SYSTEMS ELECTRONICS GROUP

SYSTEMS M4500 MACHINE COMPONENTS

RSV34-MS1

RESOLVER with MS CONNECTOR

- **Brushless, Single-turn Resolver Rated to 3,000 RPM**
- **Rotary Position Transducer for M4500, M4020, M4040, M4041, and S3041 as well as other Programmable Limit Switches**
- **Automotive Rated Double Bearing with 5/8" Shaft for Radial Loadings up to 400 LBs**
- **Resolver, Bearing, and Flexible Coupling mounted in Single Piece Mount for added Rigidity and Strength**
- **Flexible Coupling Isolates Resolver from Shaft Loads**
- **NEMA 4x Rated 1/4" Wall Thickness Sealed 6061 Aluminum Housing provides Maximum Protection for Resolver**
- **Circular Military Spec. Threaded Connector for High Reliability and Quick Disconnect**
- **Mating Cable Assemblies available at User Defined Lengths**
- **Electrically and Mechanically Mounting Compatible with other Manufactures Resolvers**

The Resolver in General

The resolver is a brushless rotary transformer with one rotor and two stator windings. The stator windings are wound and physically located stationary in the resolver such that they are 90 degrees out of phase with each other. The rotor is rotated with the shaft. When used as a position transducer, the rotor of the resolver is excited with an AC reference signal at a fixed frequency. The shaft angle can then be deduced by comparing the relative amplitudes of the returned signals from the stators. The amplitudes will be proportional to the COSINE and SINE of the angle of the rotor with respect to the stators. Programmable Limit Switches incorporate Resolver-to-Digital converters which compute the angle based on these relative amplitudes.

The Resolver in General (cont'd)

In comparison to other types of rotary position transducers such as encoders, the resolver is generally superior both in accuracy and ruggedness. Optical encoders contain shutters with LEDs and internal electronics to generate position information. The electronics in the encoder are prone to failure due to vibration and other environmental conditions (temperature, humidity, solvents, etc). Resolvers do not contain any electronics (they are simply wound transformers) and therefore are not subject to the same failure mechanisms as encoders, providing a much more rugged position transducer for high vibration, hostile environments.

The accuracy of optical encoders is a function of the type, incremental or absolute, and is fixed based on the resolution of the shutters used. The higher the resolution, the more expensive the encoder general is. With resolvers, the resolution is defined by the resolution of the Resolver-to-Digital converter used in the Programmable Limit Switch. The resolver is also an absolute position transducer such that when power is first applied to the PLS and resolver, the Resolver-to-Digital converter determines the actual shaft angle of the resolver immediately. With incremental encoders, one complete revolution of the encoder shaft must be made after power up to determine the encoder shaft position.

General Description of the RSV34-MS1

The RSV34-MS1 combines a brushless resolver, automotive rated double bearing shaft, flexible coupling, circular military spec connector, and a NEMA 4X housing to provide a very rugged and reliable position transducer for use with virtually any Programmable Limit Switch. The resolver, double bearing shaft, and flexible coupling are mounted in a single, machined 6061 aluminum mount for maximum rigidity and strength. The housing is made of machined 1/4" thick 6061 aluminum for additional strength and protection for the resolver and sealed to provide NEMA 4X rated protection against solvent and fluid ingress.

The 7-pin circular military spec connector allows quick disconnection of the RSV34-MS1 while at the same time providing a high degree of reliability. The connector mates with Amphenol 97-3108A-16S-S right angle or Amphenol 97-3106A-16S-S straight socket connectors. Cable assemblies, complete with either connector, can also be provided separately, cut to user specified length (see ordering information).

Ordering Information

Part Number	Description
RSV34-MS1	Resolver with MS Connector
RSV-MSCBLE-XX	Resolver Cable with Amphenol 3106A straight connector. XX specifies cable length in feet.
RSV-RSCBLE-XX	Resolver Cable with Amphenol 3108A right angle connector. XX specifies cable length in feet.

Mounting

The RSV34-MS1 is supplied with two sets of mounting holes (4 holes each). The first set contains 10-32 threaded inserts for use with 10-32 screws or bolts while the second set is 9/32" through holes for use with 1/4-20 bolts, washers, and nuts. Use whichever set is most appropriate for the application. The RSV34-MS1 should be securely mounted to a bracket which fully supports the weight of the RSV34-MS1 and does not exceed the radial and axial loading of the RSV34-MS1. Either a timing gear , belt, or flexible coupling, such as a Helical or Lovejoy coupling, can be used to couple the 5/8" shaft of the RSV34-MS1 to the shaft on the machine. The shaft of the RSV34-MS1 is provided with a 3/16" keyway which should be keyed with the coupler to make sure the resolver shaft does not slip. Figure 1 shows the mounting hole dimensions as well as the overall dimensions of the RSV34-MS1.

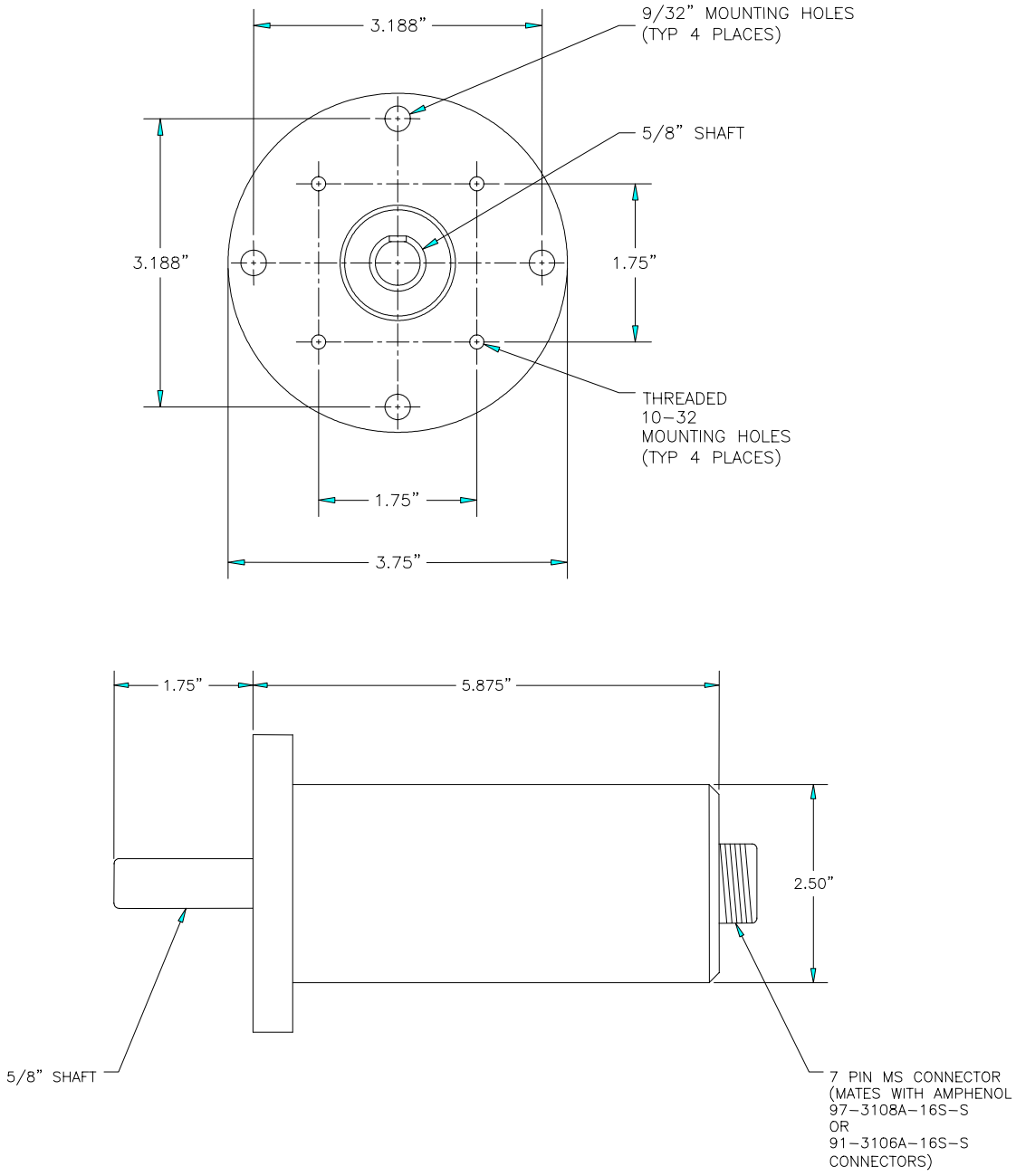
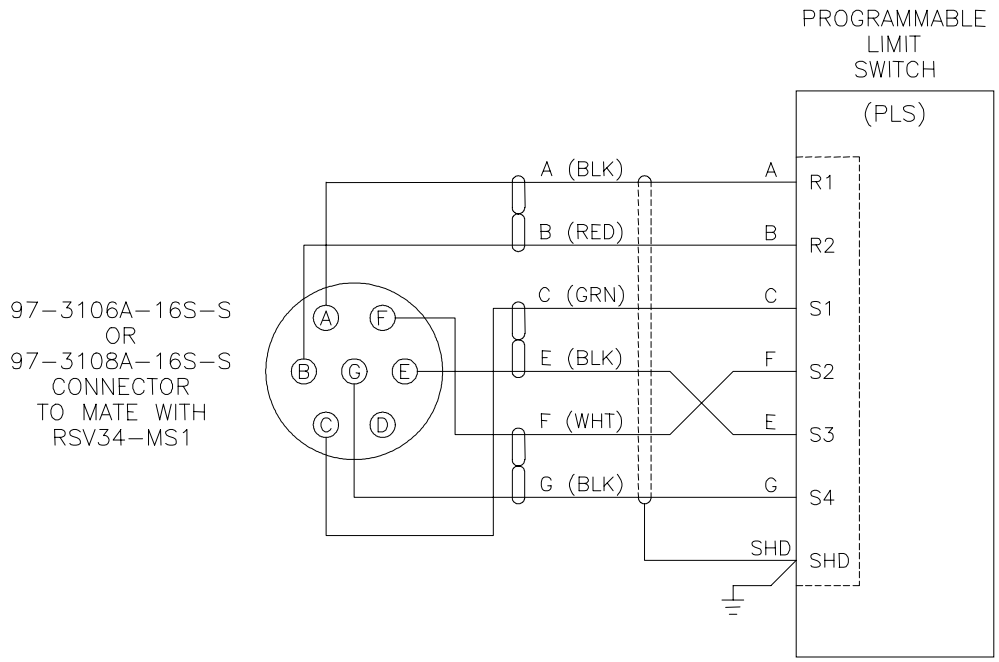
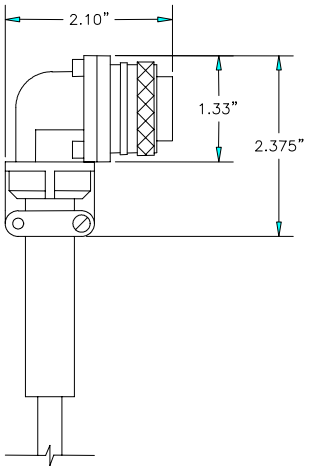


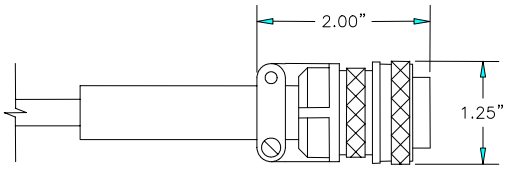
Figure 1 - RSV34-MS1 Mounting Deminsions

Wiring Diagram





Cable with 97-3108A-16S-S Connector



Cable with 97-3106A-16S-S Connector

NOTES:

1) The connection diagram is shown for CCW increasing position. To reverse the direction for CW increasing position, swap S1 and S3 at the PLS terminals.

2) Separately ordered cable assemblies are supplied with Belden 9873 cable which consists of three pairs of individually shielded twisted cable. The shields of these pairs should be tied to the logic common at the terminals of the PLS (or earth ground, if the logic common is at earth ground). Do not tie the shields at the resolver also. If a cable assembly is not purchased but instead assembled by the user, it is still necessary to use the Belden 9873 cable connected as shown in the wiring diagram.

3) Required connector to mate with the RSV34-MS1 is Amphenol 97-3108A-16S-S right angle socket connector or Amphenol 97-3106A-16S-S straight socket connector.

RSV34-MS1 Resolver

Specifications

Size:	
Body Length:	5.875"
Body Diameter:	2.500"
Mounting Flange Diameter:	3.750"
Shaft Length:	1.750”
Shaft Diameter:	0.625”
Mechanical:	
Weight:	2.75 lbs
Maximum Shaft Load:	
Radial:	400 lbs
Axial:	200 ibs
Maximum Speed:	3,000 RPM
Starting Torque:	2.0 oz-in
Moment of inertia:	15 gm-cm2
Electrical:	
Rated Input Rotor Voltage:	1.88 Vrms
Output Stator Voltage:	2.63 Vrms
Transformation Ratio:	1.4
Rated Frequency:	2,250 Hz
Rotor DC Resistance:	15.9 ohms (typ)
Stator DC Resistance:	120.6 ohms (typ)
Isolation (High Pot):	
Between windings and case:	550 Vrms
Between isolated windings:	250 Vrms
Environmental:	
Operating Temperature:	-25 to 75 degrees C
Shock:	50 G’s for 10msec
Vibration:	15 G’s up to 2,000 Hz