INSTRUCTION MANUAL

INSTRUCTION MANUAL
EXTRUSION PULLERS
NPS-STD Series

Instruction Manual NPS-STD 22 JUNE 2021

NOVATEC™ EXTRUSION

Novatec, Inc. 222 E. Thomas Ave. Baltimore, MD 21225 | www.novatec.com

Phone: 410-789-4811
Toll Free: 800-938-6682
Main Fax: 410-789-4638

Parts Email: parts@novatec.com
Service Email:service@novatec.com
Sales Email: sales@novatec.com

Please record the following information, which is specific to this piece of equipment, in the space provided. Our Parts/Service Department will need these numbers to properly respond to any of your requests.

Instruction Manual: NPS-STD IM 22 JUNE 2021

Model #: _____

Serial # _____

DISCLAIMER: NOVATEC, Inc. shall not be liable for errors contained in this Instruction Manual nor for misinterpretation of information contained herein. NOVATEC shall not, in any event, be held liable for any special, indirect or consequential damages in connection with performance or use of this information.

Table of Contents

1.0 PURPOSE OF THIS MANUAL

This manual describes the installation and operation of the NOVATEC Model NPS Flat Belt Puller. Before installing this product, please read this guide and any additional guides associated with the system's auxiliary equipment.

Explanation of Symbols

This manual includes both general and task-specific safety precautions. These precautions are highlighted in the manual by the following categories:

⚠ **WARNING:** This symbol identifies situations that are potentially hazardous to personnel or equipment.

NOTE	Highlights information provided in text or procedures. This information may or may not be related to safety.

2.0 SAFETY PRECAUTIONS AND WARNINGS

These operating instructions must be read, understood, and implemented by all personnel responsible for this system.

- All mechanical and electrical work must be performed by qualified personnel only.
- NEVER disable or remove safety features. Doing so can result in severe injury.
- Always disconnect power before servicing.
- Refer to the machine serial number nameplate and drawings supplied with this system for actual power requirements.
- Be sure to install the equipment with the proper electrical connections according to all national and local regulations.
- Electric power supply should be through a separate disconnect switch with properly sized overload/fuse protection.
- The customer is required to operate the equipment with all safety features in proper working condition.
- NOVATEC shall provide no further guarantee for function and safety in the event of unauthorized modifications.

3.0 GENERAL DESCRIPTION

Novatec Precision Belt Pullers pull extruded products through sizing and or cooling tanks and regulate the consistency of the extrusion process. NPS Series pullers control line speed through a precision servo connected to a right angle gearbox that di rives a dual serpentine belt. Poly-V drive and driven pulleys ensure consistent pulling traction. This is achieved by precisely regulating the lower traction belt and using a synchronous serpentine belt to drive the upper traction belt

Traction assemblies are available in the following sizes:

Metric	US
10.16 cm wide x 76.2 cm traction length	4” wide by 30” traction length
15.24 cm wide x 76.2 cm traction length	6” wide by 30” traction length

Each traction assembly is mounted to rigid and accurate aluminum guides which ride vertically on round steel shafts to adjust the traction assembly position. Beams adjust individually with a hand wheel.

Each puller belt is accurately tensioned by means of a pair of air cylinders inside the traction assembly. The air cylinders are regulated and acting on the driven pulley at the in-feed end of the belt. The air cylinders are monitored with a pressure switch so that tension is assured before operation of the drive motors. A bleed valve allows relief of the tension cylinders for belt changes.

Wrap-around adjustable guarding prevents access to in-running (upstream) NIP points when properly adjusted.

4.0 SPECIFICATIONS

NPS-STD Performance Characteristics

Belt Width X Length

- 10.16 cm wide x 76.2 cm [4” x 30”]
- 15.24 cm wide x 76.2 cm [6” x 30”[

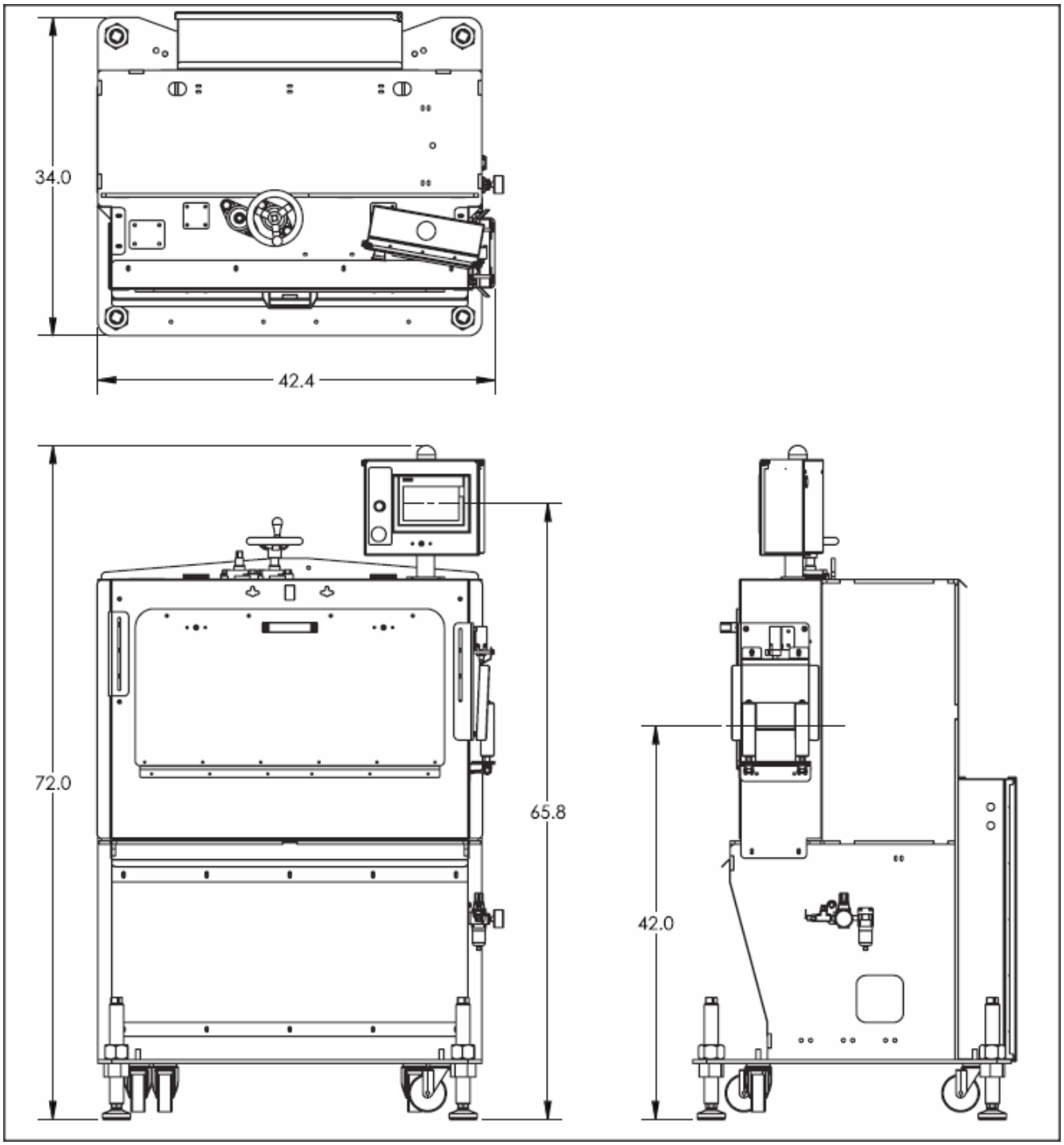
Max feed opening: 4” for 4” wide belts, 6” for 6” wide belts

Total horsepower: 2.2 kW [3 hp] - all NPS machines

Drive Type: Single Servo with synchronous serpentine drive of upper traction assembly

Gear Ratio/Belt Speeds (full torque range):

Gear Ratio	Speed - meters/minute	Speed – Feet/Minute	Approximate Pull Force lb / Kg
7.5:1	1.67-129.5	5.5-425	208 / 94.4
10:1	1.22-99	4.0-325	278 / 126.1
15:1	0.82-67	2.7-220	417 / 189.2
20:1	0.61-50.3	2.0-165	556 / 252.2
30:1	0.43-33.5	1.4-110	580 / 263.1



Dimensions:

	Metric	*U.S*
Footprint:	*107.7 cm wide x 86.4 cm deep*	*42.4” wide x 34” deep*
Overall height:	*182.88 cm*	*72”*
Centerline height:	*106.7 cm ± 5.08 cm*	*42”+/-2”*

Weight:

Installed: 544 kg (est.) 1200 lbs. (est.)

Shipping: 590 kg (est.) 1300 lbs. (est.)

Electrical Requirements (full load Amps):
460/3/60: 7.2 Amps

Belt Cover Material:

- 4” x 30” x 8.0 mm [5/16”) thick 55 durometer, shore A Urethane, standard.
- 4” x 30” x 8.0 mm (5/16”) thick 60 durometer, shore A, silica-filled natural rubber

Options

- Remote touch screen control at extruder
- Belt gap indicator
- Left to Right Machine Operation
- Alternate gear box ratios

Belt Cover Options:

- 9.5 mm [3/8”] thick 40 shore A
- 7.9 mm [5/16”] thick 65 or 70 shore A

5.0 FEATURES

INDUSTRIAL STRENGTH SIEMENS PLC TOUCH SCREEN CONTROL, STANDARD.

Standard built-in features include:

Process monitoring

- **Digital line rate indication**
- **Recipe management with clamp force setting**

Ethernet ready

Standard totalizing control

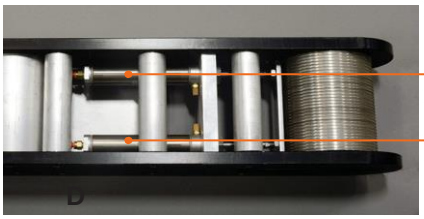
Standard data logging

Servo and gearbox drives-dual-sided serpentine belt

Individual adjustment of beams with hand wheel

Full product guarding with clear polycarbonate door

Adjustable product guide rollers and guarding plus bump switch



Dual pneumatic belt tensioning on upper and lower beams

Standard belt tension valve and bleed gauge

6.0 TYPICAL APPLICATIONS

NOVATEC NPS pullers can pull extrudate from a functional extrusion process or from coils. The NPS series of machines can pull tube and profile up to a diameter of about 4” or 6” (depending on belt width). The outer surface (cover) of belt material is important to process consistency. Soft belt cover materials have the best pulling capability and are less prone to slipping; however they are more prone to tearing. Poly V belts are standard on the NPS family of machines and provide better power transmission and tracking as compared with toothed timing belts and flat belts.

7.0 PLC OVERVIEW

7.1 General

The NOVATEC, NPS Series pullers use a Siemens PLC controller to control all functions of the NPS series pullers including recipe management, user settings, user display and process monitoring. A high resolution touch screen provides the human to machine interface to the PLC.

7.2 Startup and Power Loss

When power is first applied to the Puller following a power loss, the Puller will return to the Home screen. The last active recipe will remain loaded and can be accessed by pressing the picture of the machine or the button with the puller belts.

8.0 PLC ICONS

The icons used on the touch screen of the PLC are meant to be self-explanatory but the following explanations may be helpful. Touching them will result in the action described.

Return to Line Speed Set Point

Reset Speed Trim when in slave run

To Next Screen

Back to Last Screen

View Alarms

To Home Screen

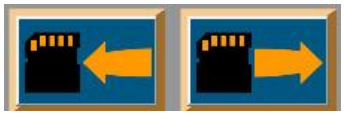
To HELP Screen

Start/Pause Footage Counter for This Run

Start/Pause Footage Counter for Combined Runs

Shortcut to dedicated Footage Counters screen

To System Diagnostics Screen



Backup and Restore Setup Parameters to/from the SD card

To User Management Screen

Terminate HMI Application & Open System Control Panel

Copy & Paste (Edit Recipe Screen)

Activate, Acknowledge or Commit Change

Cancel / Change

Saves Change to Recipe

To Setup 1 Screen

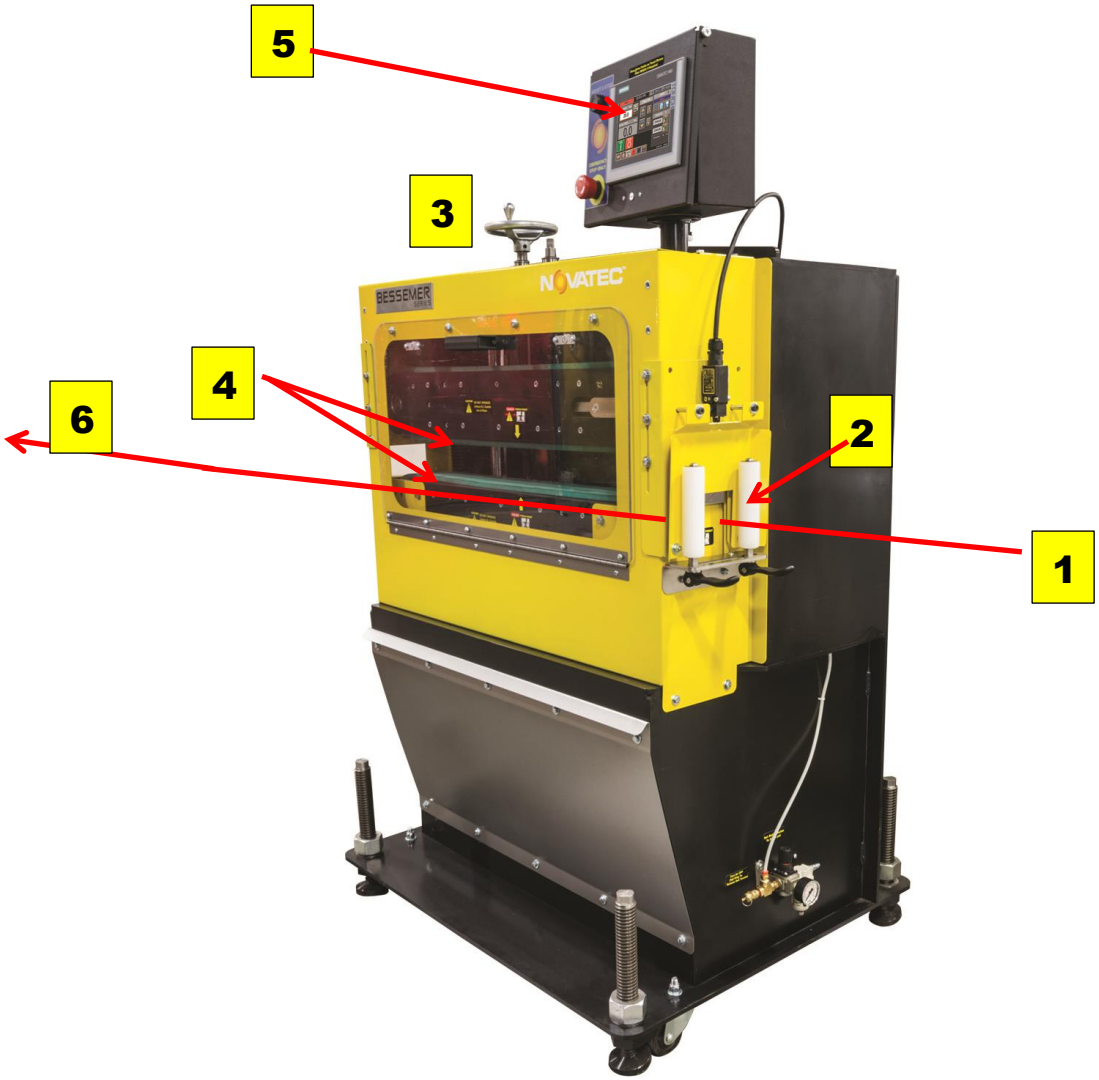
Smart Access Visibility Enabled

Smart Server Enabled

Opens Dashboard

9.0 OPERATING PRINCIPLES

1. The extrusion enters the puller from the upstream side of the puller.
2. Guide rollers or product guides position the extrusion entering the traction belts.
3. A hand wheel adjustment adjusts the vertical position of the upper and lower traction assemblies.
4. Upper and lower traction belts move the extrusion through the puller
5. The PLC control is used to set belt speed, enter recipes, measure the amount of extrudate processed and more.
6. Pulled material is fed to the cutter.



10.0 INSTALLATION

1. Carefully unpack the puller and any other components delivered with it. Check all packaging for loose parts, documentation, and other included items. Carefully inspect the puller. Ensure that no wires, bolts, screws, terminals, or other connections have come loose during shipping. Check to ensure that all moving parts are not obstructed by debris or excess packing material.

2. You may require the following tools to complete the installation:
   a. 16” or 18” adjustable wrench
   b. Metric and Imperial hex wrenches

3. All national and local electrical, building, and safety codes need to be followed. Proper grounding of all equipment is important. Check the electrical wiring schematic for wiring numbers and details. The following paragraphs describe installation of typical system components. Some of them are optional and may not be required for your system.

   CAUTION: ***All machines must be grounded to prevent "shocks" from static electricity that is generated by some materials as they are moved. This is an extremely important step.***

⚠ *All electronics are susceptible (to varying degrees) to electrostatic damage and, although as much protection as possible has been designed into the system; this cannot completely eliminate upsets due to electrostatic voltage being accidentally introduced into the electronic circuitry.*

10.1 Mechanical Installation

! CAUTION: Lifting hazard/Tip-over hazard: To avoid personal injury or damage to the puller, lift the puller using a forklift or hoist with straps that been positioned at the pullers center of gravity

1. **Determine the position of the puller.** Puller position should be selected with consideration to the location of the adjacent cooling tank.

   WARNING: Pullers are unidirectional and should only be placed in the product flow direction for which they are designed. Pullers are designed to pull in the direction from the non-motor end toward the motor end of the machine.

   Right to left material flow is the standard machine configuration. Machines designed for right to left material flow will have motors on the left when facing the machine’s touch screen control when properly oriented. The non-motor end of the puller should be closer to the extruder than the motor end of the machine when properly oriented. **Observe all compliance and legal requirements for safety and guarding relating to the machinery installation.** Allow at least 300 – 600 mm (12 to 24 inches) between the downstream end of the sizing tank and the input end of the puller so the tank/sizing table can be moved away from the extruder for startup and maintenance. Allow at least 925 mm (36 inches) of clearance in front and back of the puller for user and maintenance access.

   Normally, the puller should be as close as possible to the cutter for flexible products, but it may be necessary to allow 6-8 feet between puller and cutter for rigid products. Additional clearance may be required when using electronic sizing gauges.

2. **Once the general position has been determined, carefully align the puller with the extrusion line.** It is easiest to adjust the position on the floor before adjusting to the proper height.

3. **Measure centerline height of extruded product centerline.** Use a laser or liquid level to ensure all equipment is aligned to this height.

4. **Align the puller with the centerline height of this equipment.**

   To adjust the centerline height of the puller, adjust each foot pad at the corners of the base of the puller with a 400-460 mm (16" or 18") adjustable wrench. Ensure that the puller is level. The bottom of the puller base plate should be positioned 110 mm (4-1/4") from the floor for a 1067 mm (42") centerline height.

   ! CAUTION: Never operate puller while on casters. Always set Foot Pads Puller MUST be Securely Anchored to Floor Before Operation.

5. **Check that Centerline height of the machine allows proper vertical travel for the upper traction assembly.** Some processors attempt to run at higher centerline heights so the material runs over the top edge of an immersion tank. This is permissible as long as there is sufficient travel in the upper traction assembly to allow agglomerates and oversized materials to pass by lifting the upper traction assembly.

   CAUTION: Failure to ensure that the upper traction assembly has sufficient vertical travel can lead to premature belt wear/tearing of belt cover.

   CAUTION: Failure to ensure that the upper traction assembly has sufficient vertical travel will also prevent opening of the booms and present a crushing hazard for machines with walk thru style guards.

6. **Install puller belt suitable to application.**

   Ensure the recommended belt is installed before start up. Refer to the "Replacing Belts" section of instruction manual if required. Typically soft belts are used for thinner walled more fragile parts and hard belts are used for parts that are less prone to deformation due to greater compression force. 40 or 55 durometer belts are typically used for general use where machines are not dedicated to particular extrudate geometry. 55 durometer belts are offered as standard for NPS pullers.

7. **Install Guarding and adjust product guides**

   Fully enclosed guarding is provided. Each style guard is designed to prevent access to the in-running nip point hazard zones.

   CAUTION: Never use equipment without properly installed guarding which is appropriate to its location of use and compliant with local law and compliance guidelines.

   Adjust the belt puller guide roller or product guide so that the product is positioned in the center of the belt.

10.2 Electrical Installation

Always disconnect and lock out the main power supply before wiring power and control cables between the NPS Puller controller and the external devices. Refer to the wiring diagram and general arrangement drawings supplied with this system before making electrical connections.

- Use shielded cable for communications wiring.
- Keep communication cables and control wiring as far as possible from high voltage equipment. If you must run cable across power lines, run the cable at right angles to the line.
- Ensure the equipment grounding is properly connected. Shielded cable should be grounded at one end only and is typically grounded in the main I/O enclosure.

WARNING: Do not install communication cable where it will come into contact with any buildup of electrical charge!

It may be tempting to run the wire next to the material conveying lines, but a substantial buildup of electrical charge can and will occur, especially with certain types of plastic resins and, if the conveying lines are not grounded, they can arc to the cable disrupting communications and/or possibly causing damage.

Open the puller's electrical enclosure and insert the main power through a knockout in the wall of the enclosure. Connect the power wire as indicated on the included wiring diagram. Check that all terminal screws are secure. Close electrical enclosure.

Before testing the machine, confirm that the placement and wiring of the puller conforms to all applicable national and local regulations. When ready, turn on the main disconnect. Make sure that the E-Stop button is in the out position. Press the reset button.

All national and local electrical, building, and safety codes need to be followed. Proper grounding of all equipment is important. Check the electrical wiring schematic for wiring numbers and details. The following paragraphs describe installation of typical system components. Some of them are optional and may not be required for your system.

CAUTION: *All machines must be grounded to prevent "shocks" from static electricity that is generated by some materials as they are moved. This is an extremely important step.*

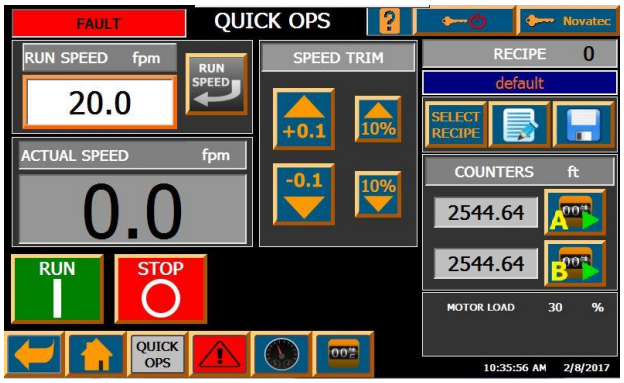
All electronics are susceptible (to varying degrees) to electrostatic damage and, although as much protection as possible has been designed into the system; this cannot completely eliminate upsets due to electrostatic voltage being accidentally introduced into the electronic circuitry.

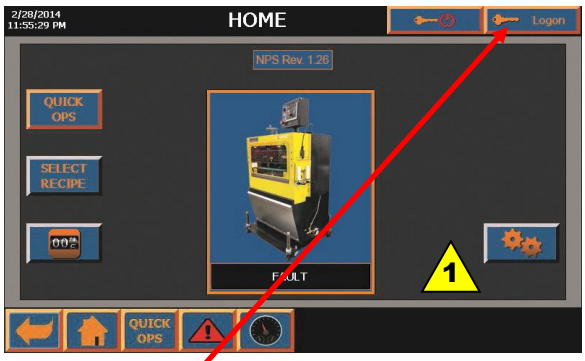
11.0 INITIAL SETUP SCREENS

11.1 Accessing SETUP Screens

Please follow ALL installation and safety procedures described in manual.

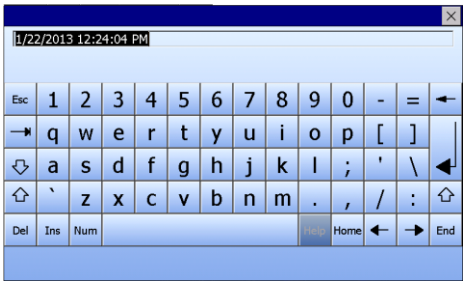
Turn Main Power Disconnect to "ON" 12 O'clock) position. (Light turns Red)
QUICK OPS screen (below) will appear.





Press to access HOME screen. Then press. Logon

An alpha/numeric screen will appear.



NOTE: If the proper level of password protection has not been entered prior to attempting changes, the alpha/numeric password entry keypad will appear, prompting the user to input the proper user name and password before changes can be made.

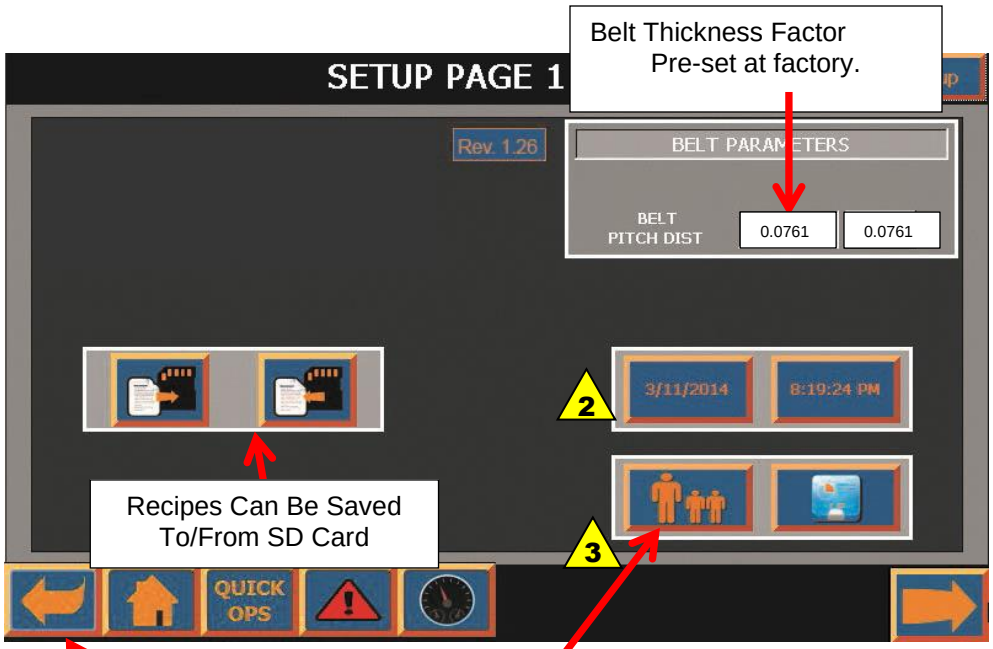
User name and Password factory defaults:
level1 : 1111 (Operator)
level2 : 2222 (Production Supervisor)
level3 : 3333 (Maintenance)
setup : 4444 (Factory Presets – Setup Group)

Enter 4444 then touch to return to the HOME Screen.

1 Press to access SETUP PAGE 1.

11.2 SETUP PAGE 1

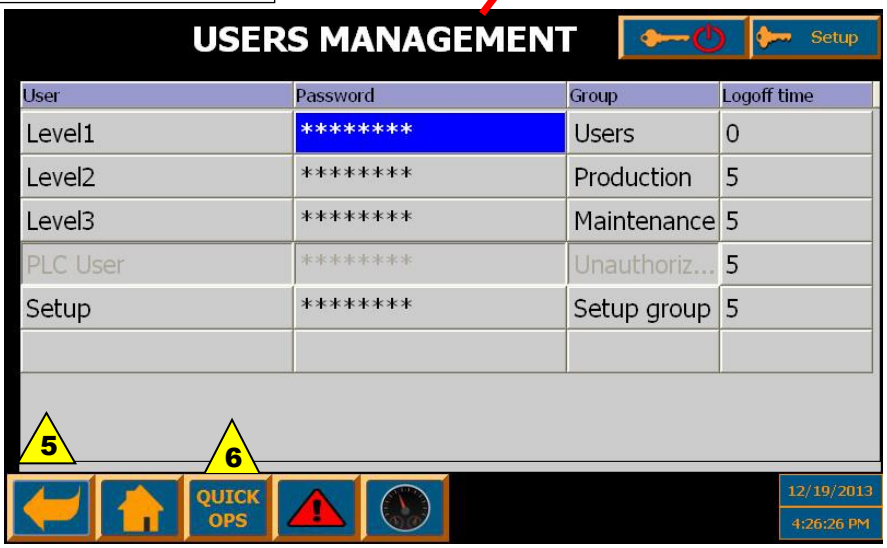
Level 3 or Setup user login is required to make changes to this page.



To Previous Page

2 Time & Date

It is important that time and date are correct. If they are not press either button and the entry screen will appear. Enter date as xx/xx/xx and time as: xx:xx:xx am or pm. Press ↵ after each entry.



You may want to create your own passwords for various levels of access.

3 Press USERS MANAGEMENT icon and follow Instructions below.

To replace Level 1, 2, or 3 with an individual's name, press that button and enter the name on the alpha/numeric screen that will appear. A minimum of 4 and a maximum of 9 letters can be used. Touch the ↵ arrow after your entry to return to the User Management screen.

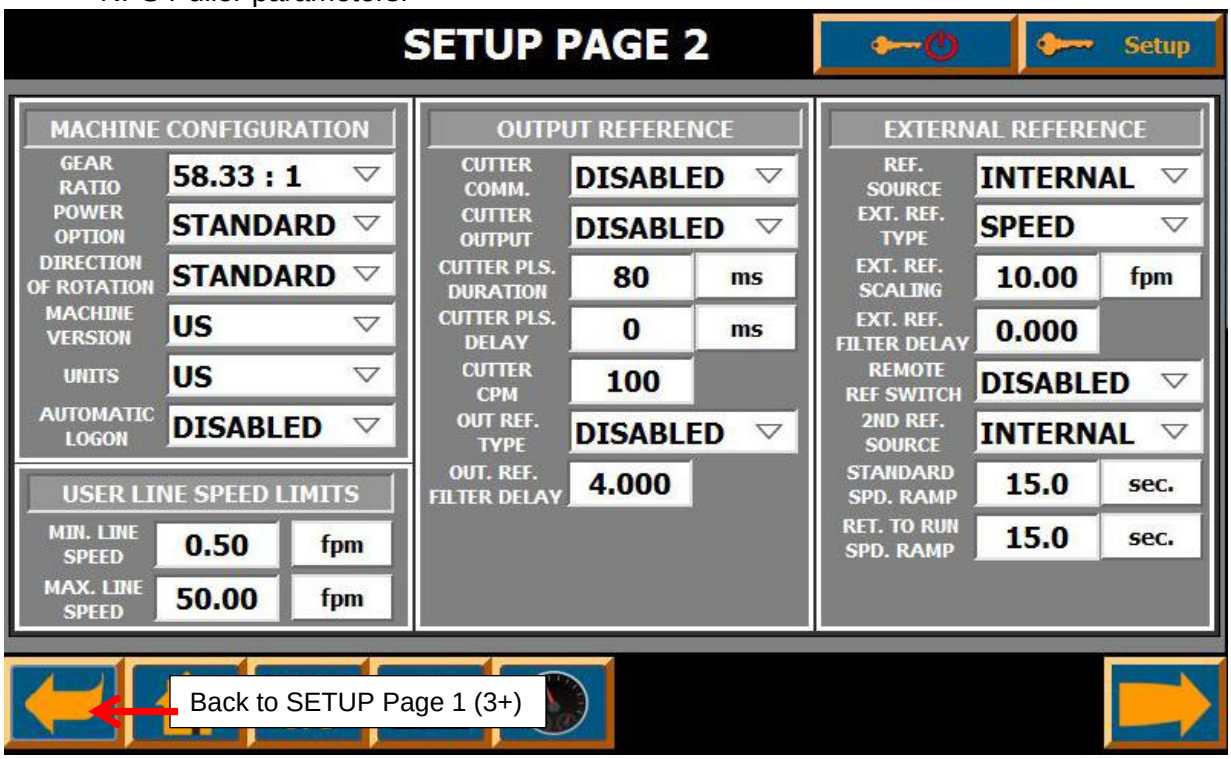
To set User Passwords, double tap in the password block and you will be prompted to enter the new password twice.

NOTE: whenever user name is changed, logoff and logon with the new user name is required for the system to backup a new user name.

5 Press ← to return to SETUP PAGE 1 and then QUICK OPS button. **6**

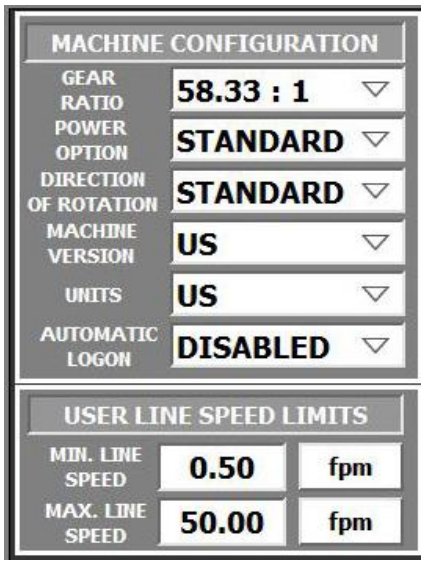
11.3 SETUP Page 2 (setup level authorization)

The main purpose of this section is to demonstrate the degree of control you have over the NPS Puller parameters. `



ALL PARAMETERS ARE PRE-SET AT THE FACTORY AND ANY CHANGE REQUIRES "SETUP" AUTHORIZATION.

MACHINE CONFIGURATION PARAMETERS:

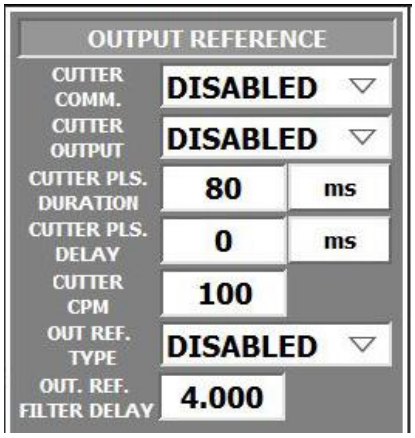


GEAR RATIO – Pertains to installed gearboxes.
POWER OPTION - STANDARD/HI-POWER/230V;

DIRECTION OF ROTATION –
STANDARD = RIGHT HAND = (Material Flow from Right to Left)
LEFT HAND = Material Flow from Left to Right)
MACHINE VERSION – US or EU for European version
UNITS – US or METRIC
AUTOMATIC LOGON – When enabled, basic machine operation is allowed without a LOGON. (Level 1 User always logged in.)

USER LINE SPEED LIMITS
USER SET – Minimum Line Speed
USER SET – Maximum Line Speed
NOTE: User defined speed limits can't be lesser or greater than system speed limits (those depend on the gear reducer size – refer to page 4).

OUTPUT REFERENCE:



CUTTER COM. –
Enable/Disable Ethernet communication with NOVATEC cutter. When enabled, actual line speed will be transmitted to the cutter via network.

OUT REF.TYPE –
Selection of speed or torque for optional analog output signal.

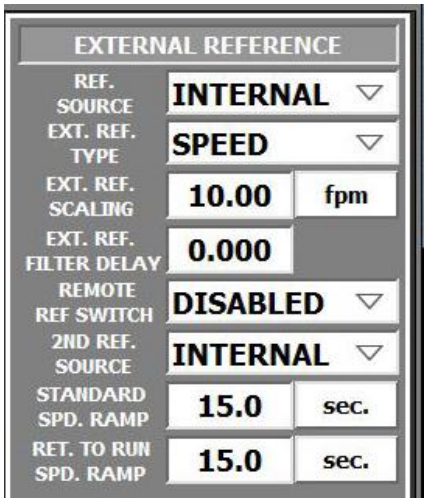
USER LINE SPEED LIMITS:
Minimum and Maximum line speeds are set based on selected gear ratio. It can be further limited by the user, if necessary.

OUT.REF.TYPE– configuration of optional analog output module – DISABLED/SPEED SP/SPEED PV where speed SP is speed set point, speed PV is speed process value (calculated based on feedback from the drive)

OUT.REF.FILTER DELAY – filter for optional analog out signal

EXTERNAL REFERENCE

This parameter set is used whenever there's a requirement to control Puller speed from an external source (e.g. from extruder). Usually, these parameters may require adjustment at the plant.



REF. SOURCE – Possible choices are:
INTERNAL - reference is controlled from Puller's HMI)
ANALOG IN - 0-10 VDC analog signal from external device is Used to provide reference
COMMS - reference is received through Ethernet. (Option currently available for Novatec equipment only).

EXT.REF.TYPE – External reference type with possible SPEED or TORQUE selections (TORQUE reference currently possible with NOVATEC equipment only).

EXT.REF.MAX LINE SPD. – Scaling factor for speed reference. Number entered corresponds to maximum requested line speed at 10 VDC analog signal value.

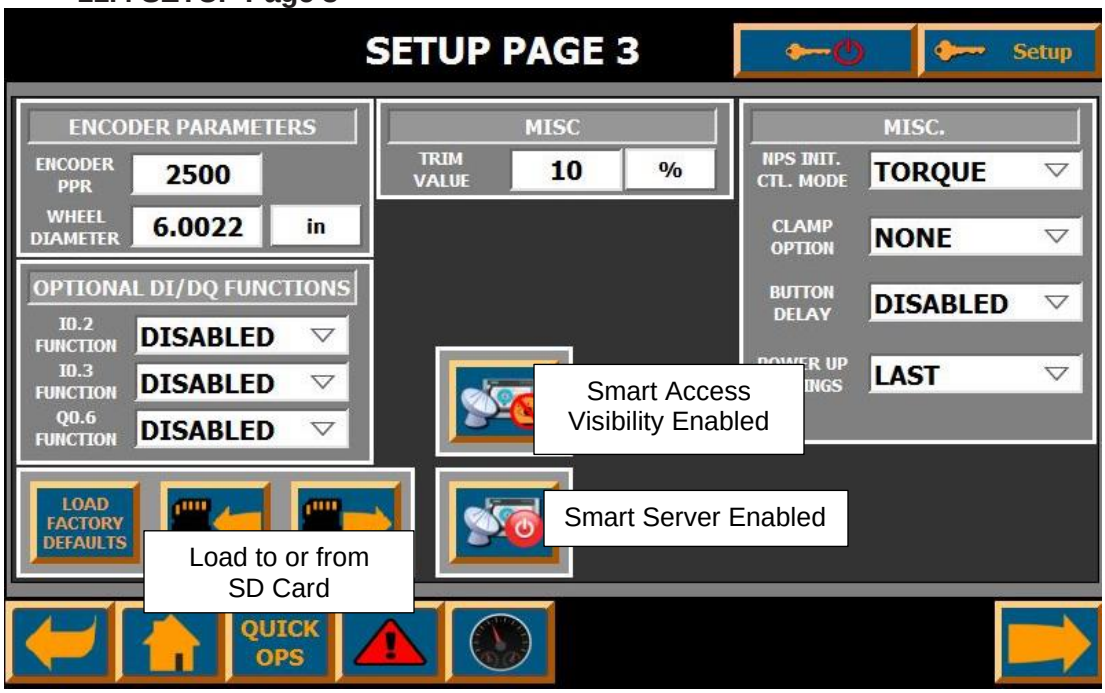
EXT.REF.FILTER DELAY – time value in seconds for analog signal smoothing. When set to 0, analog signal smoothing is disabled.

REMOTE REF. SWITCH – optional setting. When ENABLED, second reference source can be used. A selector switch or external discrete signal has to be wired to the Puller. With this discrete signal reference sources can be switched (e.g. between internal and external speed reference).

REMOTE REF. SOURCE – second external reference source. Like in the case of REF.SOURCE it can be selected between INTERNAL, ANALOG IN or COMMS (Novatec equipment only). This is valid only when REM. REF. SWITCH is enabled.

SPEED RAMP RATE – Puller's acceleration/deceleration rate (in seconds). Specifies time required to achieve maximum line speed (maximum machine speed depending on the gear ratio, not user limited speed).

11.4 SETUP Page 3



ENCODER PARAMETERS - ENCODER PPR (encoder pulse/rev.) WHEEL DIAMETER (encoder wheel diameter [in])

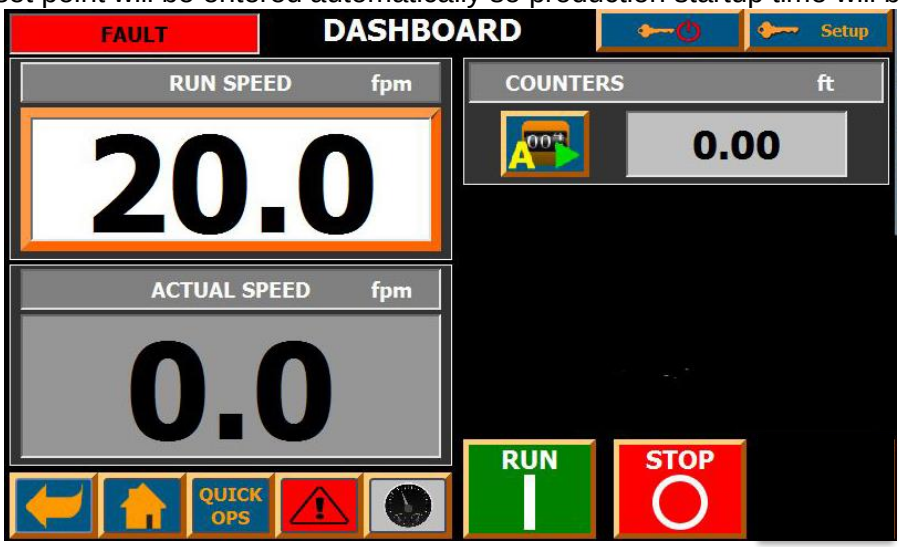
OPTIONAL DI/DQ FUNCTIONS - For commands & status bits to external system (i.e. extruder). Where I0.2 FUNCTION can be set to DISABLE/REMOTE START, I0.3 FUNCTION can be set as DISABLED/REMOTE STOP, Q0.6 FUNCTION can be set as DISABLED/STATUS RUN;

CLAMP OPTION - (selection if clamp option is installed) BUTTON DELAY (configurable pushbutton delay for STOP, RUN and CLAMP buttons – 1,2,3 sec.) and POWER UP SETTINGS (LAST/DEFAULT recipe loaded after system powered on)

Press Quick Ops button to return to Quick Ops Page or  **to access Dashboard**

12.0 RECIPE MANAGEMENT

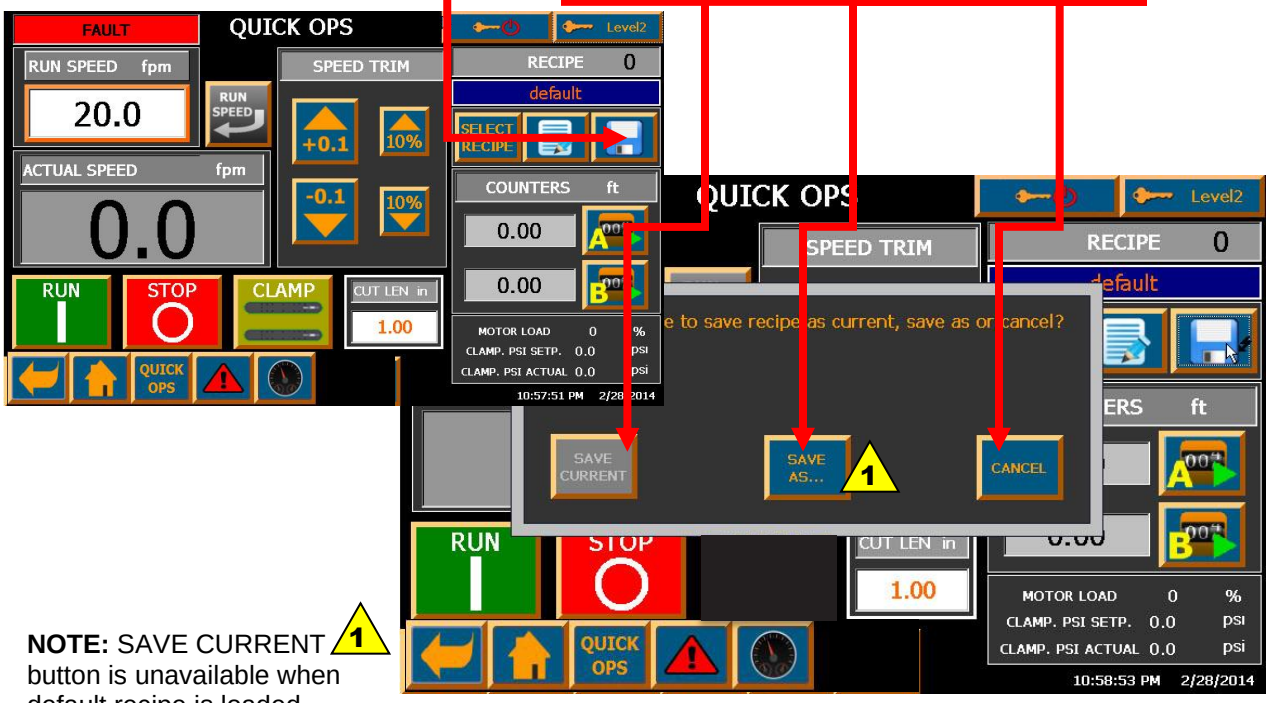
NOVATEC NPS Pullers can be programmed with up to 30 recipes. After recipes are entered, the Level 1 operator can select and load a recipe and the startup speed, run speed as well as the clamp set point will be entered automatically so production startup time will be greatly reduced.



Level 2 personnel can save new recipes or modify existing recipes.

12.1 Saving Recipe From Production Run (Quick Ops)

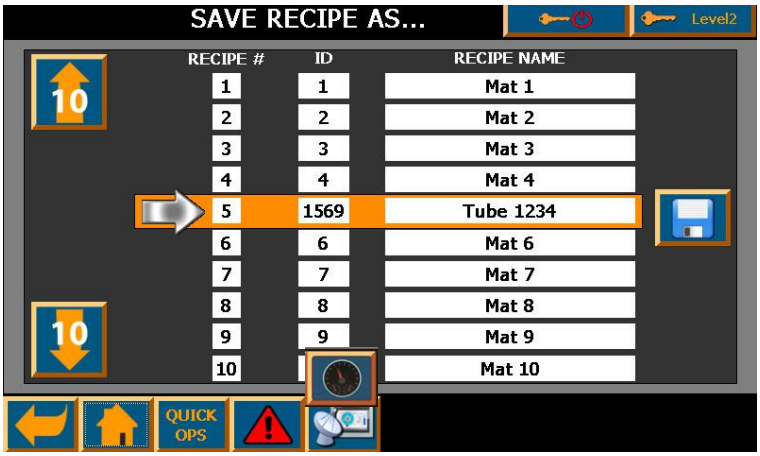
Once your production parameters for a job are finalized, LOGON as Level 2.
Click the SAVE icon and a pop-up will appear. You can choose SAVE CURRENT, SAVE AS… or CANCEL.



NOTE: SAVE CURRENT 1 button is unavailable when default recipe is loaded (RECIPE 0).

If you are saving a new recipe… click SAVE AS and the SELECT RECIPE MENU will appear.

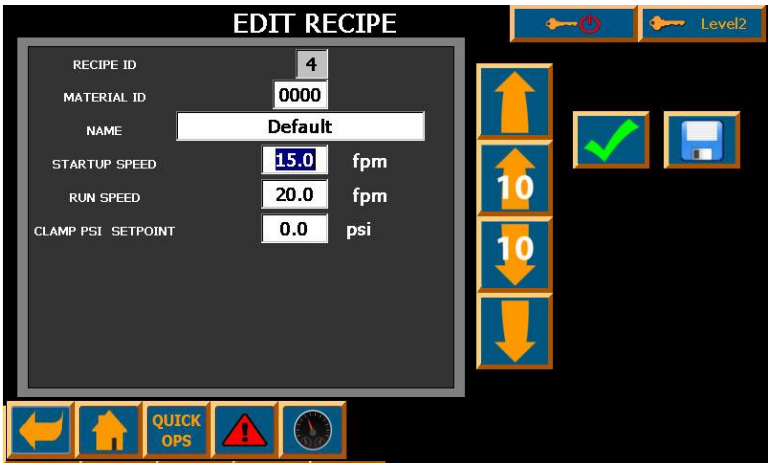
Click on a Recipe ID (up to 4 characters) and or RECIPE NAME (up to 10 characters) to select location where recipe will be saved then click and the recipe is saved. Edit Recipe screen will be open and recipe can be re-named.



12.2 Editing An Existing Recipe

To edit an existing recipe, select the recipe by pressing the recipe #. note that you can scroll through the recipes, 10 at a time, by pressing the 10 or 10 buttons.

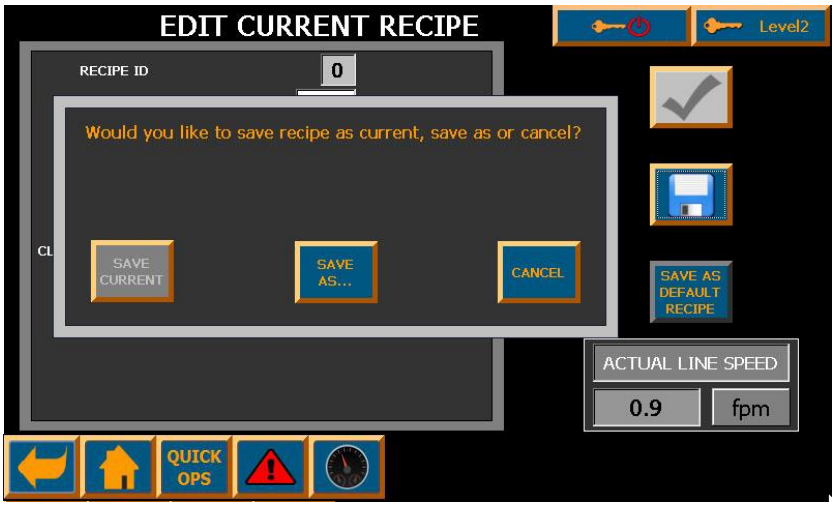
Then press the EDIT icon and the EDIT RECIPE screen (below) will appear.
Simply enter the new material ID and/or recipe NAME along with the new parameters.
If you press the icon, the recipe will be simply saved for future use.
If you press the icon, the recipe will be saved and start to RUN immediately.



NOTE: A Default recipe is installed in each NOVATEC NPS Puller. It is intended as a default startup recipe for any production run. It can be changed.

12.3 Editing A Current Recipe

You can make changes to the recipe of a product during the RUN mode by pressing 
The EDIT WORKING RECIPE icon on the Quick Ops screen and modifying parameters in the usual manner. You can then save the changes as a DEFAULT Recipe or press  and SAVE AS or CANCEL on the pop-up screen that will appear.



NOTE: Pressing SAVE also automatically activates changes made on the screen.
NOTE: SAVE CURRENT button is unavailable when default recipe is loaded.

When saving as a default recipe a pop-up will appear prompting user to activate recipe as well. Check mark symbol can be used to activate modified recipe.

12.4 Footage Counter Page

Press Footage Counter  button at bottom of HOME page.

The footage counters start automatically when the NPS Puller is in the RUN mode.

The footage counter readings from the Quick Ops page also appear on the main Footage Counters page (above).
SECTION CURRENT records the footage run during the current shift (or until the counter is re-set.
BATCH CURRENT records the combined totals from the SECTION CURRENT readings.

Either of the above can be paused and resumed or re-set to ZERO by pressing respective A or B counter PLAY/PAUSE of reset buttons.

Any time the SECTION CURRENT or the BATCH CURRENT is re-set, those values are transferred as the SECTION LAST and the BATCH LAST readings. These can also be re-set to ZERO by pressing and holding the respective buttons.

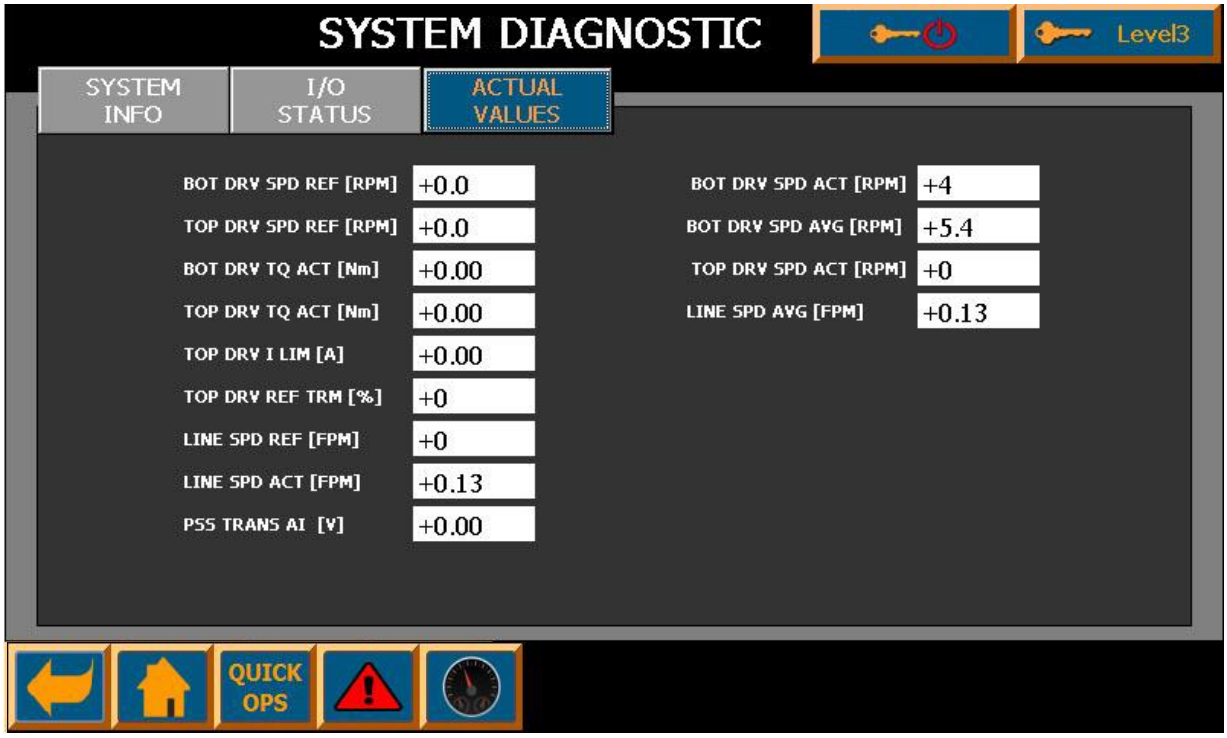
This information can be helpful in determining the total footage being produced by each shift and from one day to another. These footages can also be compared to the useable product produced to calculate the amount of scrap being produced at any given time.

12.5 System Diagnostics Screen

Press System Diagnostics icon  on HOME page to access this page.
This screen has three different views that can be changed by pressing tabs in the upper part of the screen (System Info, I/O Status and Actual Values).

System Info view shows all machine setup parameters.

I/O Status view shows current LED status of PLC discrete inputs and outputs as well as current voltages read at analog inputs AI0 and AI1.



Actual Values view shows most actual machine values (e.g. motor speeds, torques etc.).

A full range of diagnostics can be accessed including:

- BOT DRV SPD REF – is commanded speed of bottom drive
- TOP DRV SPD REF – is commanded speed of top drive
- BOT DRV TQ ACT – actual torque of the bottom belt motor [%]
- TOP DRV TQ ACT – actual torque of the top belt motor [%]
- TOP DRV U TQ LIM – maximum torque limit of upper drive
- TOP DRV REF TRM[%] – additional torque trim applied to factory settings increase to provide additional torque assist, decrease to reduce torque assist from top belt
- LINE SPD REF [ft./min] – set line speed
- LINE SPD ACTUAL [ft./min] – calculated line speed based on the current motor rpm, pulley diameter, belt thickness and gear ratio
- PSS TRANS AI [V] – actual voltage read at analog input AI0 (voltage of the pressure transducer)
- BOT DRV SPD ACT – is instantaneous speed of bottom drive [rpm]
- TOP DRV SPD ACT – is instantaneous speed of top drive [rpm]
- BOT DRV SPD AVG – is moving average speed of bottom drive [rpm]
- TOP DRV SPD AVG DRV – is moving average speed of top drive [rpm]
- LINE SPD AVG – aggregate average of top and bottom drive averages [rpm]

12.6 Alarm Screen

If the alarm light flashes, pressing the  button or VIEW ALARM button whenever New Alarm Present pop-up window is present on the Quick Ops screen, displays Current Alarms screen. All current alarms are shown in the table together with short alarm descriptions.

Pressing View Alarm button on the New Alarm Present pop-up window will close pop-up and open Current Alarm screen. Pressing IGNORE will close pop-up only.

Pressing alarm name selects it. To acknowledge and reset selected alarm, press  button.

To get more information on the selected alarm, press  button. A small pop up window will show up with more detailed alarm description and suggested actions to clear it.

Pressing ALARM HISTORY button located in the right bottom corner of the alarm screen will change view from Current Alarm to the Alarm History.

Alarm History view shows more detailed information like time and date when alarm, when alarm was acknowledged, when alarm condition was cleared (alarm is gone) as well as system alarms and events (like when user tried to logon but entered wrong username or password).
Alarm History buffer can be cleared by the user by pressing CLEAR ALARM HISTORY button (this action requires Level3 authorization).

Symbols in column Status represent status of the alarm event:

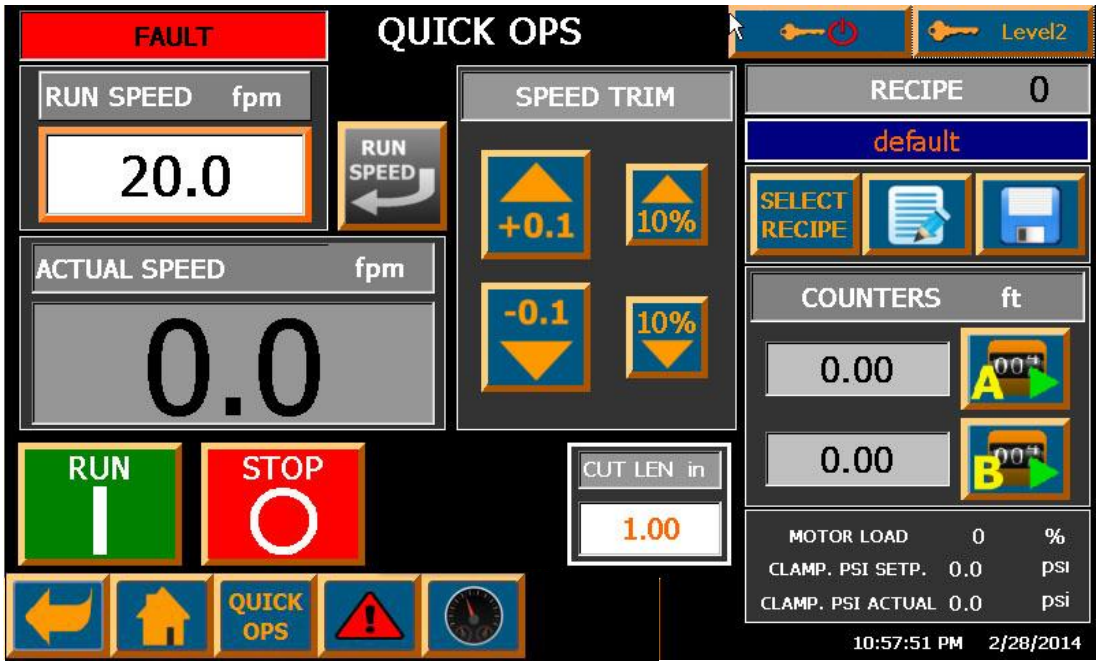
- I - means alarm occurred
- A – means alarm was acknowledged
- O – means alarm condition was cleared (alarm is no longer present)

13.0 PULLER OPERATION

DANGER! PINCH POINT
Never get clothing or any part of your body near pinch points

DANGER: Never remove or disable safety devices to sustain production. Operating without these safety devices could lead to hazardous conditions that can cause severe injury. Take all necessary precautions when working around moving parts to prevent body parts and clothing from being pulled into the machine.

1. Make sure all components properly installed and hardware is tight.
2. Check that puller is firmly anchored with floor locks.
3. Ensure machine is properly wired and all enclosure doors are closed.
4. Push E-Stop pushbutton.
5. Power on the machine.
6. The following **System Overview** screen will appear on the control panel.



14.0 MECHANICAL MACHINE ADJUSTMENTS

14.1 Verify Pressure Setting for Belt Tension - Overview

Adjust lower regulator to 80-85 psi (5.86 bar). A pressure switch setting has been factory adjusted to prevent operation without properly tensioned belts. A check valve ensures that the tension is maintained during periods without service air pressure. Setting regulator pressure will ensure that cylinders internal tensioning cylinders set the proper tension without any manual adjustment.

14.2 Turn to release E-STOP pushbutton and Press to re-set E-STOP

(at this point light should go green)

If the light does not turn GREEN, try pulling the blue safety switch

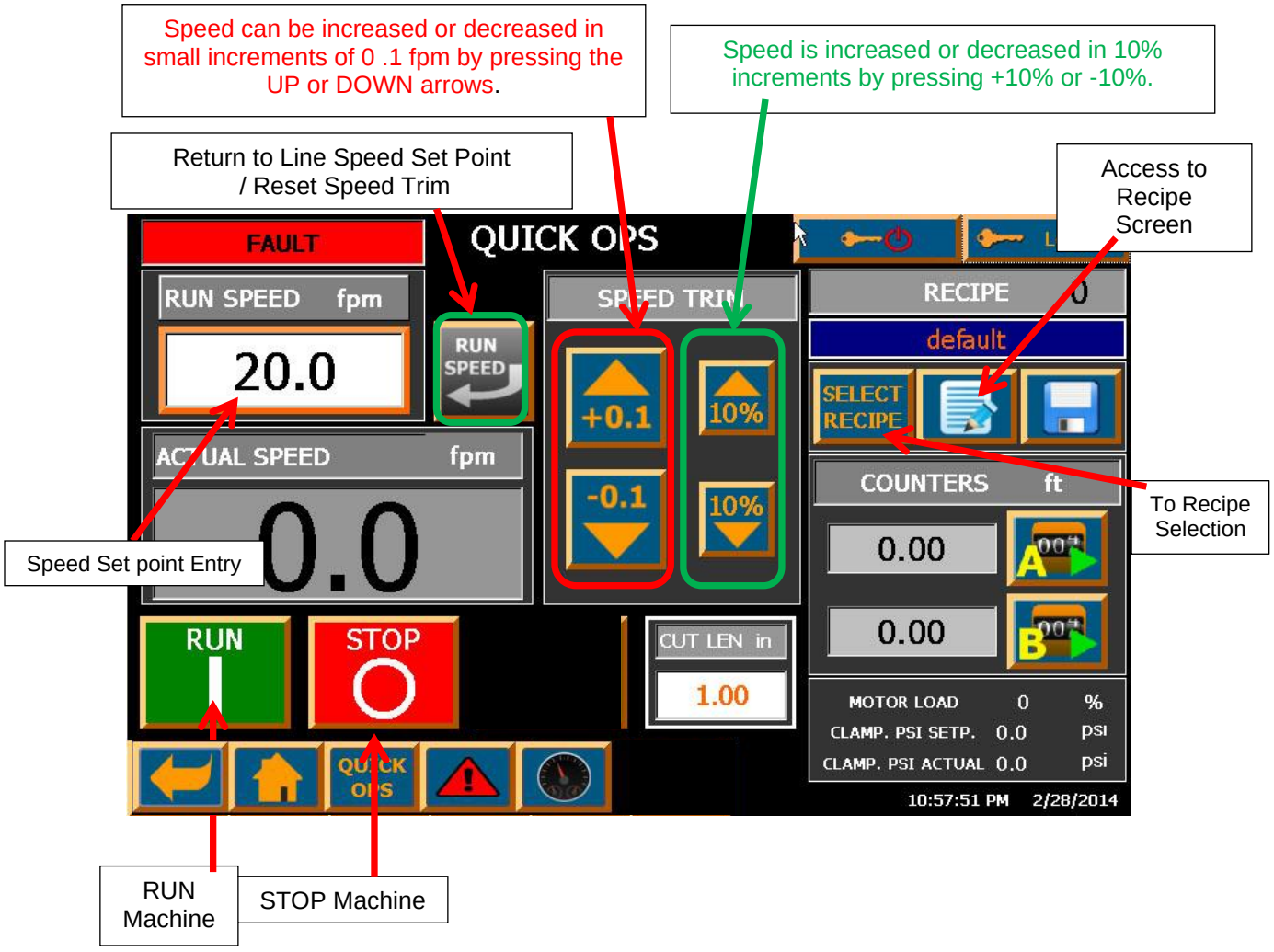
toward the operator, then press the Reset E-STOP pushbutton again. Enter speed and set point or activate recipe.

14.3Test Bump Switch

With belts running at low speed, press on this yellow plate. You should hear a click and the safety switch should stop the belts from running. Reset the safety switch by pulling the safety switch toward the operator.

NOTE: THIS TEST SHOULD BE DONE BEFORE EACH RUN.

15.0 SETTING UP A PRODUCTION RUN



1- Press SPEED Reference and enter speed you want to run in ft./min.
2- Adjust upper and lower boom pressure by turning the respective ACME threaded shafts with hand wheel..
3- Press RUN to start puller.
4- The Footage Counter begins when the PULLER is started.
5- Press Date or Time to reset clock – Important for Alarm Time Stamp.
6- Increase or decrease speed in 10% or 0.1 fpm increments.
7- Press RECIPE NUMBER to access Recipe screen
8- Press  then  to access detailed setup screens.

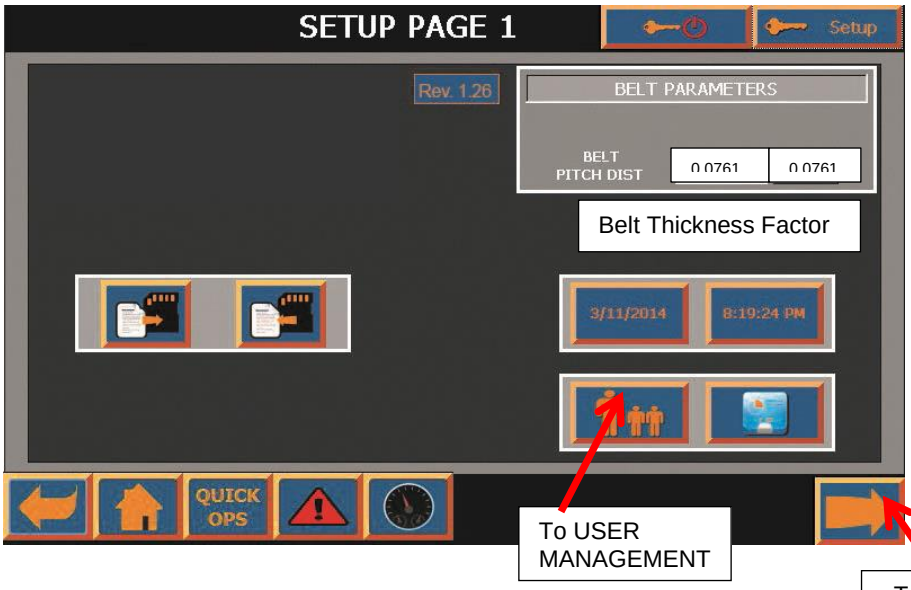
Hand wheel mounted to adjust lower boom height. Move to shaft on right to adjust upper boom height.

15.2 Detailed Setup Screens

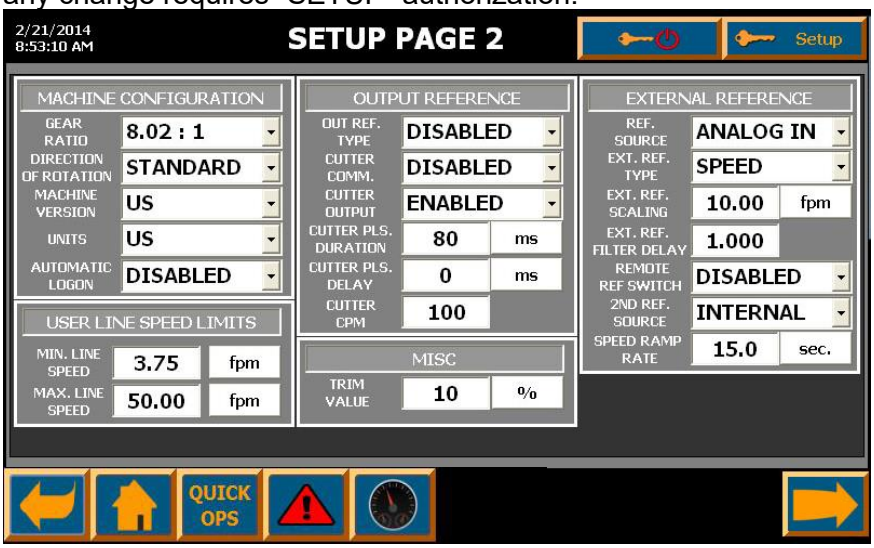
Press the LOGON button when access to parameters is desired.

NOTE: If the proper level of password protection has not been entered prior to attempting changes, the alpha/numeric password entry keypad will appear, prompting the user to input the proper password before changes can be made. Press to log out.

Level 3+ required to make changes to this page.



All parameters on this page are pre-set at the factory and any change requires “SETUP” authorization.



16.0 MAINTENANCE

It is recommended that maintenance and inspection be performed on a scheduled basis. Maintenance requirements may vary widely for each installation and specific operating conditions. It is suggested that a complete inspection be performed with necessary maintenance at the end of the first month, the first three months, and the first six months. These inspections will indicate how often future maintenance will be necessary.

- ❑ All electrical, mechanical repairs and tests are to be performed by qualified personnel only.
- ❑ Disconnect electric power from control box before opening panel for maintenance.
- ❑ Depressurize pneumatic system before performing maintenance or repairs on pressure containing components. Check all pressure gauges and ensure bleed valves have been actuated to ensure that depressurization has occurred.
- ❑ Cutter enclosure and gear reducers may be hot. Components inside the enclosure will be hotter than the air inside, especially the servo motor.
- ❑ Do not disable or bypass equipment safety features.
- ❑ Refer to system component manuals for additional information.
  NOTE: SEE LUBRICATION INSTRUCTIONS BELOW (16.1) – Flush and replace lubricant after first 100 hours of operation then every 2500 operation or every 6 months.

⚠ **WARNING: Before beginning repair work, disconnect all power sources and secure against inadvertent reconnection.**

⚠ **WARNING:** Auxiliary equipment may contain moving parts that may cut, crush, or otherwise injure personnel when safety/access covers are removed. Do not place hands or limbs in equipment during operation.

At Startup

- ❑ Verify all guards are in place and able to be fully closed.
- ❑ Ensure belt tension and pressure switch are properly set
- ❑ Record equipment Serial Numbers and the NPS Controller program revision level.
- ❑ Test operation of Bump Switch (see 14.3)

Every Belt Change

- ❑ Inspect condition of line pace encoder if used.

Daily

- ❑ Inspect belts for wear and tear
- ❑ Check belt tension pressure
- ❑ Verify puller alignment

Every 3 Months

- ❑ Check all electrical connections to make sure that they have not become loose, especially those connections at contactors, like motor starters.
- ❑ Monitor gear reducer temperature. Gear reducer temperature should not exceed 200°F (93°C) at any time or operating condition. See gear reducer manual for further maintenance instructions.
- ❑ Check serpentine belt for wear
- ❑ Grease pillow blocks and hand wheel fittings

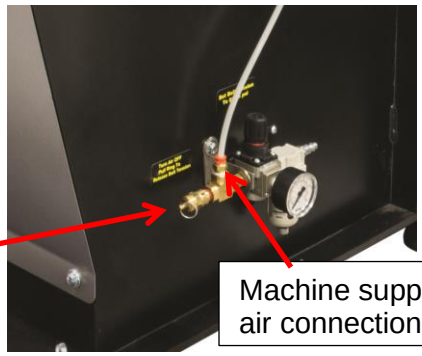
Every 12 months

- ❑ Remove serpentine belt and check sheaves and bearings for wear. Replace, if necessary.

16.1 Trouble Shooting – Air Pressure Switch for Belt Tension

The air pressure switch is pre-set at factory. If pressure is out of specification and alarm will appear. Adjustment can be made with an Allen wrench.

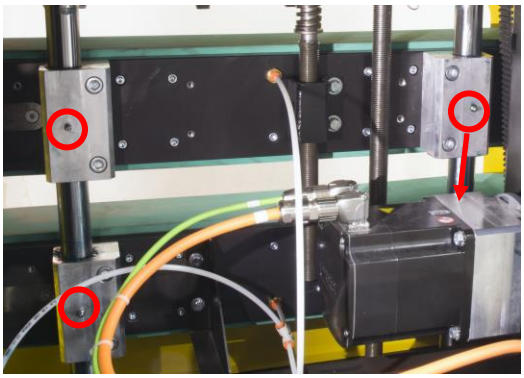
Alternately, the belt traction can be tensioned by looking down the gap from the upstream end of the traction assemblies. The gap will be convex if too loose and concave if too tight. The pressure switch will need to be readjusted if a pressure other than the factory set pressure for belt tension is set. Turn down pressure on regulator to desired setting. Remove machine air supply. Relieve pressure in traction assembly by pulling ring on pressure relief valve.



16.2 Replacing Traction Belts

Turn down pressure in lower regulator. Remove air service to the machine and remove guarding that prevents belt from being removed. Relieve pressure in traction assembly by pulling ring on pressure relief valve (see section 16.1 above) push upstream pulley to the rear to loosen the belt. Remove the belts and replace after inspecting inside of each traction assembly. Attach machine supply air. Reset lower regulator to proper pressure. Adjust pressure switch if necessary. Manually check the proper alignment and installation of traction belts.

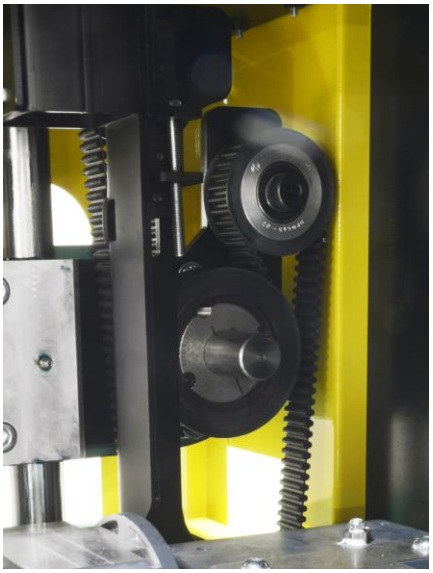
16.3 Grease Pillow Blocks and Handwheel Fittings – Every 3 Months



Add grease to 4 points on pillow blocks and grease fittings on 2 hand wheel connection points.

16.4 Serpentine Belt

Every 3 months, the serpentine belt should be checked for tension and every 12 months the belt should be removed so that sheaves and bearings can be checked for wear and replaced, if necessary.



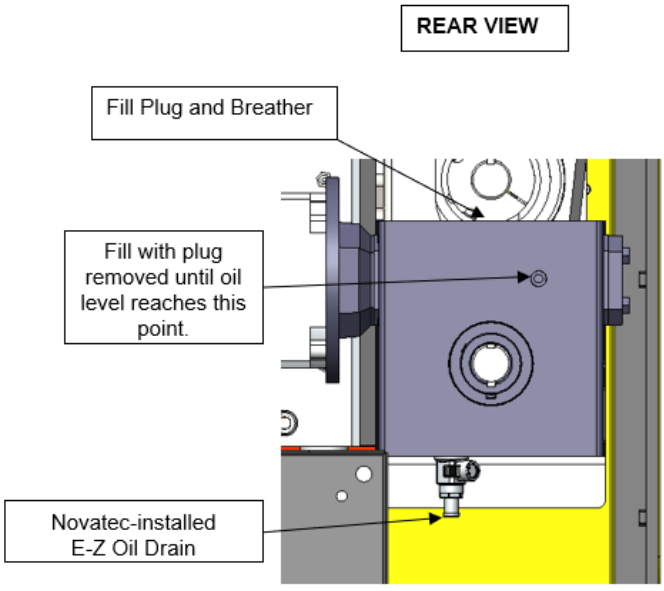
16.5 Lubrication Instructions For Worm Gear Speed Reducer – IMPORTANT!

Overview

After the first 100 hours of operation, the lubricant in the Hub City worm gear speed reducer must be thoroughly flushed and replaced.

- **Drain existing lubrication oil.**
- **FLUSH with HUB CITY PAG H1 Synthetic Lubricant or Novatec P/N 14221**
- **Replace with 1.5 quarts of HUB CITY PAG H1 Synthetic Lubricant or Novatec P/N 14221**

After every 2500 hours of operation (or every 6 months – whichever occurs first), the same procedure must be followed to ensure proper operation of the speed reducer.



See Lubrication Quick Card attached and
Complete HUB CITY instructions on next 4 pages. (See Series 260)

HUB CITY WORM GEAR SPEED REDUCERS

LUBRICATION & INSTALLATION INSTRUCTIONS — SINGLE & DOUBLE REDUCTION

CONGRATULATIONS... Your decision to purchase a Worm Gear Speed Reducer from HUB CITY will provide you with many years of trouble free service if the following lubrication and installation instructions are adhered to.

IMPORTANT SELECTION INFORMATION

Read ALL instructions and safety precautions prior to operating unit. Injury to personnel or unit failure may be caused by improper installation, maintenance, or operation.

Check to verify that the application does not exceed the capacities published in the current catalog. Written authorization from HUB CITY is required to operate or use gear units in man lift or people moving devices.

The system of connected rotating parts must be free from critical speed, torsional, or other type vibration, regardless of how induced. The responsibility for this system analysis lies with the purchaser of the gear unit.

Buyer shall be solely responsible for determining the adequacy of the product for any and all uses to which the buyer shall apply the product. The application by buyer shall not be subject to any implied warranties of merchantability or fitness for a particular purpose.

HUB CITY WORM GEAR SPEED REDUCER — These instructions apply to all HUB CITY Worm Gear Speed Reducers.

LUBRICATION

⚠ CAUTION

ALL HUB CITY WORM GEAR SPEED REDUCERS ARE SHIPPED DRY. OIL MUST BE ADDED PRIOR TO OPERATION.

Do not operate the unit without making sure it contains the correct amount of oil. Do not overfill or underfill with oil, or injury to personnel, unit, or other equipment may result.

All HUB CITY Worm Gear Speed Reducers are splash lubricated. The unique design of the reducers permits nearly universal mounting by placing a fill, drain and oil level plug at the proper location for mounting positions. See Mounting Position Figures that follow.

⚠ CAUTION

Review the approved mounting positions and lubrication levels identified in the **Mounting Position Figures** on page 3 of this document. Do not deviate from the mounting positions or lubrication levels shown without contacting the factory.

After selecting the position that the unit will be mounted but before operating: Remove Fill and Breather Plug (1X) and Oil Level Plug (2X). Clean threads on the removed plugs and the plug holes with degreaser. Fill gear box with an approved lubricant (see information this page) until lubricant starts coming out of Oil Level Plug (2X) hole. Install plugs securely in gear case. Note — Plug with Breather (1X) must always be installed in the top of gear case, opposite Drain Plug (3X).

VARIATIONS FROM NORMAL CONDITIONS — Input speeds higher than 1,800 RPM may require an adjustment in oil level. For vertical input, factory modifications may be required, or review vertical shaft lubrication specification included with vertical shaft mounting kit. For vertical output, factory modifications (grease pack and nilos ring) may be required, or review vertical shaft lubrication specification included with vertical shaft mounting kit.

LUBRICANT — Use only lubricants which are recommended for enclosed Bronze Worm Gears, with ISO viscosity Grade 460, or AGMA 7. (Extreme ambient or operating temperatures may require different viscosities. Consult the factory for recommendations.) Choose conventional oil, PAO Synthetic oil, or PAG Synthetic oil, depending on the application.

CHANGING LUBRICANT — After the first 100 hours of operation, drain out initial oil, flush out the gear case with an approved nonflammable, non-toxic solvent, such as Whitmore's Flushing Oil (#06802030) or Medallion™ Flushing Oil Kosher (#06812010), and refill. Thereafter, oil should be changed at least every 2500 operating hours or every 6 months — whichever occurs first.

Flush & Refill with Novatec P/N 14221

⚠ WARNING

Oil, housings, and other components can reach high temperatures during operation, and can cause severe burns. Use extreme care when removing lubrication plugs and vents while servicing the unit.

⚠ CAUTION

Oil should be changed with greater frequency if unit is used in a severe environment such as dusty or humid.

APPROVED LUBRICANTS — WORM GEAR REDUCERS

Novatec P/N 14221		GL-460	SYNTHETICS
AMBIENT TEMPERATURE	°F	40 to 100	-10 to 125
	°C	4 to 38	-23 to 52
OPERATING TEMPERATURE	°F	To 225	To 225
	°C	To 107	To 107
AGMA NUMBER		7 COMP.	7
ISO-ASTM VISCOSITY GRADE		460	460

HUB CITY WORM GEAR LUBE GL-460

HUB CITY GL-460 is a premium quality, heavy bodied lubricant formulated and recommended for enclosed worm gear drives. It is suitable for splash lubrication of worm gearing at moderate to high speeds and temperatures. Lubricants of this type and meeting the above specifications may be substituted where HUB CITY LUBRICANTS are recommended. Lubricant selected must be compatible with bronze gear materials and viton rubber seals. For ambient temperature above 100°F (38°C) or operating temperature above 225°F (107°C) consult the factory.

HUB CITY SYNTHETIC 634 LUBRICANT

HUB CITY SYNTHETIC 634 LUBRICANT is a premium gear box lubricant which is recommended for worm gear drives in most applications, especially those subject to low start up temperatures and/or high operating temperatures. This lubricant is a synthesized hydrocarbon based material which provides longer lubrication intervals because of its increased resistance to thermal and oxidative degradation. This decreases maintenance costs. Further economy is realized because of the increased efficiency of units lubricated with HUB CITY SYNTHETIC 634 LUBRICANT. This lubricant can be operated at temperatures considerably above 225°F (107°C). However, the factory should always be contacted prior to operating at high temperatures as damage may occur to seals or other components. Lubricant manufacturer and HUB CITY should be contacted when substituting a premium lubricant where HUB CITY SYNTHETIC 634 is recommended.

HUB CITY PAG 460 or NOVATEC P/N 14221

HUB CITY PAG 460 H1 Synthetic Lubricant is recommended gear drives in most applications. This lubricant provides the ultimate efficiency and thermal capacity, and wide operating temperature range, excellent for low start-up temperatures and high operating temperatures. Hub City PAG 460 H1 is approved for USDA/NSF H1 use in food processing facilities where there is the possibility of incidental contact with food. This fully synthetic polyglycol lubricant has high thermal and oxidative stability for longer lubrication intervals, and is well suited for lubed-for-life applications. The high efficiency reduces operating costs, and the increased life reduces maintenance costs. PAG Synthetic Lubricants are not compatible with any other lubricants, and must never be mixed. Topping off with the wrong lubricant could cause unit failure.

PAG Synthetic Lubricants absorb more water than other lubricants, so extra care should be taken not to expose the PAG lubricants to excessive moisture.

Food grade lubricants must always be stored separately from non-food grade lubricants, to prevent the possibility of using the wrong lubricant. Separate pumps and containers must always be used with food grade lubricants, to prevent contamination.

⚠ CAUTION

Do not mix nonsynthetic and synthetic oil in the unit. Do not mix PAG synthetic with any other oil type.

⚠ CAUTION

If unit is used in the food or drug industry (including animal food) consult the petroleum supplier or HUB CITY for recommendations of lubricants which meet the specifications of FDA, USDA and/or other authoritative bodies having jurisdiction. Standard lubricants are not suitable for these applications or these industries. Hub City PAG 460 H1 is approved for USDA/NSF H1 service.

HUB CITY A Regal Beloit Company
P.O. Box 2089, 2914 Industrial Avenue, Aberdeen, SD 57402-2089 (605) 226-0360
FAX: 605-225-0567 www.hubcityinc.com hubsales@regalbeloit.com

HUB CITY WORM GEAR SPEED REDUCERS
LUBRICATION & INSTALLATION INSTRUCTIONS — SINGLE & DOUBLE REDUCTION

⚠ CAUTION

ALL HUB CITY WORM GEAR SPEED REDUCERS ARE SHIPPED DRY. OIL MUST BE ADDED PRIOR TO OPERATION.

APPROXIMATE OIL CAPACITIES — WORM GEAR REDUCERS SERIES 130 THRU GW100

SERIES	MOUNTING POSITION	NOTES	QUANTITY (Pints) Shaft Output	Hollow Bore Output	Drop Bearing
130	Worm Top		0.44	0.44	N/A
	Worm Bottom		0.38	0.38	N/A
	Vertical Input		0.31	0.31	N/A
	Vertical Output	---	0.31	0.31	N/A
W150	Worm Top		1.50	1.44	N/A
	Worm Bottom		1.00	1.00	N/A
	Vertical Input		1.00	1.00	N/A
	Vertical Output	---	1.00	1.00	N/A
180	Worm Top		.88	.81	N/A
	Worm Bottom		0.81	0.75	N/A
	Vertical Input		0.63	0.63	N/A
	Vertical Output	---	0.63	0.63	N/A
210	Worm Top		1.50	1.38	N/A
	Worm Bottom		1.25	1.12	N/A
	Vertical Input		1.00	1.00	N/A
	Vertical Output	---	1.12	1.00	N/A
W240	Worm Top		3.00	2.88	N/A
	Worm Bottom		2.50	2.50	N/A
	Vertical Input		2.00	2.00	N/A
	Vertical Output	---	2.00	2.00	N/A
260	Worm Top		3.00	2.75	N/A
	Worm Bottom		2.38	2.25	N/A
	Vertical Input		2.00	1.88	N/A
	Vertical Output	---	2.12	1.88	N/A
300	Worm Top		7.00	6.50	N/A
	Worm Bottom		5.25	5.25	N/A
	Vertical Input		4.25	4.25	N/A
	Vertical Output	---	4.50	4.50	N/A
320	Worm Top		4.75	4.00	7.50
	Worm Bottom		4.00	3.63	5.50
	Vertical Input		3.12	2.75	4.50
	Vertical Output	---	3.12	2.75	5.00 Vertical Down 3.00 Vertical Up
380	Worm Top		7.38	6.50	8.50
	Worm Bottom		6.38	6.12	7.00
	Vertical Input	***	4.63	4.38	5.75
	Vertical Output	---	4.38	4.12	6.00 Vertical Down 4.00 Vertical Up
W420	Worm Top		7.00	7.00	12.00
	Worm Bottom		9.50	9.50	12.00
	Vertical Input	***	8.00	8.00	12.00
	Vertical Output	---	8.00	8.00	12.00
450	Worm Top		7.00	5.20	9.00
	Worm Bottom		4.80	4.00	5.70
	Vertical Output	---	3.80	3.00	5.80 Vertical Down 3.80 Vertical Up
520	Worm Top		10.60	7.30	14.50
	Worm Bottom		7.50	5.10	9.30
	Vertical Output	---	5.50	3.80	9.40 Vertical Down 5.50 Vertical Up

SERIES	MOUNTING POSITION	NOTES	QUANTITY (Pints) Shaft Output	Hollow Bore Output	Drop Bearing
GW60	Worm Top		19.50	19.50	27
	Worm Bottom		20.50	20.50	27
	Vertical Output	---	20	20	27
GW70	Worm Top		35	35	40
	Worm Bottom		32.75	32.75	40
	Vertical Output	---	20.75	20.75	40
GW80	Worm Top		48	48	63
	Worm Bottom		51.25	51.25	63
	Vertical Output	---	28.75	28.75	63
GW100	Worm Top		72	72	102
	Worm Bottom		80	80	102
	Vertical Output	---	40	40	102
W300	Worm Top		N/A	0.70	N/A
	Worm Bottom		N/A	0.40	N/A
	Vertical Output	---	N/A	0.40	N/A
W50B	Worm Top		N/A	3.20	N/A
	Worm Bottom		N/A	2.00	N/A
	Vertical Output	---	N/A	3.50	N/A
W516	Worm Top		5.25	5.25	N/A
	Worm Bottom		2.75	2.75	N/A
	Vertical Output	---	2.60	2.60	N/A

*** This quantity of oil will fill the unit to the centerline. Factory modifications required to provide sealed top bearing. No modifications needed on Series 380 if quill-type C-Flange is mounted up.

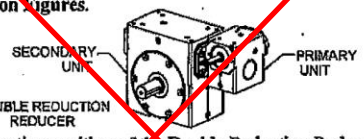
--- This quantity of oil will fill the unit to the centerline. Factory modifications required to provide grease pack and Nilos ring at top bearing.

⚠ CAUTION

Always check for proper oil level after filling. Capacities vary somewhat with model and mounting position. Oil should rise to bottom edge of Oil Level Plug (2) hole. Do not overfill.

SPECIAL INSTRUCTIONS FOR DOUBLE REDUCTION REDUCERS:

The Primary Unit and the Secondary Unit each have independent oil reservoirs. Each unit must be filled to the specified level of oil as noted in **Mounting Position Figures.**



If the final mounting position of the Double Reduction Reducer is such that either the input shaft of the Primary Unit or the Input (High Speed) shaft of the Secondary Unit is in a vertical position, consult the factory for special lubrication instructions.

SPECIAL INSTRUCTIONS FOR DROP BEARING REDUCERS:

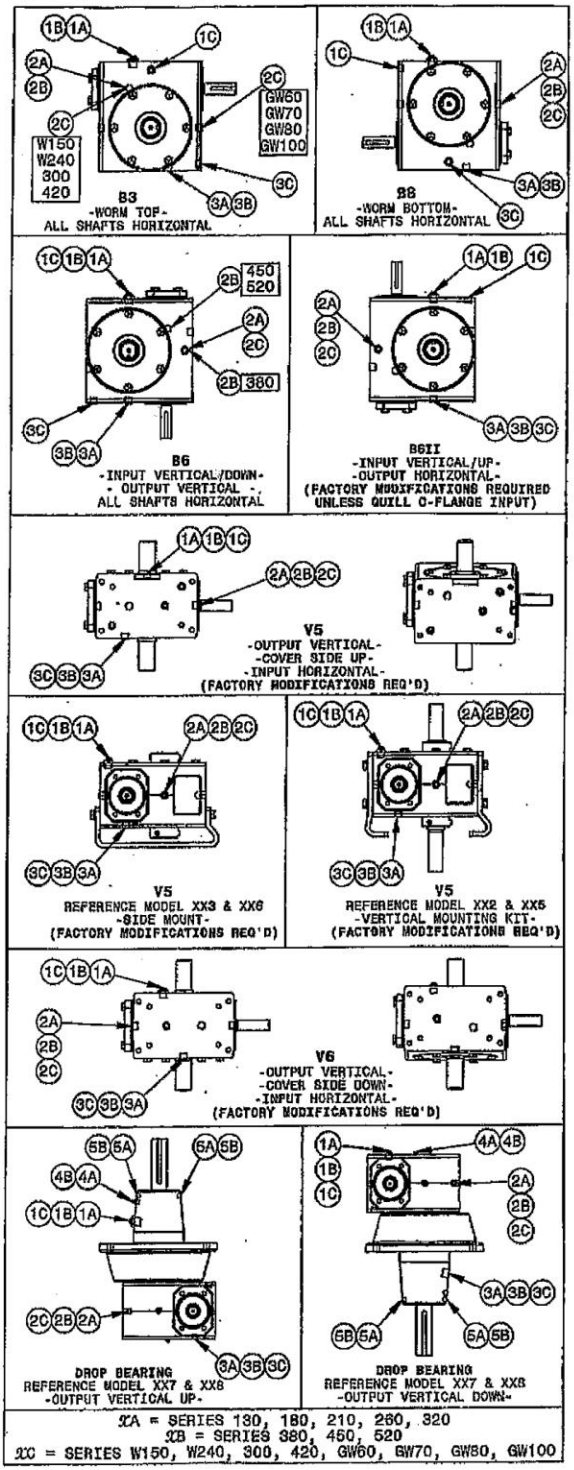
When Drop Bearing unit is positioned Output Vertical-Up or Output Vertical-Down an adequate amount of lubrication must be supplied to the upper Bearing through Grease Fitting (4X). All Drop Bearing units are equipped with Double Seals on the Output Shaft. Periodically the Pipe Plugs (5X) should be removed, a Grease Fitting inserted in one hole, and enough grease injected to purge all of the old grease from between the seals.

HUB CITY A Regal Beloit Company
P.O. Box 1089, 2914 Industrial Avenue, Aberdeen, SD 57402-1089 (605) 225-0360
FAX: 605-225-0567 www.hubcityinc.com hubsales@regalbeloit.com

HUB CITY WORM GEAR SPEED REDUCERS

LUBRICATION & INSTALLATION INSTRUCTIONS — SINGLE & DOUBLE REDUCTION

MOUNTING POSITION FIGURES FOR HUB CITY WORM GEAR SPEED REDUCERS, SERIES 130 THRU GW100



⚠WARNING

Wear protective clothing and eye shields when installing or maintaining unit and machine.

⚠WARNING

A unit cannot be used as an integral part of a machine superstructure which would impose additional loads on the unit other than those imposed by the torque being transmitted, or by any shaft mounted power transmitting device such as sprockets, pulleys, or couplings.

⚠WARNING

Units ARE NOT to be considered fail safe or self-locking devices. If these features are required, a properly sized, independent holding device must be utilized. Reducers are not to be used as a brake.

⚠WARNING

Any brakes that are used in conjunction with a unit must be sized or positioned in such a way so as to not subject the unit to loads beyond the capacities published in the current catalog.

⚠WARNING

Make certain that all tools and other items are clear from rotating parts before starting machine. Stand clear, and start machine slowly to be sure all components are secure and operating properly.

⚠WARNING

Make certain that the power supply is disconnected before attempting to service or install the unit, or remove or install any components. Lock out the power supply, and tag it to prevent unexpected application of power.

OPERATING POSITIONS — Normal Speed Reducer positions are shown in the Mounting Position Figures on this sheet. For special applications, mounting position may be inclined. However, if position varies more than 15°, it may be necessary to make some adaptions to maintain a sufficient oil level. Contact your local distributor or HUB CITY for recommendations. Input rotation of Speed Reducers can be either clockwise or counterclockwise.

⚠CAUTION

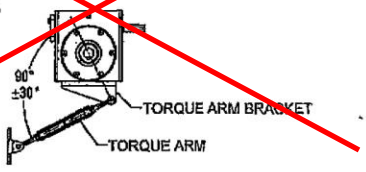
Exterior threaded or through holes on this drive are for mounting the drive or drive accessories (couplings, sprockets, etc.). They are not to be used for lifting the drive or any driver/driven equipment.

⚠CAUTION

Inspect shafts and components for paint, burrs, or other imperfections before installing components. Do not use excessive force or pounding to install components onto unit shafts, as this may cause damage to shafts, bearings, or gears.

SHAFT MOUNT UNITS — The Torque Arm Bracket can be attached to any of the four available mounting surface locations of the unit.

Install and position Torque Arm at 90° ± 30° to the plane (a line drawn) between the center of the output hollow bore and the bolt that attaches the Torque Arm to the Torque Arm Bracket of the unit. The Torque Arm should be positioned to be in tension, NOT compression, based on output rotation of the gear drive.



HUB CITY
A Regal Beloit Company
P.O. Box 1089, 2914 Industrial Avenue, Aberdeen, SD 57402-1089 (605) 225-0360
FAX: 605-225-0567 www.hubcityinc.com hubsales@regalbeloit.com

HUB CITY WORM GEAR SPEED REDUCERS
LUBRICATION & INSTALLATION INSTRUCTIONS — SINGLE & DOUBLE REDUCTION

⚠ CAUTION

Excessive setscrew torque may cause damage to the output sleeves in hollow bore units. Please refer to the following table for recommended tightening torque.

SIZE	RECOMMENDED TORQUE
1/4 NC	87 LB. - IN.
5/16 NC	165 LB. - IN.
3/8 NC	290 LB. - IN.

⚠ WARNING

For safe operation and to continue the unit warranty, when installing, reinstalling, or replacing a factory installed fastener for servicing purpose, or to accommodate the mounting of guards, shields or other light load imposing devices, or for mounting the unit, it becomes the responsibility of the purchaser or user to properly determine the quality, grade of fastener, thread engagement, load carrying capacity, tightening torque, and the means of torque retention.

COUPLINGS — Flexible couplings to input and output shafts are recommended because they minimize bearing and gear wear caused by slight misalignment. Follow coupling manufacturer's recommendations for installation and shielding.

SHEAVES AND SPROCKETS — When mounting sheaves or sprockets, the center of the load should be located as close to the reducer as possible. Excessive overhung loading could result in early failures of bearing or shaft. Refer to the general catalog or contact your local distributor for overhung load ratings. Follow manufacturer's recommendations for installation and shielding.

⚠ CAUTION

Test run unit to verify operation. If the unit being tested is a prototype, that unit must be of current production configuration.

RUN-IN PERIOD — A new unit will not operate at maximum efficiency during the run-in period. Increased current draw or heat rise may be seen during this time.

PREVENTATIVE MAINTENANCE — Keep shafts and vent plug clean to prevent foreign particles from entering seals or gear case. Inspect periodically for oil leaks.

⚠ CAUTION

Mounting bolts, coupling fasteners, and other power transmitting devices should be routinely checked to ensure that all parts of the unit are firmly anchored to provide proper operation (loose fasteners can cause alignment problems and excessive wear). Check end play in shafts. Noticeable movement might indicate service or parts replacement is necessary.

⚠ CAUTION

If the unit cannot be located in a clear and dry area with access to an adequate cooling air supply, then precautions must be taken to avoid ingestion of contaminants such as water, and to avoid a reduction of cooling ability due to exterior contaminants.

HUB CITY has Sales Offices and a network of Industrial Power Transmission Distributors that can serve your needs world wide. Check the Yellow Pages for one near you or contact the factory sales office.

IMPORTANT INFORMATION:

In the event of the resale of this Worm Gear Speed Reducer (unit), in whatever form, resellers/buyers will include the following language in a conspicuous place and in a conspicuous manner in a written agreement covering such sale:

The manufacturer makes no warranty or representations, express or implied, by operation of law or otherwise, as to the merchantability or fitness for a particular purpose of the goods sold hereunder. Buyer acknowledges that it alone has determined that the goods purchased hereunder will suitably meet the requirements of their intended use. In no event will manufacturer be liable for consequential, incidental, or other damages.

Resellers/buyers agree to include this entire document, including the warnings and cautions listed herein, in a conspicuous place and in a conspicuous manner to instruct users on the safe usage of the product

ELECTRIC MOTOR AND HYDRAULIC MOTOR AND PUMP INSTALLATION INSTRUCTIONS
For "C" Flange and Hydraulic Flange Units

1. Be sure all of the paint and masking have been removed from the face and pilot of the flange. Check the bore (input or output) to be sure it contains an adequate amount of anti-seize compound, which is normally installed at the factory. This compound will inhibit fretting corrosion between the motor or pump shaft and the unit bore.
2. Install the key (if round bore) to the maximum depth of the keyway provided in the bore.
3. Align keyways or splines of motor or pump and bore of unit and install motor or pump into frame.
4. **CAUTION:** HUB CITY "C" flange reducers and Hydraulic Flange Reducers are designed to accept motors with shafts that do not exceed the maximum specified by the N.E.M.A. or SAE standards. If the motor or pump shaft bottoms out before the motor or pump flange seats against the reducer flange face, the motor or pump shaft length must be adjusted to N.E.M.A. or SAE standards.
5. Secure the motor or pump to the unit. Capscrews and lockwashers are provided with "C" flange units.
6. Tightening torques for mounting bolts are provided in the chart below.

CAPSCREW TIGHTENING TORQUE
Grade 5 Capscrews (dry, without lubricant)

Capscrew Size	Tightening (Ft. - Lbs.)		Capscrew Size	Tightening (Ft. - Lbs.)
1/4 NC	8		1/2 NC	71
5/16 NC	16		5/8 NC	143
3/8 NC	29		3/4	251

A Parts List and Print for your Drive is available upon request. To obtain the proper Parts List and Print, you must accurately furnish the Assembly Number, Model Number, Ratio, Style and Shipping Code as shown on the metal tag attached to the Gear Drive. For assistance, phone or write your Industrial Power Transmission Distributor, or the Factory Sales Office.

HUB CITY A Regal Beloit Company
P.O. Box 1089, 2014 Industrial Avenue, Aberdeen, SD 57402-1089 (605) 225-0360
FAX: 605-225-0567 www.hubcityinc.com hubsales@regalbeloit.com

17.0 WARRANTY

NOVATEC, INC. - Effective Date 8 MAY 2017

NOVATEC, INC. offers COMPREHENSIVE PRODUCT WARRANTIES on all of our plastics auxiliary equipment. We warrant each NOVATEC manufactured product to be free from defects in materials and workmanship, under normal use and service for the periods listed under **"Warranty Periods".** The obligation of Novatec, under this warranty, is limited to repairing or furnishing, without charge, a similar part to replace any part which fails under normal use due to a material or workmanship defect, within its respective warranty period. It is the purchaser's responsibility to provide Novatec with immediate written notice of any such suspected defect. Warranted replacement parts are billed and shipped freight pre-paid. The purchaser must return the suspect defective part, freight prepaid and with identifying documentation to receive full credit for the part returned. Novatec shall not be held liable for damages or delay caused by defects. No allowance will be made for repairs or alterations without the written consent or approval of Novatec.

The provisions in equipment specifications are descriptive, unless expressly stated as warranties. The liability of Novatec to the purchaser, except as to title, arising out of the supplying of the said equipment, or its use, whether based upon warranty, contract or negligence, shall not in any case exceed the cost of correcting defects in the equipment as herein provided. All such liability shall terminate upon the expiration of said warranty periods. Novatec shall not in any event be held liable for any special, indirect or consequential damages. Commodities not manufactured by Novatec are warranted and guaranteed to Novatec by the original manufacturer and then only to the extent that Novatec is able to enforce such warranty or guaranty. Novatec, Inc. has not authorized anyone to make any warranty or representation other than the warranty contained here. Non-payment of invoice beyond 90 days will invalidate the warranty. A renewed warranty can be purchased directly from Novatec.

Please note that we always strive to satisfy our customers in whatever manner is deemed most expedient to overcome any issues in connection with our equipment.

Warranty Periods:
Note: All warranty periods commence with the shipment of the equipment to the customer.

5-Year

Resin Drying to Include

NovaWheel™ Dryers *
Dual Bed Dryers
NovaDrier *
NDM-5 Membrane Dryer
Gas-Fired Process Heaters
Gas-Fired Regeneration Heaters
Drying Hoppers
Central Drying Hopper Assemblies
Heater/Blower Units and Hot-Air Dryer
Silo Dehumidifiers
NovaVac Dryers *

Resin Blending and Feeding to Include

WSB Blenders, MaxiBatch & Feeders *
Gaylord Sweeper Systems

Resin Conveying to Include

GSL Series Vacuum Loaders
GlassVu Loaders, Receivers and Hoppers

Downstream Extrusion Equipment to Include

C and NC Bessemer Series Cutters
NPS Bessemer Series Pullers
NPC Mini Puller/Cutter
All NS Series Servo Saws
All Cooling and Vacuum Tanks Manufactured by Novatec

3-Year

When a Prophecy data plan is activated for VPDB and SVP pumps with PumpSense™, Novatec automatically extends the warranty to 3 years. The data plan must be activated within 60 days after pump shipment, and remain active through the warranty period to maintain extended warranty eligibility. The first 6-months of data plan usage is free from Novatec.

2-Year

Central System Controls to Include

FlexTouch™ Series Controls
FlexXpand™ Series Controls
OptiFlex™ Series Controls
PLC Communications Modules
Greenboard Communications Modules
LOGO! Mini PLC

Moisture Measurement Equipment to Include
MoistureMaster®

PET Resin Crystallizers

Resin Conveying and Systems Components to Include

VL/VLP Series Loaders
VRH, VR, VR-FL & VRP Series Receivers
Compressed Air Loaders
AL-B Barrel Loader
Cyclone Dust Collectors
Conveying System Accessories
Surge Bins
Valves and Accessories
Electronic Metal Separators
Quick Select Manifolds
Tilt Tables
Filter Dust Collectors
Drawer Magnets

1-Year

Resin Conveying System Components to Include

*VPDB Vacuum Positive Displacement Pumps
*SVP Vacuum Pumps
MVP Vacuum Pumps
UltraVac Vacuum Pumps
Vacuum Regenerative Blower Pumps
Velocity Control Valves

*See 3-Year Warranty above

Central System Controls to Include

MCS-600 Series Controls – (Distributed I/O)
MCS-400 Series Controls
CL Silo Manager

Infrared Dryers
Custom Equipment of any kind unless otherwise specified
Railcar Unloading Systems

Exclusions:
Routine maintenance/replacement parts are excluded from the warranty. These include, but are not limited to: hoses, desiccant, filters, filter elements, wiper seals, gaskets, dew point sensors, infrared lamps, motors, internal solenoids, fuses and motor brushes. Use with abrasive materials will void the warranty of any standard product. Wear resistant options may be available to extend usable service life with abrasive materials. Novatec reserves the right to limit the warranty if the customer installs replacement parts that do not meet the specifications of the original parts supplied by Novatec.

***Specific Exclusions:**

1. NovaDrier warranty is void if coalescing filters are not replaced on a 6-month or yearly basis (per instruction manual) and/or membrane has been exposed to ozone.
2. NovaVac Dryer -The ability of the canisters to hold vacuum will be compromised if the vacuum seal edge is damaged from mishandling. We do not warranty canisters damaged from improper handling. We do, however, warranty the seals.
3. LOAD CELLS on our WSB's are covered by Novatec standard warranty as long as they have not been damaged from improper handling.
4. Desiccant Wheel Warranty will be void if the wheel has been exposed to plasticizer, dust or other contaminants as a result of negligence on the part of the processor.

This warranty shall not apply to equipment:

1. Repaired or altered without written approval of NOVATEC unless such repair or alteration was, in our judgment, not responsible for the failure
2. Which has been subject to misuse, negligence, accident or incorrect wiring by others
3. Warranty is void if processing rates exceed manufacturer-recommended levels or if damage is caused by ineffective power isolation and/or power spikes/sags or incorrect installation.

NOTE: All conditions and content of this warranty are subject to changes without notice.

