

## Vacuum & Pressure RailCar Unloader (RCU)

Models:

*RCU-4D4D-2525(-57), RCU-4P4D-2525(-57),  
RCU-4D4P-2525(-57), RCU-4P4P-2525(-57)*



**NOVATEC**<sup>TM</sup>  
Part of the **MAGUIRE** Family

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Instruction Manual: RCU-4X4X-2525 IM 21 MAY 2018

Model #: \_\_\_\_\_

Serial #: \_\_\_\_\_

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## 1.) INTRODUCTION

NOVATEC, INC. RCU Series is a Rail Car Unloader for pellets incorporating dual positive displacement blowers to produce both the vacuum and pressure conveying airflow. The blower is driven by 3-phase motors through v-belt drive systems. The unit comes complete with a rotary feeder, cyclone, surge hopper, high material level bin switch for the surge hopper, high pressure switch, high vacuum switch, pressure relief valve, vacuum relief valve, pressure gauge, vacuum gauge, secondary dual stage filter, silencer, and complete controls for automatic operation; all mounted to a common structural base. The control package is completely programmed at the factory for full automatic operation. The control package includes all motor starters, a control voltage transformer, indicator lights, push buttons, alarm horn, and fused disconnect switch; all mounted in a NEMA 4 enclosure.

The push buttons and switches include the following: emergency stop, load silo select switch, start loading, stop loading, horn silencer, vacuum/pressure blower and heat exchanger motor override, and feeder motor manual override.

Indicator lights include: power, vacuum blower, pressure blower, feeder motor, high vacuum, high pressure, surge hopper, high level, purge, and one for each silo high level as required for the application.

## 2.) WARNING

Always disconnect power before servicing. Only qualified technicians should service, maintain, or repair the Vacuum/Pressure Conveyor. Before using this equipment, read in detail the product bulletins and other information found in this manual. A safe installation is necessary before operating the equipment. The instructions should be understood and followed before installing or operating the equipment.

### 3.) PRINCIPLE OF OPERATION

Pellets are drawn under vacuum from a pickup point through a tubing/elbow/hose system to a cyclone unit inlet on the Vacuum/Pressure Conveyor. The cyclone discharges the material into the surge hopper while the air proceeds out of the top of the cyclone. The vacuum conveying air passes through a dual stage secondary filter. The secondary filter uses a cyclonic action to remove most of the “carryover” (dust fines, and a few pellets) from the air and deposits this carryover into a removable catch pan which is held to the secondary filter by a ring clamp. The air continues through the cartridge filter element, which removes all particles of dust larger than 1 micron (99.9% efficiency) and exits the secondary filter.

High pressure conveying air leaves the pressure blower and passes through a heavy duty, high sound attention silencer. The pressurized air continues through a check valve to the feeder adapter, which is mounted to the bottom of the rotary feeder. The rotary feeder motor speed can be adjusted from 30-60Hz for the proper material feed.

Pellets from the surge hopper enter the rotary feeder at the top and exit at the bottom dropping into the feeder adapter. The high pressure conveying air entering the feeder adapter picks up the pellets and conveys them into the silo.

The rotary feeder is driven by a 3-phase motor and gear drive. It continuously turns during the loading operation to feed pellets collected from the vacuum side to the high pressure conveying air.

Should the surge hopper become full, a high material level switch mounted to its side detects this condition and signals the controller to open the vacuum break valve to stop loading until the material level falls.

A high vacuum switch detects if the system exceeds its maximum operating vacuum level. If high vacuum is detected the alarm horn will sound, and stop-loading sequence will automatically begin.

A high-pressure switch detects if the system exceeds its maximum operating pressure level. If high pressure is detected the alarm horn will sound, and the system will automatically stop without going through the stop loading sequence.

A mechanical vacuum relief valve and mechanical pressure relief valve are provided as a safety. They will automatically open if the maximum vacuum or pressure conditions are exceeded in order to avoid to the positive displacement blower.

## 4.) OPERATION LIMITATIONS

### 4.1) *Operating at Higher Altitudes...3000FT Above Sea Level or More*

Atmospheric pressure is lower at higher elevations and, as a result, the compression of air by the pump requires more work for vacuum conveying. In these higher altitude applications, the pressure and vacuum relief valves of the RCU will need to be replaced with the appropriate units to prevent the pump from damaging itself or the motor by attempting to compress air of reduced density to an unsafe (vacuum) or inadequate (pressure) level.

Blower exhaust temperature and motor cooling are functions of both vacuum/pressure level and elevation. Vacuum Blower exhaust temperature must not exceed 300°F to avoid premature blower failure. Pressure Blower exhaust should be regulated with respect to material being conveyed; may require accessory Air-to-Air Heat Exchanger. Decreased motor full load amperage (FLA) limits may require alternate overload protection or increased frame size or motor horse power (HP).

*Failure to adjust the railcar unloader will void the unit warranty. When the end-use site is known, Novatec endeavors to pre-adjust the vacuum pump's performance at the factory to compensate for elevations above 3000 feet. Novatec then labels the vacuum relief valve accordingly. If your pump-use site is 3000 feet above sea level or more, and no indication of pre-adjustment is present on the pump assembly, please contact Novatec Engineering or the Novatec Service Department at the number on the front cover of this manual to get instructions for adjusting your RCU pump for use at elevations at 3000 feet or more above sea level.*

### 4.2.) *Purge Time*

Clearing out the conveying lines on a railcar unloading system is important to the efficiency of the system and the quality of the material conveyed. Leaving material in an outdoor conveying line will leave the system prone to line plug generation for the next silo load cycle, and the material exposure to environmental temperature/seasonal changes and to moisture accumulation. Purge Time is a control parameter that allows you to set a period of time following a loading cycle to clear out the pressure material line when finished conveying to a silo. This will activate once the silo high-level switch is reached, resulting in the opening of the vacuum breaker valve and the stopping of the material feed into the pressure line. Optimum Purge Time may be set dependent upon pump capacity, utilization, and pressure conveying distance.

## 5.) UNPACKAGING

Caution should be exercised when handling the equipment. The railcar unloading pump unit (RCU) is usually shipped completely assembled and required no further attention prior to installation. The railcar cyclone may have some assembly required depending on the size of the unit and how the unit is shipped. Note any shipping damage on delivery receipt and report immediately to trucking company.

## 6.) GENERAL INSPECTION

When the unit is unpacked, make a visual inspection looking for missing parts or damage that may have occurred during shipment. Report any missing parts to Novatec, Inc. immediately. All electrical and mechanical connections should be checked for tightness, as vibration during transit may cause them to loosen. Inside the control box is a set of electrical and assembly drawings for reference.

**IMPORTANT:** Before placing the vacuum pump into service, be sure oil has been put in the pump, as oil may have been drained following factory quality control testing. See section 13 for lubrication guidelines.

*Replacement blowers are shipped without oil.*

## 7.) ENGINEERING DATA & SPECIFICATIONS

### 7.1) Application Drawings and Information:

<b>Assembly Model</b>	RCU-4D4D-2525	RCU-4D4P-2525	RCU-4P4D-2525	RCU-4P4P-2525
	RCC12-4D4D	RCC12-4D4P	RCC12-4P4D	RCC12-4P4P
<b>Electrical</b>	CNTL-RCU-2525			

### 7.2) Specifications:

<b>Horse Power (HP), Vacuum/ Pressure</b>	25/25HP			
<b>Flow Rate (CFM), Vacuum/ Pressure</b>	500/425 CFM	500/535 CFM	580/425 CFM	580/535 CFM
<b>Line Size, Vacuum/ Pressure</b>	4.0" OD/4.0" OD	4.0" OD/4.0" Pipe	4.0" Pipe/4.0" OD	4.0" Pipe/4.0" Pipe
<b>Max Vacuum</b>	12"Hg			
<b>Vacuum Relief</b>	13"Hg			
<b>Max Pressure</b>	6psig			
<b>Pressure Relief</b>	8psig			
<b>Feeder Motor HP (460V)</b>	1HP			
<b>Feeder Motor HP (575V)</b>	1.5HP			
<b>Max Number of Silos</b>	8			

**NOTE:** For dimensional information, please see the associated assembly drawings.

### 7.3) Utilities (460V):

<b>Electrical</b>	460V/3Ph/60Hz
<b>Air</b>	N/A
<b>Total Connected Amperage</b>	64.0A
<b>Total kVA</b>	51.0A
<b>Pressure Blower Motor FLA</b>	31.0A
<b>Vacuum Blower Motor FLA</b>	31.0A
<b>Feeder Motor FLA</b>	1.5A
<b>Vacuum Breaker Valve (VBV) Compressed Air</b>	80-120psig

**NOTE:** Standard control voltage: 24VDC. Optional 115VAC for silo accessories.

### 7.4) Alternate Utilities (575V)

<b>Electrical</b>	575V/3Ph/60Hz
<b>Air</b>	N/A
<b>Total Connected Amperage</b>	51.7A
<b>Total kVA</b>	51.5kVA
<b>Pressure Blower Motor FLA</b>	24.0A
<b>Vacuum Blower Motor FLA</b>	24.0A
<b>Feeder Motor FLA</b>	1.9A
<b>Vacuum Breaker Valve (VBV) Compressed Air</b>	80-120psig

**NOTE:** Standard control voltage: 24VDC. Optional 115VAC for silo accessories.

## 8.) MECHANICAL INSTALLATION

Place the unit on a level/flat base with the inlet and outlet ducts conveniently positioned for conveying. It is preferable that the installation site offer some protection from inclement weather. Both the vacuum and pressure lines must be airtight; using tubing, elbows, and hose as required. Install the conveying lines using straight sections wherever possible to keep the number on elbows to a minimum. Position the lines horizontally and/or vertically with no slope. Install hose clamps, quick connect couplers, or bolted couplers at all junctions as required. Use tubing or pipe that is the same size as that for which conveyor was designed. Smaller or larger lines will at the very least affect performance, and in some cases, make it impossible to convey material.

Assemble components that may have been dismantled for shipping according to the assembly drawing. Seal all flange connections using suitable gasket or sealant silicon caulking or silicon sealant as recommended.

Do not connect the inlet and outlet of the Rail Car Unloader to the conveying lines at this time. Leave them disconnected until after the initial start-up procedure and “dry” run through the Sequence of Operation is successfully completed. Carefully tighten every nut, bolt and electrical connection. Vibration during shipping may have loosened them. Every connection needs to be checked. Check all connections before beginning the initial start-up procedure.

## 9.) UTILITIES CONNECTIONS

### *9.1) Electrical Installation*

Only qualified technicians familiar with local and national codes should install the equipment. Connect the proper power supply (check nameplate) through a main line disconnect (field supplied unless included with the control unit) to terminal connections L1, L2, L3 and ground inside the control cabinet. The conveyor must be grounded for safety reasons and for reliable operation of the solid-state controls. Attach the earth ground to one of the panel-mounting studs or to another acceptable location. Observe all local and national building codes and practices as required. In addition, follow and adhere to all local and national electrical codes.

Field wiring to a material high-level switch for each silo is required. Refer to the electrical schematic for specific wire numbers and information. See the (Engineering Data Sheet) for the drawing number. Copies of the electrical schematic are also included with this manual. Special order options may also require additional field wiring or installation. This information is indicated on the electrical or mechanical assembly drawings for each application.

### *9.2) Compressed Air Installation*

Connect 80-120psig compressed air to the vacuum break valve solenoid. A filter (not supplied) should be provided if the cleanliness of the air is questionable.

## 10.) FIELD ADJUSTMENT & PROGRAMMING OF EQUIPMENT

All the vacuum and pressure switches for the Vacuum/Pressure Conveyor are adjusted at the factory; therefore, field adjustment normally is not necessary. The controls are also fully programmed, so no field programming is necessary.

The purge timer is preset for 60 seconds.



## 11.) INITIAL START-UP PROCEDURE

1. Do not connect the inlet and outlet lines to the Rail Car Unloader until after the initial start-up procedure is completed and a “dry” run made through the Sequence of Operation.
2. After checking the electrical connections, and connecting the proper power supply, move the handle for the fused disconnect switch to the “On” position. The “Power” pilot light should come on
3. Verify that the “Emergency Stop” push button is pulled out. Note that this push button contains a light that is “ON” when the “Emergency Stop” is pushed in, which is the “stopped” or “OFF” position.
4. Rotate the “Load Silo” selector switch to any silo position that does not have a “Silo High Level” light on.
5. Press and hold the “Manual Feeder” push button to verify that the feeder rotating in the direction shown by the arrow attached to the feeder housing. The direction of rotation label is on the feeder housing. When the push button is released the feeder will stop. If the feeder is rotating backwards turn the power to the Rail Car Unloader completely off and switch any two of the three incoming power supply lines. Verify that the feeder motor is not exceeding its full load nameplate amperage.
6. Press and hold in the “Manual Vacuum Blower” push button to verify rotation of the vacuum blower. Press and hold in the “Manual Pressure Blower” push button to verify rotation of the pressure blower and heat exchanger fan following generally the same rotation as outlines above with the exception that if the feeder rotation has been correctly established above, two of the three blower motor leads should be switched at the motor starter. Shut off power to the Rail Car Unloader completely before switching any high voltage control wiring. Verify that the blower motors are not exceeding their full load nameplate amperage.
7. After the correct feeder, blowers and fan rotation directions are established, proceed to the Sequence of Operation section in this manual. The inlet and outlet conveyor lines should remain disconnected until a “dry” run is made through the Sequence of Operation.

## 12.) RAILCAR CONNECTION & UNLOADING INSTRUCTIONS

1. With the pump off, remove the plastic caps from both the front and back of the railcar unloading port. These caps are provided by the resin manufacturer.
2. Install the take-off box vent on the FAR side of the railcar, and the railcar probe on the NEAR side. Attach the stainless-steel flex hose with cam-lock connections to the railcar probe and to the associated vacuum manifold port. Make sure the connections are tight, all other header positions are sealed, and that the railcar probe carburetor is open to allow air to enter.
3. Open the FAR side gate for initial unloading of the selected railcar. Start RCU and check vacuum. Adjust railcar probe carburetor until 10-12”Hg conveying vacuum and/or 5-6psig conveying pressure is achieved. The lower the vacuum/pressure, the lower the conveying rate. (Do not exceed conveying vacuum of 13” Hg or 8psig, for the mechanical relief safety valve will begin to actuate, hinder system performance, and damage the unit if ran in this condition continuously.)
4. As the FAR side compartment finishes emptying during the unloading process mentioned in the next section (Section 13: “Sequence of Operation”), open the NEAR side compartment completely to continue transferring material until the railcar is empty. Make sure conveying vacuum and/or pressure is still within designated limits.
5. Upon full material depletion, shut down the RCU unit and repeat on the next available railcar.

### 13.) SEQUENCE OF OPERATION

1. With power supplies to the Rail Car Unloader, the “Power” light should be in and the “Emergency Stop” push button pulled out.
2. Turn the “Load Silo” selector switch to the silo number that is to be loaded. (Make sure physical connection is made to silo if multiple silo system)
3. Press the “Start Loading” push button; the blower motor will start and the “blower” indicator light should also come on.
4. After the Start-up Feeder Delay Timer (30 sec) is complete, the feeder will start; the “Feeder” indicator light will come on. Adjust the feeder speed at the keypad of the feeder motor VFD. If the conveying lines are connected, material is drawn into the cyclone and then conveyed to the silo.
5. Press the “Stop Loading” push button to stop conveying. The vacuum blower will stop, thus halting vacuum conveying. The “Purge” indicator light will come on.
6. After the purge timer delay (60 sec) is complete, the Pressure Conveyor will stop. Both motors will be off.
7. If the surge hopper becomes full, the surge hopper high level switch will sense this condition. The “Surge Hopper High Level” light will come on and the Vacuum Breaker Valve (VBV) will open; stopping the vacuum conveying. When the material level in the surge hopper goes down, the vacuum blower will come on and the VBV will close to start vacuum conveying.
8. If a silo becomes full as detected by a silo high-level switch, the “Silo High Level” light for that silo will come on and the alarm horn will sound. Push the “Horn Silence” push button to turn off the alarm horn. The conveyor will automatically stop conveying following the same stop loading sequence, listed in step #5. Essentially, a silo high level condition causes the stop loading sequence to automatically begin.
9. If a high vacuum condition is detected by the high vacuum switch, the vacuum motor will stop, the “High Vacuum” light will come on, the alarm horn will sound, and the stop loading sequence listed in step #5 will automatically begin. After the Rail Car Unloader stops, the “High Vacuum” light will remain on until the system is reset by pushing the “Start Loading” push button.
10. If a high-pressure condition is detected by the high-pressure switch, the Rail Car Unloader will immediately shutdown. The alarm horn will sound and the “High Pressure” light will remain on until the system is reset by pushing the “Start Loading” push button.
11. If the “Emergency Stop” push button is pushed in, the conveyor will immediately stop. The light in the “Emergency Stop” push button is on when it is in the “Stopped” (off) position. It must be pulled out to turn the conveyor on.
12. With the emergency stop push button pulled out (on) and power supplied to the unit, the control package can be used as a silo level indicator panel when filling the silo from a truck. This feature is automatic and requires no further installation. The silo high material level switch for each silo will cause the “Silo High” indicator light to come on and the alarm horn to sound when silo is full. As before, the horn is silenced with the “Horn Silence” push button. A particular silo does not have to be selected with the “Load Silo” selector switch. Each “Silo High” sequence will automatically work independently.

## 14.) PARTS LIST

### 14.1) 460V, Standard

#### RCU-4D4D-2525 SERIES RAIL CAR UNLOADER, STANDARD, 460V (SUBJECT TO CHANGE WITHOUT NOTICE)

Description	QTY	Model			
		RCU-4D4D-2525	RCU-4D4P-2525	RCU-4P4D-2525	RCU-4P4P-2525
Blower, Pressure	1	PD-5MQ-HORZ-RHBD			
Blower, Vacuum	1	PD-6MQ-HORZ-RHTD			
High Pressure Switch	1	12138			
High Vacuum Switch	1	12139			
Motor, Pressure, 460/3/60	1	01918			
Motor, Vacuum, 460/3/60	1	01918			
Motor Starter Contactor, Pressure Blower	1	eCON40-S2-1			
Motor Starter Contactor, Vacuum Blower	1	eCON40-S2-1			
Motor Starter Overload, Pressure Blower	1	eOL12-50-S2			
Motor Starter Overload, Vacuum Blower	1	eOL12-50-S2			
Pressure Gauge, 0-15psig	1	04432			
Pressure Relied Valve, 8psig	1	04431			
Rotary Feeder, Airlock Assembly, 1HP, 460/3/60	1	05-0410			
Selector Switch, 12 Position	1	20177-018			
Siemens S7-1200 PLC	1	eio1410ac-s7			
Siemens S7-1200 PLC I/O Expansion	1	eiom1616-s7			
Surge Hopper High Level Switch, 24VDC	1	08175			
Transformer, 250V A	1	etrans-004			
Vacuum Breaker Valve	1	02046 (4" OD)	02046 (4" OD)	02046-P (4" Pipe)	02046-P (4" Pipe)
Vacuum Breaker Valve Solenoid, 24VDC	1	08238			
Vacuum Filter Element	1	11034			
Vacuum Gauge, 0-30"Hg	1	50011			
Vacuum Relief Valve, 13" Hg	1	vrv20-13			
VFD, Airlock Feeder	1	evfd1.5-abb350			
V-Belt, Pressure, BX69	3	05490			
V-Belt, Vacuum, BX69	3	05490			

**NOTE:** Parts shown are for standard RCU & RCC series units. Refer to special job drawings for custom unit information. For information on alternative airlock feeder sizes used, refer to: order, drawings, and/or the additional controls kit. Verify information on existing part before ordering and installing replacement. All information is subject to change without notice. For parts assistance, please contact the Novatec Sales Department.

14.2) 575V, Alternate

**RCU-4D4D-2525 SERIES RAIL CAR UNLOADER, ALTERNATE, 575V  
(SUBJECT TO CHANGE WITHOUT NOTICE)**

Description	QTY	Model			
		RCU-4D4D-2525-57	RCU-4D4P-2525-57	RCU-4P4D-2525-57	RCU-4P4P-2525-57
Blower, Pressure	1	PD-5MQ-HORZ-RHBD			
Blower, Vacuum	1	PD-6MQ-HORZ-RHTD			
High Pressure Switch	1	12138			
High Vacuum Switch	1	12139			
Motor, Pressure, 575/3/60	1	04201			
Motor, Vacuum, 575/3/60	1	04201			
Motor Starter Contactor, Pressure Blower	1	eCON32i-S0-11			
Motor Starter Contactor, Vacuum Blower	1	eCON32i-S0-11			
Motor Starter Overload, Pressure Blower	1	eOL10-40i-S0			
Motor Starter Overload, Vacuum Blower	1	eOL10-40i-S0			
Pressure Gauge, 0-15psig	1	04432			
Pressure Relied Valve, 8psig	1	04431			
Rotary Feeder, Airlock Assembly, 1.5HP, 575/3/60	1	14364			
Selector Switch, 12 Position	1	20177-018			
Siemens S7-1200 PLC	1	eio1410ac-s7			
Siemens S7-1200 PLC I/O Expansion	1	eiom1616-s7			
Surge Hopper High Level Switch, 24VDC	1	08175			
Transformer, 250V A	1	etrans-004			
Vacuum Breaker Valve	1	02046 (4" OD)	02046 (4" OD)	02046-P (4" Pipe)	02046-P (4" Pipe)
Vacuum Breaker Valve Solenoid, 24VDC	1	08238			
Vacuum Filter Element	1	11034			
Vacuum Gauge, 0-30"Hg	1	50011			
Vacuum Relief Valve, 13" Hg	1	vrv20-13			
VFD, Airlock Feeder	1	evfd2-abb550-600V			
V-Belt, Pressure, BX69	3	05490			
V-Belt, Vacuum, BX69	3	05490			

**NOTE:** Parts shown are for standard RCU & RCC series units. Refer to special job drawings for custom unit information. For information on alternative airlock feeder sizes used, refer to: order, drawings, and/or the additional controls kit. Verify information on existing part before ordering and installing replacement. All information is subject to change without notice. For parts assistance, please contact the Novatec Sales Department.

## 15.) MAINTENANCE & INSPECTION SCHEDULE

It is recommended that maintenance and inspection is done on a scheduled basis. Maintenance requirements will naturally vary widely for each installation and specific operating conditions. It is suggested that a complete inspection be performed with the necessary maintenance at the end of the first day, the first week, the first month and the first three months. The results of these inspections will determine how often future maintenance will be necessary.

**BEFORE ANY MAINTANENCE IS STARTED**, remember to remove the unit from service and disconnect electrical power.

### 15.1) General Maintenance

#### **EVERY WEEK**

1. Inspect the secondary dual stage air filter cartridge. Clean or replace as required. Remove any fines collected from the catch pan. Shorten this time interval if experience indicates unusual dust loading.
2. Check the system for air leaks and correct as required.

#### **EVERY 3 MONTHS**

1. Units equipped with sleeve bearing motors should be lubricated with SAE 20 oil
2. Units equipped with ball bearing motors are factory greased and should be re-lubricated with high-grade ball bearing grease.

#### WHEN ADDING LUBRICANT

- 2.1 Remove filter plugs at the bearings and install grease fitting suitable to your grease gun.  
Also, remove the drainage plugs at the bearings.
- 2.2 Add ball bearing grease until all the old grease is expelled through the drain hole.
- 2.3 Run motor with drain plug removed to eliminate excess grease.
- 2.4 Clean and replace drain plugs.
3. Some units are equipped with permanently lubricated bearings and no lubrication is required. All motors should be examined on an individual basis.
4. Check motor(s) amperage (See Engineering Data Sheet).

## **EVERY 6 MONTHS**

1. Check for loose electrical connections.
2. Tighten all bolts and nuts.
3. Check V-Belts. Adjust or replace as required.

### **3.1 V-Belt Adjustment:**

- 3.1.1 Remove belt guard, 4 bolts and associated hardware hold the component in place.
- 3.1.2 Carefully examine each belt for excessive stretch, looseness, frayed surfaces, or exposed cord.
- 3.1.3 Replace all belts if one or more belts are found to be excessively worn. Always replace belts as a set; never individually.
- 3.1.4 Inspect the tension using the specifications below. Once belts are found in good condition and tensioned properly, replace the belt guard ensuring all 4 bolts and associated hardware are fastened properly. Never operate the pump unit without the belt guards firmly in place.

### **3.2 V-Belt Replacement:**

- 3.2.1 Remove belt guard, 4 bolts and associated hardware hold the component in place.
- 3.2.2 Loosen the motor's mounting bolts and slide the motor base towards the pump, allowing the belts to loosen. Remove the belts.
- 3.2.3 Confirm use of the proper replacement belts (see parts list) and install them carefully onto each sheave pulley. All belts must be replaced as a set.
- 3.2.4 Re-tension the belts with the sliding motor base according to the chart in "3.3 V-Belt Tensioning Guide".  
Note: new belts require greater initial tension than belts that have been in operation. Double check the belt tension while tightening the motor base and assure the motor stays in alignment (Blower sheave face flush with Motor sheave face, see section 15 for more details) while re-tightening.
- 3.2.5 Re-attach the belt guard ensuring the four mounting bolts are tight and locking washers are in place. Confirm that no part of the belt guard comes in contact with rotating sheaves or belts. Never operate the pump unit without the belt guards firmly in place.

### 3.3 V-Belt Tensioning Guide

3.3.1 Sheave face alignment: Before any final adjustment to belt tension, sheave alignment should be checked. This can be accomplished with a flat bar (or equivalent) using the thin edge against the sheave. This provides a stiff flat surface in comparison to the wider edge which can tend to bow. The purpose of aligning the faces of the sheaves is to simplify the belt tensioning process and to more evenly distribute the load across multiple belts. If sheaves are out of alignment, loosen the motor securement bolts until the hex nuts are finger tight to allow the motor to slide. Adjust motor base bolts until the sheave faces on the blower and the motor are aligned; whether it be V-Belt adjustment or replacement.

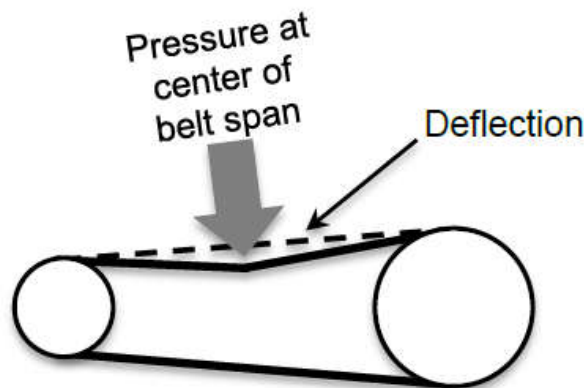
3.3.2 If utilizing existing belts, check belt health/quality as detailed under “3.1 V-Belt Adjustment”. Adjust belt tension according to the “**RE-TENSIONING**” & “BELT DEFLECTION” portions of the table below. Address each belt as necessary while keeping sheave faces aligned.

**Do not** over tension belts, as it will shorten the belt life and put excess load on the motor and blower bearings. Re-tighten motor securement bolts and re-check the tension to ensure it did not change.

3.3.3 If replacing with new belts, install the belts in the proper groves of the sheaves and pull the motor (with the adjustment bolts, alternating between each one) until the belts are under slight tension and sheaves aligned. Adjust belt tension according to the “**TENSIONING**” & “BELT DEFLECTION” portions of the table below. To keep sheaves aligned during the process, tighten the two adjustment bolts in equally distributed quarter turns. Keep checking belt tension throughout the process until desired tension is achieved.

**Do not** over tension belts, as it will shorten the belt life and put excess load on the motor and blower bearings. Re-tighten motor securement bolts and re-check the tension to ensure it did not change.

Belt Drive	Existing Belt <b>RE-TENSIONING</b> Pressure	Replacement Belt <b>TENSIONING</b> Pressure	Belt Deflection at Pressure
Vacuum	5.5 lb	8.0 lb	0.38"
Pressure	5.5 lb	8.0 lb	0.38"





### 15.2) Blower Maintenance and Lubrication

Proper blower lubrication is critical for blower performance and longevity. Follow the guidelines:

1. NOVATEC model RCU series pumps include splash lubricated bearing that require no grease, but both the gear and shaft sides of the blower unit contain oil sumps that must be maintained as part of your lubrication and oil replacement.
2. Replacement of the blower lubrication should be done:
  - 2.1. After the initial 100 hours of operation
  - 2.2. Every 2500 hours thereafter.
3. The proper oil level should be in the middle of the sight glass gauge when the blower is not operating. **DO NOT OVERFILL OIL SUMPS**; damage to the blower may occur and voiding of warranty will result.

Routine “topping off” of oil levels is NOT advised. Each pump examination should include stopping the pump, allowing the oil level to stabilize, and then checking the level in the sight glass windows before adding oil to the required level. See blower oil capacities and filling locations.

4. The oil level may naturally rise and/or fall in the gauge during operation, but the oil level should not fall below the middle of the site gauge when the blower is idle.

### 15.3) Blower Lubrication Type and Capacities

Blowers should only be run using Gardner Denver AEON PD-XD lubricating oil unless specified otherwise. NOVATEC part numbers are:

<b>1 Quart</b>	<b>1 Case (12 Quarts)</b>
VPDB-QT	VPDB-CASE

Oil capacities of the blower should be for reference when refilling the blower units with the appropriate amount of lubricant. As you approach the expected oil volume specified, focus your attention to the oil level in the sight glass gauge for the remainder of the filling process. Be careful as the oil will need time to settle for true volume measurement. **DO NOT OVERFILL OIL SUMPS**; damage to the blower may occur and voiding of warranty will result.

<b>Blower</b>	<b>Oil Capacities</b>	
	<b>Shaft Side Oil Sump</b>	<b>Gear Side Oil Sump</b>
<b>Vacuum</b>	32.0oz	68.0oz
<b>Pressure</b>	19.1oz	40.0oz

### 15.4) Rotary Feeder Maintenance

Refer to the rotary feeder (airlock) manufacturers’ instruction manual for maintenance information.

## 16.) SPECIAL NOTE: SHEAVE RE-INSTALLATION

In the case that blower and motor sheaves are removed from the Rail Car Unloader unit, please adhere to the re-installation requirements to ensure proper unit function and to ensure belt usage longevity.

1. The distance between the blower face and the sheave must not exceed 3/8" (0.38"). This ensures the blower won't see an excessive load on the shaft bearings.
2. Motor sheave must be aligned with blower sheave from face to face. This can be done using a stiff straight bar, and ensures the belts won't see unnecessary wear from misalignment.
3. Make sure bushing/hub is well secured with included hardware to the associated sheave and shaft. This will clamp the split-style bushing against the shaft, locking the bushing and sheave in place. NOTE: If bushings/hubs have set-screws included, tighten set-screw against motor/blower shaft.

## 17.) WARRANTY

### WARRANTY – NOVATEC, INC. - Effective Date 3 FEBUARY 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 by Novatec

#### 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  
Custom Equipment of any kind unless otherwise specified

UltraVac Vacuum Pumps  
Vacuum Regenerative Blower Pumps

**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. Touch screen controls on NovaWheel dryers have a 2-year warranty. All other controls have a 1-year warranty. 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.