



# Optidrive Applications Support Library

<b>Application Note</b>	<b>AN-ODE-3-006</b>
<b>Title</b>	<b>Configuring Voltage and Current Reference Inputs</b>
<b>Related Products</b>	<b>Optidrive E3</b>
<b>Level</b> <b>1</b>	1 – Fundamental - No previous experience necessary 2 – Basic – Some Basic drives knowledge recommended 3 – Advanced – Some Basic drives knowledge required 4 – Expert – Good experience in topic of subject matter recommended

## Overview

Optidrive E3 provides two analog inputs, which may be used to provide speed setpoint signals for example, or used with the internal PI control. These analog inputs will accept signals in current or voltage format. This application note details how to configure these sources for a variety of signal formats.

## Parameters

### P-16: Analog Input 1 (Terminal 6) Format

This parameter allows the user to configure the format of the signal connected to analog input 1. The following formats are supported:

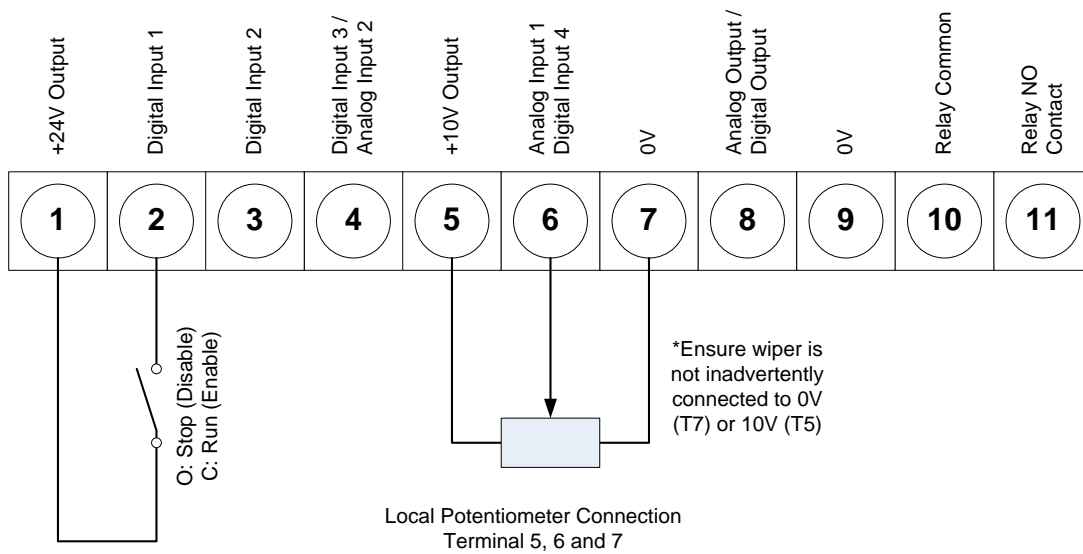
<b>U 0-10</b>	Voltage input, 0V ... 10V (Uni-polar, uni-directional)
<b>b 0-10</b>	Voltage input, 0V ... 10V (Uni-polar, bi-directional)
<b>A 0-20</b>	Current input, 0mA ... 20mA
<b>t 4-20</b>	Current input, 4mA ... 20mA – Drive trip below 3mA
<b>r 4-20</b>	Current input, 4mA ... 20mA – Drive Stop below 3mA
<b>t 20-4</b>	Current input, 20mA ... 4mA – Drive trip below 3mA
<b>r 20-4</b>	Current input, 20mA ... 4mA – Drive Stop below 3mA
<b>U 10-0</b>	Voltage input, 0V ... 10V (Uni-polar, uni-directional, inverse operation)

Typical configurations for the analog input (Terminal 6) are shown below.

**Example 1: Local Potentiometer using drive internal supply voltage.**

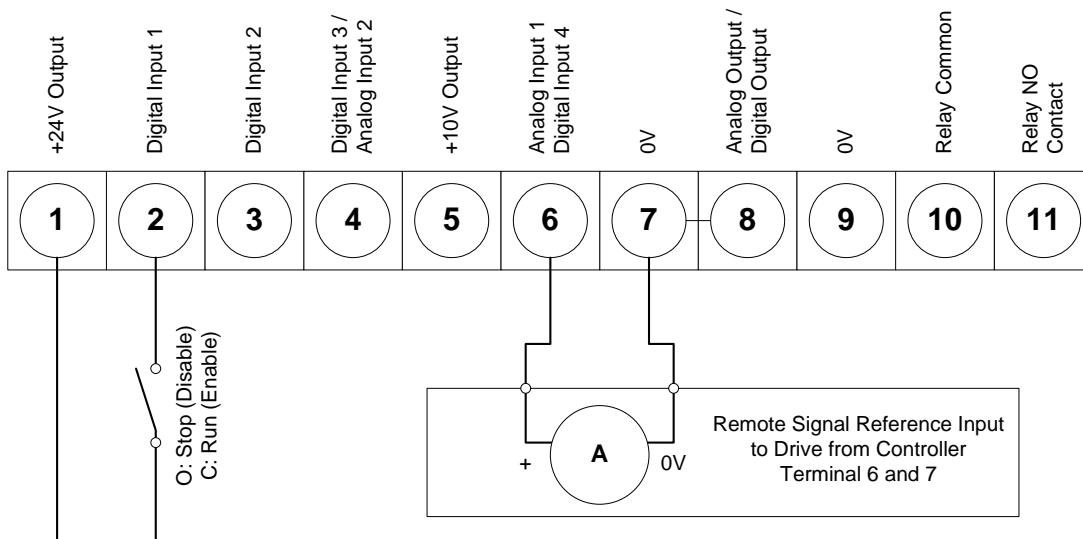
Optidrive E3 is configured with the internal +10V uni-polar supply for connection to a local Potentiometer.

P-16 = **U 0- 10**



**Example 2: Remote Signal Reference (Current Source).**

P-16 = **A 0-20, t 4-20, r 4-20, t 20-4, r 20-4** (Matched to source)



**P-47: Analog Input 4 (Terminal 4) Format:**

This parameter allows the user to configure the format of the signal connected to analog input 2. The following formats are supported:

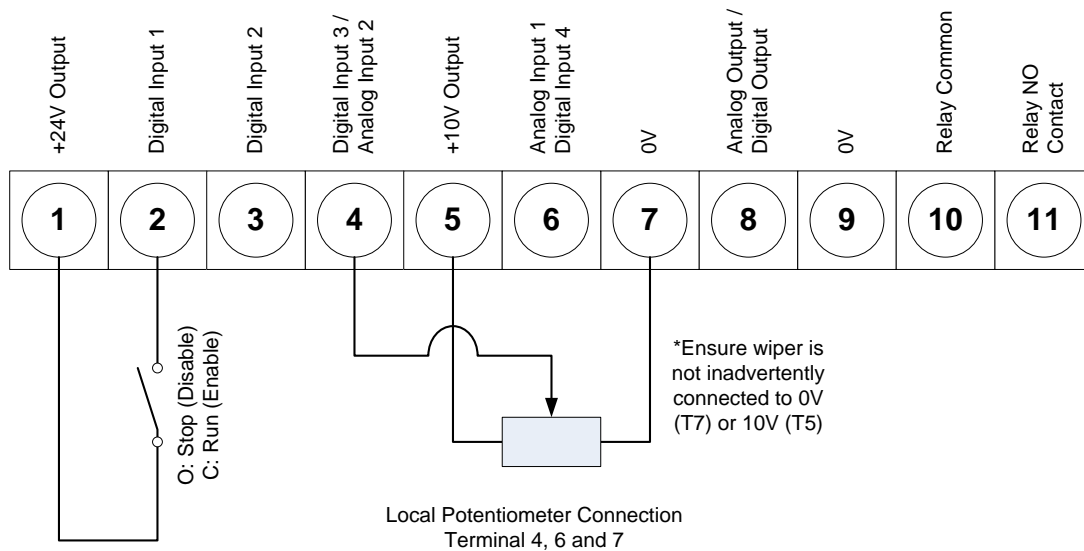
<b>U 0-10</b>	Voltage input, 0V ... 10V (Uni-polar)
<b>A 0-20</b>	Current input, 0mA ... 20mA
<b>t 4-20</b>	Current input, 4mA ... 20mA – Drive trip below 3mA
<b>r 4-20</b>	Current input, 4mA ... 20mA – Drive Stop below 3mA
<b>t 20-4</b>	Current input, 20mA ... 4mA – Drive trip below 3mA
<b>r 20-4</b>	Current input, 20mA ... 4mA – Drive Stop below 3mA
<b>Ptc-th</b>	Motor Thermistor connection mode

Typical configurations for the analog input (Terminal 4) are shown below.

**Example 1: Local Potentiometer using drive internal supply voltage.**

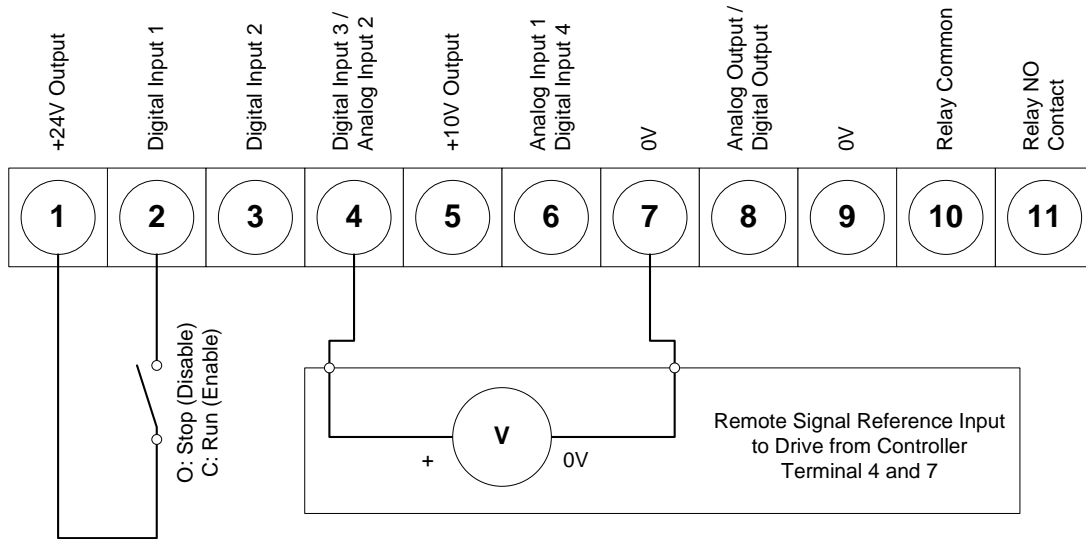
Optidrive E3 is configured with the internal +10V uni-polar supply for connection to a local Potentiometer.

P-47= **U 0-10**



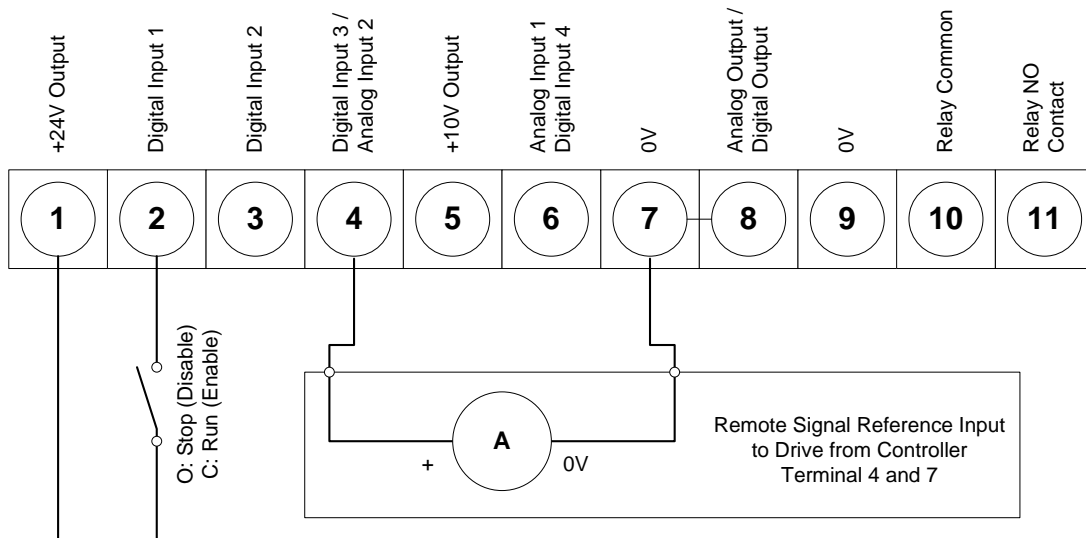
**Example 2: Remote Signal Reference (voltage Source).**

P-47 = **U 0- 10** (Matched to source)



**Example 3: Remote Signal Reference (Current Source).**

P-47 = **A 0-20, t 4-20, r 4-20, t 20-4, r 20-4** (Matched to source)



## Analog Input 1 Offset and Scaling

The offset and scaling parameters for analog input 1 allow the user to adjust the range of the analog input, or to work with alternative signal levels, e.g. 0 – 5 volt input.

When using the analog input to control the speed of the motor, a signal level of 0.0% results in the motor operating at minimum speed, P-02. A signal level of 100% results in the drive operating at maximum speed P-01.

### P-35: Analog Input 1 (Terminal 6) Scaling:

This parameter is used to scale the analog input 1 prior to being applied as a reference to the drive. For example, if P-16 is set for 0 – 10V, and the scaling factor is set to 200.0%, a 5 volt input will result in the drive running at maximum speed.

### P-39: Analog Input 1 (Terminal 6) Offset:

This parameter defines an offset for the analog input 1, as a percentage of the full range of the input. A positive offset is deducted from the incoming analog signal and a negative offset is added to the signal.

For example, if P-16 is set for 0 – 10V, and the analog offset is set to 10.0%, then 1 volt (10% of 10V) will be deducted from the incoming analog reference prior to it being applied within the drive.

The resulting signal level, which will be displayed in P00-01 is then

$$(\text{Input Signal Level (\%)} - \text{P-39}) \times \text{P-35}$$

E.g.

P-16 set for 0 – 10 volt

P-35 = 200%

P-39 = 10%

4 volt signal level applied

$$\text{P00-01} = 4 / 10 = (40\% - 10\%) * 200\% = 60\%$$

## Checking the Analog Input Signals

Two parameters are provided to display the signal level applied to the analog input. These parameters display the signal level in % after the scaling and offset have been applied.

When checking incoming signals

- P00-01 displays the Analog Input 1 Signal Level (%)
- P00-02 displays the Analog Input 2 Signal Level (%)

Note that the Offset and Scaling parameters described above for Analog Input 1 are applied before the displayed value of P00-01. This means that the displayed value

### Note

No offset or scaling options are provided for analog input 2.

### P-15: Digital Input Function select.

Set for a function that gives analog input 1 control or selectable analog input 1 / analog input 2 controls.

## Appendix

Revision History			
Issue	Comments	Author	Date

01	Document Creation	KB	07/09/15
02	Edited	JB	08/09/15
03	Edited	BL	18/01/17