AMCI ADVANCED MICRO CONTROLS INC.

DuraCoder®

An integrated resolver based encoder designed as a direct replacement for optical encoders in motion sensing applications

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Beyond traditional solutions

For rotary motion sensing in industrial applications, two types of products have conventionally been employed. Traditionally, resolvers have offered the highest reliability in harsh industrial environments. However, until now their durability has come with a relatively high cost per unit. At a much lower price, optical encoders have proven a more economical solutions for many applications. But the relative fragility of their constructions typically leads to the need for frequent replacement. The AMCI DuraCoder® represents a technological advance that gives users a new and optimum choice.

The DuraCoder® optical encoder replacement

DuraCoder® is an integrated resolver-based encoder. So it offers all the reliability and durability of its resolver predecessors. However, significant technology breakthroughs in design and manufacturing make DuraCoder® less expensive than a typical resolver system. In fact, it's priced at the optical encoder level. That means that DuraCoder® can easily and economically replace the optical encoder in any industrial rotary motion sensing application. This includes applications requiring absolute measurement, where the device provides a unique, incorruptible output code for each shaft position, as well as incremental measurement, where the device measures precise distance traveled from a reference point.

Field-programmable

The implementation of LSI and surface-mount technologies also allows DuraCoder® to offer a user programming option. Using simple onboard switches, technicians and engineers can easily select the unique resolution (in pulse per turn) required by each incremental application. Since users no longer have to maintain a separate stock of unique spares for each application – as demanded by nonprogrammable optical encoders – DuraCoder® greatly simplifies inventory requirements and technical support.

Additional Features

Robust DuraCoder® design doesn't stop with brushless resolver technology. Six O-ring housing seals are used for maximum protection against all contaminants. Contact bearing seals give excellent protection against dust and water. The use of larger bearings allows 40% greater loading capacity than conventional encoders. This translates into longer life and less downtime for most applications. Various shaft modifications are available; please contact the factory.

Typical DuraCoder® applications

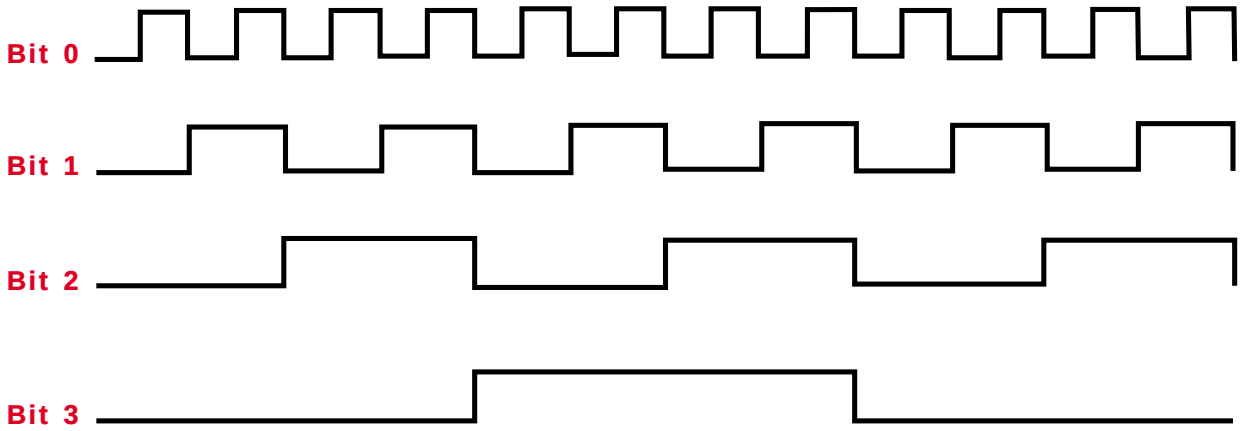
- Machine Control
- Process Control
- Lumber/Sawmill Machinery
- Motor Control Feedback
- Textile Machinery
- Robotics
- Machine Tools
- Printing Equipment
- Metal Stamping/Forming
- Packaging Machinery
- Paper Process Machinery
- Assembly Machinery

Absolute Single Turn Digital Output Version

The AMCI absolute digital output DuraCoder® provides unique position data output in relation to shaft position, with resolutions up to 12 bits. The absolute DuraCoder® assigns a unique position value to each measured increment. This prevents erroneous readings caused by power failure. As power is restored, the absolute position data is reported without the need for a homing sequence or reference signal.

Output resolutiuon can be ordered factory set or programmable, allowing the user to set the output code and resolution.

Example of Absolute Digital Signal



DC25 □ - B □ □ □ □ □

HOUSING
F = Square Flange
S = 2.5 '' Dia. Servo Flange

BEARING SEAL

SHAFT DIA.
1 = 0.375'' Dia.
2 = 10 mm Dia.
3 = 0.250'' Dia.

DURACODER® TYPE
A = Absolute Parallel Lever Update[1]
B = Absolute Parallel Edge Update[2]
L = Absolute Parallel Level Update[1], Mx[3]
E = Absolute Parallel Level Update[2], Mx[3]

OUTPUT SCALING
1 = 1,024 Gray Code
2 = 1,024 Natural Binary
3 = 4,096 Gray Code
4 = 4,096 Natural Binary
5 = 360 BCD
6 = 1000 BCD
7 = 3600 BCD
8 = Programmable Resolution and Output Code
B0002 to B4096 Factory Set Binary
D0002 to D4000 Factory Set BCD
G0002 to G4096 Factory Set Gray

OUTPUT CONFIGURATION
HIGH TRUE OUTPUTS
A = Current Source, Single Ended, 24 Vdc. Max.
B = Current Sink, Single Ended, 24 Vdc. Max.
C = Current Sink, Single Ended with 10KΩ Pull Up Resistor.
LOW TRUE OUTPUTS
F = Current Source, Single Ended, 24 Vdc. Max.
G = Current Sink, Single Ended, 24 Vdc. Max.
H = Current Sink, Single Ended, with 10KΩ Pull Up Resistor.

CONNECTOR
S = Side
E = End

Notes:

1) Level Update- The outputs continuously update when a logic"1" voltage is supplied to the input pin.

2) Edge Update- The outputs update only when the voltage supplied to the input pin makes a transition.

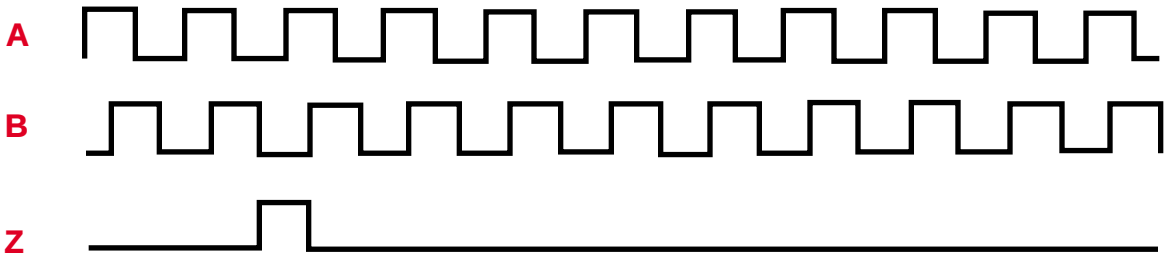
3) Mx- Multiplex option. Outputs are passive when the input pin is pulled to GND. Allows multiple DuraCoders® on single input wires.

Incremental Digital Output Version

The incremental digital output DuraCoder® is a virtually indestructible encoder for industrial motion applications. The Incremental DuraCoder® comes with a unique feature - programmability. The DuraCoder® is designed to allow the customer to set the number of cycles per turn to any value between 2 to 4096. This feature allows the customer to reduce inventory while maintaining the variety of output configurations present in any automation environment.

The DuraCoder® produces the standard quadrature output signals allowing for both unidirectional and bi-directional operation. The DuraCoder® also produces a marker pulse for homing or turns counting applications. Output types include sinking, sourcing, or differential line driver.

Example of Incremental Digital Signal



DC25 □ - B □ □ □ □ □

HOUSING
F = Square Flange
S = 2.5'' Dia. Servo Flange

BEARING SEAL

SHAFT DIA.
1 = 0.375 '' Dia.
2 = 10 mm Dia.
3 = 0.250'' Dia.

DURACODER® TYPE
N = Incremental, Gated
M = Incremental, Upgraded
Single Ended output only.
T = Incremental, Gated
2-Speed Resolver
F = Incremental, Gated
4-Speed Resolver

OUTPUT SCALING
IF DURACODER® TYPE= M, N
PRGM - Field Programmable
0002 to 1024 - Factory Set
IF DURACODER® TYPE =T
PRGM - Field Programmable
0004 to 2048† - Factory Set
†Multiples of 2 only.
IF DURACODER® TYPE = F
PRGM - Field Programmable
0008 to 4096‡- Factory Set
‡Multiples of 4 only.

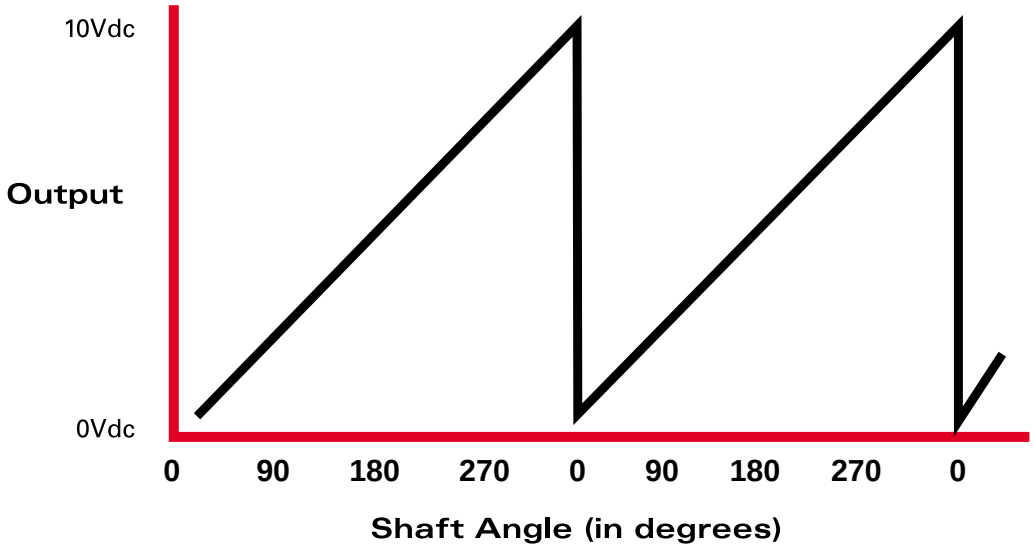
CONNECTOR
S = Side
E = End

OUTPUT CONFIGURATION
A = Current Source, Single Ended,
24 Vdc Max.
B = Current Sink, Single Ended,
24 Vdc Max.
C = Current Sink, Single Ended,
with 2.2 kΩ Pull Up Resistor.
D = Differential Line Driver
5 Vdc Output Only.
Not available with Type M.
E = Current Source, Single Ended,
with 2.2KΩ Pull Down Resistor.

Absolute Single Turn Analog Output Version

Designed as a replacement for potentiometers, the analog output DuraCoder® is a perfect fit for closed loop process control. Available with analog voltage or analog current output, the analog DuraCoder® has an output format for any application. The analog DuraCoder® can be selected to produce the full output signal over 360, 180, 90, or 45 degrees. Available output signals include 0-5Vdc, 0-10Vdc, +/-5Vdc, or +/-10Vdc for analog voltage output. The analog current output versions are 4 to 20mA, 0 to 20mA, or 0 to 24mA.

Example of Analog Voltage Signal



DC25 □ - B □ □ □ □ □

HOUSING
F = Square Flange
S = 2.5 '' Dia. Servo Flange

BEARING SEAL

SHAFT DIA.
1 = 0.375'' Dia.
2 = 10 mm Dia.
3 = 0.250'' Dia.

DURACODER® TYPE
V = Analog Voltage
C = Analog Current

OUTPUT SCALING
IF DURACODER® TYPE=V
1 = 0 to 5 Vdc
2 = 0 to 10 Vdc
3 = ±5 Vdc
4 = ±10 Vdc
5 = -5 to 0 Vdc
6 = -10 to 0 Vdc
IF DURACODER® TYPE=C
1 = 4 to 20 mA
2 = 0 to 20 mA
3 = 0 to 24 mA

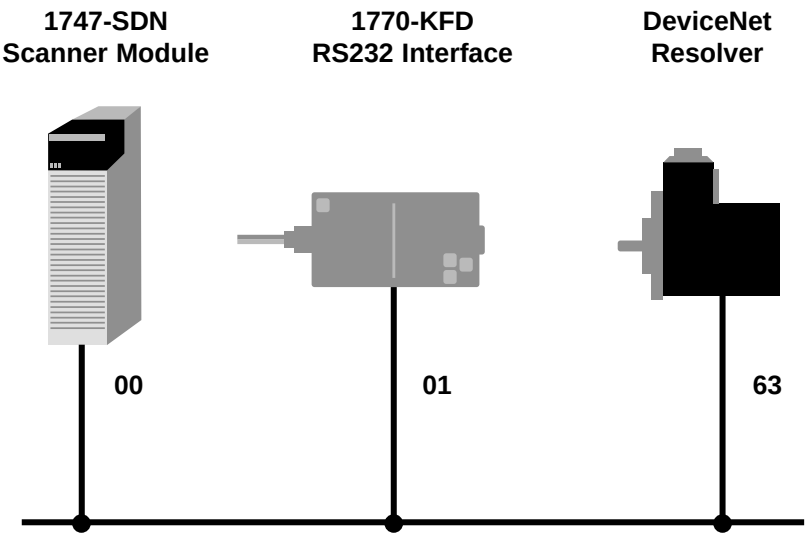
OUTPUT CONFIGURATION
IF DURACODER® TYPE = V, C
K = 360º Output Signal Period
L = 180º Output Signal Period
M = 90º Output Signal Period
N = 45º Output Signal Period

CONNECTOR
S = Side
E = End

Absolute Serial/DeviceNet Output Version

As the use of networks increased in automation control, a networkable encoder was required. AMCI has filled that need with the DeviceNet DuraCoder®. Developed using the resolver device profile defined by ODVA, the DeviceNet DuraCoder® provides the durability of a resolver with the connectivity and versatility of a network. The resolution of the DeviceNet DuraCoder® is programmable over the network to a maximum value of 4096. Other programmable features include zero offset and programmable limit switch outputs.

Example of DeviceNet Network



DC25 □ - B □ S 1 X □

HOUSING
F = Square Flange
S = 2.5'' Servo Dia. Flange

BEARING SEAL

SHAFT DIA.
1 = 0.375'' Dia.
2 = 10 mm Dia.
3 = 0.250'' Dia.

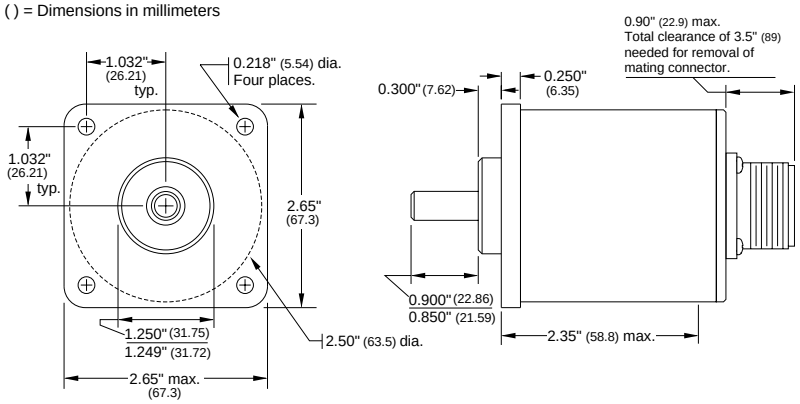
DURACODER® TYPE
S = Absolute Serial Data

OUTPUT CODING
1 = DeviceNet

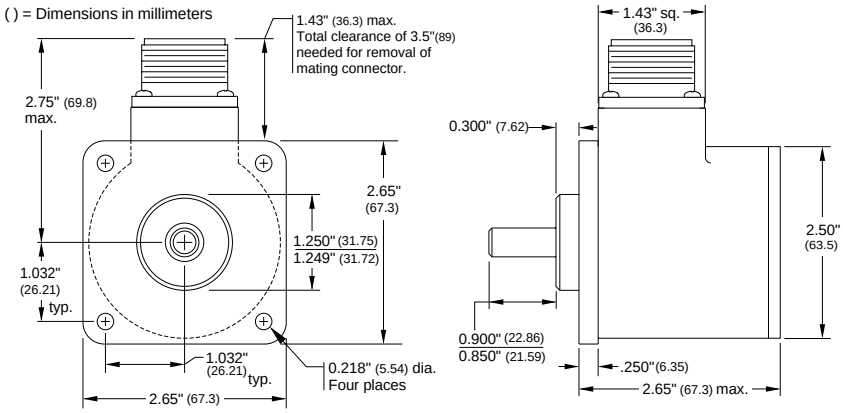
CONNECTOR
X = Not used
Reserved for Future Expansion

CONNECTOR
S = Side
E = End

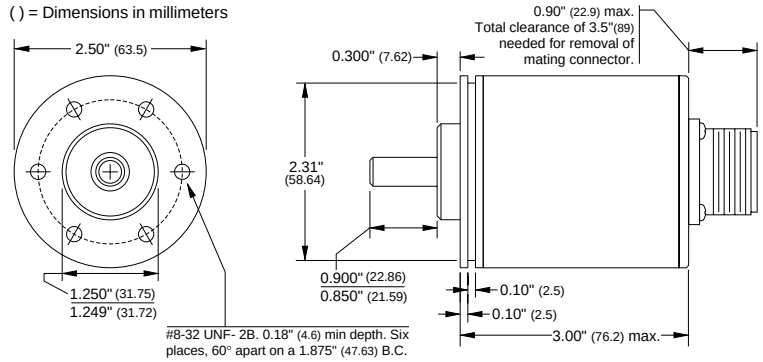
( ) = Dimensions in millimeters



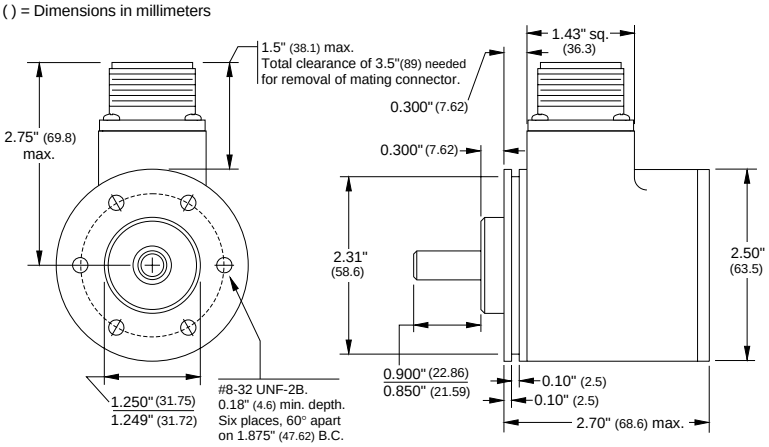
( ) = Dimensions in millimeters



( ) = Dimensions in millimeters



( ) = Dimensions in millimeters



DuraCoder® Specifications

Electrical

Incremental Type

Code Format:	2 square waves in quadrature with standard gated index
Cycles Per Turn:	2 to 4096 factory set Optional– field-programmable
Frequency Response:	Data –210 kHz (min.) Index –125 kHz (min.)
Output Configuration:	Current Source, 5 to 24 V dc Current Sink, 5 to 24 V dc Current Sink with 2.2 kΩ pull-up resistor, 5 to 24 V dc Differential Line Driver, 5 V TTL

Absolute Parallel Type

Code Format:	Gray; Binary; 4096 bits (max.) BCD; 3600 counts full scale (max.)
Frequency Response:	50 kbits/sec (minimum)
Output Configuration:	Open Collector

Absolute Serial Type	Binary; 4096 bits (max.) DeviceNet
Analog Type	0 to 5 V dc; 0 to 10 V dc; ± 5 V dc; = 10 V dc 4 to 20 mA; 0 to 20 mA
Resolution (All Types)	12 bits

Drive Capability

Source:	10 mA @ 5 V dc 30 mA @ 24 V dc
Sink:	10 mA @ 5 V dc 30 mA @ 24 V dc
Differential:	20 mA
Power Requirements (All Types)	5 to 24 V dc

Mechanical

Package Style:	2 1/2'' dia. flange or servo
Shaft	1/4, 3/8'' or 10 mm dia. stainless
Shaft Loading:	Axial 50 lb, radial 100lb
Connector:	Axial or radial

Environmental

Housing:	NEMA 4 rated
Connector:	MS "R" style
Operating Temperature:	-40ºC to 85º C standard
Humidity:	98% relative humidity, noncondensing
Shock:	50g 11 msec duration
Vibration:	20g, 5 to 2000 Hz

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