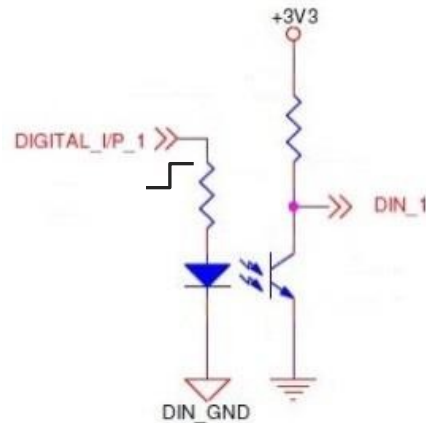# Digital Inputs

Overview

Digital Inputs are optically isolated, sinking inputs. They can be triggered from a PLC, Limit Switch, Push Button, or any other device capable of supplying the voltage required for activation. They can be programmed to any one of several functions as outlined in the Assign/Setup section. Basic wiring is covered below, as well as some common examples.

Specifications

Optically Isolated

DINGND is Common for all 4 Inputs

12-24VDC (Absolute MAX 30VDC)

MAX 50mA Sink

Rising Edge Triggered

Assign/Setup

Select an Input

Each of the 4 Digital Inputs can be assigned to any of the available functions. Use the Up and Down arrows to select an Input, then press the enter key to view the list of available functions.

Assign a Function

**Unassigned -** Best choice for all unused Inputs.

Clear Weight - Clears the Accumulated Weight to Zero.

Print Ticket - Prints a Ticket. Requires a printer be connected and Tickets turned ON. (Device Setup/Printer/Tickets/On)

Print then Clear - Prints a Ticket with the Accumulated Weight, then clears that Weight to zero.

Enter Load - Used in Batching/Load Out mode to Enter a Selected Target Weight.

Zero Calibration - Initiates a Zero Calibration. Also assign an Output to this function and it will turn On when the Calibration begins, then turn off again when the calibration is complete.
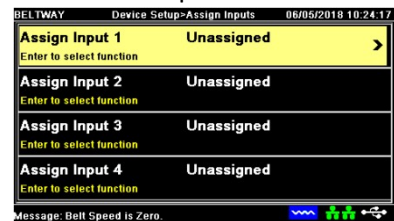
Wiring

Follow local codes and requirements for wiring.

Accepts 12-24AWG wire.

DIGND is common to all 4 Inputs.

12-24VDC (Absolute MAX 30VDC)

Max Sink 50mA

Examples

Connect to a variety of devices:

PLC Digital Output card (Fig1)

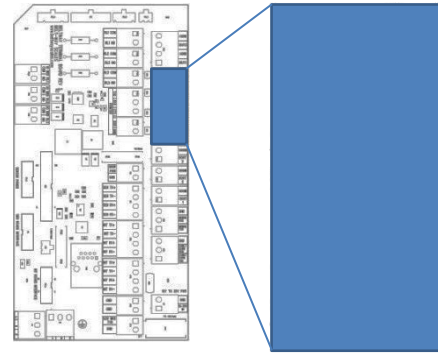Push Button (Fig1)
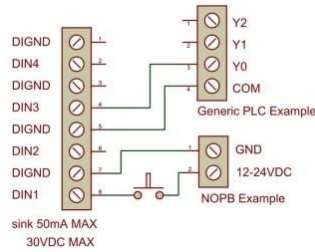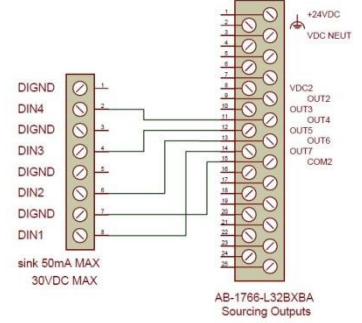
Limit Switch

AB1766 sourced Outputs (Fig2)


Figure 1

Figure 2

Digital Outputs

Overview

Digital Outputs are optically isolated, sinking outputs. They can be wired to a PLC, a pulse counter, a Solid State Relay or similar devices. They can be programmed to any of several functions as outlined in the Assign/Setup section. Basic wiring is covered below, as well as some common examples.

Specifications

Optically Isolated

DOUTGND is Common for all 4 Outputs

MAX 100mA Sink

Absolute MAX 30VDC

Switch low side only
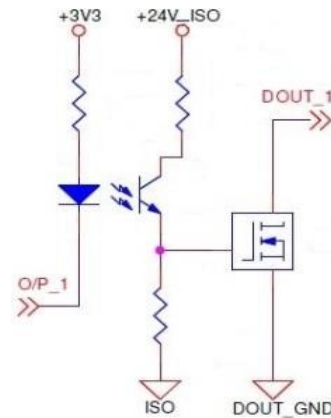
Assign/Setup

Select an Output

Each of the 3 Digital Outputs can be assigned to any of the available functions. Use the Up and Down arrows to select an Output, then press the enter key to view the list of available functions.

Assign a Function

Unassigned - Best choice for all unused Outputs.

Pulsed Outputs - Generates a pulse per selected weight unit.

Quadrature Wave - Generates a pulse 90° out of phase with the pulsed output. Forces both pulses to a 50% duty cycle.

Error Alarm - Activates under various error conditions.

Min/Max Speed - On/Off based on belt speed setpoint.

Min/Max Rate - On/Off based on flow rate setpoint**.**

Batching/Loadout - On when Accumulated Weight is cleared; off if weight >= (target – cutoff).

Zero Calibration - On when Zero Cal begins; Off when Zero Cal is complete. Also assign an Input to this function to initiate the Zero Calibration.
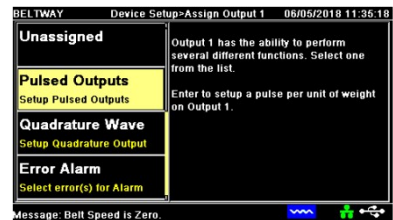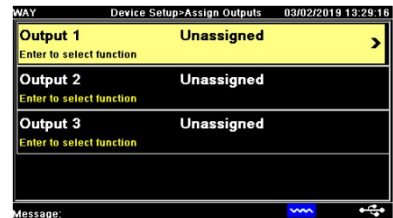
Setup Function

Pulsed Output - Max pulse frequency is 4Hz. You will need to select a value for Weight per Pulse, and enter a value for Pulse On Time. The period will vary with the rate of product flow across the scale, but the pulse on time will not.

o **Weight/Pulse.** Weight units are selected during Scale Setup and displayed on the Home Screen. Refer to the chart below to select the best Weight/Pulse setting for your Rate. The chart is the same for all weight units: tons, long tons, lbs, tonnes, or kg.

Wt/Pulse Setting	0.01	0.1	1	10	100
Max Wt/Hr	150	1,500	15,000	150,000	1,500,000
Max Wt/Min	2.5	25	250	2,500	25,000

o **Pulse On Time** - Duty Cycle is fixed at 50% when used with Quadrature Output. See below for an explanation of Quadrature Wave. Reference the waveform shown at right. The output turns on and then off, this is one pulse. The ratio of the on time to the total period of the pulse is the duty cycle. It is usually not necessary to set the pulse on time above 50% of the period. Enter a value for pulse on time in seconds. Be sure the pulse on time is less than the period, or the output will never turnoff; that means no pulse.
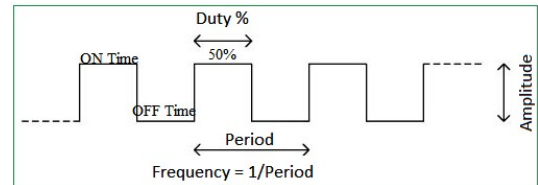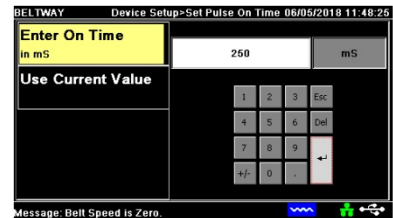

Period = 1/((weight/time)/(weight/pulse)/(sec/time))

EXAMPLE:

0.24s = 1/((**150**ton/hr)/(**.01**ton/pulse)/(**3600**sec/hour))

You would set pulse On time <= 120mS for best results.
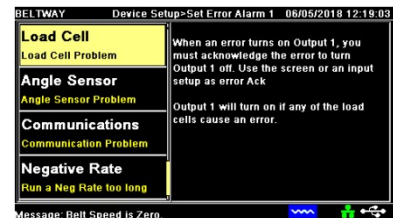

Quadrature Wave - This is a second channel of pulsed output.

A second digital output MUST be assigned to the pulsed output function as described above. The quadrature output uses the weight/pulse setting from the pulsed output above, but the pulse on time is ignored.

The quadrature function forces both pulses to a 50% duty cycle, 90° out of phase, regardless of flow rate.

Error Alarm - Select an error condition to trigger the output.

o **Load Cell** - On when 0mV > LC signal > 20mV
o **Angle Sensor** - On when Angle >= 35°
o **Communications** - On when comms are down.
o **Negative Rate** - On if Rate < 0
o **Any Error** - On when any of the above conditions occur.

Min/Max Speed - Triggers based on speed setpoint and minimum or maximum setting.
- o **Speed Setpoint -** Enter a belt speed value to turn on the output.
- o **Output Type**
  - **Min Speed Output** - On when speed <= Setpoint
  - **Max Speed Output** - On when speed >= Setpoint

Min/Max Rate - Triggers based on rate setpoint and minimum or maximum setting.
- o **Rate Setpoint -** Enter a product flow rate value to turn on the output.
- o **Output Type**
  - **Min Rate Output** - On when rate <= Setpoint
  - **Max Rate Output** - On when rate >= Setpoint

Batching/Loadout - On when Accumulated Weight < (Target Weight – Cutoff).

Zero Calibration - On during Zero Calibration, turns off when complete.

Wiring
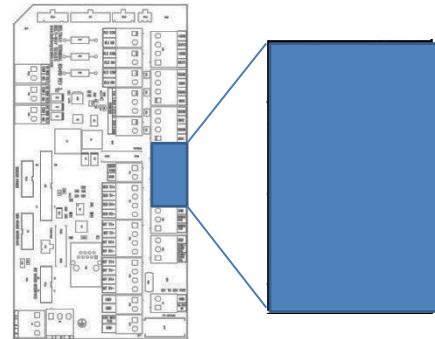
Follow local codes and requirements for wiring.

Accepts 12-24AWG wire

DOGND is common to all 3 Outputs.

12-24VDC (Absolute MAX 30VDC)
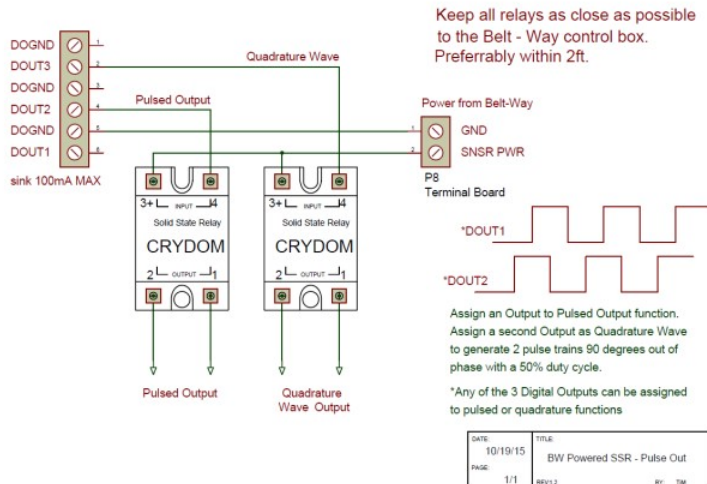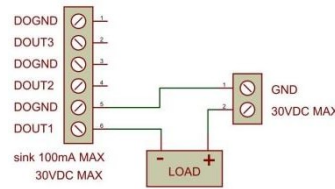
Max Sink 100mA

Examples

Connect to a variety of devices:

PLC Digital Input card

Solid State Relay to drive AC loads
- o Alarms
- o Lights

Pulsed Out & Quadrature Wave wired to Solid State Relays to drive AC input card.
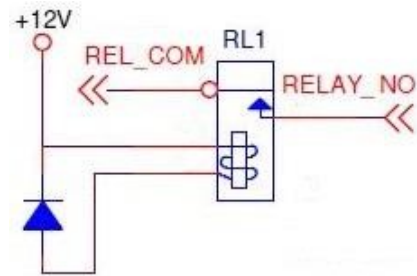
Relay Outputs

Overview

Relay Outputs are Normally Open dry contacts. They can be wired to lights, horns, PLCs, and VFDs, as well as Start/Stop/Jog circuits on feeders, conveyors, or similar devices. They can be programmed to any of several functions as outlined in the Assign/Setup section. Basic wiring is covered below, as well as some common examples. The Pulsed Output function is NOT available for the Relay Outputs.

Specifications

3 discrete sets of dry contacts.
Switching voltage 220VDC/250VAC
Switching power 60W/62.5VA
Switching current 2/5A
High dielectric/surge to 2500Vrms between contacts

Assign/Setup

Select a Relay

Each of the 3 Relay Outputs can be assigned to any of the available functions. Use the Up and Down arrows to select an Output, then press the enter key to view the list of available functions.

Assign a Function

Unassigned - Best choice for all unused Outputs.

Pulsed Output - Not Available to Relay Outputs.

Error Alarm - Activates under various error conditions.

Min/Max Speed - On/Off based on belt speed setpoint.

Min/Max Rate - On/Off based on flow rate setpoint.

Batching/Loadout - On when Accumulated Weight is cleared; off if weight >= (target – cutoff).

Zero Calibration - On when Zero Cal begins; Off when Zero Cal is complete. Also assign an Input to this function to initiate the Zero Calibration.
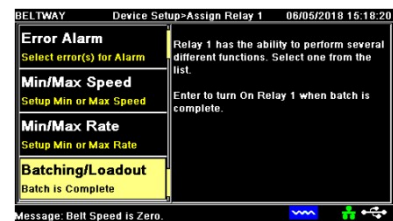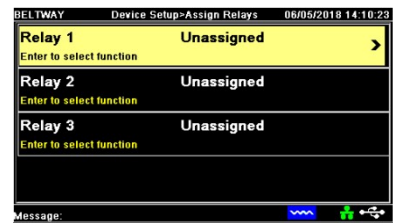
Setup Function

Error Alarm - Select an error condition to trigger the output.

- **Load Cell** - On when 0mV > LC signal > 20mV
- **Angle Sensor** - On when Angle >= 35°
- **Communications** – On when comms are down.
- **Negative Rate** – On if Rate < 0
- **Any Error** - On when any of the above conditions occur.
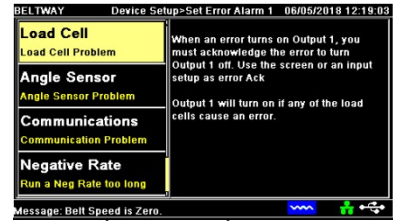
Min/Max Speed - Triggers based on speed setpoint and minimum or maximum setting.

- **Speed Setpoint -** Enter a belt speed value to turn on the relay.
- **Output Type**
  - **Min Speed Output** - On when speed <= Setpoint
  - **Max Speed Output** - On when speed >= Setpoint

Min/Max Rate - Triggers based on rate setpoint and minimum or maximum setting.

- **Rate Setpoint** - Enter a product flow rate value to turn on the relay.
- **Output Type**
  - **Min Rate Output** - On when rate <= Setpoint
  - **Max Rate Output** - On when rate >= Setpoint

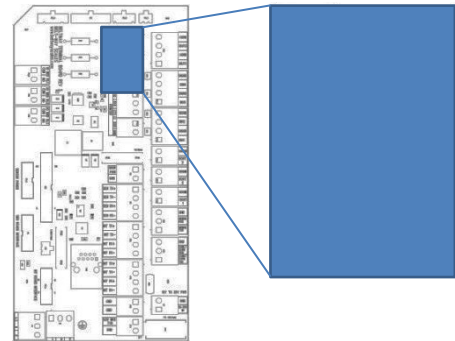**Batching/Loadout** - On when Accumulated Weight < (Target Weight – Cutoff).

Zero Calibration - On during Zero Calibration, turns off when complete.

Wiring

Follow local codes and requirements for wiring.

Accepts 12-24AWG wire

3 discrete sets of dry contacts.

Examples

Connect to a variety of devices:

PLC Input card

Horns, Lights

Wired AND - The "Wired AND" circuit lets you assign 2 outputs to 2 different functions and have the load activate only when one output AND the other are ON

Wired OR - The "Wired OR" circuit allows you to assign 2 outputs to 2 different functions and have the load activate when either one OR the other is ON.
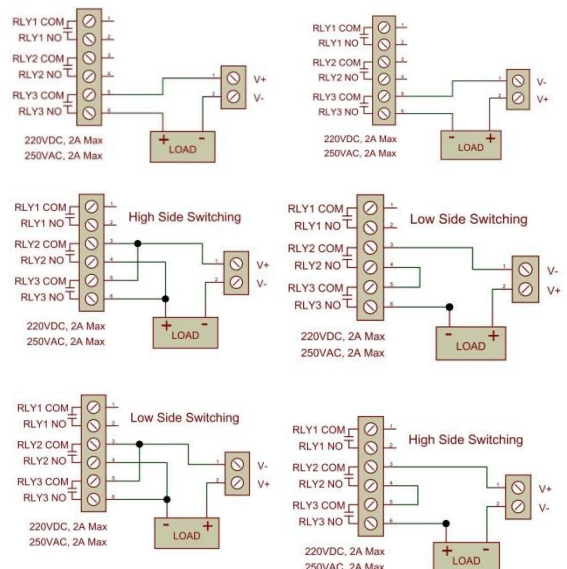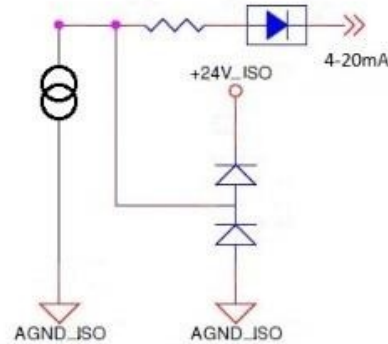
Analog Outputs

Overview

Analog Outputs are isolated and powered 4-20mA outputs. They can be wired to a PLC, VFD, Data Logger, chart recorder, or other device for monitoring and/or controlling product flow rate. They can be programmed for different output ranges and scales as outlined in the Assign/Setup section. Basic wiring is covered below, as well as some common examples.

Specifications

Isolated

AGND is Common for both Outputs

Both Loops are 24VDC Powered

MAX Load 1000Ω

Assign/Setup

Select an Output

Each Input can be assigned to either of the available output functions. Use the Up and Down arrows to select an Analog Output, then press the enter key to view the list of available functions.

Assign a Function

0-20mA - Zero to Max Rate tons/hr produces 0-20mA.
  Add a resistor to generate 0-5VDC or 0-10VDC

4-20mA - Zero to Max Rate tons/hr produces 4-20mA.   Add a resistor to generate 1-5VDC or 2-10VDC.

Setpoint% - 100% to monitor product flow rate.
  For blending applications this is the % of product that this scale contributes to the mix.

Maxrate - 0 ton/hr = 4mA, Maxrate ton/hr = 20mA

Analog Cal – Can bump up the 4mA output.
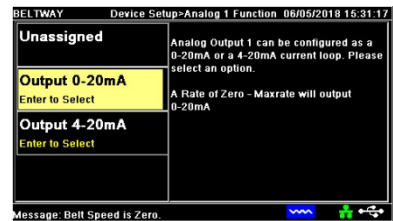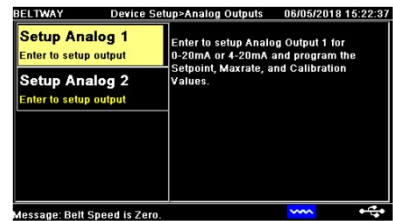
Wiring

Follow local codes and requirements for wiring.

Accepts 12-24AWG wire

AGND is common to both outputs
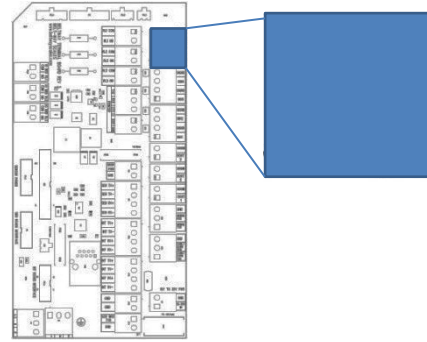
Examples

Connect to a variety of devices:

PLC

Data logger

Variable Frequency Drive

Chart Recorder