RushCut
Semi-Automatic Cut-Off Machine

Operation Manual

Machine Serial No. 0203

Rush Machinery, Inc.
4761 Route 364
Rushville, NY 14544 USA

Tel: 800-929-3070 (Toll Free - USA & Canada)
or 585-554-3070
Fax: 585-554-4077

Email: mail@rushmachinery.com
Website: www.rushmachinery.com

Table of Contents

1. Safety 3
   1.1 Preliminary Precautions 3
   1.2 Maintenance and Repair Precautions 3
   1.3 General Operating Precautions 3

2. Machine Specifications 4
   2.1 Electrical 4
   2.2 Cut-Off Wheel 4
   2.3 Coolant 4
   2.4 Compressed Air 4

3. Machine Description 4

4. Machine Diagram 5

5. Machine Features 6
   5.1 Coolant Tank Reservoir and Pump 6
   5.2 Enclosure Safety Interlock 7
   5.3 Operator Control Panel 7
   5.4 Emergency Stop 7
   5.5 Observation Window 8
   5.6 Manual Joystick Controller 8
   5.7 Adjustable Material Stop 9
   5.8 Main Power Switch 9
   5.9 Adjustable Position (modular hose) Coolant Nozzles (1) 9
   5.10 Adjustable Pneumatic Material Clamps 10
   5.11 Saw Wheel Guard 10
   5.12 Belt Guard 11
   5.15 LED Light Strip 11
   5.14 Removable Plugs for Long Materials 11

6. Control Panel Diagram 12-14

7. Coolant Solenoid (Optional) 15

8. Changing the Cutting Wheel 15

9. Setup For Making Auto Cuts 15
   9.1 Cutting In Auto Cycle 16
   9.2 Cutting In Manual Mode 17
   9.3 Starting Parameters 17
   9.4 Approximated Cycle Times 18

10. General Maintenance 18
   10.1 Cleaning 19
   10.2 Coolant System Maintenance 19
   10.3 Coolant Maintenance 19
   10.4 Belt Adjustment 19

11. Rush Machinery Warranty 20

Table of Contents Continued

APPENDIX B: Graymills Coolant System..... 21
APPENDIX C: Electrical Schematics 22
APPENDIX E: Optional Accessories 24

RushMachinery
Grind better.



1. Safety

Failure to read, understand, and follow any and all instructions and warnings in this or any section of the manual voids all manufacturer warranties. The makers of this product cannot be held responsible for damage or injury resulting from incorrect use or failure to observe all operating procedures and precautions contained herein.

1.1 Preliminary Precautions

Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, and/or service the equipment. Read and understand the manual in its entirety before proceeding. The user is responsible for applicable local codes; wiring, grounding, disconnects, and circuit breaker protection are of particular importance. Failure to observe this precaution could result in severe bodily injury of loss of life.

NOTE: Customer must provide wiring and strain relief connector to provide power to the control panel. All wiring must be done in accordance with any applicable local electrical codes.

1.2 Maintenance and Repair Precautions

Turn off the power to the machine before checking or making any machine repairs or adjustments.

This equipment is at line voltage when AC power is connected to the machine. Verify that there is no voltage present at input leads. **Disconnect and lockout the power from the machine before repairing or adjusting anything on the machine.** Failure to observe this precaution could result in severe bodily injury or loss of life.

1.3 General Operating Precautions

Do not operate this machine without the proper guards in place at all times. Under no circumstances should anyone put their hands or any part of their body near the cutting wheel or the feeder bar while the machine is running. The operator must keep hands clear of all pinch points and moving parts of the machine while it is running. The operator must not wear loose fitting clothing, jewelry, or anything else which could get caught on any part of the machine at any time. Under no circumstances should any of the safety features—including the door closed sensor, wheel guards, loading tray guards, and any other feature—be bypassed by any means.

2. Machine Specifications

2.1 Electrical

3 Phase, 200–240 volts
15 Amps
50/60 Hz

2.2 Cut-Off Wheel

Form: 1A1R
Diameter: 8”
Bore Size: 0.75 inch
Width: 0.030–0.050 inch
Default RPM: 2200

2.3 Coolant

For the RushCut, the only coolant approved for use is water with a rust inhibitor and a cobalt inhibitor, such as Grindex 10 CO from Blaser Swisslube, (www.blaser.com). It is important that the concentration of the coolant is maintained per manufacturers’ recommendation.
Be certain the supplied coolant tank and pump are installed correctly and in good working order at all times. Cutting carbide generates a substantial amount of heat and a lack of coolant can create hazardous situations. The use of other coolants, such as oil without proper fire suppression and mist collection, are not recommended unless utilizing an appropriate fire suppression system and with mist collection.

Coolant tank holds 10 gallons/37.85 liters.

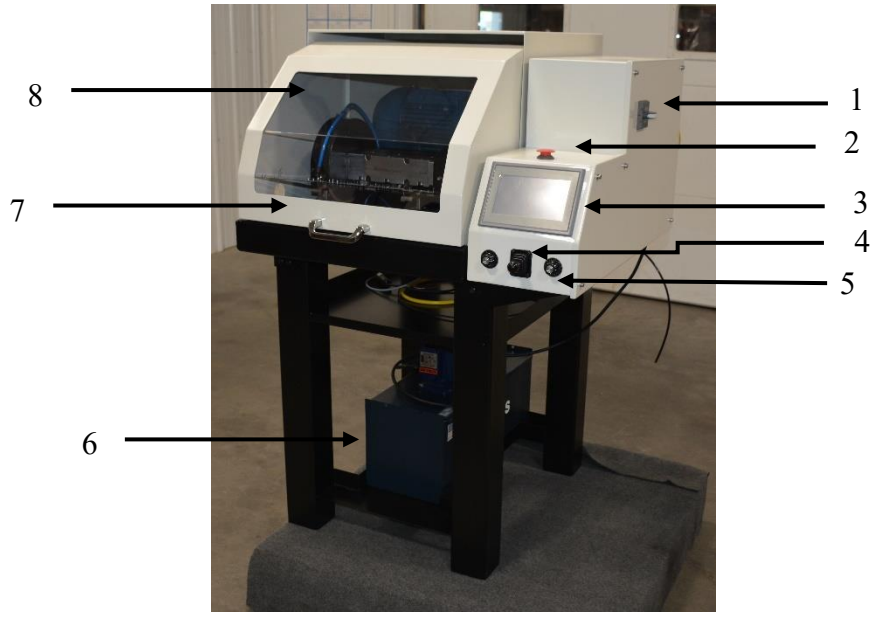
2.4 Compressed Air

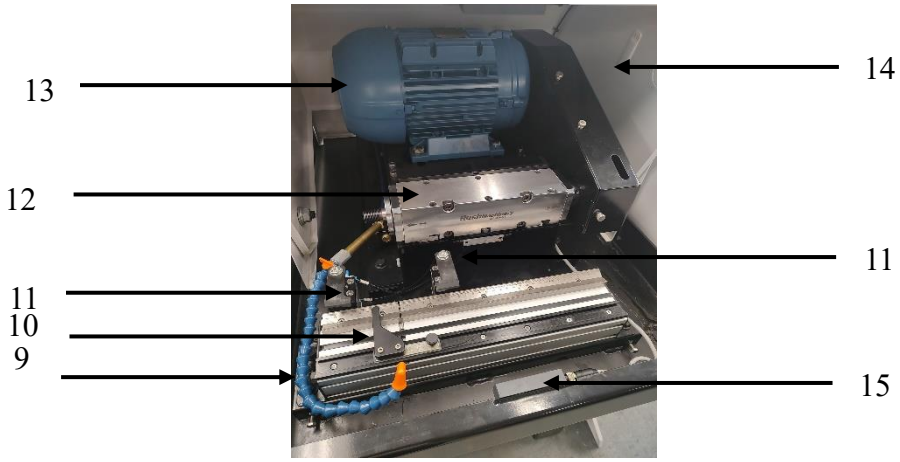
Dry air set at 80psi and 5cfm

3. Machine Description

The Rush Machinery RushCut HSS and Carbide Cut-Off Machine is an easy to operate solution to the carbide industry’s cutoff needs. The machine features a PLC controlled stepper motor driven work head that powers the cutting wheel. It is a semi-automatic cutoff machine. The machine is capable of cutting carbide and high-speed steel, with the appropriate diamond or CBN wheel. The machine comes with everything needed to make cuts. All that is needed to start cutting is place the machine and coolant tank in a stable position with shims as necessary, connect it to your electrical power source, connect the compressed air supply, and add coolant.

4. Machine Diagram





1. Main Power Switch
2. Emergency Stop Button
3. Operator's Panel
4. Joystick Controller
5. Spindle Speed Override & Feed Rate Override
6. Collant Reservoir
7. Operator's Door
8. Observation Window
9. Adjustable Position Coolant Nozzle
10. Adjustable Tool Stop Locator
11. Adjustable Pneumatic Material Clamps
12. Cutting Spindle *(Wheel Guard Removed for Clarity)*
13. Spindle Motor
14. Spindle Belt Guard
15. Magnetic Door Lock

5. Machine Features

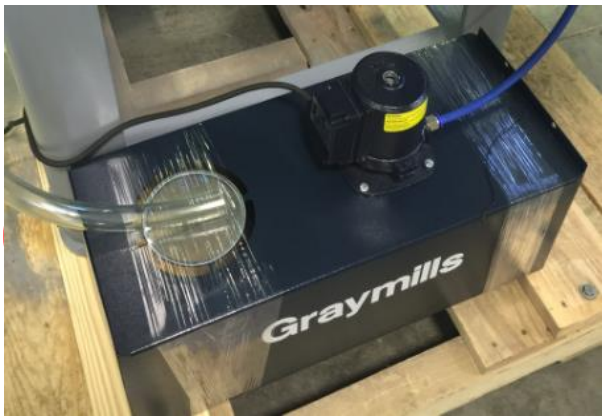
5.1 Coolant Tank Reservoir and Pump

The coolant tank supplied with the RushCut is a Graymills recycling coolant tank with a 10-gallon capacity, removable catch screen filter for cleaning, and plugs directly into the main electrical cabinet at the rear in a dedicated quick connection.

Set the coolant tank on the built-in shelf near the bottom of the machine base. Fill the tank with water and a rust inhibitor, such as Blaser Grindex 10.

Connect the coolant line and controller connection as shown below. Ensure the drain line end is positioned in the strainer and check it periodically to verify that it is still properly positioned. Monitor the fluid level regularly to maintain adequate coolant and change the fluid according to the rust inhibitor maker's guidelines.









5.2 Enclosure Safety Interlock

The enclosure safety interlock is intended to protect the operator from potential injury. The enclosure cover must be closed and the safety interlock engaged for the CYCLE START button to function. The enclosure cover cannot be opened while machine is cycling, and the safety interlock is engaged. Coolant can be turned on while enclosure is open.

NOTE: Disabling the safety interlock will void the machine warranty.



5.3 Operator Control Panel

See the **Main Machine Operation: Control Panel** section below. Note that the operator's panel uses a touchscreen.

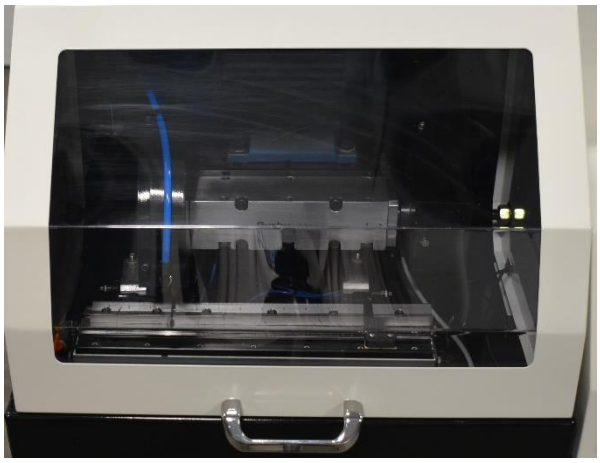


5.4 Emergency Stop

When the EMERGENCY STOP button is pressed, the cutting head will stop and the wheel shuts off in its current position. **NOTE:** The cutting wheel still rotates for 1 second after the EMERGENCY STOP button is pressed.

5.5 Observation Window

The large window allows the operator to observe the cutting process while the cover is closed. The window is made of Lexan to provide the operator a clear view and protection from coolant spray or potentially dangerous cut ends.



5.6 Manual Joystick Controller

The Joystick controller allows the operator to jog the wheel forward and backwards. This is useful when setting the start and end points of the cutting cycle. The joystick can also be used to cut a part manually by holding down the joystick throughout the cut. Joystick speeds can be set in the settings page on the operator's display screen.



5.7 Adjustable Material Stop

A material stop that moves through the V tray to the right of the saw wheel provides a stop for repetitive cuts. The material stop can be removed for long materials via the thumb screw.



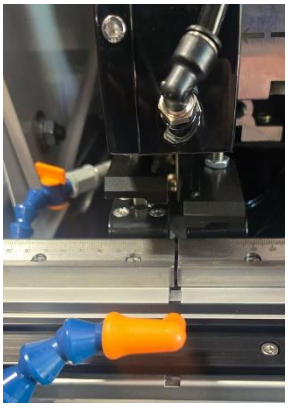
5.8 Main Power Switch

The Main Power switch is located on the electrical panel on the right side of the machine. This switch turns the power on or off from the building power supply source.



5.9 Adjustable Position (modular hose) Coolant Nozzles (2)

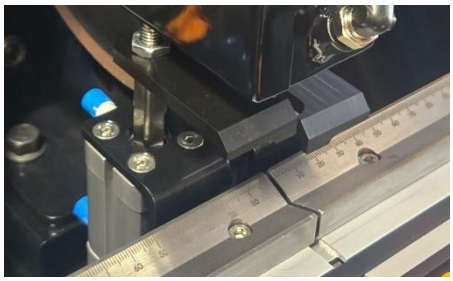
The RushCut comes with two coolant lines. One is adjustable and one is mounted in the wheel guard that is a fixed position. Position the adjustable nozzle so that adequate fluid is flowing at the contact point of the cutting wheel.

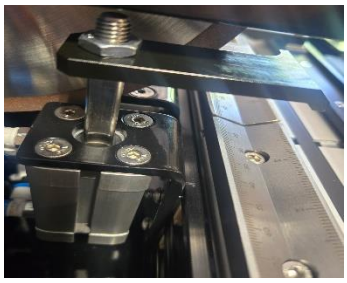


5.10 Adjustable Pneumatic Material Clamps

The material clamps that hold the rod or tool to be cut in the V tray are adjustable for position. Simply slide the clamps side to side to move them into the desired location. The top fingers of the clamps can be removed by the top hex nut shown below. This allows for easy replacement and or custom fingers to be used. Clamps can be actuated up and down through the control panel.

Each clamp cylinder has 2 speed control valves. One for the up direction and one for the downward direction. Adjust if necessary if the clamping is moving too fast or too slow in either direction.





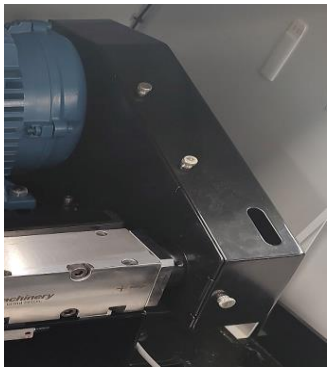
5.11 Saw Wheel Guard

The saw wheel is covered by a guard that pivots up out of the way to change the saw wheel. The pivot also allows the guard to lift slightly when making cuts that go deeply into the V tray.



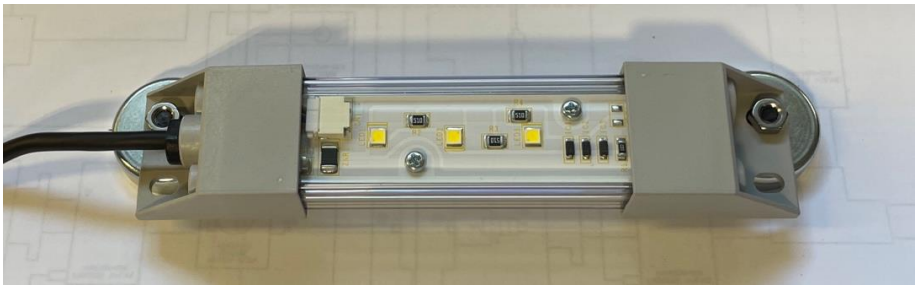
5.12 Belt Guard

The drive motor is connected to the spindle via drive belts, located under the belt cover. The cover is held in place by 3 screws that are easily removed to replace the belt.



5.13 LED Light Strip

The RushCut comes with an LED light mounted to the inside of the enclosure. The LED light can be turned on/off at the control panel.



5.14 Removable Plug for Long Materials

The RushCut comes with a hole on each side of the enclosure to allow the cutting of long rod. The holes are covered with plastic plugs that locate in the cutout area. To remove the plug simply press it from the outside in.

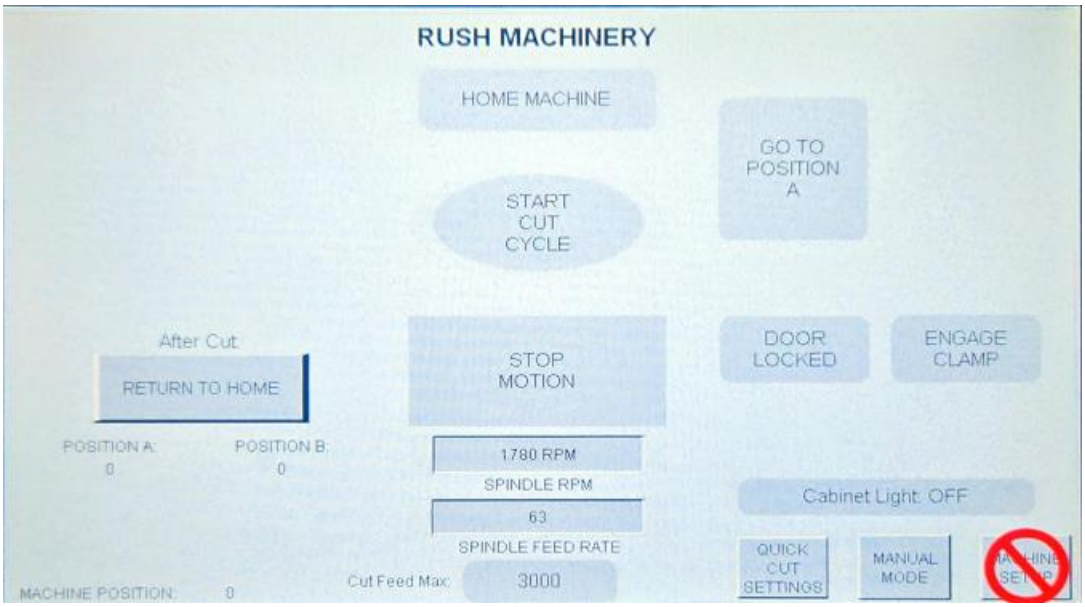




6. Control Panel Diagram



After turning on the main power, the control panel will display the home screen.



Button Description

Home Machine:	Use this button to send the cutting wheel back away from the rod to its furthest point, which is referred to as Home Position.
Start Cut Cycle:	Press this button to start an auto-cutting cycle. The safety door interlock will engage; the Spindle and coolant will turn on and the cutting wheel will travel to position “A”. The cutting wheel will then feed through the rod to end at position “B” then return out of the cutting area.
Stop Motion:	Press this button to stop the cutting cycle.
Spindle RPM:	Displays the current RPM of the cutting wheel.
Spindle Feed rate:	Displays the current feed rate of the cutting wheel.
Cut Feed Max:	Displays the current maximum feed rate allowed.
After Cut:	Toggle this button to set the return position to either “A” or “Home” position after the auto-cut has been completed.
Position A:	Displays the location of the start point of the cut. This location should be 1-2mm in front of the rod to be cut.
Position B:	Displays the location of the end point of the cut. This location needs to be far enough so that the wheel cuts the rod completely.

Control Panel Diagram Continued

Machine Position: This display shows the distance the cutting wheel is away from “Home” position.

Stop Motion: Press this button to stop the cutting cycle.

Go To Position A: Pressing this button will move the wheel to position A using a fast motion.

Door Lock: Indicates if the safety door interlock is engaged.

Engaged Clamp: Toggle button used to raise or lower the rod holding clamps.

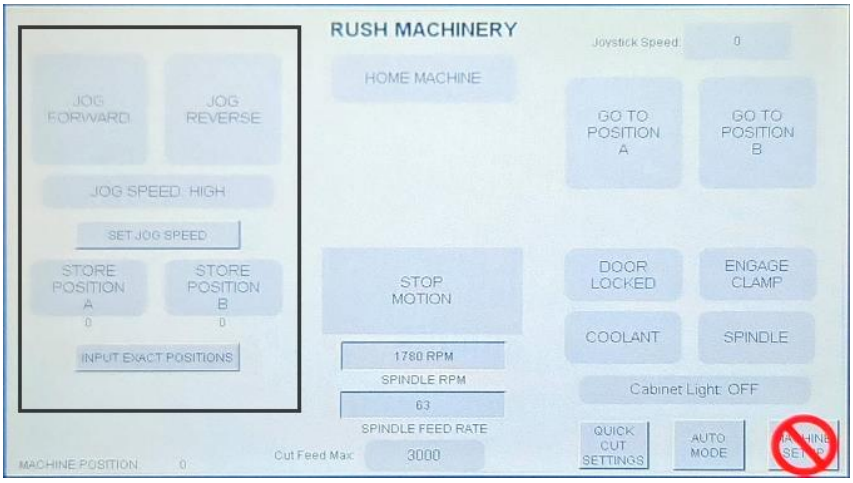
Cabinet Light: Toggle button to turn on or off the LED enclosure light.

Quick Cut: Settings page to store cutting feed rates based on diameters.

Manual Mode: Press this button to toggle between Auto mode and Manual mode. Manual mode is used for setups. Auto mode used for automatic cutting.

Machine Setup: Used by Rush for setting Master parameters.

Manual Mode



Notice: The highlighted area changes between Auto and Manual mode.

Jog Forward: Using the joystick, the operator can jog the cutting wheel towards the rod.

Jog Reverse: Using the joystick, the operator can jog the cutting wheel away from the rod.

Jog Speed High: Displays the current jog speed, either set to High or Low speed.

Set Jog Speed: Sets the allowable speed for High or Low jog speed.

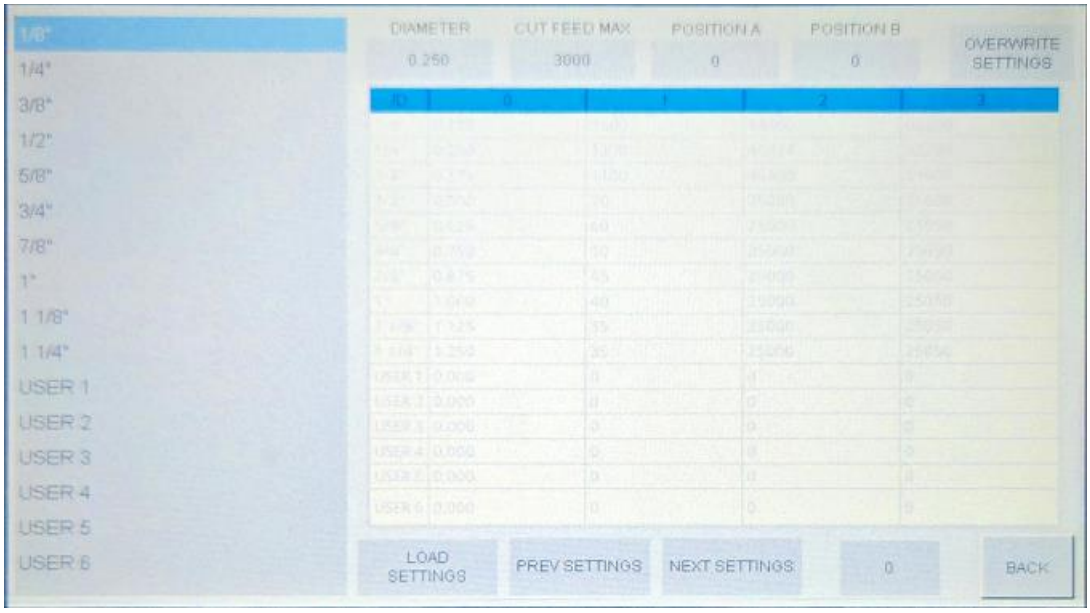
Manual Mode Continued

Store Position A: Press this button to store the start point of the cutting cycle. Jog 1-2mm away from the rod and set this point.

Store Position B: Press this button after you jog to the location where the cutting cycle needs to stop at. This is considered the end of the cut location. RushCut will cut from point A to point B.

Input Exact Positions: TBD

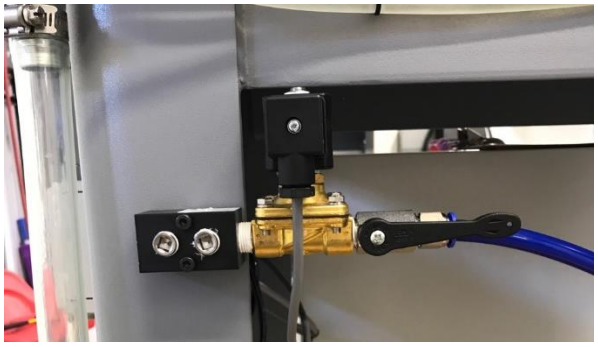
Quick Cut Settings



The Quick cut settings page is a database for storing parameters based on diameters.
You can store the A and B locations, along with the cutting speed, for each diameter you want to store.
This can easily be transferred to the Autocycle by selecting that diameter and pressing the Load Settings.

7. Coolant Solenoid (Optional)

The coolant solenoid is for anyone who would like to adapt their RushCut to their central coolant system. All you need is a 3/8" NPT male adapter to thread into the manifold. The solenoid is controlled by the switch on the control panel, and flow is controlled by the flow control valve after the solenoid.



8. Changing the Cutting Wheel

The RushCut saw wheel is held on with a 19mm nut with left-hand threads. To change the wheel, swing the wheel guard up off the wheel. Hold the spindle in place with a 14mm wrench at the opposite end. Use a 26mm wrench to loosen the nut that holds the saw wheel on. Remove the old wheel and replace with a new one. Tighten the new wheel on and lower the guard back into position. The required wrenches are supplied with the machine.

9. Setup for Auto Cycle – Semi-Auto

The RushCut Semi-Automatic Cutoff Machine is intended to make cuts safely and effectively by controlling the cut speed so that the wheel life is maximized. The sequence for setup is as follows:

1. Open the operator's door.

2. Load the item to be cut and adjust the material stop as desired.

3. Enter manual mode, and using the joystick, jog wheel towards the rod to be cut. Stop the wheel in front of the rod by approximately 1mm. Next, press Store Position A.

4. Move the rod so the wheel can pass through without contacting the wheel. Jog the wheel in to a point where the wheel will cut through the rod completely. Next, press Store Position B.

5. Now press either Goto Position A or press Home Machine, this will back the wheel away for the rod.

6. Setup for Auto cycle is now complete.

9.1 Making Cuts – Semi-Auto

7. Position the item to be cut and adjust the clamps to securely hold the item as necessary. The clamps can be raised and lowered by pressing the Engage Clamp button. Repeat this process until the item is securely held by the clamps.

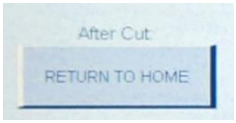
8. Close the operator's door so the safety lock will engage.

9. Press the Auto Mode button to enter the auto cycle.

10. Verify the Spindle speed and feed rate are correct for the diameter and material being cut.

11. Press the Start Cycle button. The spindle will turn on, the Clamps will engage, and the coolant will start. If the spindle is in home position, it will move to position A quickly and start cutting. If the spindle is already at position A when Start Cycle is pressed it will start cutting to position B.

12. After the cutting wheel finishes the cutting, the wheel will back away from the rod. This position will either be Position A or Home position, whichever the operator chooses.



13. The spindle and coolant will shut off and the clamps will rise, and the operator's door can now be opened.

9.2 Making Cuts – Manual Mode

14. Cutting a rod can also be achieved by using manual mode by using the Joystick controller. This is a good option when only 1 or 2 pieces need to be cut.

15. Locate the rod to the desired length or up against the part locator. Close the operator's door and engage the clamps down. Turn on the spindle and coolant using the touch buttons on the operator's panel.

16. Set jog speed to high if the wheel is near the home position and jog towards the rod, stopping in front of the rod by approximately ½" or 13mm. If already close to the rod set the jog speed to low. Verify the low speed is correct for that diameter rod to be cut.

17. When the cutting wheel is close to the part, hold the Joystick down to cut through the rod at low jog speed. When finished, jog away from the rod in the opposite direction. Turn off the spindle and coolant and open the operator's door. Now, remove the rod.

9.3 Starting Parameters

Listed below are some starting parameters for feeds and speeds on the RushCut:

1. The feed rate is established by entering a value into the Quick cut database or by entering the value directly into the Spindle Feed Rate parameter located in the Auto page of the operator's panel. It should be set high enough to allow aggressive cutting while limiting the amount of noise and low-frequency vibration. Going too slow will cause loading of the wheel, so make sure that you are cutting aggressively enough. If the feed rate is too fast, there may be excessive noise, low frequency vibration and possible bouncing.

2. The spindle speed should be set so that the wheel is allowed some breakdown as it is cutting. If you are using a very hard wheel, then you will want to use a slower spindle speed, so the wheel does not act harder. If the wheel is a softer bond and is breaking down relatively fast, then increasing the spindle speed will help increase the life of the wheel.
3. Part diameter will also be a determining factor in both spindle speeds and feed rates. On a larger diameter part, slower rates of feed and spindle speed will help to achieve a cleaner cut and longer wheel life. Conversely, faster spindle speeds and faster rates of feed will help with the cutting of smaller-diameter rods.

    a. Suggested:
        i. With Carbide: the spindle speed range will be between 2000 RPM to 2400 RPM
            1. ≤ 0.25", spindle speed will be at or close to 2400 RPM
            2. ≥ 1", spindle speed should be around 2000 RPM

        ii. With CBN: the spindle speed range will be between 1750 RPM to 2200 RPM
            1. ≤ 0.25", spindle speed will be around 2200 RPM
            2. ≥ 0.75", spindle speed will be around 1750 RPM
        iii. If you are cutting steel with a Rockwell hardness of 35 HRC or less, then you will want to increase the spindle speed to around 2600 RPM for parts ≤ 0.5" and around 2400 RPM for parts > 0.5" up to 1". > 1" use 2200 RPM.

9.4 Approximated Cycle Times

Using the chart below will give you an approximation of the cycle times for different diameters.

Approximate Diameter in inches	Approximate Time to Cut in Seconds
0.07	3
0.12	6
0.20	10
0.28	17
0.35	22
0.43	28
0.51	35
0.59	47
0.67	57
0.75	71
0.83	86
0.91	101
0.98	115
1.06	130
1.14	155
1.22	179
1.30	214
1.38	253
1.46	292

10. General Maintenance

10.1 Cleaning

Keeping the RushCut clean is important to ensure long life and proper functionality. Start by removing any large cutoff pieces or chips so that they do not get caught in the drain line. Use the coolant nozzles to rinse cutting residue out of the machine and into the coolant tank or separate container. Use shop rags to wipe down all surfaces to remove all carbide or steel residue.

10.2 Coolant System Maintenance

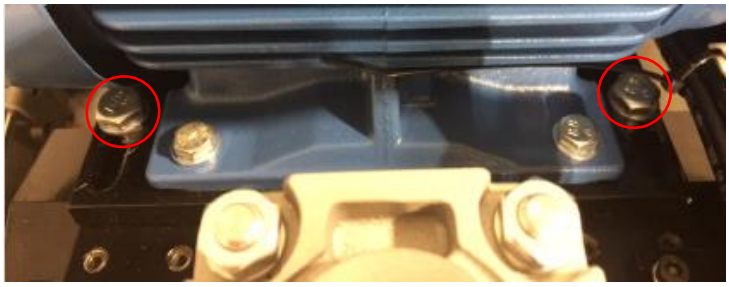
The Graymills Coolant System comes with a screen strainer that should be cleaned out daily. If allowed to dry, the residue may clog the strainer and prevent it from functioning properly or causing the coolant to flow over the sides. This could result in spills or possible damage to the pump if cutoff pieces reach the pump. The bottom of the tank will collect the residue and a central baffle will prevent large particles from reaching the pump. This tank should be drained and cleaned annually at a minimum or more often, depending on your specific situation. Determine how much residue is settling to the bottom of the tank after your first few weeks of use to gauge the frequency of cleanout that your machine will need.

10.3 Coolant Maintenance

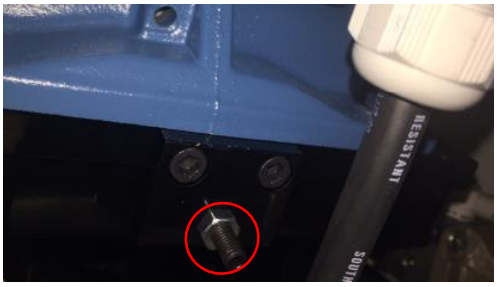
The water coolant with rust inhibitor must be kept clean to ensure proper cooling and cutting process residue removal from the cut. Blaser Grindex 10 is the recommended rust inhibitor. Follow the manufacturer's guidelines and recommendations for mixing and periodic testing using a refractometer to ensure bacteria do not form in the coolant. The coolant concentration should be checked and adjusted monthly and changed annually.

10.4 Belt Adjustment

The belt tension is adjusted by removing the cover, loosening the four motor mounting plate bolts (see photos below; rear mounting plate bolts are not shown), adjusting the tensioning set screw (note locking nut in photo below), and retightening the nuts. Finally, replace the belt guard and tighten all five bolts.



Front of Motor



Rear of Motor

11. Rush Machinery Warranty

For one year from date of delivery of the RushCut Semi-Automatic Cutoff Machine, provided that the machine is installed and operated in accordance with the instruction manual, Rush Machinery will repair or replace any mechanical or electrical part(s) for the machine, if defective in material or workmanship, at no charge. To obtain service under this warranty, contact Rush Machinery, and, at our option, the defective part(s) may have to be returned with shipping charge prepaid by the user. Rush Machinery will, without charge, repair or replace defective part(s). This warranty does not apply to the following: shipping damage, damage or problems caused by abuse, accident, alteration, negligence, or failure to follow operating instructions. In no event will Rush Machinery, Inc. be liable for incidental or consequential damages.

Warning: the use of coolant oil or mixed coolants without proper fire suppression and mist collection is flammable and not recommended. The use of unapproved liquids may void the warranty.

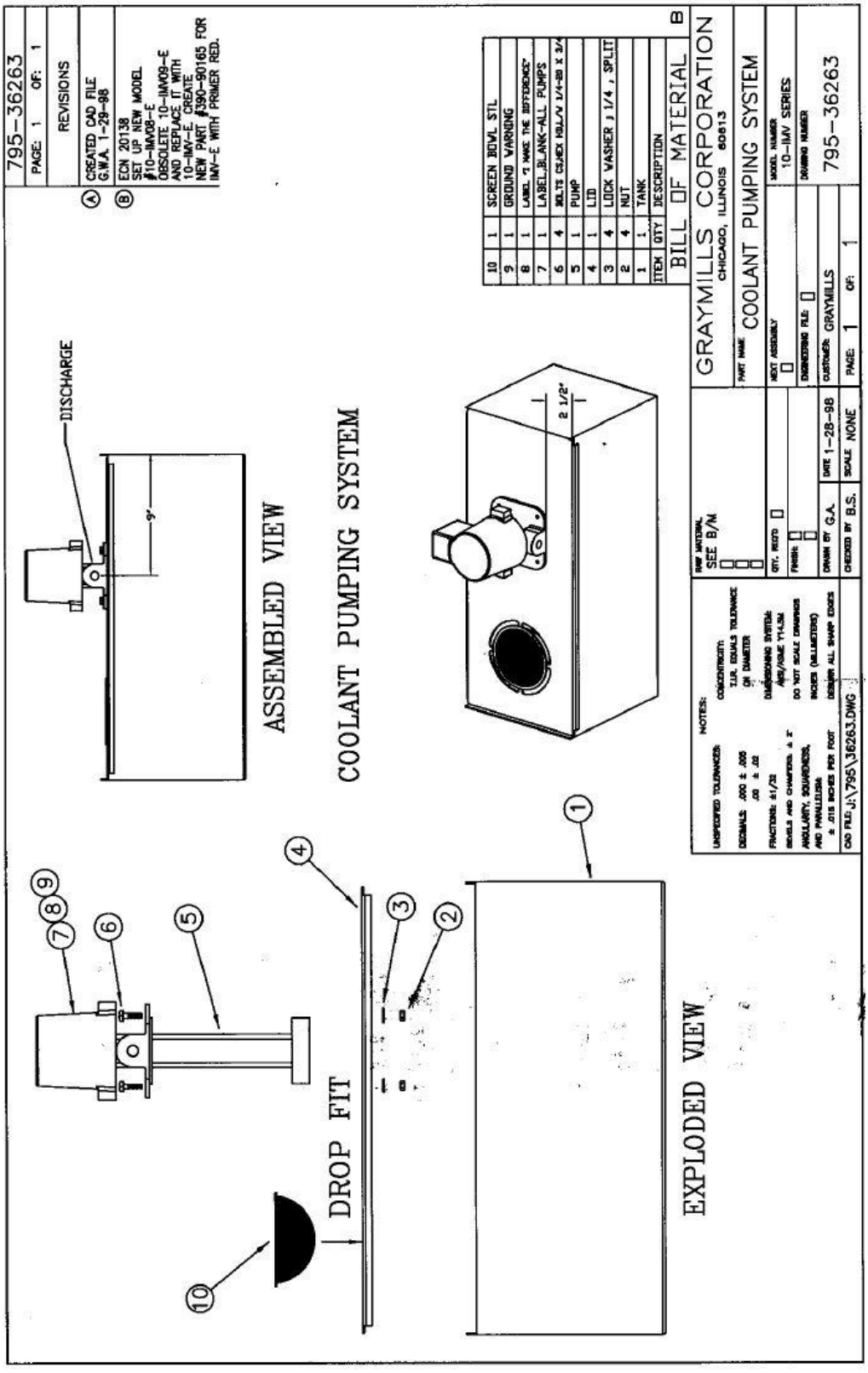
For any maintenance, service, or parts needs, please contact the service department at:

Rush Machinery, Inc.
4761 Route 364
Rushville, NY 14544 USA

Tel: 800-929-3070 (Toll Free - USA & Canada)
or 585-554-3070
Fax: 585-554-4077

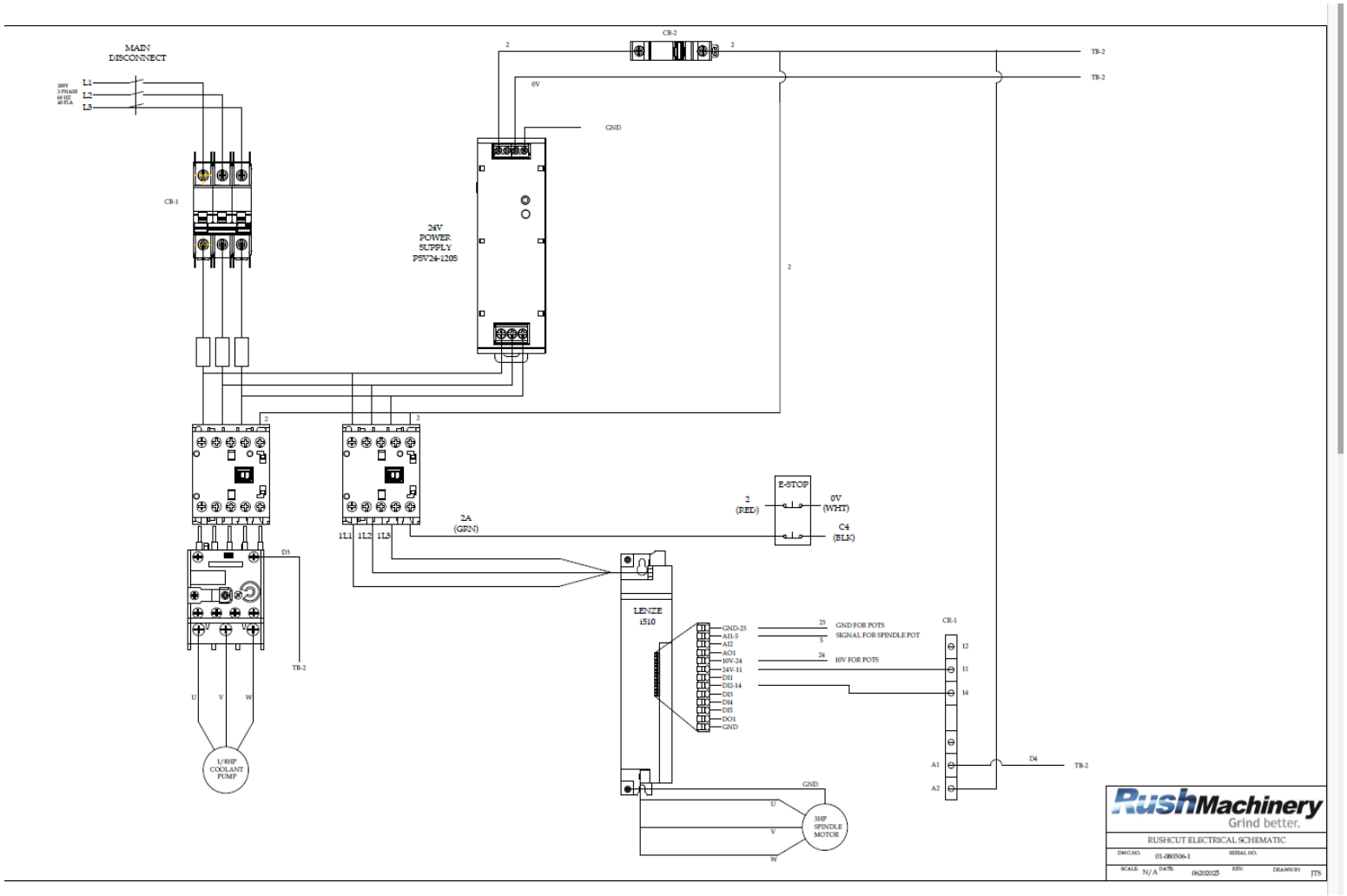
Email: mail@rushmachinery.com
Website: www.rushmachinery.com

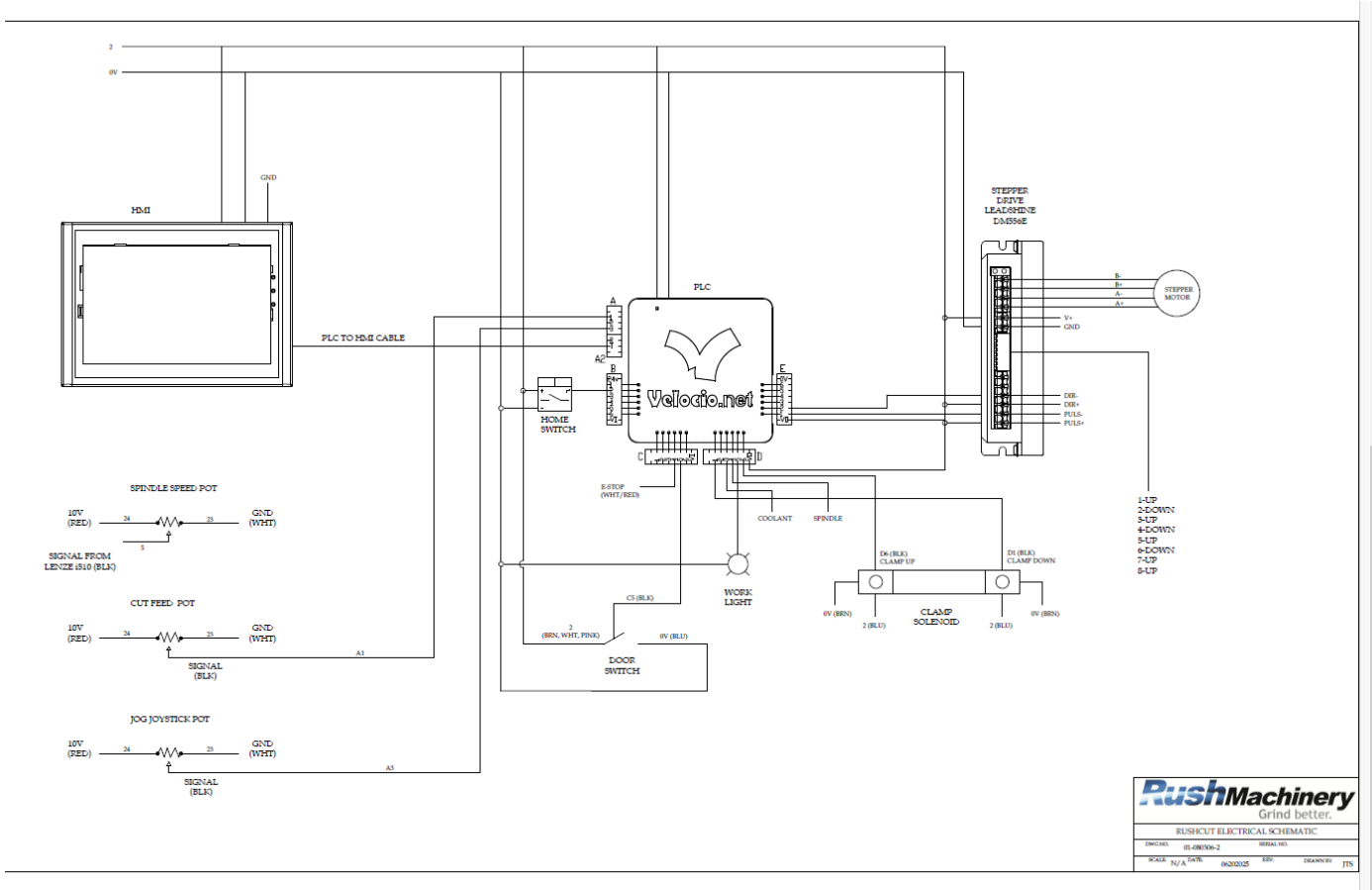
APPENDIX B: Graymills Coolant System



APPENDIX C: Electrical Schematics

RushCut

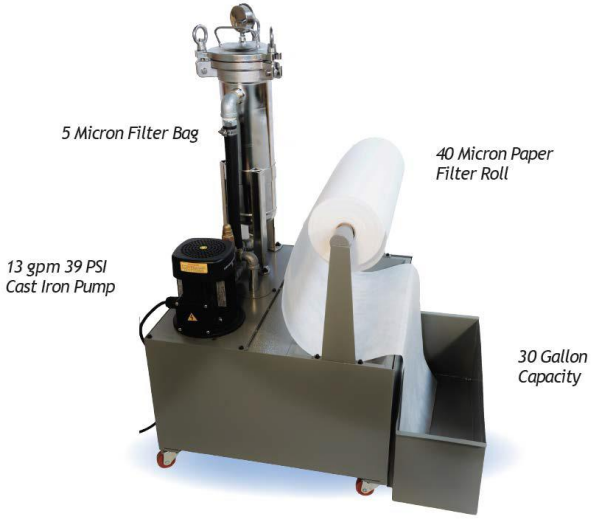



2
0V
GND
HMI
PLC TO HMI CABLE
PLC
Velocio.net
A
A2
B
E
HOME SWITCH
STEPPER DRIVE LEADSHINE DM556E
STEPPER MOTOR
B-
B+
A-
A+
V+
GND
DIR-
DIR+
PULS-
PULS+
E-STOP (WHT/RED)
COOLANT
SPINDLE
1-UP
2-DOWN
3-UP
4-DOWN
5-UP
6-DOWN
7-UP
8-UP
SPINDLE SPEED POT
10V (RED)
GND (WHT)
SIGNAL FROM LENZE i510 (BLK)
CUT FEED POT
SIGNAL (BLK)
A1
JOG JOYSTICK POT
A3
WORK LIGHT
C5 (BLK)
2 (BRN, WHT, PINK)
0V (BLU)
DOOR SWITCH
D6 (BLK) CLAMP UP
D1 (BLK) CLAMP DOWN
0V (BRN)
2 (BLU)
CLAMP SOLENOID
RushMachinery
Grind better.
RUSHCUT ELECTRICAL SCHEMATIC
DWG NO. 01-080306-2
SERIAL NO.
SCALE N/A
DATE 06202025
REV:
DRAWN BY JTS

APPENDIX E: Optional Accessories



Mist Collection (EC06001)
high-efficiency air filtration up to 97% on submicron particles



30-Gallon Coolant System (EC00001)
two-stage filter with 40-micron paper filter roll with 5-micron filter bag



Fire Suppression (EC06000)
automatic thermal sensor detection and manual emergency override