

INSTRUCTION MANUAL EXTRUSION PULLERS NPS-HD Series



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Instruction Manual: NPS-HD 13 NOVEMBER 2019



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Instruction Manual: NPS-HD IM 13 NOVEMBER 2019

Model: _____

Serial number: _____

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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. Two independently powered traction drives provide accurately regulated speed control and eliminate the slippage between top and bottom belts. This is achieved by precisely regulating the lower belt with encoder feedback and providing constant torque to the top belt. In this way, speed of belts is precisely synchronized and there is no relative motion between top and bottom belts which will contribute to speed regulation inaccuracies.

Traction assemblies are available in the following sizes:

<u>Metric</u>	<u>US</u>
10.16 cm wide x 76.2 cm traction length	4" wide by 30" traction length
15.24 cm wide x 101.6 cm traction length	6" wide by 40" traction length

Two 800W [1horsepower] servo motors are powered by independent dual servo drives. Two high efficiency double reduction helical gear reducers provide speed and torque matched to application requirements and traction assembly size.

Each traction assembly is mounted to a rigid and accurate steel carriage which rides vertically on 'V' rollers to adjust the traction assembly position. The lower traction assembly is positioned by means of a jack screw and hand wheel to set the centerline height of the extrudate. The upper traction assembly is held open with a gas spring until closed with force applied with an air cylinder. Air cylinder pressure is set by a pressure regulator. A pressure transducer allows a display of the clamp force setting for process repeatability. The upper traction assembly position can be controlled via a hand wheel actuated down stop. In this way, collapse of very thin walled extrudate is prevented.

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.

CE rated machines feature a safety enclosure which prohibit access to hazard zones. Alternately, non CE machines feature walk thru guarding which limit access to in-running nip points at the in-feed entrance when properly adjusted.

4.0 SPECIFICATIONS

NPS-HD Performance Characteristics

Belt Width X Length

- 10.16 cm wide x 76.2 cm [4" x 30"]
- 15.24 cm wide x 101.6 cm [6" x 40"]

Max recommended feed opening: 4" for 4" wide belts, 6" for 6" wide belts

Max possible feed opening: 22.8 cm [9"]

Total horsepower: 1.6 kW [2 hp] - all NPS machines

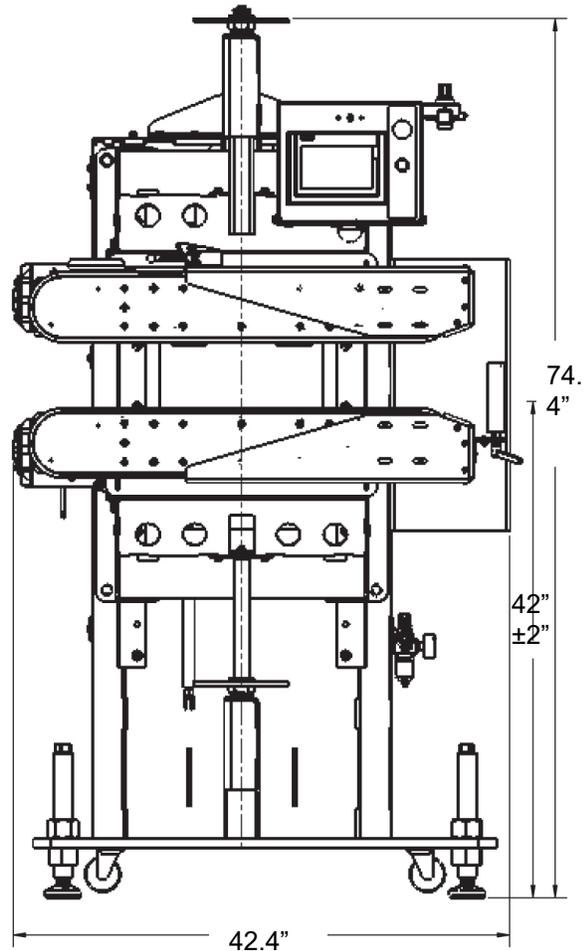
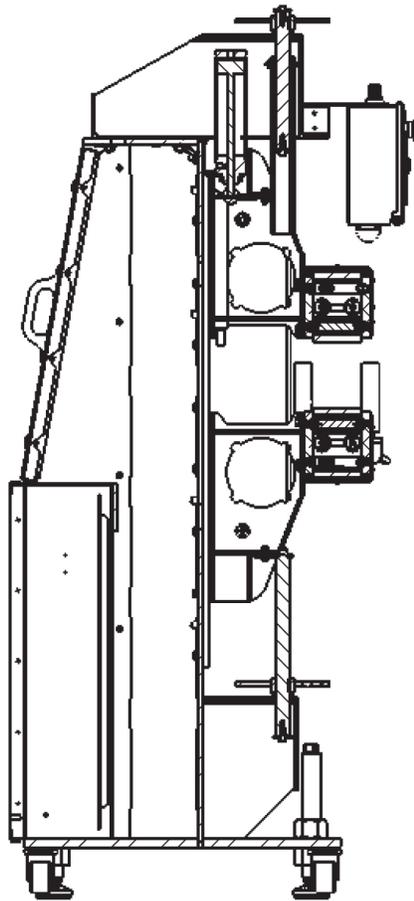
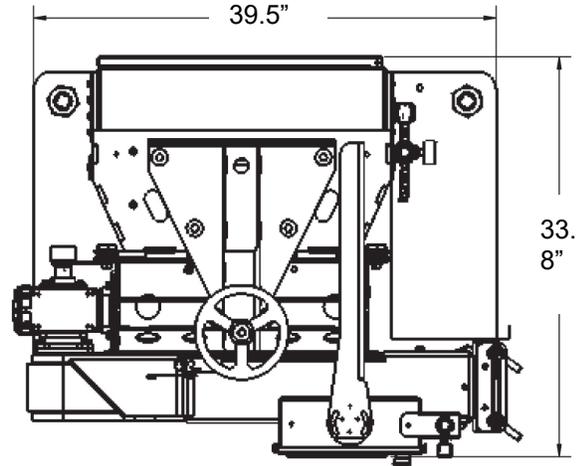
Drive Type: Dual Servo

Gear Ratio/Belt Speeds (full torque range):

<u>Gear Ratio</u>	<u>Speed - meters/minute</u>	<u>Speed – Feet/Minute</u>
58.33:1	0.16-16	0.5-50
52.50:1	0.18-18	0.6-60
43.53:1	0.2-20	0.7-70
29.10:1	0.3-30	1-100
19.93:1	0.5-50	1.5-150
15.60:1	0.6-60	2.0-200
11.42:1	0.8-80	2.75-275
8.02:1	1.15-115	3.75-375

Dimensions:

	<i>Metric</i>	<i>U.S</i>
Footprint:	109.2 cm wide x 86.4 cm deep	43" wide x 34" deep
Overall height:	190.5 cm	75"
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: 5 Amps

Belt Cover Material:

- 9.5 mm [3/8"] thick 55 durometer shore A Urethane, standard.

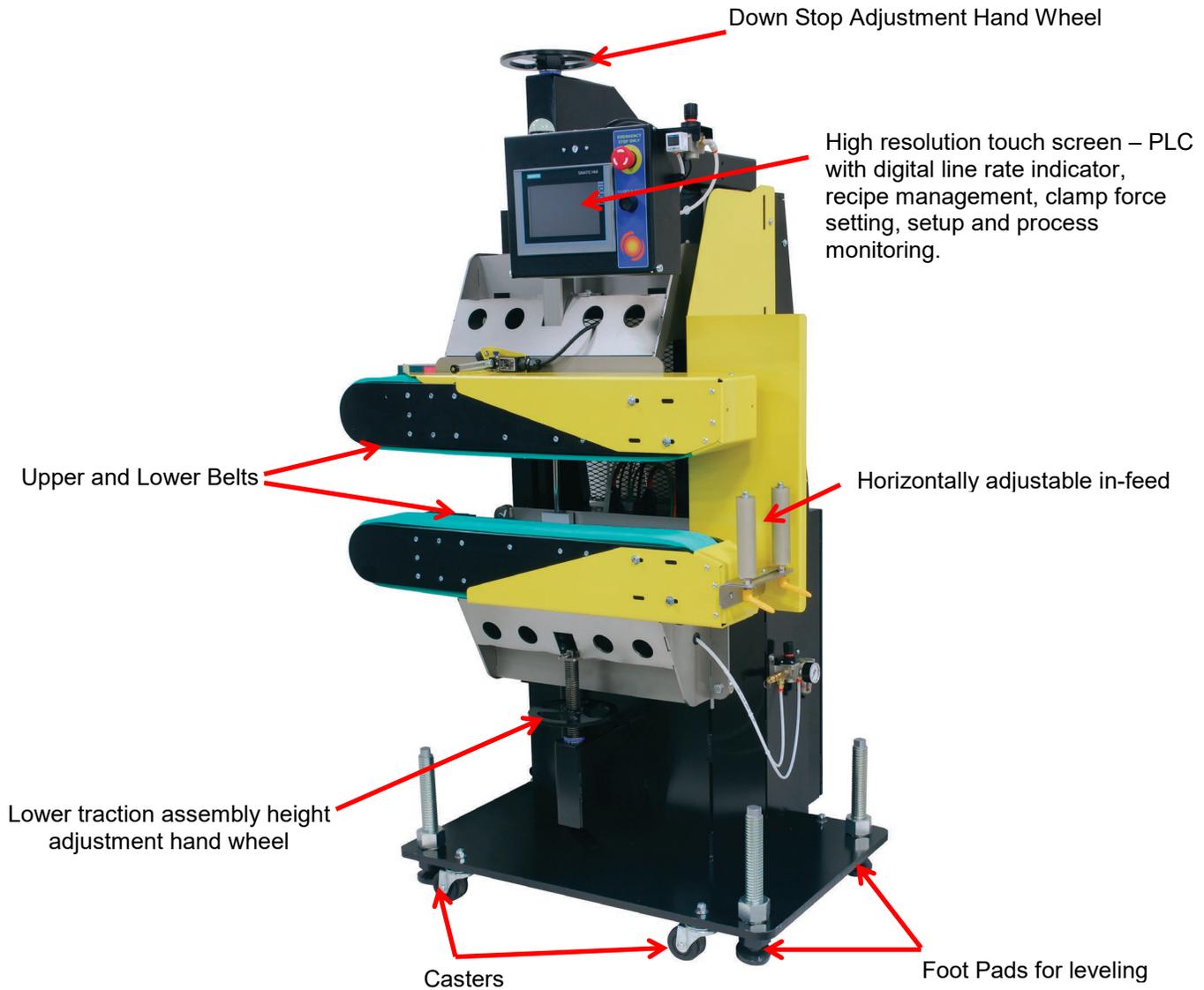
Options

- Remote Belt Speed Control (remote speed potentiometer)
- Remote Touch Screen Controller
- Left to Right Machine Operation
- Input Voltages other than 460/3/60

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





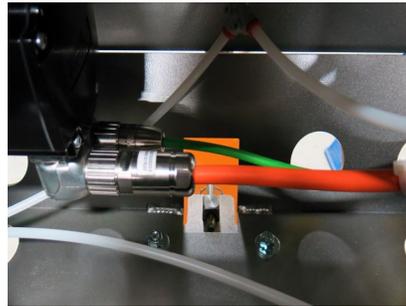
Double Reduction Helical Gear Reducer with optional external encoder mounted on the gear reducer for precise speed reading by other machinery (e.g. cutters).



Traction Motor Servo Drives



Belt tension bleed valve with pull ring
And belt tension pressure gauge



Servo Motor Power and Encoder Cable Connections.



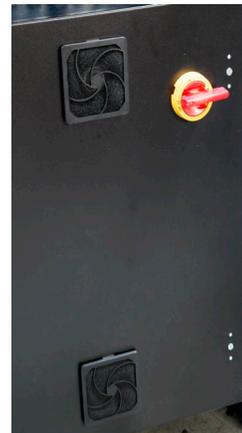
Belt Pressure
in psi or bar



Gas Spring End



Air Pressure Switch



Electrical Enclosure with
Main Power Disconnect and air inlet and exhaust fans



Industrial RJ-45 socket (shown with cap) for networking Puller PLC with Novatec Cutter or customer's plant PCs (data collection etc.).



Pull Blue Button UP to re-set when necessary

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, machine motions, 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



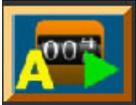
View Alarms



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



Clamp/Unclamp Upper/Lower Belts



Smart Access Visibility Enabled



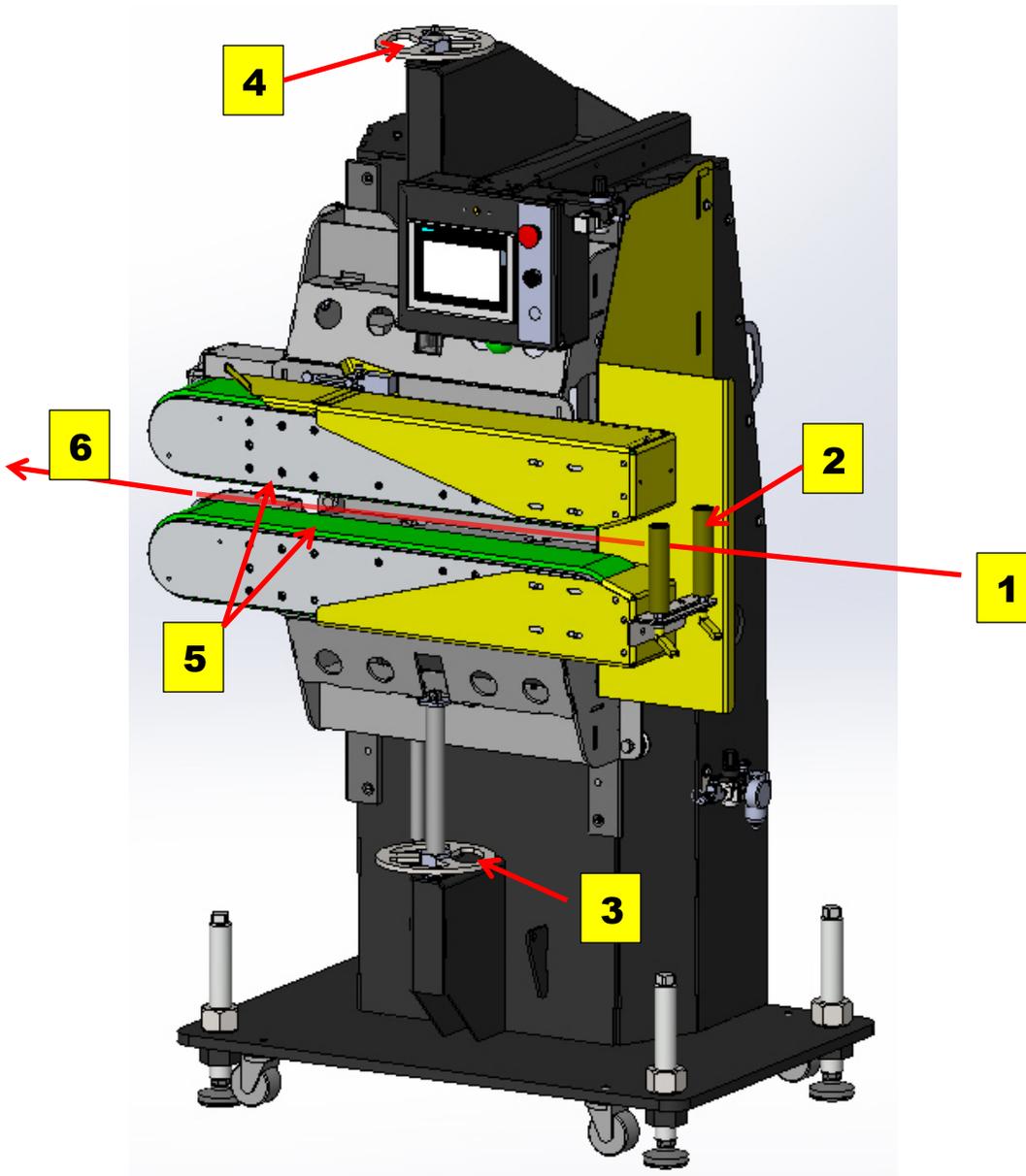
Smart Server Enabled



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 lower hand wheel adjustment adjusts the vertical position of the lower traction assembly
4. When necessary an upper boom down stop hand wheel adjusts position of the upper boom. (typically, the down stop setting is only used for thin walled sections that would otherwise collapse from excessive clamping force)
5. Upper and lower traction belts move the extrusion through the puller
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 for machines for use in the European Economic Zone. 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.



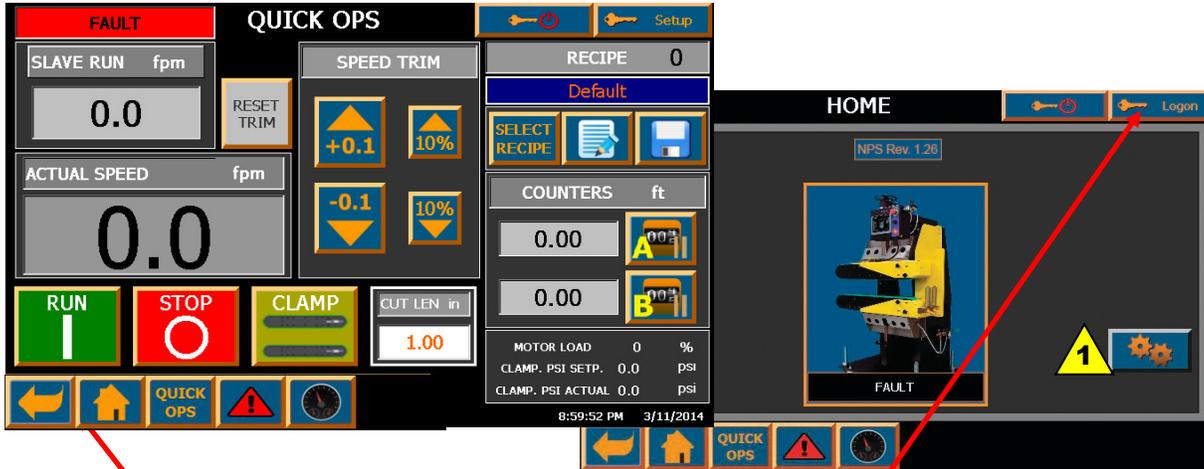
All electronics are susceptible (to varying degrees) to electrostatic damage and, although as much protection as possible has been designed into the system; this cannot completely eliminate upsets due to electrostatic voltage being accidentally introduced into the electronic circuitry.

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.



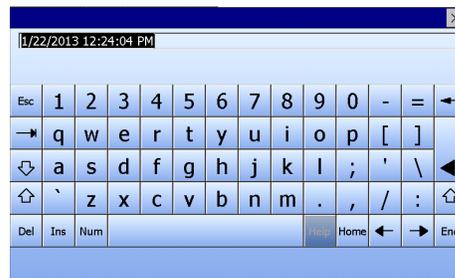
Press  to access HOME screen. Then press .

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.

 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.

Calibration Points for Air Pressure Transducer for Upper Boom (3+)

Belt Thickness Factor (3+)
Pre-set at factory.

SETUP PAGE 1

PRESSURE TRANSDUCER CALIBRATION Rev. 1.05

LO PSS POINT 0.0 psi

HI PSS POINT 0.0 psi

BELT PARAMETERS

TOP BELT PITCH DIST 0.1350 in

BOT BELT PITCH DIST 0.1350 in

19.1

3/11/2014

8:19:24 PM

Recipes Can Be Saved To/From SD Card

←

QUICK OPS

⚠

🕒

→

To Previous Page

To USERS MANAGEMENT screen (3+)

Time & Date

USERS MANAGEMENT

User	Password	Group	Logoff time
Level1	*****	Users	0
Level2	*****	Production	5
Level3	*****	Maintenance	5
PLC User	*****	Unauthoriz...	5
Setup	*****	Setup group	5

←

QUICK OPS

⚠

🕒

12/ 19/ 2013

4:26:26 PM

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. 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 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.

SETUP PAGE 2




ALL

MACHINE CONFIGURATION	OUTPUT REFERENCE	EXTERNAL REFERENCE
GEAR RATIO: 58.33 : 1 ▾	CUTTER COMM.: DISABLED ▾	REF. SOURCE: INTERNAL ▾
POWER OPTION: STANDARD ▾	CUTTER OUTPUT: DISABLED ▾	EXT. REF. TYPE: SPEED ▾
DIRECTION OF ROTATION: STANDARD ▾	CUTTER PLS. DURATION: 80 ms	EXT. REF. SCALING: 10.00 fpm
MACHINE VERSION: US ▾	CUTTER PLS. DELAY: 0 ms	EXT. REF. FILTER DELAY: 0.000
UNITS: US ▾	CUTTER CPM: 100	REMOTE REF SWITCH: DISABLED ▾
AUTOMATIC LOGON: DISABLED ▾	OUT REF. TYPE: DISABLED ▾	2ND REF. SOURCE: INTERNAL ▾
USER LINE SPEED LIMITS		
MIN. LINE SPEED: 0.50 fpm	OUT. REF. FILTER DELAY: 4.000	STANDARD SPD. RAMP: 15.0 sec.
MAX. LINE SPEED: 50.00 fpm		RET. TO RUN SPD. RAMP: 15.0 sec.


Back to SETUP Page 1 (3+)


PARAMETERS ARE PRE-SET AT THE FACTORY AND ANY CHANGE REQUIRES “SETUP” AUTHORIZATION.

MACHINE CONFIGURATION PARAMETERS:

MACHINE CONFIGURATION	
GEAR RATIO	58.33 : 1 ▾
POWER OPTION	STANDARD ▾
DIRECTION OF ROTATION	STANDARD ▾
MACHINE VERSION	US ▾
UNITS	US ▾
AUTOMATIC LOGON	DISABLED ▾

USER LINE SPEED LIMITS	
MIN. LINE SPEED	0.50 fpm
MAX. LINE SPEED	50.00 fpm

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:

OUTPUT REFERENCE		
CUTTER COMM.	DISABLED ▾	
CUTTER OUTPUT	DISABLED ▾	
CUTTER PLS. DURATION	80	ms
CUTTER PLS. DELAY	0	ms
CUTTER CPM	100	
OUT REF. TYPE	DISABLED ▾	
OUT. REF. FILTER DELAY	4.000	

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.

EXTERNAL REFERENCE		
REF. SOURCE	INTERNAL ▾	
EXT. REF. TYPE	SPEED ▾	
EXT. REF. SCALING	10.00	fpm
EXT. REF. FILTER DELAY	0.000	
REMOTE REF SWITCH	DISABLED ▾	
2ND REF. SOURCE	INTERNAL ▾	
STANDARD SPD. RAMP	15.0	sec.
RET. TO RUN SPD. RAMP	15.0	sec.

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.

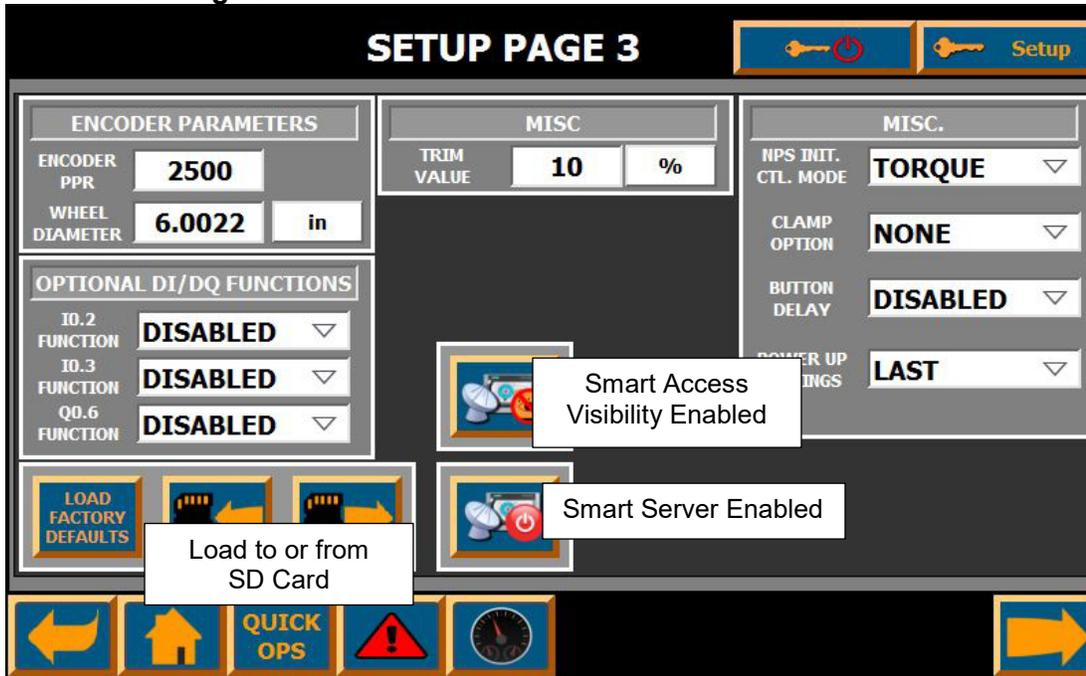
EXT.REF.FILTER DELAY – time value in seconds for analog signal smoothing. When set to 0, analog signal smoothing is disabled.

REMOTE REF. SWITCH – optional setting. When ENABLED, second reference source can be used. An selector switch or external discrete signal must 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;

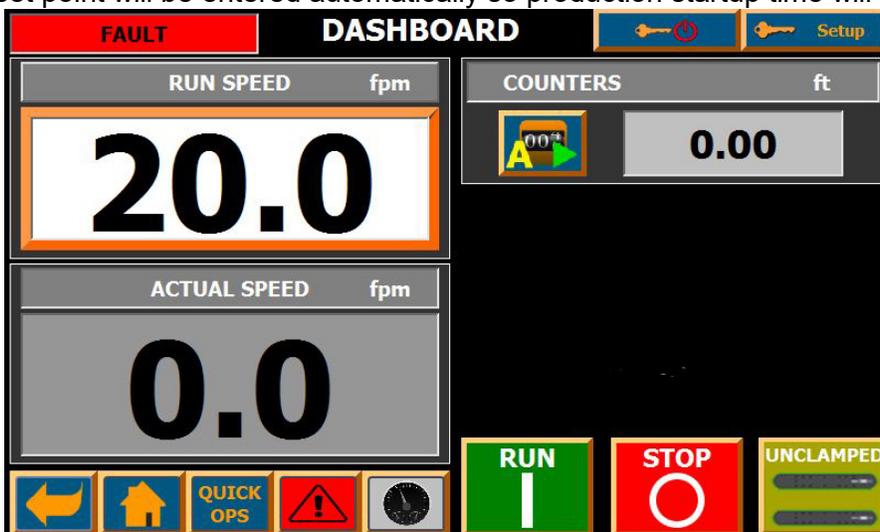
CLAMP OPTION - (selection if clamp option is installed) **BUTTON DELAY** (configurable pushbutton delay for STOP, RUN and CLAMP buttons – 1,2,3 sec.) and **POWER UP SETTINGS** (LAST/DEFAULT recipe loaded after system powered on)

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.

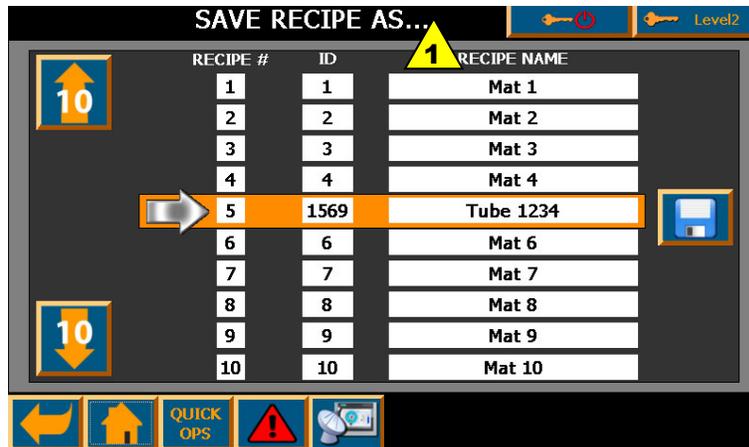


NOTE: SAVE CURRENT button is unavailable when default recipe is loaded (RECIPE 0).

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



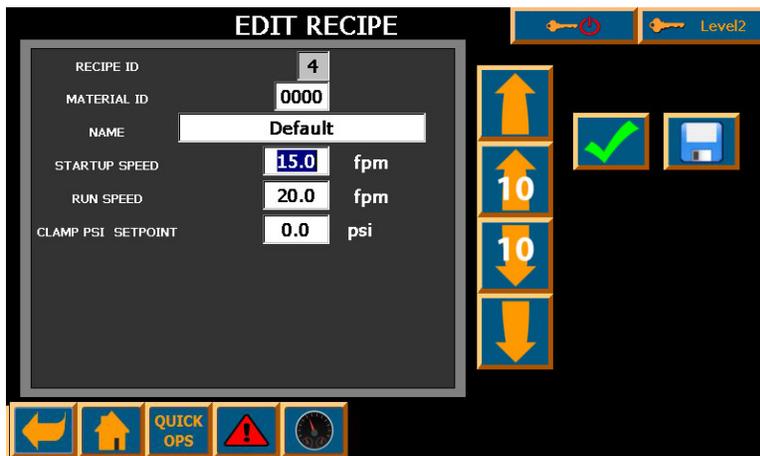
Click on a Recipe ID (up to 4 characters) and or RECIPE NAME (up to 10 characters) to select location where recipe will be saved then click  and the recipe is saved. Edit Recipe screen will be open and recipe can be re-named.



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  or  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.

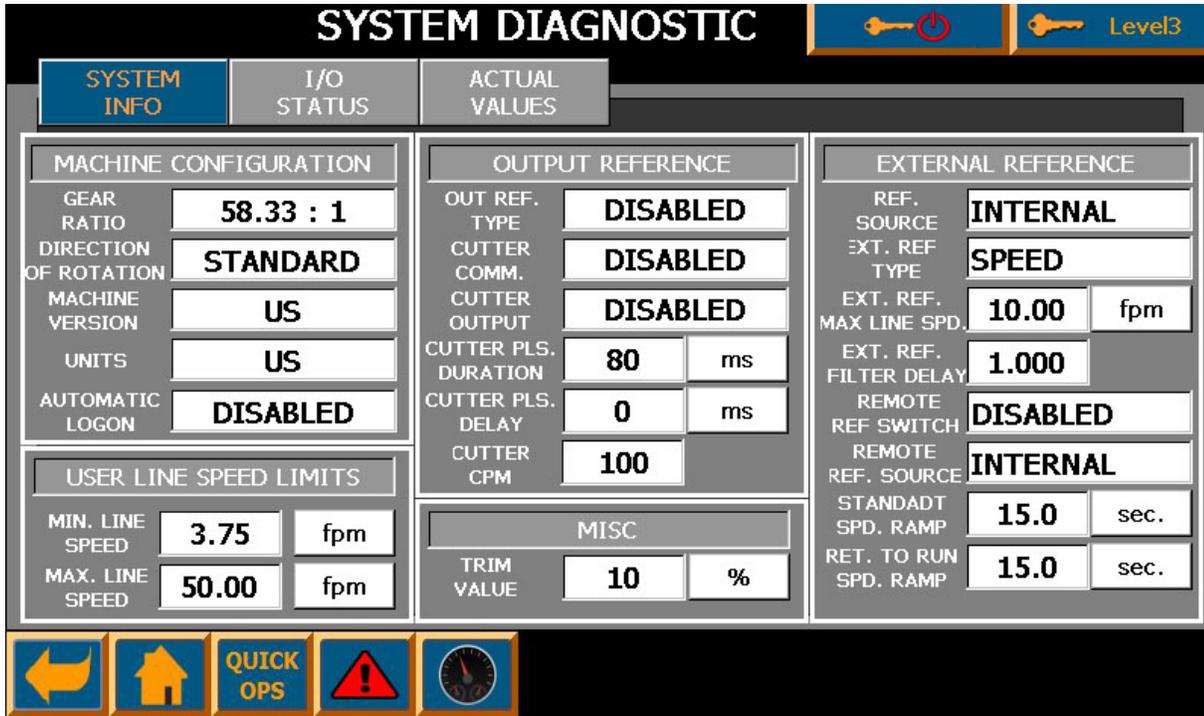
Either of the above can be paused and resumed or re-set to ZERO by pressing respective A or B counter PLAY/PAUSE or reset buttons.

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 DIAGNOSTIC Level3

SYSTEM INFO | I/O STATUS | ACTUAL VALUES

MACHINE CONFIGURATION		OUTPUT REFERENCE		EXTERNAL REFERENCE	
GEAR RATIO	58.33 : 1	OUT REF. TYPE	DISABLED	REF. SOURCE	INTERNAL
DIRECTION OF ROTATION	STANDARD	CUTTER COMM.	DISABLED	EXT. REF. TYPE	SPEED
MACHINE VERSION	US	CUTTER OUTPUT	DISABLED	EXT. REF. MAX LINE SPD.	10.00 fpm
UNITS	US	CUTTER PLS. DURATION	80 ms	EXT. REF. FILTER DELAY	1.000
AUTOMATIC LOGON	DISABLED	CUTTER PLS. DELAY	0 ms	REMOTE REF SWITCH	DISABLED
USER LINE SPEED LIMITS		CUTTER CPM	100	REMOTE REF. SOURCE	INTERNAL
MIN. LINE SPEED	3.75 fpm	MISC		STANDADT SPD. RAMP	15.0 sec.
MAX. LINE SPEED	50.00 fpm	TRIM VALUE	10 %	RET. TO RUN SPD. RAMP	15.0 sec.

Navigation icons: Home, QUICK OPS, Warning, Gauge

System Info view shows all machine setup parameters.



SYSTEM DIAGNOSTIC Level3

SYSTEM INFO | **I/O STATUS** | ACTUAL VALUES

SIEMENS SIMATIC S7-1200

AIO [V] +0.00 AI1 [V] +0.00

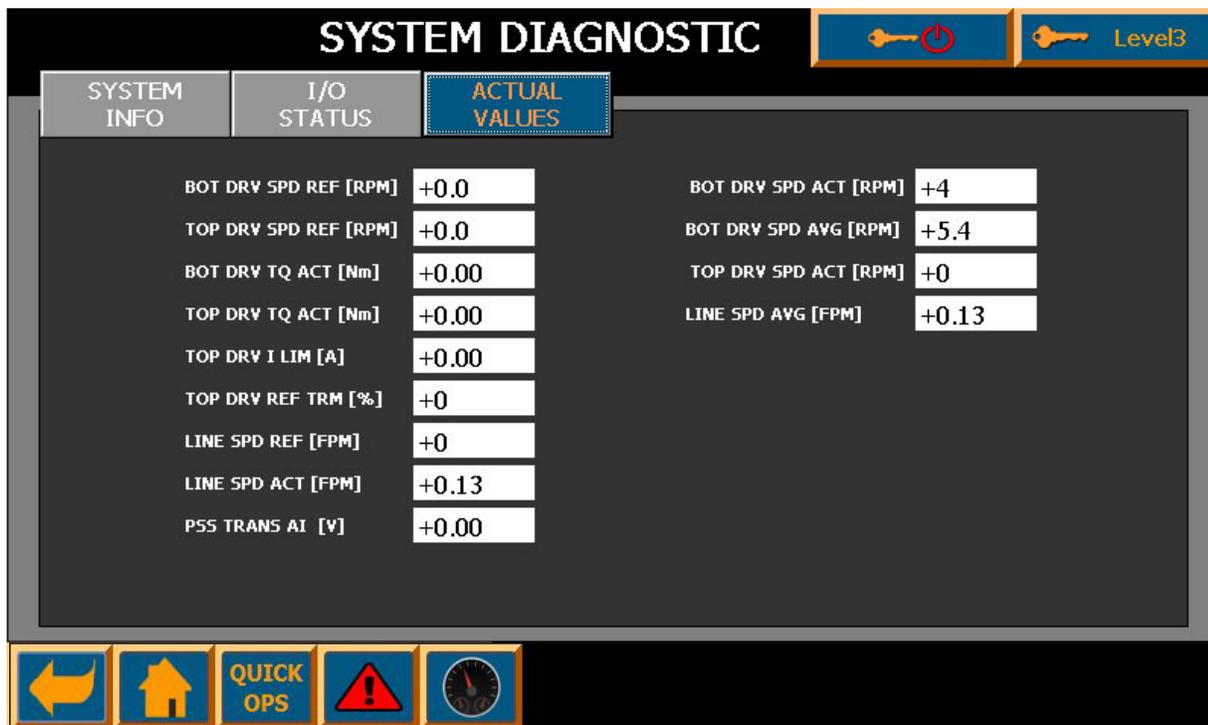
PLC Discrete I/O Status:

- DI a: 0-7 (0 is lit)
- DI b: 0-5
- DO a: 0-7 (0 is lit)
- DO b: 0-1

CPU 1214C DC/DC/DC

Navigation icons: Home, QUICK OPS, Warning, Gauge

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.

3/11/2014
8:17:18 PM

CURRENT ALARM

Level1

No.	Time	Date	Status	Text	GR
110	8:02:36 PM	3/11/2014	I	Belt tension air pressure too low.	0
107	8:02:36 PM	3/11/2014	I	EStop / Safetys are not OK. Check EStop, safety switch,...	0
104	8:02:36 PM	3/11/2014	I	Top drive Profinet fault. Check connection between the d...	0
101	8:02:36 PM	3/11/2014	I	Bottom drive fault No. 5200 See drive manual.	0

**QUICK
OPS**

**ALARM
HISTORY**

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.

3/11/2014
8:18:20 PM

ALARM HISTORY

Level3

No.	Time	Date	Status	Text	GR
\$ 260000	8:12:38 PM	3/11/2014	I	Invalid password or user name. Logon has failed.	0
\$ 80029	8:02:51 PM	3/11/2014	I	Log initialization ended. 1 logs reported errors.	0
\$ 80015	8:02:50 PM	3/11/2014	I	Alarm_log_10 - The system cannot find the drive specifie...	0
! 110	8:02:36 PM	3/11/2014	I	Belt tension air pressure too low.	0
! 107	8:02:36 PM	3/11/2014	I	EStop / Safetys are not OK. Check EStop, safety switch,...	0
! 104	8:02:36 PM	3/11/2014	I	Top drive Profinet fault. Check connection between the d...	0
! 101	8:02:36 PM	3/11/2014	I	Bottom drive fault No. 5200 See drive manual.	0
\$ 140000	8:02:36 PM	3/11/2014	I	Connection established: HMI_connection_1, Station 192....	0
\$ 70018	8:02:34 PM	3/11/2014	I	User administration imported successfully.	0
\$ 110001	8:02:34 PM	3/11/2014	I	Change to operating mode 'online'.	0
\$ 70022	8:02:34 PM	3/11/2014	I	User administration import started.	0
\$ 80028	8:02:33 PM	3/11/2014	I	Log initialization started.	0
\$ 270006	8:02:32 PM	3/11/2014	I	Project modified: Alarms cannot be restored from the pe... 0	0

**QUICK
OPS**

**CLEAR
ALARM
HISTORY**

**CURRENT
ALARM**

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:

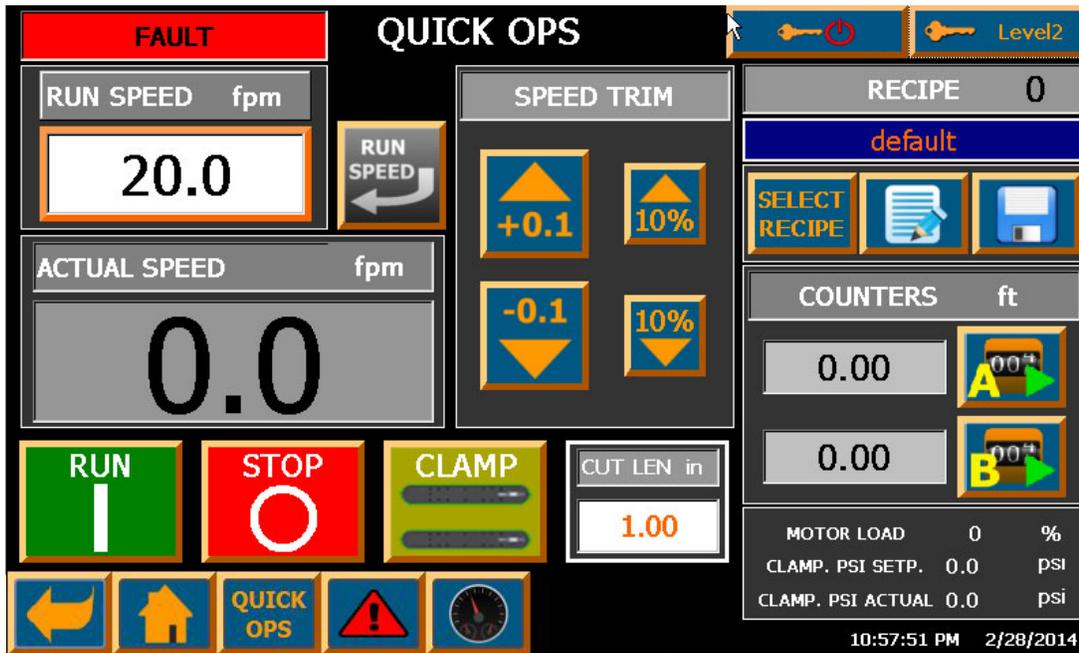
- I - means alarm occurred
- A – means alarm was acknowledged
- O – means alarm condition was cleared (alarm is no longer present)

13.0 PULLER OPERATION



DANGER: 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 Belt Clamp Pressure Calibration

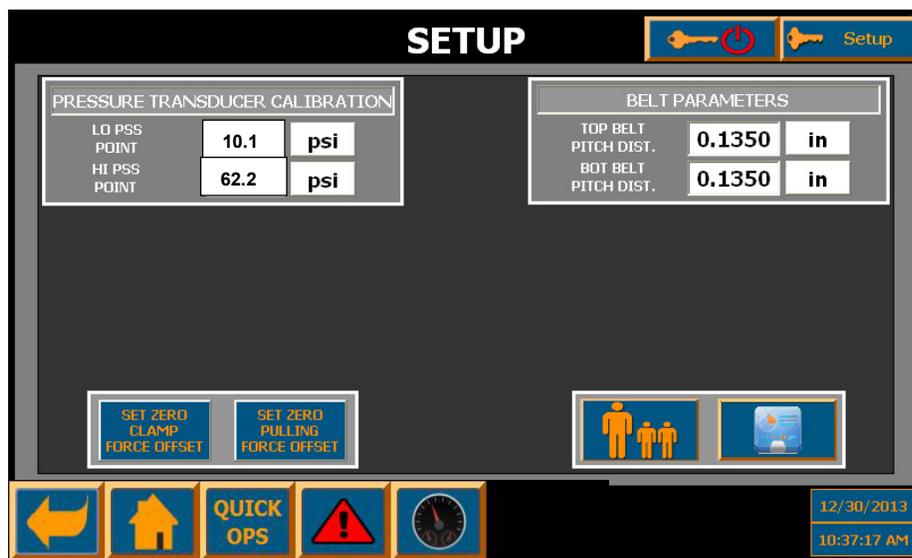
Belt clamp pressure (upper boom) or compression force is **set** by adjusting upper pressure regulator located next to the touch screen. This pressure regulator has built in electronic transducer connected to the PLC and it is used to calculate compression (clamping) force. Pressure transducer is calibrated at the factory. See next page in case re-calibration is required.

PULL knob UP. Turn to adjust clamp pressure.
Push knob down to lock.



14.3 In case a re-calibration of the pressure transducer is required:

Press  on the HOME screen to access SETUP screen (Level 3+ authorization required) Dial down boom pressure (upper regulator) to low number (e.g. 0.68 Bar or 10 psi) and then enter transducer reading as **LO PSS POINT** on the SETUP SCREEN. Next, dial boom pressure up to high number (e.g. 80 - 5.5 bar psi) and then enter value from transducer's display to **HI PSS POINT** on the SETUP SCREEN. Close upper boom and then set required pressure for zero clamping force.



Adjust upper regulator knob until desired clamp force setting is achieved. Setting should be approximately 2x maximum expected pull force or greater or else belts may slip on the extrudate and cause pull speed to be different from the belt speed. Clamp pressure should be sufficient to make upper belt contact lower belt. Actual clamping force (at the cylinder) will be shown on the SYSTEM OVERVIEW screen.

Relative zero clamping force can be set by pressing ZERO CLAMP FORCE OFFSET.

NOTE: If upper belt does not contact lower belt, check to see if lower traction assembly is set to the correct height for the material being extruded.

Clamp pressure should not provide so much clamp pressure as to deform the material being extruded or adversely affect traction belt cover life.

14.4 Setting Belt Gap for Thin-Walled Extrudate

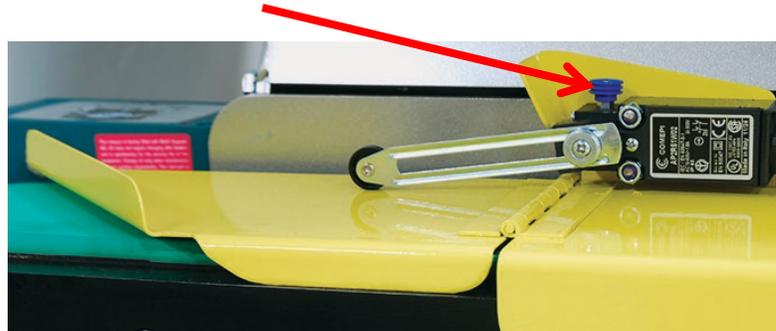
In cases where thin walled tube is used, Set the belt clamp pressure as indicated above but in order to prevent damage to the extrudate, use the upper hand wheel to limit the downward travel of the upper boom.



14.5 Pull E-Stop pushbutton (at this point light should go green)



If light does not turn green, try pulling the blue safety switch up (shown below)



Press Reset E-STOP pushbutton Enter speed setpoint or activate recipe

14.6 Setting Up A Production Run

The screenshot shows the control panel interface with several callouts:

- Speed can be increased or decreased in small increments of 0.1 fpm by pressing the UP or DOWN arrows.** (Red callout pointing to the +0.1 and -0.1 buttons)
- Speed is increased or decreased in 10% increments by pressing +10% or -10%.** (Green callout pointing to the 10% buttons)
- Return to Line Speed Set Point / Reset Speed Trim** (White callout pointing to the RUN SPEED button)
- Access to Recipe Screen** (White callout pointing to the RECIPE screen)
- Speed Set point Entry** (White callout pointing to the RUN SPEED display)
- To Recipe Selection** (White callout pointing to the SELECT RECIPE button)
- RUN Machine** (White callout pointing to the RUN button)
- STOP Machine** (White callout pointing to the STOP button)
- Clamp / Unclamp** (White callout pointing to the CLAMP button)

- 1- Press SPEED Reference and enter speed you want to run in ft./min.
- 2- For thin-walled extrudate - Adjust Upper Hand Wheel to prevent downward travel
- 3- Press CLAMP to lower UPPER Boom
- 4- Press RUN to start puller
- 5- The Footage Counter begins when the PULLER is started.
- 6- Press Date or Time to reset clock – Important for Alarm Time Stamp.
- 7- Increase or decrease speed in 10% or 0.1 fpm increments.
- 8- Press RECIPE NUMBER to access Recipe screen
- 9- Press  then  to access detailed setup screens.

14.7 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.

SETUP

PRESSURE TRANSDUCER CALIBRATION		
LO PSS POINT	10.1	psi
HI PSS POINT	62.2	psi

Calibration Points for Air Pressure Transducer for Upper Boom

BELT PARAMETERS		
TOP BELT PITCH DIST.	0.1350	in
BOT BELT PITCH DIST.	0.1350	in

Belt Thickness Factor

SET ZERO CLAMP FORCE OFFSET SET ZERO PULLING FORCE OFFSET

Terminate HMI Application & Open System

Offset Pre-sets for Clamping and Pulling To SETUP Page 2 To USER MANAGEMENT

12/30/2013 10:37:17 AM

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

SETUP PAGE 2

MACHINE CONFIGURATION	
GEAR RATIO	8.02 : 1
DIRECTION OF ROTATION	STANDARD
MACHINE VERSION	US
UNITS	US
AUTOMATIC LOGON	DISABLED

OUTPUT REFERENCE	
OUT REF. TYPE	DISABLED
CUTTER COMM.	DISABLED
CUTTER OUTPUT	ENABLED
CUTTER PLS. DURATION	80 ms
CUTTER PLS. DELAY	0 ms
CUTTER CPM	100

EXTERNAL REFERENCE	
REF. SOURCE	ANALOG IN
EXT. REF. TYPE	SPEED
EXT. REF. SCALING	10.00 fpm
EXT. REF. FILTER DELAY	1.000
REMOTE REF SWITCH	DISABLED
2ND REF. SOURCE	INTERNAL
SPEED RAMP RATE	15.0 sec.

USER LINE SPEED LIMITS	
MIN. LINE SPEED	3.75 fpm
MAX. LINE SPEED	50.00 fpm

MISC	
TRIM VALUE	10 %

2/21/2014 8:53:10 AM

15.0 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 servomotor and resistor.
- ❑ Do not disable or bypass equipment safety features.
- ❑ Refer to system component manuals for additional information.



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.

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
- ❑ Verify full travel available in upper traction assemblies step 5 section 9.1 above

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.

EVERY 30 MONTHS – REPLACE GEARBOX SEALS

Important to maintain gearbox to avoid premature failure

Gearbox seal kits will be supplied at NO CHARGE, upon request, upon 30 months and 60 months during warranty period.

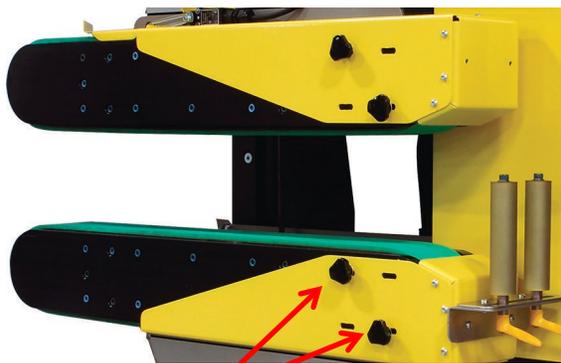
- Kit includes:
 - 2x14452 Seal, Gearbox, input CR16048
 - 4x14453 Seal, Gearbox, Output CR19227
 - 2x14221 Gear Oil, Synthetic, ISO 460, 1 Qt., PAG

15.1 Instructions for Replacing Gearbox Seals

1. Remove gearbox from machine after removing motor and adapter.
2. Orient gearbox so input is horizontal and above output shaft.
3. Vent and Drain oil preferably while gearbox is still hot and just after use to keep particles suspended in oil.
4. Replace drain plug.
5. Remove and replace seals in output (2x p/n 14453) and input (p/n 14452) shafts using provided oil (p/n14221) as lubricant.
6. Refill on benchtop by filling with 1 pint oil until overflow at plug behind motor input flange.
7. Re-install plug and vent.
8. Replace Gearbox onto machine.

15.2 Replacing 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 10.1 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.



Loosen these knobs to remove safety shrouds.



15.3 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 gap may be tensioned by looking down the belt 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.

Attach machine supply air. With power to the machine, but machine unlocked, adjust pressure switch counterclockwise until light goes out, then clockwise so light remains on at new, lower pressure setting. The pressure switch is located on the lower traction assembly at the pneumatic "T" fitting.



15.0 WARRANTY

WARRANTY-NOVATEC, INC.

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

Effective May 8, 2017

15.0 WARRANTY CONTINUED

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.

