Table of Contents

C. Control and Signal Modules C-2
SD2—Control/Signal Module C-2
1. Product Overview C-2
1.1 SD2 Master C-3
1.2 SD2 Tool C-3
2. Product Information C-4
2.1 Tool Side TSI C-4
3. Installation C-5
3.1 Master Module Installation C-5
3.2 Master Module Removal C-6
3.3 Tool Module Installation C-7
3.4 Tool Module Removal C-7
4. Operation C-8
4.1 Recommended Sequence of Operations C-8
4.2 Lock, Unlock, and RTL Sensor Cable LED Behavior C-10
5. Maintenance C-11
5.1 Pin Block Inspection and Cleaning C-12
6. Troubleshooting and Service Procedures C-13
6.1 Troubleshooting Procedures C-13
6.2 Service Procedures C-15
6.2.1 Seal Replacement C-15
7. Serviceable Parts C-16
7.1 Master and Tool C-16
7.2 Accessories C-16
8. Specifications C-17
9. Drawings C-18

C. Control and Signal Modules

SD2—Control/Signal Module

1. Product Overview

The control/signal modules are required to provide a means for the customer to communicate with and control the Tool Changer. Connectors on the SD2 Master and Tool modules provide interfacing to support the Tool Changer and customer-specified I/O.

NOTICE: The 0 and 24 VDC supply lines are required to be on certain pin locations of the customer interface connector. Refer to *Section 9—Drawings* for pin out information and location of the I/O signals.

The Master pin blocks have compliant spring probes, and the Tool pin blocks have fixed contact pins (refer to *Figure 1.1*). When the Tool Changer is coupled, the Master transfers signals and power to the Tool through the pin block, which is surrounded by a V-ring which is water resistant but not waterproof.

To avoid unintentional human contact, the Master spring pins are recessed below an insulated surface.



DANGER: This module has a voltage of 50V or greater; always remove power before contacting the module. Arcing and damage occur if power is not removed from the module during maintenance or service. Always remove power before attaching or disconnecting cables, separating or inserting the mating couplers, or making any contact with the Tool Changer or Utility Coupler.



CAUTION: Never couple or uncouple the servo modules unless electrical power has been disconnected and discharged both upstream and downstream from the modules. Arcing and contact damage occur during coupling or uncoupling if power is not removed and discharged. Always disconnect and discharge power from upstream and downstream of the modules before coupling or uncoupling.

1.1 SD2 Master

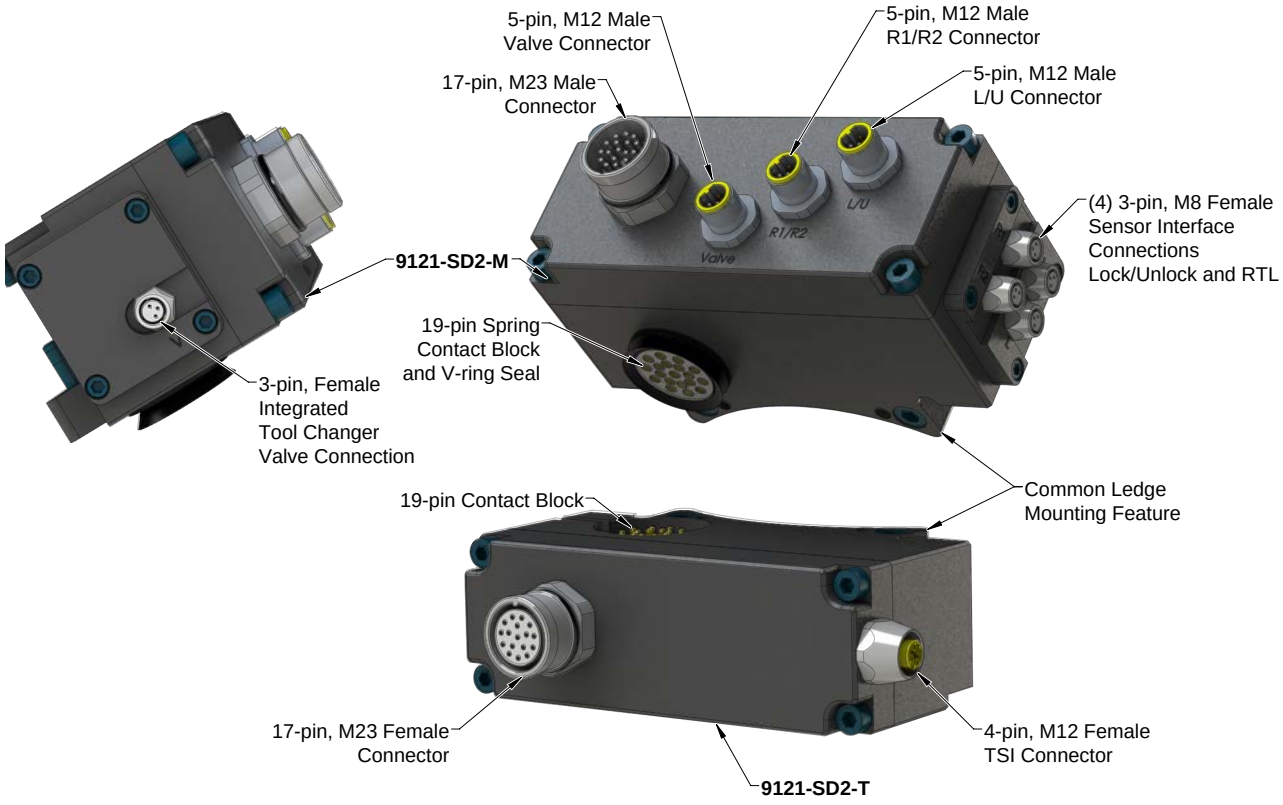
The Master module is equipped with a 17-pin M23 male connector for passing electrical power and signal circuits to support the Tool Changer and customer specified I/O. The M23 connector wiring is compatible with that of an off-the-shelf, customer supplied Profibus I/O block that is integrated into the overall Tool Changer package. (3) separate 5-pin M12 male connectors on the Master support and interface with a customer supplied Profibus I/O block. These connections support Tool Changer Lock, Unlock, and RTL (Ready-to-Lock) proximity sensor inputs as well as the Tool Changer valve Latch and Unlatch commands. Cables are provided in the overall Tool Changer package to connect these signals to the customer supplied Profibus I/O block. Electrical schematics and connector details are provided in *Section 9—Drawings*.

An electrical interface is provided on the Master module for support of an integrated solenoid valve (DC Voltage). The integrated valve can be supplied from ATI as part of the valve adapter (9121-JXX-M). Refer to the valve adapter manual for more information. Electrical interface drawings and connector details are provided in drawings in *Section 9—Drawings*.

1.2 SD2 Tool

The SD2 Tool module has a 17-pin M23 female connector and provides the interface for supplying signal circuits to the end-of-arm tooling. The M23 connector wiring is compatible with that of an off-the-shelf, customer supplied Profibus I/O block that is integrated into the overall Tool Changer package. A 4-pin M12 female connector passes TSI signals. Refer to *Section 9—Drawings* for additional information and connector details.

Figure 1.1—SD2 Master and Tool Modules



2. Product Information

This section provides more detailed information on the behavior of the SD2 Master and Tool modules.

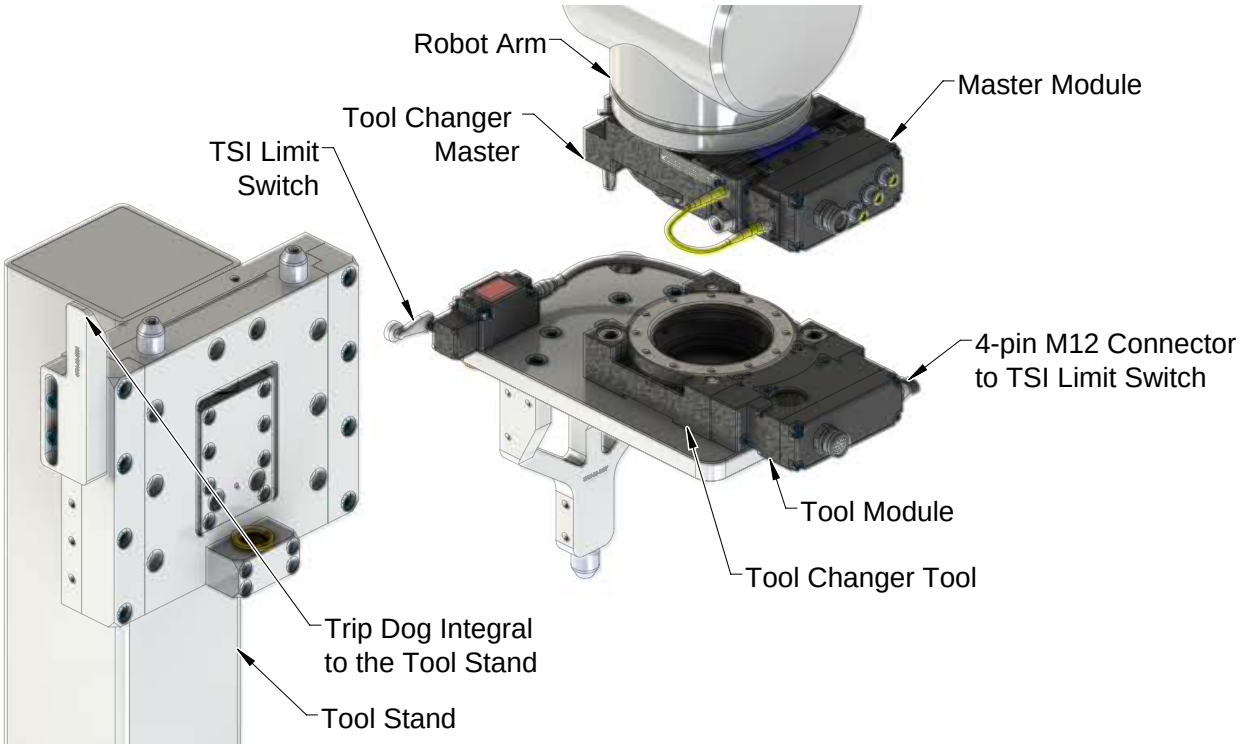
2.1 Tool Side TSI

The modules have special features that provide for the customer the ability to operate the Tool Changer as safe as possible. In addition to the standard Lock, Unlock, and Ready-To-Lock sensor inputs, the modules have Tool Stand Interlock (TSI). The TSI feature consists primarily of a physical break in the unlock solenoid valve circuit. The broken circuit is made available to the customer via a TSI connector on the Tool module. Using this connector, a mechanical switch and trip dog can be integrated by the customer to allow the unlock solenoid valve circuit to be completed only when the Tool is in the tool stand. A momentary action single-pole, single-throw switch is suggested. Refer to *Figure 2.1*.

In order to allow the Tool Changer to uncouple when a Tool is not present, a relay circuit in parallel with the TSI circuit is utilized. This relay circuit is located in the Master module and is triggered by the RTL sensor. If the RTL sensor is off, indicating no Tool presence, then the relay circuit is closed; thus, allowing the unlock solenoid valve circuit to be completed. If the RTL sensor is on, indicating Tool presence, then the relay circuit is open, and the TSI circuit on the Tool side must be closed in order to complete the unlock solenoid valve circuit.

CAUTION: This Tool Changer is equipped with Tool Stand Interlock (TSI). Special procedures are required to uncouple the Tool Changer. Refer to *Section 4.1—Recommended Sequence of Operations* for more information.

Figure 2.1—Tool Stand Interlock (TSI)



3. Installation

The control/signal 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 9—Drawings*.

DANGER: This module has a voltage of 50V or greater; always remove power before contacting the module. Arcing and damage occur if power is not removed from the module during maintenance or service. Always remove power before attaching or disconnecting cables, separating or inserting the mating couplers, or making any contact with the Tool Changer or Utility Coupler.

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.

3.1 Master Module Installation

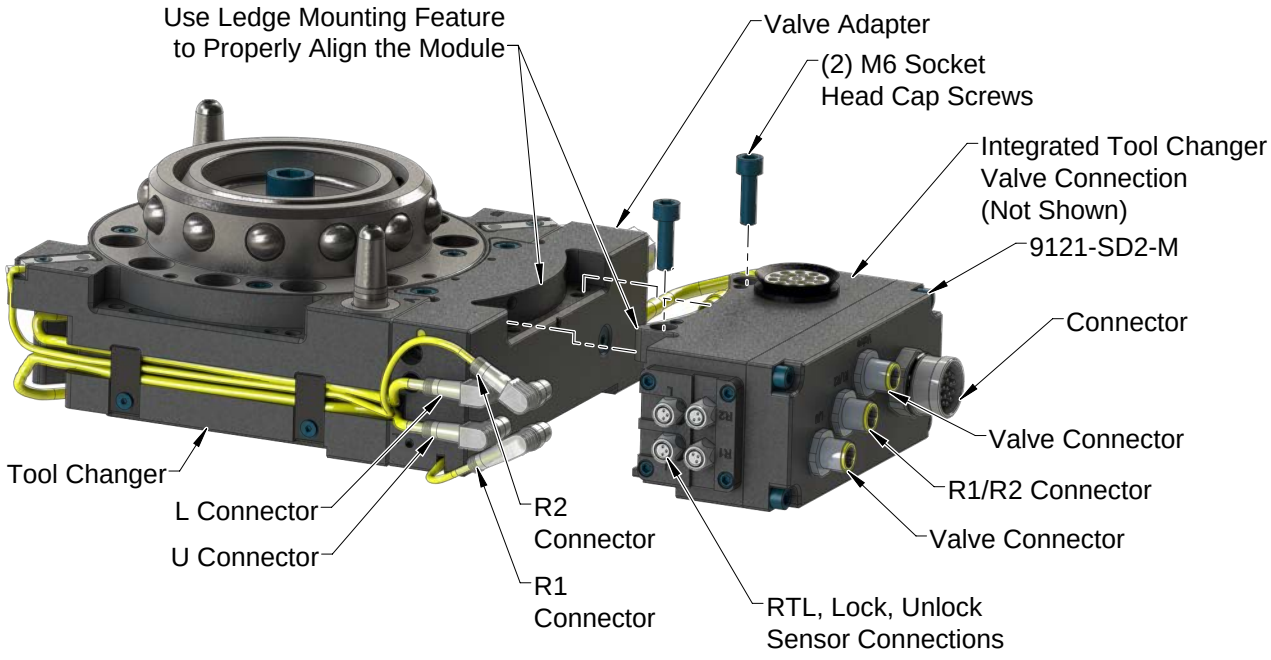
Refer to *Figure 3.1* for Master module installation instructions.

Tools required: *5 mm hex key, 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 (for example: electrical, pneumatic, and hydraulic circuits).
4. Ensure that the mounting surface is clean.
5. Place the module into the appropriate location on the air or valve adapter.
6. Apply Loctite 242 to the supplied M6 socket head cap screws.
7. Install the (2) M6 socket head cap screws and secure the module to the air or valve adapter using a 5 mm hex key. Tighten to 70 in-lbs (7.9 N-m).
8. Ensure the Lock (L), Unlock (U), RTL (R1), and RTL (R2) connectors are clean and connect the sensor cables to the control/signal module.
9. Ensure that the connectors (power, signal, auxiliary, etc.) are clean and connect the cables to the module.
10. Safely resume normal operation.

Figure 3.1—Module Installation



3.2 Master Module Removal

Tools required: *5 mm hex key*

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. Disconnect (for example: power, signal, auxiliary, etc.) cables from the control/signal module.
5. Support the control/signal module, remove the (2) M6 socket head cap screws using a 5 mm hex key, and lift the module from the tool adapter.

3.3 Tool Module Installation

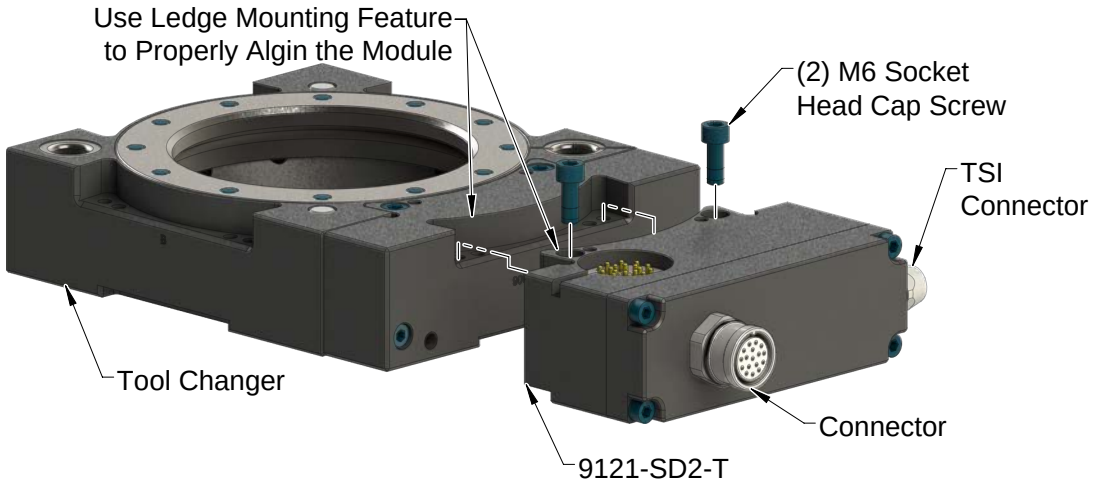
Refer to *Figure 3.2* for Tool module installation instructions.

Tools required: *5 mm hex key, 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 (for example: electrical, pneumatic, and hydraulic circuits).
4. Wipe down the mounting surfaces with a clean rag.
5. Place the module onto the tool adapter.
6. Apply Loctite 242 to the supplied M6 socket head cap screws. Install the (2) M6 Socket Head Cap Screws and secure the module to the tool adapter using a 5 mm hex key. Tighten to 70 in-lbs (7.9 N-m).
7. Ensure the power, signal, auxiliary, and other connectors are clean and connect cables to the module.
8. Safely resume normal operation.

Figure 3.2—Module Installation



3.4 Tool Module Removal

Tools required: *5 mm hex key*

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. Disconnect (for example: power, signal, auxiliary, etc.) cables from the control/signal module.
5. Support the control/signal module, remove the (2) M6 socket head cap screws using a 5 mm hex key, and lift the module from the tool adapter.

4. Operation

The 17-pin M23 connectors are provided on the control/signal Master and Tool modules for customer interface to downstream I/O. (3) separate 5-pin M12 connectors on the Master support an interface to the Tool Changer Locked, Unlocked, RTL proximity sensors as well as Latch and Unlatch valve outputs. This interface allows for confirmation as well as control of the Tool Changer and locking mechanism position. Output signals need to be provided to the control module to actuate the solenoid valve in order to provide pneumatic pressure to lock or unlock the Tool Changer. Integrated connections Locked, Unlocked, and Ready-to-Lock proximity input connections are provided on the Master module for confirmation of the Tool Changer and locking mechanism positions.

NOTICE: The 0 and 24 VDC supply lines are required to be on certain pin locations of the customer interface connector. Refer to *Section 9—Drawings* for pin out information and location of the I/O signals.

Refer to the specific Tool Changer manual for coupling conditions of the Tool Changer and *Section 4.1—Recommended Sequence of Operations*. When coupled, the module Tool can be communicated with, Tool-ID can be read (if equipped), and attached end-effectors can be used.

4.1 Recommended Sequence of Operations

This Recommended Sequence of Operations procedure is to be used as a general guide when programming a robot or PLC for use with a Tool Changer and control/signal modules. This procedure is intended for “automatic” modes used during normal application processes.

1. Start→ The robot and Tool Changer Master are free of the stand or storage location, the Tool Changer is uncoupled and the Tool Changer locking mechanism is fully retracted. (The **Unlocked** input is true, indicating that the Tool Changer locking mechanism is fully retracted). The Tool is by itself in the tool stand.
    a. The **RTL1** and **RTL2** inputs are OFF.
    b. The ATI Tool and any downstream device(s) are offline.
2. Ensure the Master is Unlocked. (The Master must be unlocked prior to entering the Tool to prevent the ball bearings from impinging on the Tool bearing race.)
    a. The **Unlocked** input is on and remains on, indicating that the Tool Changer locking mechanism is fully retracted.
3. Robot and Master move into the Tool are parallel and within 0.06” of the Tool (i.e., the module contact pins are touching, the **RTL** sensors have sensed the targets on the Tool).
    a. The **RTL1** and **RTL2** inputs are on, indicating that it is permissible to couple the Tool.
    b. ‘Input’ power connections become available on the Tool.
    c. Communications with downstream device(s) should now be established.
4. Coupling the Tool Changer.
    a. The **Unlatch** output is off.
    b. The **Latch** output is on (for double solenoid only).
    c. The **Unlocked** input goes off a short time later, indicating piston travel. Subsequently, the **Locked** input goes on and remains on, indicating that the coupling operation is complete.
5. Robot moves away from the Tool Stand with the Tool Changer coupled.

6. Normal operation:
    a. The following inputs are on:
        i. **Locked**
        ii. **RTL1**
        iii. **RTL2**
    b. The following inputs are off:
        i. **Unlocked**
7. Robot moves into the Tool Stand with the Tool Changer coupled.
8. Uncoupling the Tool Changer. **IMPORTANT: It is critical that the Tool be nested securely in the Tool Stand prior to Uncoupling the Tool Changer.**
    a. The **Latch** output is off (for double solenoid only).
    b. The **Unlatch** output is on.
    c. The **Locked** input goes off a short time later and subsequently the **Unlocked** input goes on and remains on, indicating that the uncoupling operation is complete.
9. Robot and Master move up and away and are at a distance greater than 0.125” from the Tool (the module contact pins are no longer touching).
    a. The **RTL1** and **RTL2** inputs are off.
    b. ‘Input’ power connections become unavailable on the Tool.
    c. Communications with downstream device(s) should now be lost.
10. Robot and Master in free space.
    a. The following inputs are on:
        i. **Unlocked**
    b. The following inputs are off:
        i. **Locked**
        ii. **RTL1**
        iii. **RTL2**

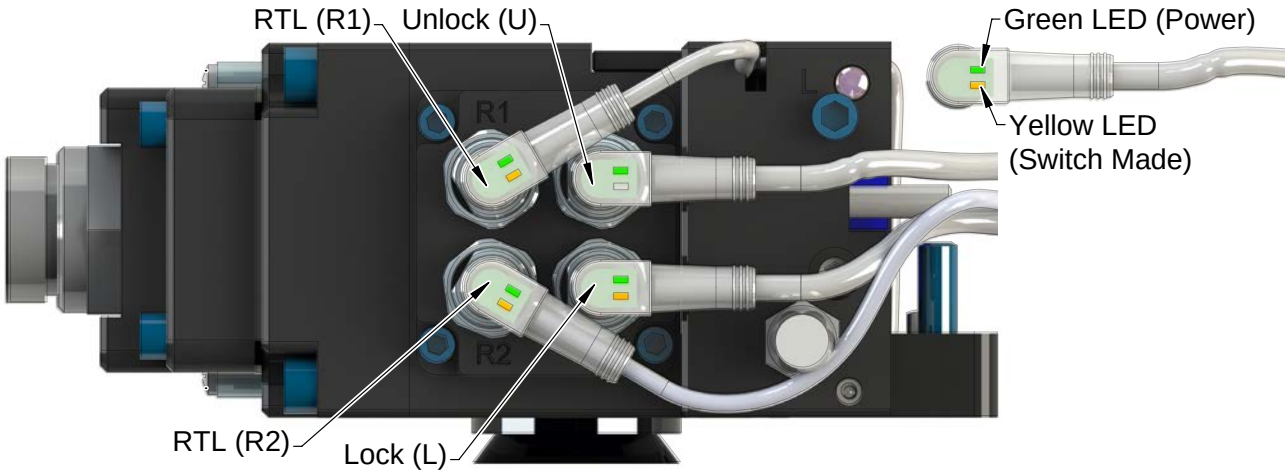
4.2 Lock, Unlock, and RTL Sensor Cable LED Behavior

The Lock, Unlock, and RTL sensor cables are equipped with two LEDs. The Green LED indicates the sensor has power and the yellow LED indicates the switch has been made. The LED behavior is affected by the control/signal module.

Table 4.1—Sensor Cable LED Behavior for Common Tool Changer Positions

Tool Changer Position	Sensor cable LED Behavior			
Unlocked (Tool Changer Master plate free of stand with no Tool plate attached)	RTL (R1) Sensor	ON / OFF	ON / ON	Unlock (U) Sensor
	RTL (R2) Sensor	ON / OFF	ON / OFF	Lock (L) Sensor
Ready to Lock (Tool Changer Master plate with Tool plate parallel and at a distance of 1.22 mm or less from each other)	RTL (R1) Sensor	ON / ON	ON / ON	Unlock (U) Sensor
	RTL (R2) Sensor	ON / ON	ON / OFF	Lock (L) Sensor
Locked (Tool Changer Master plate with Tool plate attached in fully locked position)	RTL (R1) Sensor	ON / ON	ON / OFF	Unlock (U) Sensor
	RTL (R2) Sensor	ON / ON	ON / ON	Lock (L) Sensor
Missed Tool (Tool Changer Master plate locked with no Tool plate attached)	RTL (R1) Sensor	ON / OFF	ON / OFF	Unlock (U) Sensor
	RTL (R2) Sensor	ON / OFF	ON / OFF	Lock (L) Sensor

Figure 4.1—Lock, Unlock, and RTL Sensor cable LED Behavior (Shown in Locked Position)



(Control module shown for reference only)

5. Maintenance

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.

DANGER: This module has a voltage of 50V or greater; always remove power before contacting the module. Arcing and damage occur if power is not removed from the module during maintenance or service. Always remove power before attaching or disconnecting cables, separating or inserting the mating couplers, or making any contact with the Tool Changer or Utility Coupler.

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.

If the Tool Changer is used in dirty environments (for example: 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. 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, perform periodic inspections to assess for unexpected damage and assure long-lasting performance. Perform the following visual inspection monthly:

- Inspect mounting fasteners to verify they are tight; if loose, then tighten to the proper torque. Refer to *Section 3.1—Master Module Installation*.
- Cable connections should be inspected during maintenance periods to ensure they are secure. Loose connections should be cleaned and 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 6.2.1—Seal Replacement*.

5.1 Pin Block Inspection and Cleaning

Tools required: *Nylon Brush (ATI part number 3690-0000064-60)*

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. Inspect the Master and Tool pin blocks for debris or darkened pins.

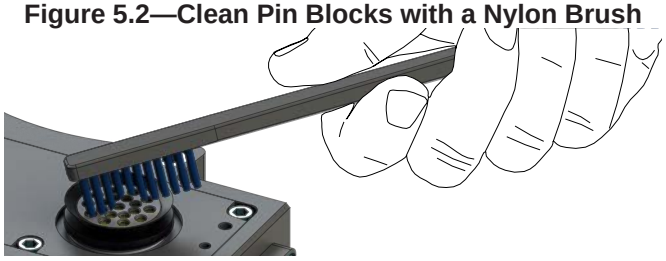
Figure 5.1—Inspect Master and Tool Pin Blocks



5. If debris or darkened pins are present, use a vacuum to remove the debris, and clean using a nylon brush (ATI part number 3690-0000064-60).

NOTICE: Do not use an abrasive media and/or cleaners or solvents to clean the contact pins. Using abrasive media and/or cleaners or solvents will cause damage to the contact surface or cause pins to stick. Clean contact surfaces with a vacuum or non-abrasive media such as a nylon brush (ATI part number 3690-0000064-60).

Figure 5.2—Clean Pin Blocks with a Nylon Brush



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

Figure 5.3—Stuck Pin and Pin Block Damage



7. If pins become stuck or if there is damage to the pin block, contact ATI for either a possible pin replacement procedure or module replacement.
8. Safely resume normal operation.

6. Troubleshooting and Service Procedures

This troubleshooting section provides information to help diagnose conditions with the Tool Changer or control module. The service procedures provide instructions for component replacement and adjustment.

DANGER: This module has a voltage of 50V or greater; always remove power before contacting the module. Arcing and damage occur if power is not removed from the module during maintenance or service. Always remove power before attaching or disconnecting cables, separating or inserting the mating couplers, or making any contact with the Tool Changer or Utility Coupler.

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.

6.1 Troubleshooting Procedures

Refer to the table below for trouble shooting information.

Table 6.1—SD2 Troubleshooting Procedures

Symptom	Possible Cause	Correction
Unit will not lock or unlock	Debris caught between the Master and Tool plates.	Clean debris from between the Master and Tool plates. Verify mounting hardware is secure and does not protrude above the mating surfaces.
	Ball bearings are not moving freely.	Verify that ball bearings are moving freely. Clean and lubricate as needed. Refer to the Maintenance section of the Tool Changer manual for instructions.
	Master and Tool are within the specified No-Touch zone.	Verify that the Master and Tool are within the specified No-Touch zone when attempting to lock. *Refer to the Installation – Tool Stand Design Section of the Tool Change manual for specifications.*
	Air supply not to specifications.	Air pressure must be at the proper pressure. Refer to the Tool Changer manual for pneumatic requirements.
	Signals are mapped incorrectly.	Verify that signals are mapped and are communicating properly. Refer to *Section 9—Drawings* for electrical schematic.
	Valve adapter exhaust muffler clogged.	The valve adapter exhaust muffler may be clogged. Refer to the valve adapter manual for more information.

Table 6.1—SD2 Troubleshooting Procedures		
Symptom	**Possible Cause**	**Correction**
Sensors not operating properly	Sensor cables are damaged or incorrectly connected.	Verify that cables are connected correctly and not damaged, replace if damaged. Refer to the Troubleshooting Section of the Tool Changer manual.
	Tool plate is not secured properly or debris is trapped between surfaces.	Ensure that the Tool plate is securely held to the Master plate, that nothing is trapped between their surfaces.
	Air trapped in the Unlock (U) air port.	Ensure that there is no air trapped in the Unlock (U) air port. *Refer to Air and Valve adapter section for pneumatic specification and requirements.*
	Sensor is malfunctioning.	Verify the sensors are functioning properly. Refer to the Tool Changer manual.
Loss of Communication	Damaged signal cabling	Check/Replace signal cabling upstream and downstream of Tool Changer modules.
	Worn or damaged contact pins	Inspect module contact pins for debris/wear/ damage. Refer to *Section 5.1—Pin Block Inspection and Cleaning*. V-ring seal damaged and allow debris in contact pins. Replace V-ring seal, refer to *Section 6.2.1—Seal Replacement*.
	Product upstream and downstream of Tool Changer failed or damaged	Check product upstream and downstream of Tool Changer for failure. This failure can “appear” to be caused by the Tool Changer or affect Tool Changer performance.

6.2 Service Procedures

The following service procedures provide instructions for component replacement and adjustment.

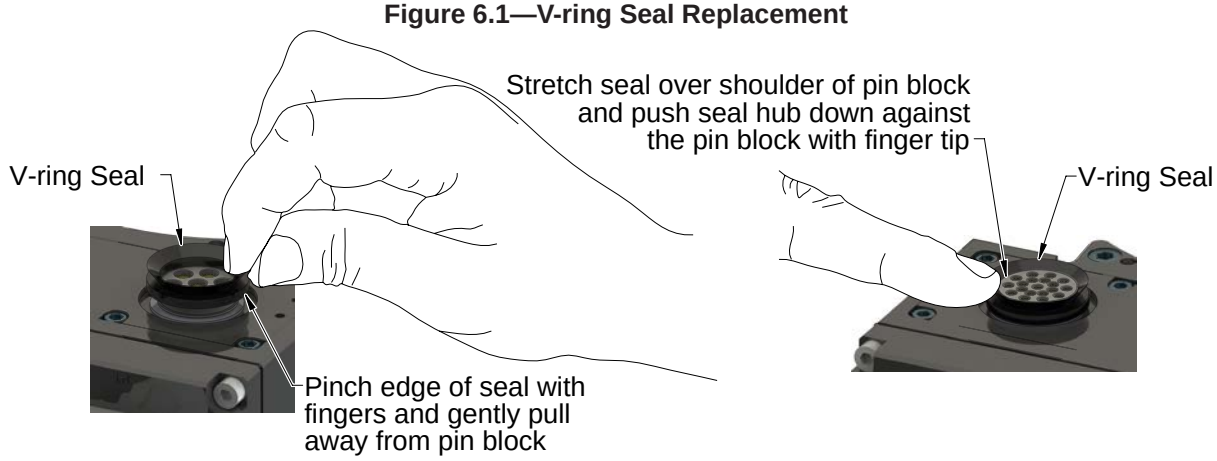
6.2.1 Seal Replacement

Parts required: *Refer to Section 7.1—Master and Tool.*

The seal protects the electrical connection between the Master and Tool module. Replace the seal if it becomes worn or damaged.

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. To remove the existing seal, pinch the edge of the seal and pull the seal away from the pin block on the Master module.
5. To install a new seal, stretch the new seal over the shoulder of the pin block.
6. Push the seal hub down against the pin block.
7. Safely resume normal operation.

Figure 6.1—V-ring Seal Replacement



7. Serviceable Parts

7.1 Master and Tool

Refer to *Section 9—Drawings*.

7.2 Accessories

Table 7.1—SD2 Master and SD2 Tool Accessories

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
*	*	3690-0000064-60	Brush, Blue Nylon All Purpose (Contact Pin Cleaning)

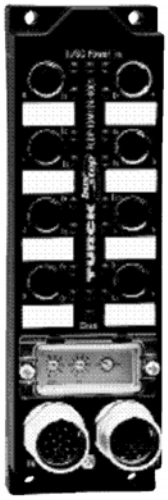
8. Specifications

Table 8.1—SD2 Master Module Specifications	
9121-SD2-M	Control/Signal module supporting integrated solenoid valve (DC Voltage), Tool Changer I/O and Profibus I/O block. Mates with SD2 Tool.
Interface Connector(s)	**Customer Interface:** 17-pin M23 male Tool Changer connection compatible with Profibus I/O block (3) 5-pin, M12 male I/O point connection(s) **Integrated Tool Changer I/O:** (4X) M8 3-pin female connector supporting Tool Changer Locked, Unlocked, and Ready-to-Lock Proximity sensor in parallel 3-pin female integrated Tool Changer valve connection
Profibus I/O Block	Refer to *Section 9—Drawings*. Alternate I/O blocks available from Turk (P/N FLDP-IOM124-0001) and Siemens(P/N simatic-ET200R).
Electrical Rating	**Pass-Through to Tool:** 5 A maximum current rating, 250 V Max.
	Tool Changer Current Draw: Unswitched Power: 220 mA @ 24 VDC: Master and Tool with Locked, RTL 1, and RTL 2 sensors Switched Power: 250 mA @ 24 VDC (solenoid valve) (only when Locking or Unlocking Tool Changer). **Tool Changer Control:** Lock, Unlock, and Ready-to-Lock Sensors: 10-30 VDC operational voltage, 150 mA Operational Current.
Weight	1.7 lbs (0.75 kg)

Table 8.2—SD2 Tool Module Specifications	
9121-SD2-T	Control/Signal module with 19-pin block supporting Profibus I/O block and TSI on the Tool. Mates with SD2-M.
Interface Connector(s)	**Customer Interface:** 17-pin M23 female Tool Changer connection compatible with Profibus I/O block **TSI Interface:** 4-pin M12 female connector
Electrical Rating	**Pass-Through to Tool:** 5 A maximum current rating, 250 V Max. **TSI:** 24 V, 4 A
Weight	1.4 lbs (0.62 kg)

9. Drawings

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



The FLDP-IOM124-0001 *busstop*® station provides a direct connection to PROFIBUS-DP. Up to twelve 2-/3-wire pnp sensors and up to four actuators with an output current of 2 A each may be connected to the station.

The inputs feature common short-circuit monitoring. The signal status of the inputs/outputs is indicated by green LEDs. The ON-LINE/OFF-LINE status of the station is signalled by a green/red LED.

The robust station is epoxy-encapsulated and equipped throughout with metal connectors.

Connection to PROFIBUS-DP is accomplished with 17-pole round connectors. The station supports transmission rates of up to 12 Mbps and adjusts automatically to the communication rate determined by the master station. The address of the station is set via two rotary switches located under a protective cover. It can be set from 0 to 99.

Power is also fed via a 17-pole connector. A green Power LED indicates that the station is powered, while a red Power LED indicates that the load voltage is missing. If the load voltage falls below the minimum value of 18 VDC, the Power LED turns red.

The robot module can be connected to the earth potential via the external earthing screw. The earth (PE) is capacitively coupled with the shield of the bus cable.

The GDS file can be downloaded from the internet under **www.turck.com.**

FLDP-IOM124-0001

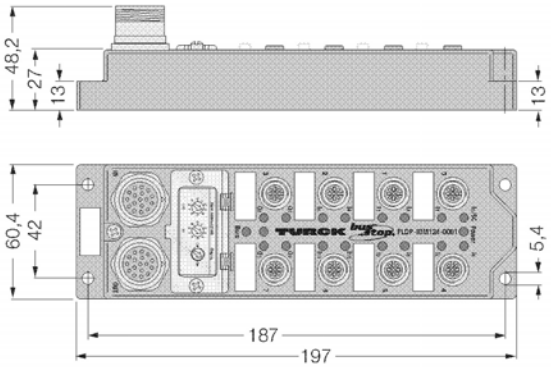
- Robust PROFIBUS-DP station
- 6 x 2 inputs and 2 x 2 outputs

Applications

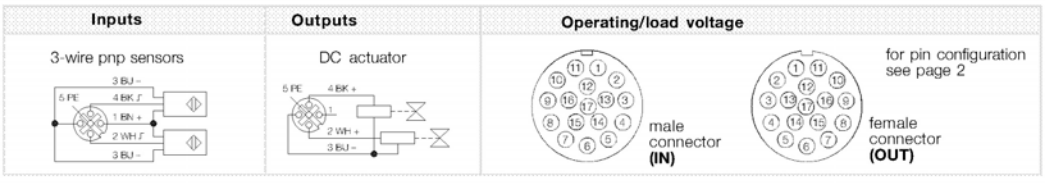
- For robot applications
- For connection of twelve 2/3 pnp wire sensors or mechanical contacts
- For connection of four actuators, 2 A max. each

Special features

- Common short-circuit monitoring of pnp inputs
- Glass fibre reinforced plastic housings with encapsulated electronics and nickel-plated brass connectors meet protection degree IP67
- Transmission rate up to 12 Mbps
- Intelligent bus terminator



Wiring diagram



Input/output module FLDP-IOM124-0001
6 x 2 inputs/2 x 2 outputs, 24 VDC

Type	FLDP-IOM124-0001
Ident-no.	6825347
Operating/load voltage	18...30 VDC
Internal current consumption	< 200 mA (from operating voltage)
Adjustments	
Address	0...99 (decimal) via 2 rotary switches located under protective cover
diagnosis function „U_L"	disabling of the diagnosis function via U_L
In this example address 15 is set	 diagnosis function „U_L"
Input circuits	(12) pnp 3-wire sensors/2-wire sensors
Input voltage	18...30 VDC (from operating voltage)
Input current	total input current ≤ 500 mA, short-circuit protection
Switching threshold OFF / ON	2 mA / 4 mA
Input time delay	2.5 ms
Switching frequency	< 250 Hz
Isolation	to bus
Output circuits	(4) DC actuators
Output voltage	18...30 VDC (from load voltage)
Output current	2 A per output, short-circuit protection
Switching frequency	< 250 Hz
Isolation	to bus
LED indications	
Bus	green/red: normal operation/no communication
Voltage supply	green/red: normal operat./load voltage missing
I/O status	(12) green: input ON / (4) green: output ON
Common short-circuit indication (LED SC)	red: short-circuit at one input
Connection	
Operating and load voltage	17-pole round connector
Bus line	17-pole round connector
Inputs/outputs	M12 x 1 connector
Bus terminator	automatic activation of the internal bus terminator if pin 15 and pin 16 of 17-pole female connector are not shorted

Pin configuration

17-pole round connector			
IN		**OUT**	
1		1	0 V, U_B
2		2	0 V, U_L
3		3	+24 V, U_L
4		4	+24 V, U_B
5		5	PE
6		6	B-line
7		7	
8		8	
9		9	
10		10	
11		11	A-line
12		12	
13		13	
14		14	
15		15	reserved
16		16	reserved
17		17	

I/O data mapping

Abbreviations:
C0P4 = connector 0, pin 4,
C1P2 = connector 1, pin 2
0 = off, 1 = on
SC = common short-circuit indication of inputs, I > 500 mA
U_L = load voltage, U_L < 18 VDC
U_B = operating voltage U_B < 18 VD

Bit		7	6	5	4	3	2	1	0
Input	**Byte 0**	C4P2	C4P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Input	**Byte 1**	–	–	–	–	C6P2	C6P4	C5P2	C5P4
Output	**Byte 0**	–	–	–	–	C7P2	C7P4	C3P2	C3P4
Diagnose	**Byte 0**	–	–	–	–	–	U_B	U_L	SC

Housing	197 x 60 x 27 mm (h x w x d)
Material	PA6-GF30; nickel-plated brass connectors
Mounting	via 4 through-holes, Ø 5.3 mm
Protection degree (IEC 60529/EN 60529)	IP67 (NEMA 1, 3, 4, 12, 13)
Shock and vibration test	according to EN 60068-2-6/2-27
Temperature range	0 °C up to +55 °C (32 °F up to +131 °F)

D300454 0303

Subject to change without notice • Edition 03.03 • © Hans Turck GmbH & Co.KG 2003

Hans Turck GmbH & Co.KG • D-45466 Mülheim/Ruhr • Tel. 0208/4952-0 • Fax 0208/4952-264 • E-Mail: turckmh@mail.turck-globe.de • www.turck.com