Bardac drives

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A P P L I C A T I O N   N O T E

Drive Applications Support Library

Application Note	AN-P2-006
Title	Configuring Voltage and Current Reference Inputs
Related Products	P2 Series AC Drives
Level: 1	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:

The speed and Torque of the P2 Series drives can be controlled by either voltage based or current based reference signals. These signals can originate from a locally mounted potentiometer or from a remote intelligent control system (such as a PLC).

In addition the analog reference values fed back to the drive can be used within the drives PLC programming functionality (Licensed option) to represent feedback or values to the internal PLC program.

This applications note explains how the analog reference values are connected to the drive and how the drive is configured to understand the format of the signal it is receiving.

Parameters:

P2-30: 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:

U 0- 10	Voltage input, 0V ... 10V (Uni-polar)
U 10-0	Voltage input, 10V ... 0V (Uni-polar)

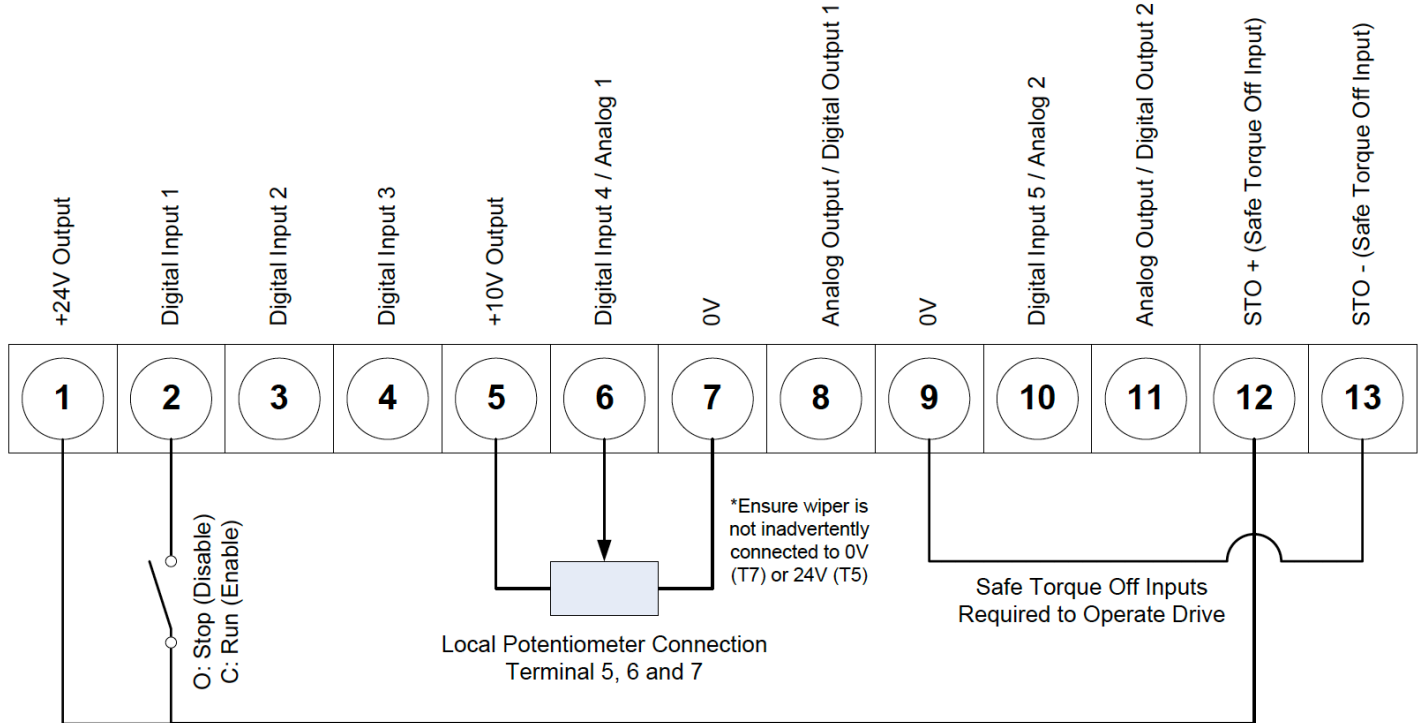|	
- 10- 10	Voltage input, -10V ... 10V (Bi-polar)
A 0-20	Current input, 0mA ... 20mA
t 4-20	Current input, 4mA ... 20mA – Drive trip below 3mA
r 4-20	Current input, 4mA ... 20mA – Drive Stop below 3mA
t 20-4	Current input, 20mA ... 4mA – Drive trip below 3mA
r 20-4	Current input, 20mA ... 4mA – Drive Stop below 3mA

When set to 0-10V or 10-0V, all negative voltages will give zero speed. When set to -10-10V all negative voltages will result in the drive running with negative (reverse) speed. Speed is proportional to the magnitude of the input voltage in both directions.

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

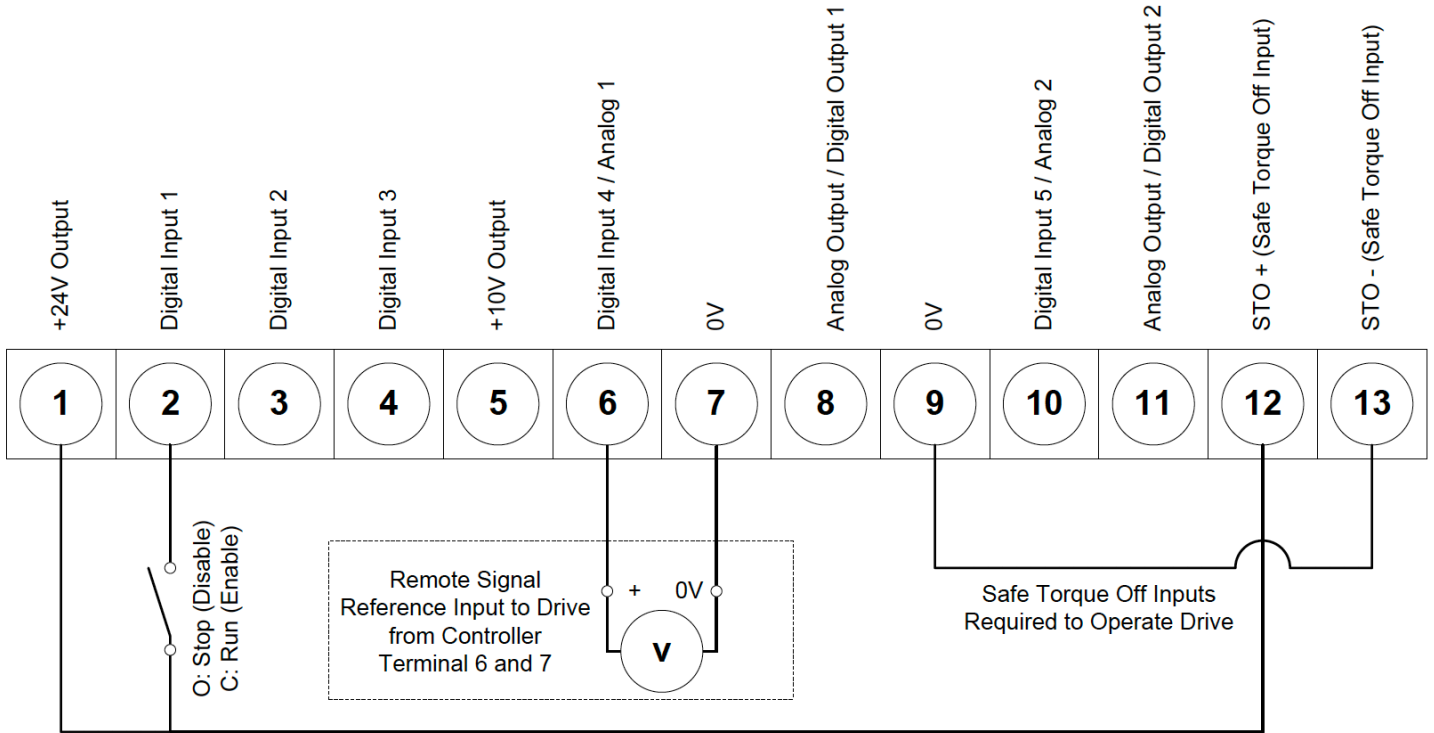### Example 1: Local Potentiometer using drive internal supply voltage.

P2 drives are configured with the internal +10V uni-polar supply for connection to a local Potentiometer.
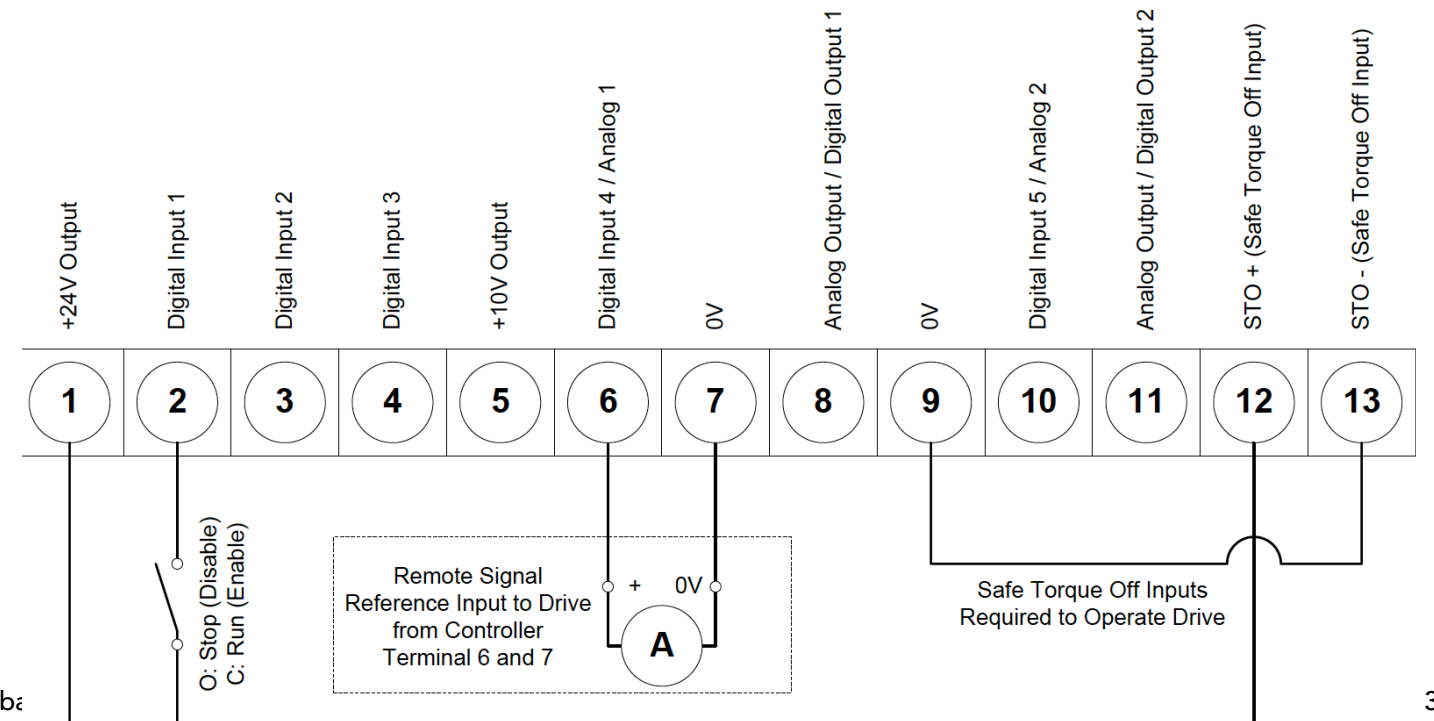
P2-30 =   U 0- 10, U 10-0

Local Potentiometer Connection
Terminal 5, 6 and 7

*Ensure wiper is not inadvertently connected to 0V (T7) or 24V (T5)

Safe Torque Off Inputs Required to Operate Drive

Example 2: Remote Signal Reference (voltage Source).

P2-33 = *U 0- 10, U 10-0* (Matched to source)

Terminal	Function
1	+24V Output
2	Digital Input 1
3	Digital Input 2
4	Digital Input 3
5	+10V Output
6	Digital Input 4 / Analog 1
7	0V
8	Analog Output / Digital Output 1
9	0V
10	Digital Input 5 / Analog 2
11	Analog Output / Digital Output 2
12	STO + (Safe Torque Off Input)
13	STO - (Safe Torque Off Input)

O: Stop (Disable)
C: Run (Enable)

Remote Signal Reference Input to Drive from Controller Terminal 6 and 7

+   0V

V

Safe Torque Off Inputs Required to Operate Drive

Example 3: Remote Signal Reference (Current Source).

P2-33 = *A 0-20, t 4-20, r 4-20, t 20-4, r 20-4* (Matched to source)

Terminal	Function
1	+24V Output
2	Digital Input 1
3	Digital Input 2
4	Digital Input 3
5	+10V Output
6	Digital Input 4 / Analog 1
7	0V
8	Analog Output / Digital Output 1
9	0V
10	Digital Input 5 / Analog 2
11	Analog Output / Digital Output 2
12	STO + (Safe Torque Off Input)
13	STO - (Safe Torque Off Input)

O: Stop (Disable)
C: Run (Enable)

Remote Signal Reference Input to Drive from Controller Terminal 6 and 7

+   0V

A

Safe Torque Off Inputs Required to Operate Drive

P2-33: Analog Input 2 (Terminal 10) Format

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

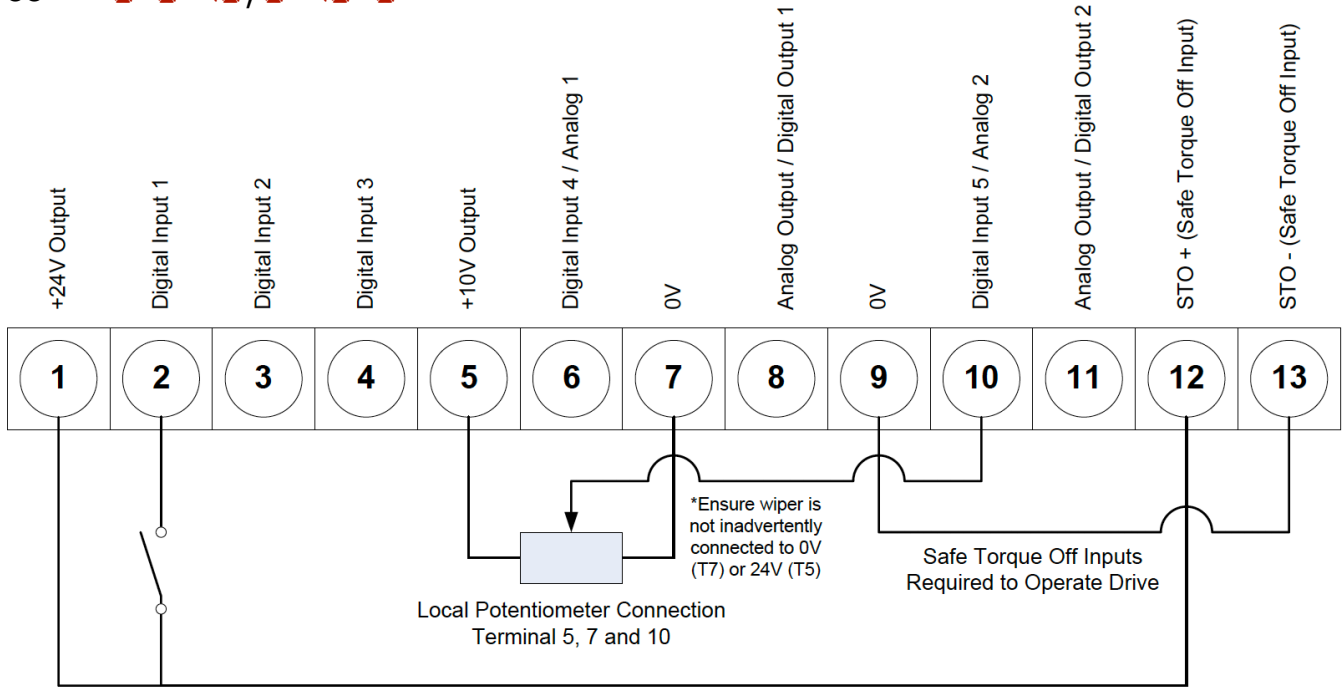|	
U 0- 10	Voltage input, 0V ... 10V (Uni-polar)
U 10-0	Voltage input, 10V ... 0V (Uni-polar)
Ptc-th	Motor PTC Thermistor Input
A 0-20	Current input, 0mA ... 20mA
t 4-20	Current input, 4mA ... 20mA – Drive trip below 3mA
r 4-20	Current input, 4mA ... 20mA – Drive Stop below 3mA
t 20-4	Current input, 20mA ... 4mA – Drive trip below 3mA
r 20-4	Current input, 20mA ... 4mA – Drive Stop below 3mA

When set to 0-10V or 10-0V, all negative voltages will give zero speed.

Typical configurations for the analog input (Terminal 10) are shown below.

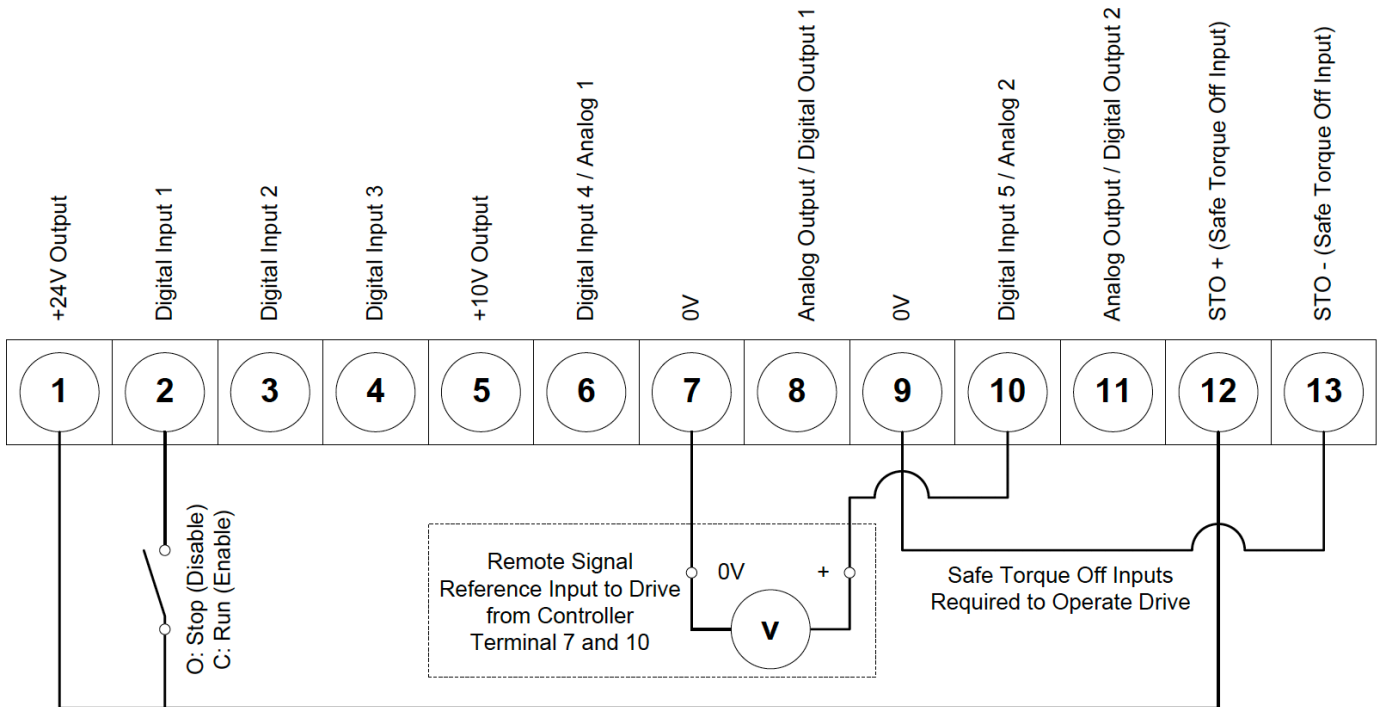## Example 1: Local Potentiometer using drive internal supply voltage.

P2 drives are configured with the internal +10V uni-polar supply for connection to a local Potentiometer.

P2-33 = $U\ 0\text{-}10, U\ 10\text{-}0$

Local Potentiometer Connection
Terminal 5, 7 and 10

*Ensure wiper is not inadvertently connected to 0V (T7) or 24V (T5)

Safe Torque Off Inputs Required to Operate Drive

Example 2: Remote Signal Reference (voltage Source).

P2-33 = $U\ 0\text{-}10, U\ 10\text{-}0$ (Matched to source)

O: Stop (Disable)
C: Run (Enable)

Remote Signal Reference Input to Drive from Controller
Terminal 7 and 10

Safe Torque Off Inputs Required to Operate Drive

Example 3: Remote Signal Reference (Current Source).

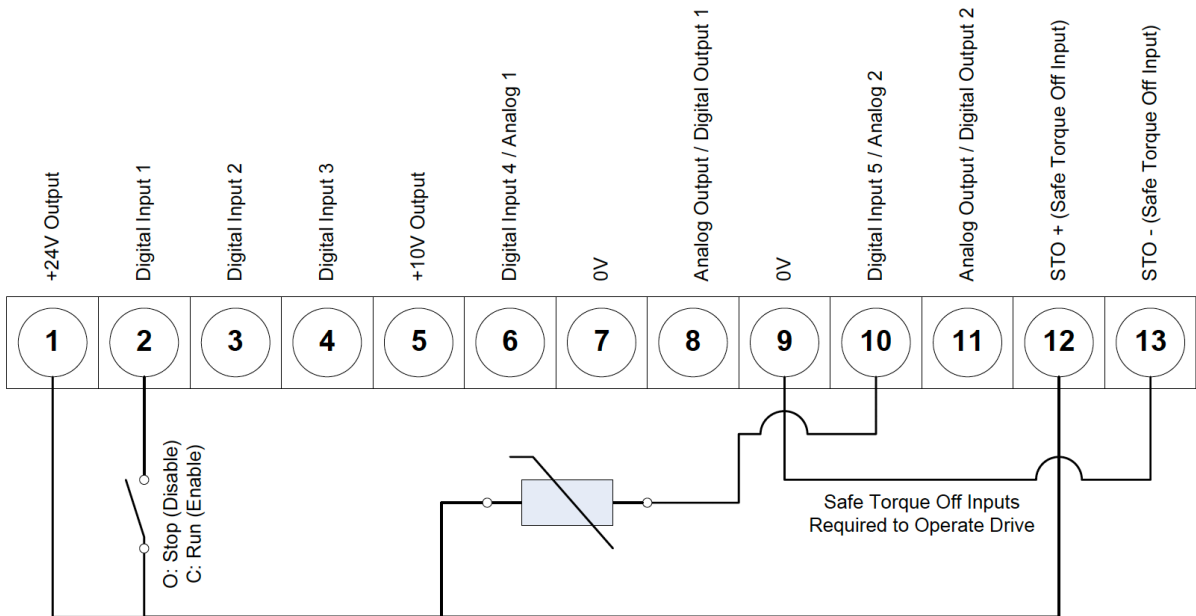P2-33 = *A 0-20, t 4-20, r 4-20, t 20-4, r 20-4* (Matched to source)
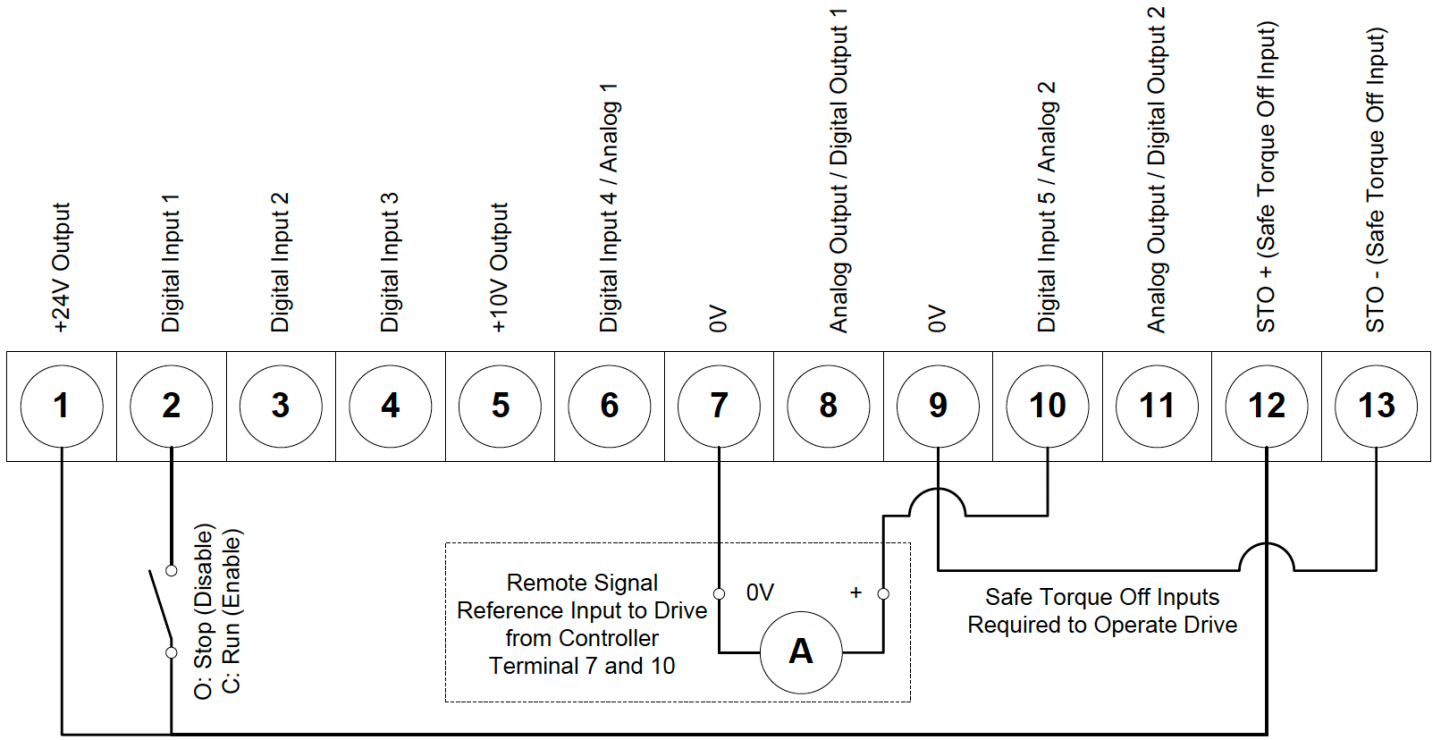
Example 4: Remote Signal Reference (Motor Thermistor).

P2-33 = *Ptc-th*

Compatible Thermistor : PTC Type, 2.5kΩ trip level

Use a setting of P1-13 that have Input 5 function as External Trip, e.g. P1-13 = 6

P2-31: Analog Input 1 (Terminal 6) Scaling

P2-34: Analog Input 2 (Terminal 10) Scaling

This parameter is used to scale the analog input prior to being applied as a reference to the drive. For example, if P2-30 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.

P2-32: Analog Input 1 (Terminal 6) Offset

P2-35: Analog Input 2 (Terminal 10) Offset

This parameter defines an offset for the analog input, 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 P2-30 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.

Appendix:

Revision History			
Version	**Comments**	**Author**	**Date**
1	Document Creation	JP	02/09/12
2	Revised to new format	KB	06/15/15
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