

Table of Contents

C. Control and Signal Modules	3
DB2—DeviceNet Module	3
1. Product Overview	3
1.1 DeviceNet Module	3
2. Installation	5
2.1 Installing	5
2.2 Removal	5
2.3 DeviceNet Configuration.....	6
2.4 Utility Schematic.....	6
3. Product Information.....	7
3.1 Master Node.....	7
3.1.1 Setting the DIP Switches	7
3.1.2 MAC ID.....	7
3.1.3 Baud Rate	8
3.1.4 Termination Resistor	8
3.1.5 Module Status LED.....	8
3.1.6 Network Status LED	9
3.2 Tool Node.....	9
3.2.1 Setting the DIP Switches	9
3.2.2 MAC ID.....	10
3.2.3 Baud Rate	10
3.2.4 Termination Resistor	10
3.2.5 Tool ID (Tool Node Only).....	10
3.2.6 Module Status LED.....	11
3.2.7 Network Status LED	11
3.2.8 Quick Connect.....	11
3.3 Software	11
4. Operation	13
5. Maintenance	15
5.1 Pin Block Inspection and cleaning.....	15
5.2 Seal Replacement.....	16
6. Troubleshooting	17
7. Recommended Spare Parts.....	17
8. Specifications	18
9. Drawings	19

Glossary of Terms

TERM	DEFINITION
Auxiliary Power Available	An input indicating the presence of Auxiliary Power Supply to the ATI Master module.
EOAT	End-Of-Arm-Tool (end effector).
Latch	The output supplied to the ATI Master DeviceNet node to couple the tool changer (only valid for double solenoid valve equipped units).
Lock	A proximity sensor input indicating that the coupling mechanism is in the Lock position.
RTL	A proximity sensor input that senses when the ATI Tool is close.
RTL Relay	A relay circuit present on the ATI Master module that is triggered by the RTL sensor and allows the tool changer to be uncoupled when there is no Tool present.
RTL V	A control reliable input provided for health status monitoring of the RTL Relay.
Solenoid Energized	An input indicating current draw from the valve and the solenoid coil.
TSI	The Tool Stand Interlock feature is a custom ATI safety solution and circuit designed to only allow tool changer release while in the stand or storage location.
TSI Relay	A relay circuit present on the ATI Tool module that is triggered by a tool stand limit switch in order to close the TSI circuit and allow tool changer release.
TSIV	A control reliable input supported for monitoring of a tool stand limit switch used with the TSI circuit.
TSRV	A control reliable input provided for health status monitoring of the TSI Relay.
Unlatch	The output supplied to the ATI Master DeviceNet node to uncouple the tool changer.
Unlock	A proximity sensor input indicating that the coupling mechanism is in the Unlock position.

C. Control and Signal Modules

DB2—DeviceNet Module

1. Product Overview

1.1 DeviceNet Module

The DeviceNet modules are required to provide a means for the customer to communicate with and control the tool changer. Refer to [Section 3—Product Information](#) of this manual for detailed DeviceNet programming information and operational capability.

A single or double solenoid valve is provided with the master valve adapter for Lock/Unlock control of the tool changer. The user is only required to provide a pneumatic supply source to the tool changer.

Power and signal connectors are provided for interfacing on the Master and Tool modules. When the tool changer is coupled, the Master and Tool modules pass signals using a spring-loaded pin block. A flexible boot surrounds the pin block to seal the connection from moisture and liquid while coupled.

The DB2 module is designed with special features to afford the user the opportunity to operate the tool changer in the safest manner possible. In addition to providing the standard Lock, Unlock, and Ready-to-Lock sensor inputs, the modules are outfitted with Tool Stand Interlock (TSI). The TSI feature consists primarily of a physical break in the unlatch solenoid valve circuit. The TSI circuit is designed to allow tool changer release ONLY when the tool is in the stand or storage location.

A momentary action double-pole, single-throw mechanical limit switch is recommended to be used in concert with TSI. The limit switch is integrated on the EOAT (see [Figure 1.1](#) and [Figure 1.2](#)). An interface to the TSI circuit is made available to the customer via a 4-Pin Eurofast (12mm) connector on the Tool module. An off the shelf cord set can be utilized to connect this interface to the limit switch assembly.

In order to allow the tool changer to uncouple when a Tool is not present, a relay circuit (RTL Relay) in parallel with the TSI circuit is utilized. The RTL Relay circuit is located in the Master module and is triggered by the RTL sensor. If the RTL sensor is low, indicating no Tool presence, then the RTL Relay circuit is closed allowing the unlatch solenoid valve circuit to be completed and the tool changer to be uncoupled. If the RTL sensor is high, indicating Tool presence, then the RTL Relay circuit is open and the TSI circuit is passed through to the Tool side.

Once on the Tool side, the TSI circuit is closed by another relay circuit (TSI Relay). The TSI Relay is located in the Tool module and is triggered by closure of the limit switch. When the EOAT is in the stand and the limit switch is closed, the TSI Relay is closed, thus making the TSI circuit through the tool side. When the EOAT is out of the stand the TSI Relay is open and the TSI circuit remains open regardless of any unintentional Unlatch command.

Control reliability monitoring of the Relays, limit switch and TSI circuit is achieved using the RTL, V, TSRV and TSIV inputs, respectively. Refer to [Table 4.1](#) for suggested fault monitoring conditions.

The DB2 Master module firmware requires that the TSIV input be true in order for the Unlatch output command to be executed when a tool is present (i.e. RTL is high). On the DB2 Tool module, the TSIV input is made available to the customer along with the TSI circuit via the 4-Pin TSI connector. Refer to the TSI connector details in [Section 9—Drawings](#) of this manual.

The Tool module employs a series of thumbwheel switches for setting of the Tool ID input. This allows the customer to distinguish between the different Tools that are being used in a robotic cell or on a production line. See [Section 3.3—Software](#) for DeviceNet bitmap and I/O information.

Figure 1.1—DB2 DeviceNet Module

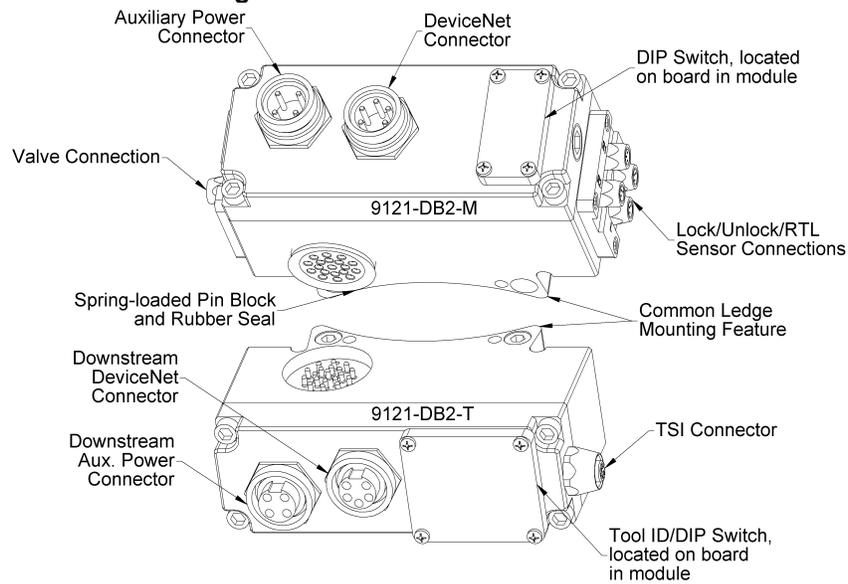
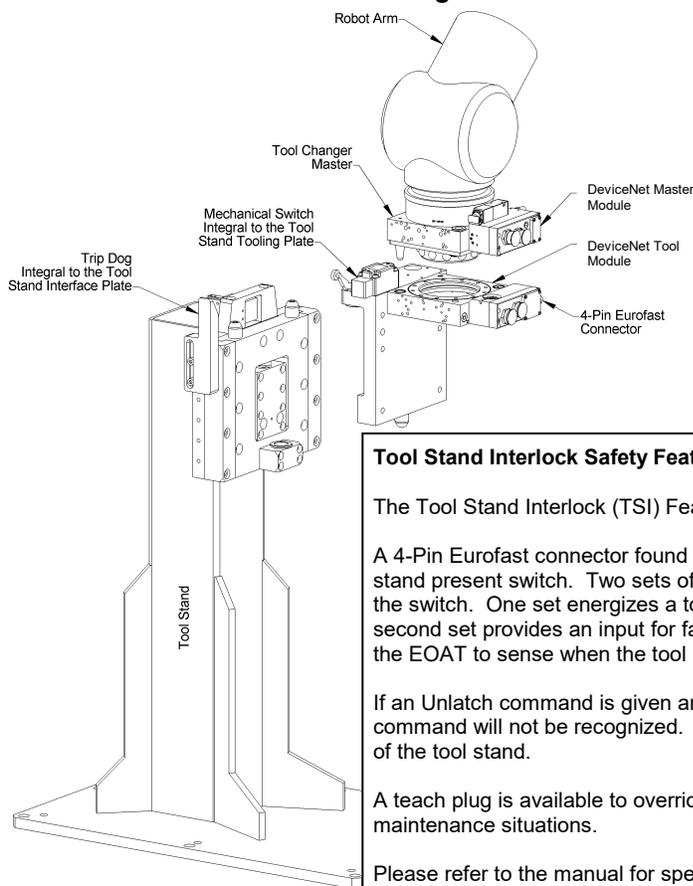


Figure 1.2—Tool Stand Interlock



Tool Stand Interlock Safety Feature:

The Tool Stand Interlock (TSI) Feature is provided with this tool changer.

A 4-Pin Eurofast connector found on the Tool module is designed for use with a tool stand present switch. Two sets of NO, double-pole single-throw, contacts are required on the switch. One set energizes a tool-side relay to make the Valve circuit, while the second set provides an input for fault monitoring. This switch should be integrated onto the EOAT to sense when the tool is in the stand.

If an Unlatch command is given and the tool is not docked properly, the Unlatch command will not be recognized. This prevents the accidental release of the tool outside of the tool stand.

A teach plug is available to override the TSI safety feature during initial setup and maintenance situations.

Please refer to the manual for specific details regarding the TSI feature.

NOTICE: This tool changer is equipped with Tool Stand Interlock (TSI). Special procedures are required to uncouple the tool changer. Refer to [Section 4—Operation](#).

2. Installation

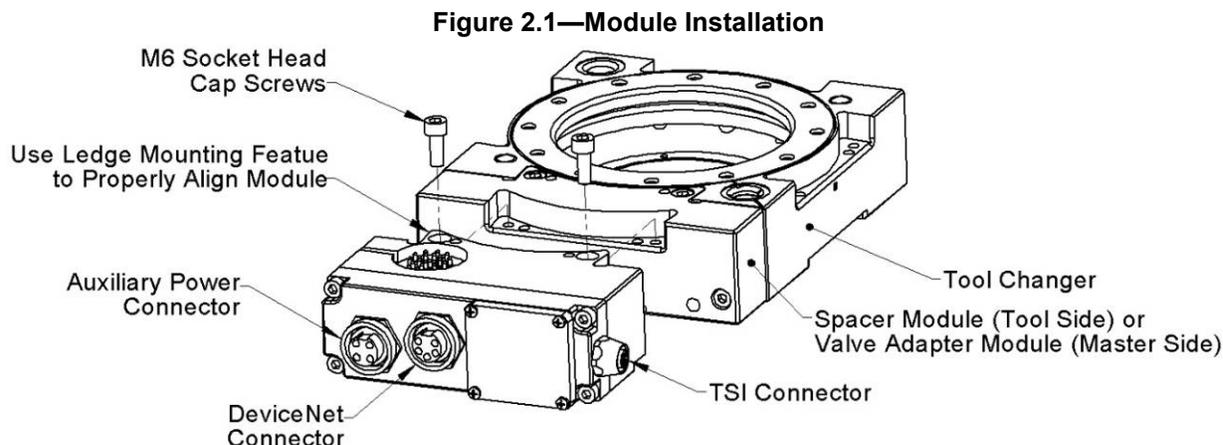
The control/signal modules are typically installed by ATI prior to shipment. The steps below outline the field installation or removal as required.



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 modules.

2.1 Installing

1. It may be necessary to clean the mounting surface on the Tool Changer 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 Tool Changer body. Align the module with the Tool Changer using the dowels in the bottom of the ledge feature. Refer to [Figure 2.1](#).
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 Tool Changer and tighten to 40–70 in-lbs.
4. Power, signal, and auxiliary cables can be connected to the module after attaching the module to the Spacer or Valve Adapter Modules. Ensure that the connectors are cleaned prior to being secured as appropriate.



2.2 Removal

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 2.1](#).



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 DeviceNet Configuration

Various parameters for the DeviceNet modules need to be configured prior to operating the tool changer. Please refer to *Section 3—Product Information* of this manual for detailed information on installation and operation of the DeviceNet modules.

2.4 Utility Schematic

Refer to *Section 9—Drawings* of this manual for customer interface and wiring details for the DB2 modules.



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 some critical electrical and/or pneumatic lines not to function properly and may result in injury to personnel or damage to equipment. Follow the robot manufacturer's guidelines and carefully route hoses and cables to avoid damage.

3. Product Information

The DeviceNet modules enable the customer to control and communicate with the tool changer through a network using standard DeviceNet protocol. DeviceNet nodes are established on the Master and Tool side modules. The modules employ standard connectors, 5-pin Mini for DeviceNet communications and power and 4-pin Mini for Auxiliary power. Please refer to drawings in Section 8 for specific module wiring and connector interface information.

Prior to use of the tool changer and the DeviceNet modules, various hardware settings must be configured. Communicating with the DeviceNet Modules requires knowledge of DeviceNet standards and operation.

3.1 Master Node

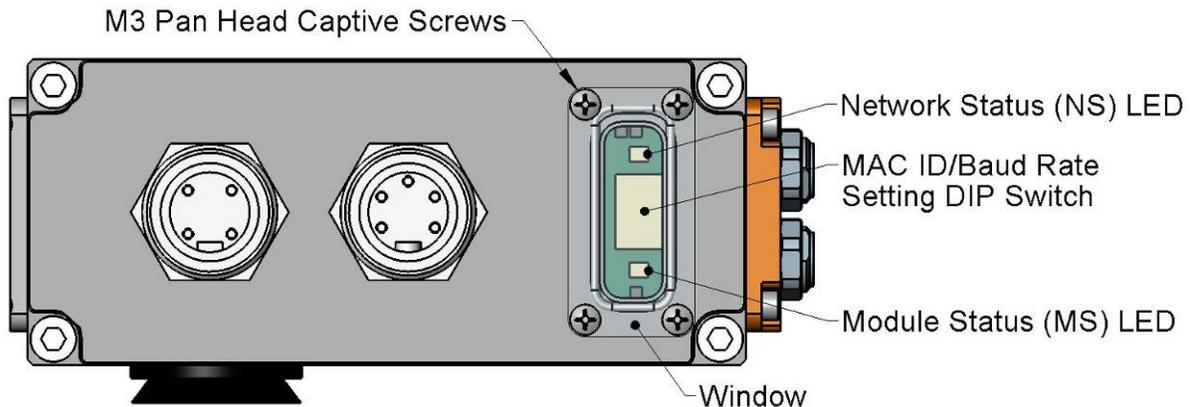
The Master Node operates as a Group 2-Only Server on the DeviceNet network. The Master Node supports Explicit Messages, Polled, Strobe and Change of State/Cyclic of the predefined Master/Slave Connection set. The Master Node supports Quick Connect operation as defined by ODVA (refer to the EDS file for specific information). The Master Node does not support the Unconnected Message Manager (UCMM). MAC ID, Baud Rate and Termination Resistor settings for the Master Node are configured through a DIP switch. (2) LED's provide network and module status.

3.1.1 Setting the DIP Switches

1. Loosen the four M3 Pan head Captive Screws and remove the window.
2. Set the DIP switches as needed, refer to [Figure 3.2](#) for details.
3. Re-install the window and tighten the M3 Pan Head Captive Screws.

NOTICE: When replacing the window, ensure that the seal is positioned correctly to prevent fluid leakage into the module and damaging the electronics.

Figure 3.1— Master Module DIP Switches and LED's



3.1.2 MAC ID

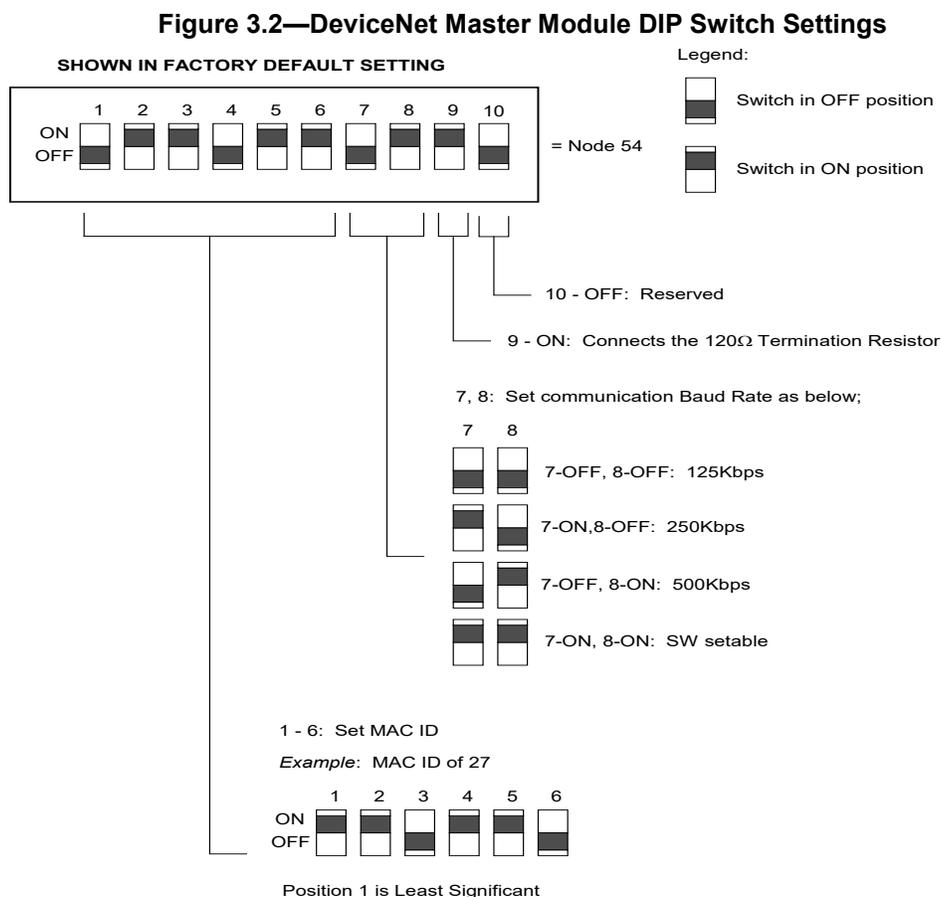
The MAC ID is set by either hardware or software configuration. The range is 0-63. In order for the MAC ID to be set by software, all DIP switch positions must be on. If the MAC ID is set by software, the Baud Rate must also be set by software. Refer to [Figure 3.2](#) for detailed information on DIP switch setup.

3.1.3 Baud Rate

Baud Rate is set by either hardware or software configuration. The possible settings are 125, 250 or 500Kbps. In order for the Baud Rate to be set by software, DIP switch positions 7 and 8 must be on. See [Figure 3.2](#) for DIP switch setup.

3.1.4 Termination Resistor

When DIP switch position 9 is on, a 120Ω resistor is placed across the CAN High and Low lines and termination to the CAN network is provided. If switch 9 is off, termination must be supplied by another device or through a termination cap at the end of the network cable.



3.1.5 Module Status LED

The module status LED is identified on the device board as “MS”. It provides device status for power and proper operation. The following table outlines this LED’s functions:

Table 3.1—Module Status LED		
Status	LED Function	Note
No Power	Off	No power applied. Check voltage is 24 VDC.
Operational	Green	Normal operation.
Standby	Flashing Green	Device needs commissioning/standby state. Configuration missing, incomplete or incorrect.
Recoverable Fault	Flashing Red	Recoverable fault.
Unrecoverable Fault	Red	Unrecoverable fault.
Self Tests	Flashing Green-Red	Device is performing self tests.

3.1.6 Network Status LED

The network status LED is identified on the device board as “NS”. It provides network status for power and communication. The following table outlines this LED’s functions:

Table 3.2—Network Status LED		
Status	LED	Note
No Power/ Off Line	Off	Device not on line. Check Baud Rate. Device has not completed the duplicate MAC ID test. Module Status is On. Check for termination resistor. Device not powered. See Module Status.
On Line, Not Connected.	Flashing Green	Device is on line but connection is not established. Device not allocated to a master.
OK On line, Connected	Green	Device is on line with connections established. Device is allocated to a master.
Connection Timeout	Flashing Red	One or more I/Os are timed out.
Critical Link Failure	Red	Failed communication. Error detected and incapable of communication. Duplicate MAC ID or Bus off.
Communication Faulted and Received and Identify Communication Fault Request – Long Protocol Message	Flashing Green-Red	A specific Communication Faulted Device. Device has received and accepted an Identify Communication Faulted Request – Long Protocol message.

3.2 Tool Node

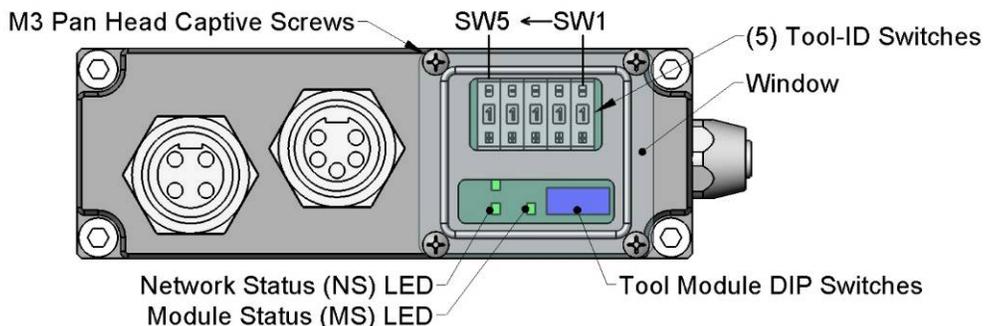
The Tool Node operates as a Group 2-Only Server on the DeviceNet network. The Tool Node supports Explicit Messages, Polled and Strobe of the predefined Master/Slave Connection set. The Tool Node supports Quick Connect operation as defined by ODVA (refer to the EDS file for specific information). The Tool Node does not support the Unconnected Message Manager (UCMM). The MAC ID and Baud Rate settings for the Tool Node are configured through a DIP switch. Tool ID is set using (5) thumbwheel switches. (2) LED’s provide network and module status.

3.2.1 Setting the DIP Switches

1. Loosen the four M3 Pan head Captive Screws and remove the window.
2. Set the DIP switches as needed, refer to *Figure 3.4* for details.
3. Re-install the window and tighten the M3 Pan Head Captive Screws.

NOTICE: When replacing the window, ensure that the seal is positioned correctly to prevent fluid leakage into the module and damaging the electronics.

Figure 3.3—Tool Module Tool-ID Switches, DIP Switches and LED’s



3.2.2 MAC ID

The MAC ID is set by either hardware or software configuration. The range is 0-63. In order for the MAC ID to be set by software, all DIP switch positions must be on. If the MAC ID is set by software, the Baud Rate must also be set by software. Refer to [Figure 3.4](#) for detailed information on DIP switch setup.

3.2.3 Baud Rate

Baud Rate is set by either hardware or software configuration. The possible settings are 125, 250 or 500Kbps. In order for the Baud Rate to be set by software, DIP switch positions 7 and 8 must be on. See [Figure 3.4](#) for DIP switch setup.

3.2.4 Termination Resistor

Internal termination resistance is not supported in the Tool module. Termination must be provided through the Master module or externally as required for proper operation of the network.

Figure 3.4—DeviceNet Tool Module DIP Switch Settings



3.2.5 Tool ID (Tool Node Only)

The Tool ID for a particular tool is established from the setup of (5) thumbwheel switches. The Tool module is available with switches configured to provide 5 independent (0-9) readings.

3.2.5.1 Setting the Tool-ID Switches

1. Loosen the four M3 Pan head Captive Screws and remove the window.
2. Use a non-conductive tool (e.g., plastic stylus) to press on the Tool-ID pushbuttons to increase (+) or decrease (-) the digit value from 1 to 9. Set the Tool-ID to the desired unique five digit number from 11111 to 99999 for each tool. Refer to *Figure 3.3*.
3. Re-install the window and tighten the M3 Pan Head Captive Screws.

NOTICE: When replacing the window, ensure that the seal is positioned correctly to prevent fluid leakage into the module and damaging the electronics.

3.2.6 Module Status LED

The module status LED is identified on the device board as “MS”. It provides device status for power and proper operation. Refer to *Table 3.1* for the module status LED’s functions.

3.2.7 Network Status LED

The network status LED is identified on the device board as “NS”. It provides network status for power and communication. Refer to *Table 3.2* for the network status LED’s functions.

3.2.8 Quick Connect

The Quick-Connect feature can be enabled in the ATI Tool Module. With the Quick-Connect feature enabled, the ATI tool changer module can reconnect to the DeviceNet network within 1 sec once power is applied to the pin block during tool change.

Modules with a "Quick Connect Enabled" sticker have this attribute already enabled. Modules without the sticker require the user to enable the feature using the robot teach pendant and/or a laptop. The Tool Module may have the Quick Connect option enabled or disabled depending on when the module was built. Contact ATI if you need assistance enabling this feature.

If you install a new module into an existing system, check to see if Quick-Connect is enabled in the old module before replacing. If you see communication faults or delays after module replacement, check to see if the quick-connect feature is enabled in the new module or if the new module has the sticker indicating quick-connect was already enabled. Tool Modules with Quick Connect enabled will not check for duplicate MAC addresses. If the DeviceNet network includes duplicate MAC addresses, this will cause communication faults. See *Section 6—Troubleshooting* for fault causes and correction.

3.3 Software

Working EDS files for the Master and Tool nodes are available from our website (www.ati-ia.com/download/edsfiles) or by e-mail, reference the part numbers given below:

DB2-M Node EDS file9030-20-1009

DB2-T Node EDS file9030-20-1010

I/O bitmaps for the DeviceNet nodes are provided in *Table 3.3*. The default settings are Node 54 for the Master module and Node 55 for the Tool module.

Bit #	Name	Description/Function
0	Lock	Tool Changer Lock Prox I/P
1	Unlock	Tool Changer Unlock Prox I/P
2	Solenoid Energized	Latch/Unlatch Solenoid Energized I/P
3	Auxiliary Power Available	Auxiliary Power Present I/P
4	RTL	Ready-to-Lock Prox I/P
5	TSIV	TSI Switch Verify I/P
6	RTLTV	RTL Relay Verify I/P
7	TSRV	TSI Relay Verify I/P

Bit #	Name	Description/Function
0	Latch	ToolChanger Valve Latch O/P
1	Unlatch	ToolChanger Valve Unlatch O/P
2		N/A
3		N/A
4		N/A
5		N/A
6		N/A
7		N/A

* Latch O/P only applicable for Double Solenoid Valve Adapter Versions

Bit #	Name	Description/Function	
0	Low Bit	Tool ID Byte 1	
1			N/A
2			N/A
3			N/A
4			N/A
5			SW1 Bit 1
6			SW1 Bit 2
7			SW1 Bit 4
8	High Bit	Tool ID Byte 2	
9			SW1 Bit 8
10			SW2 Bit 1
11			SW2 Bit 2
12			SW2 Bit 4
13			SW2 Bit 8
14			SW3 Bit 1
15			SW3 Bit 2
16	Low Bit	Tool ID Byte 3	
17			SW3 Bit 4
18			SW3 Bit 8
19			SW4 Bit 1
20			SW4 Bit 2
21			SW4 Bit 4
22			SW4 Bit 8
23			SW5 Bit 1
	High Bit	Tool ID Byte 3	
			SW5 Bit 2
			SW5 Bit 4
			SW5 Bit 8

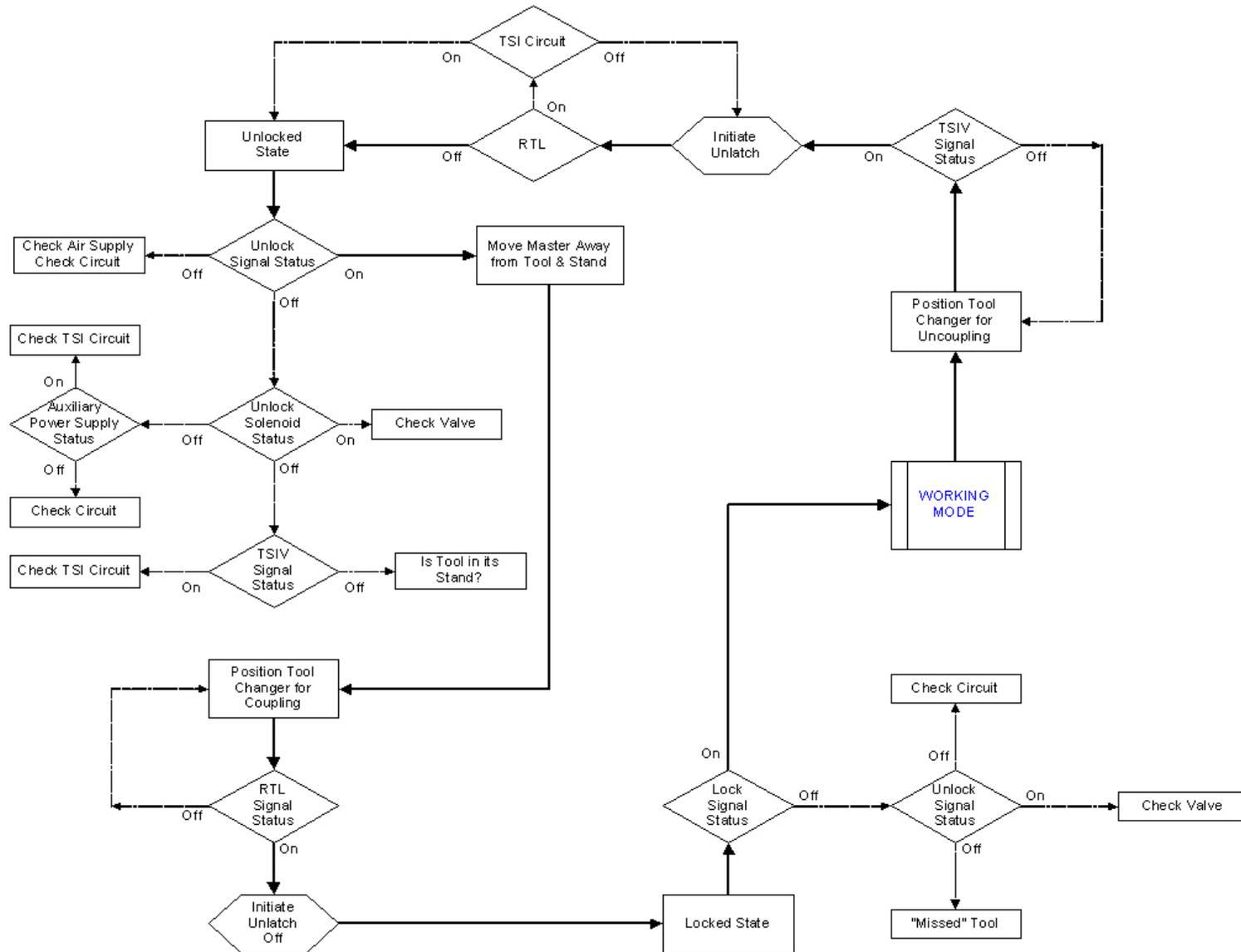
4. Operation

Please refer to the flow chart in Figure 3.4 for a logical description of the DeviceNet commands, coupling procedure and diagnostic checks.

Table 4.1 is provided below with suggested fault monitoring conditions.

Table 4.1—Fault Monitoring				
Sensor/Input1	State1	Sensor/Input2	State2	Comment
RTL	0	Tool Module*	Present*	**RTL Not Operating Properly.
RTL	0	RTL V	1	**RTL Relay or RTL Not Operating Properly.
RTL	1	RTL V	0	RTL Relay or RTL Not Operating Properly.
TSIV	0	TSRV	1	**TSI Relay or Switch Not Operating Properly.
TSIV	1	TSRV	0	TSI Relay or Switch Not Operating Properly.
TSIV	1	Clear of Stand	Yes	**Switch Failed Closed or Tied Off?
TSRV	1	Clear of Stand	Yes	TSI Relay Failed Closed?
* Slave Module Present as evidenced by Tool Presence Input or ability to read Tool ID				
** Dangerous situation where an unintentional Unlatch command could result in Tool release.				

Figure 4.1—DeviceNet Logical Operation and Diagnostic (DB2-M w/ Single Solenoid Valve Adapter)



5. Maintenance

The DeviceNet modules are designed to provide a long life with little maintenance required. The modules are not designed to be field serviced as all point-to-point wiring connections are soldered. Component replacement is limited to the V-Ring seal on the Master.



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.

If the Tool Changer is being used in dirty environments (e.g., welding or deburring applications), care should be taken to limit the exposure of the Tool Changer. Idle Tool assemblies should be covered to prevent debris from settling on the mating surface. Also, the Master assembly should be exposed for only a short period of time during Tool change and down time.

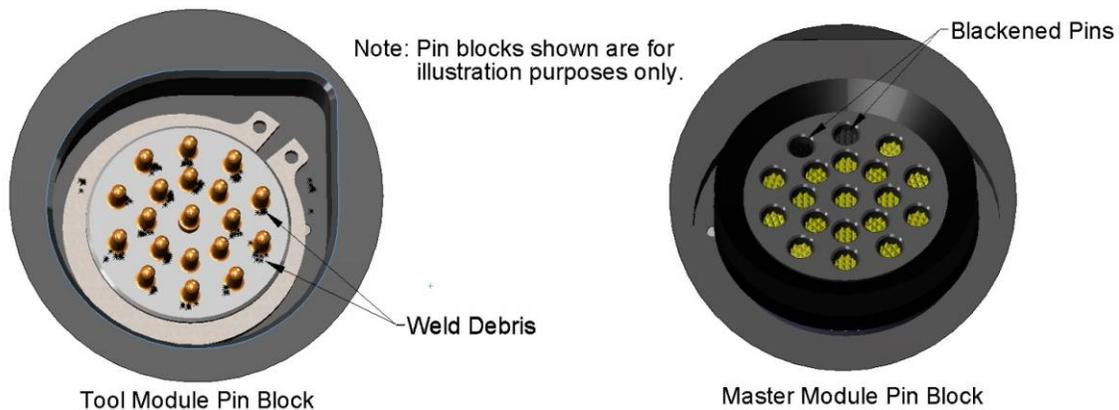
Under normal conditions, no special maintenance is necessary, however it is recommended that periodic inspections be performed to assure long-lasting performance and to assure that unexpected damage has not occurred. Perform the following visual inspection monthly:

- Inspect mounting fasteners to verify they are tight and if loose, then tighten to the proper torque.
- Cable connections should be inspected during maintenance periods to ensure they are secure. Loose connections should be cleaned and re-tightened as appropriate. Inspect cable sheathing for damage, repair or replace damaged cabling. Loose connections or damaged cabling are not expected and may indicate improper routing and/or strain relieving.
- Inspect the Master and Tool pin blocks for any pin damage, debris or darkened pins. Refer to [Section 5.1—Pin Block Inspection and cleaning](#).
- Inspect V-Ring seals for wear, abrasion, and cuts. If worn or damaged, replace. Refer to [Section 5.2—Seal Replacement](#).

5.1 Pin Block Inspection and cleaning

1. Inspect the Master and Tool pin blocks for any debris or darkened pins.

Figure 4.2—Inspect Master and Tool Pin Blocks

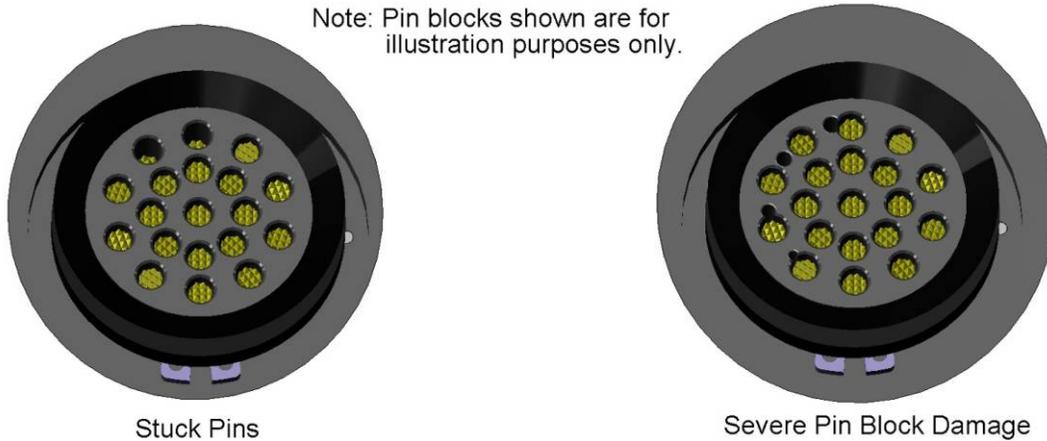


2. If debris or darkened pins exist, remove debris using a vacuum, and clean using a nylon brush (ATI part number 3690-0000064-60).

NOTICE: Do not use an abrasive media, cleaners, or solvents to clean the contact pins. Using abrasive media, cleaners, or solvents will cause erosion to the contact surface. Clean contact surfaces with a vacuum or non-abrasive media such as a nylon brush (ATI part number 3690-000064-60).

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

Figure 4.3—Stuck Pin and Pin Block Damage

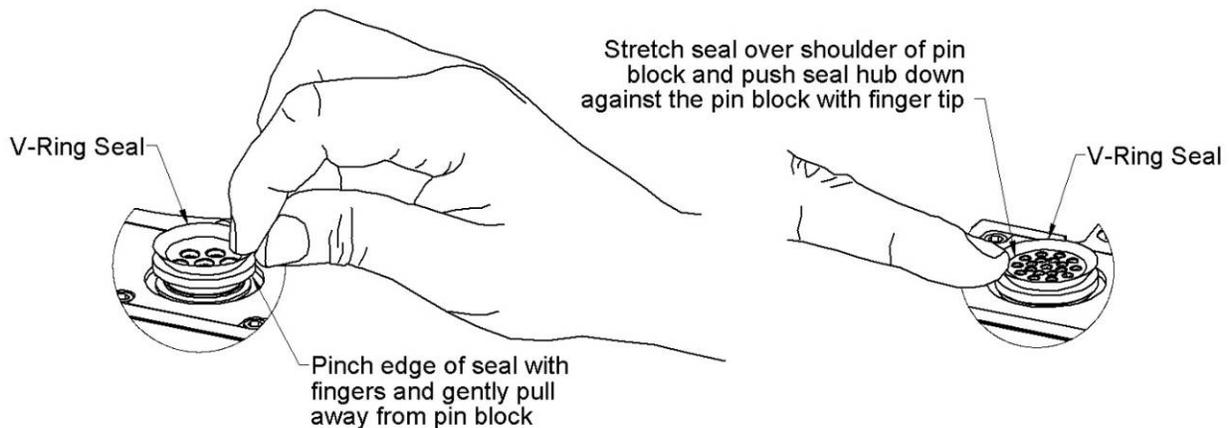


4. If stuck pins or severe pin block damage exists, contact ATI for possible pin replacement procedures or module replacement.

5.2 Seal Replacement

1. To remove the existing seal, pinch edge of seal with fingers and gently pull the seal away from the pin block on the Master.
2. Pull the seal off the pin block.
3. To install a new seal, stretch the new seal over the shoulder of the pin block.
4. Push the seal's hub down against the pin block using finger tip.

Figure 4.4—V-Ring seal Replacement



6. Troubleshooting

Refer to the flow chart in [Figure 4.1](#) for troubleshooting information, as well as the table below:

Symptom	Possible Cause / Correction
Unit will not lock or unlock	<p>Verify that ball bearings are not moving freely. Clean and lubricate as needed (see Section 4 - Maintenance).</p> <p>Check air supply</p> <p>Check that exhaust port is properly vented (check muffler)</p> <p>Verify that DeviceNet and DeviceNet signals are operating correctly.</p> <p>Verify that the Master and Tool are within the specified No-Touch zone when attempting to lock.</p>
Sensors not operating properly (but DeviceNet is operating correctly).	<p>Verify that cables are connected correctly</p> <p>Verify that the sensors are set correctly (Refer to SIP Kit Installation).</p> <p>Ensure that the Tool Plate is securely held to the Master Plate, that nothing is trapped between their surfaces, and that there is no air trapped in the Unlock (U) air port.</p>
Loss of DeviceNet Communication	<p>Check/replace DeviceNet cabling up- and down-stream of Tool Changer modules</p> <p>Inspect DeviceNet Module contact pins for debris/wear</p> <p>Check nodes up- and down-stream of Tool changer nodes for failures. These failures can “masquerade” as Tool Changer node faults.</p> <p>Verify DeviceNet network and cabling is properly tuned</p> <p>Lower Baud Rate if communication problems persist.</p> <p>Check for duplicate MAC addresses, particularly duplicates of modules with quick-connect enabled.</p> <p>Note: If using Quick-Connect, Check that the ATI Tool module and the scan list both have the quick-connect feature enabled. Check for duplicate MAC addresses, particularly duplicates of modules with quick-connect enabled.</p>

7. Recommended Spare Parts

See [Section 9—Drawings](#) of this manual.

8. Specifications

DeviceNet Module

Master Node

Factory configuration	DB2-M	MAC ID 54, Baud 500 Kbps, termination resistance “on”, “Mini” style Bus and Auxiliary Power connectors (male).
Current Draw	63mA	Does not include solenoid, which uses Auxiliary Power.
	125mA	Tool coupled, TSIV off.
	183mA	Tool coupled, TSIV on.

Tool Node

Factory configuration	DB2-T	MAC ID 55, Baud 500Kbps, No termination resistance. “Mini” style Bus and Auxiliary Power connectors (female). (5) Independent Tool ID switches, each reading a (0–9) position.
Current Draw	61mA	Tool by itself.
		Supports Mechanical Limit Switch interface with TSI circuit.

9. Drawings

REV.	DESCRIPTION	INITIATOR	DATE
08	Eco 18277; Removed 9025-20-1 199 Tool Side Client Assembly.	CF	9/5/2019

DB2 Master Module (9121-DB2-M)

DB2 Tool Module (9121-DB2-T)

Notes:

- The modules are shown at the sheet scale. All connector face views are shown at a 1:1 scale.
- Aux (4-Pin) and Bus (5-Pin) Mini Connectors are Oriented as Shown on the Modules.

19-Pin Block Wiring Information

1	CAN V+
2	CAN V-
3	Spare
4	Aux V+
5	Spare
6	Aux V-
7	CAN L
8	CAN H
9	Drain
10	NIC
11	NIC
12	NIC
13	TSI Out
14	TSI In
15	TSIV
16	NIC
17	TSRV
18	NIC
19	NIC

Standard Mini Connector Wiring Info. (Applies to Both Master and Tool Modules)

4-Pin Connector	Description	5-Pin Connector	Description
1	Aux V+	1	Drain
2	Spare	2	CAN V+
3	Spare	3	CAN V-
4	Aux V-	4	CAN L
		5	CAN H

DB2 Bottom Ref.

19-Pin Block

DB2 Bottom Ref.

19-Pin Block

4-Pin Male Minifast (Auxiliary Power)

5-Pin Male Minifast (D-Net Bus Comm.)

4-Pin Female Minifast

5-Pin Female Minifast

4-Pin Euro Connector

TSI 4-Pin Euro Connector

4-Pin Euro Connector Description

1	CAN V+
2	CAN V-
3	Relay Control
4	TSIV

Euro Connector Wiring Info.

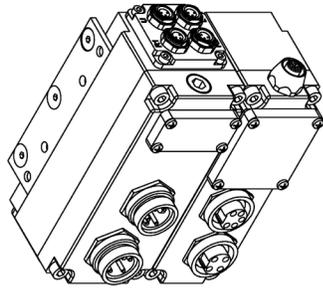
(See Tables at Left for Mini Connector Wiring Information)

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

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DB2 Serviceable Parts

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	3410-0001021-01	O-RING AS568-031
2	1	3410-0001092-01	O-ring AS568-023
3	8	3500-9957012-21	CAPTIVE SCREW M3 X 12 SLOTTED HEAD SS
4	1	3700-20-2696	Thick Window for DP/DE45 Master
5	1	3700-20-3058	Insta-Tool Window, Tool
6	1	4010-0000030-01	V-Ring Seal
7	1	9005-20-1198	Master Cleat Sub-Assembly

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DRAWN BY: P. Sparrow, 5/13/05
 CHECKED BY: R. Heavner, 5/16/05

TITLE: DB2 DeviceNet Module Drawing

SCALE: 1:2
 SHEET 2 OF 3
 DRAWING NUMBER: 9630-20-DB2
 REVISION: 08

