INSTRUCTION MANUAL

FlexTouch

Siemens FTS-4C Series

PLC Material Conveying System Control

with

4” High Resolution Comfort Panel

Color Touch Screen

FTS-4C IM 8 FEB 2018

NOVATEC™
Part of the MAGUIRE Family

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NOTES:

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: FTS-4C IM 8 FEB 2018

Serial # _____

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1 PURPOSE OF THIS MANUAL

This manual describes the installation and operation of the Novatec FTS Siemens Series Material Conveying System controller. 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 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.
- Always disconnect power before servicing.
- Refer to the machine nameplate and drawings supplied with this system for actual power requirements.
- Be sure to install the equipment in the proper electrical area according to the NEMA rating specified. Care must be taken to adhere to all national and local regulations.
- Electric power supply should be through a separate disconnect switch with properly sized overload/fuse protection.
- Thread protectors and caps provided on solenoid valves, traps, pipe ends, etc. must be removed prior to start-up.
- 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 GENERAL DESCRIPTION

The NOVATEC FTS Series controller is a custom-programmed Siemens PLC-based control system designed to incorporate existing and future resin conveying equipment.

The FlexTouch FTS series is a touch screen loading control featuring intuitive operation. A choice of two touch screen styles is available: a cost effective 4” color display or a 7” color display. Both are high resolution comfort touch displays..

Intuitive icons, that show functions, minimize the use of language specific text reducing confusion by non-English speaking users and enhancing control understanding.

Proportional control, for loading regrind in addition to virgin material, and purge valve control are included.

Filter cleaning blowback may be optioned in the main control panel.

There is a Piezo alarm horn on control face, plus a red alarm light on the alarm silence pushbutton.

4 SPECIFICATIONS

Model	Touch Screen Control	Number of Pumps	Number of Receivers	Number of Purge Valves	Control Box Dimensions
FTS-105-0-4C	4" Color	1	up to 5	0	18"x18"x8"
FTS-210-6-4C	4" Color	2	up to 10	6	18"x18"x8"
FTS-210-6-7C	7" Color				
FTS-320-8-4C	4" Color	3	up to 20	8	30"x24"x8"
FTS-320-8-7C	7" Color				
FTS-334-10-4C	4" Color	3	up to 34	10	30"x24"x8"
FTS-334-10-7C	7" Color				

Optional:

(Show as separate line items on order. See Price List # 342)

Blowback outputs for receivers:

(Must be factory installed)

For up to 5 receivers – Part# BBOM-FTS-5
For up to 10 receivers – Part# BBOM-FTS-10
For up to 16 receivers – Part# BBOM-FTS-16
For up to 32 receivers – Part# BBOM-FTS-32

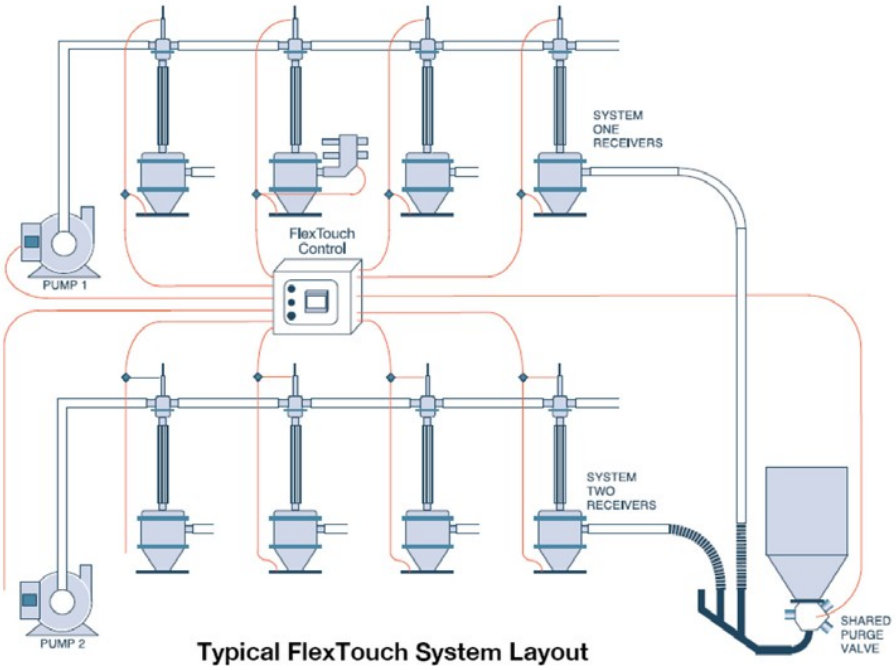
115V I/O for existing systems:

(Must be factory installed)

FTS-105-0 - Part # VOLT-105-12
FTS-210-6 - Part # VOLT-210-12
FTS-320-8 - Part # VOLT-320-12
FTS-334-10 - Part # VOLT-334-12

- **ColorNet ™ Networkable Color HMI Required for Remote PC Access:** (Upgrade for 4" or 7" color touch screen) Part # HMI-7S-ColorNet
- **Input power:** (in lieu of 115 V standard) 230/1/50/60 Part# VOLT-FTS-21
- **Alarm strobe:** (must match panel I/O voltage) 115 V Part # kit-strobe-12 24 VDC Part # kit-strobe-24

Note: Separate proportional settings may be made for each optional proportioning receiver with a pump system, however, all valves within that system are connected by a common signal. In operation all proportioning valves within a pump system operate at the same time.



Typical FlexTouch System Layout

5 PLC OVERVIEW

General

The FlexTouch S Series (FTS) material conveying system controller utilizes a centrally mounted Siemens brand Programmable Logic Controller (PLC) that sends commands to various conveying system components.

Startup and Power Loss

When power is first applied to the PLC following a power loss, the system will automatically start loading enabled stations that have material demand. If a loading station or vacuum pump (VP) is enabled, as indicated by **ON**, it will remain enabled. This prevents the operator from having to restart each piece of equipment. When first starting up, each station will have to be configured with the proper vacuum pump assignment, load, fill and dump times, no load alarm cycles, material number, and be enabled.

6 OPERATING PRINCIPLES

FlexTouch Conveying Controller

The program controls the operation of loading the receivers from selected sources.
The FlexTouch controls the operation of the vacuum pumps, the station “T” valves and the purge (material source) valves. The FlexTouch must be in **SYSTEM RUNNING** mode.

Vacuum Pump

Each vacuum pump (VP) is hard piped to multiple stations. Stations may be assigned to any pump.

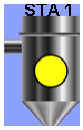
⚠ CAUTION: Care must be taken to verify that the mechanical connection of a station valve to a vacuum pump matches the vacuum pump’s assignment of that particular station

A vacuum pump (VP) will start when a connected loading station “calls” for material via its demand switch or sensor. *The pump will run for the **LOAD** and **PURGE** portions of a fill cycle, plus an additional time period that allows the pump to continue running in the event another receiver requires vacuum.* This additional period of time is called **“SEEK”** time and is adjustable at the control to minimize frequent pump starts and stops. If no other station calls for material, the vacuum pump will shut down after the seek time expires. A new station calling for material will reset the seek timer and begin a new fill cycle. The seek timer is accessible from the FlexTouch controller’s **Vacuum Pump Setup** page and has a default value of 120 seconds.

Receiver Station

Each receiver station includes a station T valve and a receiving hopper complete with a demand level switch or sensor. *The FlexTouch control panel allows the user to view the status of each receiver in the system, enable or disable it, and view or change any setup parameter*. Enabling of a receiver permits it to be automatically included in the conveying system whenever it signals a demand for material. A receiver may be enabled or disabled at any time. If a receiver is in a fill cycle when it is disabled, the cycle will continue to completion.

Receiver Station status indications are:



DEMAND - The receiver is enabled and not yet in the fill cycle, but the level switch or sensor is calling for material. The receiver is placed in the Vacuum Pump's FIFO (first in-first out) vacuum queue and will fill when its vacuum pump (VP) becomes available.

VIRGIN - The receiver is in the loading material portion of the fill cycle. If proportioning (see 7.1.8) is employed on this station, this phase of operation will typically be alternated between VIR (virgin) and REG (regrind) loading. If proportioning is not employed, then VIR will be the only indication of loading. The Station T valve is open and the purge valve, if employed, (See 7.1.7) is energized open, permitting material to be conveyed to the vacuum chamber.

REGRIND – The receiver is enabled and is in the loading regrind material portion of the fill cycle. The station T valve is open and the proportioning valve is energized to draw regrind material, typically from a source near the receiver, like a granulator.

PURGE – The receiver is in purge portion of the fill cycle. The station T valve is open and the material source valve is now closed to material flow, yet still open to air flow, allowing the conveying line to be purged free of any remaining material.

DUMP – The receiver is in the dump/discharge portion of the fill cycle. The station T valve has closed, removing vacuum from the hopper. The material that was conveyed into the receiver now discharges by gravity into the molding machine, drying hopper or bulk bin.

ALARM – The receiver has gone through the fill cycle, without satisfying the material demand switch or sensor for a consecutive number of times equal to or greater than the **No-load Alarm set point**.

The Receiver Fill Cycle

When the receiver has a demand for material, that receiver station number is moved into its assigned vacuum pump's list of receivers waiting for vacuum service from the pump. This line-up, or "queue" operates in a "First In/First Out" (FIFO) mode. The default vacuum pump assignment for all receiver stations is Pump #1.

When the receiver is ready to be filled, the vacuum pump, if not already running, will start, and the station T valve will open to introduce vacuum into the receiver. The material source valve also opens at this time, allowing material to be conveyed from the material source to the receiver. The fill cycle consists of three automatic actions, LOAD, PURGE and DUMP. The station T valve remains open for the load and purge times and closes during the dump cycle, allowing other receivers to utilize the vacuum pump.

When the VIR (Virgin) and REG (Regrind) load time(s) expire, the purge valve closes off the flow of material and the purge time begins. While the vacuum pump continues to run, the purge function allows any pellets remaining in the conveying line to be carried into the receiver, cleaning the conveying line. When the purge timer expires, the station T valve closes, the vacuum pump advances to service the next receiver station in its FIFO queue, and the receiver's dump timer is started. Pellets in the receiver are then dumped by gravity into the hopper or machine below it. If the receiver is equipped with blowback (See 7.1.6), it operates during the dump cycle.

If the receiver's material demand level switch or sensor is not satisfied at the end of the dump time, the receiver will be placed back at the end of its vacuum pump's FIFO queue.

The load, purge, and dump set points are all changeable from the FTS control and have default values of 10, 10, and 5 seconds respectively.

Vacuum Pump FIFO Queue

Any receiver may be assigned to any vacuum pump. Each vacuum pump (VP) has a First In/First Out (FIFO) queue associated with it. Each vacuum pump's queue holds the receiver numbers in the order they became empty and demanded material. The VP services each station in the order in which the demand was generated. A station is removed from the queue at the end of its purge cycle and then the VP advances to service the next station in the queue, if there is any. If a station is still in demand at the end of its dump cycle, it is re-entered into the queue. If there are no other stations in the queue, the fill cycle of a station still in demand will repeat as soon as the dump cycle is complete.

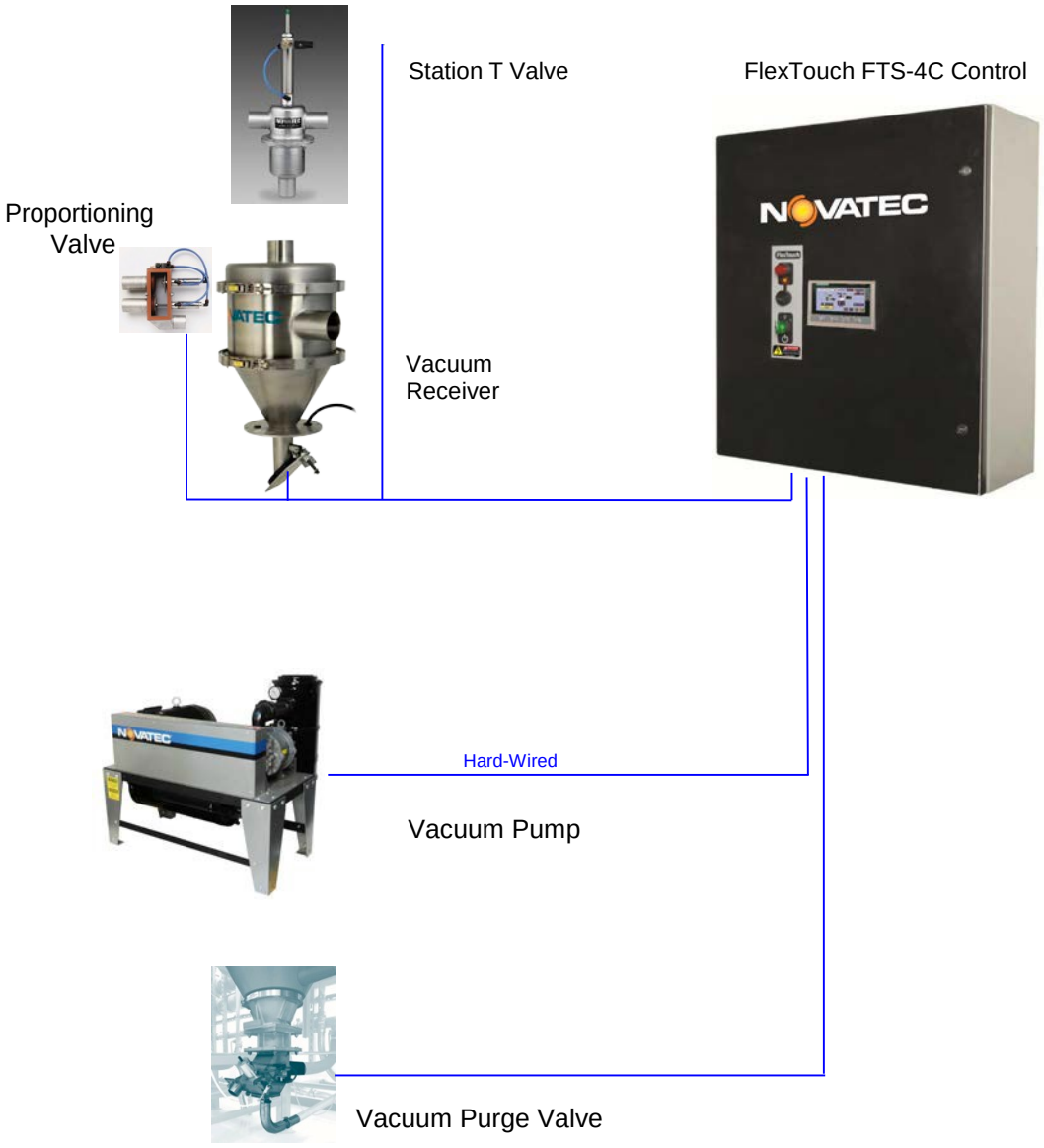
Alarms

Directly following the fill/purge cycle of each receiver, the FTS loading control monitors the receiver's demand level switch. This switch can be a proximity sensor (typically used in machine mount receivers or hopper sight glasses), an integrated flapper switch, or any other sensing device used to signal a demand for material at that receiver. After loading/dumping, the control system expects the demand switch to change from a demand condition to a full condition, at least momentarily, indicating that the receiver successfully moved material to the hopper or machine below the receiver. If the discharge time is below the pre-set minimum programmed into the control, the control assumes material did not load and records this event as a No-Load condition. If this No-Load event repeats consecutively for the number of cycles entered in the 'No-Load Alarm' parameter, an alarm signal is generated to alert the operator of a material flow fault or no-material condition. Once the demand switch properly indicates that satisfactory loading/dumping has occurred, the No-Load Alarm event list is erased. The number of No-Load cycles that are received before an alarm occurs is adjustable through the control, with the default value set at 3. Entering a value of zero (0) will disable the alarm.

Note that a station will continue to load even if the alarm is on.

The FTS loading control also monitors the vacuum pumps for motor failures. The motor failure alarm is triggered whenever the motor is called to run, but the motor auxiliary contact input does not close after 3 seconds (typically indicating an overload of the motor starter). The alarm can only be cleared by pressing the "ALARM SILENCE" button on the front of the controller. Once a vacuum pump is in an alarm state, as a safety measure, the controller will not allow that vacuum pump to attempt to start until the alarm is cleared.

Typical System Wiring



7 INSTALLATION

After unpacking and inspecting the FlexTouch Controller, four basic activities will need to be performed. These activities are:

1. Completely install station receivers and station valves, pumps, and other mechanical components. Install material conveying and vacuum lines.
2. Locate and mount the FlexTouch control panel in a convenient location.
3. Wire all the equipment to the controller enclosure per the wiring diagrams.
4. Adjust each receiver station's set points at the control including: vacuum pump number, material number and load, purge, and dump times.

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: The conveying lines must be grounded to prevent "shocks" from static electricity that are generated by some materials as they are conveyed. This is an extremely important step.

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

Generally, grounding the case of the container from which the material is being conveyed (including the lines) to the same potential as the green wire ground of the conveying system eliminates most of this problem.

7.1 Mechanical Installation

7.1.1 Material Conveying Lines

The single most important activity performed to ensure satisfactory operation of a pneumatic conveying system is the actual installation of the equipment and the equipment's interconnected material conveying and vacuum lines. All components should be located so that material lines and vacuum lines are as short as possible. Elbows or other changes in direction should be minimized. The material conveying lines should be horizontal and/or vertical and as direct as possible with no slope. Care needs to be taken that all connectors are vacuum tight. All rigid conveying tubing should be properly supported to provide a safe and secure installation.

It is generally recommended to use flexible hose and clamps to connect material pick up lances, vacuum chambers, etc., to rigid material or vacuum lines. The flexible hose should only be as long as needed since excess hose will reduce the efficiency of the system. The hose should not sag and should not be used to accommodate required bends in the material conveying line, since hose can wear rapidly by material abrasion**.**

Rigid tubes and elbows should be connected together with bolted, compression style couplers. Before coupling sections of tubing together, assure that each tube end is square cut, the tubing is round, and all burrs have been carefully removed. Tube ends should butt together inside the coupling when installed, with the bolted coupler centered over the joint. Be sure that static strips within the compression coupler are in place.

7.1.2 Vacuum Pump Unit

Locate the vacuum pumps so that access to the secondary filter element mounted to the unit is accessible. Secure to the floor or platform as necessary. Connect 3 phase power (check nameplate) to the motor starter located in the motor starter junction box mounted on the vacuum pump unit FROM A FIELD-SUPPLIED DISCONNECT SWITCH (or to the optional combination starter with integral fused disconnect switch). An electrical ground wire is also required. Control wiring for the starter coil and auxiliary feedback will need be wired back to the control cabinet.

A clean, dry supply of 80 -100 PSIG compressed air must be connected to the pressure port of the pump's vacuum breaker valve solenoid.

When the vacuum breaker valve is energized, it allows ambient air to pass through the vacuum blower. This is done instead of shutting the pump down to prevent premature wearing of the pump and belt drive caused by constantly starting and stopping the pump. Eventually the pump will shut down completely (if not needed) when the seek timer expires. Note that the default time programmed into the seek timer of the system is 120 seconds when the system is first shipped to you. If the pump seems to be shutting down after an unusually short or long period, check the programmed seek timer value.

Positive Displacement Vacuum Pump (VPDB)

Regenerative Blower Vacuum Pump (VRB)

7.1.3 Cyclone Dust Collector

Position the cyclone dust collector as close as possible to the vacuum pump. Provide access for the material catch pan or fines drum as necessary. Secure the cyclone frame to the floor. Attach vacuum lines from the conveying system to the cyclone inlet (tangential inlet on the side of the cyclone body). Attach the cyclone outlet (top duct) to the vacuum breaker valve inlet on the vacuum pump.

7.1.4 Station T Valves

Locate one T Valve near each receiver. Typically, the T Valves horizontal stubs are rigidly attached to the main vacuum line with bolted couplers during the vacuum line installation process. Additional rigid tubing or flex hose is then used to connect the bottom stub of the T Valve to the lid of the receiver. An alternate installation allows the T Valve to be located at the end of a vacuum line, with one of the horizontal stubs plugged. T valves may be oriented vertically or horizontally. The station T valve solenoid is wired back to the control cabinet. Ground the system as necessary. A clean, dry supply of 80 - 100 PSIG compressed air is connected to the pressure port on the station T valve's solenoid valve.

7.1.5 Vacuum Receiver

Secure the receiver (VR) to the hopper or surge bin as required. Orient the material inlet line and vacuum outlet line as required. Flex hose is normally used to connect the vacuum chamber to the supply line and station T valve. Wire the material level switch or sensor back to the control cabinet. A machine mount recerier (MM) is used to dump material directly into the machine throat.

Vacuum Receiver (VR)

Machine Mount Receiver (MM)

Vacuum Receiver (VRH) with built-in sequencing valve.

7.1.6 Compressed-Air Blowback

Some vacuum receivers are provided with a compressed air blowback solenoid valve for cleaning the filter depending on the application. The pulse blowback solenoid valve is wired back to the control cabinet. A clean, dry supply of 80 -100 PSIG compressed air is required. Connect it to either the compressed air accumulator tank supplied on large vacuum chambers or directly to the pulse blowback solenoid valve that is supplied on small vacuum chambers.

7.1.7 Purge Valves

Purge valves are typically installed at material sources, like silos, drying hoppers, blender bins, or anywhere conveying lines must be emptied between load cycles.

Two styles are offered by NOVATEC: A dual inlet/single outlet style (below-left) designedto be installed within a tubing network. And a hopper-bottom model (below-right) designed to be installed below drying hoppers. A clean, dry supply of 80 - 100 PSIG compressed air is required for either model. The solenoid valve located on the body of the purge valve must be wired back to the control cabinet.

External Purge Valve shown with filter screen installed

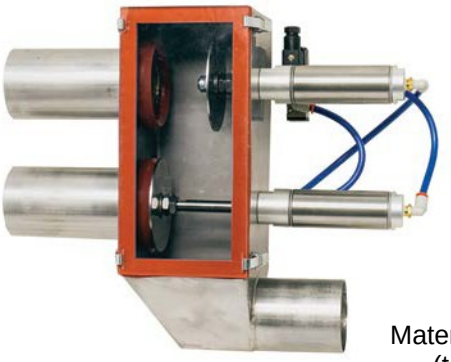
Vacuum Purge Takeoff Valve

7.1.8 Proportioning Valves

Proportional valves are typically installed directly on or very near individual receivers and allow the entry of locally generated regrind intermittently with virgin material during vacuum loading. A clean, dry supply of 80 - 100 PSIG compressed air is required. The solenoid valve located on the body of the purge valve must be wired back to the control cabinet.

Regrind Material Inlet

Virgin Material Inlet



(Shown with solenoid valve energized)

Material Outlet (to Station)

NOTE: The control energizes the proportioning valve's solenoid to pull regrind into the receiver station. When installing, please configure the valve's air piping to ensure the top port is closed to regrind in the de-energized state, and opens in the energized state. IMPORTANT: Premature gasket wear and failure may occur if the proportioning valve operates with the Regrind Material Inlet on the lower inlet port.

Electrical Installation - General

Always disconnect and lock out the main power supply before wiring power and communication cables between the FlexXpand controller and the network devices and control wiring to 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. Do not install panel beside power transformer.
- Avoid running communication cable across power lines. 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, can arc to the cable disrupting communications and/or possibly causing damage.

7.2 Electrical Installation – Wires

7.2.1 Wire Types

- Blue THHN 16 AWG (18AWG can be used for short distances, 300 feet or less)
- US Electric Code indicates Blue for 24VDC. The gauge designation may be oversized for actual load, and there are percent reductions in AWG needed based on the number of conductors in the conduit; however, many electricians pull 16 AWG as a minimum. Consult with local electrical contractors to confirm local code requirements.

7.2.2 Standard Wires for Receivers

- CONTROL POWER (+24VDC) – Supplied from a common terminal (set) at the main panel and shared by receivers grouped with the adjacent power module (see Electrical Schematic).

- CONTROL NEUTRAL (0VDC) – Supplied from a common terminal (set) at the main panel and shared by receivers grouped with the adjacent power module (see Electrical Schematic).

- DEMAND INPUT (unique to each receiver) – The demand input wire for each station is connected to one side of the receiver's demand switch. The +24VDC common wire is connected to the other side of the demand switch to provide the input signal voltage when the switch closes.

- VACUUM VALVE OUTPUT (unique to each receiver) – The vacuum valve output wire for each station is connected to one side of the receiver's vacuum valve solenoid. This can be either a receiver mounted external fill valve (EFV) or remote mounted station tee valve (SV). The solenoid valve is also wired to the 0VDC common to complete the power circuit when the output is energized.

7.2.3 Optional Wires for Receivers

(may be required for receiver installed options)

- BLOWBACK SOLENOID OUTPUT – Any receiver that includes the blowback option will also require the optional blowback output wire to operate the blowback solenoid valve.

- PROPORTIONING VALVE SOLENOID OUTPUT – Any receive that includes a proportioning (ratio) valve will also require the associated vacuum pump's proportioning output wire to operate the proportioning valve solenoid. This output is daisy-chained to all stations assigned to a given pump.

- PURGE VALVE OUTPUT – Any receiver with a purge valve mounted below the hopper to which it supplies material can also provide the standard purge valve output wire to operate the purge valve solenoid.

- FOR ALL OF THESE OPTIONS, the solenoid is also wire to the 0VDC common the complete the power circuit when the output is energized.

7.2.4 Standard Wires for Vacuum Pumps

- CONTROL POWER (+24VDC) – Supplied from a common terminal (set) at the main panel and shared by pumps grouped with the adjacent power module (see Electrical Schematic).
- CONTROL NEUTRAL (0VDC) – Supplied from a common terminal (set) at the main panel and shared by pumps grouped with the adjacent power module (see Electrical Schematic).
- AUX CONTACT (unique to each pump) – The Aux Contact input wire for each pump is connected to one side of the pump starter auxiliary contact. The +24VDC common wire is connected to the other side of the auxiliary contact to provide the input signal voltage when the contact closes.
- VACUUM PUMP MS OUTPUT (unique to each pump) – The pump starter output wire for each pump is connected to one side of the pump's motor starter. The motor starter is also wired to the 0VDC common to complete the power circuit when the output is energized.
- VACUUM BREAKER VALVE OUTPUT (unique to each pump) – The vacuum valve output wire for each pump is connected to one side of the pump's vacuum breaker valve solenoid. The solenoid valve is also wired to the 0VDC common to complete the power circuit when the output is energized.
- VACUUM PUMP PROPORTIONING VALVE OUTPUT (unique to each pump) – see Section 7.3.3

7.2.5 Optional Wires for Vacuum Pumps

(may be required for pump installed options)

- CLOSED LOOP VALVE OUTPUT – Any receiver that includes the closed loop option will also require the optional closed loop output wire to operate the closed loop valve solenoid. The solenoid is also wire to the 0VDC common the complete the power circuit when the output is energized.

7.2.6 Determining the Wire Needed

- Add up the number of individual wires needed for a group of machines using the explanations given in throughout Section 8, and install the same number of wire leads from the panel to that area.

7.2.7 Wire Lead Installation Methods

- The wire leads can be installed in any of the following ways:
  - Individual wires in conduit
  - Decided multi-conductor shielded cable for each receiver in a cable tray
  - Shared multi-conductor shielded cable for a group of receivers in a cable tray

8 CONTROLS EXPLANATION

Siemens Operator Interface and Programmable Logic Controller

The Siemens Human Machine Interface (HMI) is touch-screen viewing and data entry device, located on the face of the control panel. The screens are graphical in nature and display information in text and/or symbol change. The HMI communicates with the internal Siemens Programmable Logic Controller (PLC) using a fast serial link. The touch screen is a high resolution Siemens Comfort color touch screen and is available in a 4" or 7" size.

Startup

When power is first applied to the HMI, the Main Menu (Home) screen is displayed. Since no user is logged into the system at startup, DEFAULT is indicated in the user display.

Depending on system configuration, some buttons may not be visible on your screen.

9 OPERATOR SCREENS

Main Menu

The Main Menu (Home) screen has touch screen pushbuttons to navigate to other screens

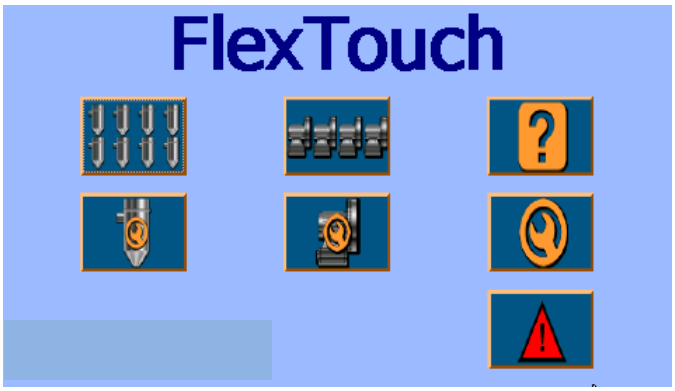
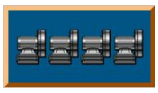


Figure 1: Default Home Menu

STATION STATUS – this button will take the user to the station overview status page. This page allows stations to be enabled ON and OFF as well as show the status of a large number of stations on one page.



VACUUM PUMP STATUS - This button navigates to the Vacuum Pump status page. These pages show the status of the vacuum pumps running, loading, purging, and which station each pump is servicing. See section 9.6 for more detail.

HELP - This button navigates to the HELP pages. These pages explain the meaning of the different symbols used and how to set the different parameters of the receiver stations.

SYSTEM SETUP - This button navigates to the System Setup page. The SYSTEM SETUP page is primarily used for the initial setup of the system by the administrator.

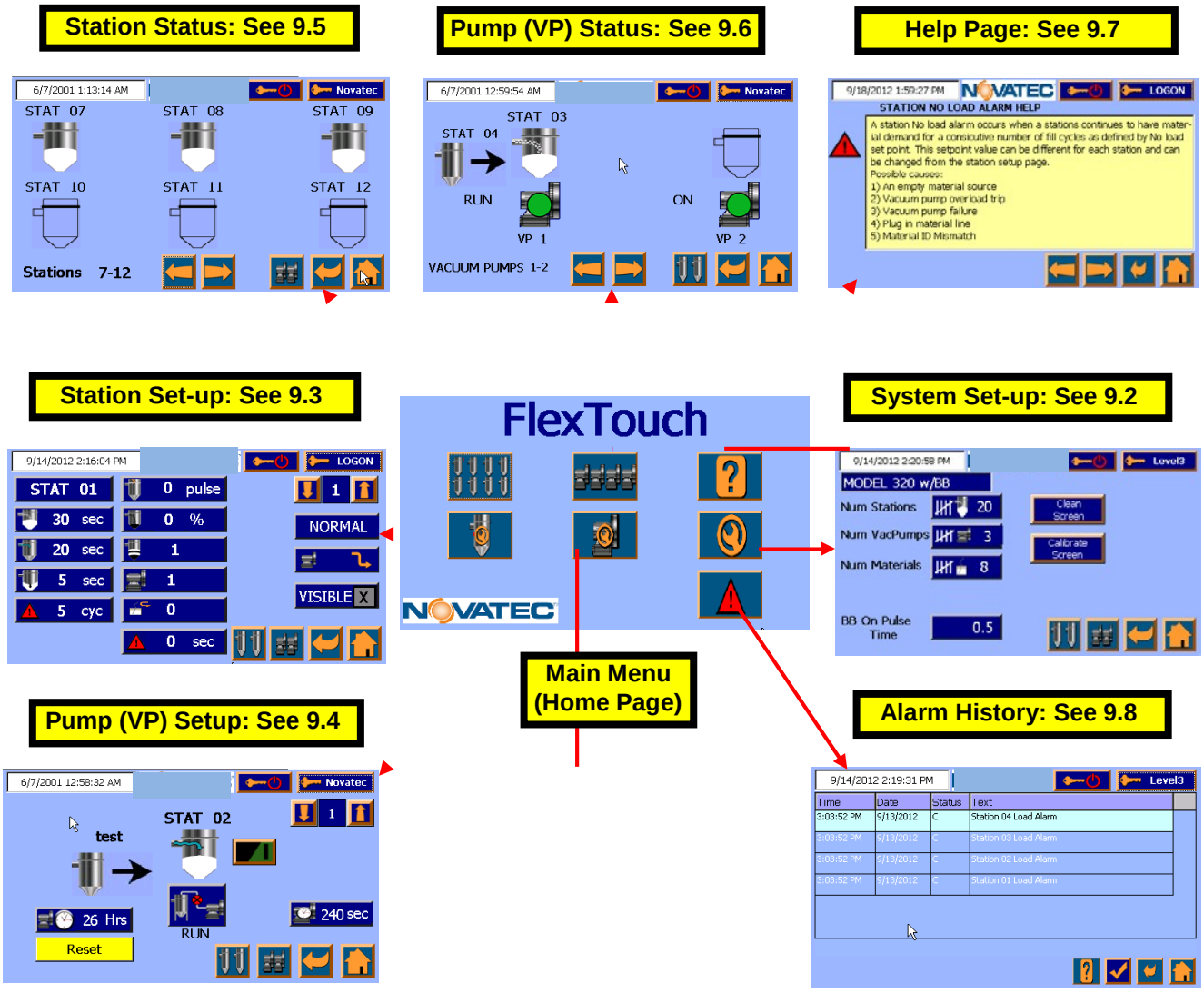
STATION SETUP – This button will take the user to the parameter setup page for a receiver station. The setup page allows the user to view and adjust (if logged in to the correct password level) any station's parameters like: load time, purge time, dump time, material selection, and vacuum pump assignment.

VACUUM PUMP SETUP - This will take the user to the parameter setup page for the vacuum pumps. The setup page allows the user to view and adjust (if logged in to the correct password level) a vacuum pump's seek time, vacuum breaker valve operation, current running hours and reset current running hours.

ALARM HISTORY PAGE - This button navigates to the Alarm History Page. This page shows all logged alarms, when they happened and when they were acknowledged.

HOME SCREEN - This button will take the user to the home, main menu page at any time. It is conveniently located in the same place on each page of the control and aides the user in navigation by allowing an easy return to the main menu (home) screen at any time.

Main Menu Navigation Map: 4” Color Touch Screen

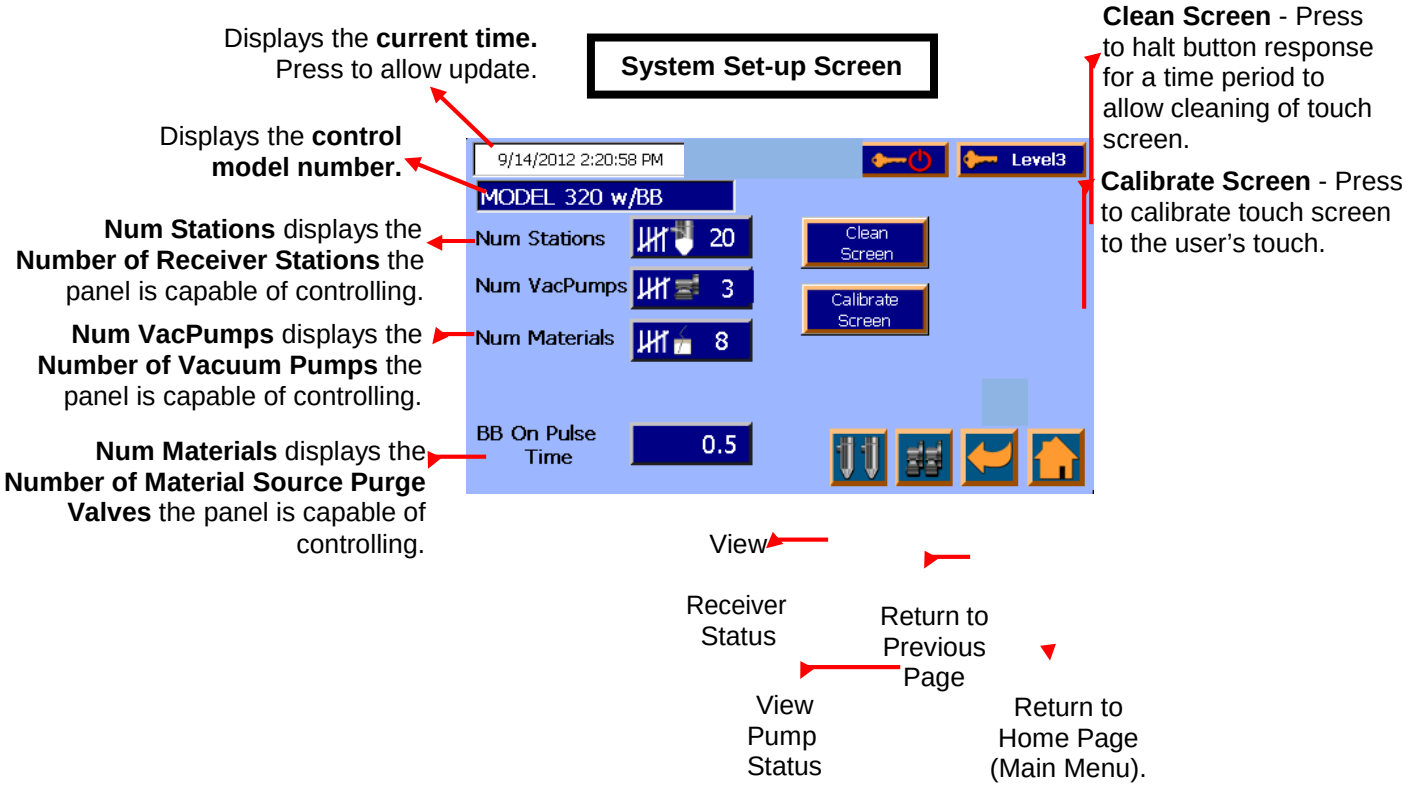


This button allows the user to login with different PASSWORD levels. The different levels will allow access to modify various parameters in the system. The password levels and input codes are:

Level 1: 1111 Permits receiver stations to be turned on (1) and off (0).
Level 2: 2222 Permits the programming of parameters for receiver stations.
Level 3: 3333 Permits system set-up and pumps to be turned on (1) and off (0)
NOVATEC: Restricted use for factory authorized settings only. Call NOVATEC Service Dept. for the password if ever required

This button LOGS THE USER OUT of the controller. Once pressed, pages or settings that are password protected will require re-inputting of the password for access. Use this button to prevent unauthorized changes to be made.

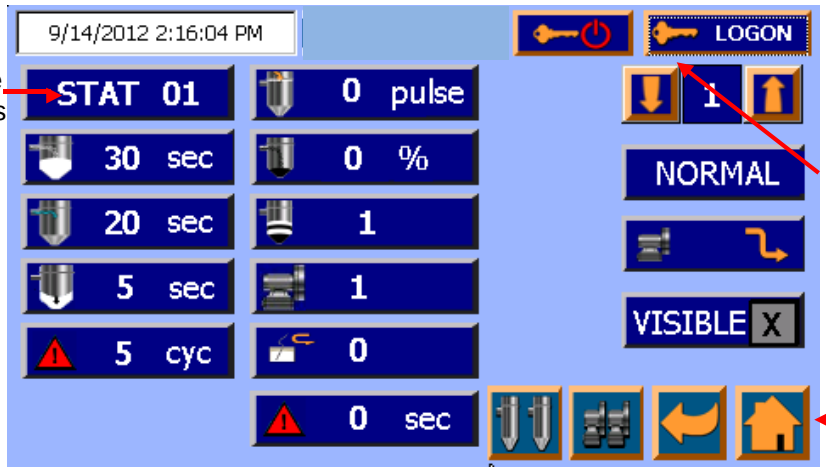
System Setup



Pressing the  button the main/home page takes you to the System Set-up page and, with the proper password, aligns the functions of the FTS control with the particular system configuration in use at your operation. To make changes to System Set-up Parameters, press the button located next to each category. A touch screen key pad will appear, allowing new settings to be entered.

Note that changes to system set-up require proper password entry. If the proper level of password protection has not been entered prior to attempting changes, the password entry keypad will appear, prompting the user to input the proper password before changes can be made. Changes to this screen after initial set-up and start-up of the system are typically only performed when physical changes have been made to the system; IE: re-routing vacuum lines or adding a new vacuum pump, station, etc.

Station Setup



Station Name
Up to 8 characters

See definitions and set-up directions for all parameters, below.

Station Number

Press to **Return to Home Page** (Main Menu).

Touching the **STATION SETUP** button on the Home Page will call up this screen to view and change parameters for a particular loading station.

All stations may be accessed sequentially (forward or backward) by touching the or buttons adjacent to the station number. In addition, pressing the station number between the arrows will call up a key pad to allow direct entry of any desired station number.

Anyone can view a station's setup parameters, but level 2 login is needed to make changes to most of the following parameters (unless noted otherwise). To make changes to Station Set-up Parameters, press the number located in each category. A touch screen key pad will appear, allowing new settings to be entered. If the proper level of password protection has not been entered prior to attempting changes, the password entry keypad will appear, prompting the user to input the proper password before changes can be made.

Station Name - Displays the receiver station number or custom programmed name that has been entered for this station. Pressing the name will bring up a keyboard that allows the name to be changed. Up to 8 characters are possible.

Fill Time - the overall time, in seconds, that material enters the convey air stream. It is the time the station T vacuum valve, and if equipped, the material purge valve, are open, allowing material flow. This setting is relative to the size of the receiver and the flow characteristics of the material. Default time is 10 seconds. Note that on receivers equipped with a proportioning valve this is the overall virgin and regrind loading time.

Purge Time – (if equipped) is the time in seconds that the station T valve remains open while the material purge valve is closed to material flow. It allows for the purging of material from the conveying line after the Load Time has expired. This time is relative to the distance from the material purge valve to the receiver and how smoothly the material flows. Default time is 10 sec.

Dump Time - this is the time that the material takes to fall from the receiver into the drying hopper, bin or machine after loading is completed. This time is determined by how smoothly or slowly the material flows by gravity from the receiver. Default is 5 seconds.

No Load Alarm – After loading/dumping, the control system expects the demand switch to change from a demand condition to a full condition, at least momentarily, indicating that the

receiver successfully moved material to the hopper or machine below the receiver. If the discharge duration is less than the pre-set minimum **Material Dem Time (Material Demand Time)** parameter, the control assumes material did not load. If this repeats consecutively for the number of cycles entered in the 'No Load Alarm' parameter, an alarm signal is generated. A setting of zero will disable the No Load Alarm.

Open/Closed Loop – Open Loop Conveying uses ambient air to convey materials after drying. Closed Loop Dry Air Conveying is used for materials to guard against regaining of moisture during conveying. Closed loop operation is only possible if the necessary closed loop piping with the dryer is installed. (See illustrations on page 20)

Indicates that material loading uses the dry, closed-loop return air of the dryer instead of ambient air as a conveying medium.

Indicates that this station utilizes (standard) ambient air for conveying.
Password level 3 is required to make changes to the closed loop conveying system configuration.

Pulses – For receivers equipped with filter cleaning blowback capability, this setting defines how many bursts of compressed air are released into the receiver during the dump cycle, to clean the filter. Requires password level 3 to make changes.

Regrind Pct (Regrind Percent) – defines what proportion of vacuum time will dedicated to loading regrind into the hopper. This value is a percentage of the FILL time. For example, if the FILL time was 10 seconds and the Regrind Percent was 40%, then the proportioning valve will dedicate 4 seconds to filling regrind material. The proportioning valve will then allow virgin material to be loaded for the remaining 6 seconds.

Regrind Layer - works in conjunction with the Regrind Percent. It tells the proportioning valve how many times to switch between loading regrind material and virgin material within a single fill cycle. A layer consists of both a regrind material part and a virgin material part. CAUTION: The calculated load time per layer should be 2 seconds or greater to move material consistently. Proportioning repeatability improves as each layer's load time increases.

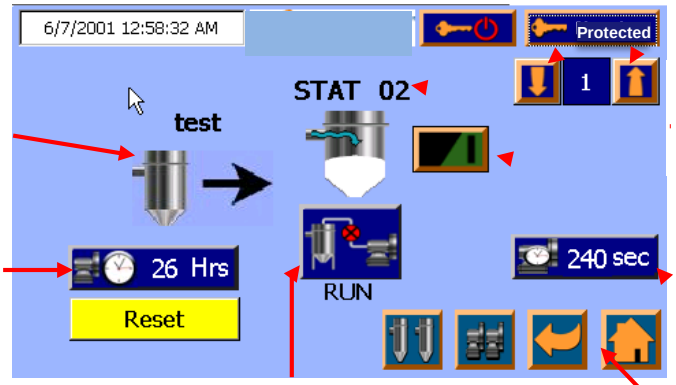
Pump Number – This setting is the Vacuum Pump to which the station's vacuum valve is piped. Changing this pump assignment in the control requires password level 3.

Material Source – The Material Source button determines which material purge valve will operate in conjunction with the loading of this particular receiver. Pressing the Material Source button brings up a keypad to select what material purge valve to energize during the load cycle.

NORMAL (or PRIORITY) – Each receiver station has a "fill priority" assigned to it. Most receivers have a NORMAL priority and the controller will fill each of these receivers in the order in which they demand material – First In, First Out (FIFO). But Receivers can also be programmed as PRIORITY. Receivers that are PRIORITY will be serviced by its assigned vacuum pump before any NORMAL receivers, even if the NORMAL receiver showed demand for material before a PRIORITY receiver. Once all the PRIORITY receivers are satisfied with material, then the controller will fill the NORMAL receivers. Requires password level 3 to make changes. CAUTION: Assigning PRIORITY to Stations can lead to extended wait times for NORMAL Stations, or prevent them from being loaded when multiple PRIORITY stations are assigned to a single pump.

Visible – An X in this box ☒ indicates that this receiver will be shown, along with others, in the Station Status screen (see section 9.5). The Station may be also made invisible so that it does NOT appear in the Station Status screen. This feature is convenient to minimize operator confusion by hiding receiver stations that are not in use or not connected.

Vacuum Pump Set-Up



Press the arrow buttons to show the PREVIOUS or NEXT Vacuum Pump Set-up Screen.

Receiver currently being serviced and current portion of the cycle.

Next receiver to be serviced, once the current receiver's filling cycle is complete.

Press this button to turn this pump "ON"/"OFF". ON (Green) or OFF (Red).

VP RUN TIME: Shows how many hours this Vacuum Pump has been running. Hours may be reset to 0 by pressing the **Reset** button.

SEEK TIME: This is how long the Vacuum Pump will run before shut down after all system demands are satisfied.

Vacuum Breaker Valve; normally closed for NOVATEC pumps or normally open for some other pumps.

View Receiver Status.

View Pump Status.

Return to Previous Page.

Return to Home Page (Main Menu).

Pressing the  button the main/home page will display the Vacuum Pump Set-up screen.

 Turning the vacuum pump OFF (0) will halt any further loading assignments being given to this pump, but the pump will complete loading all assigned stations that are in its FIFO queue, plus complete its assigned SEEK time duration, and then shut down. Turning the vacuum pump ON (1) will permit this pump to immediately begin loading any receivers that are assigned to it, providing at least one receiver connected to this pump has a demand. If there is no demand upon the pump, it will remain off until a demand signal is received.

Seek Time - This function is designed to prevent frequent starts and stops of the vacuum pump and to allow the pump to cool in a low vacuum, non-loading operation. The setting may be changed by pressing the number itself. A touch screen key pad will appear, allowing a new setting to be entered. If the proper level of password protection has not been entered prior to attempting changes, the password entry keypad will appear, prompting the user to input the proper password before changes can be made. The default value is 240 seconds. The optimum value is determined in operation for each system.

VP Run Time - This readout is a convenient method for keeping track of the hours a pump has been running since its previous reset. It can be used for scheduling maintenance, safety checks, etc. The setting may be reset to "0" by pressing the parameter icon to access the yellow reset button (most frequently used in following major pump repairs or even routine maintenance). If the proper level of password protection has not been entered prior to attempting changes, the password entry keypad will appear, prompting the user to input the proper password.

Receiver Being Serviced – is indicated by name or number, along with a graphic depiction of the specific portion of its cycle. The next receiver in the queue (if there is one) is also indicated.

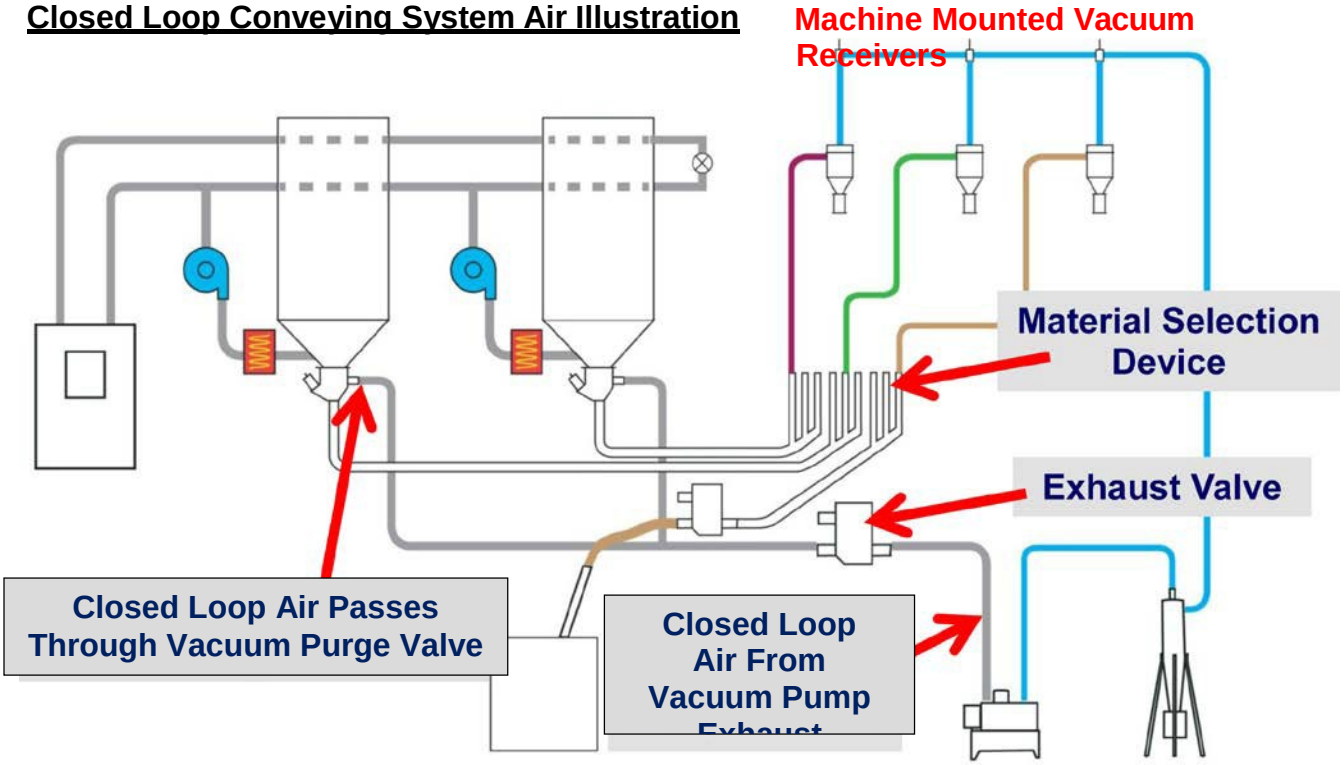
 **Vacuum Breaker Valve –** Function is indicated by the red circle located between the pump and the system filter icons on the display:

Indicates that the vacuum breaker valve is ENERGIZED to OPEN to ambient air once loading functions are satisfied and while the pump is in seek time. This is NOVATEC's standard vacuum pump operation. The breaker valve is normally-closed and is only energized once the fill cycle is complete.

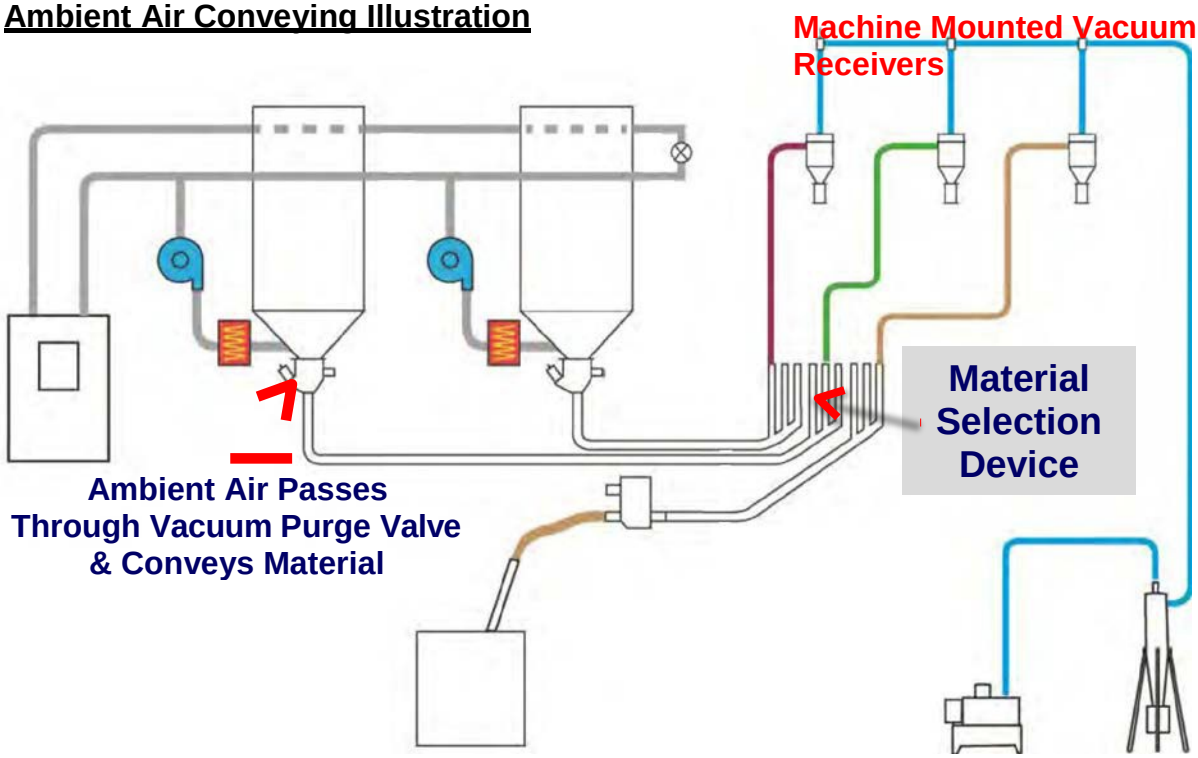
Indicates that the vacuum breaker valve is DE-ENERGIZED to OPEN to ambient air once loading functions are satisfied and while the pump is in seek time. The breaker valve is normally-open and the

valve is energized during the fill cycle. This settings aids in using the 4C Color Control with NOVATEC pumps.

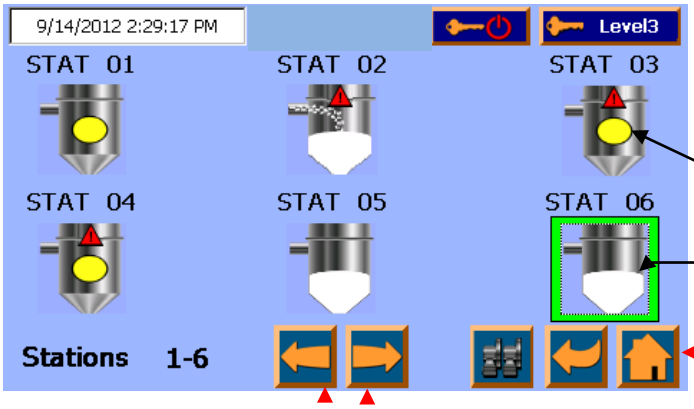
Closed Loop Conveying System Air Illustration



Ambient Air Conveying Illustration



Station Status Screen



Only receiver stations set as "VISIBLE [X]" on the Station Set-up Screen (section 9.3) will appear on this screen.

Press these buttons to enable a receiver or turn it off.
Press and hold to access the stations' setup screen.
(Release when station border turns bright green).

Return to Home Page (Main Menu)

Press these buttons to view the previous or next batch of receiver

Pressing the button on the main/home page displays the Station Status screen. Each receiver station is identified by an 8 character text display. To make changes to the station name, press the station identity number located above each receiver. A touch screen key pad will appear, allowing new settings to be entered. If the proper level of password protection has not been entered prior to attempting changes, the password entry keypad will appear, prompting the user to input the proper password before changes to the names can be made.

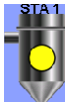
This screen provides a status display of receiver stations and permits the enabling (turn on) or disabling (turn off) of receivers. The enabling of a receiver permits it to be automatically included in the conveying system whenever it expresses a demand for material. A receiver may be enabled or disabled at any time. If a receiver is in a fill cycle when it is disabled, the cycle will continue to completion.

Receiver Station status indications are:

OFF – This empty, non-detailed icon indicates that the receiver is disabled – no material will convey to it.

ENABLED – This icon indicates that the receiver is enabled – and material will be conveyed to it if the material level switch below it is not satisfied, its vacuum pump is enabled and not faulted.

DISABLED in the middle of a fill or dump cycle – The red dot will appear to give the operator visual feedback that this station has been toggled from ENABLED to DISABLED. The fill and dump cycle icons will continue to show the status of the station receiver with the red dot present. When the dump cycle is complete, the icon will change to OFF (see above).



DEMAND– The Receiver is enabled, not yet in the fill cycle, but the level switch is calling for material. This receiver is placed in its pump's FIFO queue and will fill when its vacuum pump becomes available.

VIRGIN - The receiver is in the loading material portion of the fill cycle. If proportioning is employed on this station, this phase of operation will typically be alternated between VIR (virgin – white layer) and REG (regrind – black layer) loading. If proportioning is not employed, then VIR (white layer) will be the only indication of loading. The station T valve is open and the material source valve (if employed) is energized

open, permitting material to be conveyed to the vacuum chamber.

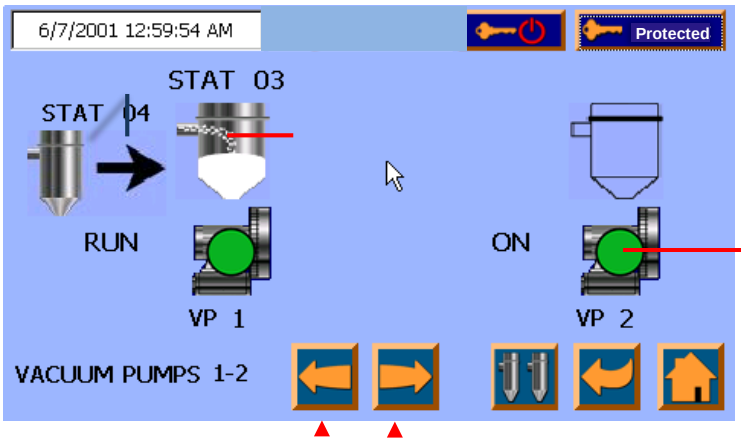
REGRIND – The receiver is enabled and is in the loading regrind material portion of the fill cycle. The station T valve is open and the proportioning valve is energized to draw regrind material, typically from a source near the receiver, like a granulator. The proportioning valve air piping should be configured to pull regrind from the upper material inlet (see Section 7.1.8).

PURGE – The Receiver is in purge portion of the fill cycle. The station T valve is still open, supplying vacuum to the receiver, but the material source (purge) valve is closed to material flow. Air continues to flow from the material source, allowing the conveying line to be purged free of any remaining material.

DUMP – The Receiver is in the dump/discharge portion of the fill cycle. The station T valve has closed, removing vacuum from the hopper and allowing the pump to service the next receiver in its queue. The material that was conveyed into the receiver now discharges by gravity into the molding machine, bulk bin or drying hopper.

ALARM – The receiver has gone through the fill cycle, without satisfying the material demand switch or sensor, a consecutive number of times equal to or greater than the no load alarm set point.

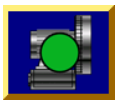
Vacuum Pump Status Screen



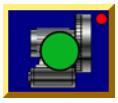
Pressing the  button on the main/home page displays the Vacuum Pump Status Screen. This overview status screen displays up to 2 Vacuum Pumps, their current operational status and up to two receivers for each displayed pump; the one being serviced (directly above the pump icon) and the next one in the FIFO queue, to the left of an arrow. See section 9.5 for a detailed explanation of the receiver functions shown on this screen. This screen assists in assessing system operation.

Pump Status Indications:

This button indicates the vacuum pump is DISABLED. Press it to toggle the vacuum pump to ENABLED. When a vacuum pump is DISABLED, no new stations will be added to its FIFO queue to be serviced to receive material.



This button indicates the vacuum pump is ENABLED. Press it to toggle the vacuum pump to DISABLED. A Vacuum Pump must be ENABLED to service loading stations and convey material.

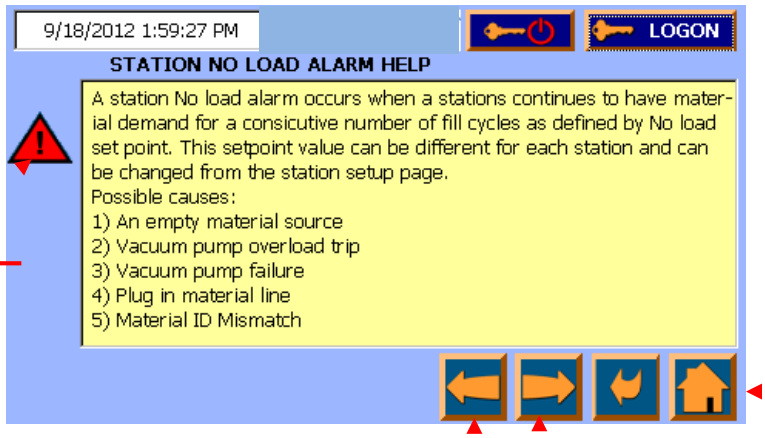


The red dot indicates that the vacuum pump has been DISABLED, but is still operating and servicing all of the receivers in its FIFO queue. Once they are done loading, the vacuum pump will go to seek and then to DISABLED.

The Vacuum Pump is in SEEK mode. There are no stations connected to it requiring material. The vacuum pump will continue to run until the seek timer counts down to zero, then shut down, but remain enabled. The vacuum pump will immediately exit seek mode if a connected station requires material.

ALARM – The starter on the Vacuum Pump has indicated a fault, IE: overload.

Help Screen



Helpful graphics where appropriate.

Return to Home Screen.

Press the arrow buttons , to show the PREVIOUS or NEXT Help topic screen

Pressing the  button the home page brings up a series of HELP screens to assist the user in understanding some of the more commonly used icons and setup parameters.

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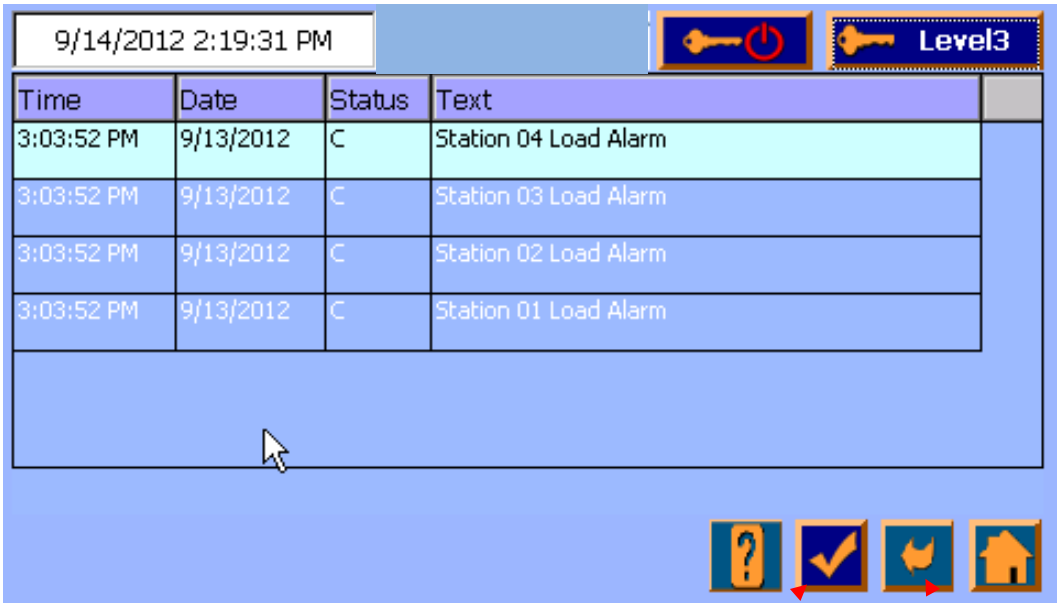
Alarm History



Acknowledge highlighted alarm message and silence audible alarm.

Return to previously viewed screen

Pressing the  button on the home page brings up the ALARM HISTORY screen, which displays a sequential list of alarms that have occurred in the conveying system. Shown above are sample alarm messages accompanied by date, time and status.

Alarm STATUS and working with Alarm messages:

ALARM STATUS CODES:
C = Current Alarm
CA = Current Alarm Acknowledged
CD = Alarm Condition Cleared but Not Acknowledged

DELETING ALARMS:
Alarms are permanently deleted from the Alarm History when the alarm condition is no longer active (cleared), and the Alarm is Acknowledged.

There is also an Alarm Silence/Clear Button located on the faceplate of the control panel enclosure.

10 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 to ensure that depressurization has occurred.
- ❑ Un-insulated dryer, hopper, and heater surfaces may be in excess of 150°F during heating. Allow the system to cool completely before beginning repair work.
- ❑ Do not disable or bypass equipment safety features.
- ❑ Refer to system component manuals for additional information.
- ❑ To prevent equipment malfunction and improper material delivery, do not manually force actuated valves (i.e. station T valves, purge valves, Proportioning Valves, etc.) to the open or closed position during system operation.

⚠ 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.

10.1 At Startup

- ❑ Verify station and VP settings.
- ❑ Record equipment Serial Numbers and the FlexTouch Controller program revision level.

10.2 Monthly

- ❑ Check system for vacuum air leaks or flow obstructions and correct as required.

10.3 Every 3 Months

- ❑ Check all electrical connections to make sure that they have not become loose, especially those connections at contactors, like motor starters.

11 REMOTE CONTROL ACCESS, NETWORKING AND HMI SETUP

The FTS Control, when equipped with the HMI-HD-ColorNet option, is able to communicate with a number of remote external devices. Accessing the FTS from 3rd party devices using an internet browser or remote desktop application provides remote monitoring and control capabilities.

All communications are accomplished through a hard wired Ethernet cable network, utilizing Industrial Ethernet protocol. Local wireless access can be created through customer installed wireless router near the FTS panel installation. Remote wireless access can be created through interface with customer corporate network.

Connecting FTS to a Corporate Network

11.1.1 Network Physical Layer

DO NOT utilize a corporate network as the physical layer (cables and routers) to connect a Novatec Control to its peripheral devices and remote I/O panels, or to connect it to other Novatec equipment and central controls. Corporate networks should access the Novatec control network via branch connection for communication purposes only.

WARNING: Failure to follow these instructions may prevent normal and safe operation of installed controls and their equipment.

11.1.2 Prior to Connecting

The customer should review and resolve all IP address conflicts PRIOR TO CONNECTING a corporate network to a Novatec control network. See Sections 11.1.3 and 11.1.4.

11.1.3 Network IP Addresses

Novatec utilizes fixed addressing scheme for its control networking topology.

IP Addresses: 192.168.1.2 (PLC)
192.168.1.3 (HMI)
Subnet Mask: 255.255.255.0

11.1.4 Network IP Address Conflicts

Novatec is not responsible for IP address conflicts that occur between its standard topology scheme and connected corporate networks.

WARNING: IP address conflicts may cause communication faults that prevent normal and safe operation of installed controls and their equipment.

If required, the HMI Subnet Mask pair stored in the FTS-HMI Setup Utility can be modified to create compatibility with the customer network (see Section 11.3 for HMI Setup instructions).

- NOTE: A router (not included) may be required for the PLC and HMI on the Novatec control network (192.168.1.X) to be visible on the customer network, depending on the IP address and mask used on the customer system. Have your network administrator contact Novatec Service for additional assistance.

Remote Access to HMI via Corporate or Wireless Network

If permitted, a wireless router can be connected to the FTS control network to provide remote access. The FTS can also be connected to a corporate network as outlined in section 11.1. When the FTS has been successfully connected to an accessible network, a remote device may be used to remotely control the HMI as follows:

11.1.5 Connect wireless Smart Device to the FTS accessible network

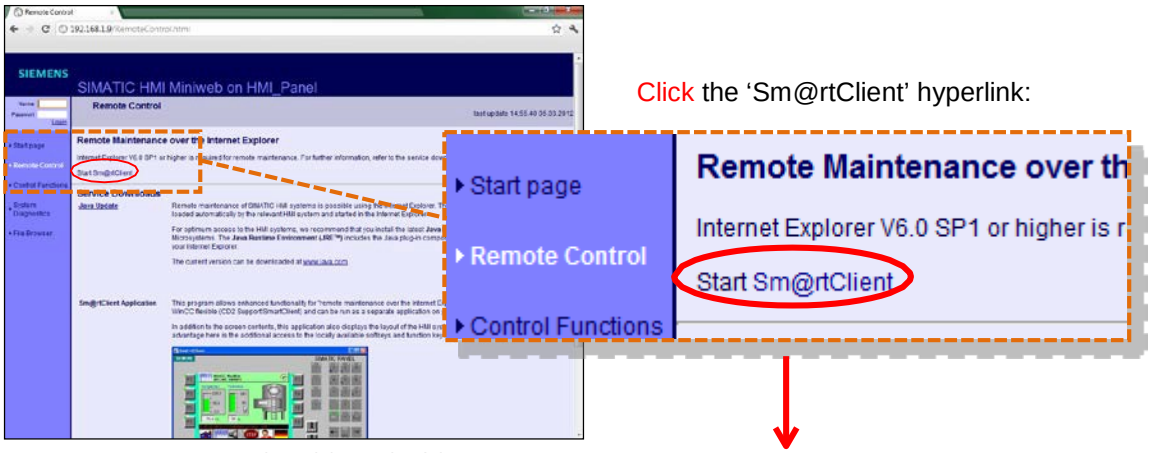
Open PocketCloud App (or similar VNC App) on Smart Device and add a manual connection link. Use FTS IP Address 192.168.1.3 to access the HMI remotely. Use '100' for password when prompted.

11.1.6 Connect PC to the FTS accessible network

Open Internet Explorer browser and enter FTS IP Address 192.168.1.3 to access the HMI remotely. When connection to the HMI is established, the following utility screen will appear (note: a JAVA browser plug-in update or installation may be required during the connection process):

Click the 'Remote Control' hyperlink:

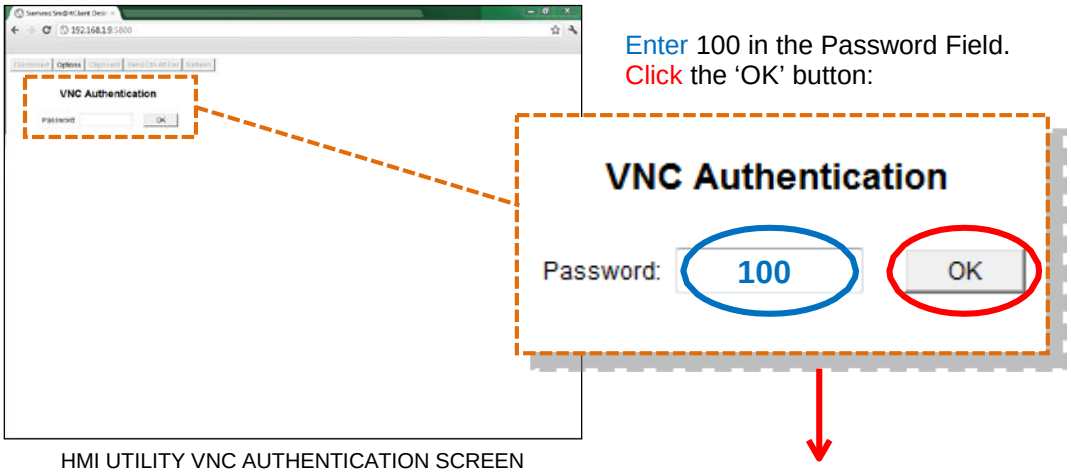
HMI UTILITY START SCREEN
IN BROWSER WINDOW



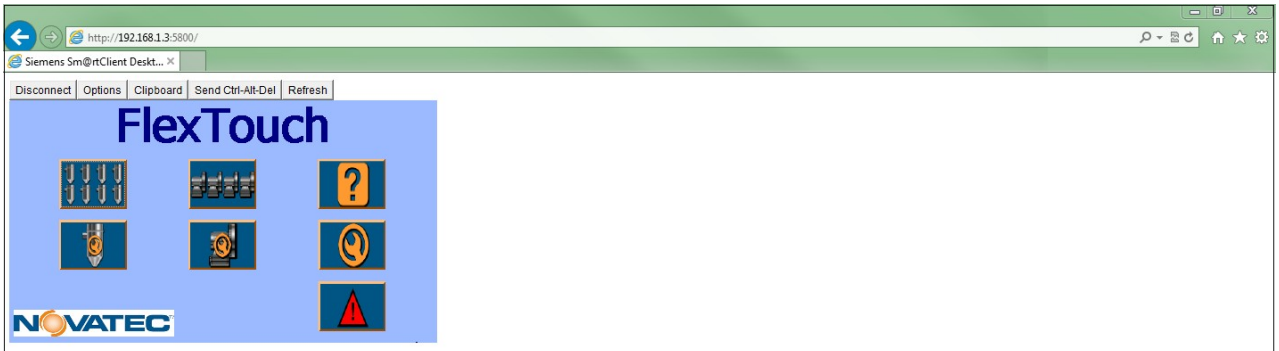
Click the 'Sm@rtClient' hyperlink:

HMI UTILITY REMOTE CONTROL SCREEN
IN BROWSER WINDOW

11.2.2 – 11.2.2 Connect PC to the FTS accessible network (cont.'d)



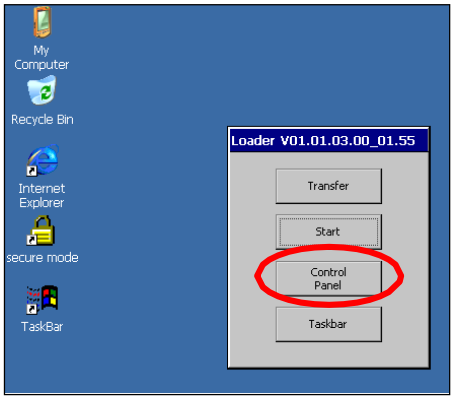
HMI UTILITY VNC AUTHENTICATION SCREEN
IN BROWSER WINDOW



FTS HMI (4") SCREEN IN BROWSER WINDOW

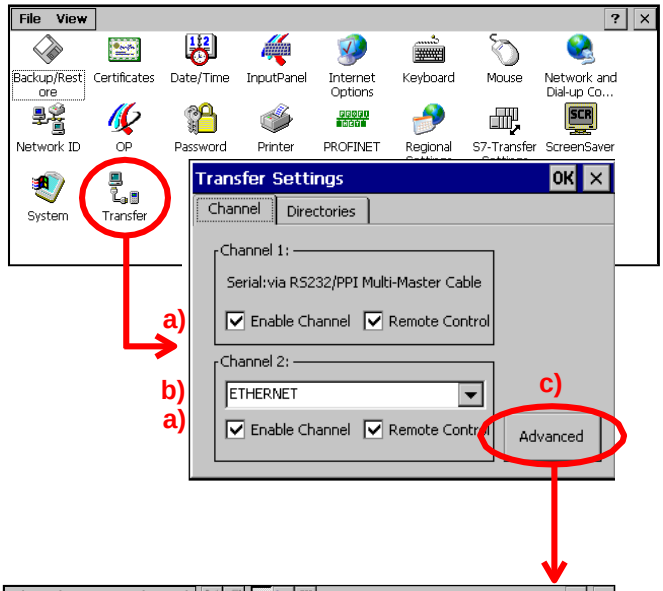
11.1.7 Accessing the HMI Operating System Utility

Power up the FTS control. During HMI boot sequence (approximately 20 – 40 seconds), the operating system 'desktop' screen appears for approximately 5 seconds. Press or click the CONTROL PANEL button.

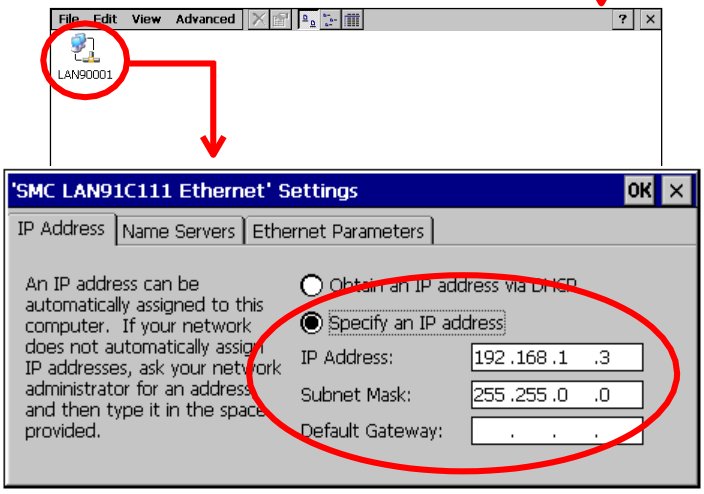


11.1.8 HMI Setup: Remote Access and Subnet Mask / IP Address

1. At the HMI Control Panel screen, double press or click the TRANSFER button. In the Transfer Settings dialog box:
   a. Verify 'Enable Channel' and 'Remote Control' boxes are checked for Channel 2.
   b. Verify Channel 2 pull down selection is set to ETHERNET.
   c. Press or click the 'ADVANCED' button.



2. At the Advanced Transfer Settings screen, double click (press) the LAN9001 button. In the Ethernet Settings dialog box, click or press the 'Specify an IP address' radio button and set the Subnet Mask to permit access from your corporate network.



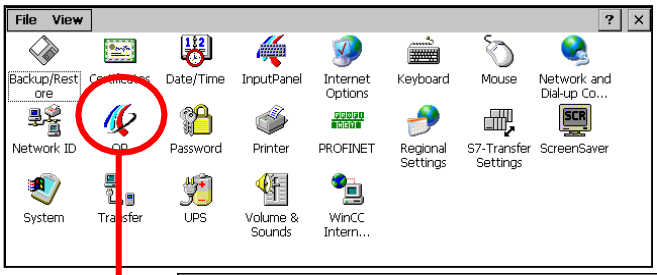
NOTES:

a) Do not change the HMI IP Address. Loss of communication with the PLC will result.

b) If IP Address conflicts exist between the Novatec Network and the corporate network, or their IP address schemes do not permit direct communication, a managed router will be needed to bridge the networks.

11.1.9 HMI Setup: Brightness and Touch Calibration

At the HMI Control Panel screen, double click or press the OP button. (see Section 11.3.1 for instructions to access the HMI Control Panel screen)

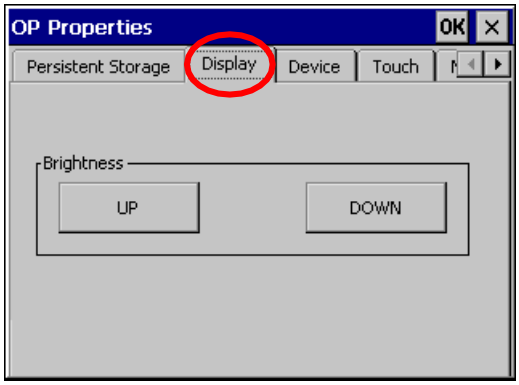


BRIGHTNESS

In the OP Properties dialog box, click or press the 'Display' tab.

Click or press the Brightness UP and DOWN buttons to adjust display appearance for ambient lighting conditions.

Click or press the OK button to close the OP Properties dialog box.

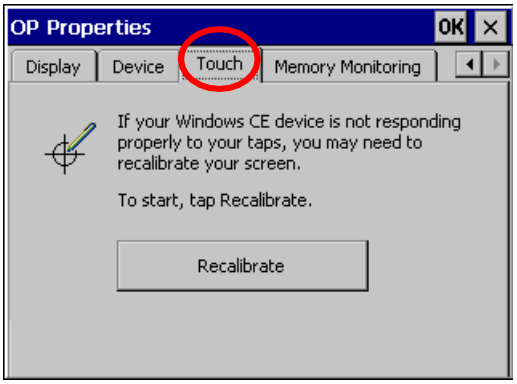


TOUCH CALIBRATION

In the OP Properties dialog box, click or press the 'TOUCH' tab.

Click or press the RECALIBRATE button and follow the on-screen prompts to sync the screen reaction to user touch taps.

Click or press the OK button to close the OP Properties dialog box.



12 WARRANTY – NOVATEC, INC. - Effective Date 7 FEB 2018

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 (Except 1-Year on Non-Novatec Buy-Out Items

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 *
Nitrogen NovaDriers (Nitro)
DryTemp Plus

Central System Controls to Include

FlexTouch™ Series Controls
FlexXpand™ Series Controls
OptiFlex™ Series Controls
PLC Communications Modules
Greenboard Communications Modules
LOGO! Mini PLC
MCS-600 Series Controls – (Distributed I/O)
MCS-400 Series Controls
CL Silo Manager

Moisture Measurement Equipment to Include

MoistureMaster®

PET Resin Crystallizers

Resin Blending and Feeding to Include

WSB Blenders, MaxiBatch & Feeders *
Gaylord Sweeper Systems

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

Resin Conveying and Systems Components to Include

GSL Series Vacuum Loaders
GlassVu Loaders,
Receivers and Hoppers
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
Velocity Control Valves

3-Year

Resin Conveying System Components to Include

** VPDB Vacuum Positive Displacement Pumps
** SVP Vacuum Pumps
** MVP Vacuum Pumps
** Railcar Unloading Systems

****5-Year Extended Warranty** - When a MachineSense® data plan is activated for products with **, Novatec automatically extends the warranty to 5 years. The data plan must be activated within 60 days after product 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.

1-Year

Infrared Dryers
UltraVac Vacuum Pumps
Vacuum Regenerative Blower Pumps
Custom Equipment of any kind unless otherwise specified

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 and NovaDrier Nitrogen (NITRO) 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. Velocity Control Valve warranty is voided if unit is placed in direct material flow.

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.

13 APPENDIX 1 – CONVEYING SYSTEM TROUBLESHOOTING

13.1 System Component Operation Details

1. VACUUM T VALVE OPERATION

Each vacuum receiver in the conveying system is coupled to a vacuum "T" valve that isolates the vacuum conveying power of the pump to one receiver at a time for conveying. Each T valve in the system must close off air flow when it is NOT in operation, allowing other receivers to receive full vacuum. One 'stuck' valve can ruin the vacuum supply for the entire system. Check that each valve operates in response to its receiver's turn in the vacuum system. Each valve should open for loading and close when loading is complete. The extended shaft of the valve's cylinder is a good indication of valve operation.

***Rule of thumb**: If only one receiver in the system is conveying correctly, it is probably that receiver's T valve that is not closing properly.*

2. RECEIVER DISCHARGE FLAPPER STUCK OPEN

The flapper valve at the base of the receiver provides three critical functions:

- Seal off the base of the receiver, creating a sealed vacuum chamber and allowing it to load,
- Open reliably to allow material to empty out and
- Signal the conveying control system of the need for more material (when it swings shut, by its own weight).

If the flapper valve is stuck open or does not fully close, conveying cannot take place. A problem receiver can be easily checked for proper, free movement of its flapper valve:

- If conveying is not triggered when the flapped is closed, there is an issue with the electrical demand switch.
- If the flapper does not swing nearly shut by its own weight, there is a pivot point (hinge) or counterweight issue.
- If the flapper is 'stuck' in the open position, there is a material contamination issue with the pivot point (hinge) of the valve and it must be cleaned and examined for wear. Contamination of the hinge is typically caused by material, finding its way into the pivot point, but in older receivers, may also be a metal burr that has formed from age.

3. RECEIVER INLET CHECK VALVE STUCK OPEN

Many receivers are equipped with swinging check valves on their material inlets. Check valves provide a variety of useful functions for system operation and are pushed open when material is conveyed into the receiver. But on systems that convey material from one source to multiple receivers, each check valve in the system must seal to allow the one receiver being loaded to receive the full vacuum force from the conveying pump. A check valve that is stuck open, either by hinge wear or a trapped pellet, will leak valuable vacuum air through that receiver while others try to fill. This decreases vacuum air at the source which can prevent conveying throughout the system. If the leakage is severe, material can even be pulled from the leaking receiver and delivered to another receiver.

***Rule of thumb:** On systems that convey material from one source to multiple receivers via a common material line; If only one receiver in the system conveys correctly, it is probably that receiver's check valve that is not closing properly.*

4. CONVEYING CONTROLS NOT PROPERLY (RE) PROGRAMMED

Central material conveying systems that include a network of pumps, receivers and material sources provide high efficiency and a multitude of flexibility. But often, new requirements are not completely programmed after material or system configuration changes. Items to check:

- Is the new material source further away than the previous source? More conveying time and/or purge time might be required to accommodate this difference in distance.

- Is the new material as free-flowing as the last material? Does the material have a tendency to clog the conveying lines, or simply convey slower due to weight or shape? Changes to load/purge times as well as material pick-up tube changes may be required.
- Has the receiver been assigned to the proper vacuum pump? The proper material valve?
- Has system piping and or wiring been modified to accommodate this new configuration for conveying?

5. VACCUM PUMP - VACUUM BREAKER VALVE OPERATION

Located on the central vacuum pump of the system, the vacuum breaker valve allows ambient air to be drawn into the pump when the conveying system is NOT conveying. This function prevents rapid re-starts and stops of the pump during the “seek” time of the loading control, cools the pump and prevents the over loads in the pump starter from over heating. But the pneumatically-operated breaker valve must close and seal when the vacuum system is conveying material, directing all vacuum force to the job of conveying. Check the following:

- The valve is connected to a reliable source of clean compressed air, which is turned on. Air pressure should be 85-120 psi.
- The valve must not be leaking vacuum air. Often a sucking sound can be heard, indicating the valve is not sealing properly.
- View the level of vacuum created by the pump on its vacuum gage while attempting to convey material: Although the reading on this gauge will vary greatly depending upon your system configuration, it is a valuable tool for assessing system operation and discovering faults. Vacuum levels below 6” indicate a breaker valve fault or other problems in the vacuum system.

6. YOUR MATERIAL SOURCE

Common bulk box issues are:

- Rat-holing: The feed tube has sucked up all the free-flowing material around its pick-up end and the material must now be stirred to allow material to flow into the feed tube again. A Gaylord tilter may be helpful in this situation.
- Bag liner line plugging: The feed tube has sucked in the thin film lining of the bulk box, blocking off material flow to the receiver.
- Feed tube fell out of the box: By weight of its own hose, or by vibration of the flex hose while conveying.
- Out of material: Time to move in a new bulk box.

Common material selection issues:

- Conveying line connected to the wrong source of material.
- Wrong purge valve selected: If a purge valve is used at the material source, it must be programmed by the system control to operate in conjunction with a specific receiver. Material changes require making a new valve selection at the system control.
- Purge valve is not operating: If a purge valve is used at the material source, it must be energized to allow material loading (and de-energized for purging). A fault at this valve, IE: lost compressed air connection, an open purge valve access door or a material jammed purge valve will prevent material movement.

7. FEED TUBE / TAKE-AWAY BOX AIR SETTINGS

The conveying of material by air cannot be accomplished without air movement. Regardless of the type of pickup device being used; purge valve, wand, take-off box, etc.… these devices must be adjusted to allow the introduction of material and air, in a mixture suitable for conveying the specific material the distance required. Typically, the probe should be at least 50% open to avoid plugging the material line.

13.2 System Control Operation – Station Conveying Timer Setup

Once the timers are set to give the maximum amount of material, per load, in the vacuum chamber without overfilling it, they should not be changed.

Exceptions: When going from a source farther from the point of usage to a source nearer the point of usage. (Or vise versa) Load time will be changed accordingly. For Purge systems, the Purge time will change but the Load time may not change.
(Increase or decrease accordingly)

13.3 Basic Startup / Troubleshooting Checklist - Receiver

1) Is the station turned on? Verify at the controller.
2) Is the Vacuum line physically attached to this station?
3) If using source valves, is the proper valve is assigned to this station? (Station Source Assignment)
4) Is the source valve opening and closing properly?
5) Check the air probe at the source – is it at least 50% open. The system cannot move material without air mixed in with the material flow.
   - If the material line plugs when no leaks are present and the probe air adjustment is 100% open, partially close the hopper slide gate to limit material flow into the conveying line.
6) Are there holes or breaks in any material or vacuum hoses?
7) Is the material flowing freely from the source?
   - Is it clogged in the hopper or receiver discharge?
   - Is the material source empty or full?
   - Is material clogged in the line?
8) Is the receiver flapper sealing properly against the discharge tube? Is the gasket installed (5” dump throat only)?

13.4 Basic Startup / Troubleshooting Checklist - Vacuum Pump

1) Check direction of rotation of the pump motor.
2) Check amperage draws; check continuity of legs on the motor.
3) Check belts for wear and tear.
4) Check blower for wear and tear. Check for any bearing play.
5) Check oil level in the blower. Replace if necessary per PM instructions.
6) To check vacuum in the system:
   a) Remove vacuum line from inlet to the cyclone.
   b) Cap off the cyclone inlet (use duct tape, or simply cover it with a rigid, flat object (wood, sheet metal, etc.).
   c) Manually start the pump by pushing in the motor starter. The high vacuum relief should open. This will let you know the pump is sealed properly. The vacuum gauge should go to maximum inches HG for the pump (see pump instruction manual).
      - If the vacuum relief doesn’t open, there is an air leak at the pump. Check the seal on the dump can on the cyclone, the filter housing lid seal at the pump, the vacuum breaker valve, (verify it has air 85 to 100 psi), and all piping connections.
   d) If the relief valve opens, reconnect the vacuum line to the system and perform the same check. If the relief valve opens, the system is sealed and all station vacuum valves are closed.
      - If the valve doesn’t open, you have a vacuum leak and the system has to be checked for any open lines, station valves open, or no air to the station vacuum valves.
7) Check the vacuum while the system is conveying material. The pump vacuum gauge should read between 4” Hg vacuum up 1” Hg less than the pump relief point. Typically, vacuum<4” Hg indicates a vacuum leak or no movement of material. Vacuum >relief point means the line is clogged:
   - Too much material is in the conveying line without the proper air mixture.
   - Stations are being overfilled.
   - The filter on the vacuum chamber or at the pump may be clogged.
   - The station vacuum valve may not be opening.