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E. Electrical Modules

NB8A—Inductive Module

1. Product Overview

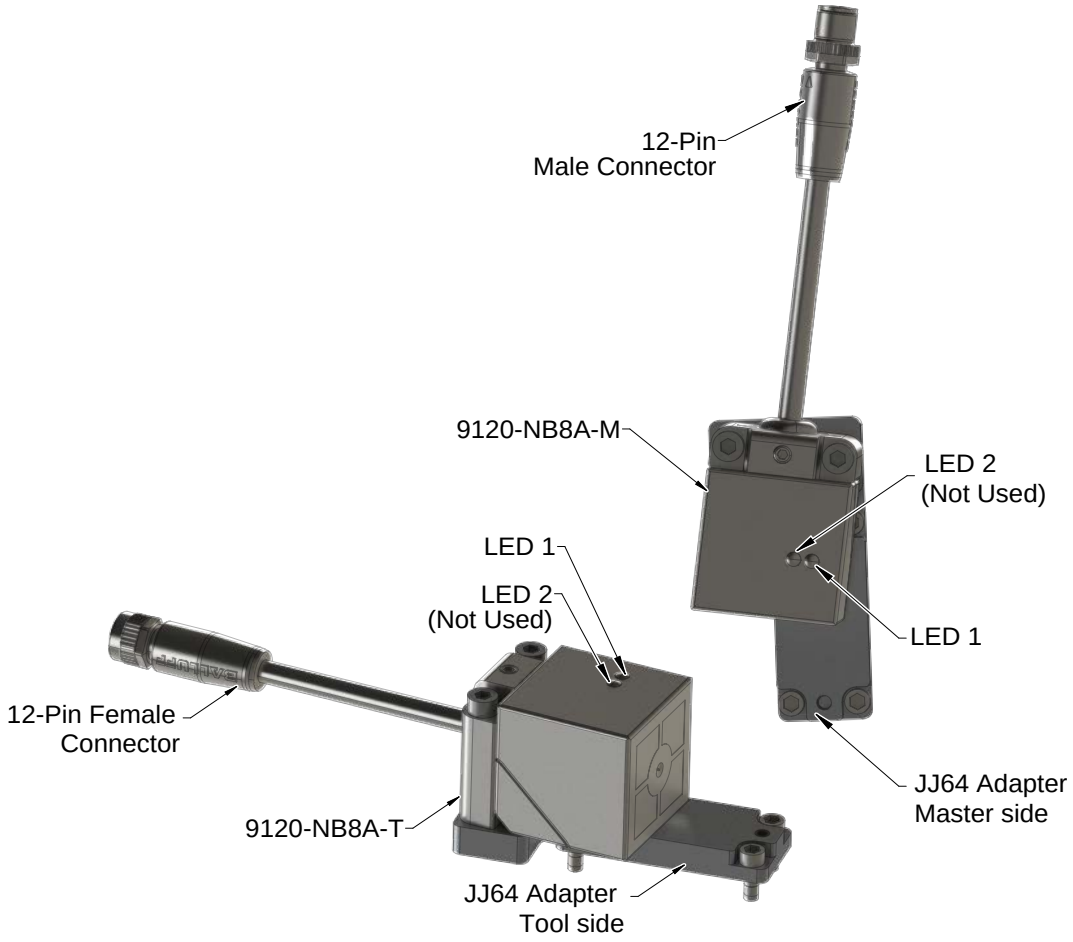
The NB8A modules support the inductive transfer of signals. The inductive coupler provides power from the Master to the Tool and provides sensor signals from the Tool to the Master.

When the Tool Changer is coupled, the Master and Tool modules transfer signals and power between modules without the need for contact. The inductive components of the module are completely sealed from moisture and liquid.

1.1 NB8A Master

The Master side inductive coupler provides signal reception from up to (8) sensors and allows power to be to transmitted to those sensors. This module is PNP-compatible. Electrical interface drawings and connector details are provided in*Section 8—Drawings*.

Figure 1.1—NB8A Modules



1.2 NB8A Tool

The Tool side inductive coupler receives power from the Master side for up to (8) sensors and transmits signals from those sensors to the master side. This module is PNP-compatible. Electrical interface drawings and connector details are provided in*Section 8—Drawings*.

2. Installation

The inductive modules are typically installed by ATI prior to shipment. The steps below outline the field installation or removal as required. For wiring information, refer to *Section 8—Drawings*.

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 (for example: 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.

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.

CAUTION: Do not bring (2) energized Master modules into face-to-face proximity of each other. Failure to observe this point may result in the premature failure of the inductive components. Properly install and secure modules to appropriate Tool Changer sides before putting them into service.

CAUTION: Do not jump or short 24 V or 0 V across the InZone or any sensor channel. Shorts or jumps can lead to permanent damage to modules. Use caution when wiring the module.

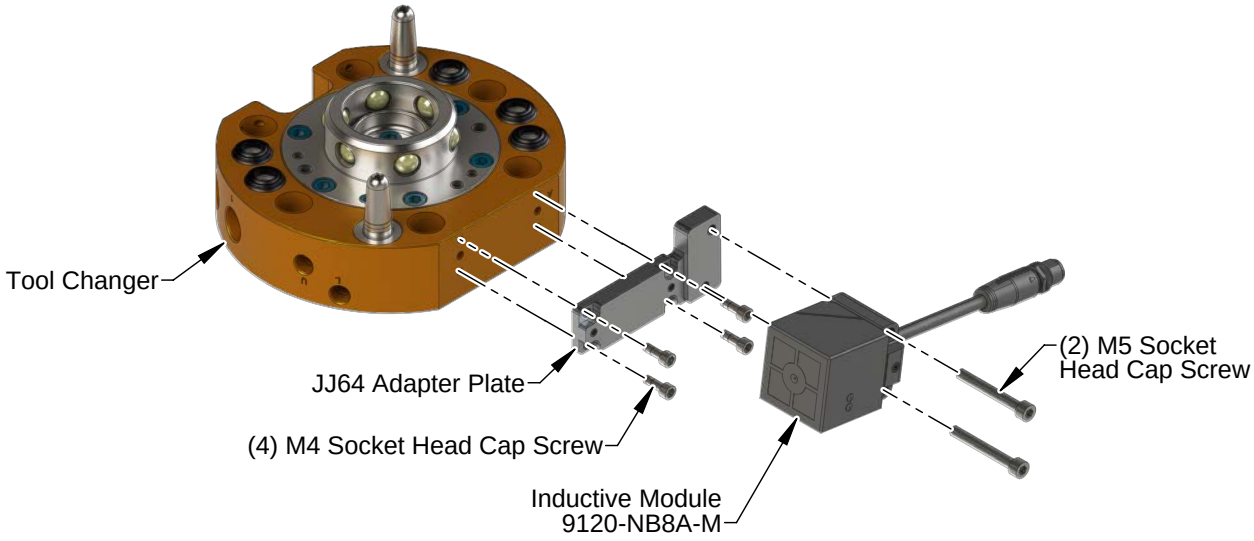
2.1 Module Installation

Tools required: *3 mm, 4 mm hex key wrenches, torque wrench*

Supplies required: *Clean rag, Loctite® 242*

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
4. Clean the mating surfaces.
5. Apply Loctite 242 to the M4 screws.
6. Install the (4) M4 socket head cap screws to secure the adapter to the Tool Changer. Using a 3 mm hex key wrench, tighten to 12 in-lb (1.35 Nm). Refer to *Figure 2.1.*
7. Apply Loctite 242 to the M5 screws.
8. Install the (2) M5 socket head cap screws to secure the module to the adapter. Using a 4 mm hex key wrench, tighten to 10 in-lb (1.13 Nm). Refer to *Figure 2.1.*
9. Connect the cable to the connector.
10. After the procedure is complete, resume normal operation.

Figure 2.1—Module Installation



2.2 Module Removal

Refer to *Figure 2.1*.

Tools required: *3 mm, 4mm hex key wrenches*

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
4. Disconnect the cable from the connectors.
5. Using a 4 mm hex key wrench, remove the (2) M5 socket head cap screws that secure the module to the adapter plate.
6. Using a 3 mm hex key wrench, remove the (4) M4 socket head cap screws that secure the adapter plate to the Tool Changer.
7. Remove the module from the Tool Changer.

3. Operation

To maximize the service life of the modules, the following points should be observed:

CAUTION: Do not allow metal between inductive couplers. Any metal debris between inductive couplers will cause the loss of signal and power strength. Metal will heat up rapidly when between couplers and can cause injury to personnel or damage to equipment. Keep inductive couplers free of debris.

CAUTION: Do not bring (2) energized Master modules into face-to-face proximity of each other. Failure to observe this point may result in the premature failure of the inductive components. Properly install and secure modules to appropriate Tool Changer sides before putting them into service.

CAUTION: Poor cable routing can also result in the wires and cables being pinched in the joint between the Tool Changer halves. Failure to observe this point may result in the premature failure of the industrial electrical connectors. Properly route and secure all cables, particularly on the Master side.

CAUTION: Do not jump or short 24 V or 0 V across the InZone or any sensor channel. Shorts or jumps can lead to permanent damage to modules. Use caution when wiring the module.

4. Maintenance

The modules are not designed to be field serviced as all point-to-point wiring connections are soldered.

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 the 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.

CAUTION: Do not jump or short 24 V or 0 V across the InZone or any sensor channel. Shorts or jumps can lead to permanent damage to modules. Use caution when wiring the module.

If the Tool Changer is being used in dirty environments (e.g., welding or deburring applications), limit the exposure of the Tool Changer. Idle Tool assemblies should be covered to prevent debris from settling on the mating surface. 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. Refer to *Section 2—Installation*.
- Cable connections should be inspected during maintenance periods to ensure they are secure. Loose connections should be cleaned and re-tightened. 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.

5. Troubleshooting

Refer to the following tables for troubleshooting information.

5.1 Status LED 1

Table 5.1— Status LED 1		
Status	**Color**	**Meaning**
Blinking	Green	Supply voltage OK
On	Green	Connected with Remote
Rapid blinking	Yellow	Supply voltage too low
Notes: 1. LED 2 is not used.		

5.2 Troubleshooting

Table 5.2— Troubleshooting		
Symptom	**Possible Cause**	**Correction**
Loss of Communication	Loose or damaged cable connections	Check cable connections.
	Damaged signal cabling	Check/Replace signal cabling upstream and downstream of the Tool Changer modules.
	Debris between inductive couplers	Clear debris with nylon brush.
	Product upstream and downstream of the Tool Changer failed or damaged	Check product upstream and downstream of the Tool Changer for failure. This failure can “appear” to be caused by the Tool Changer or affect Tool Changer performance.

6. Serviceable Parts

Table 6.1— Serviceable Parts	
Description	**Part Number**
NB8A Master Module Assembly	9120-NB8A-M
NB8A Tool Module Assembly	9120-NB8A-T
JJ64 Master Adapter	9120-JJ64-M
JJ64 Tool Adapter	9120-JJ64-T
Module Mounting Fasteners (4 per module)	3500-1062008-21
M5 x 40mm screws (2 per module)	3500-1064040-21
Optional Accessories:	
Brush, Blue Nylon All Purpose (Coupler Cleaning)	3690-0000064-60

7. Specifications

Table 7.1— NB8A Master Specifications	
9120-NB8A-M	NB8A Master Inductive Coupler Module, Base Side, PNP-Compatible Power Transmitter, 8 Sensor Signal Pass Thru with Male M12 12-Pin Connector, Mates with NB8A-T.
Interface Connector(s)	M12 12-pin Male Connector
Supply Voltage	24 VDC +/- 10%
Rated Operating Current	1000 mA
Current Load Per Output Max	Signals: 8 @ 200 mA each
Circuit Protection	Short Circuit, Reverse Polarity
Weight	0.42 lbs (0.19 kg)

Table 7.2— NB8A Tool Specifications	
9120-NB8A-T	NB8A Tool Inductive Coupler Module, Remote Side, PNP-Compatible Power Receiver, 8 Sensor Signal Pass Thru with Female M12 12-Socket Connector, Mates with NB8A-M.
Interface Connector(s)	M12 12-pin Female Connector
Drive Voltage	24 VDC +/- 10%
Rated Output Current	Signals: 8 @ 500 mA total
Circuit Protection	Short Circuit, Reverse Polarity
Weight	0.42 lbs (0.19 kg)

8. Drawings

Drawings are available on the *ATI website* or by contacting an ATI representative.