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HDR Series Sub-Miniature DIGITAL TO RESOLVER SINE COSINE CONVERTERS

FEATURES

- 14 and 16 Bits Resolution
- 2' or 4' Accuracy
- Lower cost / size comparable to hybrids
- Lowest Power Consumption: 0.533 Watts
- Internal Transformer Isolated Reference Input, Options: 115VAC. / 26VAC., or 1-26VAC. User Scaleable.
- Wide Band Frequency: DC to 3000Hz.⁴
- +/-12 and +/-15 Volt Powered Models
- -40°C to +85°C Operating Temp.²
- Short Circuit Protected Outputs¹
- Buffered 16 Bit Transparent Latch Input
- Auxiliary Reference Output for loss detect
- Low Scale Factor Variation: 0.05% Typical
- CMOS and TTL Compatible Inputs



DESCRIPTION

The HDR are sub-miniature, low cost, and low power; Digital to Resolver (AC Sine / Cosine) Converters designed for high performance industrial and COTS Military applications.

The HDR Series are sub-miniature modules that are; size comparable, low cost alternatives to Hybrid type D-R and D-S converters. Because of their advanced modular design the HDR series features short lead times that are neither limited to infrequent hybrid production cycles, long term parts allocation, minimum quantity purchases, or hybrid obsolescence related concerns.

Additionally the HDR-X units feature internal micro-transformers for 100% isolation of the AC Reference inputs, they accept either direct 115, 26VAC or user scaleable inputs as standard model selections. The use of internal Isolation Transformers on the reference inputs provides phasing

flexibility, immunity from ground loops or ground reference induced noise, and are an effective barrier to prevent any electrical noise on the reference source input from effecting the users digital control system and DC supply rails. Because the AC Reference source is commonly shared or tied to many different destinations (other hardware) in a typical system; isolation on the reference inputs protects not only the user circuitry of the D-R converter, but also every user tied to the reference source in the system. When integrated on applications as add-on hardware; the isolation assures the user that the add-on hardware is non-obtrusive, and causes no conflict with any existing apparatus. High input impedance and very low current draw on the reference input (typically less than 1 ma.) assures compatibility with low current drive resolver circuits typically used on

R-D converter products and resolver based motion control systems.

The digital input is a 16 Bits wide, both CMOS and TTL compatible 5 volt logic, representing binary weighted angle. The digital input also includes a transparent latch controlled by the LE (Latch Enable Input). When LE is at a high level (or no connect) no control over data is needed and the sine / cosine resolver outputs will be

Applications

- Avionics / Tank Simulation and Trainers
- Motor / Drive Test Instrumentation
- AC Vector Drives / Servo Systems
- Moving Target Control Systems
- GPS Integration, Displays and LRU's
- Gyro's and Navigation Systems
- Outputs to Radars and indicators
- Resolver to Digital testing, ATE
- Fire Control Systems
- Coordinate Control Systems
- Digital Control Transformers³
- Digital Phase shifting

continuously updating (always following the digital input). When LE is set to a low level the input data is latched, providing a convenient direct access solution to any bus based interface.

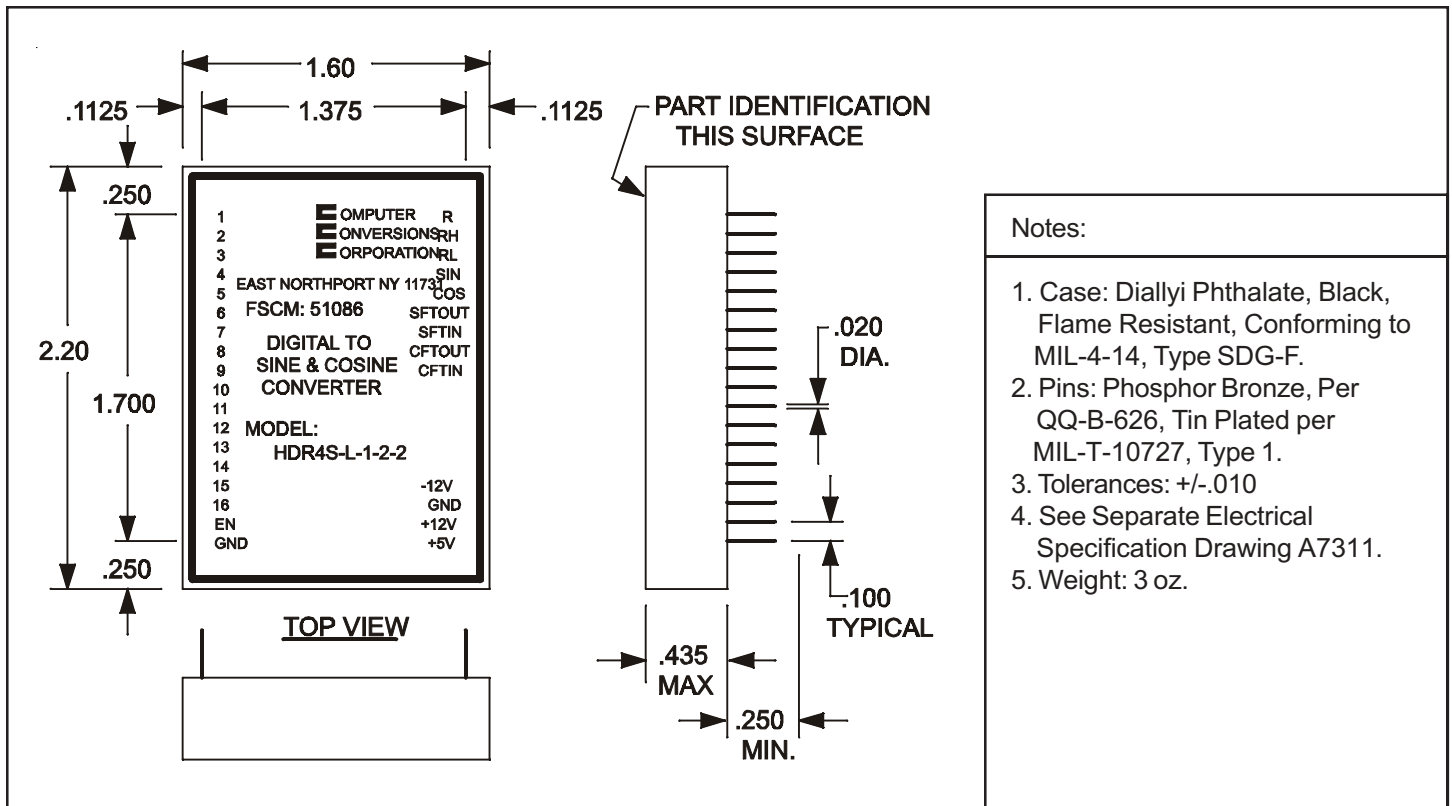
The 16 Bit digital data is binary weighted angle. The input data is converted to AC resolver type signals representing the sine and cosine of the digital angle, at the carrier frequency of the reference input. The output signals continuously tracks the reference input, always preserving the transformation ratio like that of a resolver or synchro itself. The ratio accuracy of the HDR series makes them ideal for use in driving R-D converters, resolver / synchro chains and repeaters, and R-D based motion control systems.

For standard 115V. and 26VAC reference input models the HDR series provides either a 6.81V. L-L sine/cosine output on +/-15VDC powered models, or 5.6V.L-L outputs on +/-12 VDC powered models. The outputs are short circuit protected and drive up to a full 2K. Ohm load. Using scaling resistors on the AC reference input can easily facilitate lower output levels.

For standard user scaleable models, a reference input range can be user scaled from 1 to 115VAC, and a reference input of 1.3VAC yields the full 6.81V.L-L on +/-15VDC powered units, 5.6V.L-L on +/- 12VDC powered units. Because the outputs follow the reference input, the resistors used to scale the reference can also be used to scale the sine/cosine output voltages (See Table 1 for formula and common resistor selections).

1. Short Circuit Protected to Ground
2. See model selection Guide
3. When used with S-D/R-D.
4. XR Isolated Reference Model
47-KHz.

Specifications	
Resolution:	16 Bits
Accuracy¹:	+/-2 or +/-4 arc. Minutes
Scale Factor Variation:	+/-0.05% Max. Typical (Transformation Ratio Error)
Output Settling Time:	100 Usec. Max.
Reference Input:	
Internal Resistors:	26VRMS, 115VRMS, +/-10%
External Resistors:	Programmable 1.3 to 115VRMS
Resistors are wired in series with the reference input.	
Frequency Range:	
Internally Optimized:	60Hz.(47-440) or 400Hz. (360-1200KHx.)
Wide -Band Models:	X Type Transformer Isolated 47-3000Hz. S Type Solid State Differential: DC to 3000Hz. To 10,000 Hz.: Reduced Accuracy
Input Impedance: (Reference Input)	
X Type Transformer Isolated with +/-12V supplies	
115RMS into 286K Ohms Min. L-L Balanced 26VRMS into 63K Ohms Min. L-L Balanced 1.3VRMS into 3K Ohms Min L-L Balanced	
X Type Transformer Isolated with +/-15V supplies	
115RMS into 220K Ohms. Min. L-L Balanced 26VRMS into 51K Ohms Min. L-L Balanced 1.3VRMS into 10K Ohms Min. L-L Balanced	
S Type Solid State Differential with +/-12V supplies	
115RMS into 286K Ohms Min. L-L Balanced 26VRMS into 63K Ohms Min. L-L Balanced 1.3VRMS into 10K Ohms Min. L-L Balanced	
S Type Solid State Differential with +/-15V supplies	
115RMS into 220K Ohms Min. L-L Balanced 26VRMS into 51K Ohms Min. L-L Balanced 1.3VRMS into 10K Ohms Min. L-L Balanced	
Input Current: (Ref Input)	26VRMS and 115VRMS: 1ma. max. 1.3V:0.2ma. max.
Output Voltage:	+/-15VDC Powered Models: 6.81V. L-L., +/-12VDC Powered Models: 5.6 V. L-L., Transformation Ratio follows reference input.
Output Drive:	2K Ohms, 2ma. Short Circuit Protected
DC Power Input:	+/-12VDC Powered Models: +/-12VDC @ 20ma. each +/-15VDC Powered Models: +/-15VDC @ 20ma. each All Models: +5VDC @25ma.
Notes:	
1) +/-2 arc-minute units +1LSB	



MODEL SELECTION GUIDE										
	H	D	R	<u>4</u>	<u>X</u>	<u>L</u>	-	<u>3</u>	<u>2</u>	<u>2</u>
sample	a.	b.	c.	d.	e.	f.				
Use Base Model: HDR then add:										
a. Frequency:	4 = Optimized 400Hz 6 = Optimized 60Hz. U = Universal User Scaleable									
b. Reference Input:	x = Transformer Isolated s = Solid State Differential									
c. Reference Voltage:	L = 26 VAC H = 115 VAC s = 1.3-115V User									
d. Operating Temp:	1 = 0°C to +70°C 3 = -40°C to +85°C									
e. Power:	2 = +/- 12VDC and +5 5 = +/- 15VDC and +5									
f. Accuracy:	2 = +/- 2 arc Minutes 4 = 4 +/- arc Minutes									
Example: Model HDR4XL-322 Includes: Reference Input Transformer Isolated, 26VAC@400Hz., -40°C to +85°C operating Temperature, ±12VDC Power Input, ±2' Accuracy.										