EASTERN INSTRUMENTS

CENTRIFEEDER ELECTRONICS

FOR USE WITH CENTRIFEEDER with Integrated Vibratory Control

REV 08/13 ADDENDUM
VERSION 6.22 SOFTWARE

416 Landmark Drive
Wilmington, NC 28412
www.easterninstruments.com
Phone:(910) 392-2490
Fax: (910) 392-2123

TABLE OF CONTENTS

INSTALLATION

INSTALLATION REQUIREMENTS

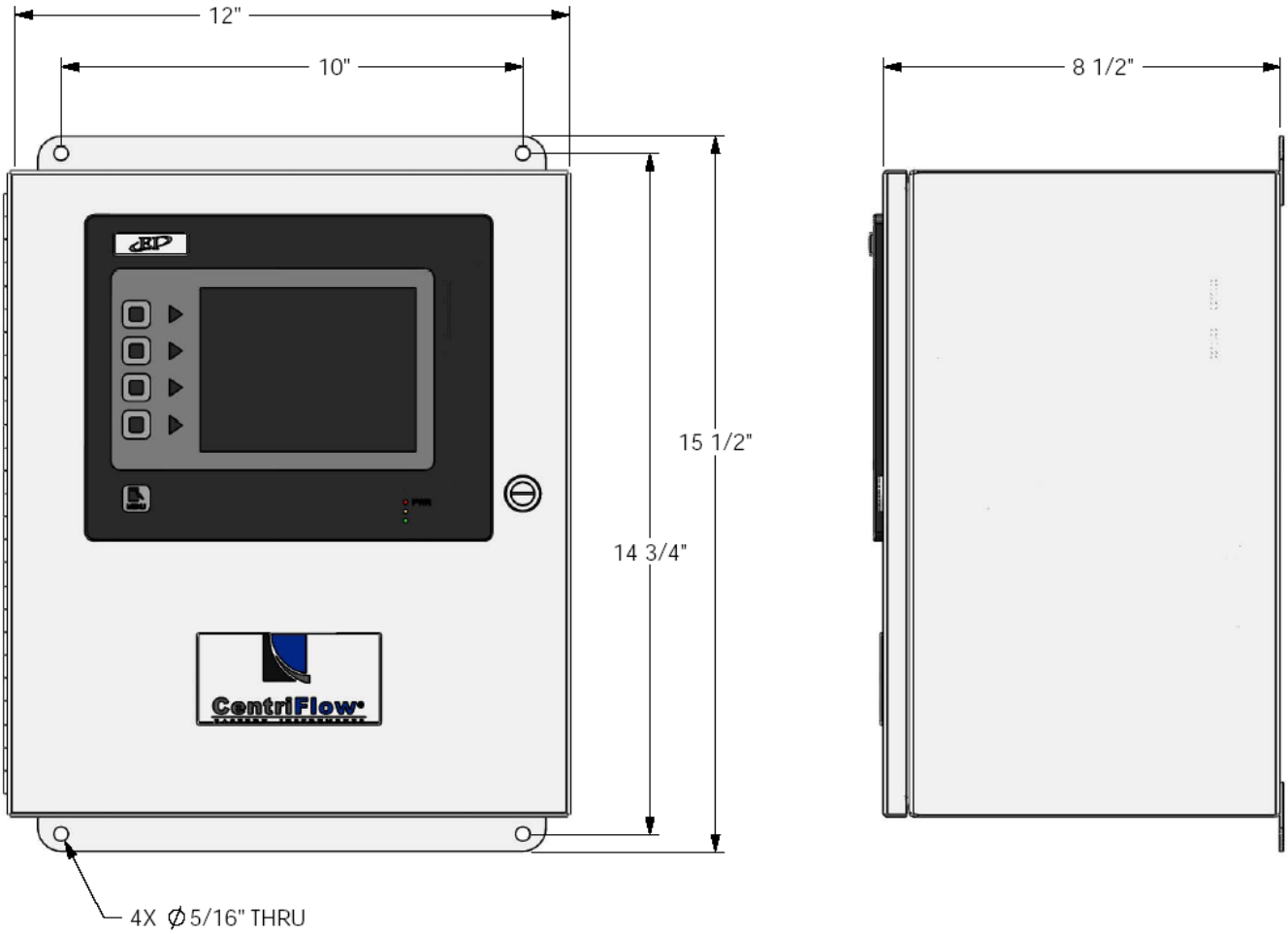
- The meter is to be used in a location where the product can be dropped from a fixed height such as a conveyer, or any type of feed system, which will give a reasonably constant initial vertical velocity. The design of the meter requires the product to contact the Tangential Plate and have some vertical drop.
- The meter should be installed so that it is level in two planes. Use the Bubble Level on top of the Seal Top to help.
- The meter should be mounted using the mount holes only. The mounting method should minimize vibration and any movement. Mounting should not be done using the flange(s).
- The discharge chute that the product stream empties into after traveling through the meter must be free flowing, meaning that it does not allow product to build up and consequently contact the Pan of the meter.
- The Electronics Enclosure and valve should be wired using only the factory cable. There is a standard 10' cable package that includes the Remote Electronics Cable, the valve Power Cable, and the Valve Position Sensor Cable supplied with the CentriFeeder™ Meter. The cables should be cut to the exact length required. Do not coil the cables.
- It is required that the Remote Electronics Cable be run through its own grounded metallic conduit connected on the side of the module and the bottom of the Electronics Enclosure. This Cable MUST be in a separate conduit than that of the AC Power or 24 Vdc Power supplied to the Electronics Enclosure. The valve power and position sensor signal cable can be together in their own grounded metallic conduit.

INSTALLATION TROUBLE AREAS

- The CentriFeeder™ Meter's 4-20mA signal is self-powered and does not require any additional voltage.
- DO NOT RUN 480V, 240V, OR 120V AND SIGNAL LINES IN THE SAME CONDUIT. The power and signal lines should be separate from each other and from all other devices. Running any other power or signal lines in the same conduit could affect the performance of your meter. Isolate both power and signal lines from each other at all times.
- The CentriFeeder™ Meter is balanced at a specific angle and should not be subject to vibration or movement. The mass of the mount should be at least 2 times the mass of the meter .
- The Seal Top should be on the meter at all times that you are not working inside the meter. This is to keep all foreign materials out of the meter that could obstruct its movement or impair its functionality.

Electronics Enclosure

Dimensional Drawing



416 Landmark Drive
Wilmington, NC 28412
www.easterninstruments.com
Phone:(910) 392-2490
Fax: (910) 392-2123

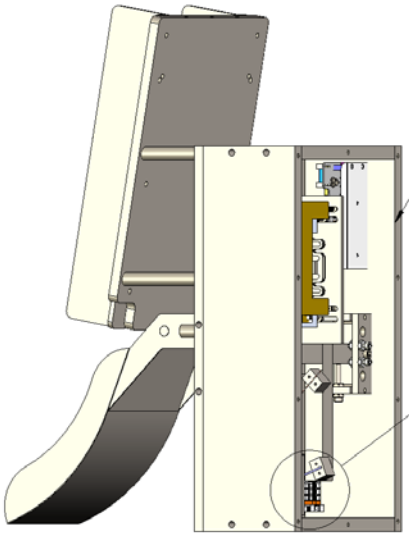
Basic Wiring: CentriFeeder with Vibratory Control

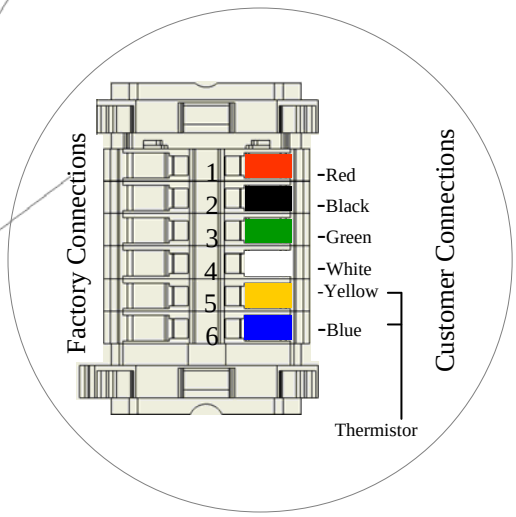
Wiring of the CentriFeeder™ can be broken down to the following categories:

- Remote Electronics Cable and Grounding Wire
- CentriFeeder™ Meter Power
- Customer Connections

REMOTE ELECTRONICS CABLE

The Remote Electronics Cable is a six-conductor cable with a shield that attaches the CentriFeeder™ to the Electronics Enclosure. It sends the measurement signal from the Transducer inside the CentriFeeder™ Meter Module to the **Customer Connections** inside the Electronics Enclosure. There is also a ground wire supplied, and it should be routed with the Remote Electronics Cable. The standard length is 10' long, but it should be cut to the exact length needed. If the distance from the CentriFeeder™ Meter Module to the Electronics Enclosure is more than 10', then the optional 25,', 50', 100' or 250' cable should also be cut to fit. Excess cable should never be coiled up and placed into the CentriFeeder™ Meter Module. The electronics enclosure end of the cable has been precut and labeled for the appropriate end connection. The cable MUST be run through grounded metallic conduit connected at both the Module and the Enclosure. Upon removing the Seal Top, the connector will be seen mounted toward the conduit connection point. All of the six conductors and the ground must be connected here. All connectors are designed so that when the push buttons are depressed, the wire crimp will open on the side. Under the connector is a label that will aid in connecting the wires to the correct position. The colors should be matched to the label.





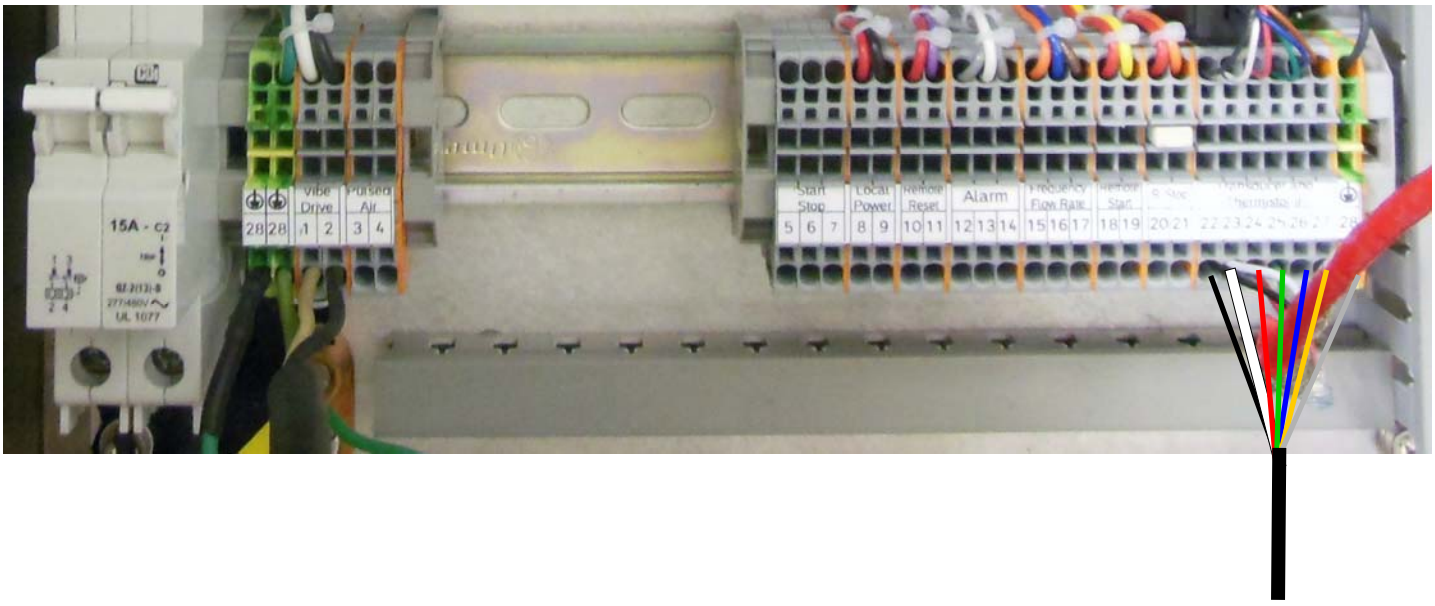
Warning: Improper grounding may cause a static discharge that can damage the electronics.

Wiring Customer Connections

REMOTE ELECTRONICS CABLE

The opposite end of the cables (Remote Electronics Cable and Grounding Cable) should be routed through the conduit and into the Electrical Enclosure. Again, as with the connection at the Module, the six conductors are connected according to color, and the ground wire will be connected to the grounding lug. The Remote Electronics Cable wires will be connected to the CUSTOMER CONNECTIONS according to the Label placed inside the Enclosure as follows:

Black Wire	—	#22
White Wire	—	#23
Red Wire	—	#24
Green Wire	—	#25
Blue Wire	—	#26
Gold Wire	—	#27
Shield	—	#28



All Connections are made to the Bottom of the Terminal Blocks

416 Landmark Drive
Wilmington, NC 28412
www.easterninstruments.com
Phone:(910) 392-2490
Fax: (910) 392-2123

Power

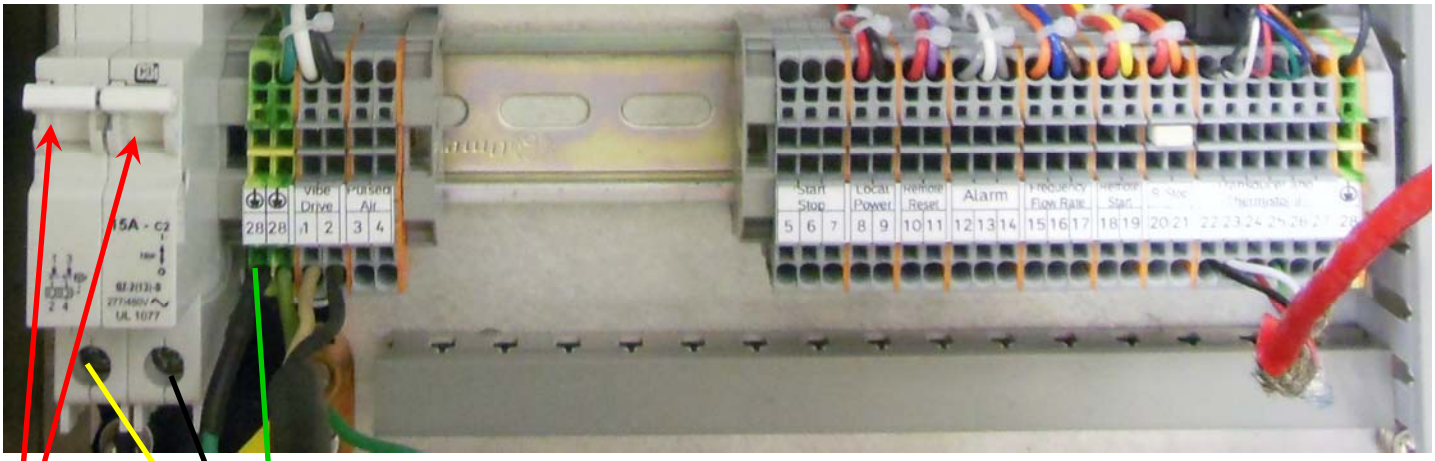
The Digital Electronics Package includes a Power Supply to convert the customer provided VAC power to 24Vdc. Please see the diagram below for wiring connections.

WARNING: TURN POWER OFF AT SUPPLY CIRCUIT BREAKER BEFORE WIRING THE POWER TO YOUR DIGITAL ELECTRONICS PACKAGE!

VAC ***ONLY*** can be connected to the Power terminals illustrated below. The VAC power is then converted to 24 Vdc through the factory wired Power Supply to supply 24 Vdc power to the electronics.

Wire the VAC Neutral and VAC Line connections to the terminal blocks using the tool provided. The wiring connections are as follows:

AC Ground	-	G (Green)
VAC Neutral	-	N (White/Yellow)
VAC Line	-	L (Black)



Circuit Breakers

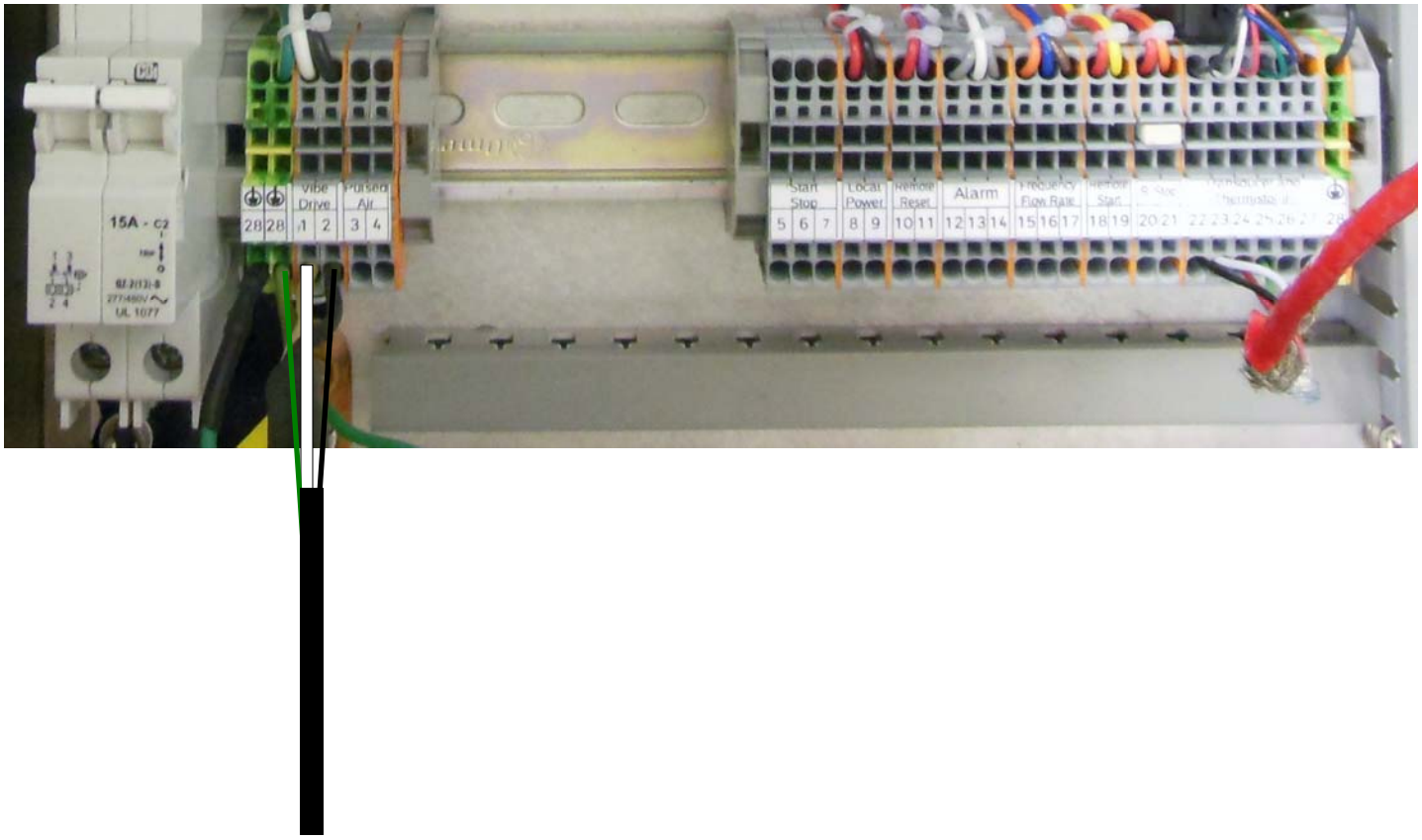
Input Voltage	115 VAC
Input Current	5A
Input Frequency	47-63 Hz

All Connections are made to the Bottom of the Terminal Blocks

Vibratory Drive

You must wire the Vibratory Conveyor to the Electronics Controller by attaching the wire from the Vibratory Conveyor (provided) to the Customer Connections as shown below.

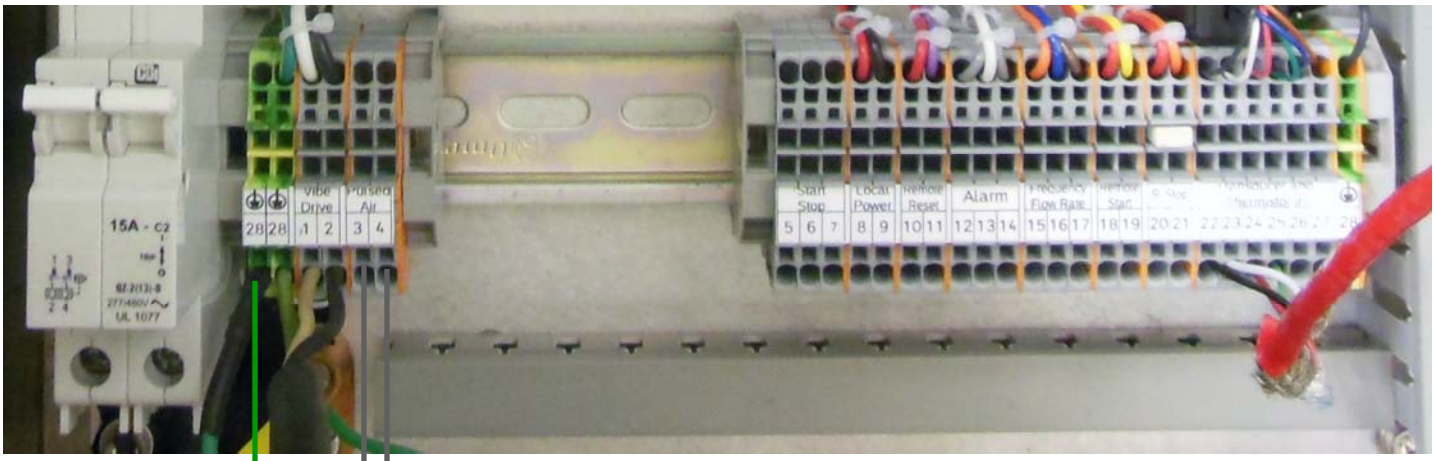
Vibratory Power (N)	-	#1 CUSTOMER CONNECTIONS
Vibratory Power (L)	-	#2 CUSTOMER CONNECTIONS

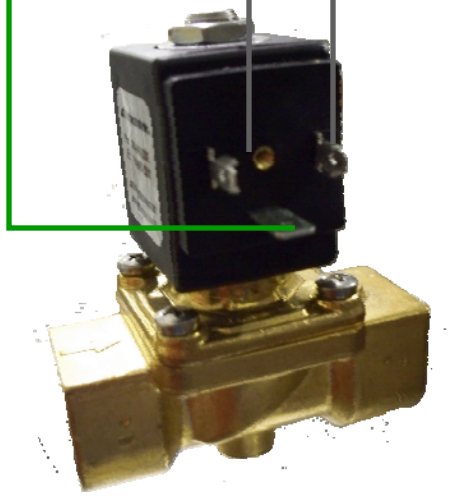


All Connections are made to the Bottom of the Terminal Blocks

Pulsed Blast (Optional)

If your CentriFeeder™ is equipped with a Pulsed Blast System, you will need to supply power to the solenoid valve on the side of the meter. Using at least an 18 Gauge, 3 Conductor Cable (not provided) connect the solenoid to the CentriFeeder™ Customer Connections as shown.





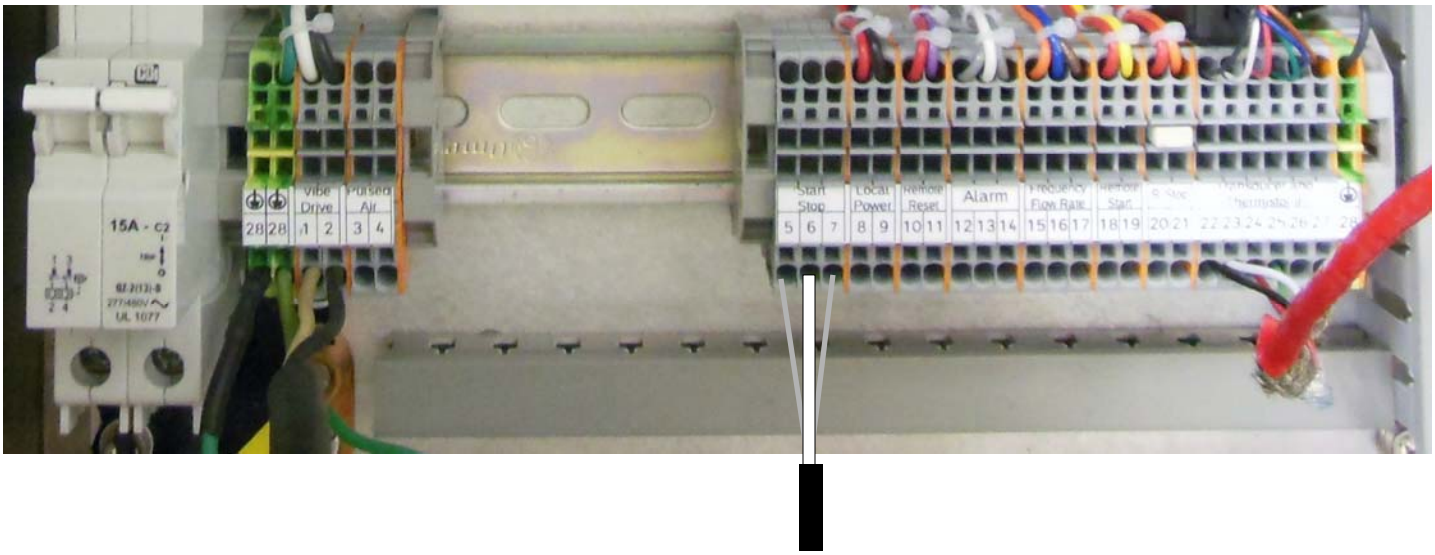
*Full Wiring Diagram in back.

All Connections are made to the Bottom of the Terminal Blocks

Start/Stop Control

You must properly wire your auxiliary controller using the connectors shown. For this step, the terminals are wired to the indicated terminal using the appropriate 18 gauge three conductor cable (not provided).

GRAY (Normally Closed)	-	#5 CUSTOMER CONNECTIONS
WHITE (Common)	-	#6 CUSTOMER CONNECTIONS
GRAY (Normally Open)	-	#7 CUSTOMER CONNECTIONS

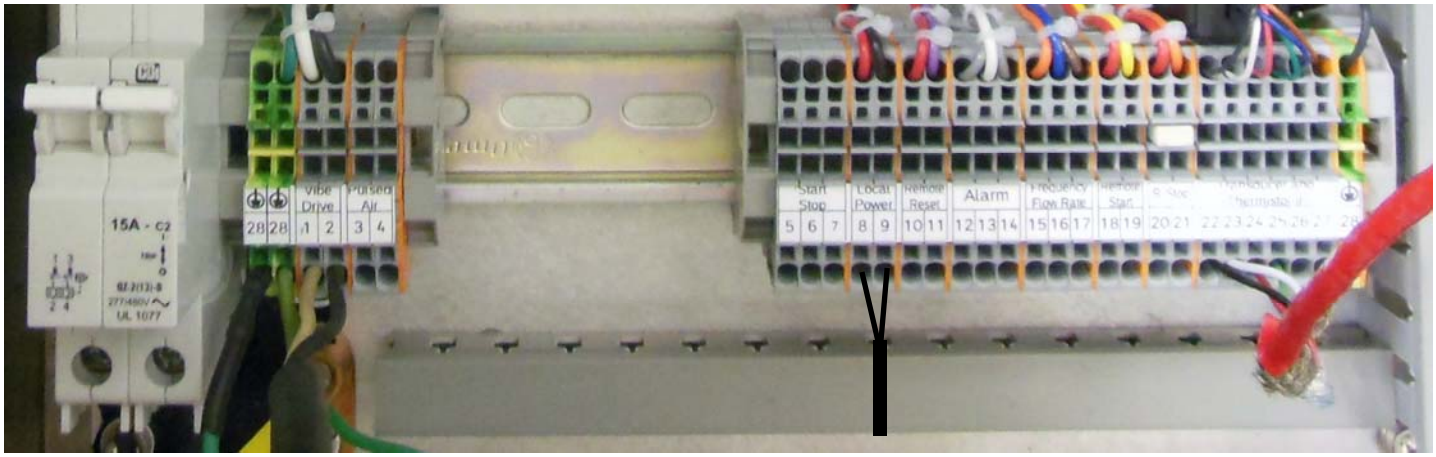


All Connections are made to the Bottom of the Terminal Blocks

24V Local Power Output

For your convenience a 24 Volt Local Power Output has been provided that can be used to power various outputs.

+24VDC - #8
-24VDC - #9



*Full Wiring Diagram in back.

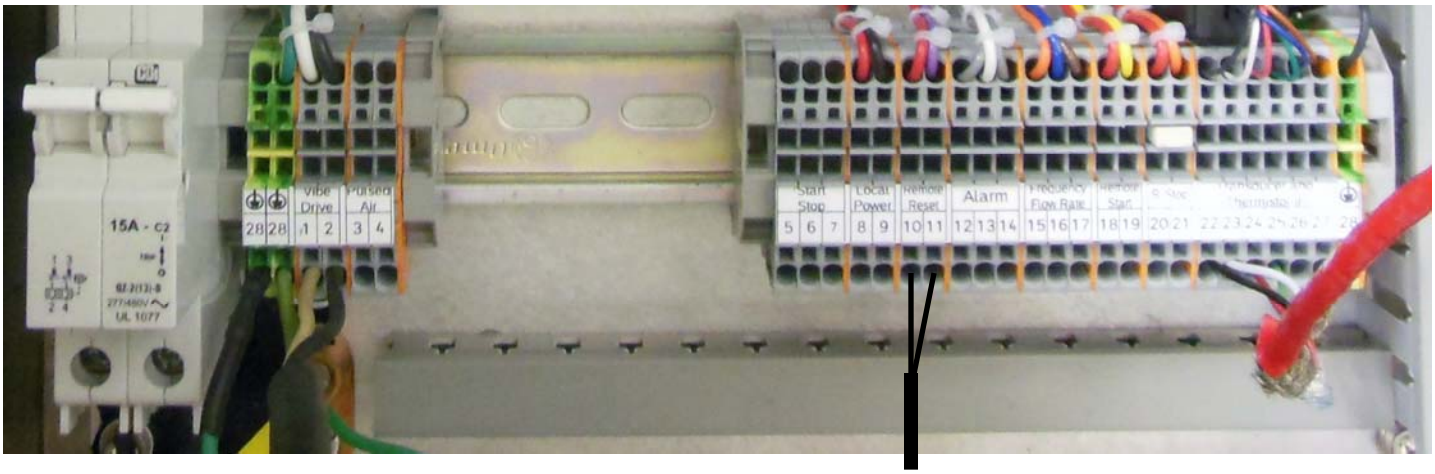
All Connections are made to the Bottom of the Terminal Blocks

Remote Reset/Zero

Digital Input
Pushbutton Switch

By installing a push button on/off switch or other mechanical relay contact, the Remote Input can be used to remotely reset your count. In order for this option to be utilized the push button on/off switch or other mechanical relay contacts (customer supplied) must be installed using the connection listed below. Please note that these inputs are prewired with voltage and only require contact closures to operate correctly (Wiring an SSR to this input will not work properly).

SWITCH IN	-	#10
SWITCH IN	-	#11



*Full Wiring Diagram in back.

Contact Type	Single contact, 1 PDT
Maximum Switching Voltage	250 V AC/DC
Limiting continuous current	6 A (resistive)

All Connections are made to the Bottom of the Terminal Blocks

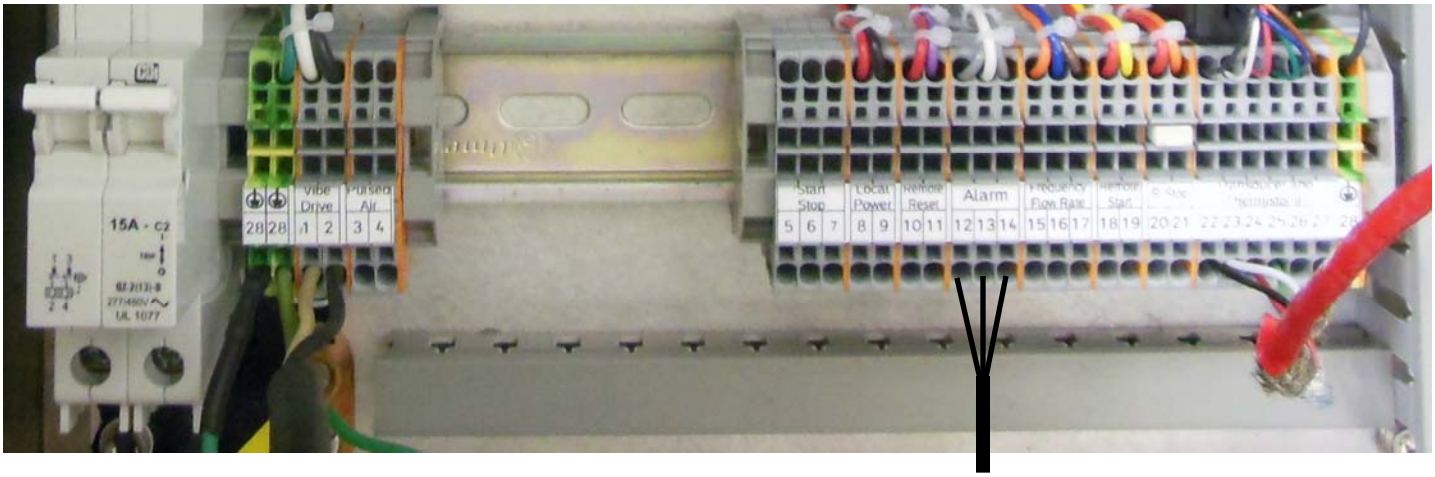
Wiring Customer Connections

Alarm

Relay Output

The relays can be used to trigger alarms which warn the operator that a batch is complete or that the rate has exceeded a set speed. The outputs are programmable to be assigned for rate or count. When assigned to the count, the relays can have a user selectable on time (duration) or can be latched until reset.

N.C. OUT	-	#12
COM OUT	-	#13
N.O. OUT	-	#14



All Connections are made to the Bottom of the Terminal Blocks

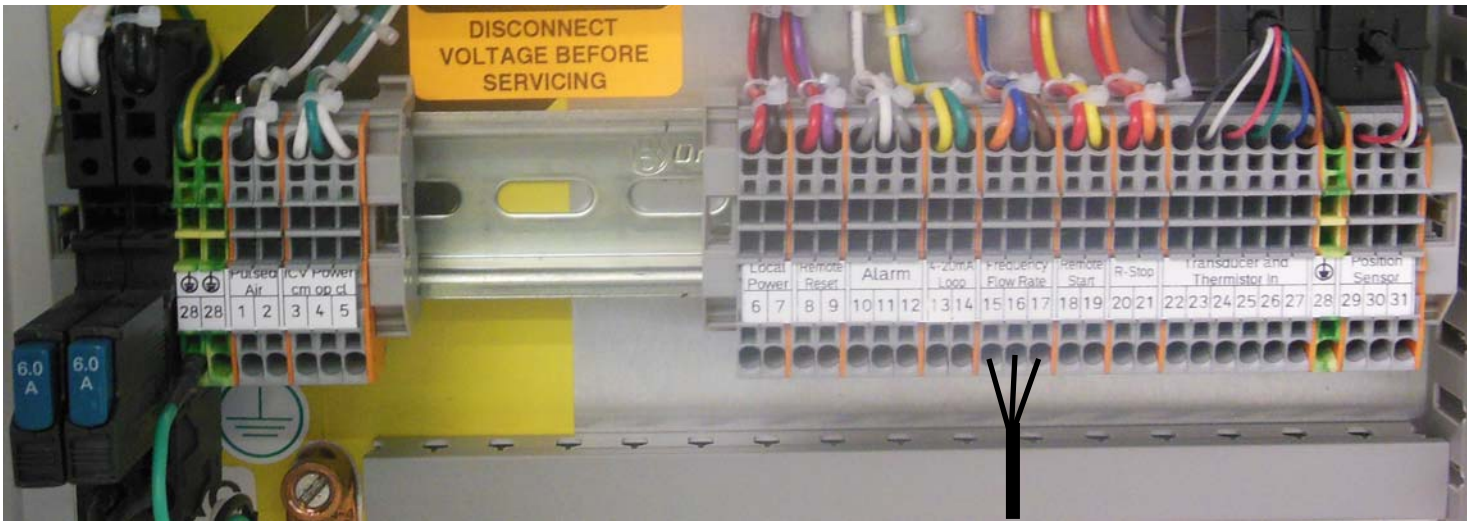
Frequency, Flow Rate Proportional (Rate)

Digital Output
Power Required

The CentriFeeder™ Electronics is capable of outputting a Totalizing Pulse Output signal. The Frequency, Flow Rate Proportional signal is a pulse signal and is labeled "Rate" at the CUSTOMER CONNECTION block. The frequency of the signal is 0 to 500 pulses per second. The Rate + (#15), supplied by the customer can be between 12 and 24 Volts. The Rate - (#17) is connected to the Common or Power Supply Ground. By connecting the Rate + and Rate - with customer supplied power and ground, the Rate Out signal will be isolated from the Digital Electronics. Although the preferred method of supplying power to the Rate output is customer supplied power, a +24V local power is available on #1 and #2. Using the local power, however, results in a loss of isolation.

This Totalizing Pulse Output will output a Voltage Pulse that is related to the Electronic Full Scale Flow Rate. For example, if the Electronic Full Scale Flow Rate were calibrated to be 300 lb./min, then a flow rate of 150 lb./min would correspond to a pulse of 250, or 50% of Electronic Full Scale Flow Rate. The configurations for these would be as follows:

Rate (+)	-	#15
Rate Out	-	#16
Rate (-)	-	#17

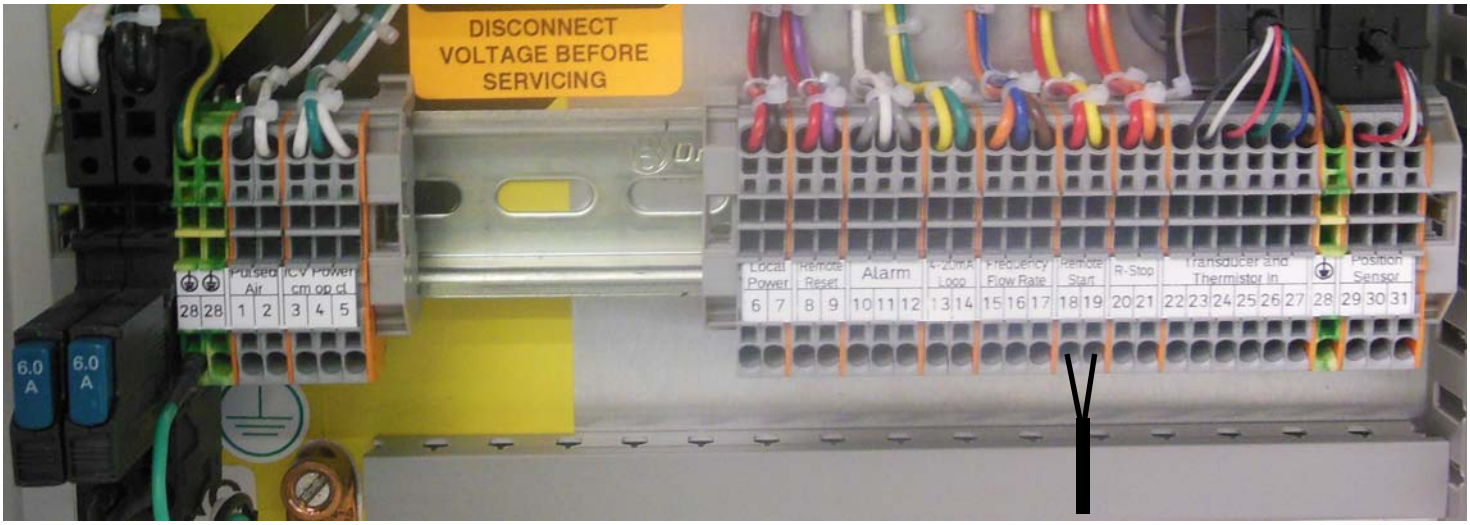


All Connections are made to the Bottom of the Terminal Blocks

Remote Start

Remote Start allows a full start of all functions of the CentriFeeder™ connected via the Remote Start inputs, immediately upon use of the mechanical, push-button switch attached via the below customer connections. Please note that the Remote Start connections are designed to work with a Normally Open Momentary Pushbutton (Customer Supplied) and upon closure of the Pushbutton, a start command will take place allowing product to begin flowing through the connected CentriFeeder™.

Remote Start IN	-	#18
Remote Start IN	-	#19

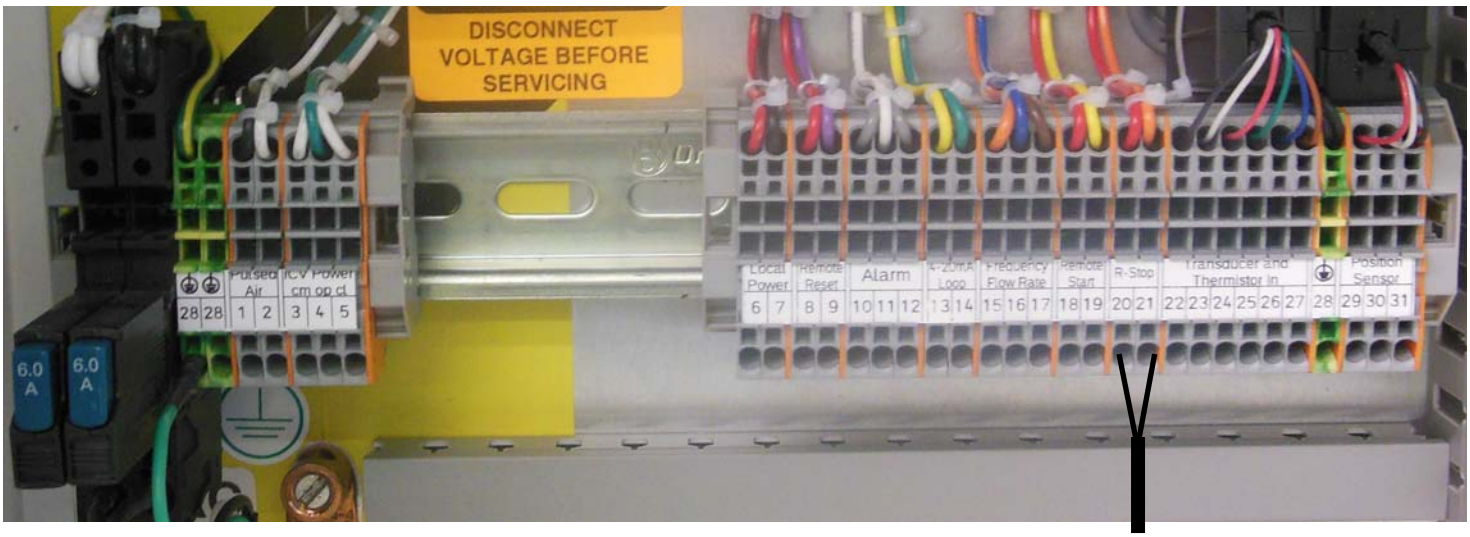


All Connections are made to the Bottom of the Terminal Blocks

Remote Stop

Remote Stop allows a full stop of all functions of the CentriFeeder™ connected via the Remote Stop inputs, immediately upon use of the mechanical, push-button switch attached via the below customer connections. Please note that the Remote Stop connections are designed to work with a Normally Closed Momentary Pushbutton (Customer Supplied) and upon opening of the Pushbutton, the ICV will not operate and will display "R-Stop" on the main Run Screen. The ICV will only operate if there is a closure between Customer Connections #18 and #19 and a jumper has been installed to serve this purpose. In order for the Remote Stop function to work, this jumper must be removed.

Remote Stop IN	-	#20
Remote Stop IN	-	#21



All Connections are made to the Bottom of the Terminal Blocks

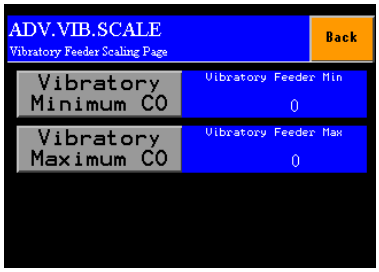
PROCEDURES

Vibratory Scaling

There is a minimum acceleration required for product in the vibratory tray to begin moving. There is also, a maximum acceleration limit specified by the manufacturer that if exceeded can cause poor short term flow. The scaling of the acceleration of the Vibratory Conveyor allows the limits of the system to be set.

Normally, a 0% control out signal in a 4-20 mA system is 4 mA, while 100% control out is 20 mA. If the minimum acceleration required to move product in the tray is not achieved until 20% control out (7.2 mA), for example, then a control out signal between 0% and 20% will not affect the flow signal. This means that the flow rate will be zero until the control out is greater than 20% which complicates the ability of the controller to maintain the desired flow rate. Although vibratory scaling is typically performed at the factory, if scaling in the field is required, please follow the below steps:

1. From the Main TOP Menu, press the ADV Advanced Control Button and then press the Control Modifications Button. Finally, press the Vibratory Scaling Button so that you are on the page to the right.
2. From the ADV.VIB.SCALE Page, you can set both the Vibratory Minimum Control Out as well as the Vibratory Maximum Control Out.



Determining the Vibratory Minimum Control Out

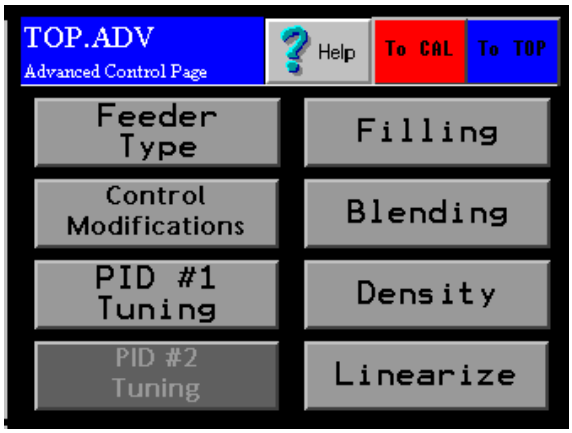
The Vibratory Minimum Control Out is determined by when product begins to move on the Vibratory Conveyor. Once product begins to move on the conveyor (only slightly) record the output (as a percentage of full scale) by pressing the Vibratory Minimum CO Button and entering it via the numeric keypad.

Determining the Vibratory Maximum Control Out

The Vibratory Maximum Control Out is determined by the amount of product that is able to move through the system. Set the maximum Control Out to 100% and see if full scale is exceeded as product runs through the meter. If full scale is exceeded, then the Maximum Control Out should be lowered until the flow rate no longer exceeds full scale. The Vibratory Maximum Control Out can be entered in a similar manner as the Vibratory Minimum Control Out as described above.

ADVANCED CONTROL SETTINGS

Your Advanced Control Settings can all be accessed via the TOP.ADV Page by pressing the Advanced Control Button on the Main Menu.

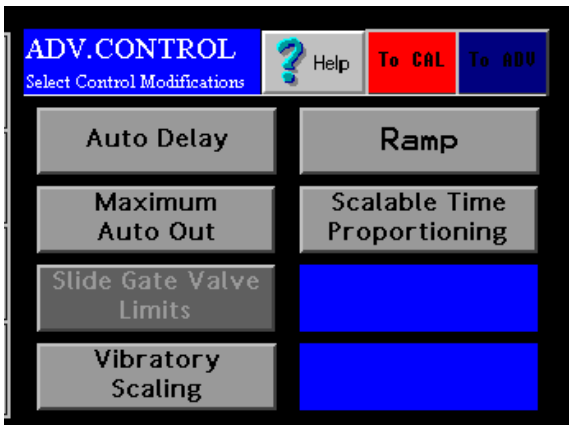


Selecting Your Feeder Type

Press the Feeder Type Button on the TOP.ADV Page. There are several options for your feed device, but for the CentriFeeder with a Vibratory Conveyor provided by Eastern Instruments, press the Peripheral Vibratory-Internal Button and press OK.

Control Modifications

Press the Control Modifications Button to access the ADV.CONTROL Page. You should now see the page below.



Setting the Auto Delay: Sets the duration of time that the unit stays in Manual Mode before switching to Automatic Mode when first started up. See the Setting the Auto Delay section of the CentriFeeder Manual

Setting the Maximum Auto Out: Sets the upper limit for use with an upper limit alarm. Please see the Setting the Maximum Auto Out section of the CentriFeeder Manual.

Vibratory Scaling: Scales the acceleration of the Vibratory Conveyor for its upper and lower limits. Please see the Vibratory Scaling section of this Addendum.

Ramp: When changing from one Set Point to another, the value set here will determine how great the ramp steps up or down to the new Set Point. This value is in % per second; if the Set Point change is from 10 ton/hr to 15 ton/hr (a change of 5 ton/hr) and the Ramp Rate is 50%/s, the Set Point will switch from 10 ton/hr to 12.5 ton/hr in 1 second and from 10 ton/hr to 15 ton/hr in 2 seconds.

Scalable Time Proportioning: Not used in conjunction with the CentriFeeder with Vibratory Control.

PID #1 Tuning

PID #1 Tuning allows you to tune the PID Control Loop for the CentriFeeder. Many of the features found here can also be accessed via the Main Run Page including toggling between Manual and Auto Control, setting the Manual Out or set point for Manual Control and setting the Process set point which is the set point for Automatic Mode.

Filling

Currently not used in conjunction with the CentriFeeder with Vibratory Control.

Blending

Currently not used in conjunction with the CentriFeeder with Vibratory Control.

Density

Currently not used in conjunction with the CentriFeeder with Vibratory Control.

Linearize

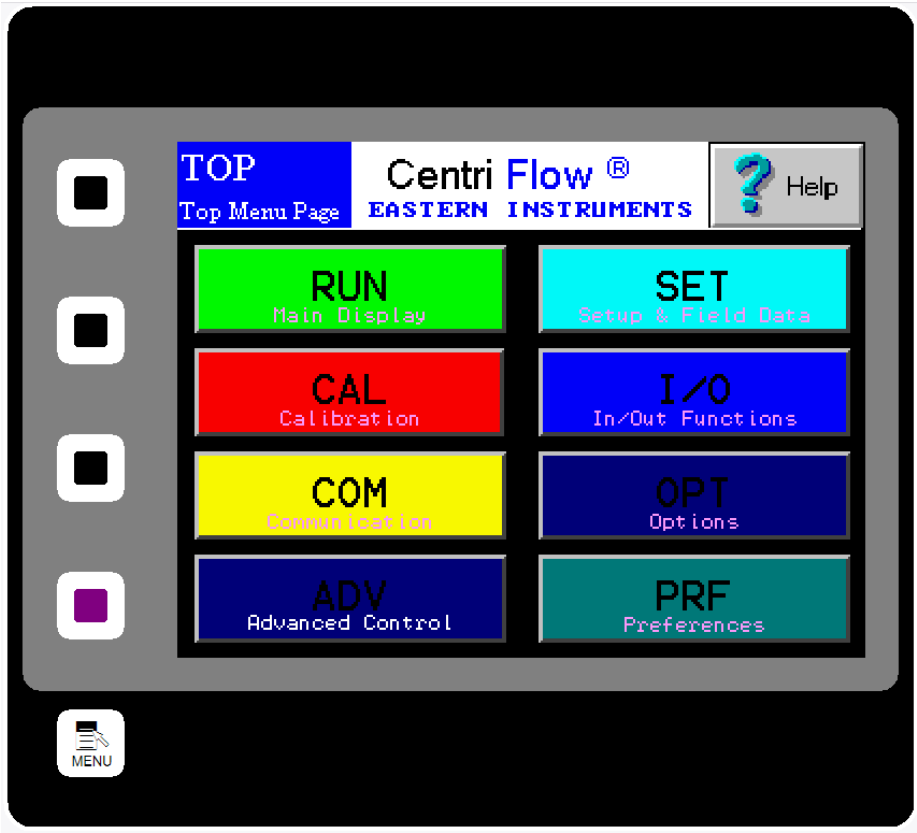
Currently not used in conjunction with the CentriFeeder with Vibratory Control.

SCREEN GUIDE

Every HMI page has a unique name that includes the previous page name combined with a description of the current page. A period separates the names. When the DCE is first powered on, or when you press the soft-key labeled MENU, the TOP page is displayed.

TOP

TOP is the Main Menu Screen. There are six buttons on the TOP page. They are RUN, CAL, COM, SET, I/O and ADV. Press the RUN button to go to the TOP.RUN page. This is the normal display mode. Press the CAL button to go to the TOP.CAL page. This is where the DCE calibration is performed (comparable to analog electronics Static Calibration). Press SET Button to go to the TOP.SETUP page. This is used to perform the DCE site calibration. Press the I/O button to go to the TOP.I/O page. This is used to set up the digital inputs and outputs. Press the ADV button to go to the TOP.ADV page. This page is where advance functions such as batching and PID are set-up. In the lower corner you will also notice an indicator displaying whether you currently have a Flash Card Installed and if you have any alarms currently activated. In the upper right corner you can access a Help Menu.



TOP.RUN

TOP.RUN is the main display mode. Access this screen by pressing the RUN Button from the TOP screen. The customer can choose between Automatic Mode and Manual Mode from this screen as well as view data in real time.

The Red and Green Bar on the Lower Right labeled SP and PV: SP stands for Set Point and represents the chosen value you would like the process to run at. It is represented as a percentage of your EFS value, or Electronic Full Scale. PV indicates your Process Value, or what the process is actually running at.

PV/SP in Engineering Units: The SP and PV values are also represented in Engineering Units in the square above the Run/Stop button on the lower left side of the screen.

The diagram of the meter/conveyor: A graphical representation of the conveyor and meter are seen on the center right of the screen and information relating to it can be viewed here.

Total/Rate Indicator: In the top left corner under the Auto and Man Buttons are the numerical values of the calculated Total and Rate values for your process as well as the units of these values.

REPLACES PAGE 67 of the CENTRIFEEDER MANUAL