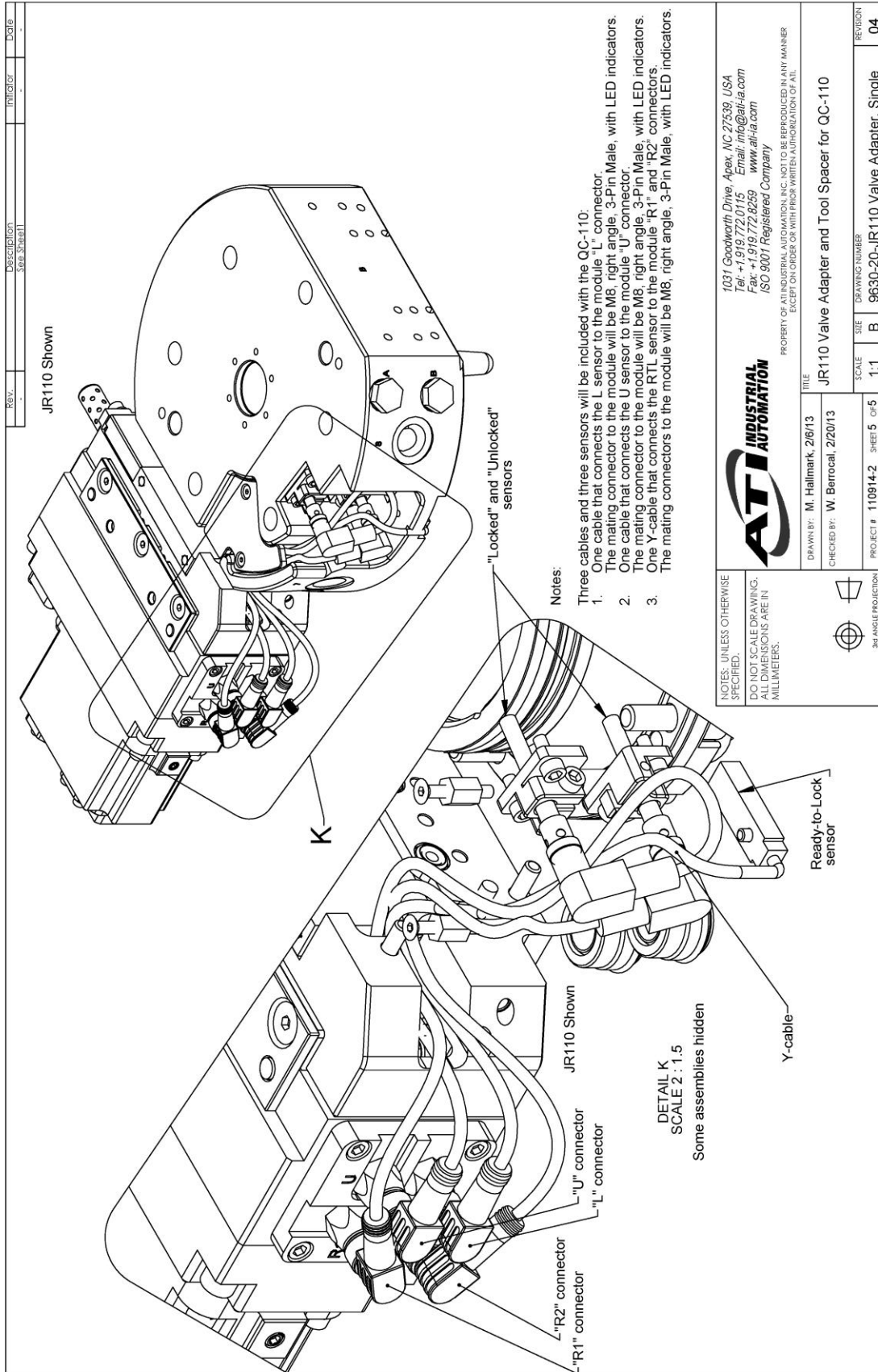
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REVISION 04

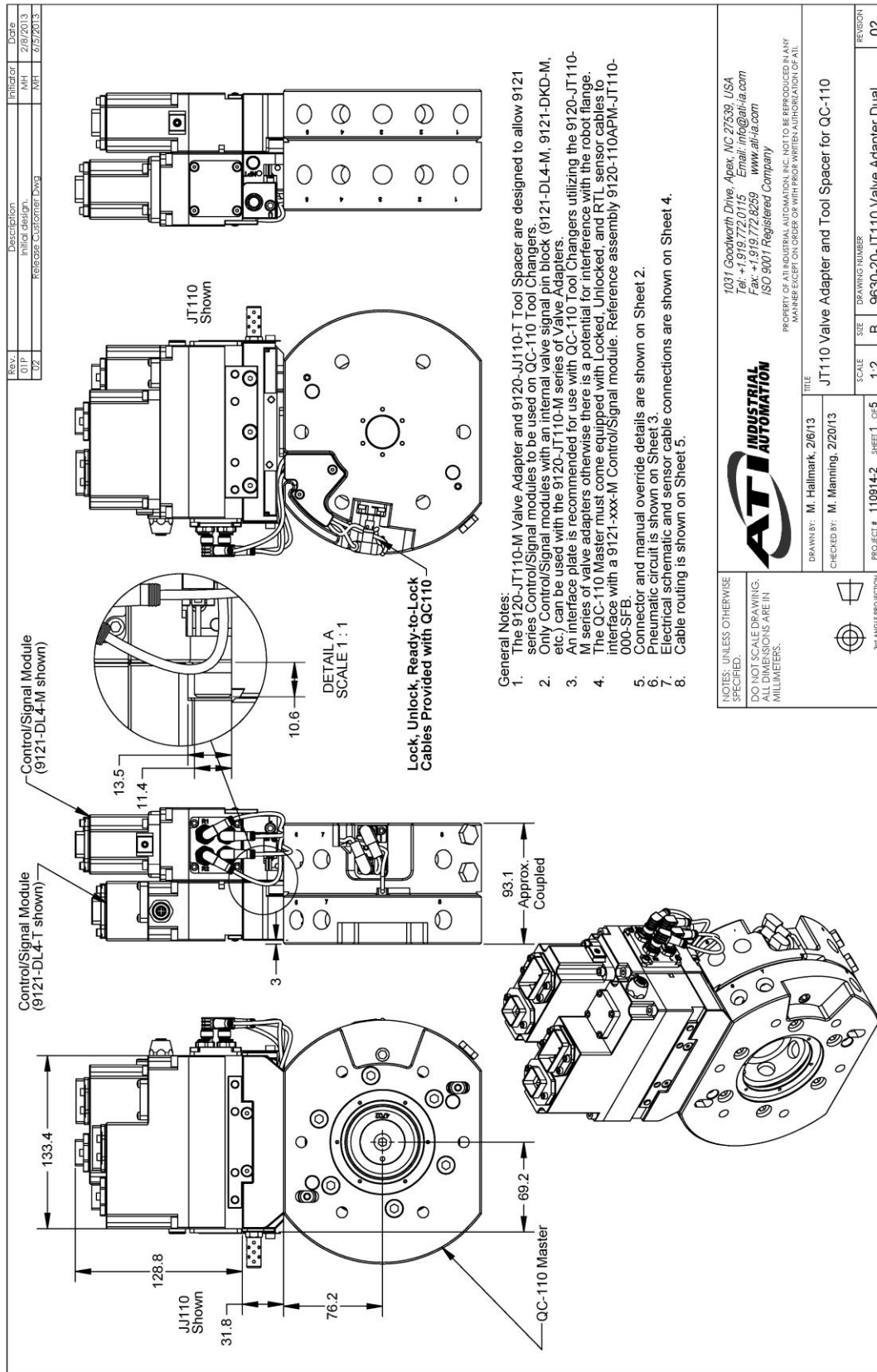
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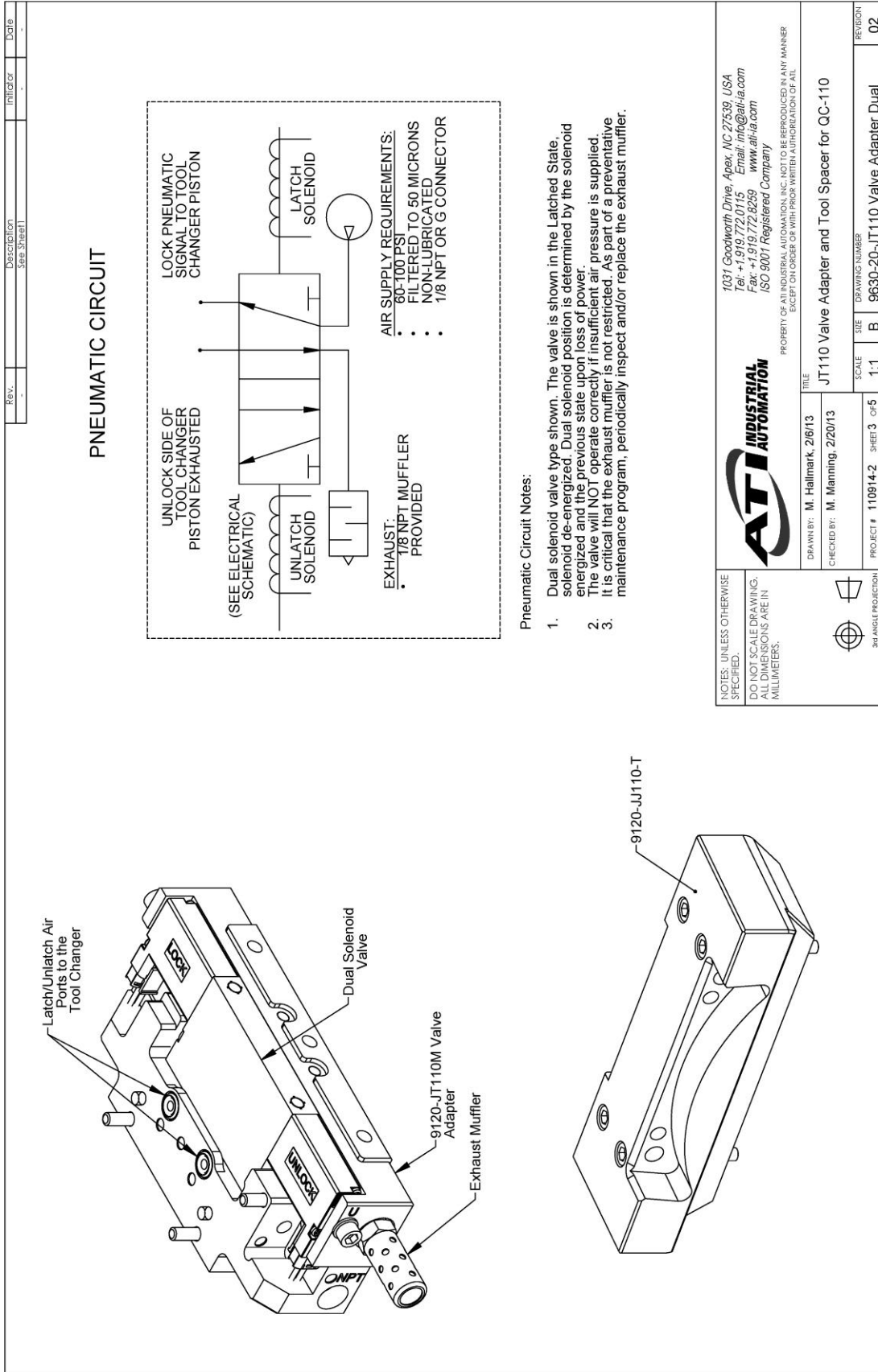
3rd ANGLE PROJECTION

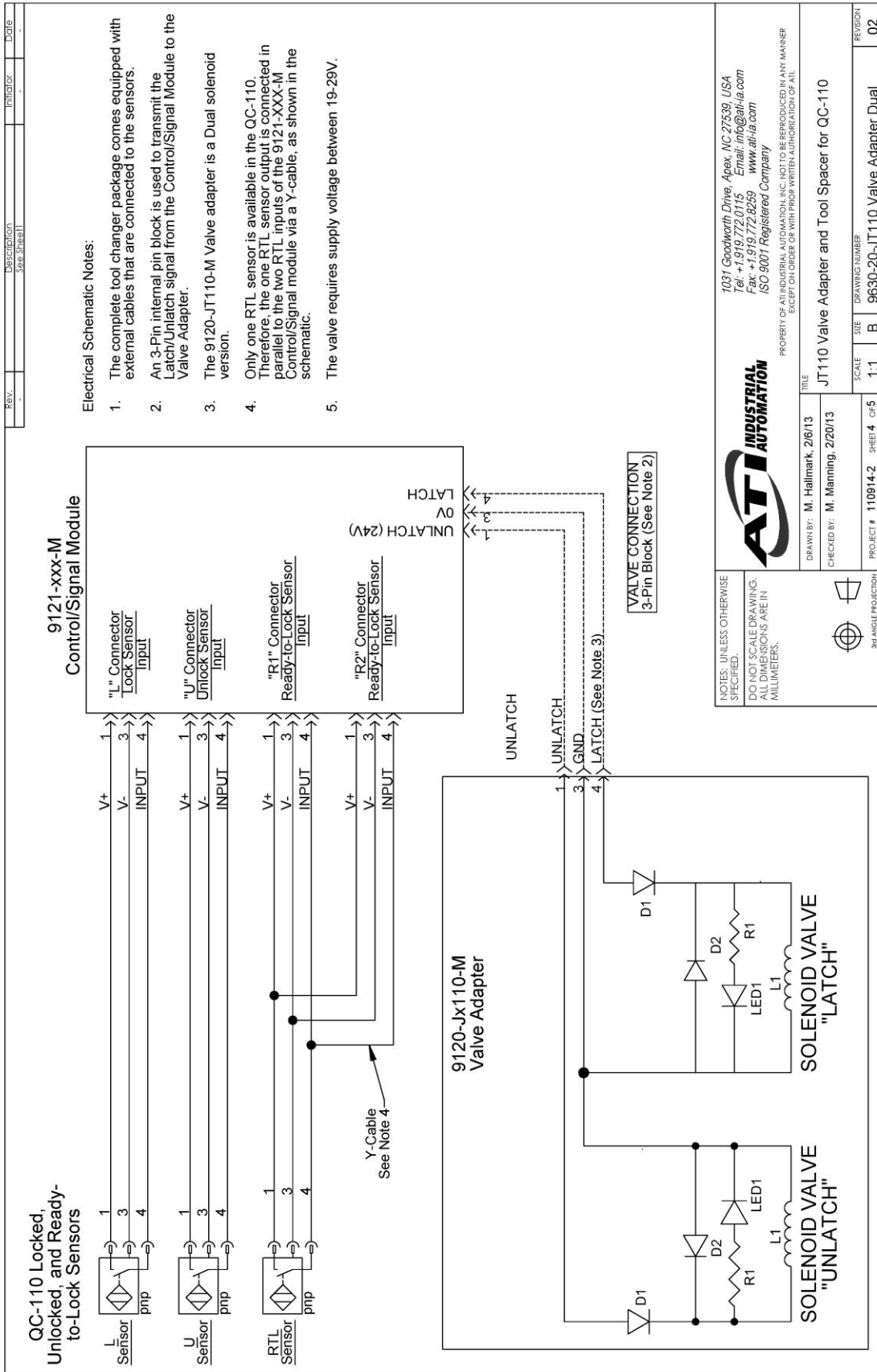
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8.2 JT110 - QC-110 Integrated Tool Changer with Double-Solenoid Valve







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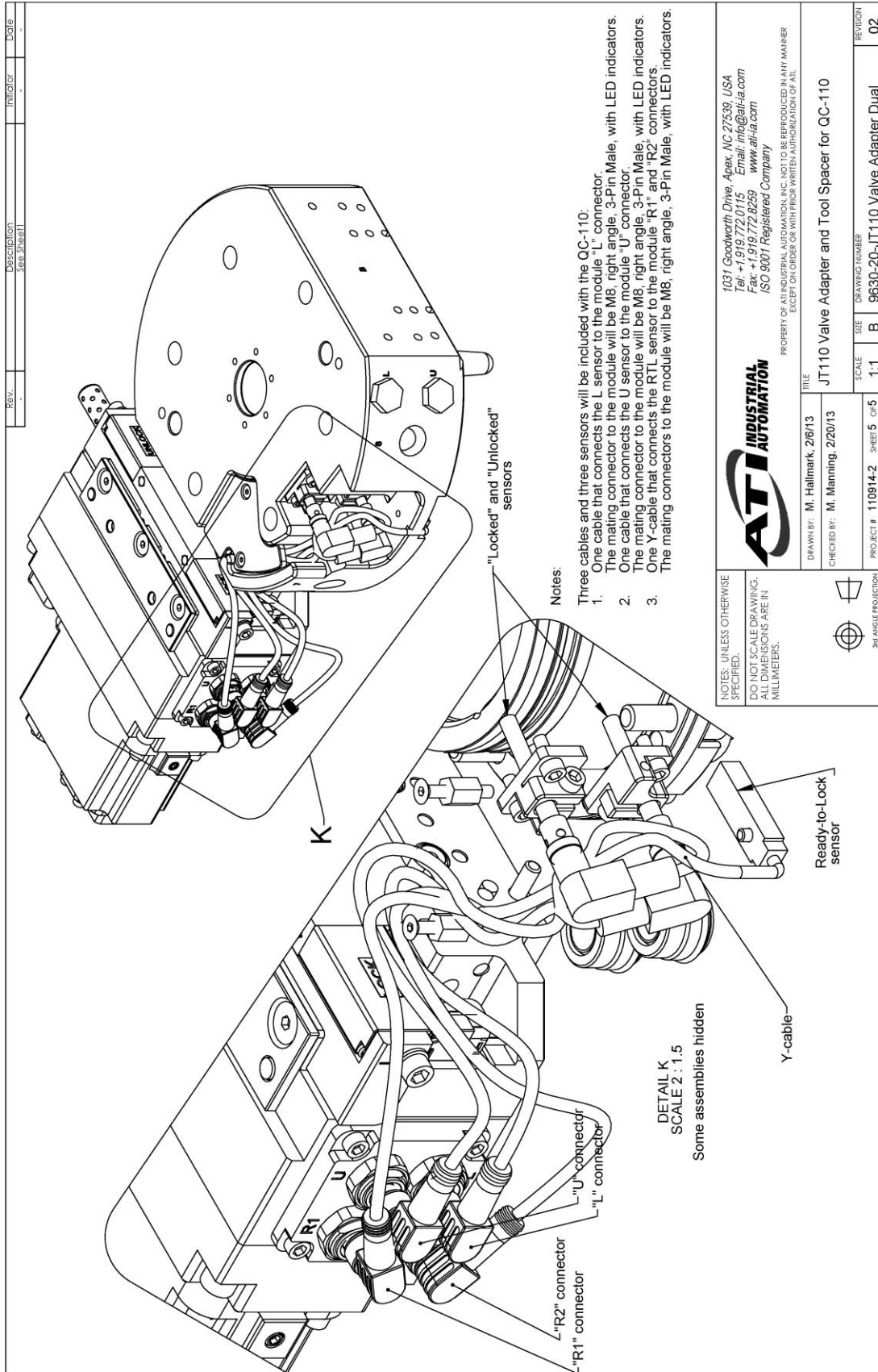
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 CHECKED BY: M. Manning, 2/20/13

TITLE: JT110 Valve Adapter and Tool Spacer for QC-110

SCALE: 1:1
 SHEET: 4 of 5
 PROJECT #: 110514-2
 DRAWING NUMBER: 9630-20-JT110 Valve Adapter Dual
 REVISION: 02

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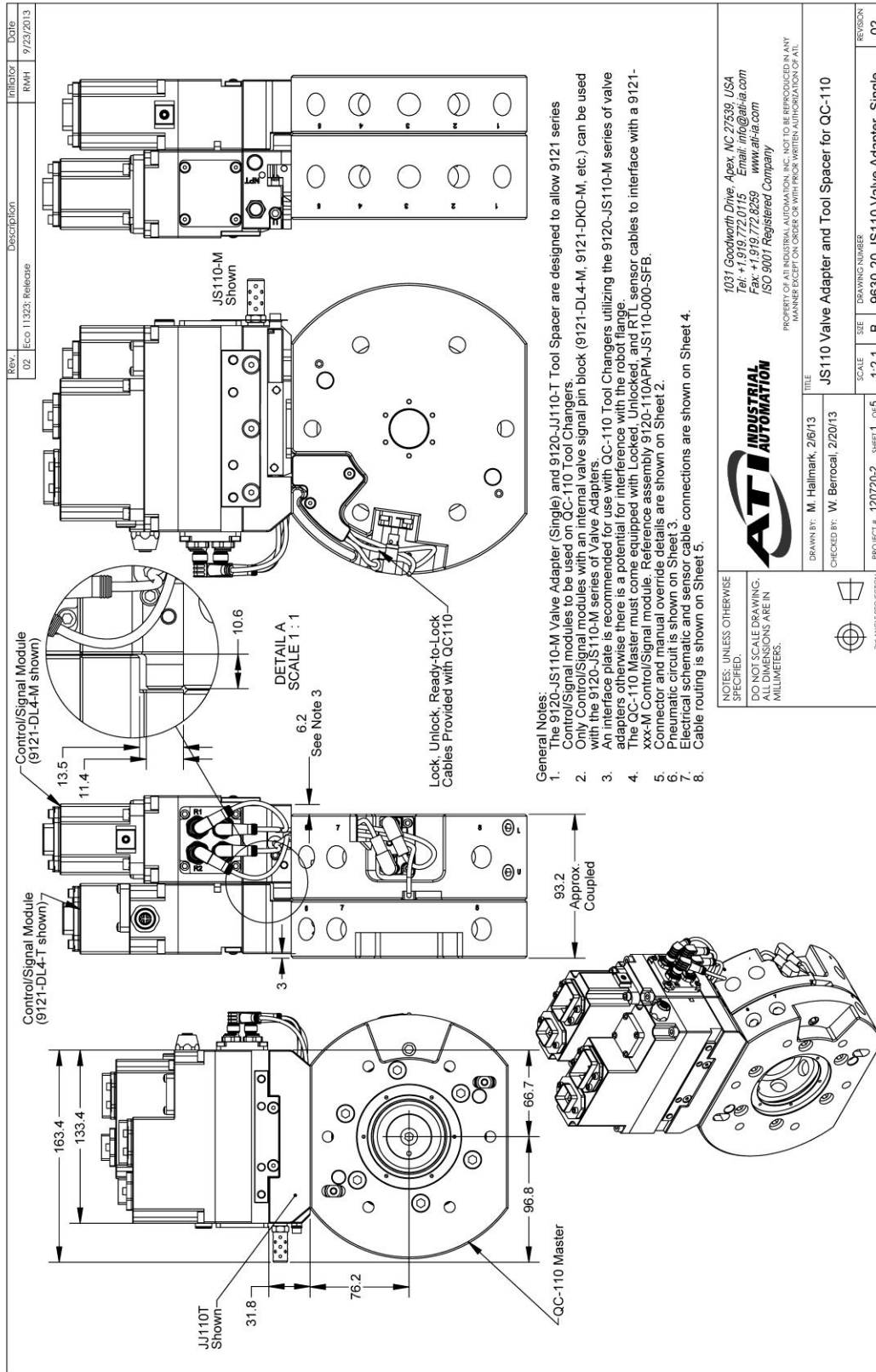
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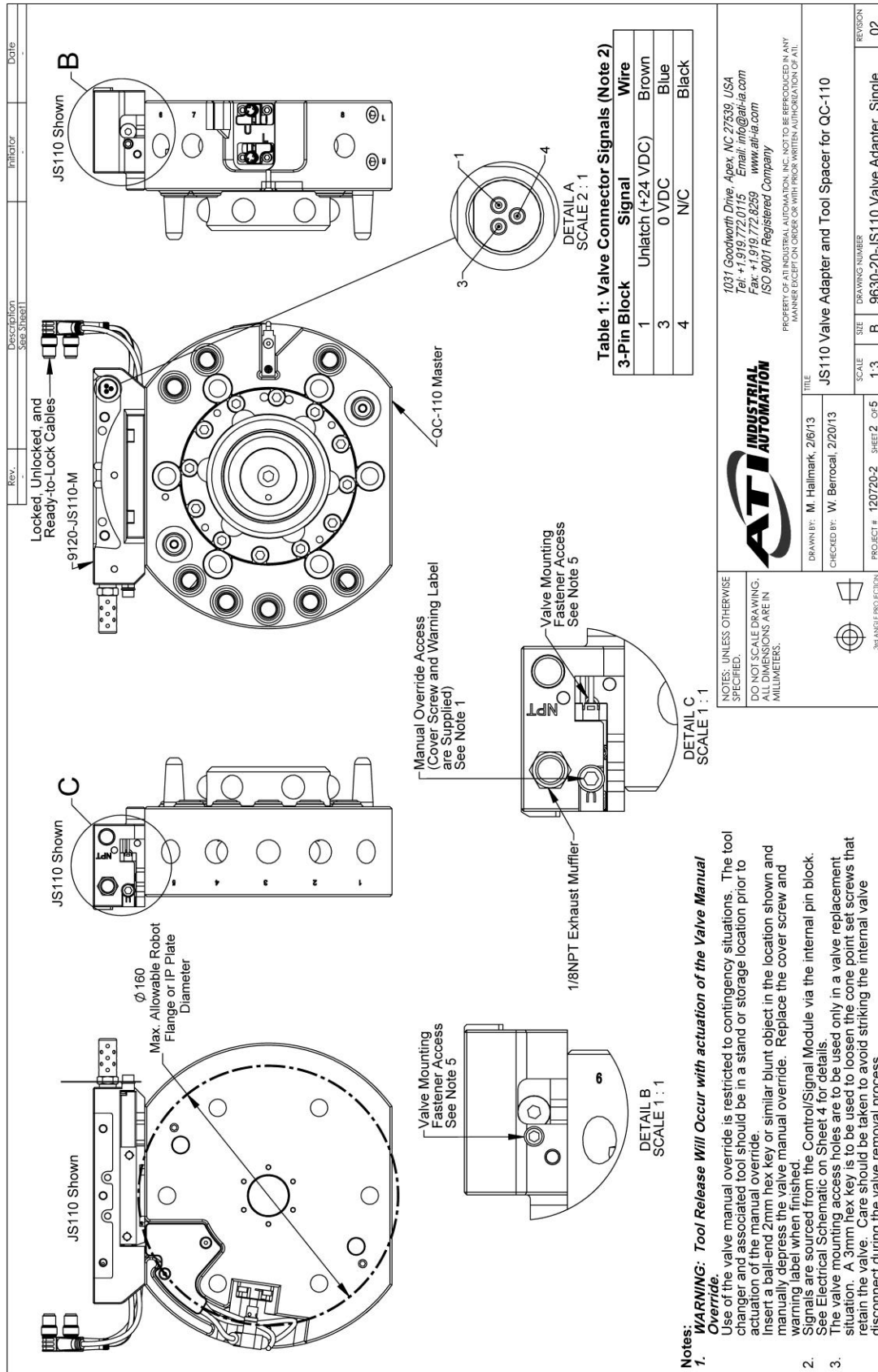
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 PROJECT #: 110914-2 SHEET 5 OF 5

3RD ANGLE PROJECTION

REVISION: 02

8.3 JS110 - QC-110 Valve Adapter, Ledge Mount Module Compatible, Master side, w/NPT Adapter (Single-Solenoid Valve)





- Notes:**
- WARNING: Tool Release Will Occur with actuation of the Valve Manual Override.** Use of the valve manual override is restricted to contingency situations. The tool changer and associated tool should be in a stand or storage location prior to actuation of the manual override. Insert a ball-end 2mm hex key or similar blunt object in the location shown and manually depress the valve manual override. Replace the cover screw and warning label when finished. Signals are sourced from the Control/Signal Module via the internal pin block. See Electrical Schematic on Sheet 4 for details.
 - The valve mounting access holes are to be used only in a valve replacement situation. A 3mm hex key is to be used to loosen the cone point set screws that retain the valve. Care should be taken to avoid striking the internal valve disconnect during the valve removal process.
 -

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

30° ANGLE PROJECTION

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 SCALE: 1:3
 SHEET 2 OF 5
 PROJECT #: 120720-2

SIZE: B
 DRAWING NUMBER: 9630-20-JS110 Valve Adapter, Single
 REVISION: 02

Rev.	Description See Sheet 1	Initiator	Date
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PNEUMATIC CIRCUIT

AIR SUPPLY REQUIREMENTS:

- 60-100 PSI
- FILTERED TO 50 MICRONS
- NON-LUBRICATED
- 1/8 NPT OR G CONNECTOR

EXHAUST:

- 1/8 NPT MUFFLER PROVIDED

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.

Pneumatic Circuit Notes:

1. Single solenoid valve shown. The valve is shown in the Latched State, solenoid de-energized, and spring returned for single solenoid.
2. The valve will NOT operate correctly if insufficient air pressure is supplied.
3. It is critical that the exhaust muffler is not restricted. As part of a preventative maintenance program, periodically inspect and/or replace the exhaust muffler.

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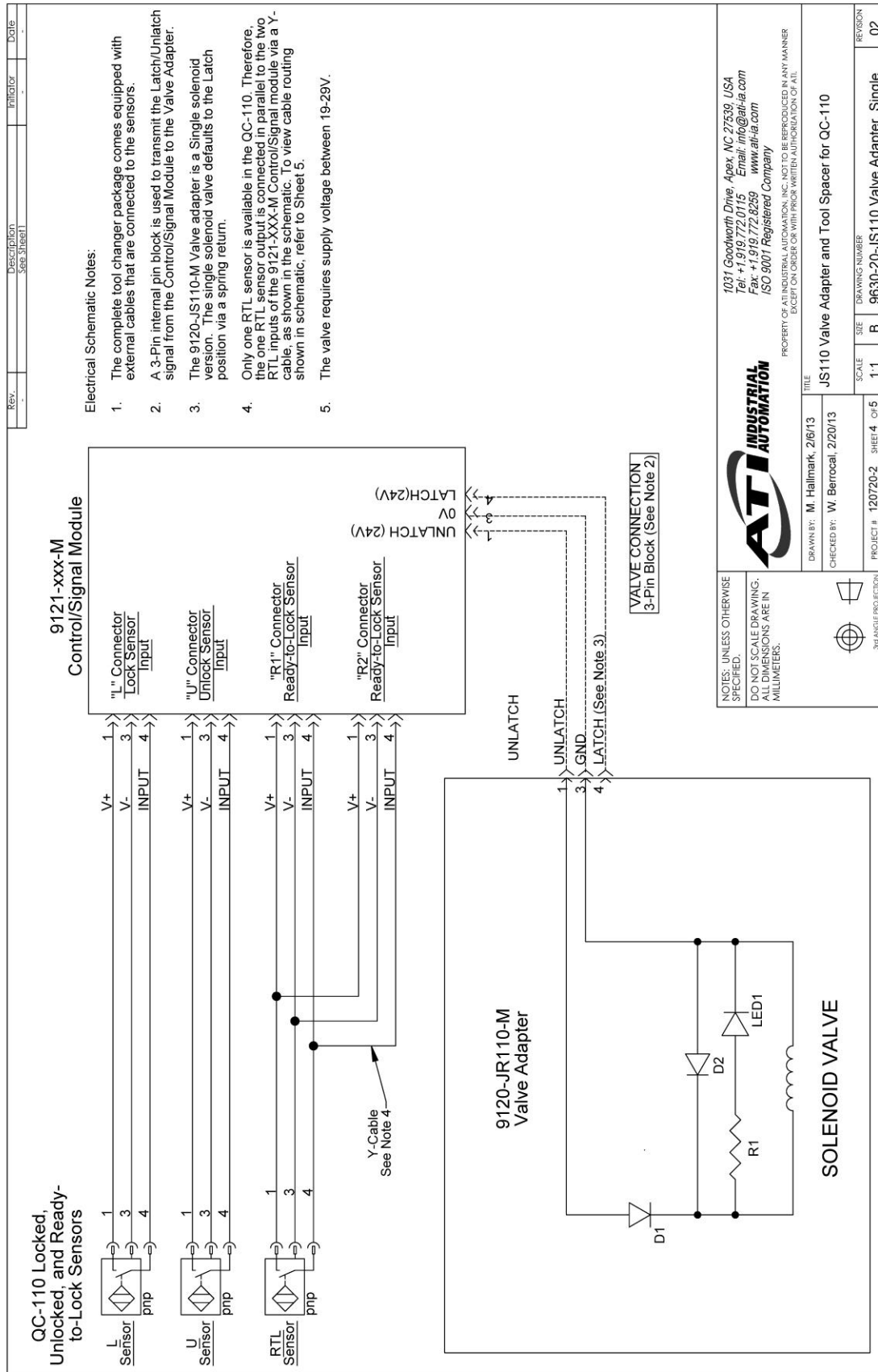
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 CHECKED BY: W. Berrocal, 2/20/13

TITLE: JS110 Valve Adapter and Tool Spacer for QC-110

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 PROJECT #: 120720-2 SHEET 3 OF 5
 REVISION: 02

Quick-Change Installation and Operation Manual
 Document #9620-20-c-jx110 air-valve adapters with valve signal pass thru-03



Rev.	Description See Sheet 1	Initiator	Date

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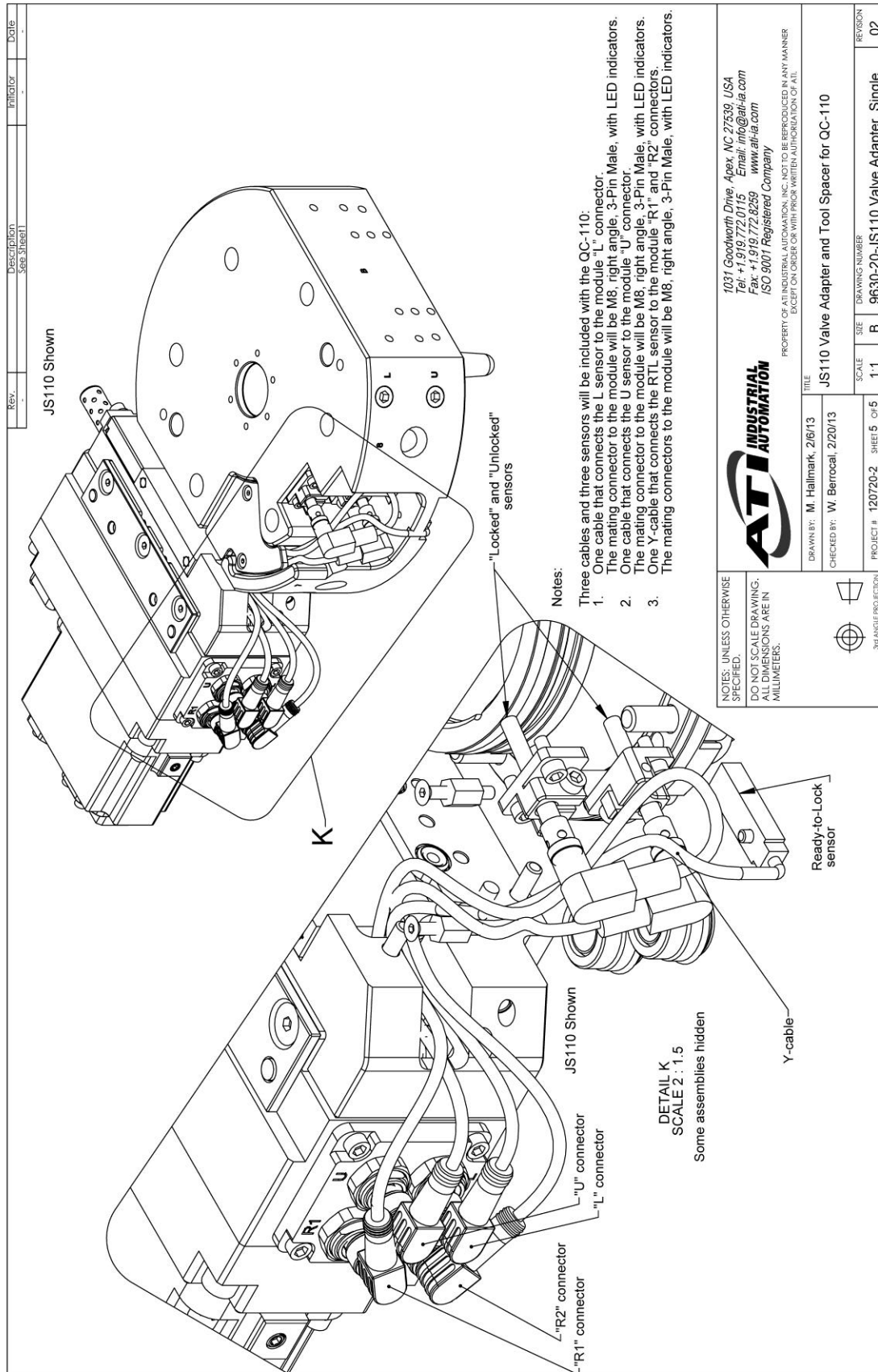
JS110 Valve Adapter and Tool Spacer for QC-110

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 CHECKED BY: W. Berrocal, 2/20/13

SCALE: 1:1
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 PROJECT #: 120720-2 SHEET 4 of 5

REVISION: 02

Quick-Change Installation and Operation Manual
 Document #9620-20-c-jx110 air-valve adapters with valve signal pass thru-03



8.4 JU110 - QC-110 Valve Adapter, Ledge Mount Module Compatible, Master side, w/BSPB Adapter (Double-Solenoid Valve)

Rev.	02	Date	9/23/2013
Initiator	BMH		
Description	Initial design.		
DIP	Release		

General Notes:

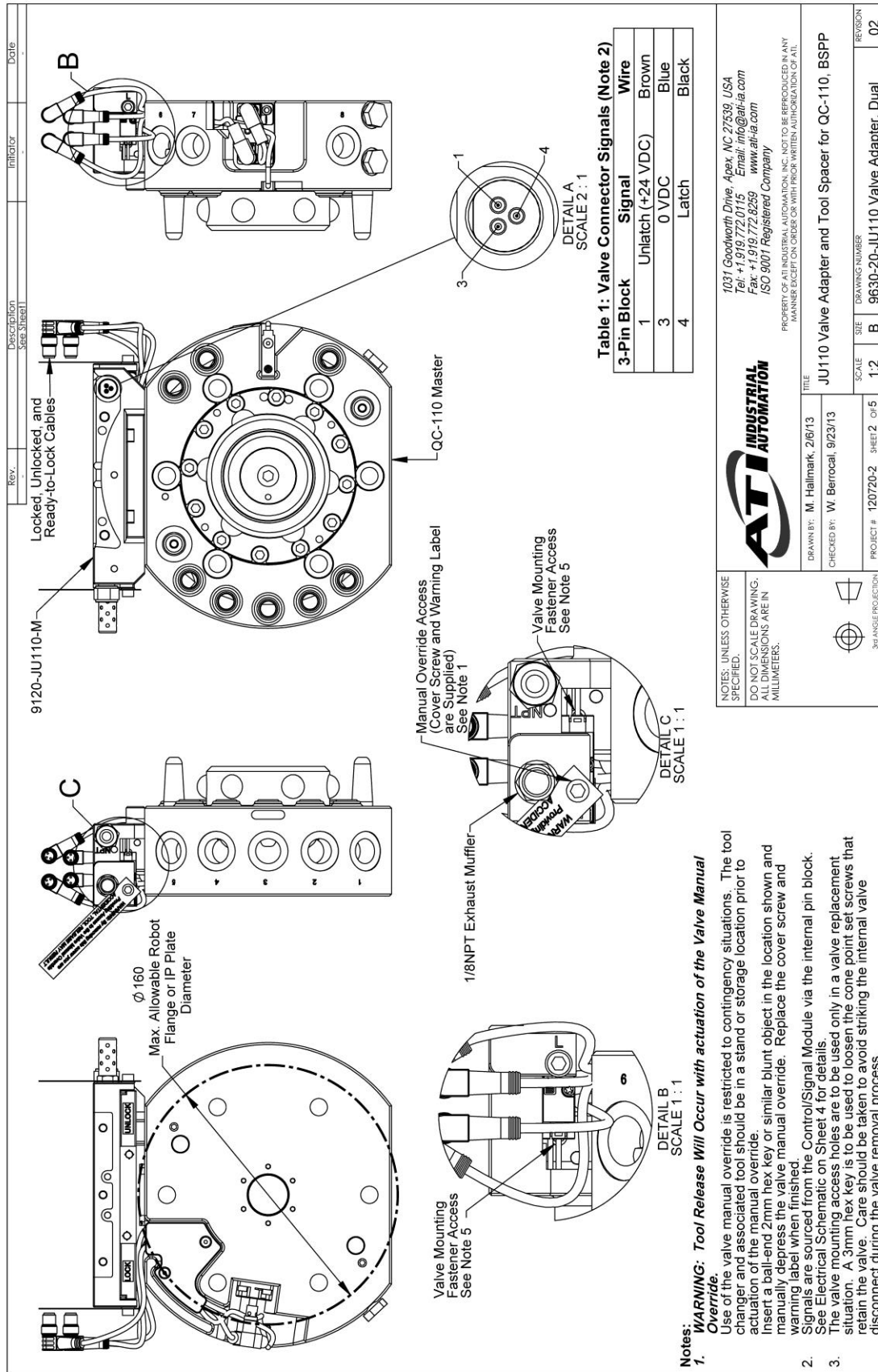
1. The 9120-JU110-M Valve Adapter and 9120-JU110-T Tool Spacers are designed to allow 9121 series Control/Signal modules to be used on QC-110 Tool Changers.
2. Only Control/Signal modules with an internal valve signal pin block (9121-DL4-M, 9121-DKD-M, etc.) can be used with the 9120-JU110-M series of Valve Adapters.
3. An interface plate is recommended for use with QC-110 Tool Changers utilizing the 9120-JU110-M series of valve adapters otherwise there is a potential for interference with the robot flange.
4. The QC-110 Master must come equipped with Locked, Unlocked, and RTL sensor cables to interface with a 9121-xxx-M Control/Signal module. Reference assembly 9120-110APM-JU110-000-SFB-E.
5. Connector and manual override details are shown on Sheet 2.
6. Pneumatic circuit is shown on Sheet 3.
7. Electrical schematic and sensor cable connections are shown on Sheet 4.
8. Cable routing is shown on Sheet 5.

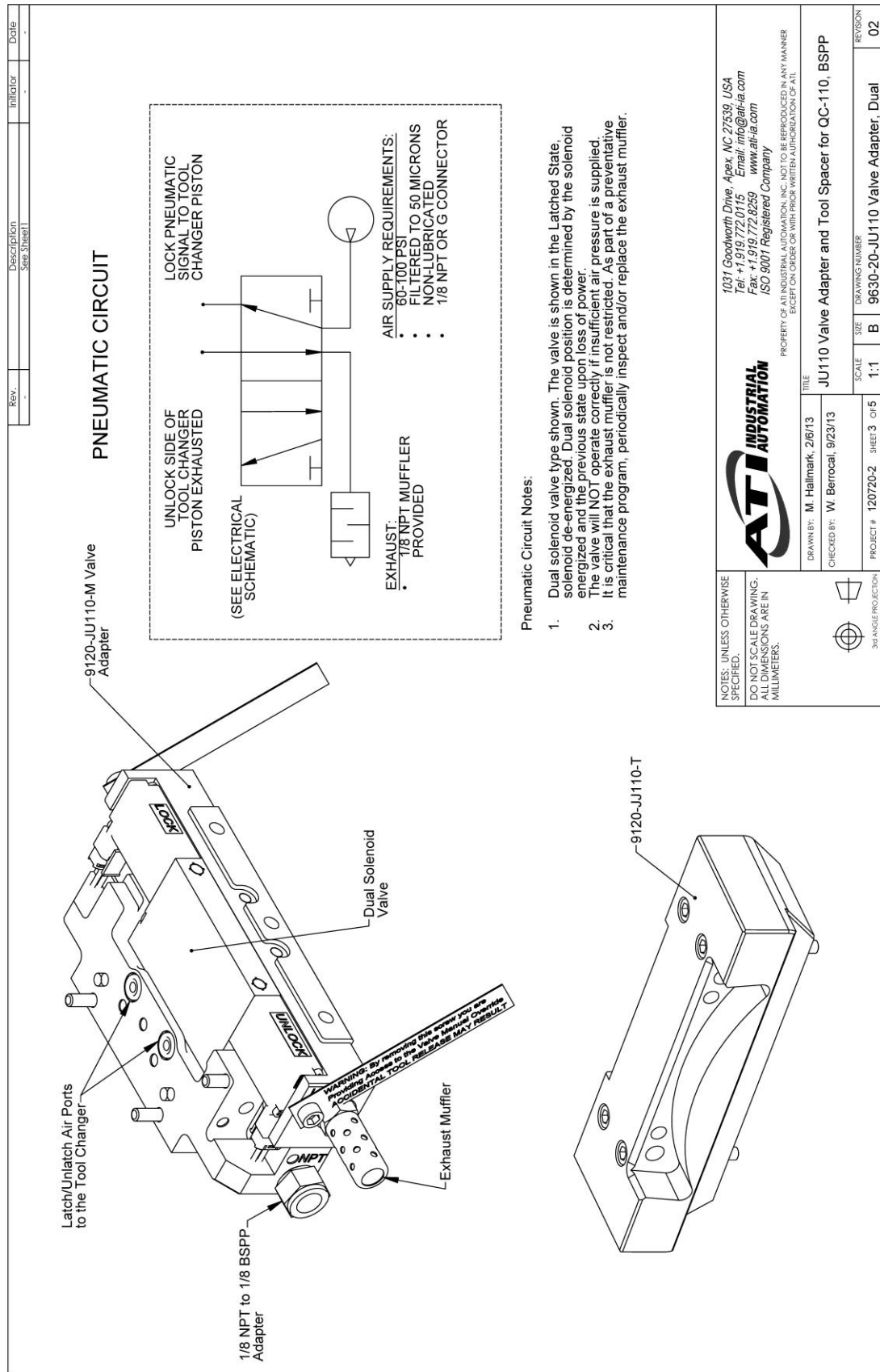
NOTES: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.

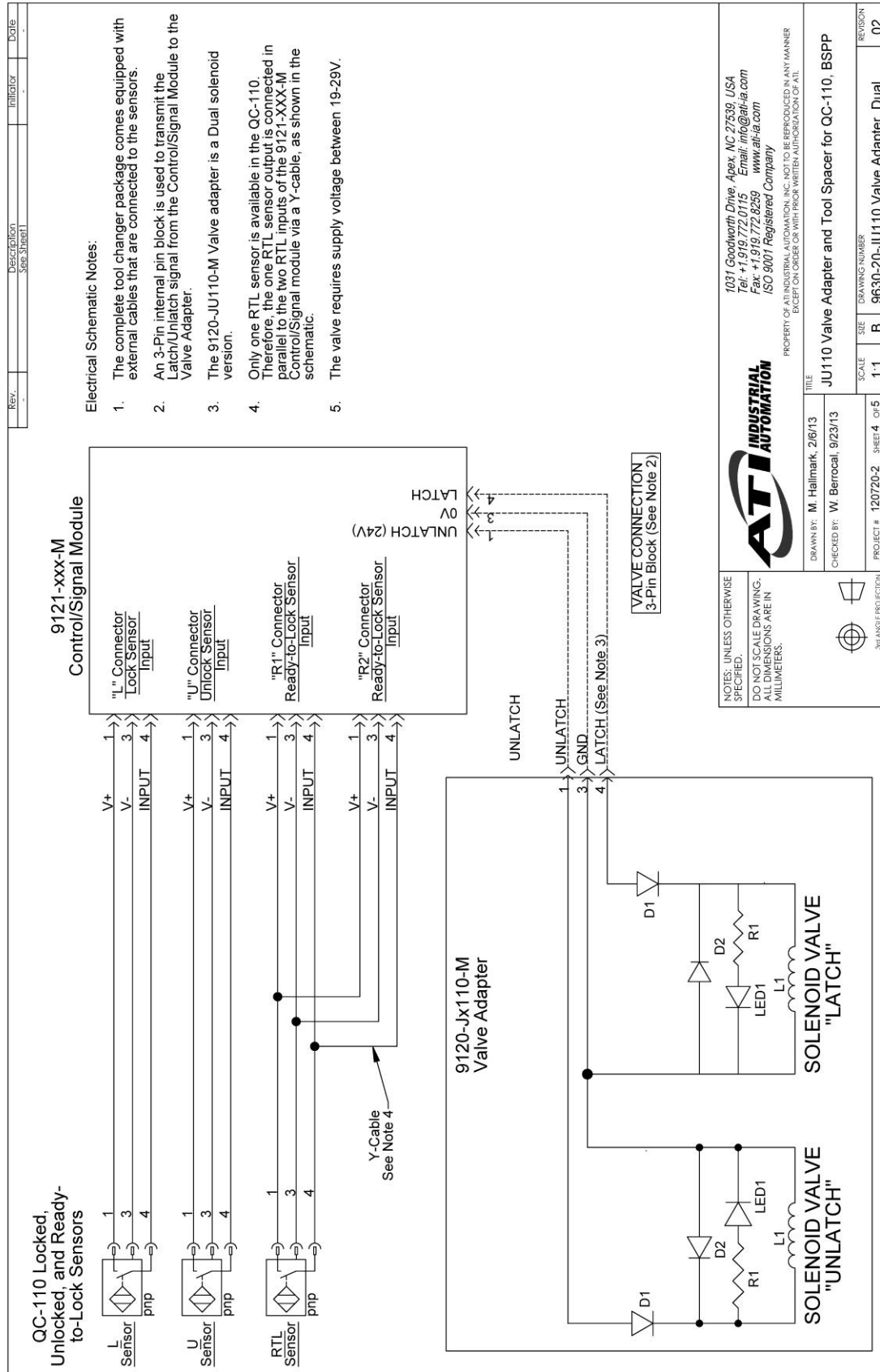
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DRAWN BY: M. Hallmark, 2/6/13	TITLE: JU110 Valve Adapter and Tool Spacer for QC-110, BSPP
CHECKED BY: W. Berrocal, 9/23/13	SCALE: 1:2
PROJECT #: 120720-2 SHEET 1 OF 5	DRAWING NUMBER: 9630-20-JU110 Valve Adapter, Dual
30° ANGLE PROJECTION	REVISION: 02







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