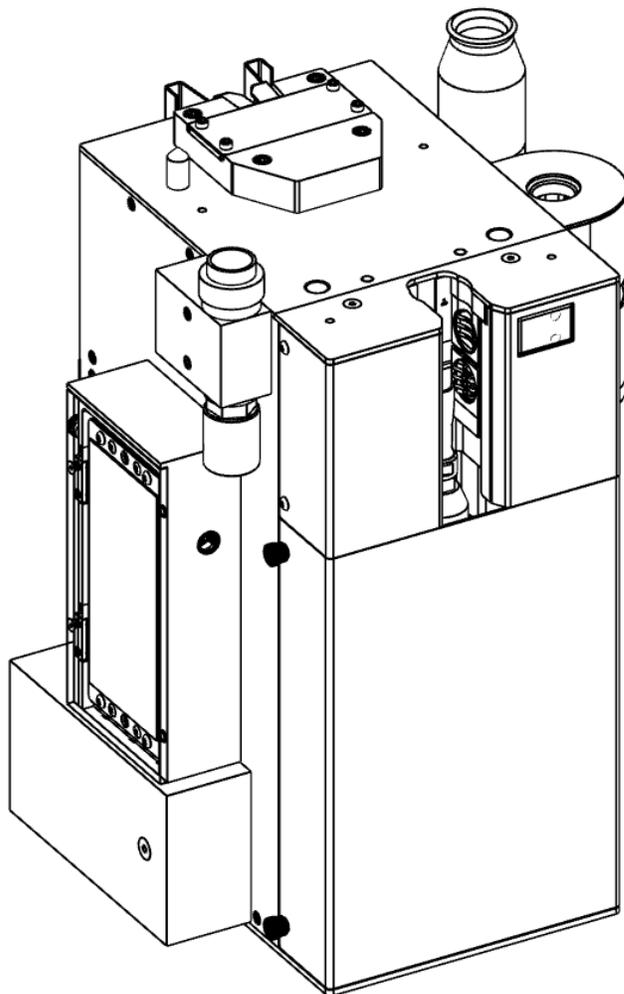


AUTOCLEAN[®]



Safety Depends on You

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

OPERATIONS MANUAL

Safety Information

Before installation and commissioning of the AUTOCLEAN® 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 AUTOCLEAN® 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 AUTOCLEAN® shall be integrated into a robot cell with an independent safety system implemented 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 AUTOCLEAN®, ensure all equipment in the area is locked out and disabled.

The AUTOCLEAN® is to be used only for nozzle removal and cleaning within the parameters of its technical specification.

Do not exceed the specified operating pressure of 85 PSI.

The AUTOCLEAN® may only be operated with the cover closed when operated independently.

Keep hands away from unit while in operation.

Keep hands away from the clamp and cleaner operating space.

Keep hands away from the wire cutter.

Keep hands and exposed long hair, jewelry or loose clothing away from the reamer and wire brush.

Safety glasses must be worn at all times while working in the vicinity of the AUTOCLEAN®.

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 AUTOCLEAN® with corrosive or aggressive vapors or liquids without first obtaining approval from the manufacturer.

Ensure that there is nothing in the AUTOCLEAN® when shutting down the system.

Warning and instruction labels from the AUTOCLEAN® 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 Information

Safety Symbols used in this manual

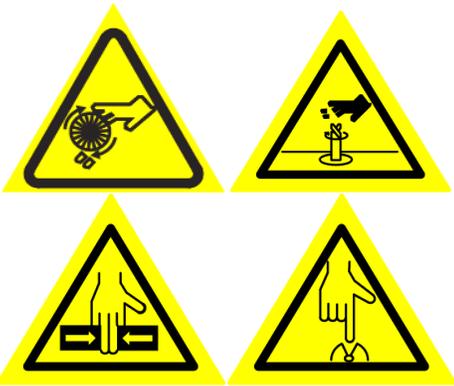
	<p>⚠ WARNING</p> <p>Moving parts can crush and cut.</p> <p>Keep hands away from the operating area of the reamer, clamp, wire brush, and wire cutter.</p>
	<p>⚠ WARNING</p> <p>Rotating reamer and wire brush.</p> <p>Keep hands away from the operating area of the reamer and wire brush.</p>
	<p>⚠ WARNING</p> <p>Entanglement Hazard.</p> <p>Do not operate with exposed long hair, jewelry, or loose clothing.</p>
	<p>⚠ WARNING</p> <p>Disconnect power before servicing.</p>
	<p>⚠ WARNING</p> <p>Disconnect air supply before servicing.</p>
	<p>⚠ WARNING</p> <p>Do not use damaged, frayed, or deteriorated air hoses and fittings.</p>
	<p>⚠ WARNING</p> <p>Maintain safe operating pressure (85 psi).</p>

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1. AUTOCLEAN® Specifications

PNEUMATIC SPECIFICATIONS

Pressure: 85 PSI +/- 5%

Flow: 22 CFM

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

ELECTRICAL SPECIFICATIONS

Voltage: 24 VDC +/- 10%

Current: 1.0 Amps DC

WIRE CUTTING SPECIFICATIONS

Minimum wire diameter: 0.030" (0.8 mm)
Maximum wire diameter: 0.063" (1.6 mm)

ANTI SPATTER FLUID SPECIFICATIONS

Use recommended water based anti spatter fluid in this product.
Do not use oil based anti spatter fluid.

PHYSICAL DIMENSIONS

HEIGHT	WIDTH	DEPTH	NET WEIGHT
18 in 457 mm	10.0 in 254 mm	11.5 in 292 mm	88 lb. 40 kg

AUTOCLEAN®

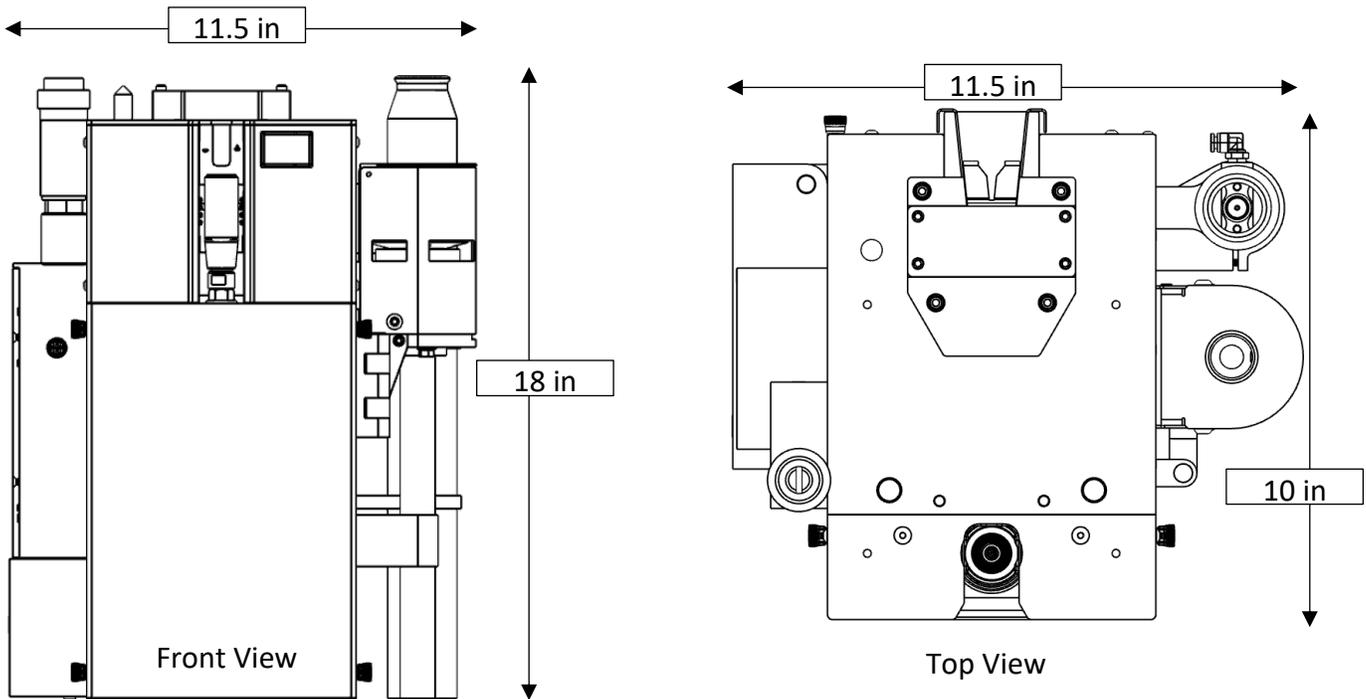
I/O

2. Installation

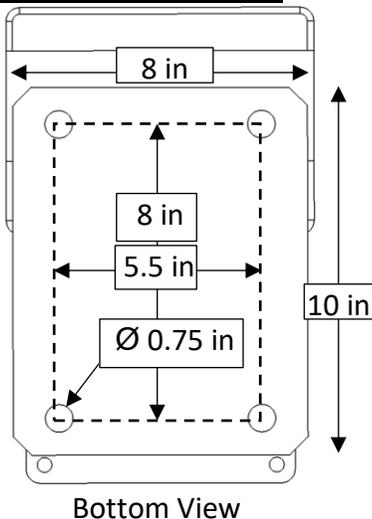
Danger of accident when connecting the pneumatic or electrical supply!

- 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 AUTOCLEAN® are disconnected until the installation is complete.
- The AUTOCLEAN® is installed onto the mounting box and stand within the weld cell at a convenient location. Be sure to consider movable fixtures, robot access, and maintenance personnel accessibility.

Machine Dimensions

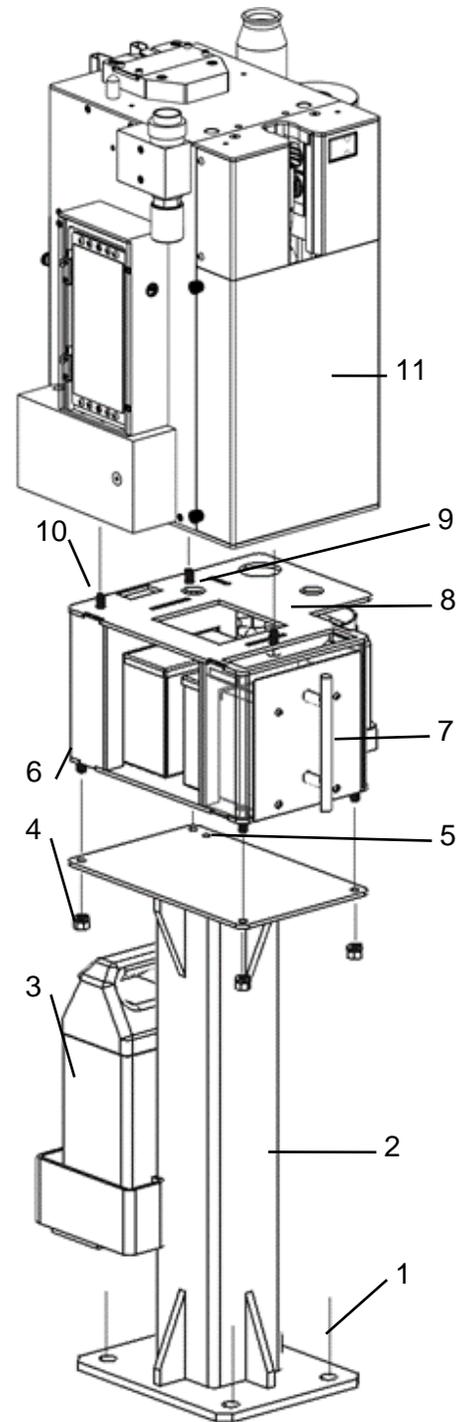
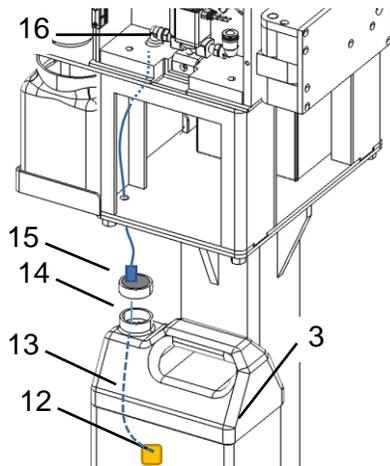


Stand Base Dimensions



2.1. Assembly With Mounting Box and Stand

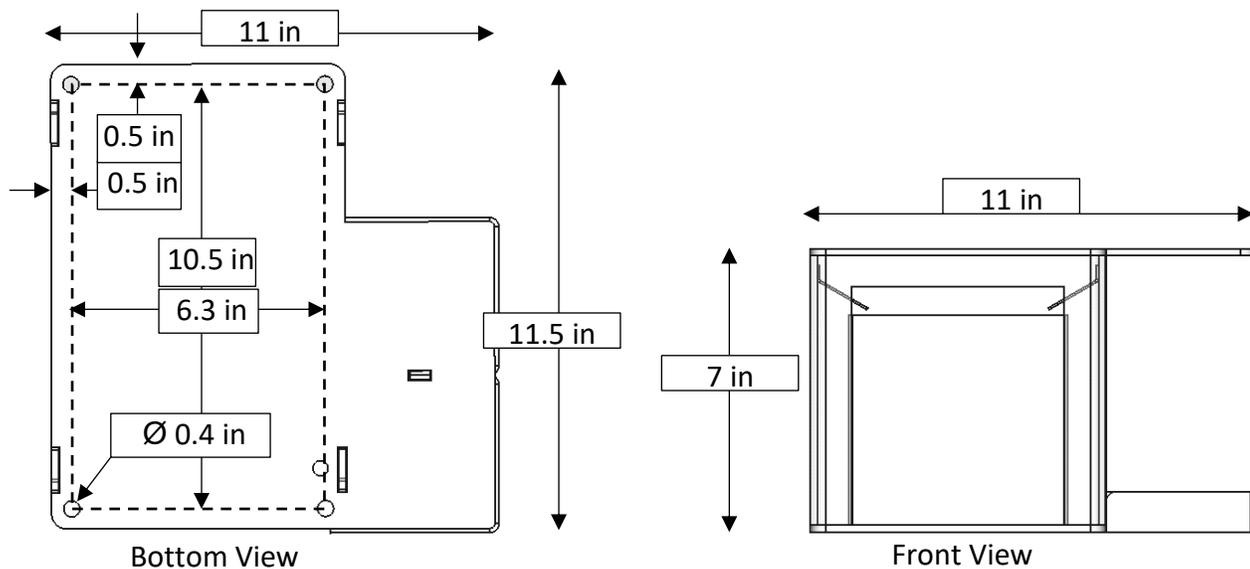
1. Secure the stand (item 2) to the floor using four (4) anchor bolts (not supplied) through the holes in the base of the stand (item 1).
2. Set the box (item 8) on the stand in the proper orientation as shown. Use the fluid line hole (item 5) as a guide.
3. Remove the front and rear drawers of the mounting box (item 7).
4. Insert four (4) box mounting bolts (item 6, 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 4, 3/8-16).
6. Set the AUTOCLEAN® (item 11) on the box in the proper orientation as shown.
7. Fasten the AUTOCLEAN® to the box by threading three (3) bolts (3/8-16x1" SHCS) and lock washers (item 10) from inside the box into the matching threaded holes in the base plate of the AUTOCLEAN®.
8. Insert the filter, hose, & cap (item 12, 13, 14) into the jug (item 3).
9. Insert the fluid hose supplied (item 15) into the check valve on the cap. Feed the hose through the hole in the stand and through the hole in the base plate as shown.
10. Insert the hose into the quick connect on the fluid valve (item 16).
11. Replace the front and rear drawers (item 7).



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2.2. Assembly with Mounting Box

The AUTOCLEAN® 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 AUTOCLEAN® on top. Follow steps 6,7,11 from section 2.1.



Anti-spatter fluid for the sprayer must be run from a location within 40 feet of the machine. The elevation of the anti-spatter reservoir with respect to spray nozzle will influence the amount of mist achieved when spraying due to the head pressure of the fluid. A higher reservoir will produce more spray and vice-versa. The reservoir may be mounted up to 10 ft below the spray nozzle. Prime the fluid line by depressing the spray button on the user interface.

2.3. Air Connection

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

AIR SUPPLY REQUIREMENTS: 85 PSI at 22 CFM. Connect the inlet supply line to the quick connect pneumatic fitting located at the side of the AUTOCLEAN®.



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 AUTOCLEAN. 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, 1.0A 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, 0.5A min for controls and sensor power.
4	Black	Power	0VDC Actuator	Connect to power supply (-) 0VDC, 1.0A min through safety circuit to disable solenoid power when required.

3. Network I/O (Ethernet/IP)

The AUTOCLEAN® 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 AOI instructions for setup with the Allen Bradley Logix PLC is available upon request.

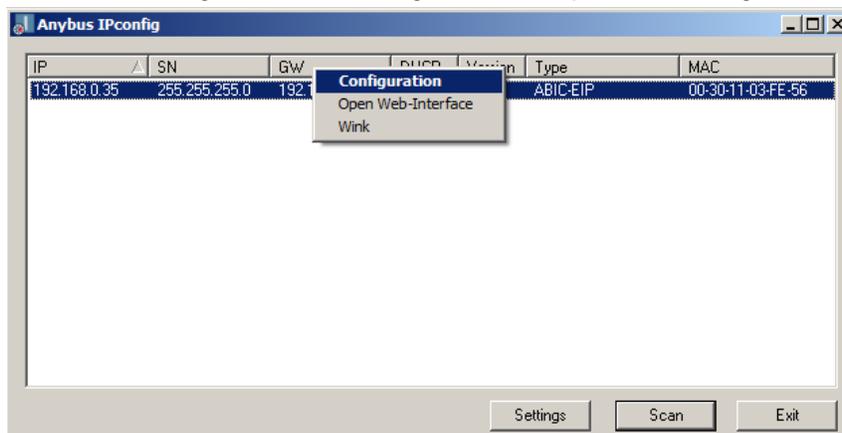
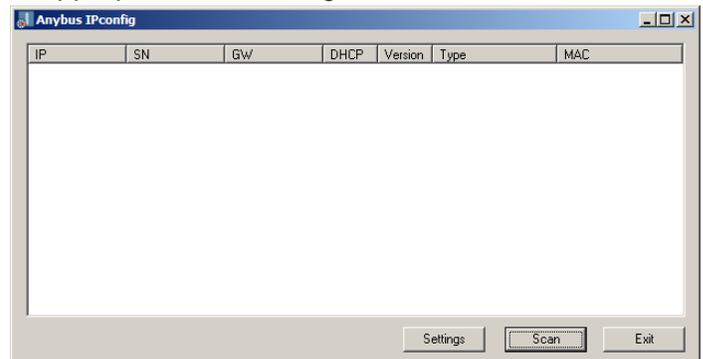
3.1. Network Setup

Outlined below is a procedure to assign an IP address to the AUTOCLEAN®. 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/AutoClean/hms-IPConfig.zip>
- A CAT-5E or Cat-6 cable.
- A network switch or ethernet cable (dependent on hardware setup).

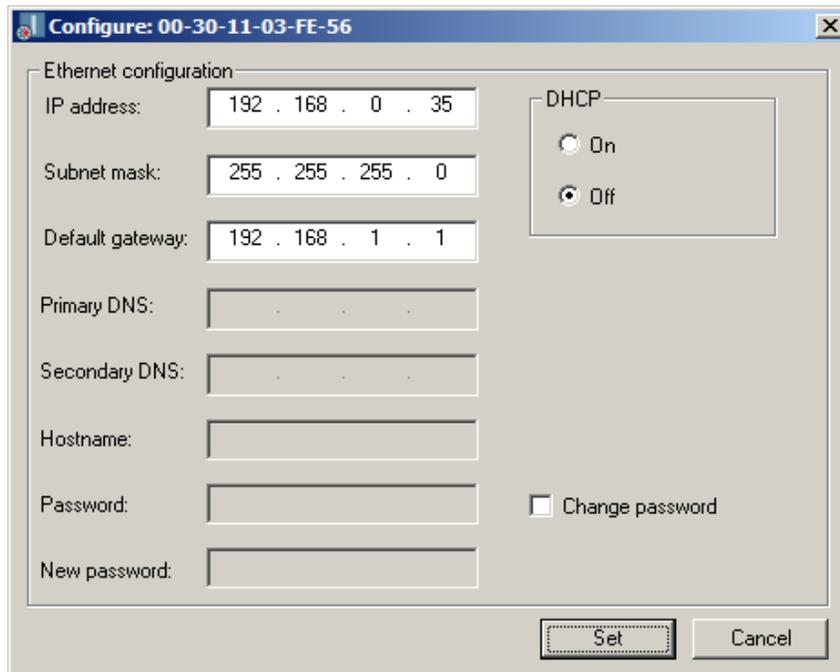
The steps to configure the IP settings for the AUTOCLEAN® outside of the standard range are:

1. While connecting directly to the AUTOCLEAN®, 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 reamer. 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 AUTOCLEAN® 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.



AUTOCLEAN®

- 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 AUTOCLEAN® to communicate with a different gateway than the default, 0.0.0.0, communication with the AUTOCLEAN® until the PC is reconfigured to operate on the same gateway



The screenshot shows a configuration dialog box titled "Configure: 00-30-11-03-FE-56". The "Ethernet configuration" section includes the following fields and options:

- IP address: 192 . 168 . 0 . 35
- Subnet mask: 255 . 255 . 255 . 0
- Default gateway: 192 . 168 . 1 . 1
- Primary DNS: [Empty]
- Secondary DNS: [Empty]
- Hostname: [Empty]
- Password: [Empty]
- New password: [Empty]
- DHCP: On, Off
- Change password

Buttons at the bottom: "Set" (highlighted with a dashed border) and "Cancel".

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

AUTOCLEAN®

3.2. Data Map

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

Ethernet/IP Output Data Map

Data output from PLC scanner to the AUTOCLEAN® adapter.

Output Byte 0,1:		
Bit	Name	Description
0	Ream	Pulse to start the ream cycle, hold to maintain the reamer at the top of stroke.
1	Spray	Pulse for 0.5 sec minimum to spray the nozzle.
2	Wire Cut	Cut the welding wire in the cutter.
3	Remove	Remove the nozzle from the diffuser.
4	Replace	Replace the nozzle onto the diffuser.
5	Diffuser Brush	Turn on the brush motor and clean the diffuser.
6..9		Reserved
10	Next	Next step in the sequence (may be used for programming and setup).
11	Home	Return internal mechanisms to their home position.
12	Reset	Reset the cycle.
12..15		Reserved

Ethernet/IP Input Data Map

Data input to the PLC scanner from AUTOCLEAN® adapter.

Input Byte: 0,1		
Bit	Name	Description
0	Ready	Clamps are open and unit is ready to start the next operation.
1	Step Complete	The remove or replace step is complete.
2	Aux Sensor	Any of the following conditions: the wire cutter is closed, ream cylinder is extended, a nozzle or gas flow is detected.
3	Error	An error has occurred in the sequence.
4	State Check	The AUTOCLEAN® has finished its current phase of operation.
5	Home	Mechanisms in the AUTOCLEAN® are at their home position.
6	Solenoid Power	Solenoid power is active.
7..11		Reserved
12	Local Mode	Machine is in Local Mode.
13	Cutter Closed	The wire cutter is in the closed position.
14	Nozzle Detect	The nozzle detect proximity sensor is active.
15	Gas Flow Detect	Gas flow is detected between min and max setpoints.
Input Byte 2		1st Error Code.
Input Byte 3		1st Error State.
Input Byte 4		2 nd Error Code.
Input Byte 5		2 nd Error State.
Input Byte 6		3 rd Error Code.
Input Byte 7		3 rd Error State.
Input Byte 8		4 th Error Code.
Input Byte 9		4 th Error State.
Input Byte 10,11		Last State (16 Bit).
Input 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 AUTOCLEAN® sequence.

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

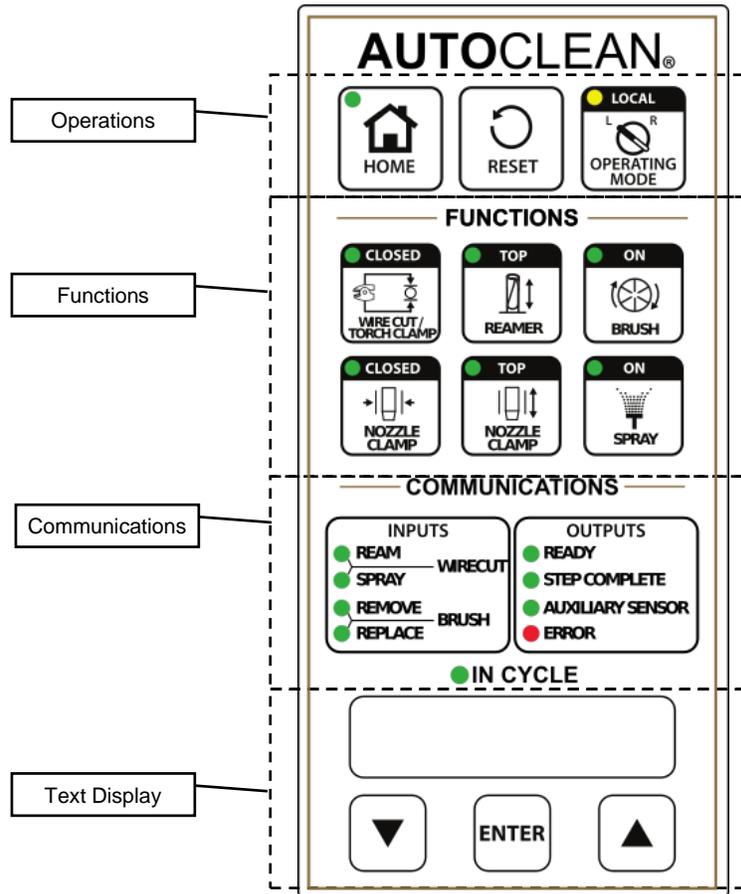
AUTOCLEAN®

3.3. Alarm Codes

The AUTOCLEAN® 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 AUTOCLEAN® is found on the side plate of the machine.



AUTOCLEAN®

Operator Interface: Operations



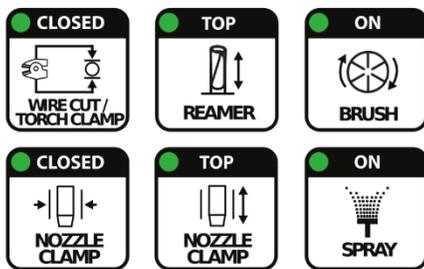
HOME: This button will command the internal mechanisms to return to home position if the unit is not currently running any automatic cycle. The indicator in the corner of the button turns on when the unit is at the home (clamps open) position.

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

FUNCTIONS

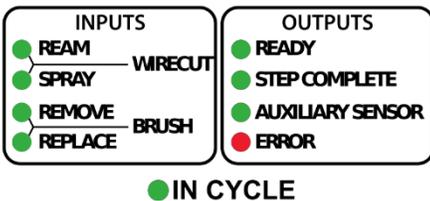


Note: Change operating mode to “LOCAL” to enable the following functions.

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

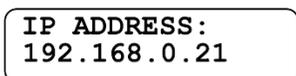
Operator Interface: Communications

COMMUNICATIONS



The indicators in the Communications section of the Operator Interface show the current robot Input / Output and cycle status. When “Ream” and “Spray” are both active indicates “Wire Cut”. When “Remove” and “Replace” are both active indicates “Brush Diffuser”.

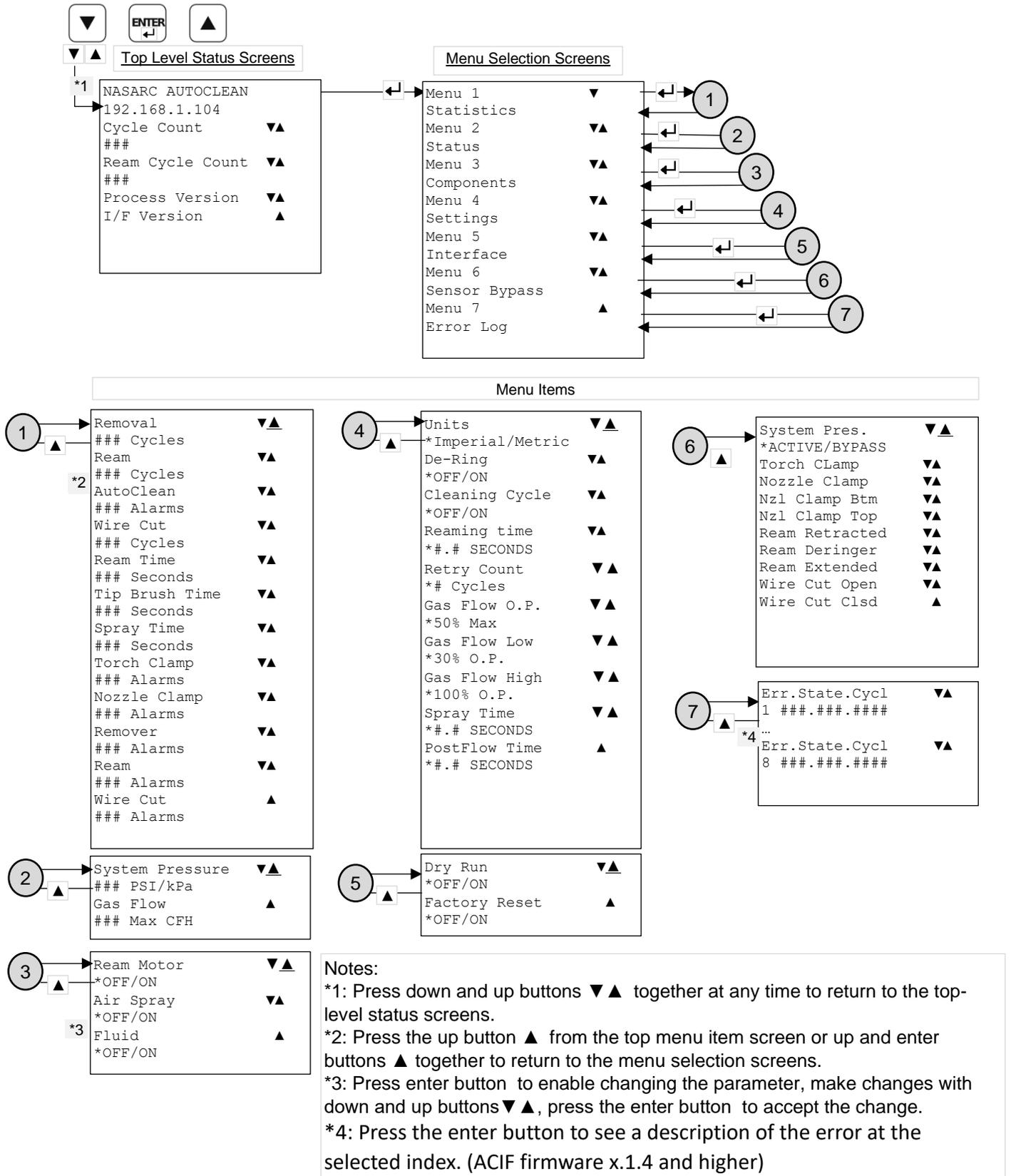
Operator Interface: Text Display



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

See section 7.3 for a full description on setting the IP address.

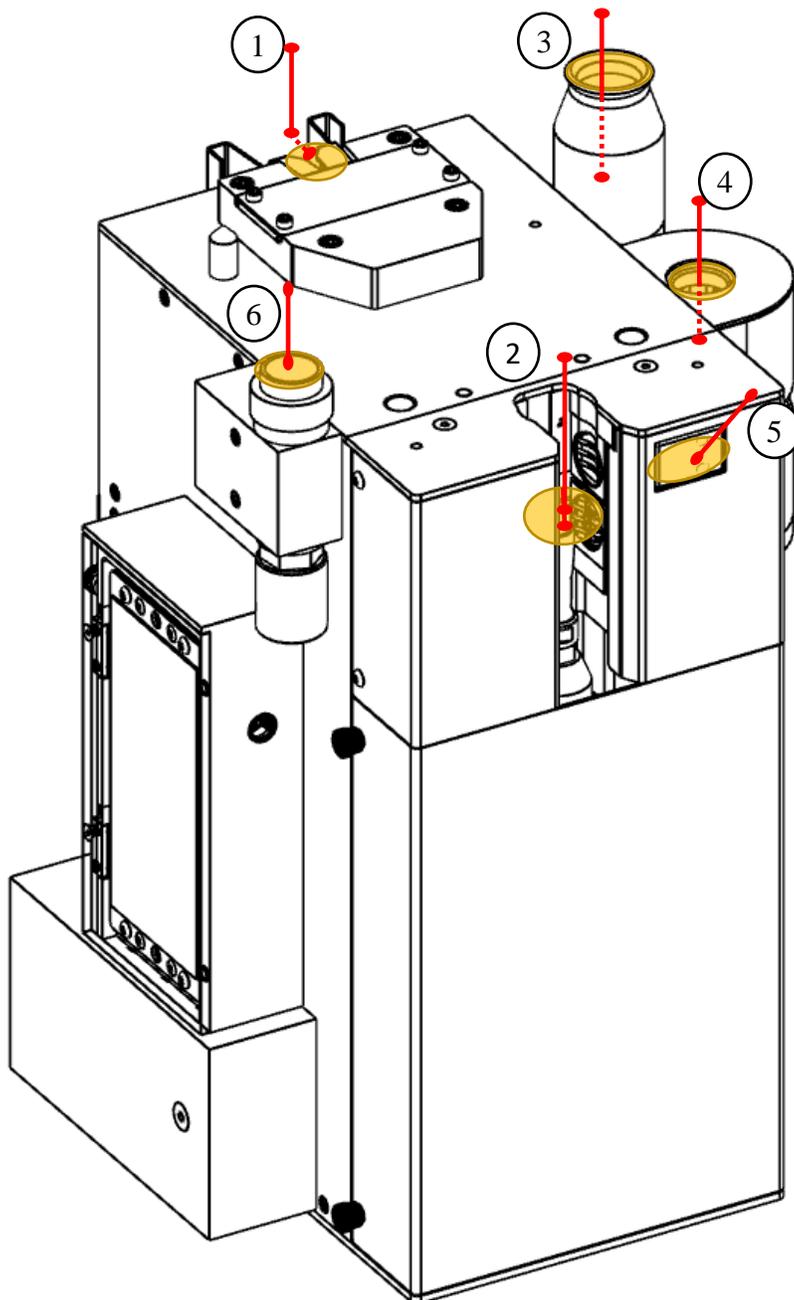
5. LCD Display Navigation



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 seven main sequences; Wire Cut, Nozzle Reaming, Nozzle Remove and Replace, Tip/Diffuser Brushing, Nozzle Gas Flow Sensing, Nozzle Detection, and Spraying. Each sequence has an approach and target position as shown in the diagram below.

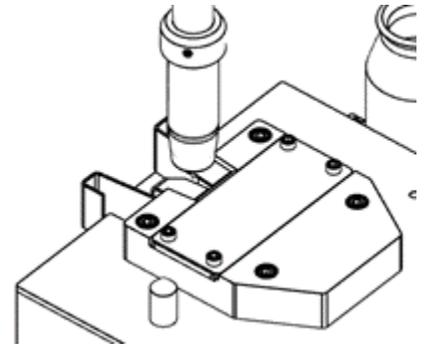
Robot Programmed Positions



1. Wire Cut approach positions and target position.
2. Nozzle Ream, Remove, and Replace approach and target positions. All three target positions are the same in (X, Y) frame coordinates. Add a five-degree rotation and 1mm lower offset in the Z axis for Replace target position.
3. Spray approach and target positions.
4. Tip & Diffuser brush approach and target positions.
5. Nozzle Detection approach and target positions.
6. Nozzle Gas Flow Sensor approach and target positions.

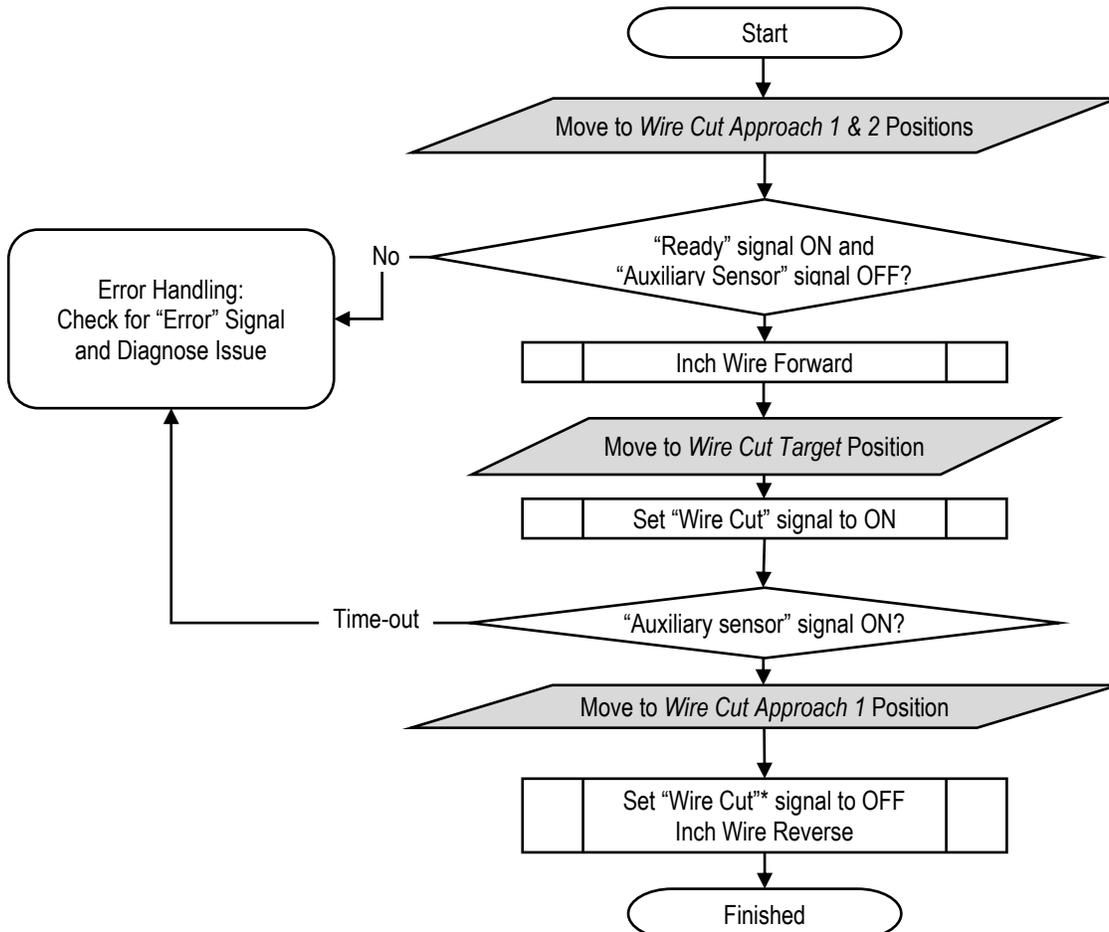
6.1. Wire Cut Procedure

1. Move robot torch TCP to a point above the top of the wire cutter housing within the clipping catchment area and record position as the *Wire Cut Approach 1* position.
2. Move the robot torch TCP into the “V” shape opening of the wire cutter guard and record position as the *Wire Cut Approach 2* position.
3. Inch the welding wire forward to extend the welding wire out of the tip sufficient to cut the wire end with the cutter blades.
4. Check that “Auxiliary Sensor” signal is OFF and “Ready” signal is ON.
5. Move robot torch to bring welding wire into the wire cutter blades and record position as the *Wire Cut Target* position.
6. Set “Wire Cut” to ON to activate the wire cutter.
WARNING: the wire cutter will operate under this condition.
KEEP HANDS CLEAR of the operating area of the wire cutter.
7. Wait for “Auxiliary Sensor” signal to be ON.
8. Move robot torch to the *Wire Cut Approach 1* position.
9. Set “Wire Cut” signal to OFF to deactivate the wire cutter.
10. Inch Reverse (retract) the welding wire into the jump liner of the gooseneck.



Wire Cut Flow Chart

The flowchart below is a recommended procedure of robot movement and logic I/O for the wire cut process.



6.2. Nozzle Ream Procedure

1. Perform a wire cut as explained in section 6.1.
2. Move the torch just above the top of the machine and record this position as the *Ream Approach* position.
3. Check that “Error” signal is OFF.
4. Check that “Step Complete” signal is OFF, and “Ready” signal is ON, both clamps are open.
5. In “Local” mode use the operator interface bring the nozzle clamp to its top position. Move the robot torch linearly into top clamp until the top of the neck clamp ring is approximately 22mm lower than the top of the unit. Use the top witness mark scribed on the plate as a guide.
6. Use the operator interface to close and open the torch clamp and nozzle clamp to verify concentricity and alignment of robot torch in clamp (see section 4).

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

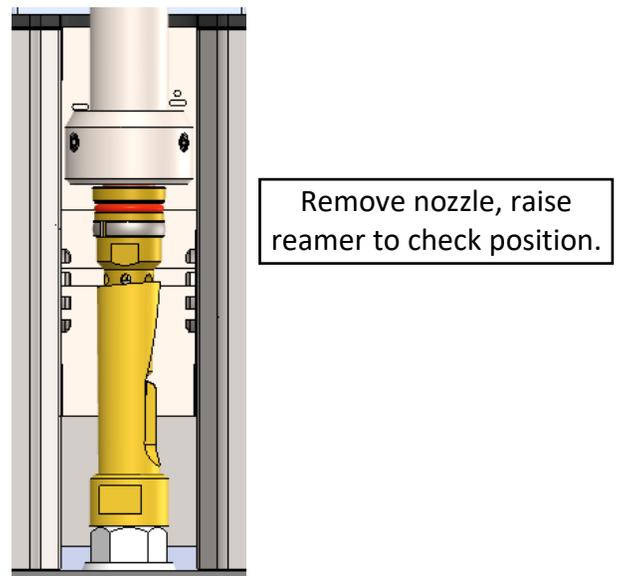
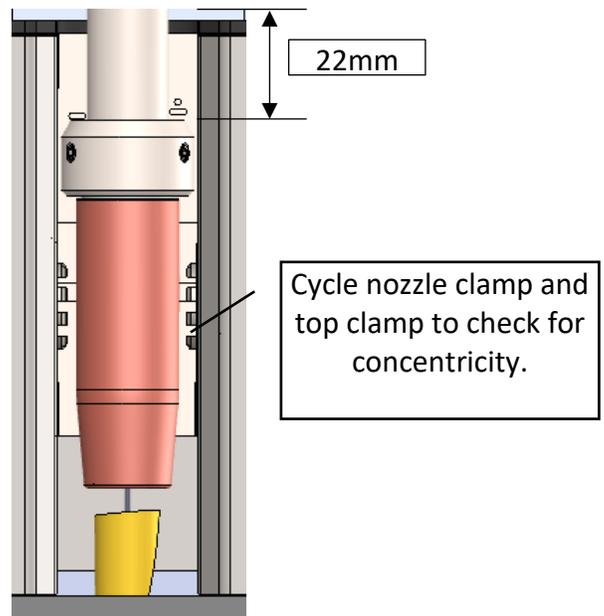
7. Record robot torch position as the *Ream Target*.
8. Move the robot linearly back to the *Ream Approach* position. Remove the nozzle and then return linearly to the *Ream Target*.
9. Use the operator interface to raise the reamer and check the position. Modify the *Ream Target* position as required.
10. Move the robot linearly back to the *Ream Approach* position. Replace the nozzle and then return linearly to the *Ream Target*.
11. Press “Operating Mode” button to turn off “Local” mode.
12. Using the robot I/O set the “Ream” signal to **ON**.



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

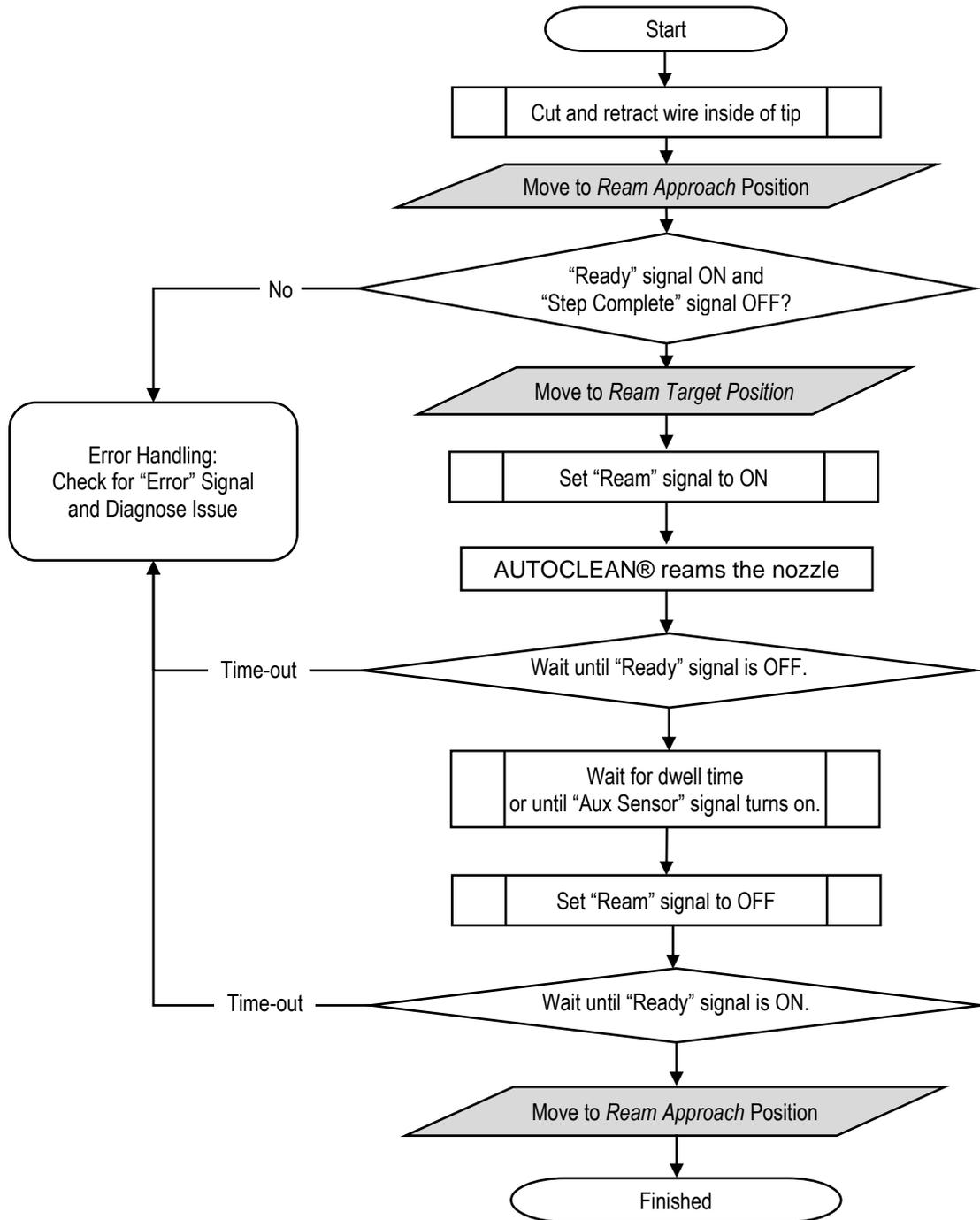
The AUTOCLEAN® will clamp and ream the nozzle. Check that the “Ready” signal turns **OFF** when the motion starts.

13. Wait for the desired dwell time, the “Aux Sensor” signal will turn on when the ream blade reaches the top of its stroke.
14. Set the “Ream” signal to **OFF**. The AUTOCLEAN® will retract the ream bit and open the nozzle clamp.
15. Wait until the “Ready” signal is **ON**.
16. Move the robot torch back to the *Ream Approach* position.



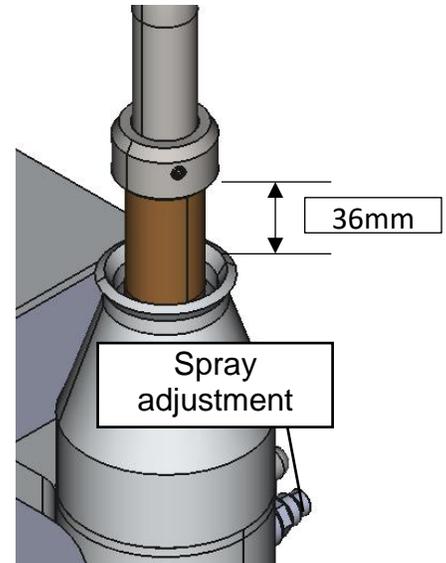
Nozzle Ream Flow Chart

The flowchart below is a recommended procedure of robot movement and logic I/O for the reaming process.



6.3. Nozzle Spray Procedure

1. Move robot torch above the spray cone and record position as the *Spray Approach* position.
2. Check that “Ready” signal is ON.
3. Move robot torch to bring the nozzle into the spray cone. The top of the nozzle should be approx. 36mm above the top lip on the spray cone. Record position as the *Spray Target* position.
4. Set “Spray” signal to ON to activate the spray.
WARNING: the sprayer will operate under this condition. KEEP FACE AND EYES CLEAR of the operating area.
5. Check that “Ready” signal is OFF.
6. Set “Spray” signal to OFF to deactivate the Sprayer.
7. Check that “Ready” signal turns ON following post flow*.
8. Move robot torch to the *Spray Approach* position.



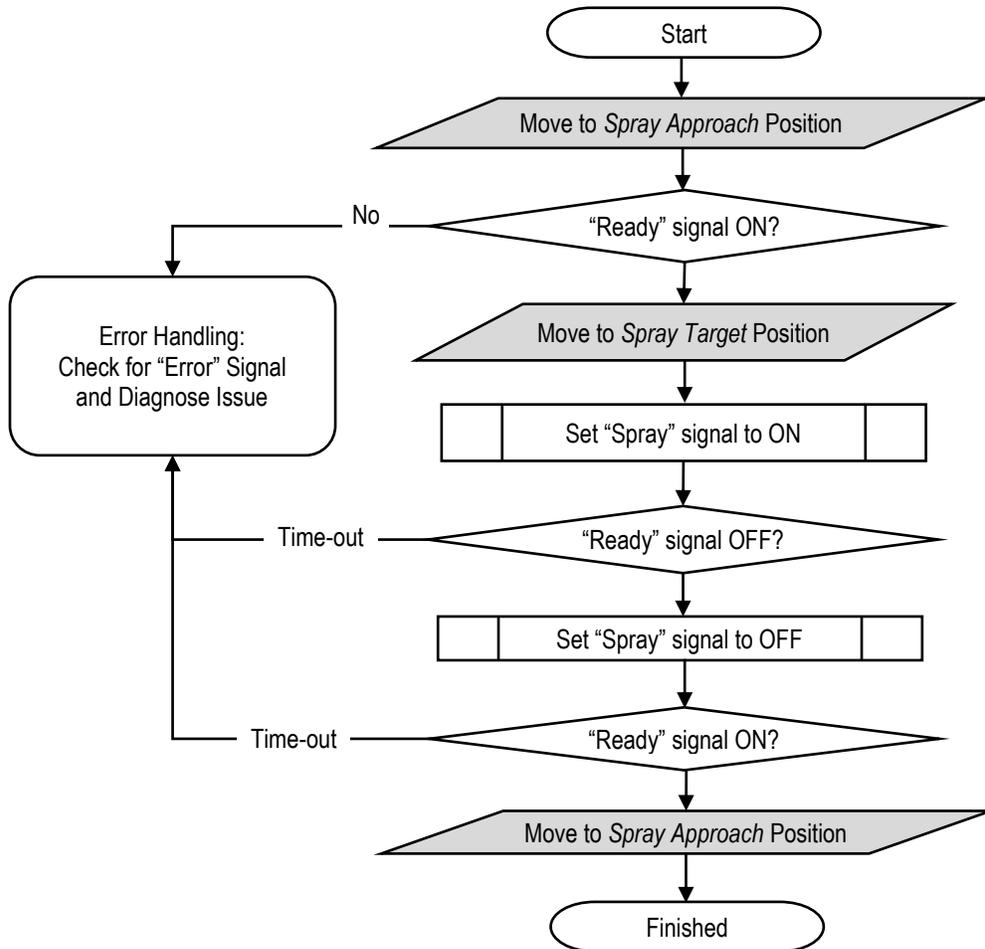
The amount of spray may be adjusted with the needle valve located behind the rear cover. Turn clockwise for less spray.

*The sprayer may use a built-in post-flow timer of 0, ¼, ½, or 1 second. The post-flow feature is setup from the menu system by selecting the desired post-flow time (see section 5). Air flow from the spray nozzle will be present for the post flow time after the spray output and corresponding fluid valve have been turned off.

The spray time is set in one of two ways: The delay between ON and OFF of the “Spray” signal from the robot, or a preset spray time setup in the menu system (see section 5). When a preset spray time is used, the “Spray” signal is pulsed to initiate the command.

Spray Flow Chart

The flowchart below is a recommended procedure of robot movement and logic I/O for the spraying process.



6.4. Nozzle Removal Procedure

1. Perform a wire cut as explained in section 6.1.
2. Move the torch just above the top of the machine and record this position as the *Remove Approach* position.
 Note: for ease of programming; The *Remove Approach* and *Ream Approach* can be the same position, also the *Remove Target* and *Ream Target* can be the same position,
3. Check that “Ready” signal is ON, and the “Step Complete” signal is OFF, both clamps are open.
4. Move robot torch linearly into the clamping system until the top of the neck clamp ring is approximately 22 mm lower than the top of the unit. Use the top witness mark scribed on the plate as a guide.
5. Record robot torch position as the *Remove Target*.
6. Use the operator interface in “Local” mode to close and open the torch and nozzle clamp to verify concentricity and alignment of nozzle in clamp.

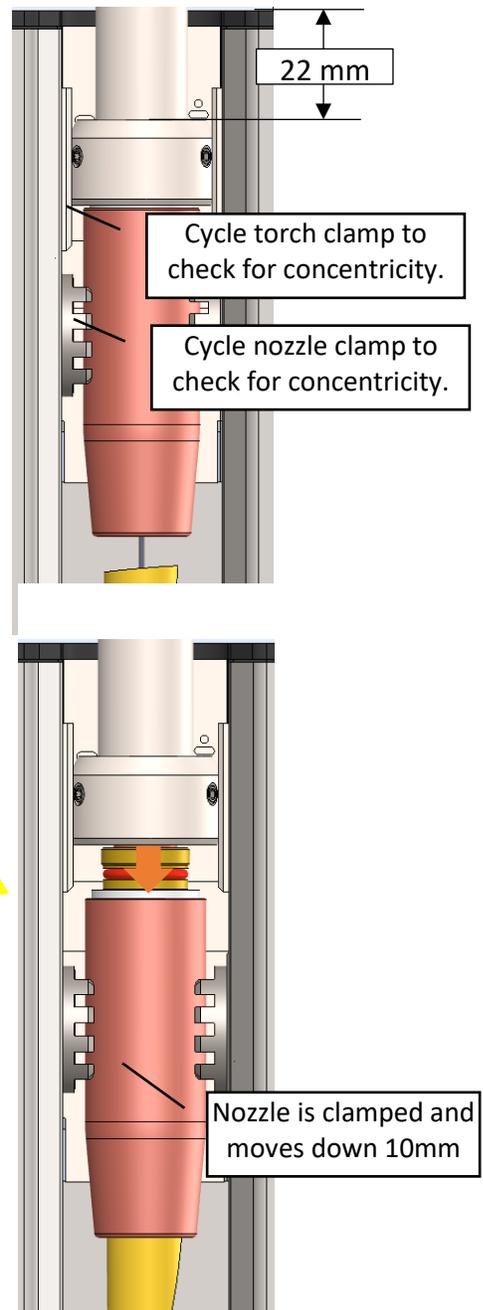
NOTE: Failure to ensure concentricity will greatly increase the possibility of wear and cycle errors.

7. Press “Operating Mode” button to turn off “Local” mode.
8. Using the robot I/O set the “Remove” signal to **ON**.

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

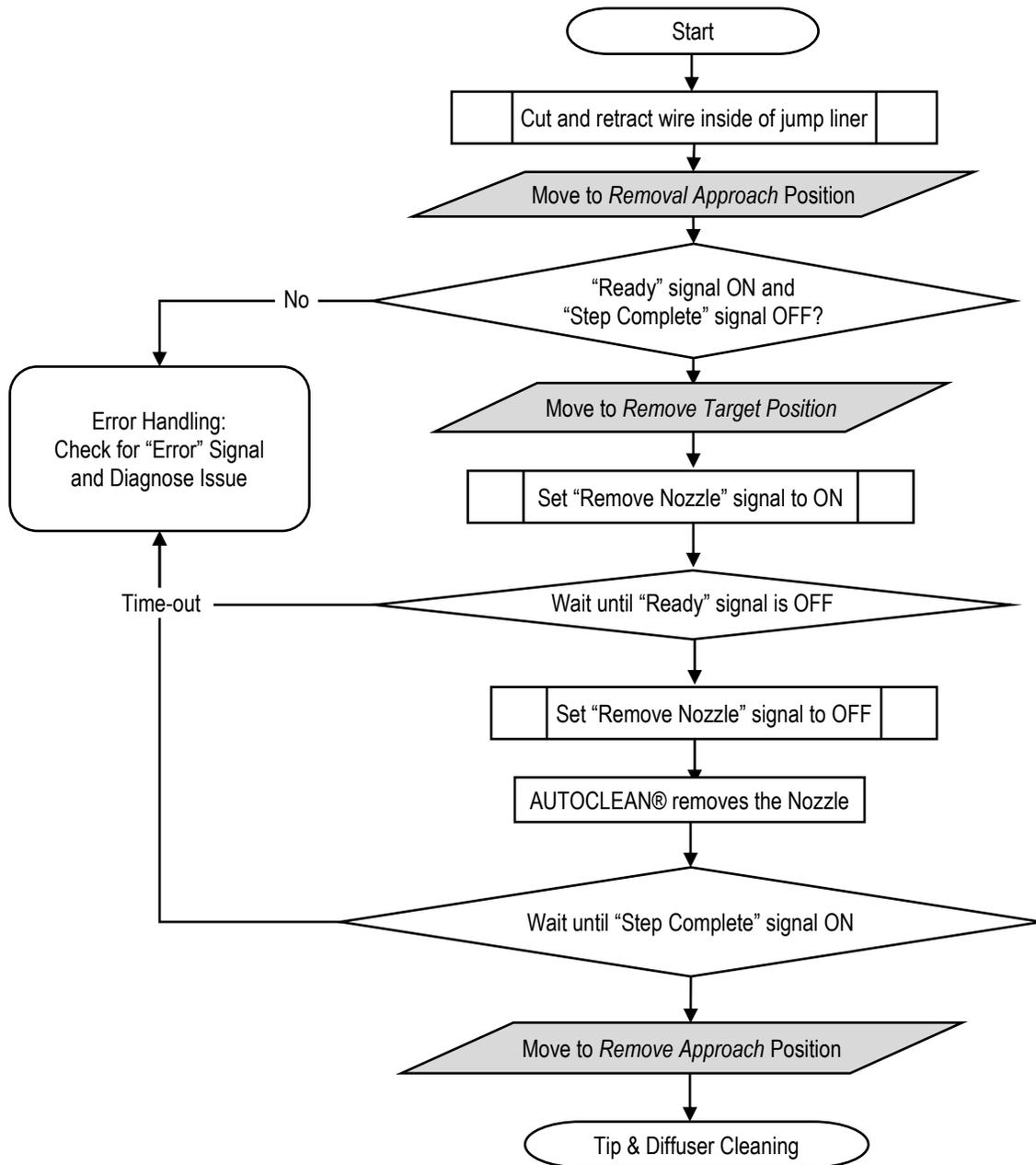


9. Wait until the “Ready” signal turns off, Set the “Remove Nozzle” signal to OFF.
10. The AUTOCLEAN® will clamp the torch, then clamp and remove the nozzle, then release the torch. Check that the “Ready” signal turns OFF when the motion starts.
11. Wait until the “Step Complete” signal turns **ON**.
12. Move the robot torch back to the *Remove Approach* position,



Nozzle Removal Flow Char

The flowchart below is a recommended procedure of robot movement and logic I/O for the removal process.

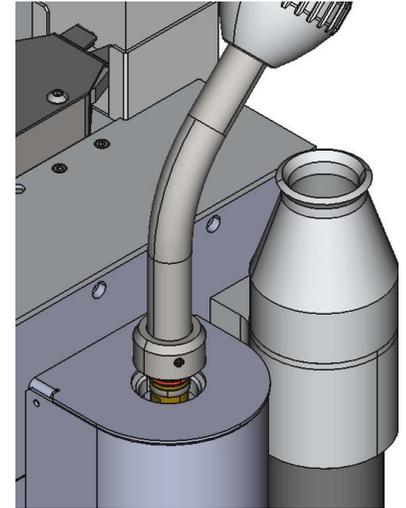


6.5. Tip and Diffuser Brush Procedure

1. Move robot to an approach position above the Tip/Diffuser Brush, record this as the *Brushing Approach* position.
2. Check for the “Ready” signal to be ON.
3. Set “Brush” command signal to ON to activate the rotary brush.

WARNING:

The brush motor will operate under this condition. KEEP HANDS CLEAR of the operating area of the wire brush. Do not operate with exposed long hair, jewelry, or loose clothing.



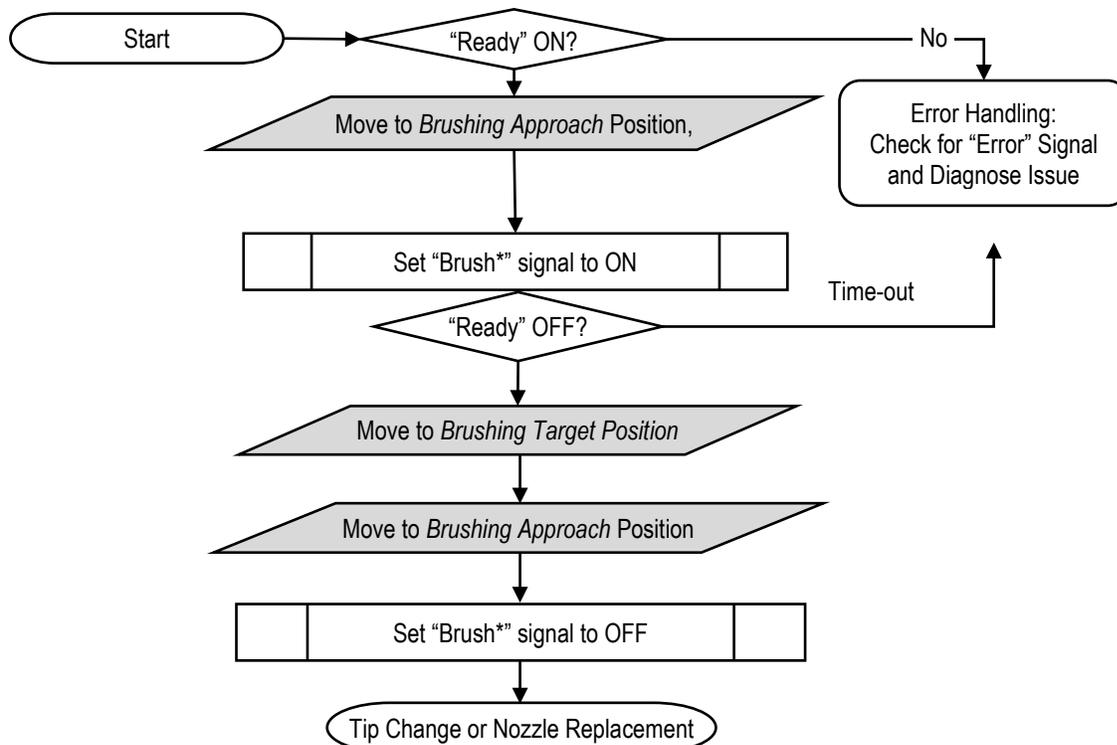
4. Move the robot straight down until the tip and diffuser are immersed in the wire brush cavity. Record this position as the *Brushing Target* position. Verify concentricity and alignment of tip and diffuser in the diffuser brush.

NOTE: Failure to ensure concentricity may result in shaking and excessive wear on components.

5. Move the torch back to the *Brushing Approach* position.
6. Set “Brush” command signal to OFF to deactivate the diffuser brush.

Tip and Diffuser Brushing Flow Chart

The flowchart below is a recommended procedure of robot movement and logic I/O for the brush process.



6.6. Nozzle Replacement Procedure

1. Move robot torch to the *Remove Approach* position.
2. Move to the *Replace Target* position (inside the top clamp). Note: The *Replace Target* position is at the same coordinates as the *Remove Target* position with a -1mm offset in the z axis of the robot world coordinates, 23 mm lower than the top of the unit.

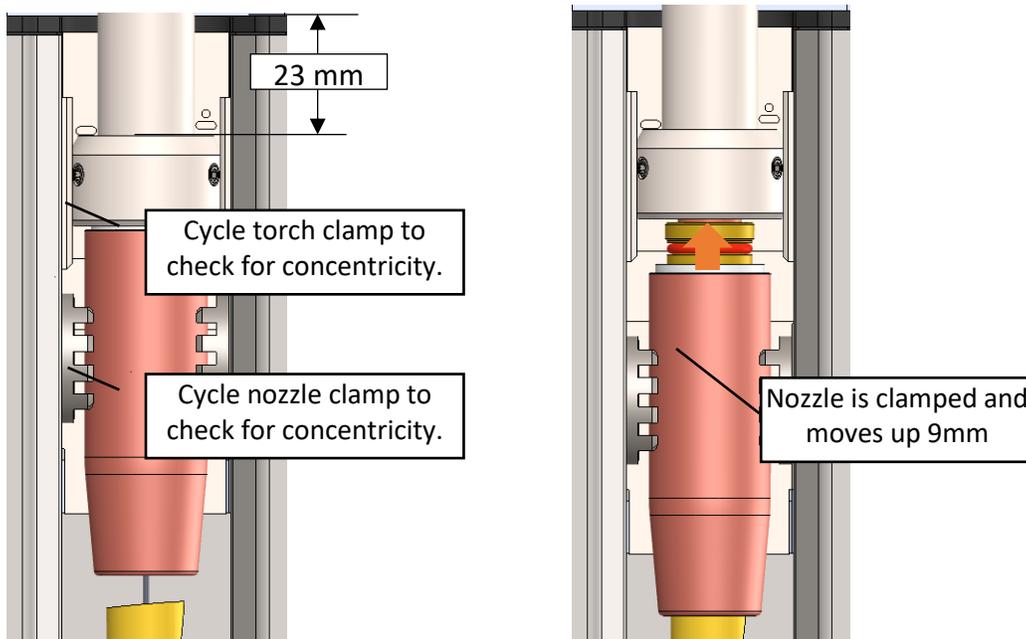
3. Use the operator interface in “Local” mode to close and open the torch and nozzle clamp and verify concentricity and alignment of nozzle in clamp.

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

4. Press “Operating Mode” button to turn off “Local” mode.
5. Set the “Replace Nozzle” signal to ON.

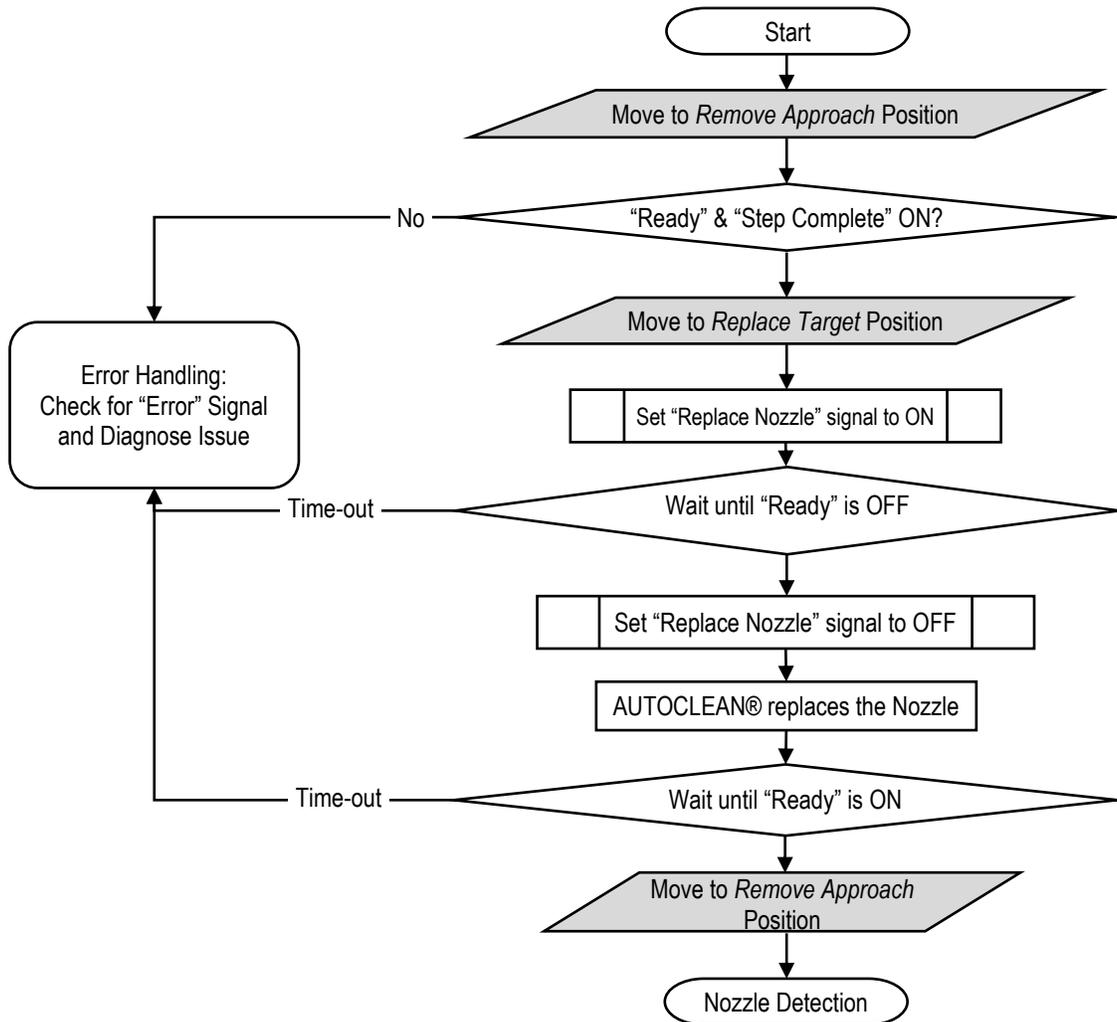
WARNING: The clamp will operate under this condition, KEEP HANDS CLEAR of the operating space of the clamp.

6. Wait until the “Ready” signal Turns OFF, set the “Replace Nozzle” signal to OFF.
7. The AUTOCLEAN® will clamp the torch, replace and release the nozzle then release the torch. Note: the “Ready” signal and “Step Complete” will be OFF during this step.
8. Wait until the “Ready” signal is ON.
9. Move the robot torch back to the *Remove Approach* position.



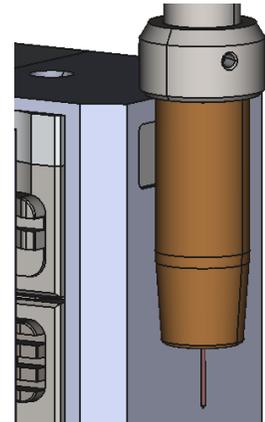
Nozzle Replacement Flow Chart

The flowchart below is a recommended procedure of robot movement and logic I/O for the replacement process.



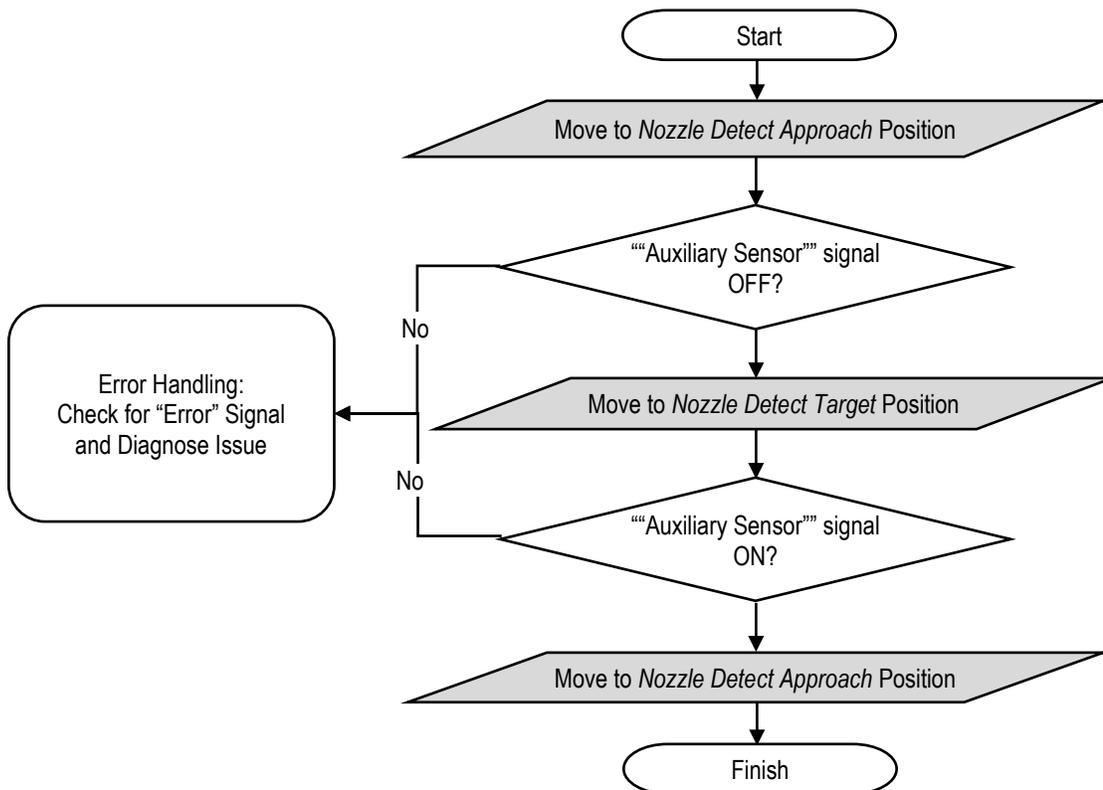
6.7. Nozzle Detection Procedure

1. Move the gas nozzle to above the top of the machine close to the Nozzle Detect Sensor but at least 10mm away, record this as the *Nozzle Detect Approach* position.
2. Check that “Auxiliary Sensor” signal is OFF.
3. Move gas nozzle so the long axis of the nozzle is aligned with the height of the machine and to within 5mm of the nozzle detect sensor.
4. Check that “Auxiliary Sensor” signal is ON, record this as the *Nozzle Detect Target* position.
5. Move to the *Nozzle Detect Approach* position.



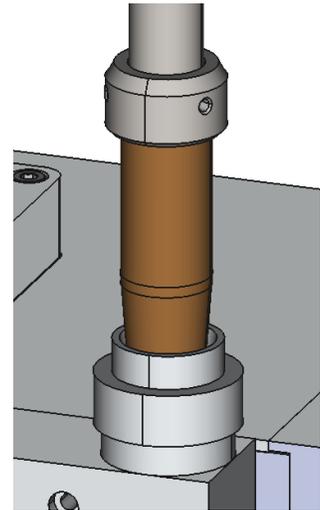
Nozzle Detection Flow Chart

The flowchart below is a recommended procedure of robot movement and logic I/O for the nozzle detect process.



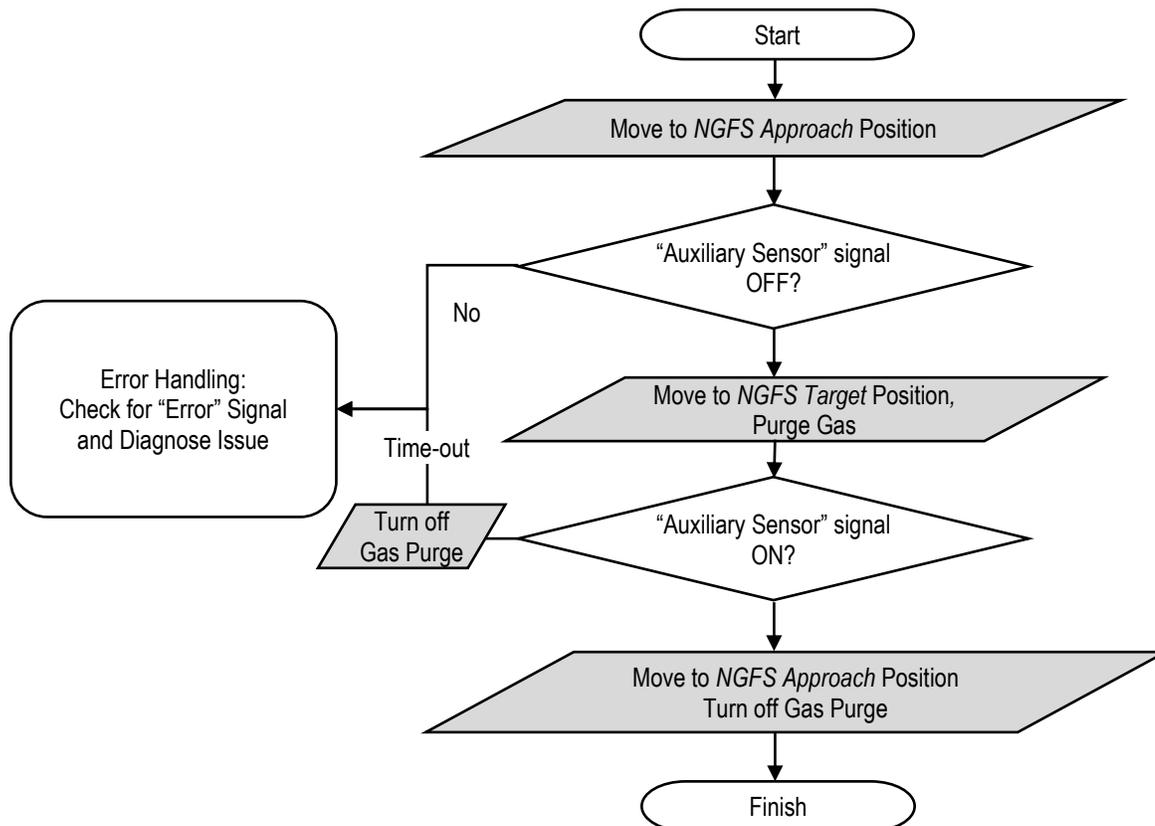
6.8. Nozzle Gas Flow Sensor Procedure

1. Move welding torch close to the Nozzle Gas Flow Sensor but at least 10 mm above, record this as the *NGFS Approach* position.
2. Check that "Auxiliary Sensor" signal is OFF.
3. Move welding torch nozzle down to engage the spring loaded NGFS flow cone and establish a seal. Record this as the *NGFS Target* position.
Note: the flow cone is mounted on a spring which will allow for some deflection in the Z axis.
4. Purge welding gas to sense. Check that "Auxiliary Sensor" signal is ON within 5 seconds while purging.
Note: The Nozzle Gas Flow Sensor may require setup. The minimum and maximum for the operating range are set in the menu system (see section 5).
5. Move to the *NGFS Approach* position.



NOTE: to save cycle time the gas may begin to purge prior to entering the flow cone in step 3.

Nozzle Gas Flow Sensor Flow-Chart



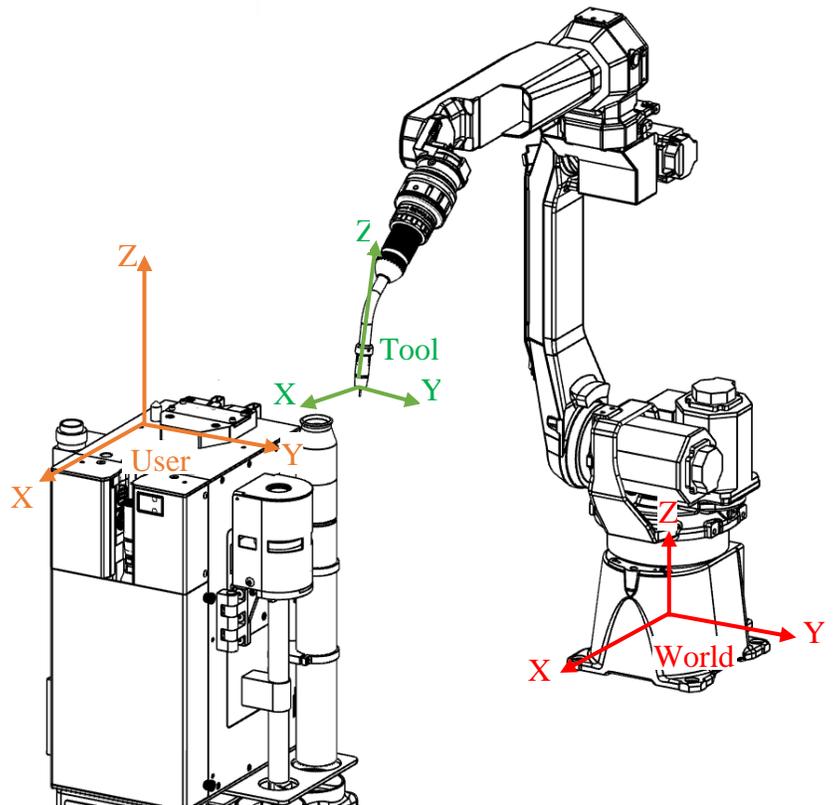
6.9. Nozzle Gas Flow Sensor (NGFS) Setup

The Nozzle Gas Flow Sensor should be setup during installation to reflect the range of gas flow for the application. There are three settings used: operating point, minimum, and maximum to determine if gas flow is within range. The operating point is registered by flowing gas into the NGFS, the minimum and maximum are set based on percentage of the operating point. Use the LCD navigation (see section 5) to select the correct LCD screens in the steps below.

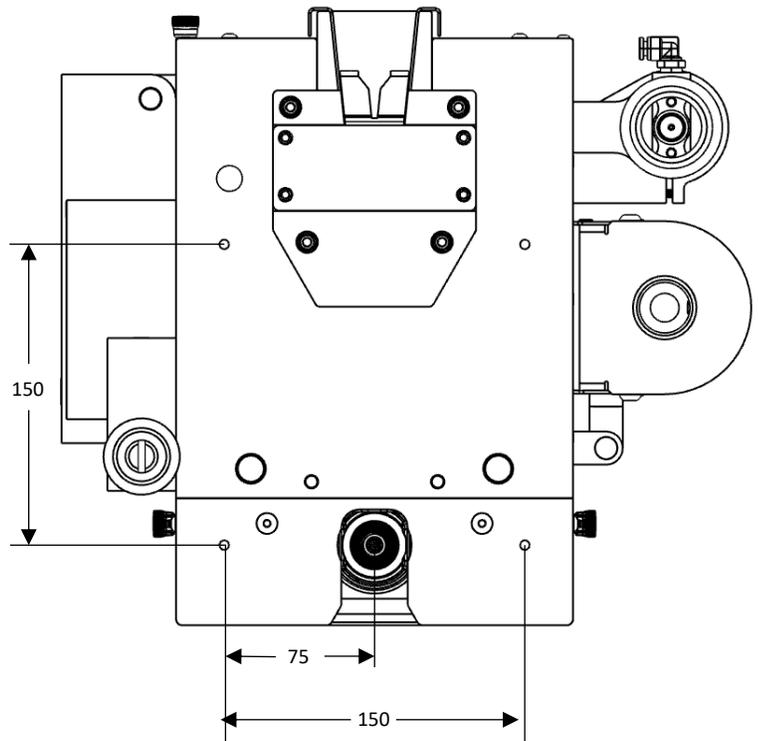
1. Move welding torch to the *NGFS Target* position (see section 6.8).
2. Navigate to the “Gas Flow O.P.” screen in the menu system.
3. Press enter button ↵ to enable changing the parameter, press the down ▼ button setting the value to 0.
4. Turn on gas purge using robot or welder controls until a stable flow is achieved (approximately 5 seconds).
5. Press the enter button ↵ to record the flow (% of sensor range).
6. Turn off gas purge.
7. Move welding torch to the *NGFS Approach* position (see section 6.8).
8. Navigate to the “Gas Flow Low” screen in the menu system to set the low end of the range (% of operating point recorded below the operating point).
9. Press enter button ↵ to enable changing the parameter, make changes with down and up buttons ▼ ▲, press the enter button ↵ to accept the change.
10. Navigate to the “Gas Flow High” screen in the menu system to set the high end of the range (% of operating point recorded above the operating point).
11. Press enter button ↵ to enable changing the parameter, make changes with down and up buttons ▼ ▲, press the enter button ↵ to accept the change.
12. Press down and up buttons ▼ ▲ simultaneously to return to the top-level status screen.

6.10. 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 AUTOCLEAN® to enable user frame programming. With the User Frame programmed, the Z-axis of the tool and User frame may be aligned. The nozzle ream/remove/replace approach and target positions are (75,150) mm from the user frame origin as shown below.

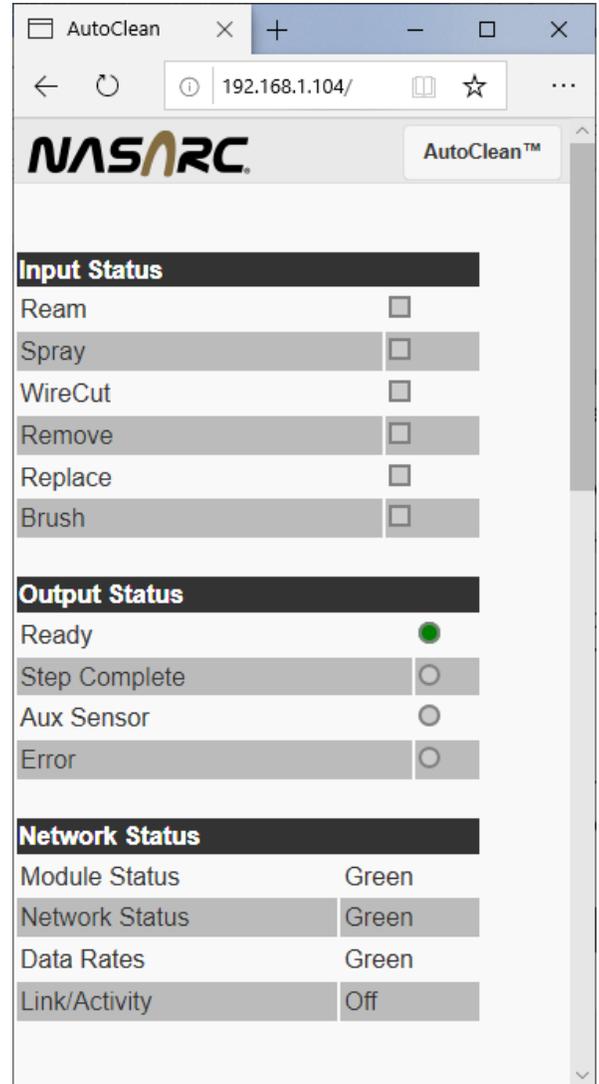
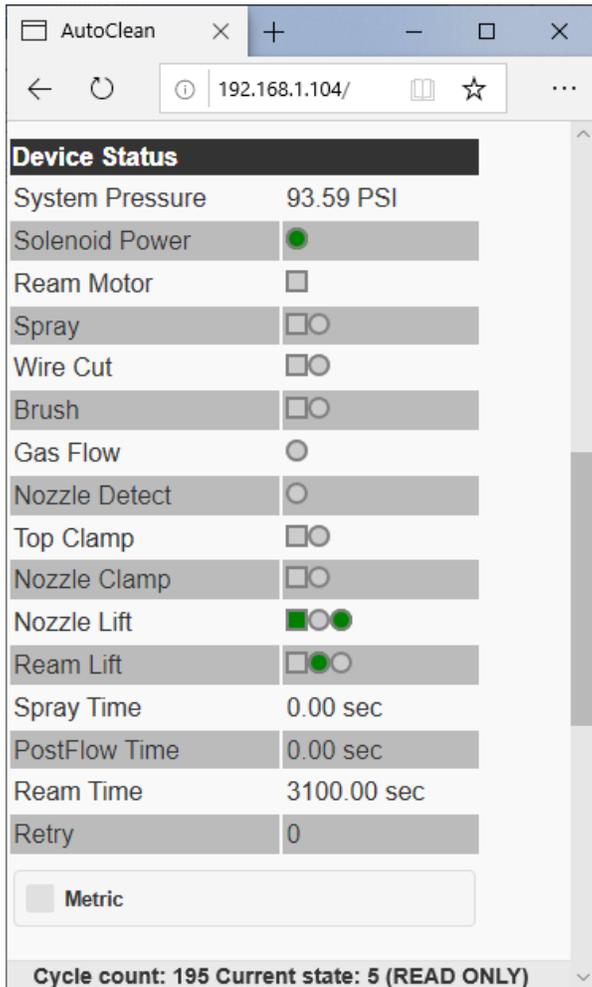


7. Web Server Interface

The AUTOCLEAN® 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 AUTOCLEAN®.

The Input and 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 solenoids and sensors.



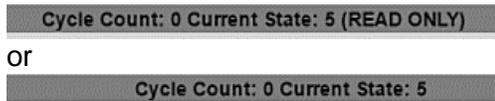
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The Statistics and Errors table displays the accumulated time and counts for each process.

The Firmware table shows the current firmware version for all controllers within the unit.

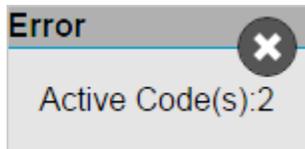
7.1. Read Only Mode

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



7.2. Error Notification

If an error occurs in the AUTOCLEAN® 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 front panel interface while in READ ONLY mode.



Statistics	
Wire Cuts	1128
Ream Count	637
Brush Time	4932
Spray Time	9049

Error Counts	
Top Clamp	10
Nozzle Clamp	19
Ream	44
Wire Cut	22
Retries	0
Cycle	316

Firmware	
Process	0_0_0
User Interface	0_0_0
Web Server	0_1_1

Cycle count: 195 Current state: 5 (READ ONLY)

7.3. IP Address Configuration

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

Enter the IP address of the AUTOCLEAN® followed by '/secure/EtnConfig.shtm' for example 192.168.1.104/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 AUTOCLEAN® 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 AUTOCLEAN® or clicking “Reboot” at the bottom of the Communications page.

8. Preventative Maintenance

The AUTOCLEAN® 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 equipment.

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 gripping faces of the torch clamp and nozzle clamp using a wire brush.
2. Remove the spray cone and clean the inside walls of the cone, and any accumulated particulate around the spray nozzle.
3. Remove the NGFS plug by unthreading and clean out debris in the cavity of the plug, replace the plug.
4. Visually inspect the Tip & Diffuser wire brush for excessive wear or damage.
5. Visually inspect the wire cutter for excessive wear or damage.
6. Open the side door(s) to inspect and clear out the inside and floor of the machine from debris, wire clippings or spatter.
7. Check the robot control cable for splits or cracks.

MONTHLY

1. Visually inspect the ream blade for excessive wear or damage.
2. Remove the Ream motor shield to clean out the spatter.
3. Remove the Tip & Diffuser wire brush compartment to clean out the spatter.
5. Remove and clean out the spatter catch trays under the unit.
6. Wipe the outside surfaces of the machine to remove accumulated debris.

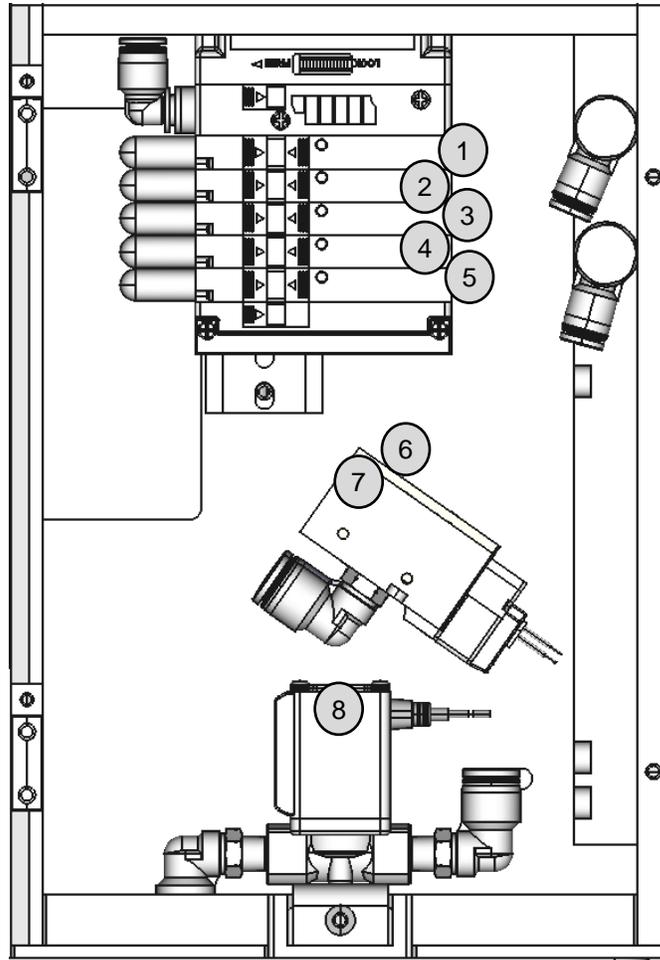
9. Troubleshooting

Problem	Possible Cause	Solution
No device status or LEDs on	<ul style="list-style-type: none"> - Power is off - Fuse is blown (controller cabinet or terminal board) - Control board defective 	<ul style="list-style-type: none"> - Turn power on - Replace fuse - Replace control board
Clamp/Motor/Lift/Cutter not working	<ul style="list-style-type: none"> - Unit in "Local" Mode - Low Aux Voltage supply - Insufficient air supply - Air line cut, disconnected, or twisted - Excessive spatter buildup - Dry run mode selected - Defective solenoid 	<ul style="list-style-type: none"> - Press "Local" to set Remote mode - Connect to 24Vdc, 1.0A - Set to 85 PSI, 22 SCFM - Replace or re-connect airline - Reset AUTOCLEAN® - Replace solenoid - Check connections and cable(s) - Contact Nasarc with error code
Ream bit does not retract	<ul style="list-style-type: none"> - Ream bit jammed in nozzle - Extended sensor defective - "Ream" output held on - Lift cylinder defective - Incorrect program position 	<ul style="list-style-type: none"> - Remove jammed bit - Replace damaged parts - Replace extended sensor - Replace lift cylinder - Contact Nasarc with error code
Controller cannot start a cycle or complete a cycle	<ul style="list-style-type: none"> - Unit in "Local" Mode - Output signal is not reaching the AUTOCLEAN® - "Complete" input signal is not responding - Device is turned off 	<ul style="list-style-type: none"> - Press "Local" to set Remote mode - Check control cable or communications setup - Reset AUTOCLEAN®
No anti-spatter liquid and/or no air flow from sprayer	<ul style="list-style-type: none"> - Low anti-spatter volume - Fluid line blocked - Insufficient air supply - Solenoid valve defective - Spray nozzle clogged - Fluid is not primed - Check valve defective 	<ul style="list-style-type: none"> - Refill anti-spatter fluid - Repair or replace fluid line - Set to 85 PSI - Replace solenoid valve - Clean or replace spray nozzle - Prime fluid line for 5 sec - Replace check valve
Wire is not being cut when the cutter jaws are closed	<ul style="list-style-type: none"> - Insufficient air pressure - Cutters are worn or damaged - Wire diameter too large - Debris in wire cutter blades 	<ul style="list-style-type: none"> - Set to 85 PSI - Replace damaged components - Wire diameter maximum = 0.063"
No signal from nozzle detect sensor	<ul style="list-style-type: none"> - Nozzle or tip is not close enough - Sensor is damaged 	<ul style="list-style-type: none"> - Modify nozzle check position to within 5mm of the sensor face. - Replace the sensor
No signal from gas flow sensor	<ul style="list-style-type: none"> - Check welding gas pressure and flow - Sensor is clogged - Sensor is damaged - Sensor range is set incorrectly 	<ul style="list-style-type: none"> - Replace gas bottle - Reprogram flow setpoints - Remove the bottom plug, clean out debris, replace the plug. - Replace the sensor - Set the sensor range (section 5).

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

10. Solenoid Valves

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

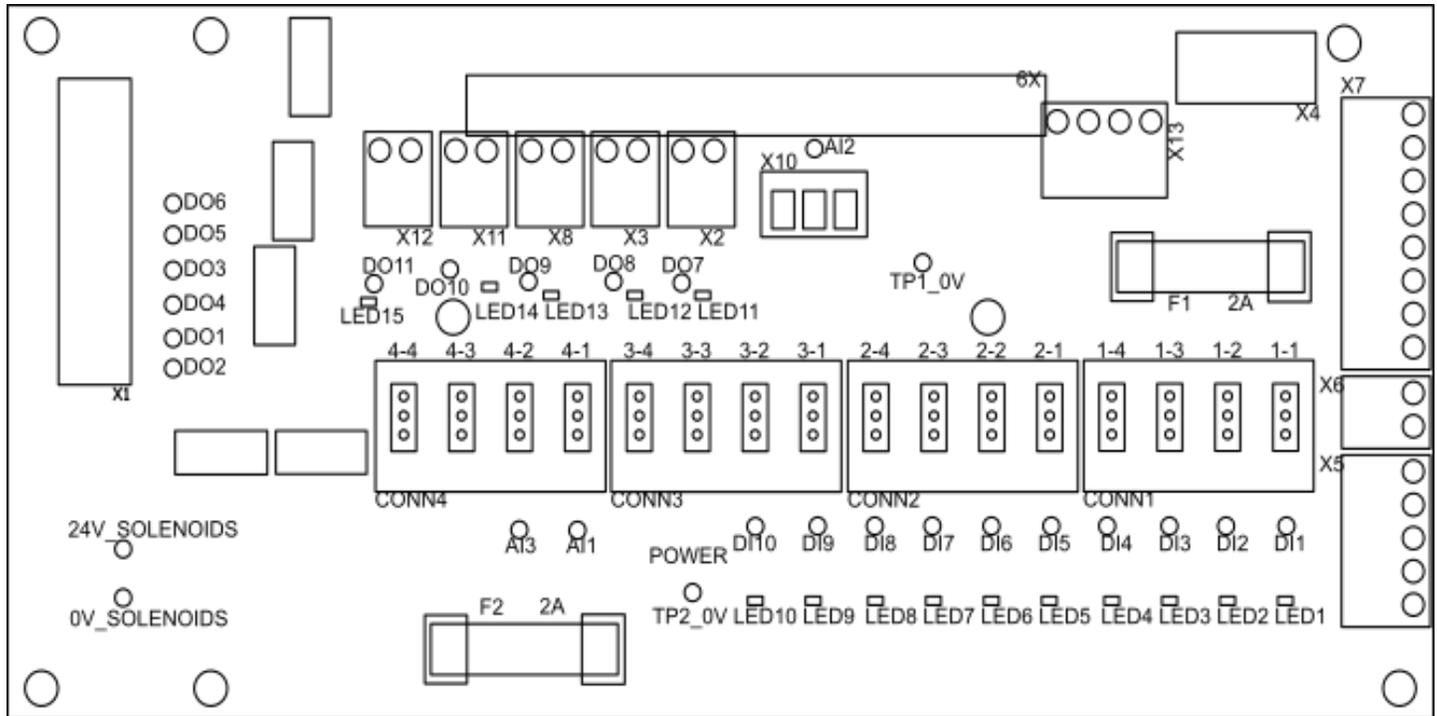


1	Torch Clamp
2	Nozzle Clamp
3	Nozzle Removal Lift
4	Rear Lift

5	Spray
6	Rear Motor
7	Tip / Diffuser Brush Motor
8	Fluid

11. Terminal Block Board

The diagram below shows the terminal block board layout followed by a table for the input sensors and output solenoids. Test points can be measured with a DC meter.



Input sensors are referenced to TP2_0V or TP1_0V. Connect the (-) black test lead to TP1_0V or TP2_0V, connect the (+) red test lead to the desired test point as per the table below. A reading of 0V = OFF, 24V = ON.

Input Sensors			
Name	Connector	LED	Test Point (TP2_0V ref)
Ream cylinder retracted	CONN1-1	LED1	DI1
Ream cylinder de-ring	CONN1-2	LED2	DI2
Ream cylinder extended	CONN1-3	LED3	DI3
Nozzle clamp bottom	CONN1-4	LED4	DI4
Nozzle clamp top	CONN2-1	LED5	DI5
Nozzle clamp cylinder open	CONN2-2	LED6	DI6
Torch clamp/wire cutter open	CONN2-3	LED7	DI7
Wire cutter closed	CONN2-4	LED8	DI8
Nozzle detect	CONN3-1	LED9	DI9
Spare	CONN3-2	LED10	DI10
System Pressure	CONN4-1		A11 (0.5V to 4.5V)
Nozzle Gas Flow Sensor	X10		A12 (0.5V to 2.7V)
Spare	CONN4-2		A13
Reserved	X7		
Robot Power	X6		
E/IP Power	X5		

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Output Solenoids are referenced to 24V_SOLENOIDS. Connect the (+) red test lead to 24V_SOLENOIDS, connect the (-) black test lead to desired test point as per the table below. A reading of 0V = OFF, 24V = ON.

Output Solenoids			
Name	Connector	LED	Test Point (0V_SOLENOIDS ref)
Torch clamp / Wire cut	X1	-	DO1
Nozzle clamp	X1	-	DO2
Nozzle remover	X1	-	DO3
Ream lift	X1	-	DO4
Spray (Air)	X1	-	DO5
Spare	X1	-	DO6
Spray (Fluid)	X2	LED11	DO7
Ream motor	X3	LED12	DO8
Tip/diffuser brush motor	X8	LED13	DO9
Spare	X11	LED14	DO10
Spare	X12	LED15	DO11
Spare	X13		

12. Replacement Parts List

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

Part number	Description
IRB020625-00	5/8" REAM BIT
IRB020501-00	1/2" BOTTLE NECK REAM BIT
NAC20-3R	DIFFUSER BRUSH REPLACEMENT ASSEMBLY
NAC10-2R	WIRE CUTTER REPLACEMENT ASSEMBLY
NTE42R	AUTOCLEAN NOZZLE DETECT SENSOR ASSEMBLY
NTE42-2	AUTOCLEAN NOZZLE DETECT SENSOR COVER
NAC30-2R	AUTOCLEAN SPRAY NOZZLE REPLACEMENT ASSEMBLY
NTP05R	AUTOCLEAN FLUID SOLENOID ASSEMBLY
NTP10R	AUTOCLEAN MANIFOLD ASSEMBLY
NTP12R	AUTOCLEAN MOTOR SOLENOID ASSEMBLY
NAC30-3	SPRAY CONE
NAC40-3R	GAS FLOW TUBE REPLACEMENT ASSEMBLY
NAC40-2R	AUTOCLEAN NGFS SENSOR ASSEMBLY
NTE11R	AUTOCLEAN TERMINAL BLOCK BOARD ASSEMBLY
NTE34R	AUTOCLEAN MEMBRANE ASSEMBLY
NTE49-A	AUTOCLEAN LIFT SENSOR ASSEMBLY
NTE49-B	AUTOCLEAN CLAMP SENSOR ASSEMBLY
NTP32R	AUTOCLEAN REAM MOTOR ASSEMBLY
NTP31R	DIFFUSER BRUSH MOTOR ASSEMBLY
NTE20-E	AUTOCLEAN SYSTEM PRESSURE SENSOR ASSEMBLY
NAC08-1R	SD NOZZLE GRIPPER JAW ASSEMBLY
NAC08-2R	HD NOZZLE GRIPPER JAW ASSEMBLY
NAC34	ANTI SPATTER BULK FEED
NAC50-6ER	ETHERNET/IP CONTROL MODULE REPLACEMENT ASSEMBLY
NCCA-F-xx	ETHERNET/IP 4 PIN POWER CABLE
NCCD-R-xx	ETHERNET/IP M12/RJ45 CABLE

xx: cable length (ft) 30,50

13. Warranty

NASARC Cert-Equip WARRANTY POLICY

AUTOCLEAN® Nozzle Cleaners 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)
| | |
ACyymmnnn
```

For example, AC2208033 is the 33rd unit manufactured in August (08) of 2022 (22)

