



Trouble Shooting Guide for Incremental Encoders

PROBLEM OR SYMPTOM	ACTION
No encoder output	<ul style="list-style-type: none"> • Verify the encoder shaft is moving. The encoder shaft must be rotating to produce an output. • Verify all wiring between the encoder and the counter/controller and the power supply are still connected. • Ensure the encoder output type matches the input type needed by the receiving device and is wired correctly. See TB-109. • Make sure the correct supply voltage is present at the encoder and also make sure it is the same as prescribed on Encoder label. • If another encoder is available, try it to confirm the encoder is the problem. • If possible, perform a field test using a DVM or scope to check for outputs. • Long cable runs can reduce signal strength to the point where a counter/controller cannot count the pulses. • Send the encoder to BEPC for testing using BEPC's Repair or Evaluation Form.
Only one channel is operating	<ul style="list-style-type: none"> • Ensure the encoder has multiple outputs (i.e. a quadrature encoder vs. a single channel encoder.) • Check the installation and wiring diagram for proper hook-up.
Missing or extra counts	<p>Electrical</p> <ul style="list-style-type: none"> • Confirm encoder output is compatible with the counter/controller input requirements. See TB-109. • Check for electrical noise at your counter/controller. Sources can be difficult to find and remedy. EMI radiated noise and conducted cable noise can come from any number of possible sources like variable speed drives, power leads, switching solenoids/relays and electric motors. Several methods can be used to reduce noise at your counter/controller. <ul style="list-style-type: none"> - Ensure equipment (motors, drives, shafts, etc) have a good earth ground and ground loops are not the source of noise. - Always route power and signal lines separately. - Signal wire continuity should be maintained from encoder to the counter/controller. (i.e. avoid junctions, splices). - Signal lines should be twisted and shielded, and placed at least 12 inches from other signal lines, and power leads. - Connect encoder cable shield to earth ground at counter/controller end leaving the end near the encoder disconnected. - If possible, use differential line driver signal outputs with high quality twisted, shielded pair cable. The complimentary signals greatly reduce common mode noise levels as well as signal distortion resulting from long cable lengths. See WP-2005. - Supply clean regulated power to encoder and associated equipment.(+/-2%) <p>Mechanical</p> <ul style="list-style-type: none"> • Check for proper anti-rotational mounting of the encoder. • Coupling is tight and not slipping. • If belt is used check for slippage and correct tension. • If a wheel is used for liner measurement make sure it is the correct wheel for the application and is working correctly. • When turning encoder shaft, roughness or side movement can mean you have bad bearings which can cause erratic readings. <p>Environmental</p> <ul style="list-style-type: none"> • Check Operating Temperature rating if used in extremely cold or hot environments. • Check IP seal rating if used in dust or water environments.



Trouble Shooting Guide for Incremental Encoders

PROBLEM OR SYMPTOM	ACTION
B channel leading A on quadrature units; Counts indicate wrong direction	<ul style="list-style-type: none"> • Reverse the wiring on the receiving end of the signals for A & B (A' & B' also for differential encoders.) This action should produce the desired results, however it may not be the correct solution.. • If differential signals are being used, make sure that both sides are properly wired. • Note: If a Marker pulse is being used, reversing the wiring will cause the reference alignment to change.
Counts in only one direction	<ul style="list-style-type: none"> • Make sure that the counter/controller is capable of, and programmed for, bi-directional counting. • Make sure the input selection type programmed into the counter/controller matches the Encoder. If there is a mis-match, the system may not work properly. • On quadrature units, both channels (A and B) must be present and operational. Check by using a dual channel oscilloscope.
Index pulse not working	<ul style="list-style-type: none"> • Verify wiring. • The counter/controller may not be capable of detecting a Marker pulse at higher RPM's. Slowing down the rotation may allow for detection of the Marker pulse. • The index pulse occurs only once per revolution, and can be difficult to check with a volt meter. Check Marker pulses with an oscilloscope.
Rough bearings/bearing noise	<ul style="list-style-type: none"> • Misalignment or improper installation. See installation instructions for your encoder located in the Information Bulletins section on www.encoder.com (EPC Website)
Premature encoder failure due to harsh environment	<ul style="list-style-type: none"> • An encoder with a shaft seal may be all that is necessary to eliminate this problem. • An encoder design with a special outer housing may be required.
Premature encoder failure due to high temperature	<ul style="list-style-type: none"> • Occasionally some applications require the encoder be specified to operate at high temperatures. EPC does offer 100° C or 120° C options on some encoders.
Premature encoder bearing failure	<ul style="list-style-type: none"> • Improper shaft loading may be the cause. The selection of a unit with a heavy duty rating may resolve this problem. However, if the shaft loading is in excess of the required loading, a flexible coupling may help extend the life of the encoder. Proper alignment most likely will alleviate the need for an HD unit all together. See WP-2003.
<p>Technical Support: Please refer to our online Technical Bulletins and Literature Library for immediate information. For assistance or any technical support inquiries, please call our Technical Support Department at +44 (0)1978 262100 or Email steve.dixon@encoder.co.uk</p>	