

The Technical Note is pertinent to the Unidrive SP Family

Accommodating Single Ended Encoder Channels

While Unidrive SP expects differential encoder feedback signals when Encoder Type is set to **Ab** or **Ab.5Er_uo**, it is possible to use an encoder that employs single-ended outputs. Single-ended in this case simply means that the Quadrature encoder only has A and B channels (and in some cases a Z channel), but does not have complementary signals A\, B\, or Z\.

For proper industrial strength applications requiring Closed loop operation with encoder feedback, we strongly recommend encoders that provide differential output channels with quadrature. These encoders utilize differential line drivers to drive moderate length of cable runs in industrial environments with good noise rejection properties.

Obviously, fidelity of feedback is of utmost importance in any Closed Loop control system. Anything less can result in erratic and even unpredictable operation. Single ended encoders could possibly be utilized although we don't recommend it nor can we promise reliable operation.

In order to accept the single ended feedback signal, it is necessary to bias the complementary channels on the encoder input to an appropriate voltage. The description below shows how an analog output on the Unidrive SP can be used to supply the necessary voltage to the complementary encoder channels.

The same approach can be used for the Commutation UVW channels.

NOTE

Be aware that the use single ended encoders are **not** recommended. Single ended encoder signals simply do not provide the same amount of noise rejection and drive strength provided by complementary line driver outputs. As a result, industrial ambient electrical noise may result in erratic operation. Good grounding and shield practices throughout will be most important to allow this method to have a fighting chance at working.

**[CHECK THE END OF THIS DOCUMENT FOR THE SUGGESTED INTERFACE SOLUTION
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WIRING

It is possible to wire an analog output signal from the Unidrive SP directly to the complementary channels of the encoder input to achieve biasing in order to attempt to “fake out” the differential receiver requirements.

NOTE: This example utilizes Analog Output 2 from the SP, but Analog Output 1 (Pin 9) could be substituted as desired

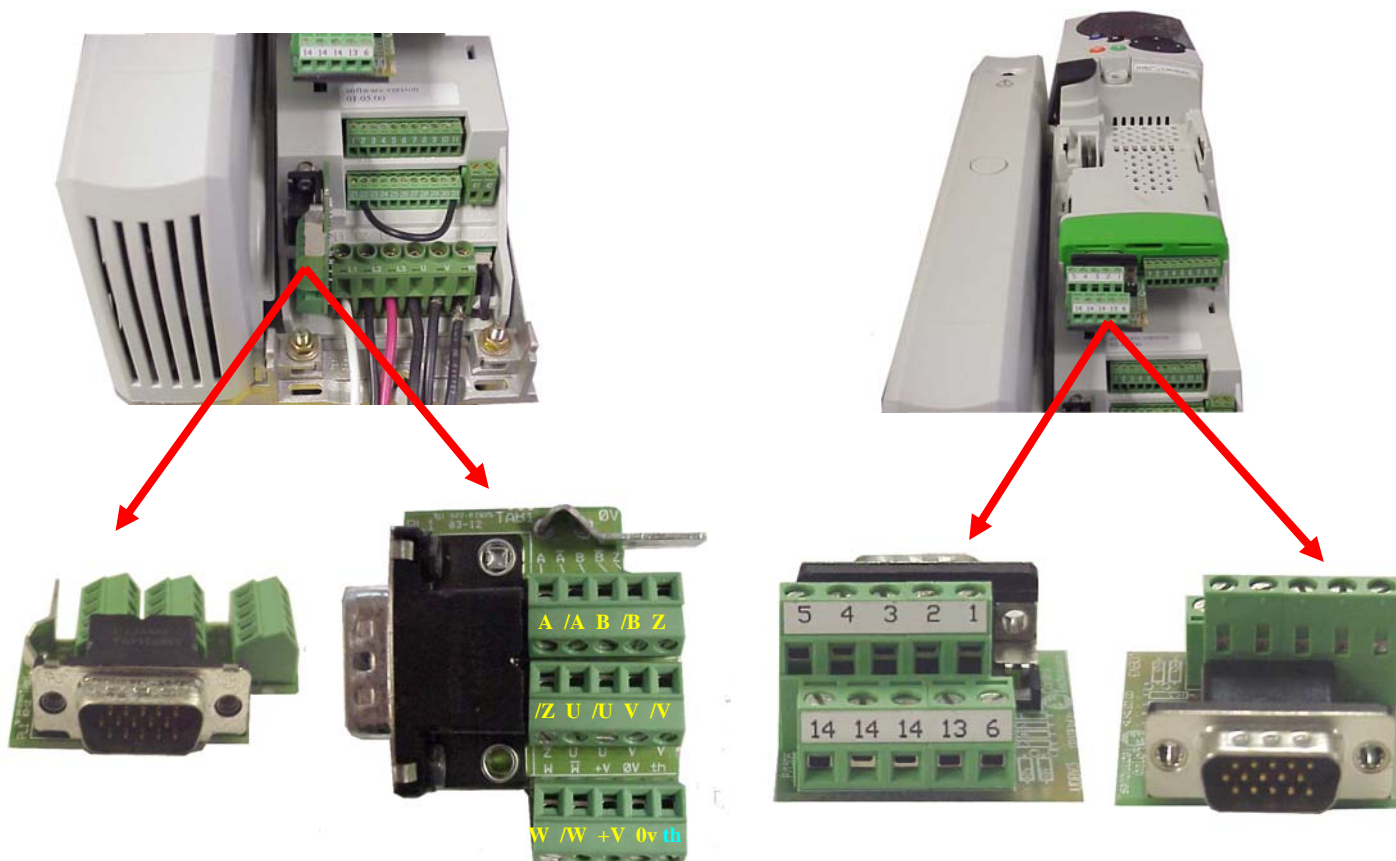
The following method may be tried as a possible alternative to the recommended UT02 board solution

The chart below shows the associated wiring connections.

Unidrive SP Control Connector Pin #	SM-ETC Pin #	Associated Signal
10	2	/A
10	4	/B
10	6	/Z *
10	8	/U
10	10	/V
10	12	/W

Only wire to those channel terminals that need biasing due to being single ended

* - Only necessary if Z Channel (marker pulse) is being used.



SM-ETC

15 pin D connector break out for the drives encoder port

UDBV3

8-position terminal break out for the SM Universal Encoder Plus Module

SETUP

In order for this circuit to function properly, the analog output must be configured to put out ½ of the value used for the encoder supply voltage (Pr3.36). Below is a list of parameters and values related to the Analog Output that must be configured using the Unidrive SP Keypad or CTSOft (or other utility).

Set #3.38 = *Ab* or *Ab.5Erud* depending on whether you have UVW comm tracks or not

Set #3.36 = the encoder voltage requirements

If #3.36 voltage is set greater than 5v, set #3.39 =0 to disable the internal termination resistors as damage could occur to internal circuitry. External termination may be necessary for proper transmission line wave reflection reduction purposes.

Set 7.22 =18.11 Set Analog Output 2 Source to parameter 18.11

Set 7.23 = 1.000 Set Analog Output 2 Scaling to 1 (could be adjusted to trim output)

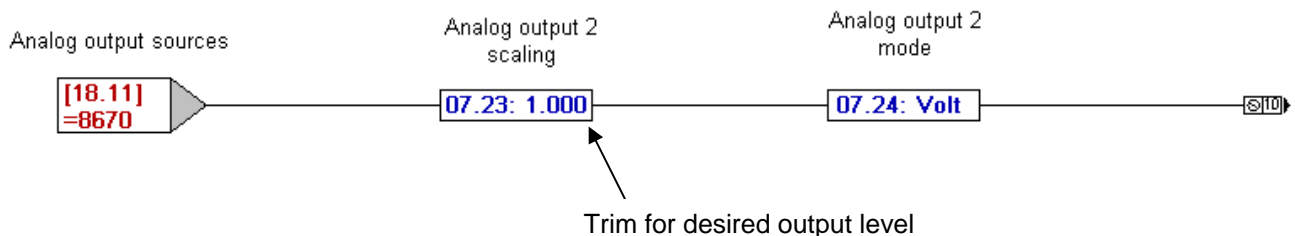
Set 7.24 Set to 0 or ***UOLt*** Set Analog Output 2 Mode to Voltage mode

Set 18.11 This value depends on the setting of parameter 3.36 in the Unidrive SP.

For 3.36 = 5V: 8670

For 3.36 = 8V: 13870

For 3.36 = 15V: 26000



Set parameter 18.11 to corresponding value in order to get 2.5V, 4.0V, or 7.5V on the Analog Output 2 channel.

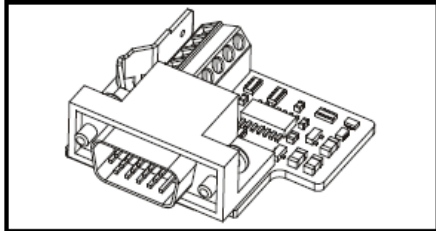
Remember that after setting parameters in the chart above to the correct value, the **RED** reset button on the drive must be pressed before the parameter values will take effect. Also note that the analog output on each SP may be calibrated slightly differently, and hence the corresponding value for parameter 18.11 may need to also change slightly or you could trim the output with the Analog Output Scaling #7.23 in this example

These values are only stored in RAM and will be lost on power-down unless an SP parameter save is performed. Set #xx.00 = 1000 then depress the **RED** reset button on the drive.

UT02 Single Ended Encoder Interface

The 15V & 24V Single Ended Encoder Interface boards are intended for use on Unidrive SP, Digitax ST and the SM-Universal Encoder Plus. They are interface devices that convert 15V or 24V single ended logic signals, obtained from sources such as Hall Effect digital position sensors or encoders (such as those on Leroy Somer LS RPM permanent magnet motors) into differential EIA485 compatible signals used by the drive. The interface boards can be used with both UVW commutation or high frequency ABZ signals. Their power is taken from the 15Vdc supply on the drive. The interface board connects directly to the 15-way D-type encoder port on the drive, while a 5-way connector block is provided for the logic inputs and a 15Vdc output. Outputs to the drive for both 15V and 24V versions are 5V differential equivalents of the inputs. The 15V version is suitable for use with LS RPM motors.

Figure 1-1 Single Ended Encoder Interface



UT02-15V is P/N EIB-SE-15V
and
UT02-24V is P/N EIB-SE-24V

1.1 Identification

The different voltage versions of the 15V & 24V Single Ended Encoder Interface boards can be identified by the label located on top of the D-type connector, as shown in the figures below.

Figure 1-2 15V model label

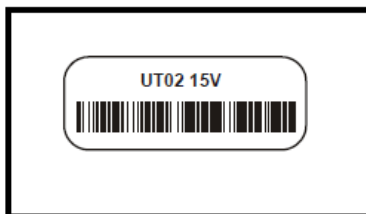
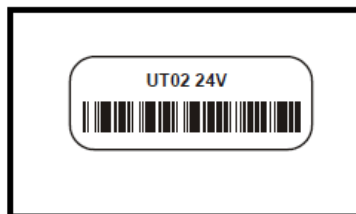


Figure 1-3 24V model label



1.2 Installation

The Single Ended Encoder Interface board should be installed in the drive's 15 way D-type encoder port as shown below. Two screws are included in the box that should be used to ensure the interface board is securely connected to the encoder port on the drive or SM-Universal Encoder Plus. If using a Unidrive SP size 1 or larger, the interface board should only be connected to a SM-Universal Encoder Plus when the Solutions Module is installed in slots 2 or 3.

Figure 1-4 Installation of the Single Ended Encoder Interface

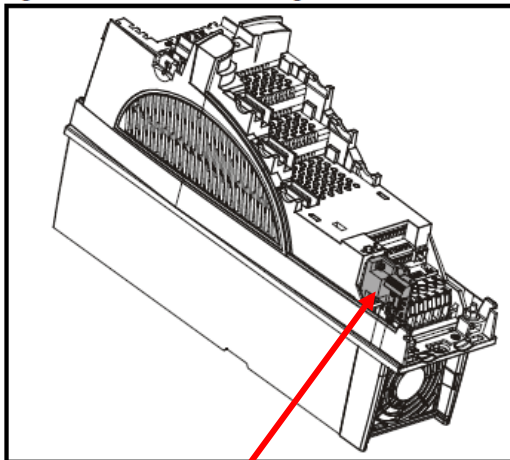
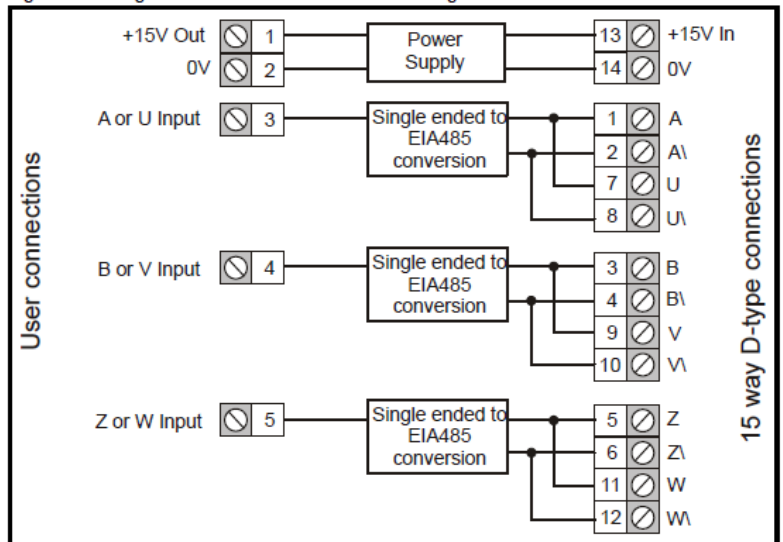


Figure 1-5 Single Ended Encoder Interface block diagram



If you need A, /A , B ,/B and U ,/U V , /V , W , /W you could use 2 of the UT02 interface boards mounted externally. You would need to 15 pin female connectors to plug into the UT02's then from there to a 15pin male that would plug into the drive encoder port.

