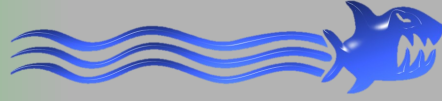
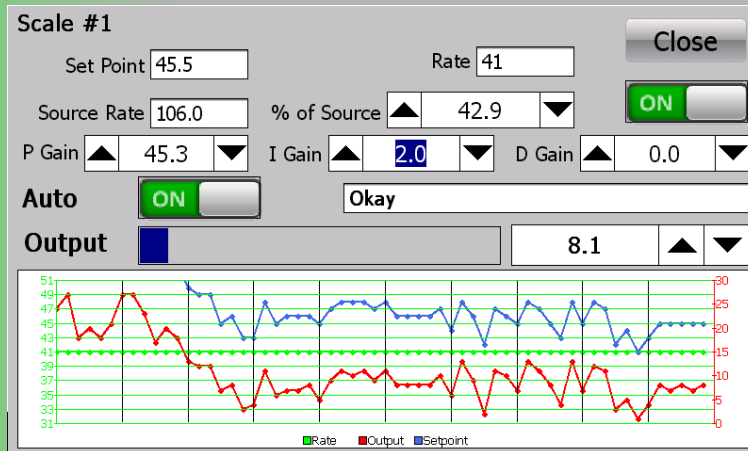


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Blending System for Weigh Shark Scales & Flow Meters



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Network Blending Controller

- Control up to 8 PID Loops.
- Uses Weigh Shark Belt scale current loop and digital outputs remotely.
- Master-Slave blending capable.
- Any mix of belt scales or solid impact flow meters can be used.

The Network Blending Controller (BC) can control up to 8 PID loops for belt scales or solid impact flow meters. Each PID loop can have a local or remote set point. The remote set point can be any belt scale, SI flow meter or Modbus device on the network. The PID loop set point can be set as a percentage of the remote device.

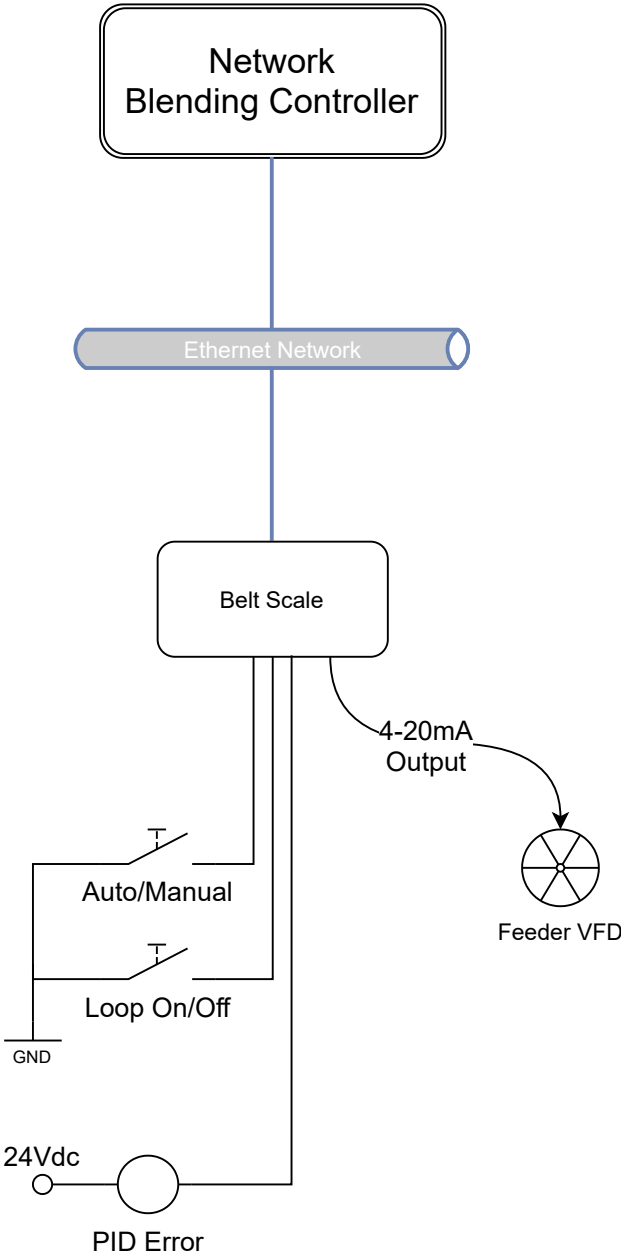
The blending controller uses the scales I/O, particularly the 4-20ma current loop output, remotely over the network to connect to the process feeder controller, usually a VFD drive, so no extra I/O devices are required.

Simple Blending Configuration

Auto/Manual switch can switch between auto PID loop control and running at a preset speed

Loop On/Off switch can turn the PID loop on/off. When loop is OFF the output to the feeder is 0.

PID Error output will indicate when there is an error in the control loop.



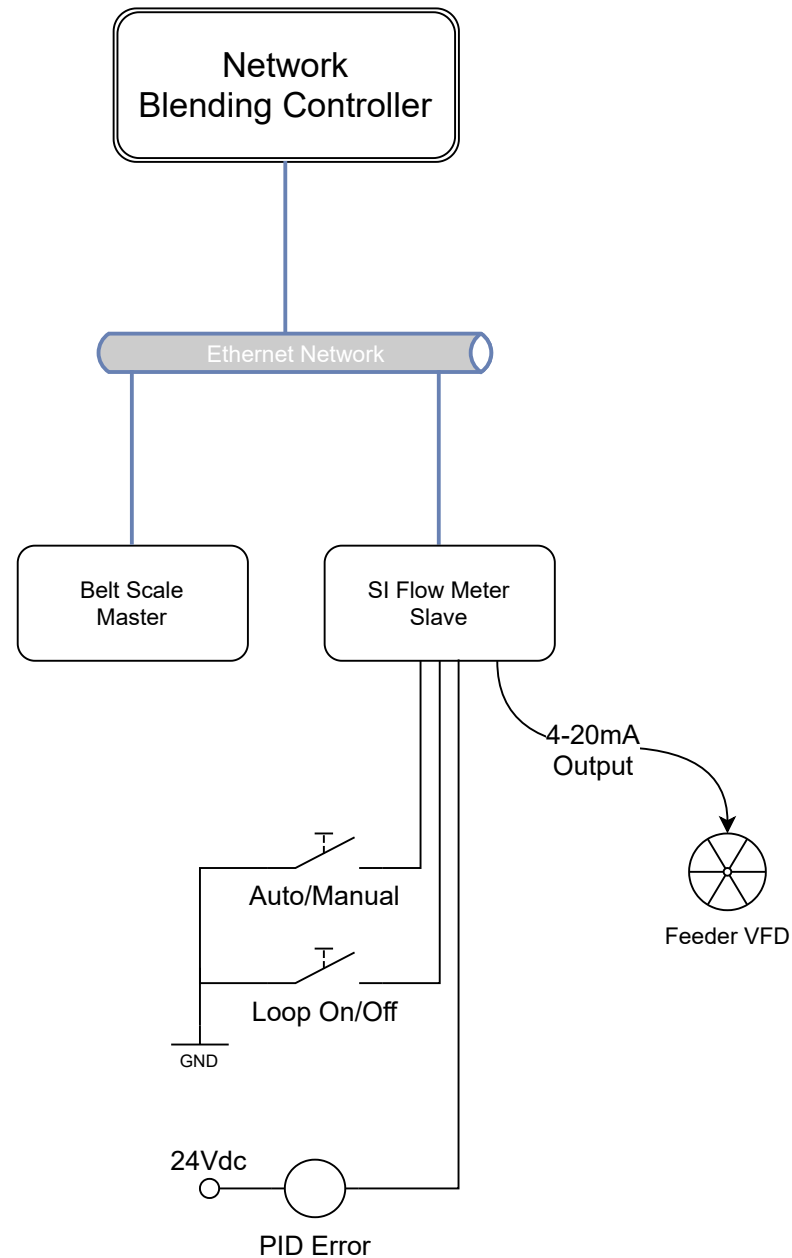
Master/Slave Configuration

The Master scale is set as the Set Point source for the Slave scale. The Slave can be set to run at a percentage of the Master scale.

Auto/Manual switch can switch between auto PID loop control and running at a preset speed

Loop On/Off switch can turn the PID loop on/off. When loop is OFF the output to the feeder is 0.

PID Error output will indicate when there is an error in the control loop.



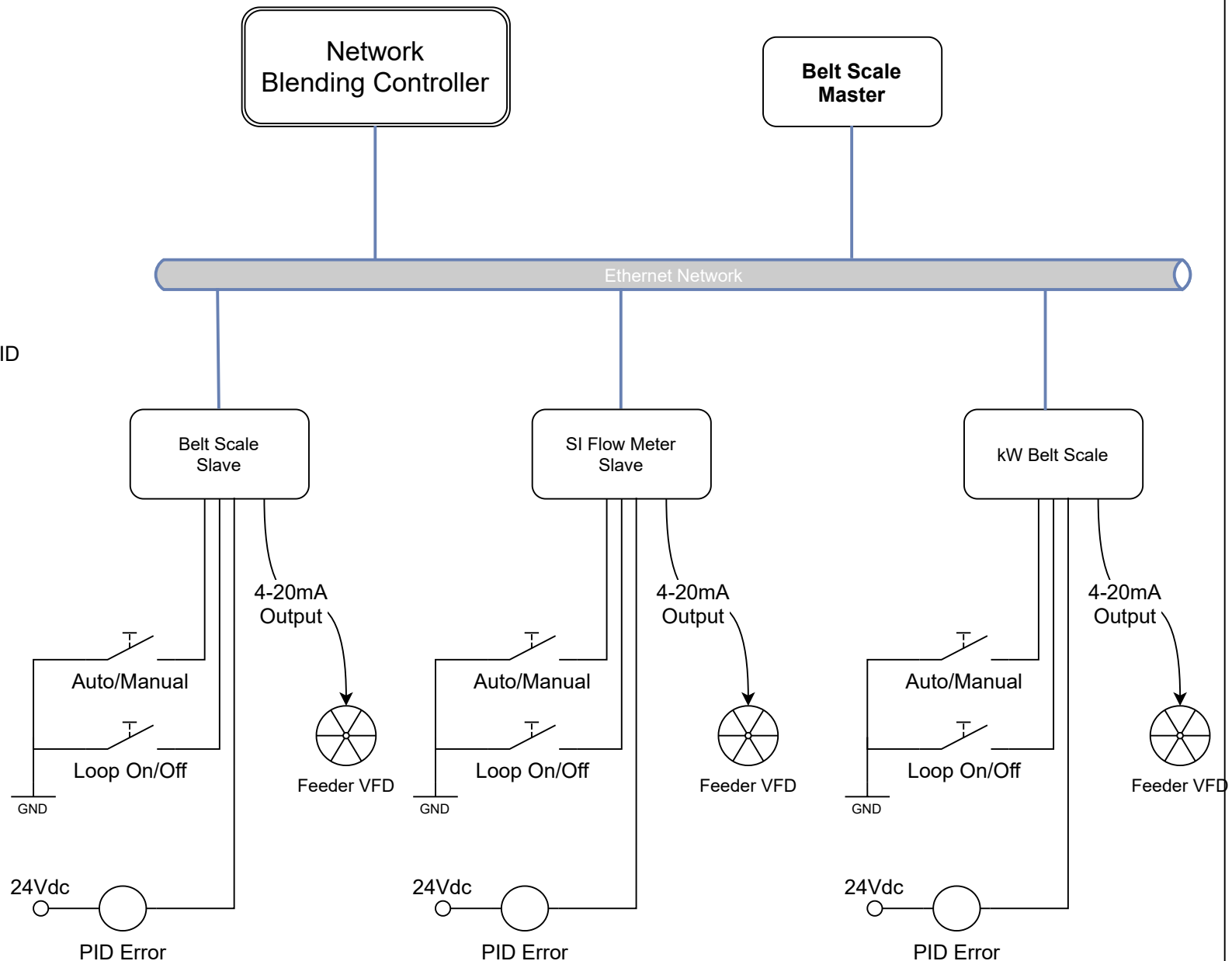
Master / Multiple Slaves Configuration

The Master scale is set as the Set Point source for the Slave scales. The Slaves can be set to run at a percentage of the Master scale.

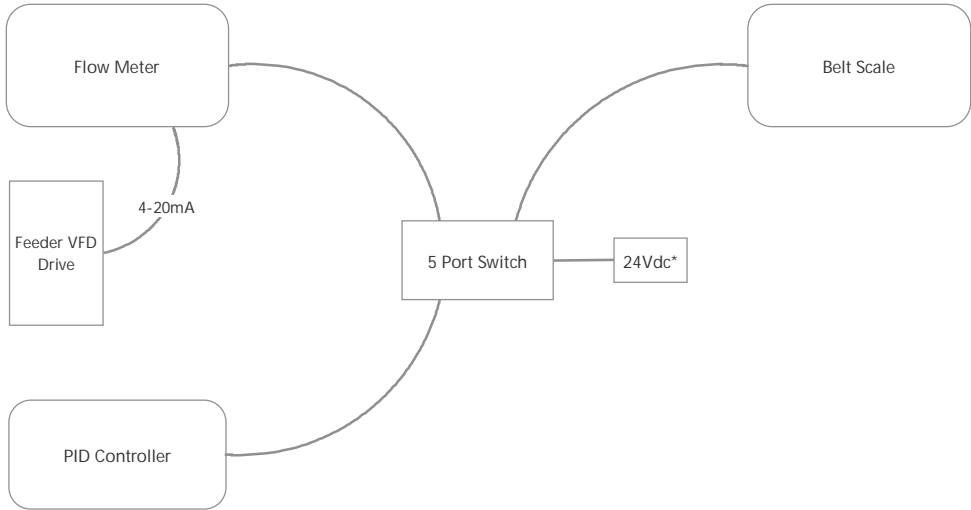
Auto/Manual switch can switch between auto PID loop control and running at a preset speed

Loop On/Off switch can turn the PID loop on/off. When loop is OFF the output to the feeder is 0.

PID Error output will indicate when there is an error in the control loop.



Ethernet Cable Layout



*The 24Vdc power supply can be shared from the PID Controller. The 5 port switch can be located inside the PID Controller enclosure.

Initial PID Setup

System Setup

- The Scales and/or Flow Meter should be installed and calibrated.
- Connect network between the scales and PID Controller.
- Setup each device according to the following parameters.
- Calibrate and Test the PID loop.
- The MASTER scale is the scale that is running the main flow of material.
- The SLAVE scale is the scale that is adding a percentage of material to the main flow.

Slave Scale Setup

- Go to I/O > Network menu
- Set the following:
 - IP Address = 192.168.000.100
 - Subnet Mask = 255.255.255.0
 - Gateway = 192.168.000.001
 - Name Server = 192.168.000.001
 - Modbus/IP = ON
 - Broadcast = ON
- Go to I/O -> Analog Output(mA) menu
- Set the following:
 - Function = MODBUS
- The current loop output of the Slave should be wired to the feeder motor drive.

Master Scale Setup

- Go to I/O > Network menu
- Set the following:
 - IP Address = 192.168.000.**101**
 - Subnet Mask = 255.255.255.0
 - Gateway = 192.168.000.001
 - Name Server = 192.168.000.001
 - Modbus/IP = ON
 - Broadcast = ON

PID Controller Setup

- Go to Menu -> Network Settings
 - IP Address = 192.168.000.200
 - Subnet Mask = 255.255.255.0

- Gateway = 192.168.000.001
- Name Server = 192.168.000.001
- Go to Multi-View – if the network is connected and scales turned on the scales should be listed in Multi-View. The data should be updating about every second.
- Enable PID for Slave Scale
 - Go to Menu -> Scale Setup
 - Make sure the settings for the Slave meter are visible; verify the IP address or scale name at the top.
 - The Slave scale name can be changed at the “Scale Name” field. After updating the name hit the small green Send arrow to the right of the name field.

Scale #1

Scale IP Address: 192.168.0.100
Scale ID: 3232235620

Display Order 1

View Time 1

Standard Rate 50

Scale Name Scale #1

Send

Allow Clear

Show on Display

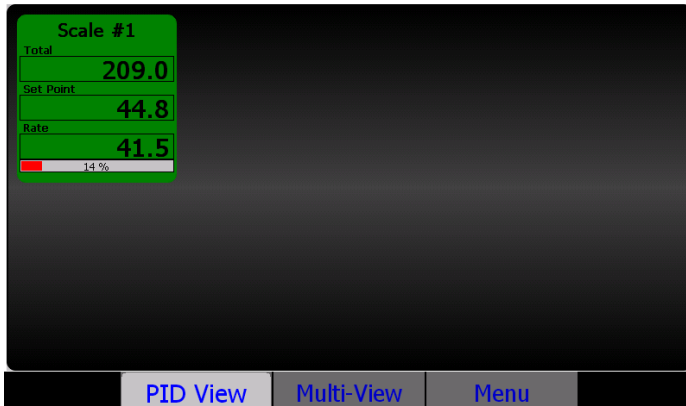
PID Control

PID

<Continue Next Page>

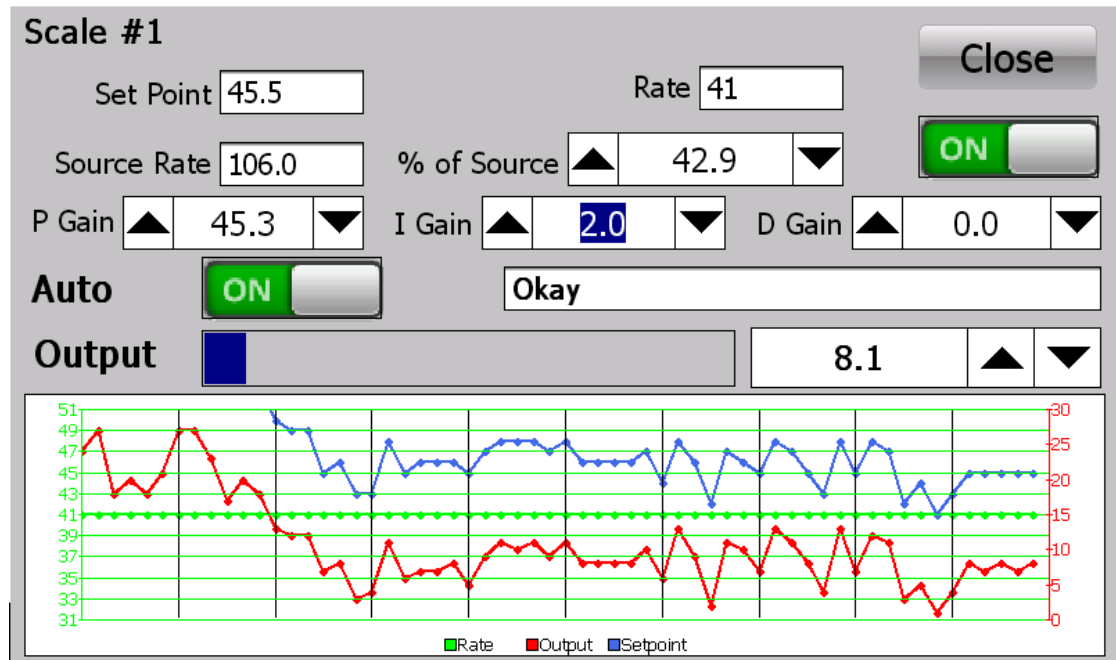
- Click the PID button.
 - Change Set Point Type to: Remote
 - Set the following:
 - Set Point Source IP = 192.168.0.101 (This is the IP Address of the MASTER scale.)
 - Register = 62
 - Double Register = Checked
 - PV Min = 0
 - PV Max = 500 (This should be higher than the absolute maximum rate that the Slave scale will see.)
 - On/Off Control = Screen
 - Auto/Manual Control = Screen
 - Click Close

- PID Control = Checked
- Click **Next** to move to the belt scale settings
- PID Control should be **Unchecked**
- The name can be changed accordingly.
- Click Close.
- Return to the Scale Setup menu and verify settings have been saved.
- After verification turn off the PID Controller, wait 5 seconds, turn it back ON.
- After reboot the PID View screen with should be displayed.



- This screen shows the status of the PID loops.

- Green = loop is Okay.
 - Red = loop Error.
- Click on the PID loop panel. The PID Screen should be displayed.



Field	Description
Set Point	This shows the target Set Point. This is calculated based on % of Source and the Source Rate. (Source is the Master scale.)
Rate	Current Rate of this scale
Source Rate	Rate for the source(Master) scale
% of Source	Percent of the source(Master) scale to run at.
ON/OFF	Turns the PID Loop On or Off. When loop is OFF the output is forced to 0.00.
P Gain	Proportional Term – The proportional term produces an output value that is proportional to the current error. The proportional term should contribute to the bulk of the output change. *
I Gain	Integral Term – The integral term is proportional to both the magnitude of the error and the duration of the error. *
D Gain	Derivative Term – The derivative action predicts system behavior and thus improves settling time and stability of the system. Derivative action is seldom used in practice. *
Auto	Auto/Manual switch
Status Display	Shows the status of the loop.
Output	Blue bar indicates the percentage of output. When in Manual mode (Auto = OFF) the output can be adjusted manually.
Chart	Shows the process history.
	* https://en.wikipedia.org/wiki/PID_controller

- Verify the current loop output.

- Put the loop in Manual mode, Auto = OFF
- Use the up/down arrows of the Output field to manually adjust the current loop output of the device. The motor should respond accordingly.
- At the Slave scale, go to I/O. The Analog Output should change accordingly.

NOTES: