AMCI ADVANCED MICRO CONTROLS INC.

RESOLVER TRANSDUCERS

Product Profile

www.amci.com

ADVANCED MICRO CONTROLS INC.
20 Gear Drive, Plymouth Industrial Park, Terryville, CT 06786
Telephone: (860) 585-1254 Fax: (860) 584-1973 www.amci.com

Company Overview

Every product AMCI manufactures needs to exceed the demands of the application. AMCI resolver transducers have proven to survive in some of the harshest, most extreme conditions. Constant evolution of the product has produced a wide range of styles and options to satisfy most requirements.

AMCI manufactures every part of the transducer; including the R11 resolver that is hand-wound and tested to ensure consistent quality. From there, the resolver is mounted in a rugged, industrial NEMA 4 or NEMA 4X enclosure that protects and isolates the resolver sensor.

The most popular transducer, the HT-20, has been solving the majority of applications since its release in 1985. As you can see from the products in this publication, many other transducers are available. The hardest part is deciding which one is best. Our sales staff at AMCI will be able to guide you through the selection process and also match the correct electronics to that transducer.

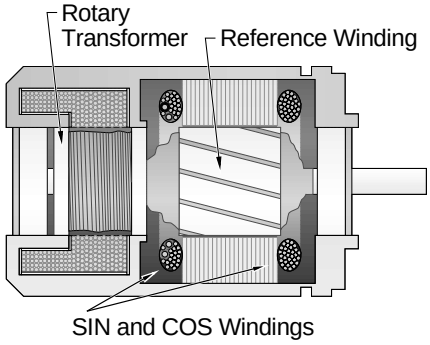
AMCI maintains a large inventory of product to ship without delay. Call us today to help you select the correct AMCI system.

Note: The complete contents of this brochure are available in a .PDF format at www.amci.com. The mechanical drawings are also available separately as an ACAD .DWG or. PDF format.

Brushless Resolver Description

The brushless resolver is unsurpassed by any other type of rotary position transducer in its ability to withstand the harsh industrial environment. An analog sensor that is absolute over a single turn, the resolver was originally developed for military applications and has benefited from more than 50 years of continuous use and development.

The resolver is essentially a rotary transformer with one important distinction. The energy coupled through a rotary transformer is not affected by shaft position whereas the magnitude of energy coupled through a resolver varies sinusoidally as the shaft rotates. A resolver has one primary winding, the Reference Winding, and two secondary windings, the SIN and COS Windings. The Reference Winding is located in the rotor of the resolver, the SIN and COS Windings in the stator. The SIN and COS Windings are mechanically displaced 90 degrees from each other. In a brushless resolver, energy is supplied from the Reference Winding to the rotor by a rotary transformer. This eliminates brushes and slip rings in the resolver and the reliability problems associated with them.



In general, the Reference Winding is excited by an AC voltage called the Reference Voltage (VR). The induced voltages in the SIN and COS Windings are equal to the value of the Reference Voltage multiplied by the SIN or COS of the angle of the input shaft from a fixed zero point. Thus, the resolver provides two voltages whose ratio represents the absolute position of the input shaft. (SINØ / COSØ = TANØ, where Ø = shaft angle.) Because the ratio of the SIN and COS voltages is considered, any changes in the resolver's characteristics, such as those caused by aging or a change in temperature, are ignored.

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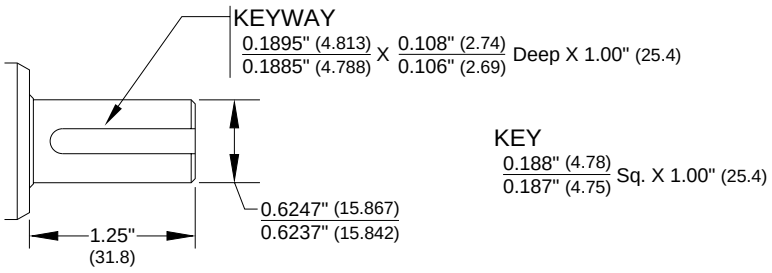
Resolver Transducers

This broad line of NEMA 4 and 4X rated transducers includes single turn H25 series with size 25 optical encoder mounting styles to the HMT-20, 3 resolver, 10,000 turn series. Select a Resolver Transducer Series for your specific application requirement from the table below.

Series	Shaft Diameter	Mounting	Number Of Resolvers	Turns For Full Scale
H25	0.250" or 0.375" or 10 mm	Flange or Servo	1	1
HT-20	0.625"	Front or Side	1	1
HT-20-(x)	0.625"	Front	1	(x) See Chart on Page 9
HTT-20-(x)	0.625"	Front	2	100, 180, 1,000, or 1,800
HMT-20-(x)	0.625"	Front	3	10,000
HTT-425	0.250" or 10 mm" or 0.625"	Motor or Front or Foot	2	100 or 1,000
HMT-425	0.250" or 10 mm" or 0.625"	Motor or Front or Foot	3	10,000
HT-400	0.625"	Front	1	1
HTT-400-180	0.625"	Front	2	180
R11	0.120" or 0.125" or 0.187"	Servo	1	1

Keyway Specifications

All AMCI Transducers with 5/8" (0.625'') shafts have keyways. Instead of repeating the keyway specs on each drawing, the specifications are given here and the drawings refer to this page. The specifications of the key that is included with each transducer is also given.



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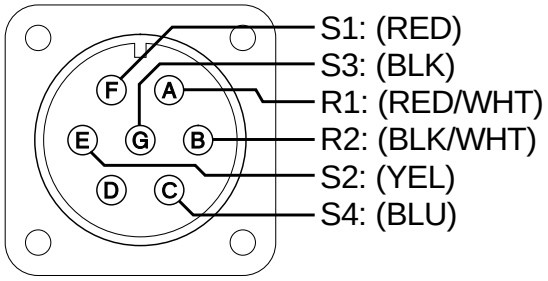
H25 Series

The H25 resolver transducer package offers a variety of mounting and connector styles. This package is the size of a 2.5'' optical encoder yet provides the ruggedness and durability of a resolver. No optical encoder can match its specifications. Available with 3/8'', 10 mm or 1/4'' shaft, mil-spec connector or integral cable, and flange or servo mount.

Connectors to: H25-FE, H25-FS, H25-SE H25-SS | **H25-FL & H25-SL**

Bendix Connector: MS3102E16S-1P

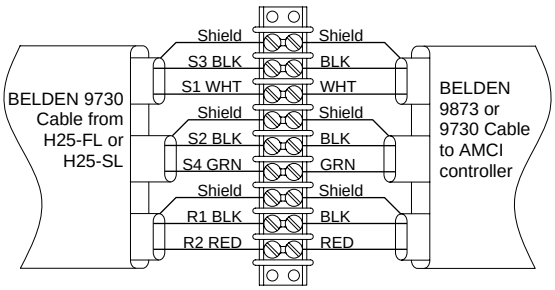


Female Mate to Connector		AMCI Part #
MS3106A16S-1S	Straight	MS-16
MS3108A16S-1S	Rt. Angle	MS-18
MS3106F16S-1S	Watertight	MS-161

Sample Illustration

The picture below shows the pinout of the integral cable and suggested wiring to extender cable. Connections to your AMCI module or controller follow published cable prints.

Note that the shields of the cable must not be connected to chassis ground except at the AMCI Controller.



Specifications

Mechanical

Shaft Loading: .....Radial:40lbs. max.
.....Axial:20lbs. max.
Starting Torque: .....1.5 oz.-in @ 25˚C
Moment of Inertia: ...$600X10^{-4}$ oz-in-sec^2 max.
Weight: .....1lb.
Housing: .....Powder-coat Aluminum
Shaft: .....303 Stainless Steel

Environmental

Shock: .....50g's for 11mSec
Vibration: .....5 to 2000Hz @ 20g's
Operating Temp: ...-20 to 125˚C

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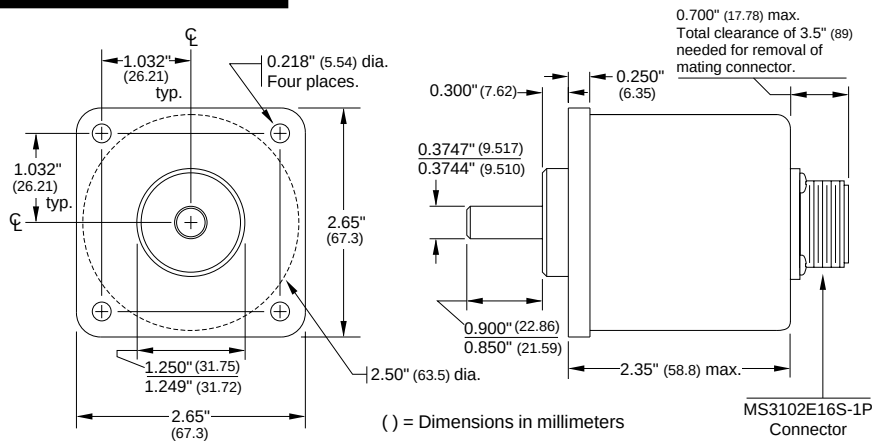
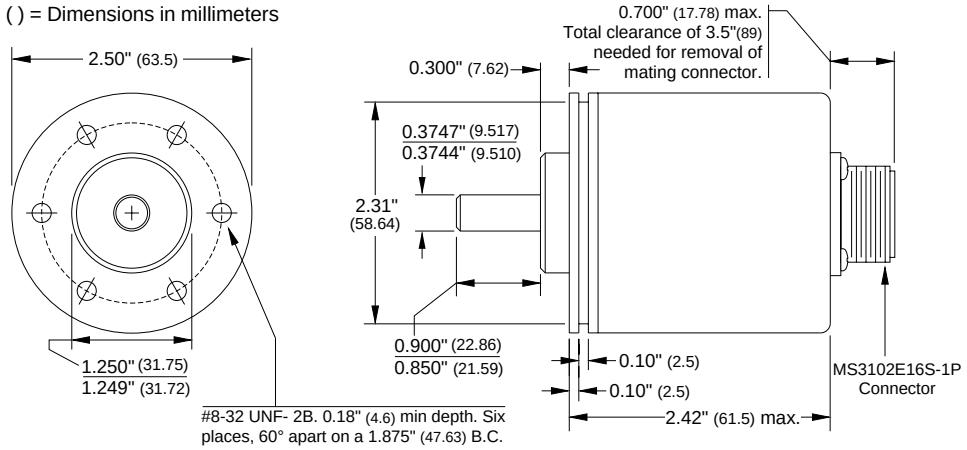
Dimensional Drawings

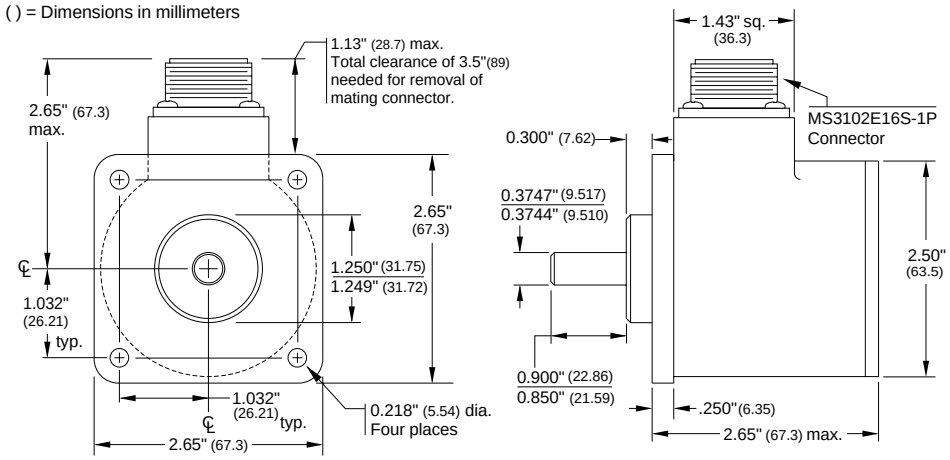
H25-FE Enclosure: NEMA 4



H25-SE Enclosure: NEMA 4

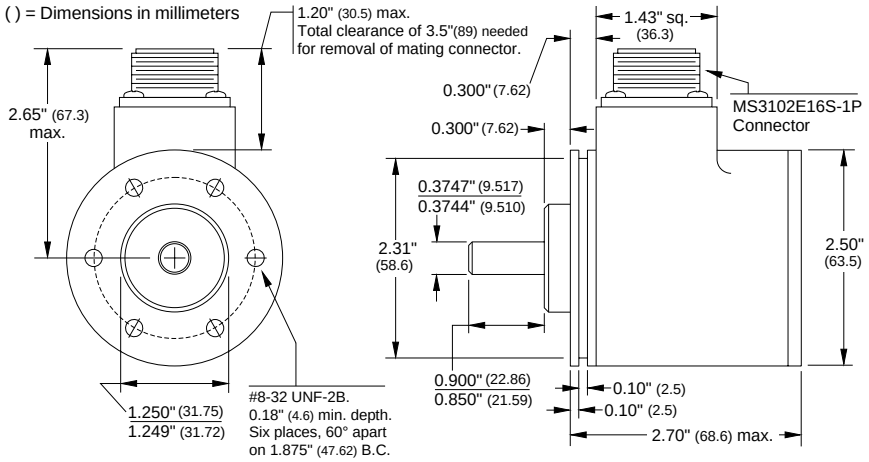


H25-FS Enclosure: NEMA 4

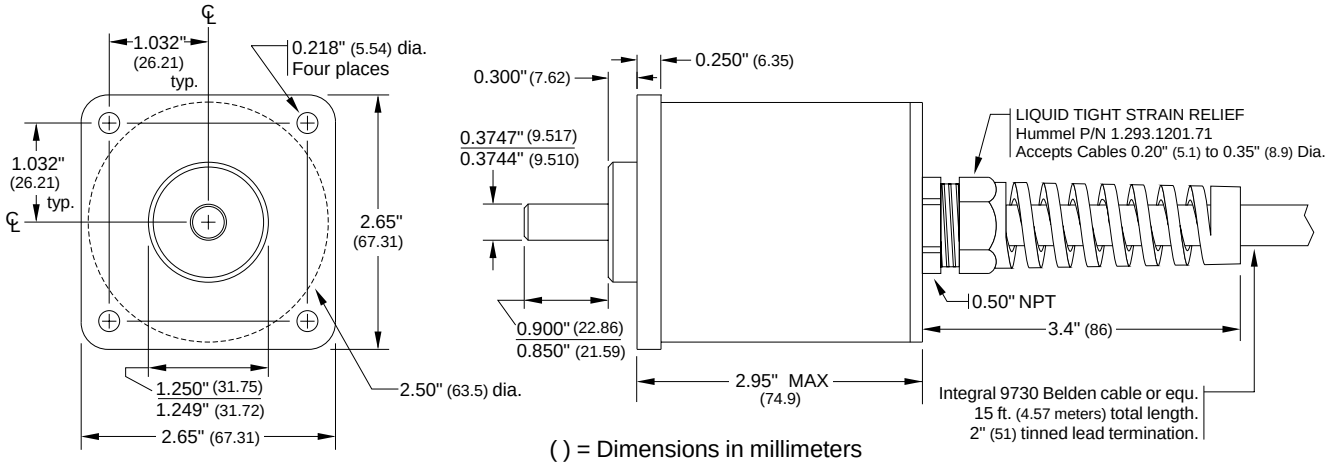


Dimensional Drawings

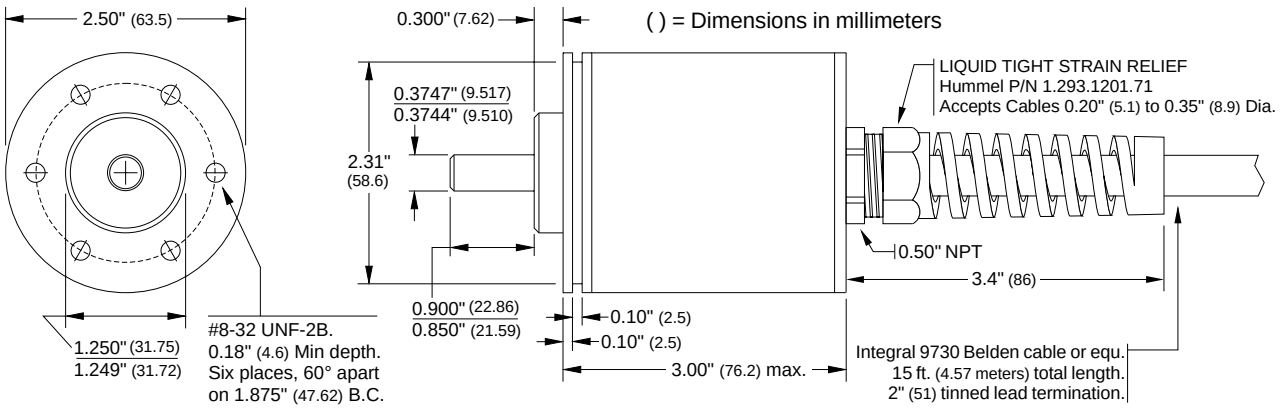
H25-SS Enclosure: NEMA 4



H25-FL Enclosure: NEMA 4



H25-SL Enclosure: NEMA 4



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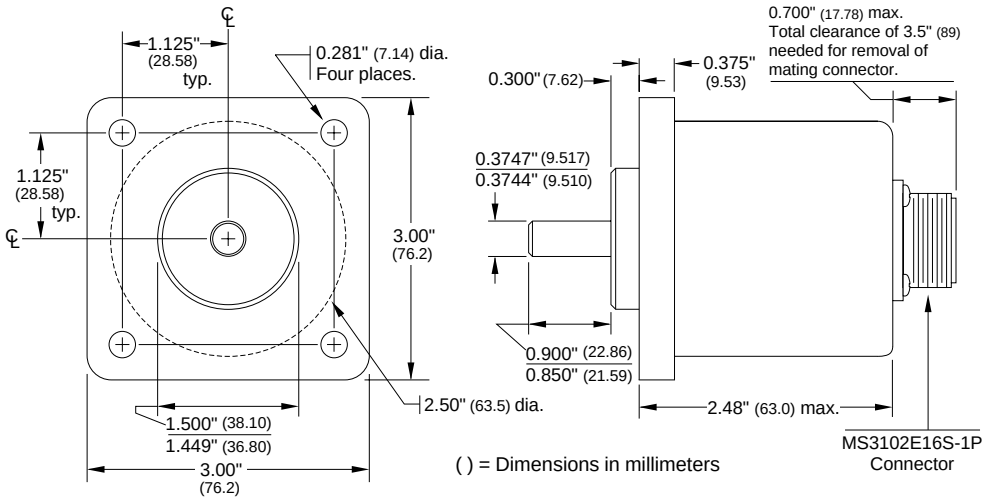
Dimensional Drawings

H25-F1E Enclosure: NEMA 4

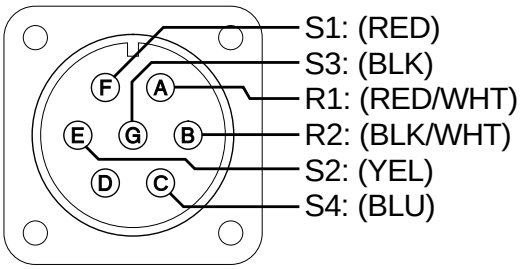


HT-6 Transducer

Specifications

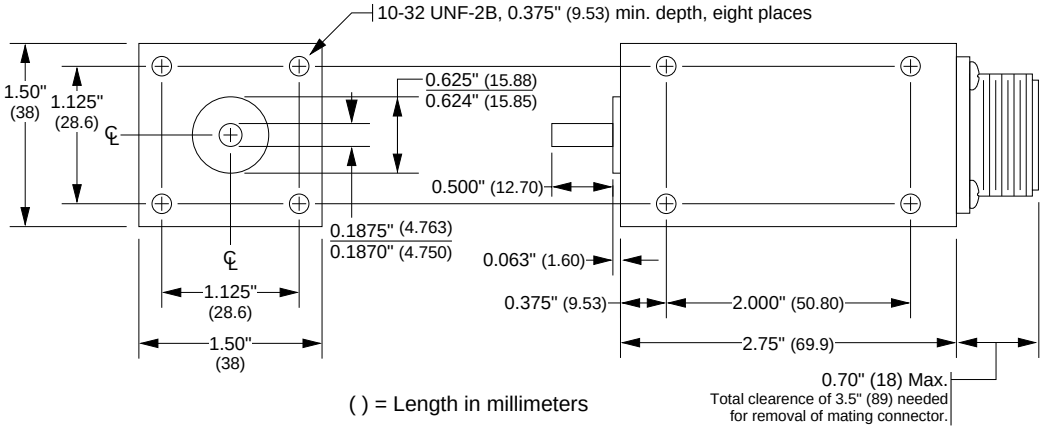
Mechanical
Shaft Loading: .....Radial: 8lbs. max.
Axial: 4lbs. max.
Starting Torque: .....0.5 oz. in. @25˚C
Moment of Intertia: ...2.1 x10^{-4} oz-in-sec^2 max
Environmental
Shock: .....50 g's for 11mSec
Vibration: .....15 g's to 2000Hz
Operating Temp: .....-20 to 125˚C
Enclosure: .....NEMA 13

Connector Pinout
Bendix Connector: MS3102E16S-1P



Female Mate to Connector	AMCI Part #
MS3106A16S-1S Straight	MS-16
MS3108A16S-1S Rt. Angle	MS-18
MS3106F16S-1S Watertight	MS-161

Dimensional Drawings



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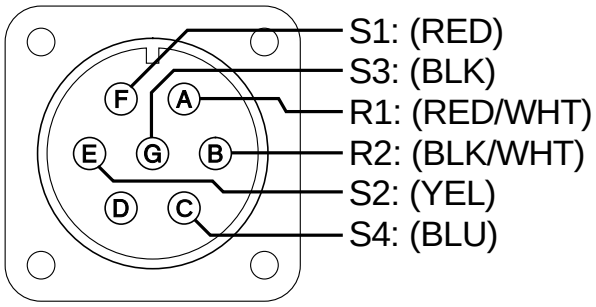
HT-20 Series

HT-20, HT-20-X
This industry-standard resolver transducer has often been imitated yet never duplicated. Standard features include: 5/8'' keyed shaft, 1/4'' X 20 mounting holes, double-row bearings, sealed housings, mil-spec connector, anodized aluminum or stainless housing, and a wide variety of gear ratios. Used as standard equipment by many OEMs.

Connector/Wiring Diagram

Connectors to: HT-20, HT-20S, HT-20K/L, HT-20-(X)

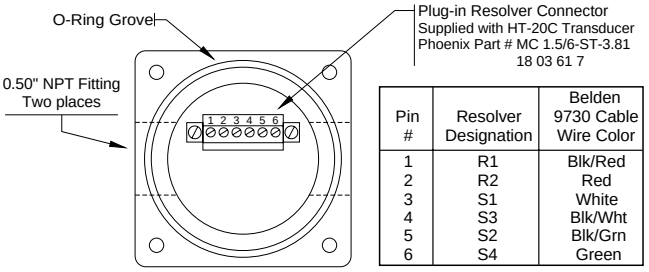
Bendix Connector: MS3102E16S-1P



Female Mate to Connector		AMCI Part #
MS3106A16S-1S	Straight	MS-16
MS3108A16S-1S	Rt. Angle	MS-18
MS3106F16S-1S	Watertight	MS-161

HT-20C

Rear View (Cover Removed)



Pin #	Resolver Designation	Belden 9730 Cable Wire Color
1	R1	Blk/Red
2	R2	Red
3	S1	White
4	S3	Blk/Wht
5	S2	Blk/Grn
6	S4	Green

Specifications

Mechanical

Shaft Loading:.....Radial: 400lbs. max.
Axial: 200lbs. max.
Starting Torque:.....8 oz-in @ 25˚C
Moment of Inertia:.....6.25 x10^{-4} oz-in-sec^2 max.
Weight: .....4lb.

Environmental

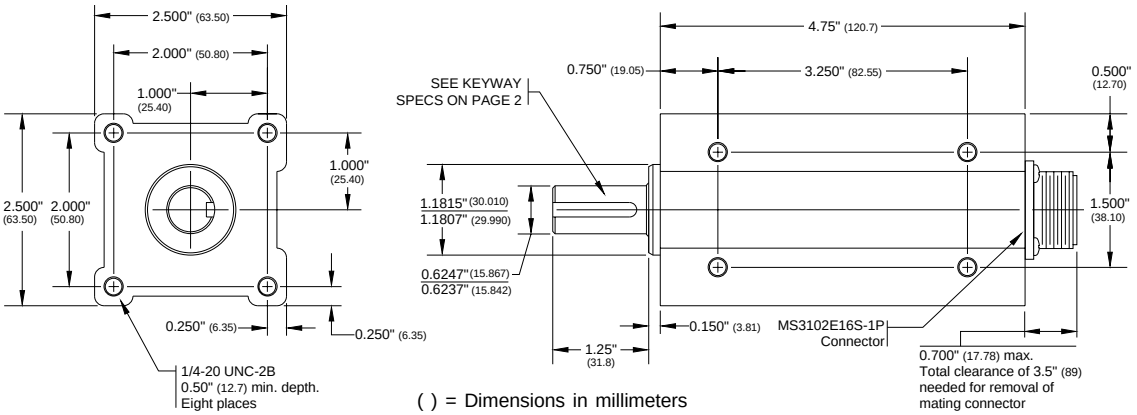
Shock: .....50g's for 11mSec
Vibration:.....5 to 2000Hz @ 20g's
Operating Temp: ...-20 to 125˚C

Keyway Specifications

See Page 2

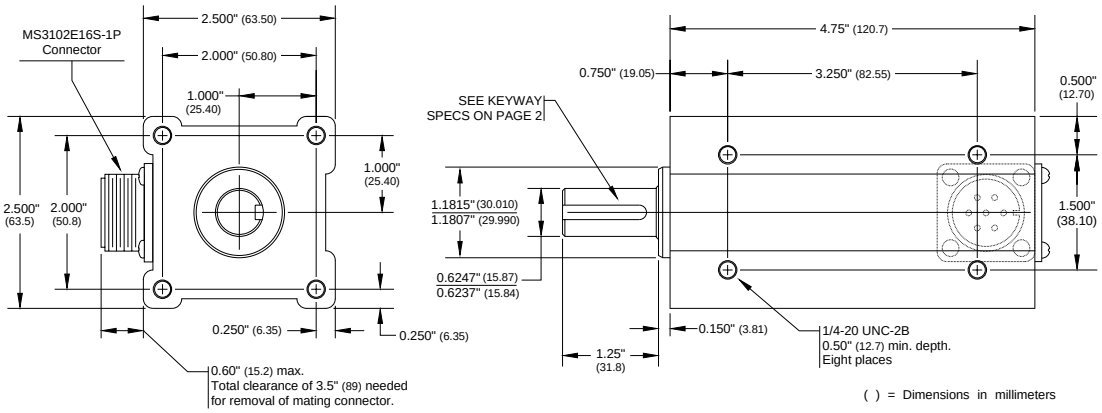
Dimensional Drawings

HT-20 Enclosure: NEMA 4/13 Housing: Anodized Aluminum Shaft: 1070 Carbon Steel



( ) = Dimensions in millimeters

HT-20S Enclosure: NEMA 4/13 Housing: Anodized Aluminum Shaft: 1070 Carbon Steel

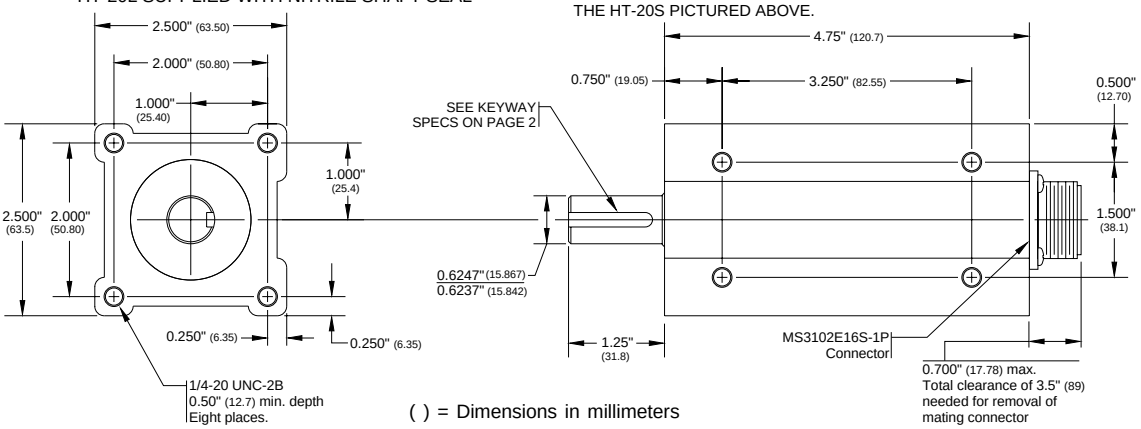


( ) = Dimensions in millimeters

HT-20K/L Enclosure: NEMA 4X Housing: Anodized Aluminum Shaft: 303 Stainless Steel

HT-20K SUPPLIED WITH VITON SHAFT SEAL
HT-20L SUPPLIED WITH NITRILE SHAFT SEAL

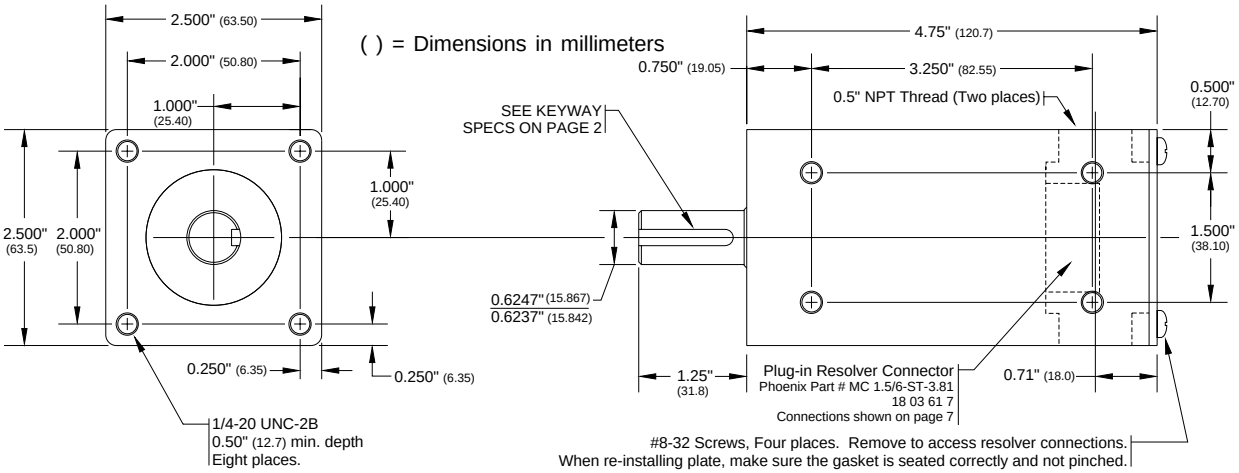
HT-20KS AND HT-20LS TRANSDUCERS WITH SIDE CONNECTOR ALSO AVAILABLE. CONNECTOR PLACEMENT IS IDENTICAL TO THE HT-20S PICTURED ABOVE.



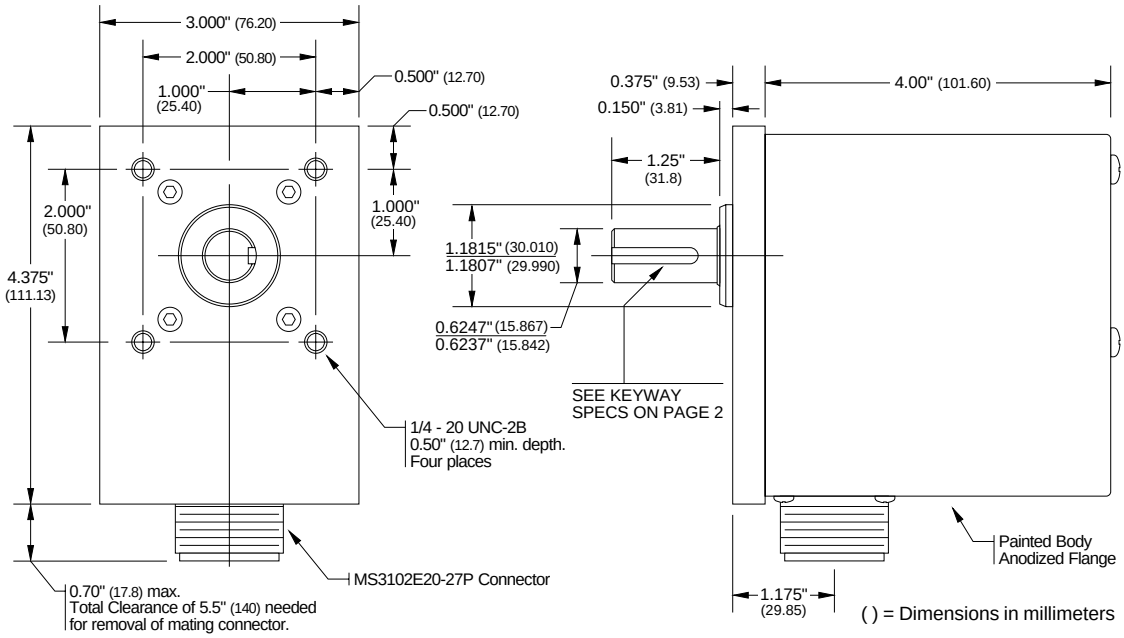
( ) = Dimensions in millimeters

Dimensional Drawings

HT-20C Enclosure: NEMA 4X Housing: 304 Stainless Steel Shaft: 303 Stainless Steel



HT-20-(X) Enclosure: NEMA 4 Housing: Painted/Anodized Aluminum Shaft: 1070 Carbon steel



* Available in the following gear ratios. Input shaft turns (X) for full scale.

2:1	4.8:1	9:1	16:1	40:1	105:1
2.5:1	5:1	10:1	18:1	50:1	150:1
2.77:1	6:1	12:1	20:1	601	180:1
3:1	7:1	13:1	24:1	64:1	250:1
4:1	8:1	15:1	36:1	100:1	256:1

Additional gear paths may be available. Check our website, www.amci.com. for an up-to-date listing.

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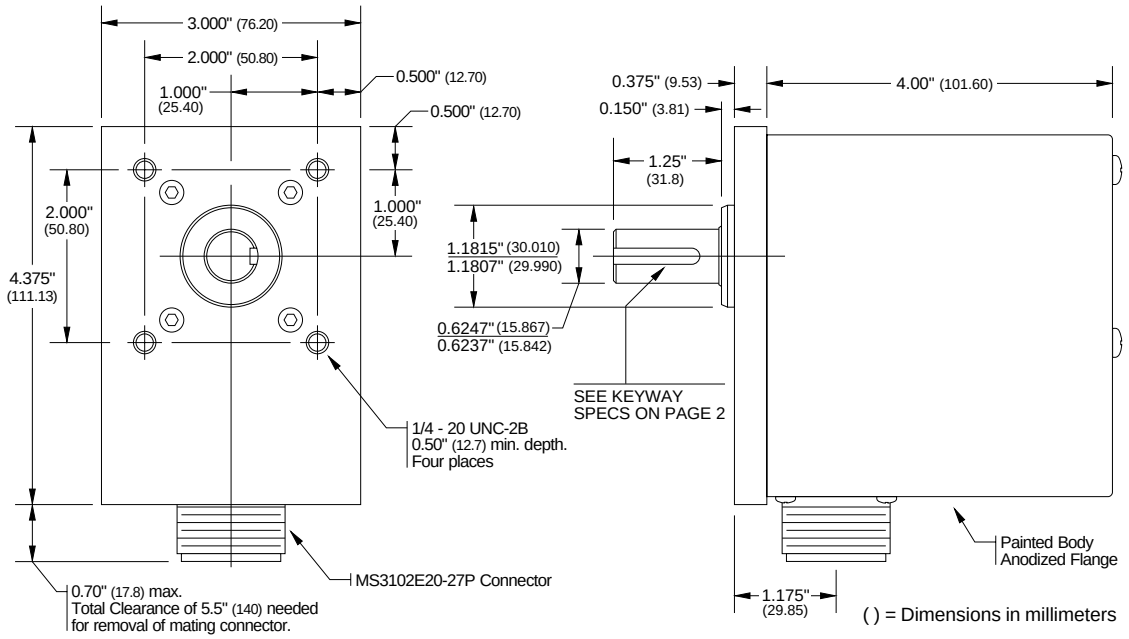
HTT-20-(X) Series

Many applications require high-resolution, multi-turn position sensing. These resolvers provide absolute position up to 1,800 turns with resolution up to 4,096 counts per turn. The transducer has a 5/8'' keyed shaft, 1/4'' X 20 mounting holes, double-row bearings, sealed housings, mil-spec connector, and is sealed for a NEMA 4 rating.

Dimensional Drawing

HTT-20-(X) Enclosure: NEMA 4 Housing: Painted/Anodized Aluminum Shaft: 1070 Carbon Steel



Specifications

Mechanical

Shaft Loading:.....Radial: 400lbs. max.
Axial: 200lbs. max.
Starting Torque:.....1.5 oz.-in @ 25˚C
Moment of Inertia:..8.75 x10^{-4} oz-in-sec^2 max.
Weight: .....1lb.

Environmental

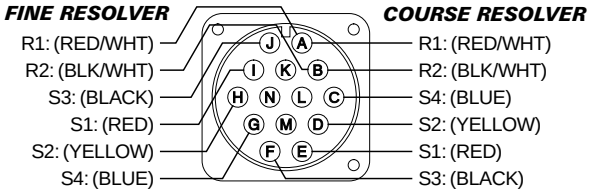
Shock: .....50g's for 11mSec
Vibration:.....5 to 2000Hz @ 20g's

Keyway Specifications

See page 2

Connector Pinout

Bendix Connector: MS3102E20-27P



Female Mate to Connector AMCI Part#

MS3106A-27S	Straight	MS-20
MS3108A20-27S	Rt. Angle	MS-22
MS3106FA20-27S	Watertight	MS-201

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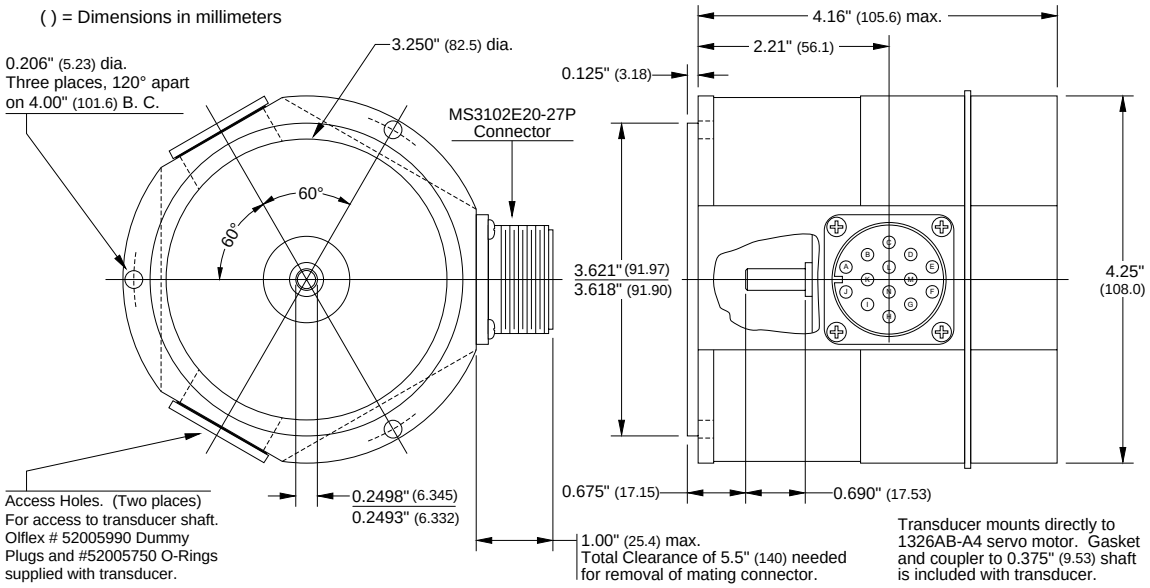
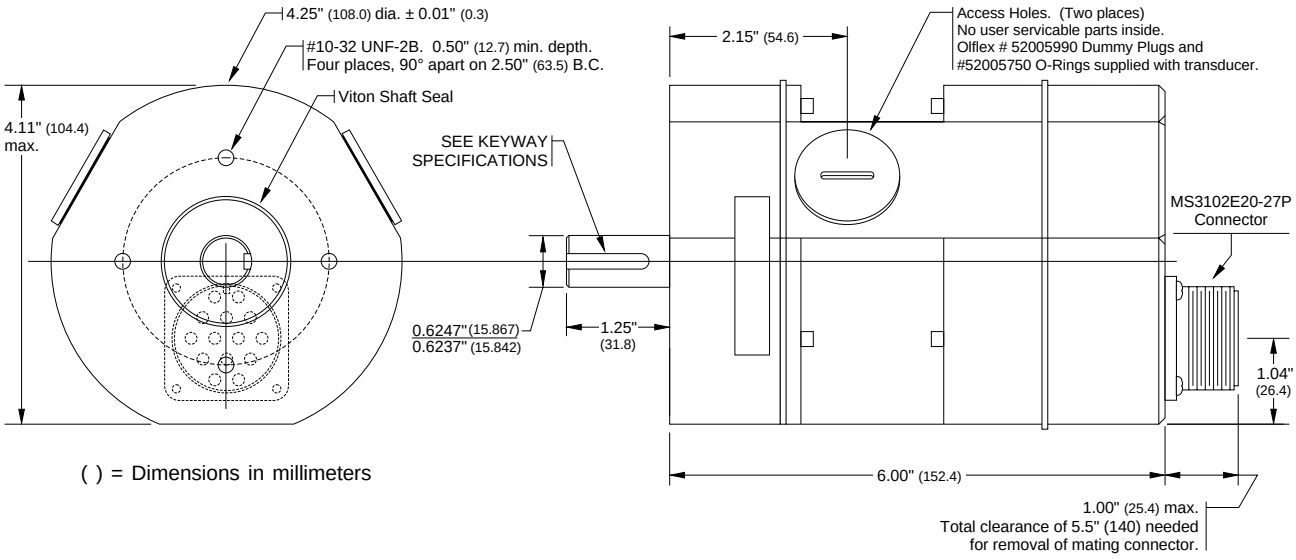
HTT-425 Series

These resolver transducers are widely used for mounting to either servo motor end bells or foot mounted to accept a large pulley or drum. The NEMA 4X rating is essential when the transducer is mounted in an outdoor environment.

HTT-425A-(X) Enclosure: NEMA 4X Housing: Anodized Aluminum Shaft: 303 Stainless Steel



HTT-425-F1E-(X) Enclosure: NEMA 4X Housing: Anodized Aluminum Shaft: 303 Stainless Steel



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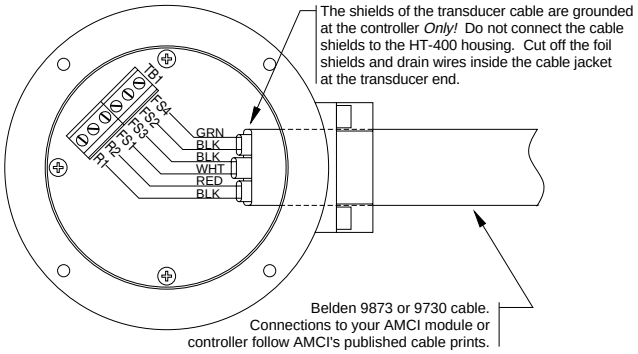
HT/HTT-400-X Series

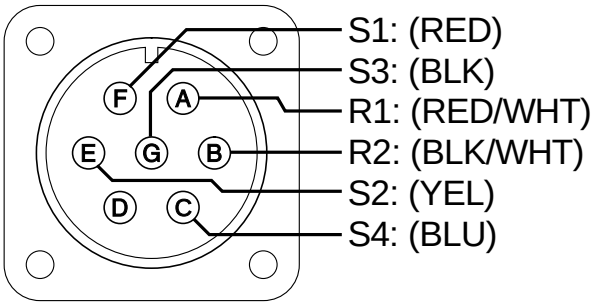
The newest member from the AMCI design team brings a 4'' diameter transducer to mechanically replace older non-AMCI transducers. These units are directly compatible with AMCI electronics and also provide a choice of wiring configurations. These units are NEMA 4 rated to operate in the harshest industrial applications.

Connector/Wiring Diagram

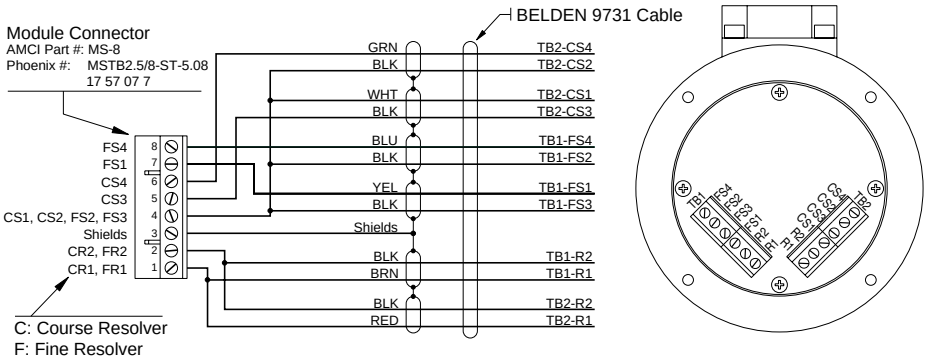
HT-400 with conduit connection



HT-400/HT-400-1E with mil spec connector



HTT-400-180



Specifications

Mechanical

Shaft Loading: Radial: .400lbs. max.
.....Axial: 200lbs. max.
Starting Torque:.....8 oz.-in @ 25˚C
Moment of Inertia:.....8.75 x10^{-4} oz-in-sec^2 max.
Weight:.....5.25 lbs.

Environmental

Shock:.....50g's for 11mSec
Vibration:.....5 to 2000Hz @ 20g's
Operating Temp: ...-20 to 125˚C

Keyway Specifications

See page 2

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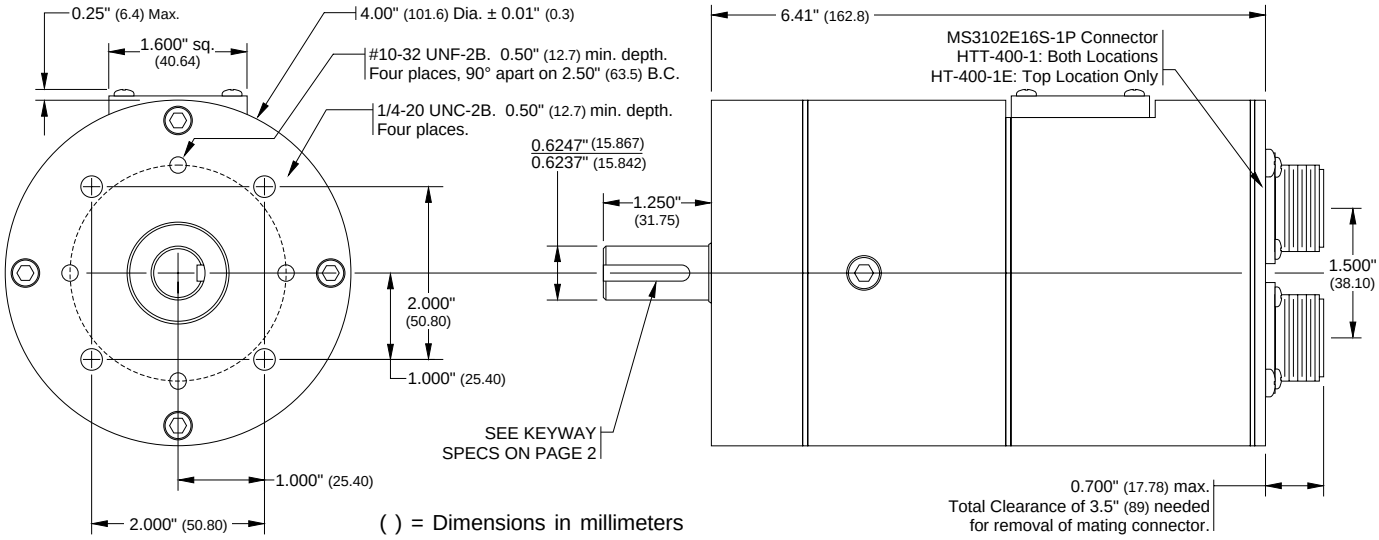
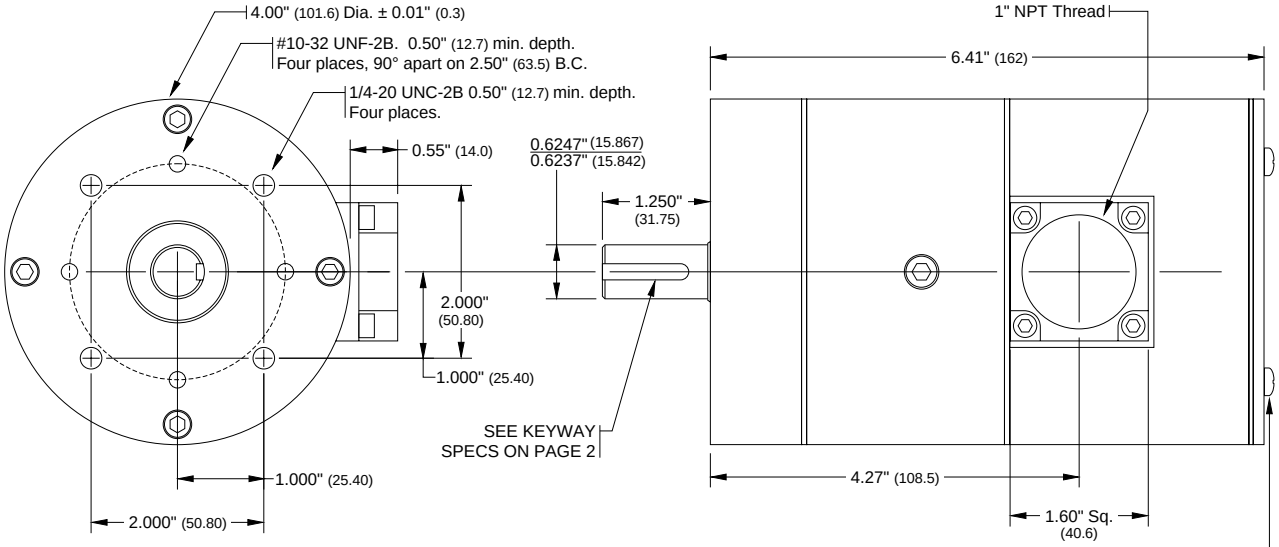
Dimensional Drawings

HT-400-1E & HTT-400-1 Housing: Anodized Aluminum Shaft: 1070 Carbon Steel



( ) = Dimensions in millimeters

HT-400/HTT-400-180 Enclosure: NEMA 4 Housing: Anodized Aluminum Shaft: 1070 Carbon Steel



( ) = Dimensions in millimeters

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R11 Resolvers

AMCI manufactures a complete line of Size 11 (1.1'' dia.) resolvers. These have been used in AMCI products for years, so their reliability and performance have been proven. They are manufactured in a wide range of electrical characteristics for guaranteed interface compatibility.

AMCI Part No.	Compatible With	Speed	Trans. Ratio	Frequency
R11X-JI0/7	Harowe: 11BRCX-300-J/10	1	0.95	5000
R11X-2J10/7	Harowe: 11BRCX-300-M	2	0.95	5000
R11X-C10/7	Harowe: 1BRCX-300-C/10	1	0.45	1000
R11W-F10/7	Harowe: 11BRW-300-F/10	1	0.50	2500
R11X-J12/7		1	0.95	5000
R11X--4T10/7		4	0.55	5000
R11W-B10/7	Harowe: 11BRW-300-B	1	1.75	400
R11W-M10/7	Harowe: 11BRW-300-M	1	0.50	5000
R11X-A10/7	Harowe: 11BRCX-300-A	1	0.54	4000
R11X-E10/7	Harowe: 11BRCX-300-E	1	0.98	2500
R11X-G10/7	Harowe: 11BRCX-300-G	1	0.45	400
R11X-L10/6	Kearfott: CR41093052-XX	1	1.40	2250

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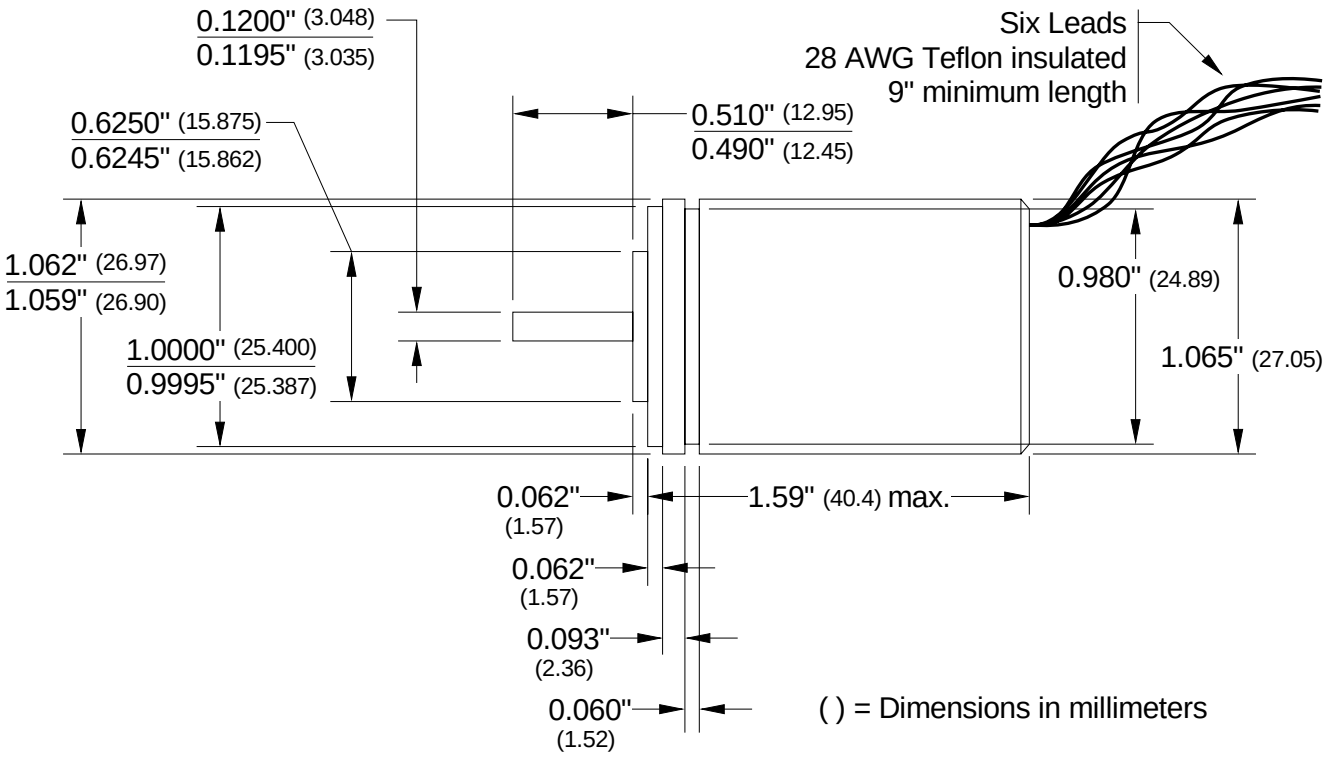
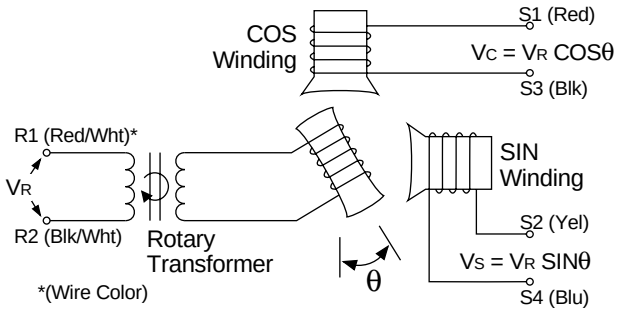
R11 Resolvers

Dimensional Drawing



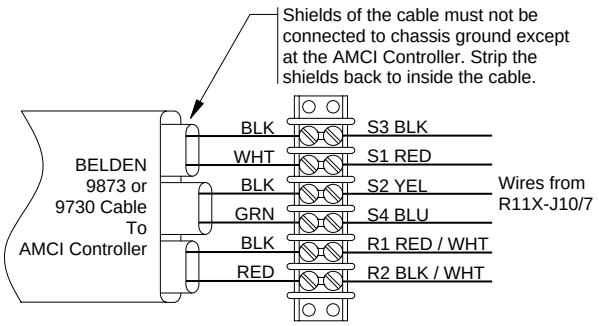
Housing: 303 Stainless Steel Shaft: 303 Stainless Steel

Schematic



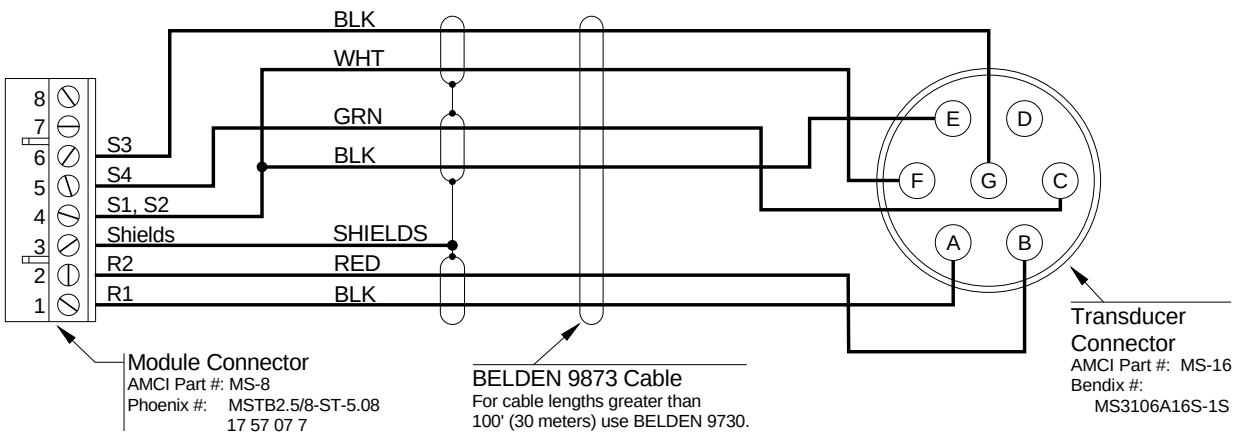
Connector/ Wiring Diagram

The picture below shows how to connect a R11X-J10/7 to AMCI'S standard cable. Connection to the AMCI Controller follow published cable prints.

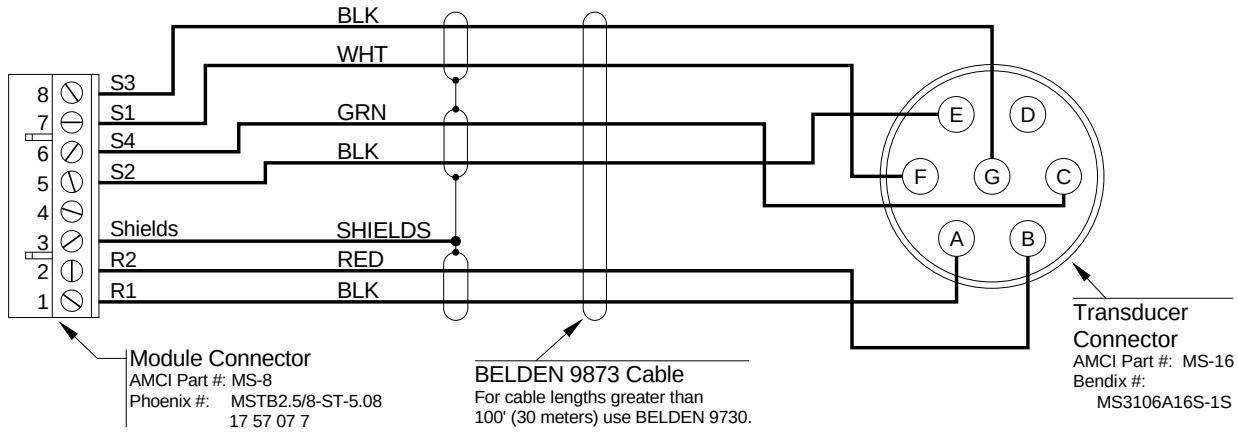


Dimensional Drawings

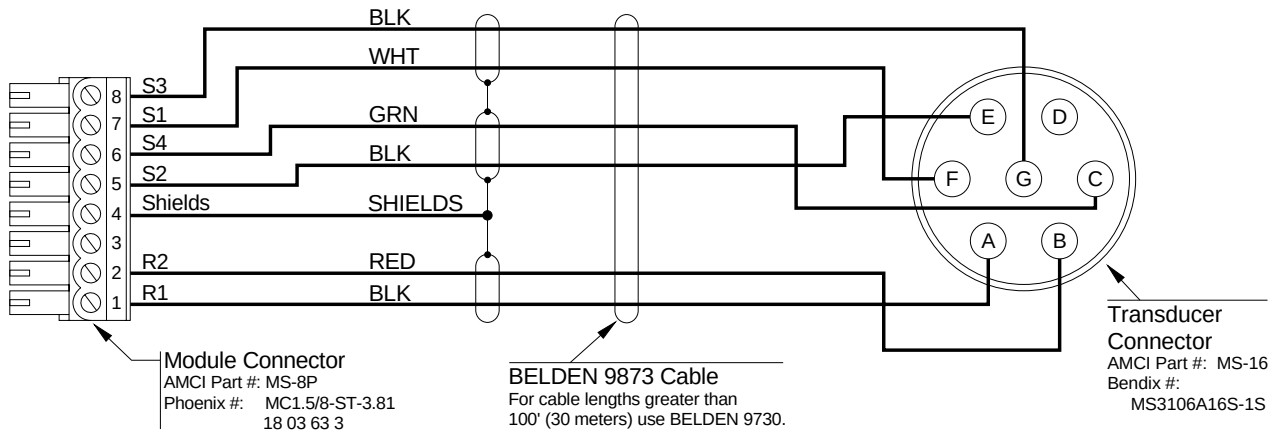
C1T-(x)



CT-(x)



C1TP-(x)



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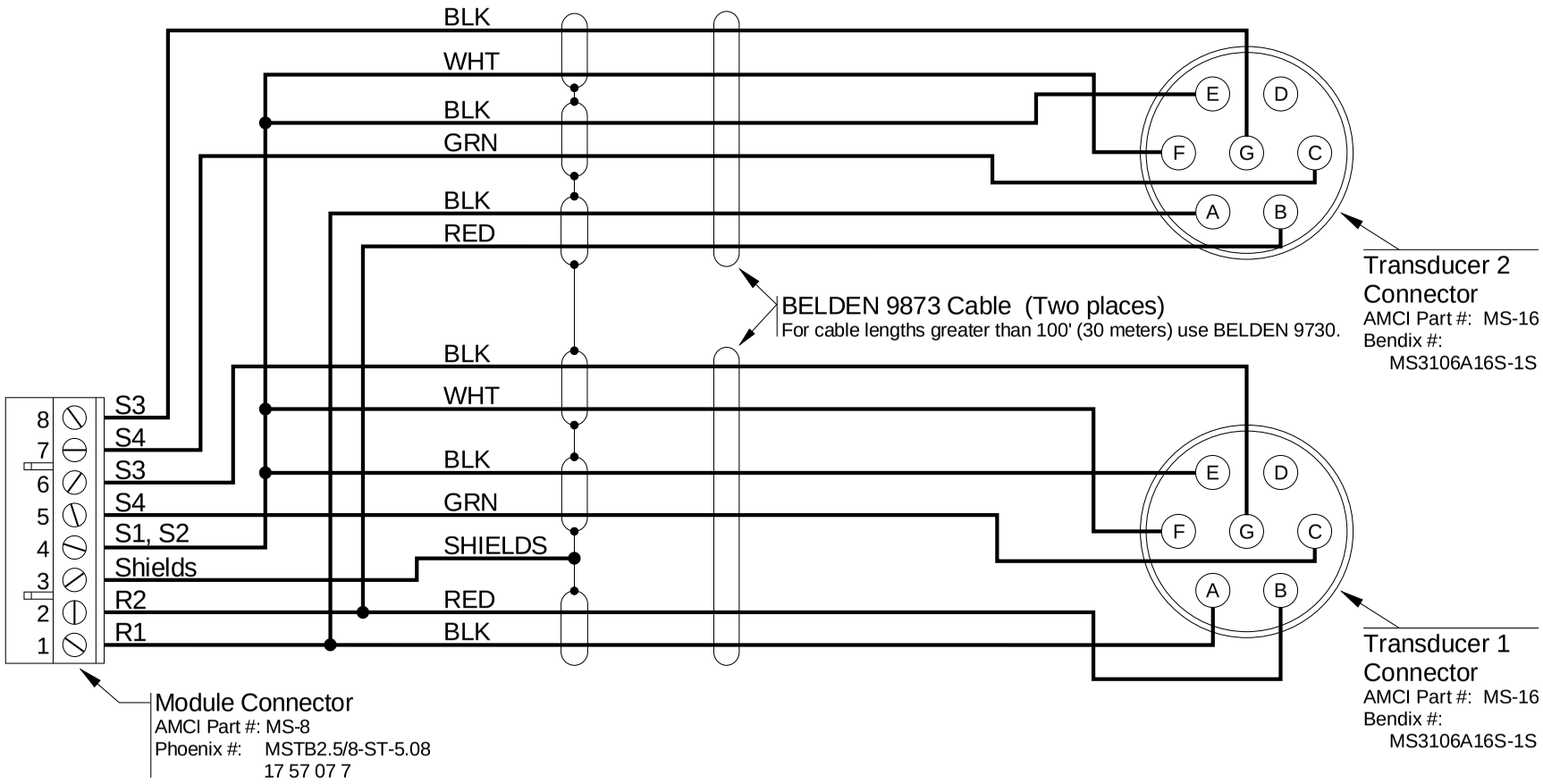
Dimensional Drawings

C2T-(X)



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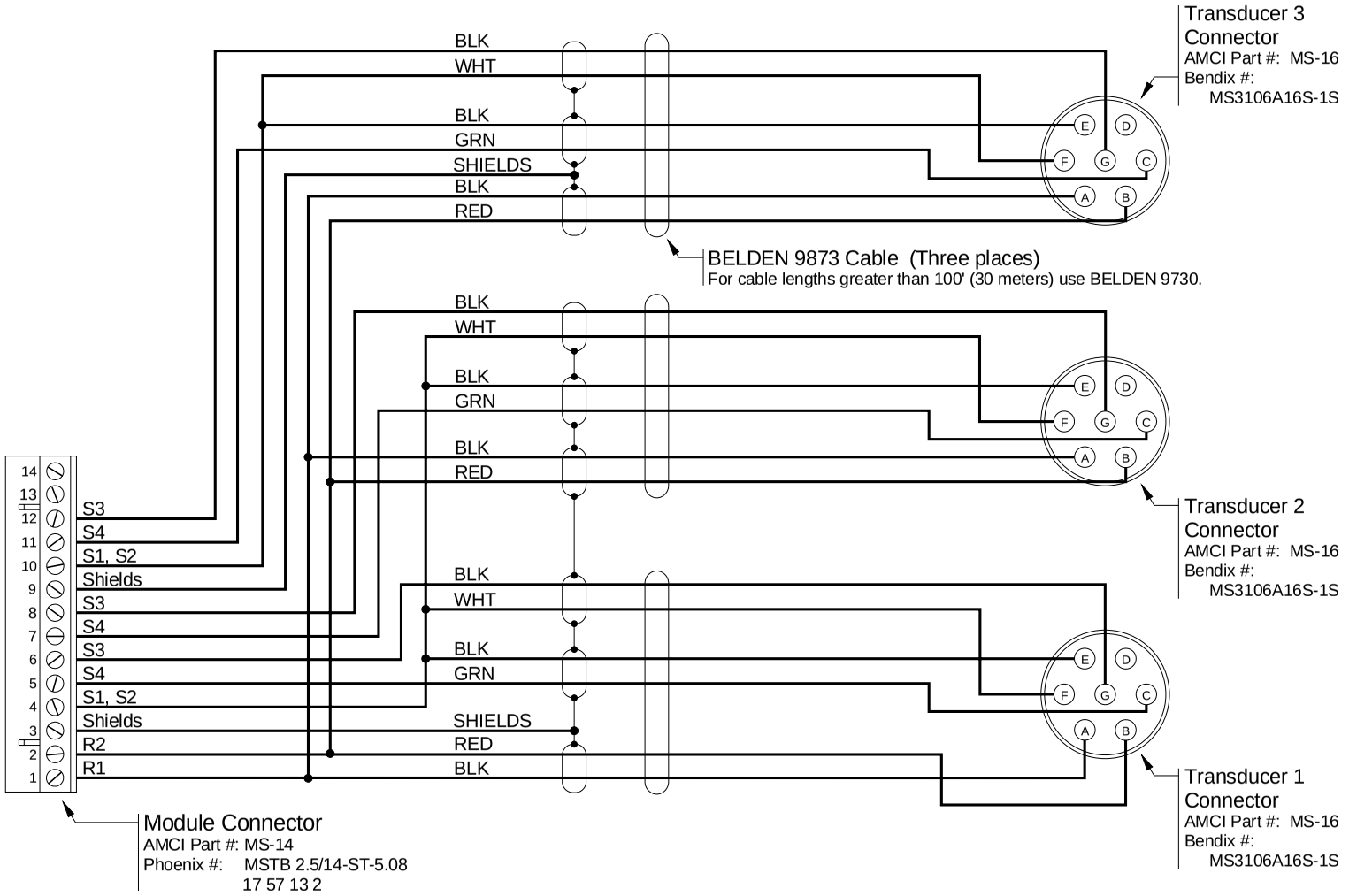
Dimensional Drawings

C3T-(X)



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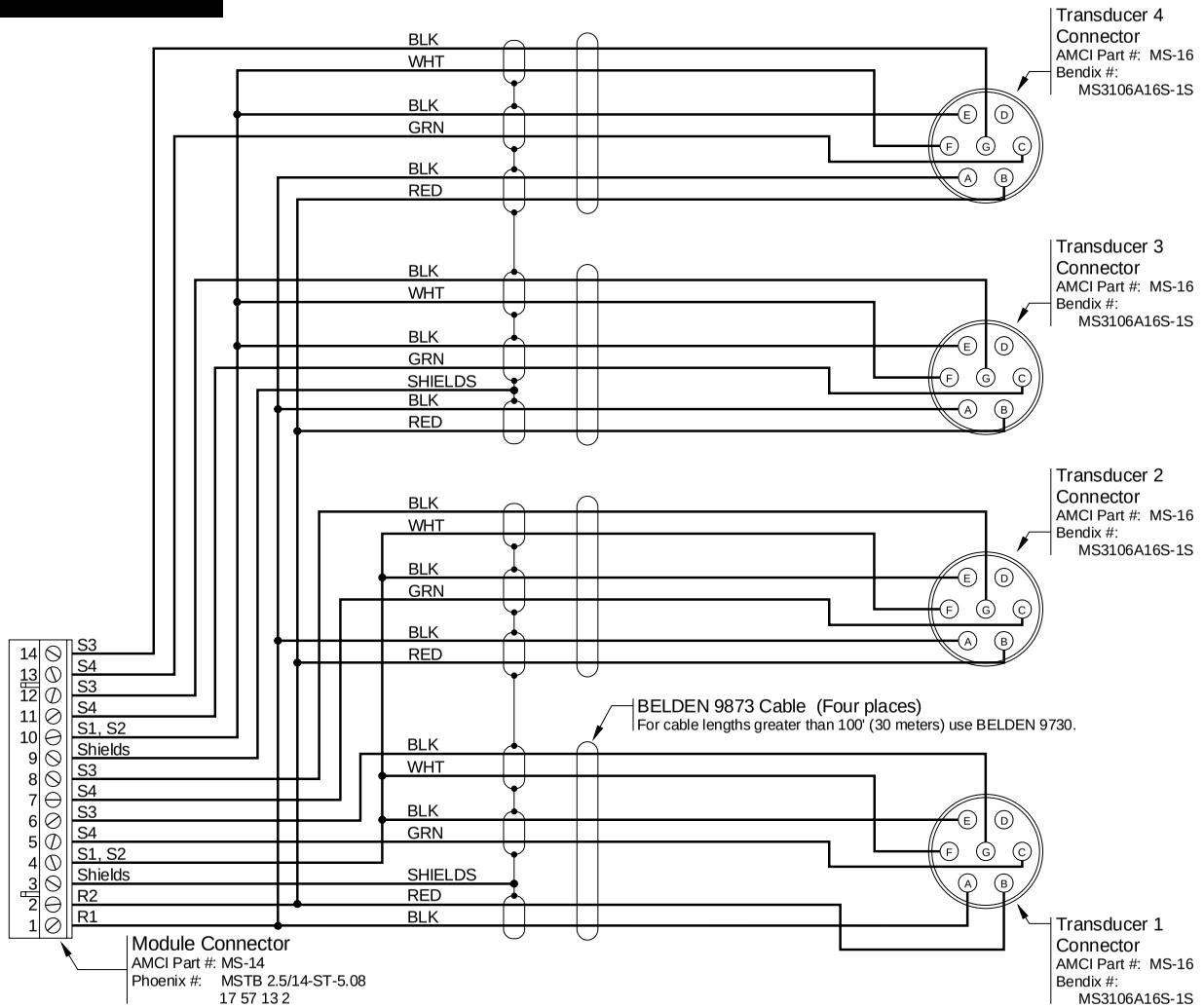
Dimensional Drawings

C4T-(X)



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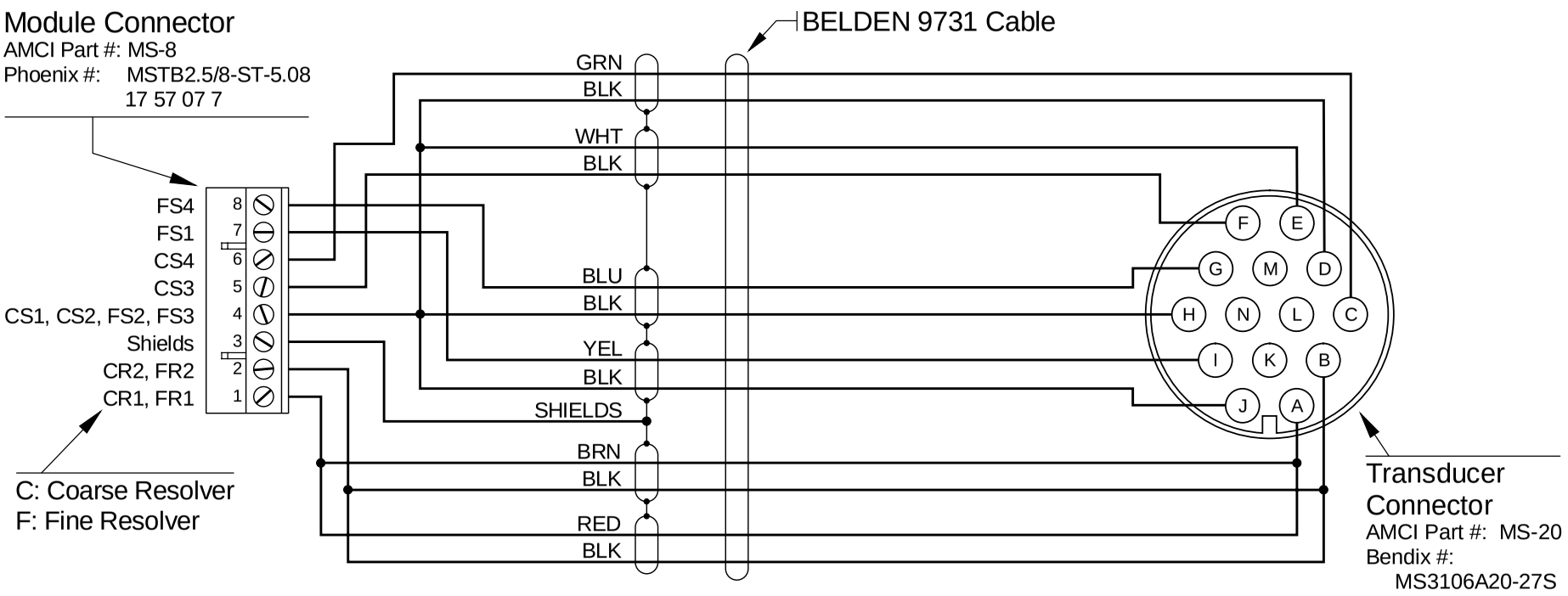
Dimensional Drawings

CTT-(X)



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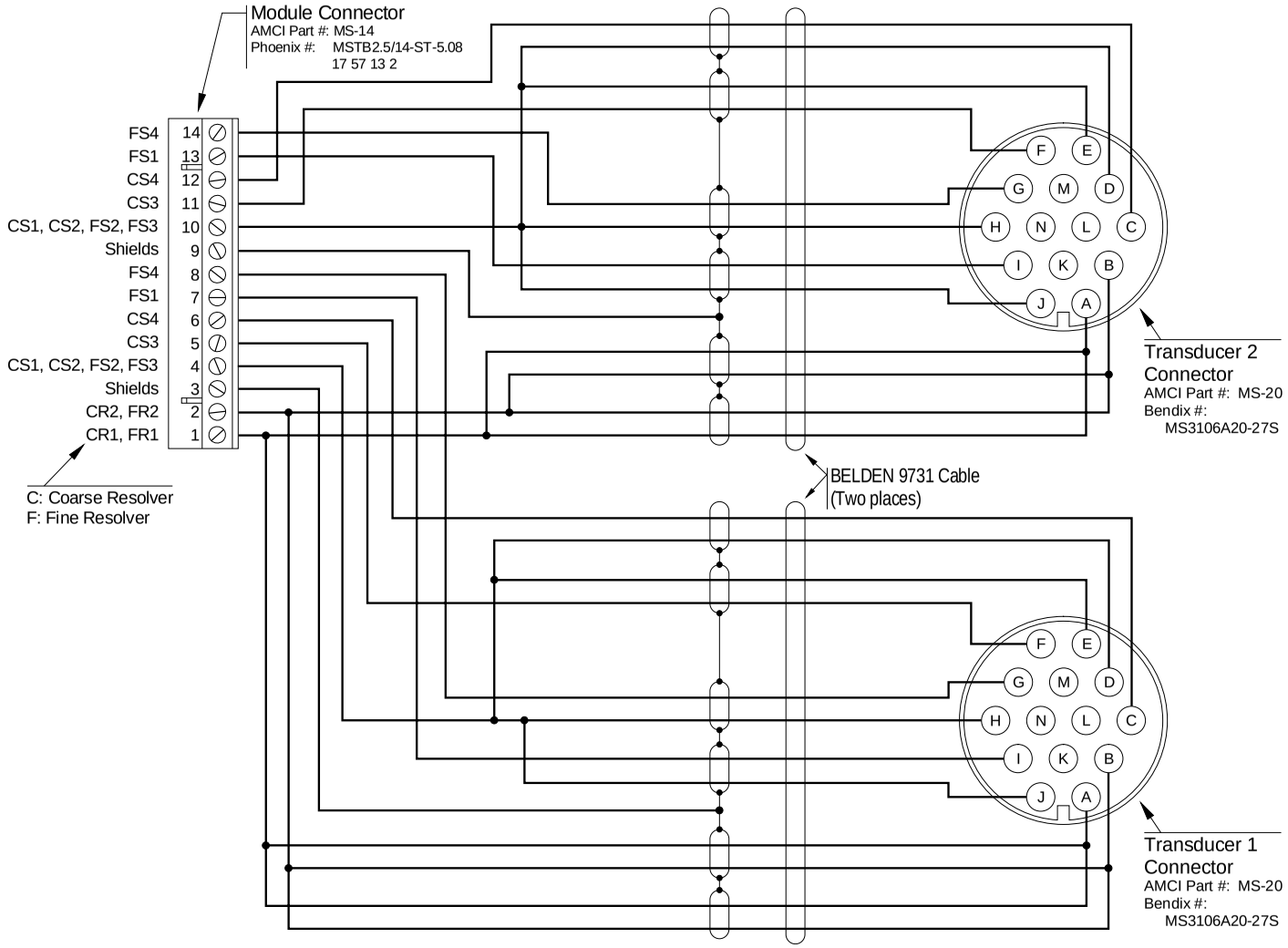
Dimensional Drawings

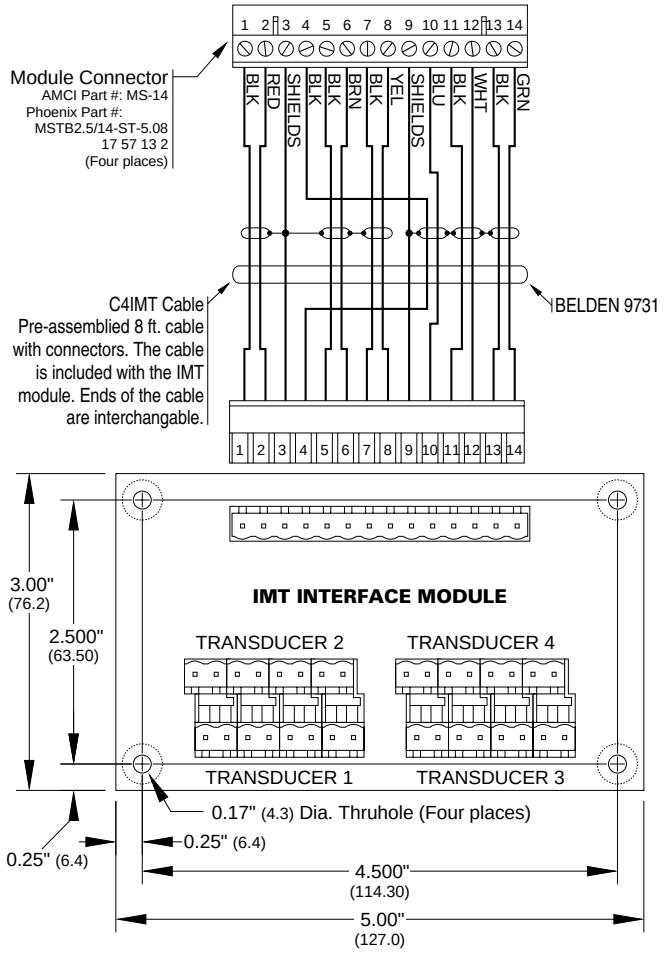
C2TT-(X)

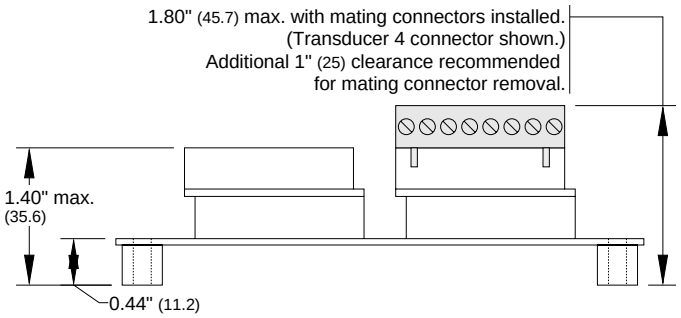


Dimensional Drawings

The IMT is used in place of C3T/C4T cables. Used in conjunction with C1T cables, the IMT can make interfacing to AMCI modules cleaner and easier.

IMT Outline





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