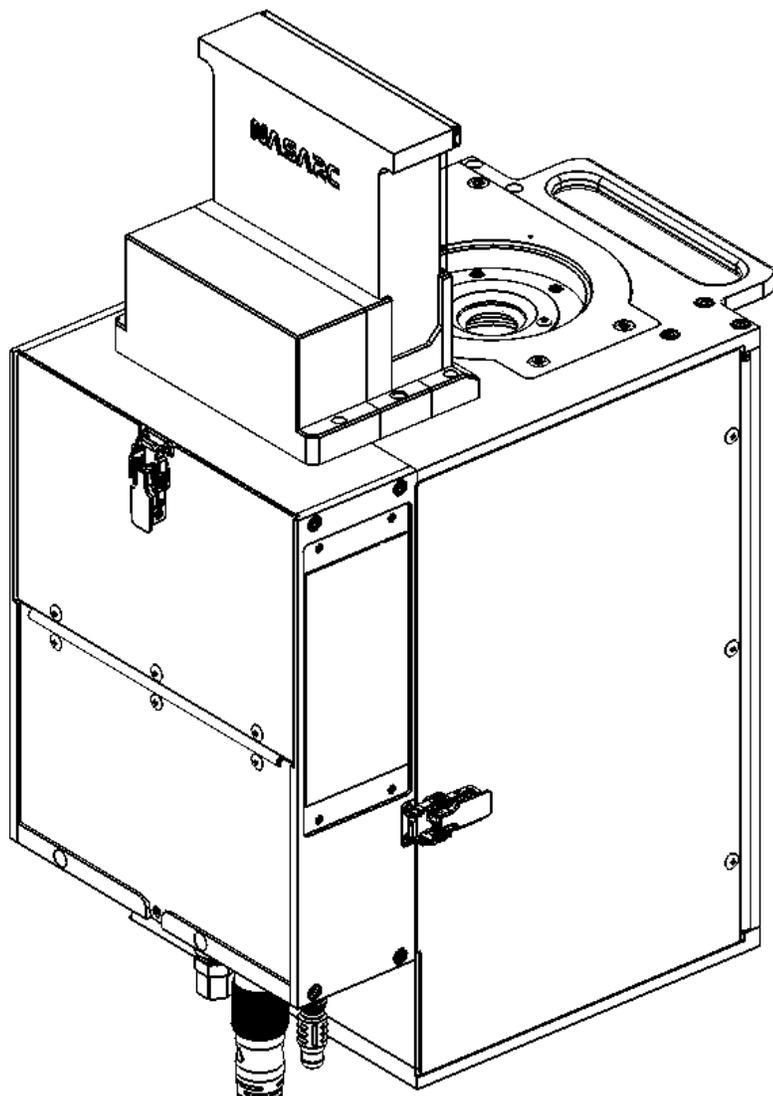


## AUTOTIP®



### Safety Depends on You

**DO NOT INSTALL, OPERATE, OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.**

## OPERATIONS MANUAL

Nasarc Technologies, Inc.  
602 Colby Drive  
Waterloo, Ontario, Canada, N2V 1A2  
Tel: (519) 747-0336 Fax: (519) 886-9022  
[WWW.NASARC.COM](http://WWW.NASARC.COM)



Before installation and commissioning of the AUTOTIP<sup>®</sup>, please read and understand all of the following safety information. Failure to follow these instructions may result in damage to the equipment or personal injury.

The AUTOTIP<sup>®</sup> is constructed to be safe to operate provided; only authorized personnel shall perform installation, commissioning, and maintenance and all safety precautions in these operating instructions shall be observed.

The accident prevention regulations as well as the safety specifications referenced below are observed ANSI/RIA R15.06-1999 Industrial Robots and Robot Systems —Safety Requirements.

The AUTOTIP<sup>®</sup> shall be integrated into a robot cell with independent safety system by plant engineering. Install within a secured area, which is only to be entered by qualified personnel for maintenance work or robot programming.

Before assembling, adjusting, or working with the AUTOTIP<sup>®</sup>, ensure all equipment in the area is locked out and disabled.

The AUTOTIP<sup>®</sup> is to be used only for tip replenishment within the parameters of its technical specification. Do not exceed the specified operating pressure of 85 PSI.

The AUTOTIP<sup>®</sup> may only be operated with the covers closed when operated independently.

Keep hands away from unit while in operation.  
Keep hands away from the clamp and tip changer operating space.

Shut off the air supply when making adjustments so that the equipment is not pressurized.

Additional fittings or accessories that are not offered from the manufacturer may only be installed with approval from the manufacturer.

Do not use the AUTOTIP<sup>®</sup> with corrosive or aggressive vapors or liquids without first obtaining approval from the manufacturer.

Ensure that there is nothing in the AUTOTIP<sup>®</sup> when shutting down the system.

Warning and instruction labels from the AUTOTIP<sup>®</sup> are not to be removed or defaced.  
For additional safety information, refer to the following publications:

ANSI STANDARD Z49.1, SAFETY IN WELDING AND CUTTING,  
American Welding Society, 550 LeJeune Rd. P.O. Box 351040, Miami, FL 33126

ANSI/RIA STANDARD R15.06-1999 Industrial Robots and Robot Systems —Safety Requirements  
American National Standards Institute, 1430 Broadway, New York, NY 10018

Canadian Standards Association; Z434-03 Industrial Robots and Robot Systems – General Safety Requirements.

5060 Spectrum Way, Mississauga, Ontario, L4W 5N6, CANADA

Safety Symbols used in this manual

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Moving parts can crush and cut. Keep hands away from the operating area of the tip clamp.</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Entanglement Hazard. Do not operate with exposed long hair, jewelry, or loose clothing.</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Disconnect power before servicing.</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Disconnect air supply before servicing.</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Do not use damaged, frayed, or deteriorated air hoses and fittings.</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Maintain safe operating pressure (85 psi).</p>

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# 1. AUTOTIP® Specifications

## PNEUMATIC SPECIFICATIONS

Pressure: 85 PSI +/- 5%

Flow: 13 CFM

**Caution: Use Filtered (5 µm), Clean, Regulated Air**

## ELECTRICAL SPECIFICATIONS

Voltage: 24 VDC +/- 10%

Current: 5.0 Amps DC

## PHYSICAL DIMENSIONS

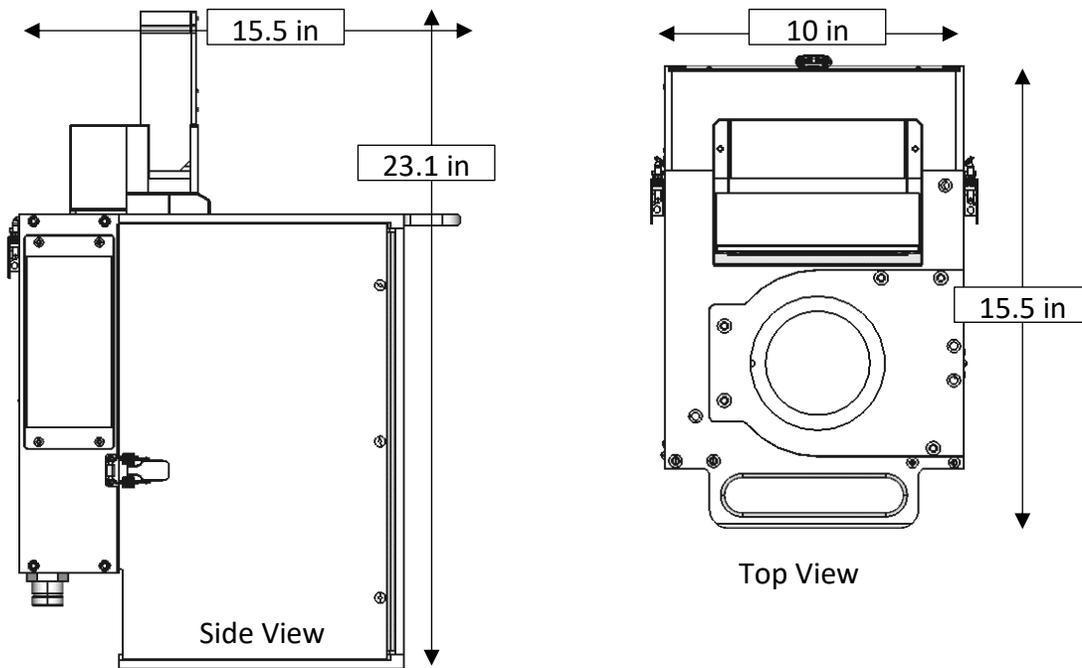
HEIGHT	WIDTH	DEPTH	NET WEIGHT
23.14 in 588 mm	15.5 in 343 mm	10.0 in 254 mm	86 lb. 39 kg

## 2. Installation

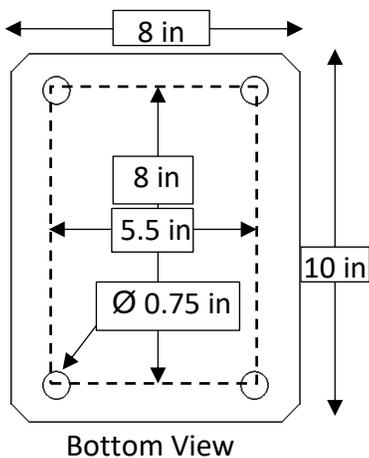
### Danger of accident when connecting the pneumatic or electrical supply!

- Prior to installation ensure that all protective measures have been taken and will remain in place while performing the installation.
- Ensure that the air supply and electrical power to the AUTOTIP® are disconnected until the installation is complete.
- The AUTOTIP® is installed onto the mounting box and stand within the weld cell at a convenient location. Be sure to consider movable fixtures, robot envelope, and maintenance personnel accessibility.

### Machine Dimensions

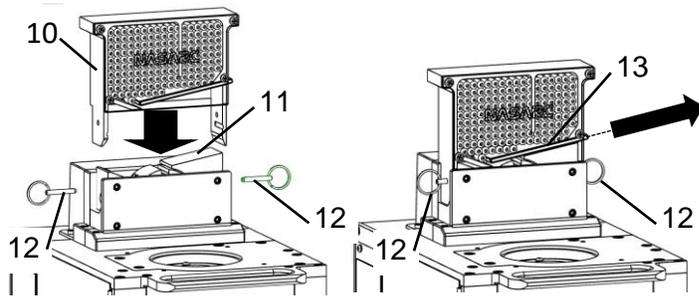
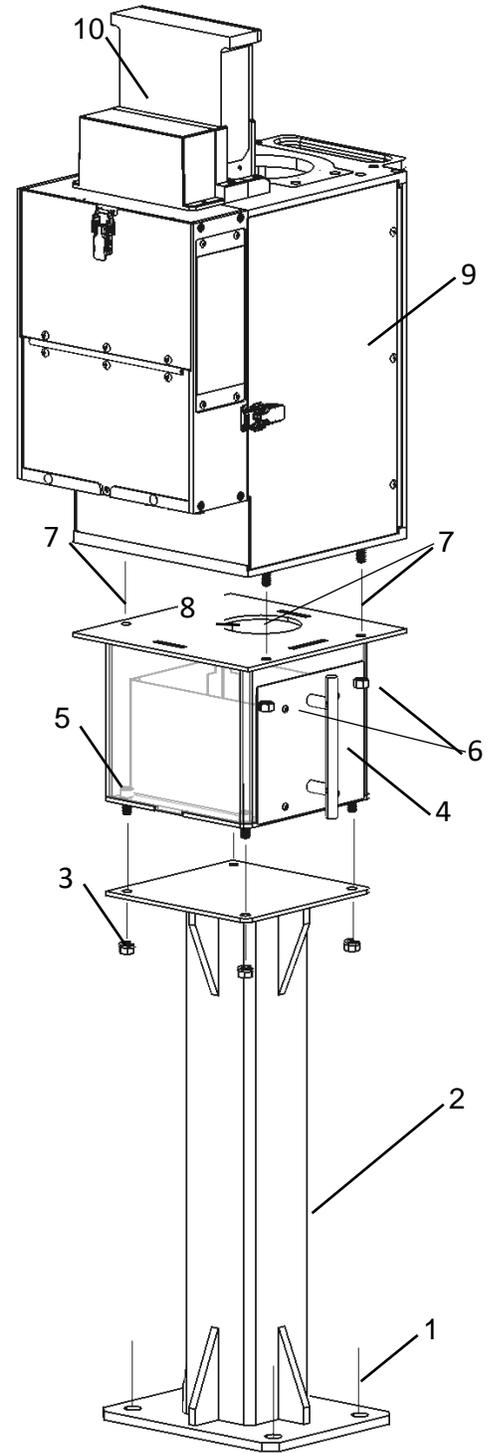


### Stand Base Dimensions



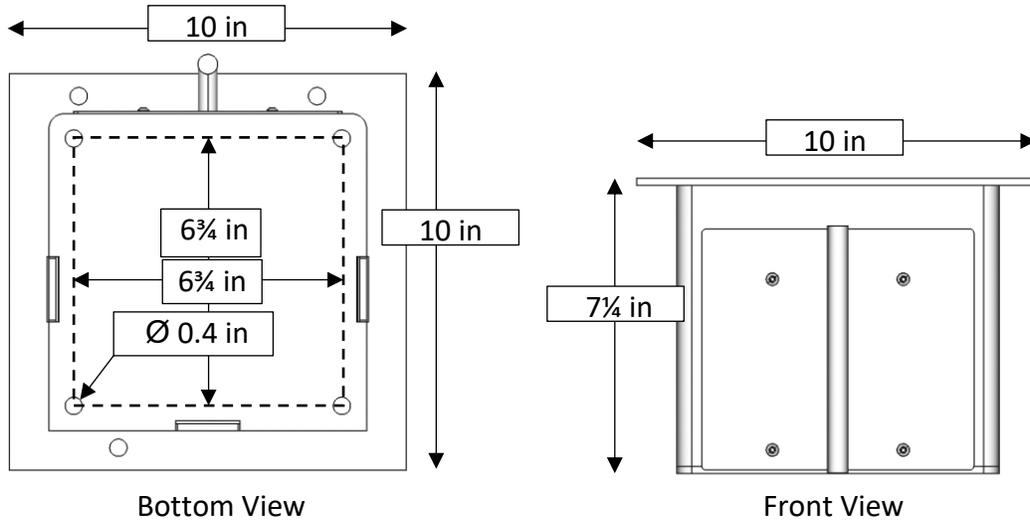
## 2.1. Assembly With Mounting Box and Stand

1. Secure the stand (item 2) to the floor using four (4) anchor bolts (not supplied) through the holes in the base of the stand (item 1).
2. Set the mounting box (item 8) on the stand in the proper orientation as shown.
3. Remove the drawer from the mounting box (item 4).
4. Insert four (4) box mounting bolts (item 5, 3/8-16x1" SHCS) through the floor of the box and top plate of the stand.
5. Fasten the box to the stand using four (4) nuts and washers (item 3, 3/8-16).
6. Set the AUTOTIP® (item 9) on the box in the proper orientation as shown.
7. Open the side doors of the AUTOTIP® and insert three (3) bolts (item 7, 3/8-16x1" SHCS) through the base plate of the AUTOTIP® and top plate of the mounting box.
8. Fasten the AUTOTIP® to the box by threading the bolts into the three (3) nuts with lock washers (item 6, 3/8-16x1" SHCS) provided.
9. Replace the drawer into the mounting box (item 4).
10. With locking pins (item 12) removed, insert the tip cartridge (item 10) into the slot on the top of the AUTOTIP® feeder assembly (item 11).
11. Remove the tab (item 13) from the cartridge, the tips will fall into place. Insert locking pins into the holes on each side.  
NOTE: do not discard the tab, it will be reused if the cartridge is removed with tips remaining inside.



## 2.2. Assembly with Mounting Box

The AUTOTIP® and mounting box may be installed on any surface in the robot cell. The bottom view of the mounting box base plate with through hole dimensions is shown below. Mount the box first then the AUTOTIP® on top. Follow steps 3-11 from section 2.1 above.



## 2.3. Air Connection

Use only regulated, filtered, clean air. Mount a 5 micron airline filter (not supplied) in the airline of the AUTOTIP®.

**AIR SUPPLY REQUIREMENTS: 85 PSI at 13 CFM.** Connect the inlet supply line to the quick connect pneumatic fitting located at the side of the AUTOTIP®.



## Electrical Connections

WARNING: Damage to equipment may occur if connected improperly. Only a qualified technician should perform the following operation.

Secure the connector into the receptacle at the base of the AUTOTIP®. Feed the other end through a strain relief into the robot controller cabinet.



### 2.4. Electrical Connection (Network I/O)

Connect Robot/PLC power via the 4-pin cable according to the following description.

Pin #	Colour	Robot Input / Output	Name	Description
1	Brown	Power	+24VDC Actuator	Connect to power supply (+) 24VDC, 4.5A min through safety circuit to disable solenoid power when required.
2	White	Power	+24VDC Control	Connect to power supply (+) 24VDC, 0.5A min for controls and sensor power.
3	Blue	Power	0VDC Control	Connect to power supply (-) 0VDC for controls and sensor power.
4	Black	Power	0VDC Actuator	Connect to power supply (-) 0VDC through safety circuit to disable solenoid power when required.

## 3. Network I/O (Ethernet/IP)

The AUTOTIP® communication module provides adapter class functionality through explicit messaging as an adapter device on the control LAN supporting Ethernet /IP protocol. The module has a capacity for 64 x 16bit inputs and outputs. Specific instructions for setup with the Allen Bradley Logix PLC is available upon request.

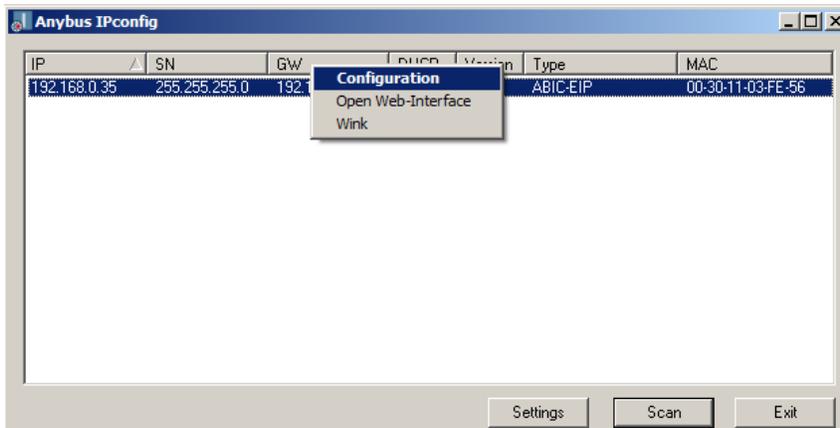
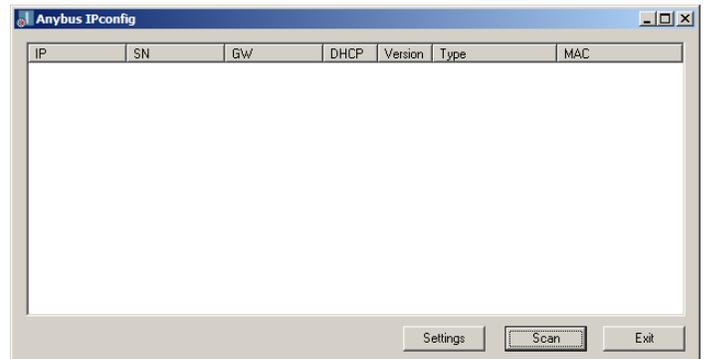
### 3.1. Network Setup

Outlined below is a procedure to assign an IP address to the AUTOTIP®. To perform the procedure, the following items are required:

- A PC with the “Anybus IPconfig” application installed. Anybus IPconfig may be downloaded and installed free of charge from.
- <https://nasarc.com/downloads/AUTOTIP/hms-IPConfig.zip>
- A CAT-5E or Cat-6 cable.
- A network switch or ethernet cable (dependent on hardware setup).

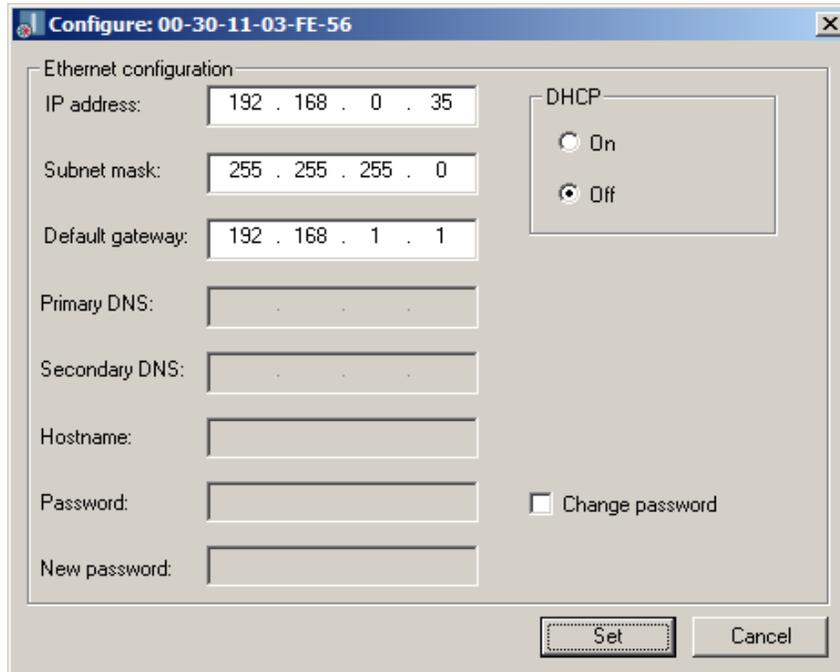
The steps to configure the IP settings for the AUTOTIP® are:

1. While connecting directly to the AUTOTIP®, a static IP address must be assigned to the PC in the same range (first three octets) as the desired IP address to be assigned to the AUTOTIP®. The subnet mask should be set to 255.255.255.0. The gateway address can be set to 0.0.0.0. Refer to online documentation for the PC and operating system on assigning a static IP.
2. Connect the PC to the AUTOTIP® through the appropriate networking hardware.
3. Start the Anybus IPconfig application installed on the PC.
4. The network connected to the PC will be scanned for HMS devices. If none are found then double check all of the connections, and the network parameters configured. After correcting any connectivity issues, click the “Scan” button inside the application.
5. Any HMS devices that are discovered will appear in the application window. Select the device to configure, and then right click to open the configuration menu.



## AUTOTIP®

- In the configuration dialog box, set the IP address, Subnet mask, and Default gateway as desired. Ensure that DHCP is set to “Off”. Click “Set”. Note that if configuring the AUTOTIP® to communicate with a different gateway than the default, 0.0.0.0, communication will not occur with the AUTOTIP® until the PC is reconfigured to operate on the same gateway



- To validate the settings, cycle the 24V power to the AUTOTIP®. Configure the PC to use the same parameters as the AUTOTIP® configuration. Ensure that the PC and AUTOTIP® have unique IP addresses. Use the IPconfig tool to ensure that the new settings have been applied correctly by scanning for the device again.

# AUTOTIP®

## 3.2. Data Map

Below is the network data that will be exchanged between the PLC scanner and the AUTOTIP® adapter.

### Ethernet/IP Output Data Map

Data output from PLC scanner to the AUTOTIP® adapter.

Output Byte 0,1:		
Bit	Name	Description
0	Remove	Remove the tip from the diffuser.
1	Replace	Replace a new tip into the diffuser.
2	Feed Tip	Feed tip(s) in the tip cartridge.
3..9		Reserved
10	Next	Next step in the sequence (optional use for programming and setup).
11	Home	Return internal mechanisms to their home position.
12	Reset	Reset the cycle.
13-15		Reserved

### Ethernet/IP Input Data Map

Data input from AUTOTIP® adapter to the PLC scanner.

Output Byte 0,1		
Bit	Name	Description
0	Ready	Clamps are open and unit is ready to start a new remove / replace / feed tip cycle.
1	Step Complete	The current operation (remove / replace / feed tip) has been completed.
2	Tip Required	There is no tip available in the tip feeder.
3	Error	An error has occurred in the sequence.
4	State Check	The AUTOTIP® has finished its current phase of operation.
5	Home	Mechanisms in the AUTOTIP® are at their home position.
6	Solenoid Power	Solenoid power is active.
7..11		Reserved
12	Local Mode	Machine is in Local Mode.
13..15		Reserved
Output Byte 2		1 <sup>st</sup> Error Code.
Output Byte 3		1 <sup>st</sup> Error State.
Output Byte 4		2 <sup>nd</sup> Error Code.
Output Byte 5		2 <sup>nd</sup> Error State.
Output Byte 6		3 <sup>rd</sup> Error Code.
Output Byte 7		3 <sup>rd</sup> Error State.
Output Byte 8		4 <sup>th</sup> Error Code.
Output Byte 9		4 <sup>th</sup> Error State.
Output Byte 10,11		Last State (16 Bit).
Output Byte 12..15		Cycle Count (32 Bit).

Both 16 bit and 32 bit integers are little endian (least significant byte / word first).

Refer to “Robot Programming” Section 6 for further description on the interaction between robot I/O signals and the AUTOTIP® sequence.

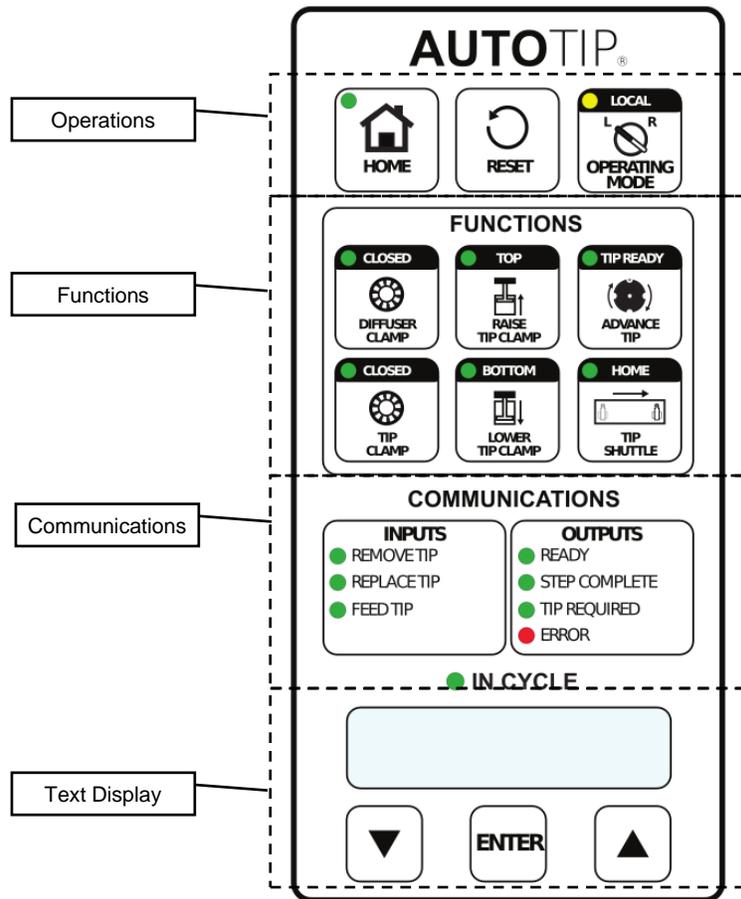
**Start Lock:** The start lock feature guards against a start signal present when the AUTOTIP® is powered up, or in an unsafe operating mode. If either of these conditions is true, the AUTOTIP® will not cycle immediately after powering up.

## 3.3. Alarm Codes

The AUTOTIP® features State-Based Alarming. The alarm code is shown on the LCD display. Contact Nasarc support for assistance in troubleshooting the alarm codes (technicalsupport@nasarc.com).

## 4. Operator Interface

The operator interface of the AUTOTIP® is found on the front plate of the machine.



## Operator Interface: Operations

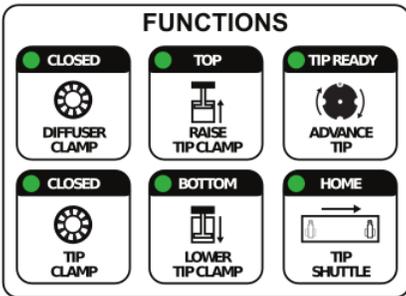


**HOME:** This button will command the internal mechanisms to return to home position if the unit is not currently running any automatic cycle. The indicator in the corner of the button turns on when the unit is at the home (clamps open) position.

**RESET:** This button is used to acknowledge alarms. Once pressed the unit will run a self-diagnostic and clear the alarm if the condition no longer exists.

**LOCAL / OPERATING MODE:** This button and indicator is used to control the operation of the unit from the local operator interface. The unit may not be operated from the robot, PLC, or web interface while the “LOCAL” LED is flashing. Pressing the button toggles between local and remote-control mode. For automatic operation of the unit from the robot or PLC press the OPERATING MODE button until the “LOCAL” LED turns off.

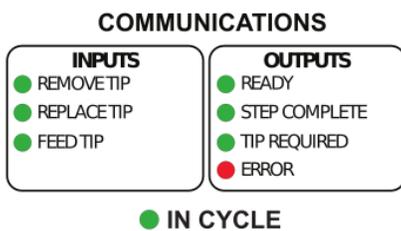
## Operator Interface: Functions



**Note: Change the operating mode to “LOCAL” to enable the following functions.**

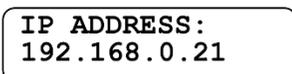
The buttons in the Functions section of the Operator Interface will activate the indicated function individually if the unit is not currently running any automatic cycle. The indicator in the corner of each button turns on when the function is activated.

## Operator Interface: Communications



The indicators in the Communications section of the Operator Interface show the current robot input / output and cycle status.

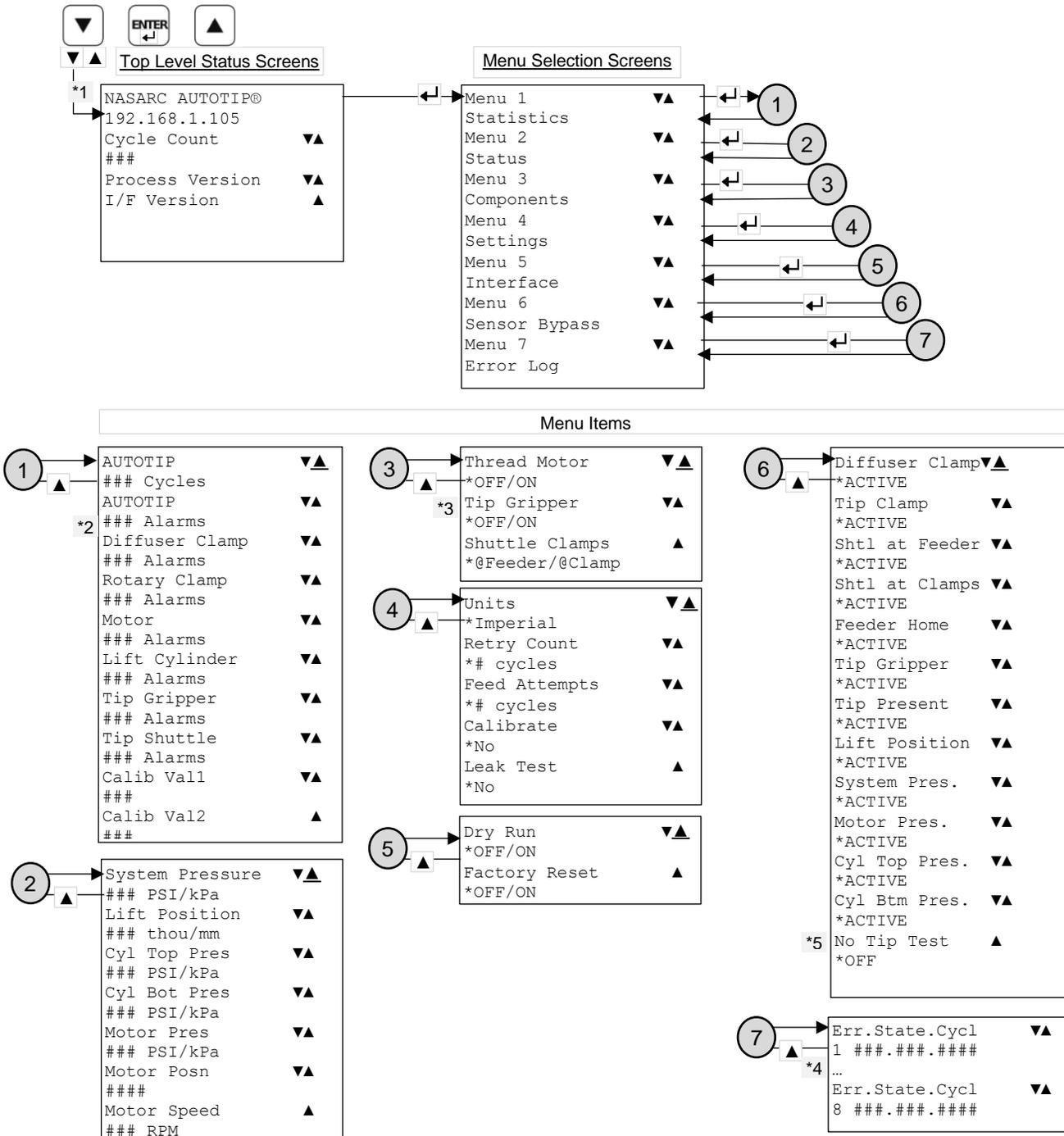
## Operator Interface: Text Display



The Text Display shows the IP address of the unit and will change to show the current alarm when one occurs.

See section 3.1 for a full description on setting the IP address.

## 5. LCD Menu Navigation:



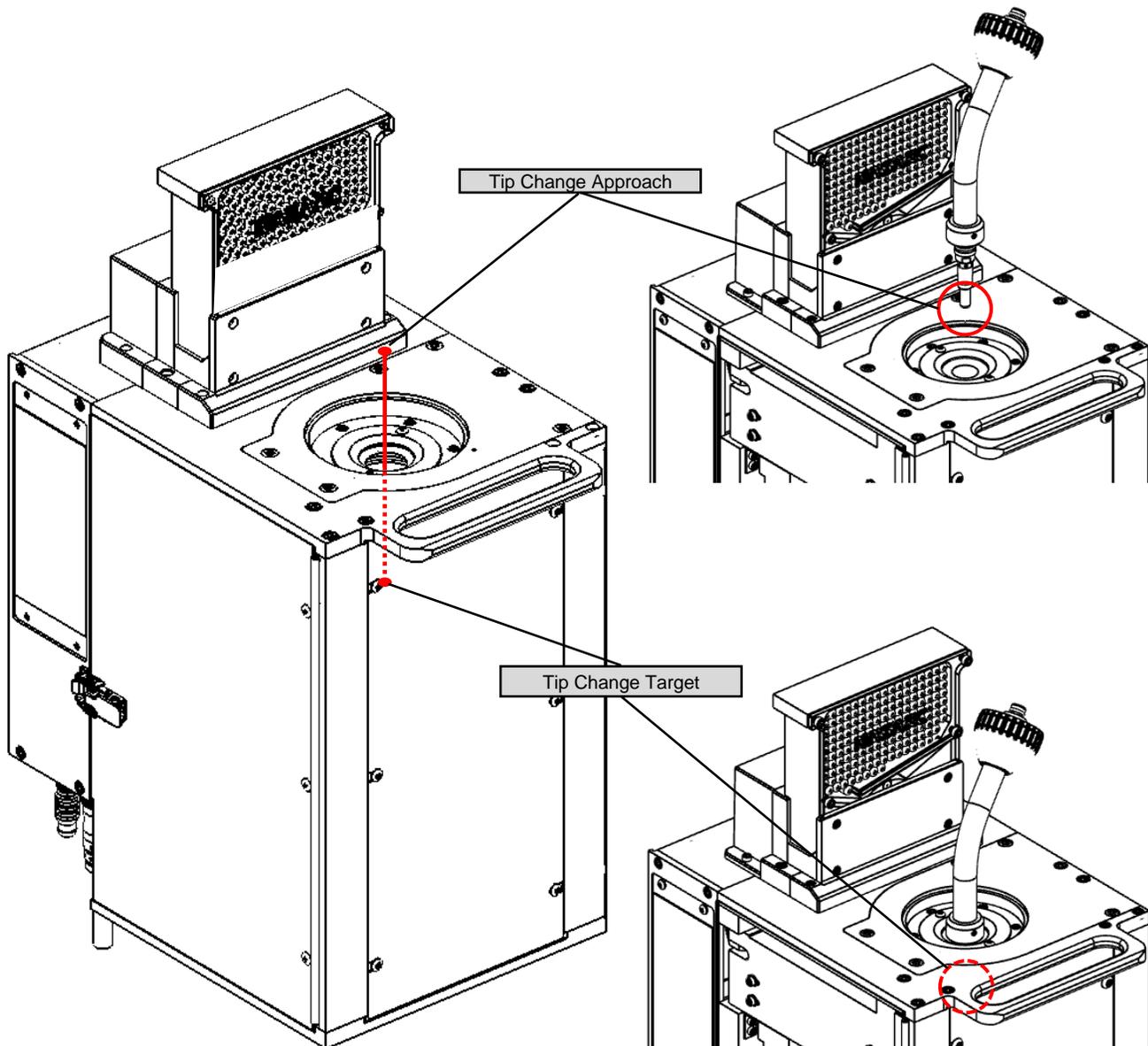
**Notes:**

- \*1: Press down and up buttons ▼ ▲ together at any time to return to the top-level status screens.
- \*2: Press the up button ▲ from the top menu item screen or up and enter buttons ▲ together to return to the menu selection screens.
- \*3: Press enter button to enable changing the parameter, make changes with down and up buttons ▼ ▲, press the enter button to accept the change.
- \*4: Press the enter button to see a description of the error at the selected index. (ATIF firmware x.1.6 and higher)
- \*5: Enable “No Tip Test” with a timer >= 500ms. Disable when timer = 0. (ATIF & ATPF firmware x.1.10 and higher)

## 6. Robot Programming:

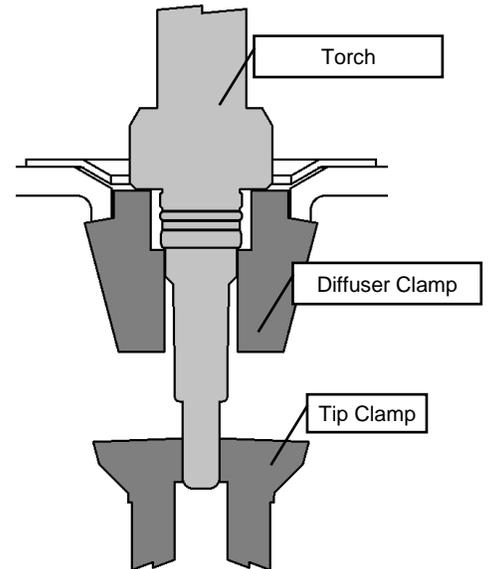
The following diagrams, procedures, and flow charts show the recommended programming method for robot TCP positions and logical flow sequence. Programming consists of a single sequence of tip removal and replacement. The sequence has an approach and target position as shown in the diagram below.

### Robot Programmed Positions



## 6.1. Tip Removal Procedure

1. The welding nozzle must be removed before the AUTOTIP® can be used. This is automatically done using the AUTOCLEAN® machine.
2. Using the robot outputs, retract the wire fully into the jump liner within diffuser.
3. Move the torch just above the top clamp and record this position as the *Tip Change Approach* position.
4. Check that the “Tip Required” signal is OFF. If this signal is ON, then pulse the “Feed Tip” output for 1 second and wait for the “Tip Required” signal to turn OFF.
5. Check that the “Ready” signal is ON, and the “Step Complete” signal is OFF. This signal includes a condition that both clamps are open. Move the tip linearly through center of the diffuser clamp and into the tip clamp. The height of the nozzle stop will be within a millimeter above the rubber ring on the top of the clamp at the target position.
6. In “Local” mode, use the operator interface to close and open the top clamp to verify concentricity and alignment of diffuser in clamp (see section 4). After ensuring that the concentricity of the diffuser in the top clamp is good, use the operator interface to close and open the tip clamp to verify the concentricity of the tip within the clamp. Make any adjustments required to the robot position until both the diffuser and tip are centered within their respective clamp.



**NOTE: Failure to ensure concentricity will greatly increase the possibility of wear and cycle errors.**

7. Record this robot torch position as the *Tip Change Target* position.
8. Press “Operating Mode” button to turn off “Local” mode.
9. Set the “Remove Tip” signal to ON.

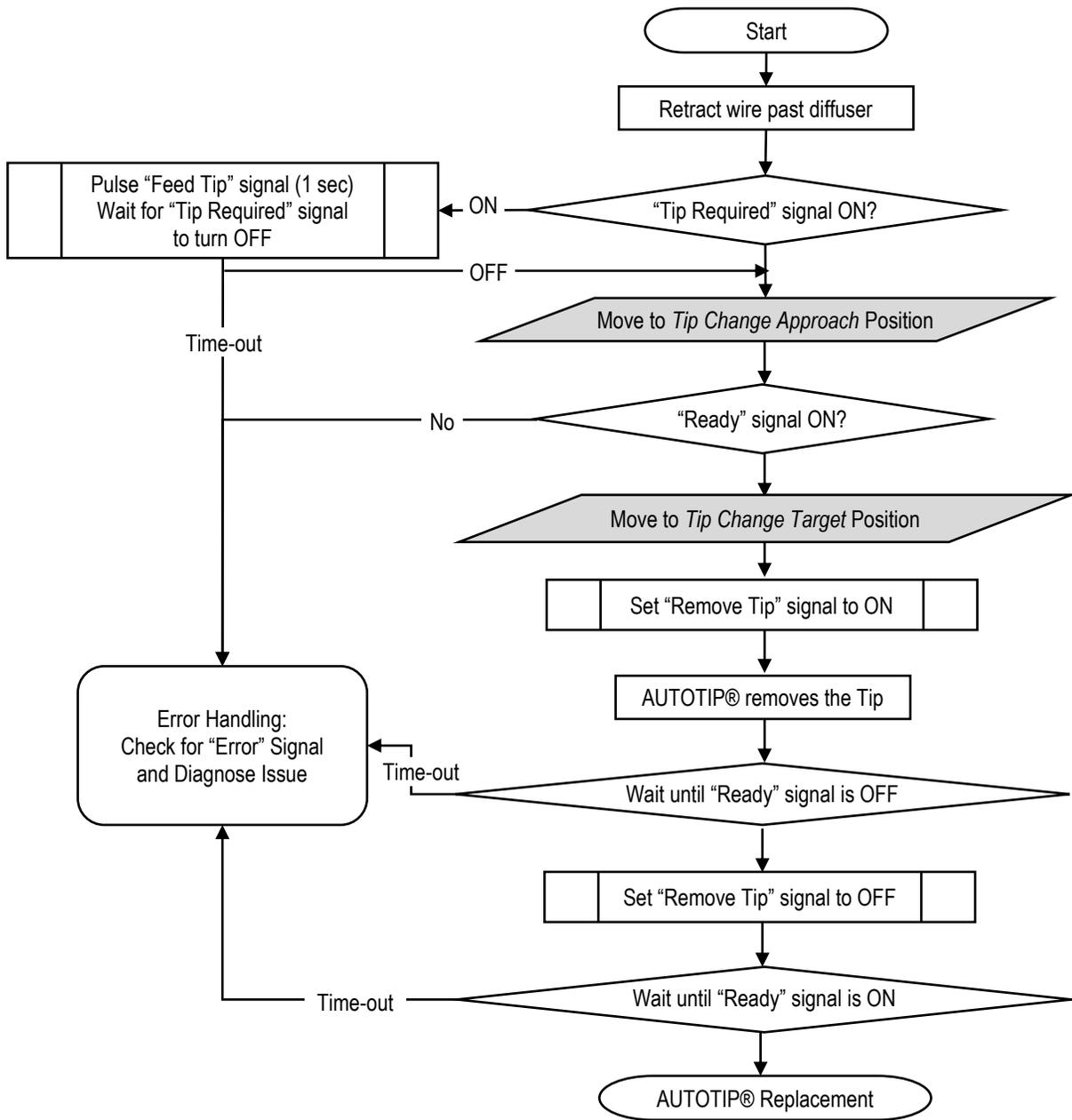


**WARNING: The clamp will operate under this condition, KEEP HANDS CLEAR of the operating space of the clamp.**

The AUTOTIP® will clamp the diffuser, clamp and remove the tip then release the diffuser. Check that the “Ready” signal turns OFF when the motion starts.

10. Wait until the “Ready” signal is OFF and the “Step Complete” signal turns ON.
11. Set the “Remove Tip” signal to OFF.
12. Check that “Ready” signal is ON, and the “Step Complete” signal is OFF.

**Tip Removal Flow Chart**



## 6.2. Tip Replacement Procedure

1. Maintain the robot at the *Tip Change Target* position (inside the top clamp). If the robot has moved away from the *Tip Change Target* position, first move the robot to the *Tip Change Approach* position, and then into the *Tip Change Target* position.
2. Check that the “Ready” signal is ON.
3. With “Local” mode off, set the “Replace Tip” signal to ON.



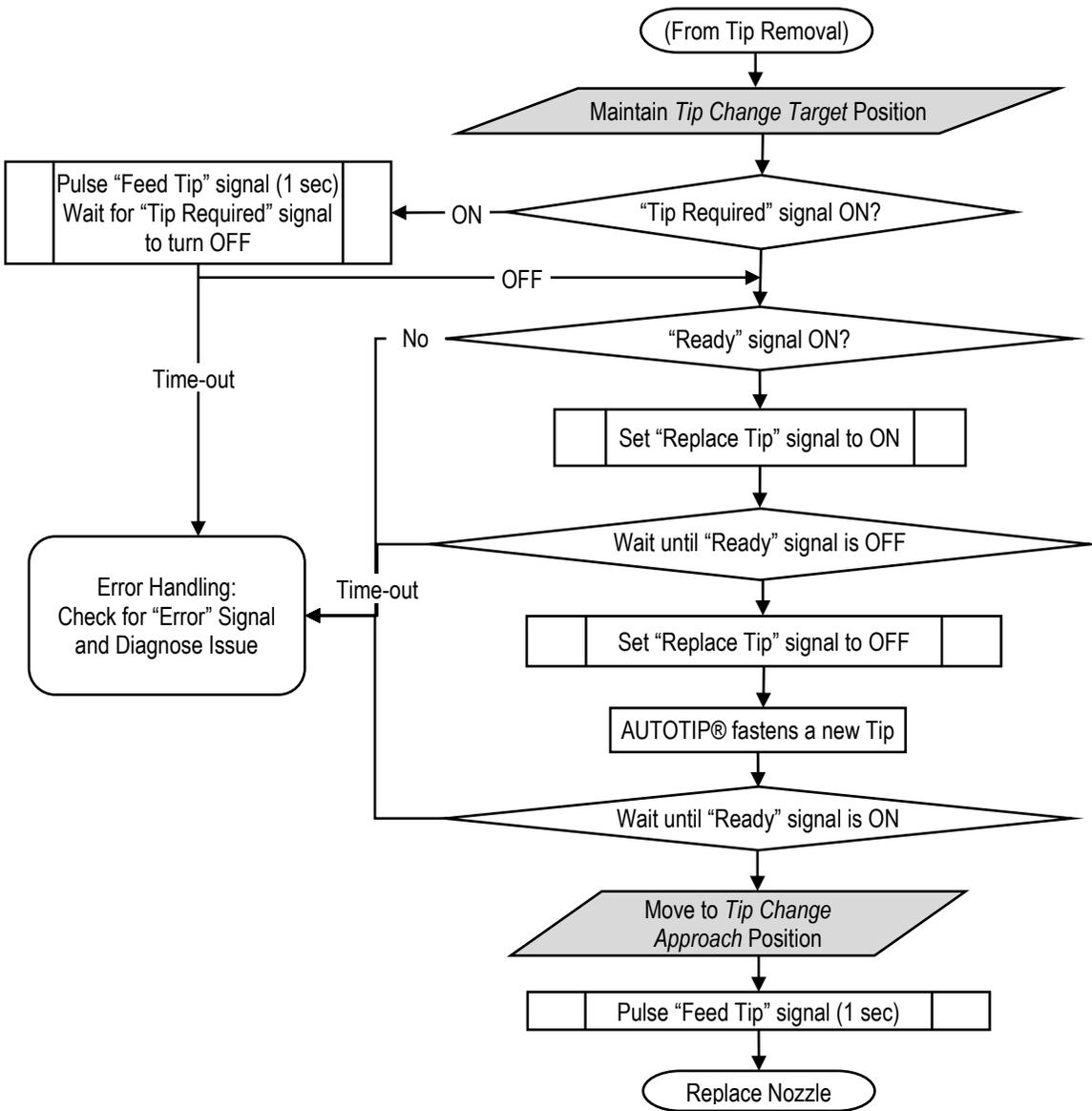
**WARNING: The clamp will operate under this condition, KEEP HANDS CLEAR of the operating space of the clamp.**

The AUTOTIP® will clamp the diffuser, fasten on a new tip then release the diffuser.

Note: the “Ready” signal and “Step Complete” will be OFF during this step.

4. Wait until the “Ready” signal is OFF and “Step Complete” signal is ON.
5. Move the robot torch back to the *Tip Change Approach* position, set the “Replace Tip” signal to OFF. The “Ready” signal will turn ON.
6. Pulse the “Feed Tip” signal for one second; the tip feeder will advance a new tip for the next cycle.  
NOTE: If a tip cannot be supplied from the cartridge, the “Tip Required” signal will remain on at this point.
7. Move the robot to the AUTOCLEAN® system to replace the nozzle.

**Tip Replacement Flow Chart**



**6.1. No Tip Test**

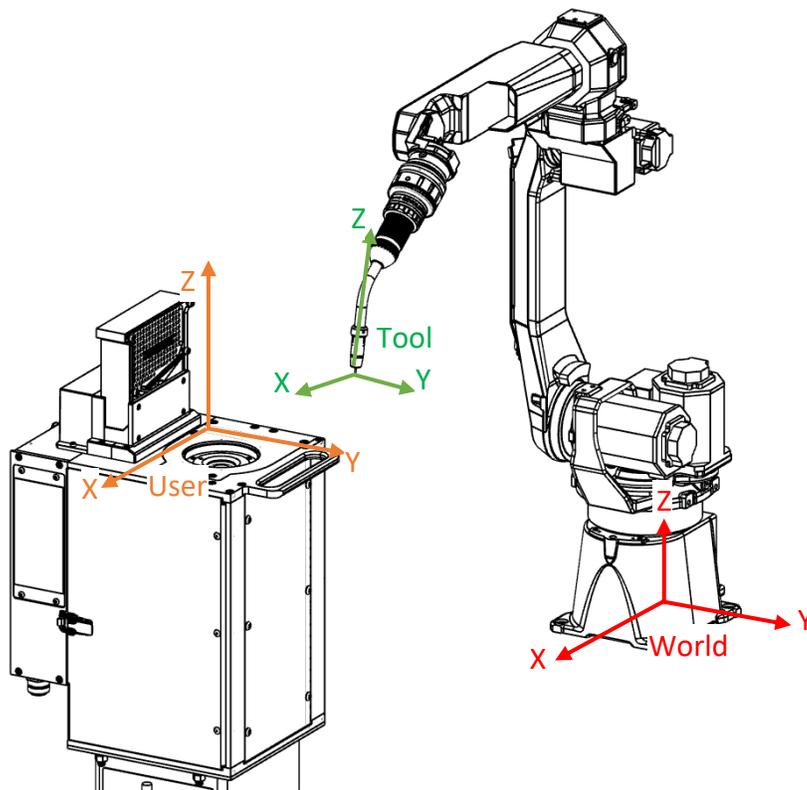
The No Tip Test will exercise all functions of the machine without removing, exchanging, or replacing a tip (ATIF & ATPF version x\_1\_10 and higher). All solenoids and sensors are used as in a normal cycle without checking for the presence of a tip. The robot will NOT enter the AutoTip when using this function but will send and receive the commands as normal. The No Tip Test is enabled from [Menu 6 Bypass] by changing \*Off to \*500ms or greater. The time indicated is used to delay sending the “Ready” signal back to the robot to emulate the true cycle time. A typical setting is 3000ms.

Remove the tip cartridge by first inserting the tab to avoid the tips falling out. Remove any remaining tips on the feeder assembly. Note: the first two replace cycles will dump the two tips that are already in the system. They can be recovered in the tray.

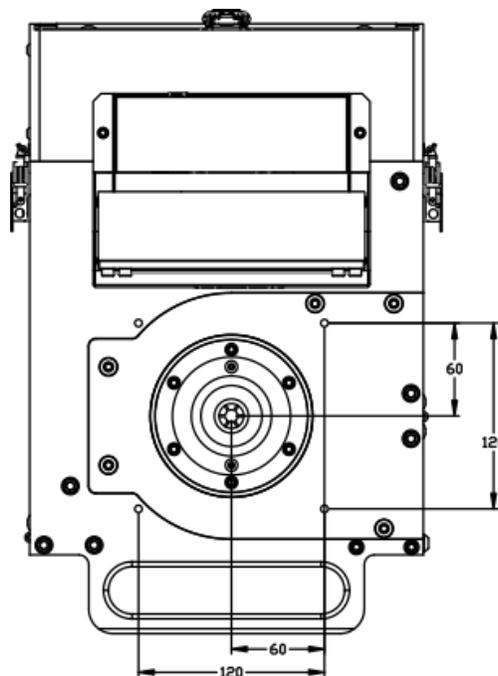
The No Tip Test setting will remain through a power cycle. Disable this function by setting the timer to 0 (\*Off).

## 6.2. User Frame

The User Frame is a standard feature in robot control software. It is the cartesian coordinate system that can be defined for a specific application. Refer to the robot software manual for specific steps on how to create and/or modify a user frame. Note: This feature is also referred to as “User Coordinates” or “Work Object” depending on the robot manufacturer.



Small marks have been applied to the top of the AUTOTIP® to enable user frame programming. With the User Frame programmed, the Z-axis of the tool and User frame may be aligned. The tip change approach and target position are (60,60) mm from the user frame origin as shown below.

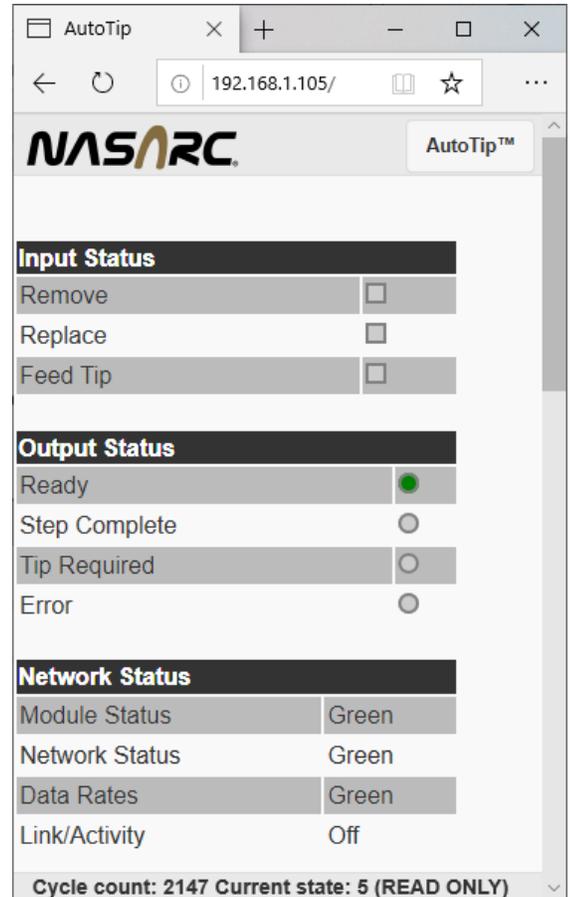
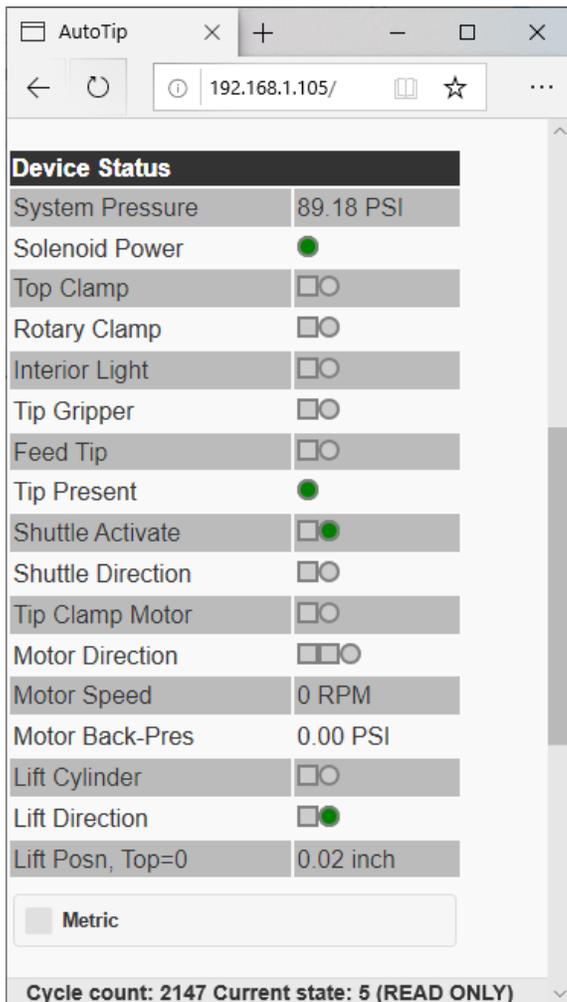


## 7. Web Server Interface

The AUTOTIP® features a Web Server Interface for enhanced diagnostics, configuration, remote monitoring, and analytics. Any modern web browser can be used to view the interface at the IP address shown in the LCD display of the front panel. The browser must be connected and communicating on the same LAN as the AUTOTIP®.

The Input Status, Output Status display the current state of each value by a square or circle. Squares represent commands to the machine, circle represents feedback from the machine. The Network Status table displays the real time value of each network LED.

The Device Status table shows the command and feedback for all internal actuators and sensor.

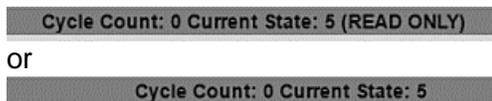


# AUTOTIP®

The Errors table displays the accumulated counts for each process. The Firmware table shows the current firmware version for all controllers within the unit.

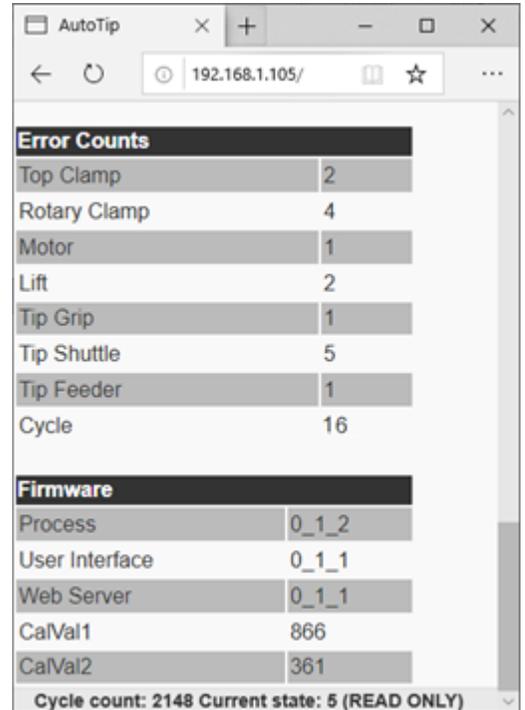
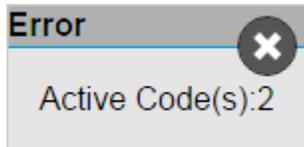
## 7.1. Read Only Mode

When a PLC or robot controller is controlling the AUTOTIP® via the network control protocol, Ethernet I/P, then the webserver is placed into READ ONLY Mode. The lower banner reflects the status of the read/write access.



## 7.2. Error Notification

If an error occurs in the AUTOTIP® operation, a popup will alert the user of the error code. Up to two error codes could be active at a time. The error may be reset via the network controller (PLC or Robot) or the operator interface while in READ ONLY mode.



## 7.3. IP Address Configuration

An isolated screen is available to change the IP address configuration.

Enter the IP address of the AUTOTIP® followed by '/secure/EtnConfig.shtm' for example 192.168.1.105/secure/EtnConfig.shtm.

If asked for a password then use the following- User: nasarc, Pass: nasarc

**Network Settings**

IP Address:

Subnet Mask:

Gateway Address:

DHCP Enabled:  On  Off

**IP Address:** A unique string of four numbers (0 – 255) separated by decimals that identifies the AUTOTIP® on the network.

**Subnet Mask:** A string of four numbers (0 – 255) separated by decimals that masks an IP address, and divides the IP address into network address and host address.

**Gateway Address (optional):** The IP address of the router (if used) on the network.

Press “Save” when complete. Note: The unit must be rebooted for the settings to take effect. A reboot may be done by power cycling the AUTOTIP® or clicking “Reboot” at the bottom of the Communications page.

## 8. Preventative Maintenance

The AUTOTIP® will require periodic maintenance to ensure a dependable service life. The following schedule is recommended.

### **⚠ WARNING**

- Turn the electrical power off.
- Turn off or remove pressurized air supply.
- Only qualified persons should install, use, or service this

#### **DAILY**

1. Check airline to the unit for leaks.
2. Check the air supply filter for liquid collected and drain if necessary.
3. Visually check the unit for damage.
4. Check robot TCP for accuracy on target positions.

#### **WEEKLY**

1. Clean the diffuser clamp and tip clamp gripping surfaces to ensure optimal gripping.
2. Check tip cartridge for adequate quantity, replace tip cartridge if necessary.
3. Open the side door(s) to inspect and clear out the inside and floor of the machine from debris, tips, or spatter.
4. Check the robot control cable for splits or cracks.

#### **MONTHLY**

1. Remove and clean out the tip catch tray (located in the stand under the unit).
2. Check the torque applied to the tip, adjust if necessary. Contact Nasarc technical support for further instructions.
3. Wipe the outside surfaces of the machine to remove accumulated debris.

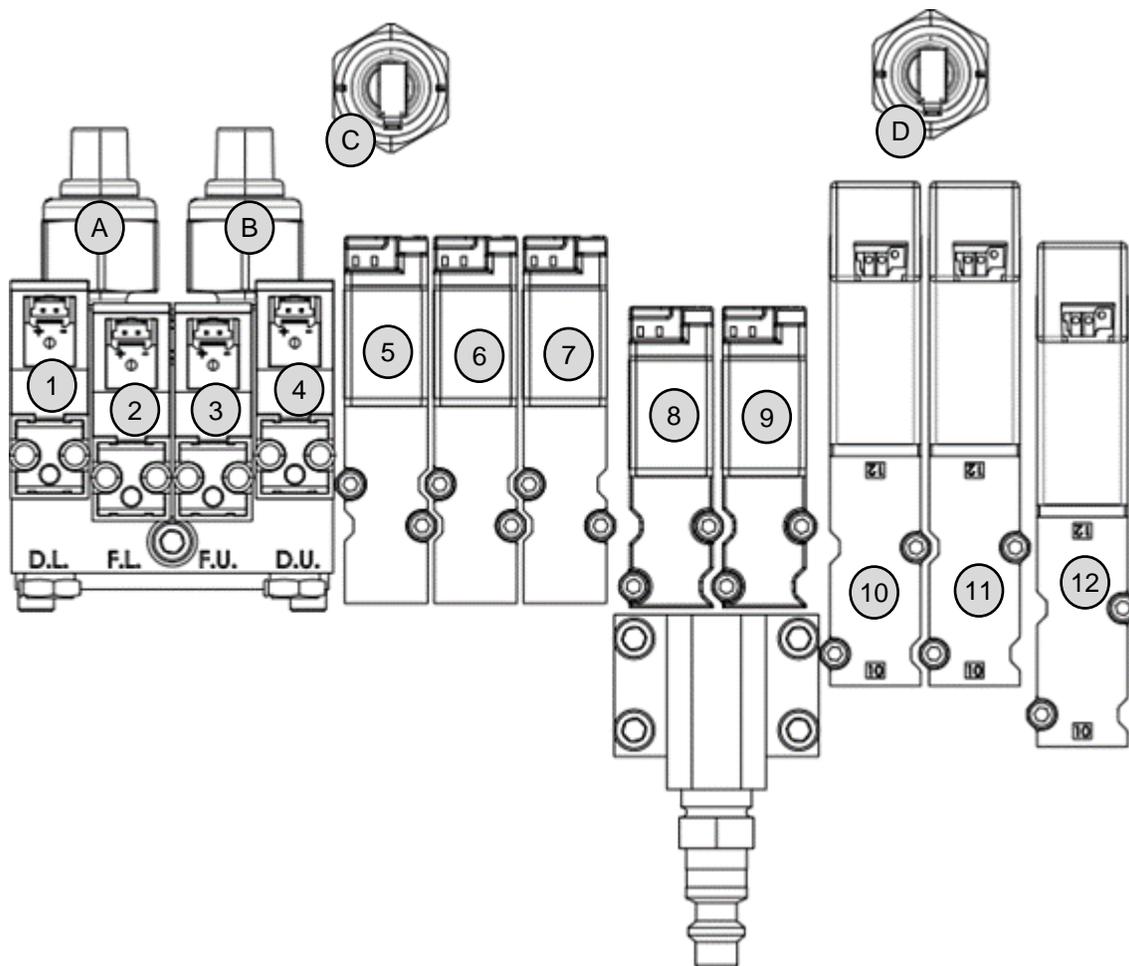
**9. Troubleshooting**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
No device status or LEDs on	<ul style="list-style-type: none"> <li>- Power is off</li> <li>- Fuse is blown (controller cabinet or terminal board)</li> <li>- Control board defective</li> </ul>	<ul style="list-style-type: none"> <li>- Turn power on</li> <li>- Replace fuse</li> <li>- Replace control board</li> </ul>
Clamp/Motor/Lift not working	<ul style="list-style-type: none"> <li>- Insufficient air supply</li> <li>- Low voltage on actuator power</li> <li>- Air line cut, disconnected, or twisted</li> <li>- Excessive spatter buildup</li> <li>- Dry run mode selected</li> <li>- Defective solenoid</li> </ul>	<ul style="list-style-type: none"> <li>- Press “Local” to set Remote mode</li> <li>- Connect to 24VDC, 4.5A</li> <li>- Set to 85 PSI, 13 SCFM</li> <li>- Replace or re-connect airline</li> <li>- Reset AUTOTIP®</li> <li>- Replace necessary solenoids</li> <li>- Check connections and cable(s)</li> <li>- Contact Nasarc with error code</li> </ul>
Controller cannot start a cycle or complete a cycle	<ul style="list-style-type: none"> <li>- “Complete” input signal not responding</li> <li>- Unit in “Local” mode</li> </ul>	<ul style="list-style-type: none"> <li>- Reset AUTOTIP®</li> <li>- Press “Mode” button to change mode to “Remote”</li> </ul>
Tips are not torqued adequately	<ul style="list-style-type: none"> <li>- Insufficient air supply</li> <li>- Air line cut, disconnected, or twisted</li> <li>- Internal pressure regulator is set low</li> <li>- Tip collet is slipping when tightening the tips</li> <li>- Tips are incorrect, or non-cylindrical</li> <li>- Tip replace target position is incorrect</li> </ul>	<ul style="list-style-type: none"> <li>- Set to 85 PSI, 13 SCFM</li> <li>- Replace or re-connect airline</li> <li>- Adjust internal pressure regulator</li> <li>- Use only approved tips provided with the cartridge</li> <li>- Reprogram target position</li> <li>- Replace diffuser</li> </ul>
Receiving “Tip Required” signal before the cartridge is empty, or Tips are not feeding correctly	<ul style="list-style-type: none"> <li>- Tips are jammed or not moving through the cartridge</li> <li>- Defective tip sensor or feed sensor</li> <li>- No retries are being performed</li> <li>- Defective tip feed motor</li> </ul>	<ul style="list-style-type: none"> <li>- Tap back of cartridge to nudge tip movement</li> <li>- Replace cartridge</li> <li>- Replace required sensor</li> <li>- Adjust number of feed attempts setting from LCD menu</li> <li>- Replace motor</li> </ul>
Diffuser is not clamping properly	<ul style="list-style-type: none"> <li>- Spatter has built up on the inner diameter of the diffuser gripping collet</li> <li>- Tip remove/replace target position is incorrect</li> </ul>	<ul style="list-style-type: none"> <li>- Clean the collet with a brush to remove the spatter</li> <li>- Reprogram target position</li> <li>- Replace diffuser</li> </ul>
Tips are not clamping properly	<ul style="list-style-type: none"> <li>- Tip gripper is damaged</li> <li>- Tip grip sensor is malfunctioning</li> </ul>	<ul style="list-style-type: none"> <li>- Test and replace damaged components</li> </ul>
Tips are not shuttling properly	<ul style="list-style-type: none"> <li>- Shuttle rail is misaligned</li> <li>- Shuttle rail is damaged</li> <li>- Shuttle cylinder or solenoid is malfunctioning</li> <li>- Tip gripper is damaged</li> <li>- Shuttle velocity controls are set incorrectly</li> <li>- Tip lift cylinder is not at bottom position</li> </ul>	<ul style="list-style-type: none"> <li>- Check for interference in shuttle movement (wire stick-out).</li> <li>- Test and replace damaged components</li> <li>- Adjust flow needle valves</li> <li>- Check lift cylinder function</li> </ul>

For advanced troubleshooting, contact Nasarc technical support with serial number, symptom, and/or error information (code(s) and state(s)).

## 10. Pneumatic Diagram

The diagram below shows the layout for pneumatic valves mounted in the control hub.

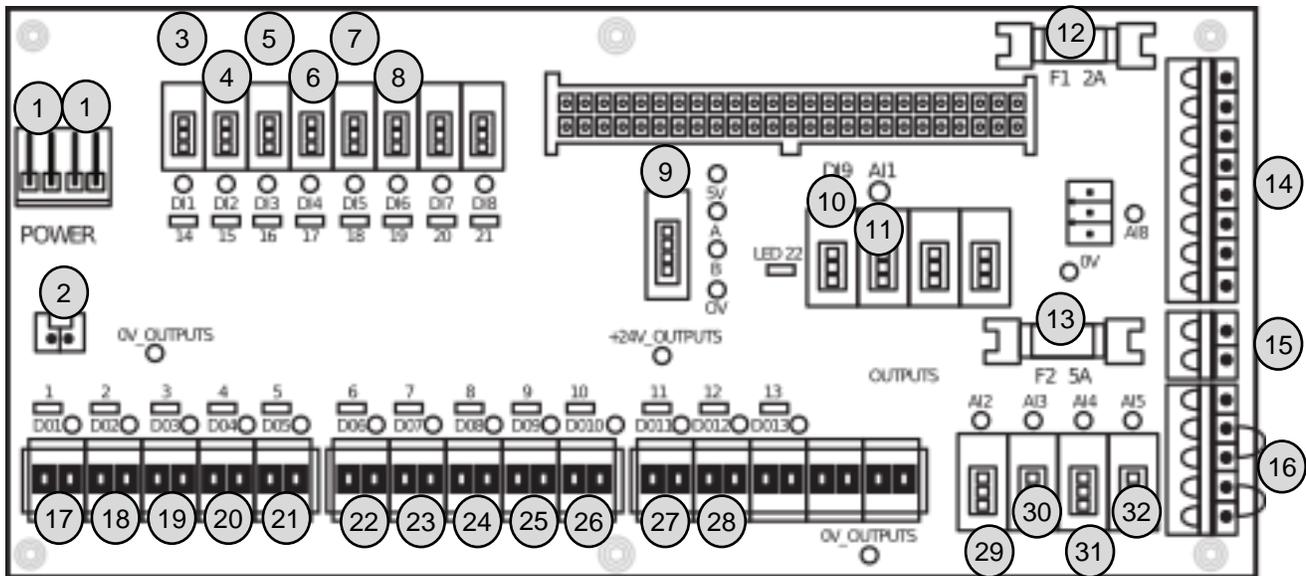


A	Lower Pressure Sensor
B	Upper Pressure Sensor
C	System Pressure Sensor
D	Motor Pressure Sensor
1	Dump Lower, 3-way valve
2	Fill Lower, 3-way valve
3	Fill Upper, 3-way valve
4	Dump Upper, 3-way valve

5	Diffuser Clamp, 4-way valve
6	Tip Clamp, 4-way valve
7	Tip Gripper, 4-way valve
8	Shuttle to Tip Clamp, 3-way valve
9	Shuttle to Cartridge, 3-way valve
10	Unthread Direction, 4-way valve
11	Thread Direction Unregulated, 4-way valve
12	Thread Direction Regulated, 4-way valve

## 11. Electrical Diagram

The diagram below shows the layout for sensors, solenoids, and robot wiring on the terminal block board



1	Interior Light (x2)
2	Stepper Motor Power
3	Diffuser Clamp Sensor
4	Tip Clamp Sensor
5	Tip Gripper Sensor
6	Shuttle at Clamp Sensor
7	Shuttle at Feeder Sensor
8	Tip Feed Position Sensor
9	Motor Encoder Sensor
10	Tip Present Sensor
11	Lift Position Sensor
12	F1 Control Fuse
13	F2 Solenoid Fuse
14	Reserved
15	Robot Power
16	E/IP Power

17	Dump Lower Solenoid
18	Fill Lower Solenoid
19	Fill Upper Solenoid
20	Dump Upper Solenoid
21	Diffuser Clamp Solenoid
22	Tip Clamp Solenoid
23	Tip Gripper Solenoid
24	Shuttle Clamps Solenoid
25	Shuttle Docked Solenoid
26	Unthread Direction Solenoid
27	Thread Unregulated Solenoid
28	Thread Regulated Solenoid
29	Lower Pressure Sensor
30	Upper Pressure Sensor
31	System Pressure Sensor
32	Motor Pressure Sensor

## 12. Parts List

Use the following part numbers when ordering replacement parts for the AUTOTIP®.

<b>Part number</b>	<b>Description</b>
NAT03-9R	DIFFUSER CLAMP ASSEMBLY
NAT06R	AUTOTIP LIFT SENSOR ASSEMBLY
NAT27R	TIP CLAMP ASSEMBLY
NTE13R	AUTOTIP TERMINAL BLOCK BOARD ASSEMBLY
NTE14R	TIP SENSING BOARD ASSEMBLY
NTE15R	LCD DISPLAY BOARD REPLACEMENT ASSEMBLY
NTE20-A	AUTOTIP MOTOR PRESSURE SENSOR ASSEMBLY
NTE20-B	AUTOTIP SYSTEM PRESSURE SENSOR ASSEMBLY
NTE20-C	UPPER PRESSURE SENSOR ASSEMBLY
NTE20-D	LOWER PRESSURE SENSOR ASSEMBLY
NTE21-A	AUTOTIP MOTOR ENCODER SENSOR ASSEMBLY
NTE22-A	TIP CLAMP PROXIMITY SENSOR ASSEMBLY
NTE22-B	TIP FEEDER SENSOR ASSEMBLY
NTE23-A	DIFFUSER CLAMP SENSOR ASSEMBLY
NTE25-A	TIP GRIPPER REED SWITCH ASSEMBLY
NTE26-A	SHUTTLE SENSOR SHORT ASSEMBLY
NTE26-B	SHUTTLE SENSOR LONG ASSEMBLY
NTE33R	AUTOTIP MEMBRANE ASSEMBLY
NTP01R	AUTOTIP SHUTTLE SOLENOID ASSEMBLY
NTP02R	AUTOTIP MOTOR SOLENOID ASSEMBLY
NTP03R	AUTOTIP 4 WAY SOLENOID ASSEMBLY
NTP06R	AUTOTIP LIFT SOLENOID ASSEMBLY
NTP30R	THREADING MOTOR ASSEMBLY
NTE31R	AUTOTIP STEPPER MOTOR ASSEMBLY
NTP50R	AUTOTIP MOTOR REGULATOR ASSEMBLY
<b>Machines with Ethernet/IP Interface</b>	
NTE18	AUTOTIP PROCESS BOARD W- ETHERNET
NCCA-F-xx	ETHERNET/IP 4 PIN POWER CABLE
NCCD-R-xx	ETHERNET/IP M12/RJ45 CABLE

xx: cable length (ft) 30,50

Tip Cartridges with 175 tips are ordered with the following part number code:

NTTX-YY-175-1      X: Material. B=Copper, C=CuCrZr      YY: Tip ID. 35=0.035", 40=0.040", 45=0.045"

# AUTOTIP

## 13. Warranty

### NASARC Cert-Equip WARRANTY POLICY

**AUTOTIP®** Tip Changers are warranted by **NASARC** to the original commercial or institutional end user/owner against defects in materials and workmanship as follows:

Motor, solenoids, circuit board, cylinders – 1 year  
External parts, wire cutters, cables, and accessories – 90 days

The warranty becomes effective on the date of purchase. During the warranty period, equipment covered by the warranty and found to be defective will be repaired or replaced at the manufacturer's discretion without charge. The manufacturer's responsibility is limited to repair or replacement of damaged or defective parts. The equipment must be returned, transportation charges prepaid with proof of purchase date, to an authorized service center or to **NASARC**. If a product warranty card has not been completed or proof of purchase is not available, the warranty will be deemed to become effective at the time the product leaves the factory authorized **NASARC** warehouse. Warranty repair service does not extend the period of warranty beyond the original period. The warranty is not transferable.

This warranty is considered null and void in the case of damage caused by abuse, misuse, accident, or any other cause that is not the result of defective materials or workmanship.

Repair or replacement is the exclusive remedy for defective equipment under this warranty. This warranty is in lieu of all other warranties written and implied, including any implied warranty of fitness for a particular purpose of this equipment. **NASARC** shall not be liable for any consequential or incidental damages for breach of any express or implied warranty of this equipment.

The month of manufacture can be found on the serial plate

```
+----- yy:  Year
| +----- mm:  Month (01 .. 12)
| | +---- nnn:  Unit number within the month (001..999)
| | |
ATyymmnnn
```

For example, AT2208033 is the 33<sup>rd</sup> unit manufactured in August (08) of 2022 (22)