



COMPUTER CONVERSIONS CORPORATION

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HDRCK Series Sub-Miniature DIGITAL TO RESOLVER SINE COSINE CONVERTERS

FEATURES

- Internal Transformer Isolated Reference Input, Options: 115VAC / 40VAC / 25VAC, or 1-26VAC User Scalable
- 16 Bits Resolution
- 30 arc Seconds Accuracy
- Lower Cost / Size Comparable to Hybrids
- Wide Band Frequency: DC to 20KHz
- High Power 2VA Output Drive
- Virtually Indestructible Outputs: Short Circuit Proof w/ Thermal Cutoff Drives High Power w/ Current Limiting
- Thermally Conducted Metal Top Heat Sink
- +/-12 and +/-15 Volt Powered Models
- 40°C to +65°C Operating Temperature
- Short Circuit Protected Outputs
- Buffered 16 Bit Transparent Latch Input
- Auxiliary Reference Output for Loss Detect
- Low Scale Factor Variation: 0.05% Typical
- CMOS & TTL Compatible Inputs



Features-HDRCK copy.jpg

DESCRIPTION

The HDRCK Series are very high accuracy, hybrid sized, high power Digital to Resolver (AC Sine / Cosine) Converters designed for high performance industrial and COTS Military applications.

The HDRCK Series are sub-miniature modules that are; size comparable, low cost alternatives to Hybrid type D-R and D-S converters. The advanced modular design of the HDRCK 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.

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.

A squared off, isolated reference output (pin R) is made available for reference loss detect by the host. This output is 5 Volt TTL/CMOS compatible logic represents the frequency of the reference input (typically feeding a one-shot or similar approach).

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.

All of these synchro and resolver converters feature virtually indestructible short-circuit proof outputs, metal top plate heat sinks, current limiting and automatic thermal cutoff.

The digital input is a 16 Bits wide, both CMOS and TTL compatible 5 volt logic, representing binary weighted angle.

APPLICATIONS

- Avionics/Tank Simulation & Trainers
- Automotive Resolver Test Stands
- Motor/Drive Test Instrumentation
- AC Vector Drives/Servo Systems
- Moving Target Control Systems
- GPS Integration, Displays and LRU's
- Gyro's & Navigation Systems
- Outputs to Radars & Indicators
- Resolver to Digital Testing, ATE
- Fire Control Systems
- Coordinate Control Systems
- Digital Control Transformers
- Digital Phase Shifting

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 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 input is binary weighted angle format. 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 HDRCK 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 2VA 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).

All models include an electrically isolated aluminum top plate for improved thermal dissipation, internal transformer isolated reference input, and are phased for direct compatibility with competitive models.

For models that drive loads of 1.2VA or higher, internal output transformers are provided on all models with a rated frequency of 400Hz. or higher.

50-60 Hz. models use an external output transformer (for 60 Hz. converters that do not require output transformers Computer Conversions Reference Powered DSP Series converters can be considered).

These converters are designed to meet the requirements of MIL-STD-202E, including salt spray when mounted to a printed circuit card that is conformal coated.

MIL-STD-202 ENVIRONMENTALS

ENVIRONMENT	METHOD	CONDITION
Shock: 50G, 11 msec	213	A
Vibration: 10G, 2k Hz	204	C
Thermal Shock	107	A
Moisture	106*	-
Salt Spray	101	B
Altitude	105	B

MIL-STD-202 ENVIRONMENTALS & OUTPUT PHASING DETAILS

Notes:

- 1) Environmentals applies to -2 and -3 suffix temp. variants.
- 2) *When conformally coated on PCB.
- 3) Guaranteed to meet these environmental test criteria.



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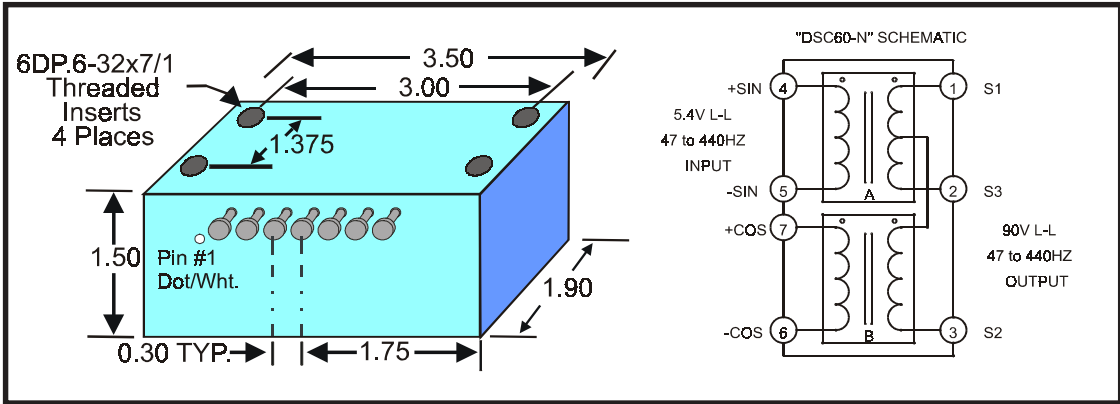
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**HDRCK Series Sub-Miniature
DIGITAL TO RESOLVER
SINE COSINE CONVERTERS**

Specifications

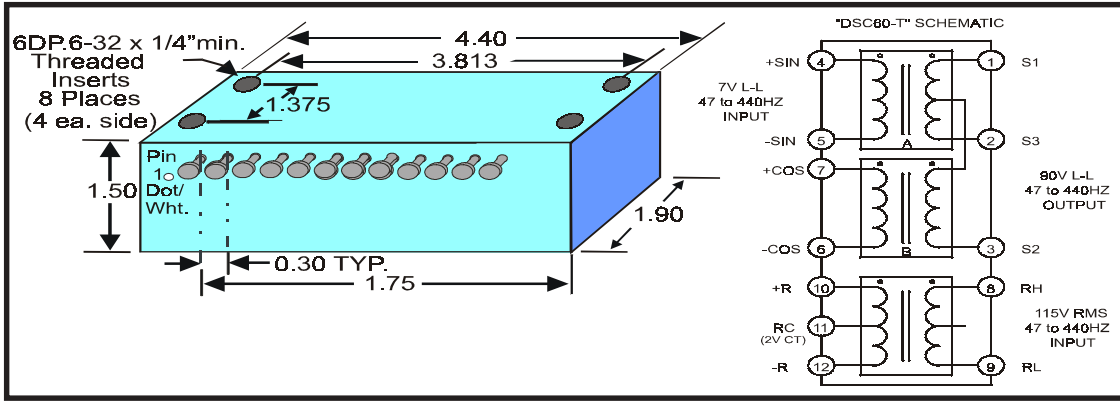
Resolution:	16 Bits
Accuracy¹:	30 arc. Seconds
Scale Factor Variation:	+/-0.05% Max. Typical (Transformation Ratio Error)
Output Settling Time:	100 Usec. Max.
Frequency Range:	HDRCK = 47 to 1,200Hz. HDRCE = 1,000 to 5,000Hz. HDRCF = 2,500 to 10,000Hz. HDRCG = 4,800 to 20,000Hz.
Reference Input:	H = 115 VAC 40 = 40 VAC L = 26 VAC U = Universal
Input Impedance: (Reference Input)	X Type Transformer Isolated with +/-12V supplies 115VRMS into 286K Ohms Min. L-L Balanced 40VRMS into 100K 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 115VRMS into 220K Ohms. Min. L-L Balanced 40VRMS into 75K 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, 40 VRMS 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.
Phase Shift:	Drives any phase angle from -90 ° to +90°
Digital Inputs:	Natural Binary Angle, Transient Protected CMOS / TTL compatible. Fan in: 1 LS TTL Loads Latch input: Pin EN, transparent when low, low to latch (OVDC), 30K ohm pull-up to +5VDC, 0.13 Std. TTL load.
Output Drive:	2VA: ±15VDC Powered Units. Short Circuit Protected 1.5VA: ±12VDC Powered Units. Short Circuit Protected

50/60 and 60Hz. Output Transformer Selections: (Ordered Separately)
All 60 Hz. Models can drive 60 and 400Hz. loads.



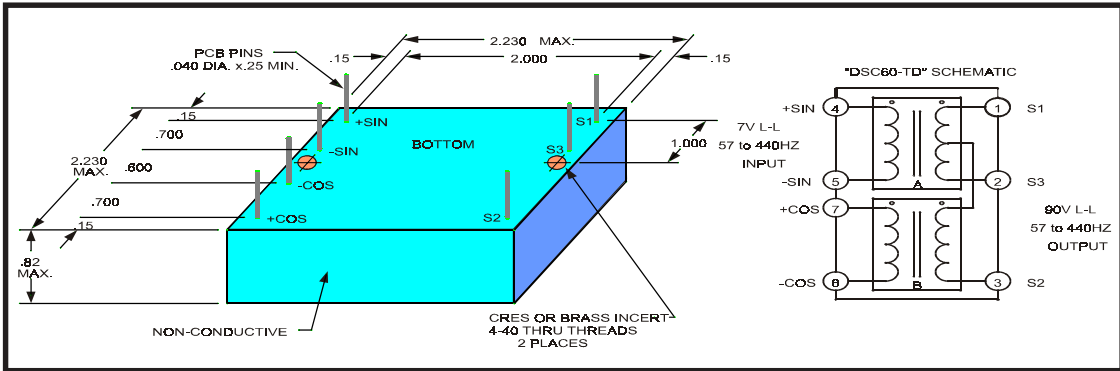
Model: DSC60-N

Output Transformer For 50/60 Hz. units. Converter: can be either +/-12VDC or +/-15VDC powered, Use converter model DSL...-5.4/H-... 115 V. Ref. to Conv.



Model: DSC60-T

Output Transformer For 50/60 Hz. units. Converter: must be +/-15VDC powered, Use converter model DSL...-7... 115 V. Reference is wired to Transformer and Transformer Reference Output is wired to converter.



Model: DSC60-TD

PCB Mount Type Output Transformer For 60 Hz. units. Converter: must be +/-15VDC powered, Use converter model DSL...-7/H... 115 V. Ref. to Conv.

CAUTION: HIGH VOLTAGES, IMPROPER HANDLING CAN RESULT IN INJURY.

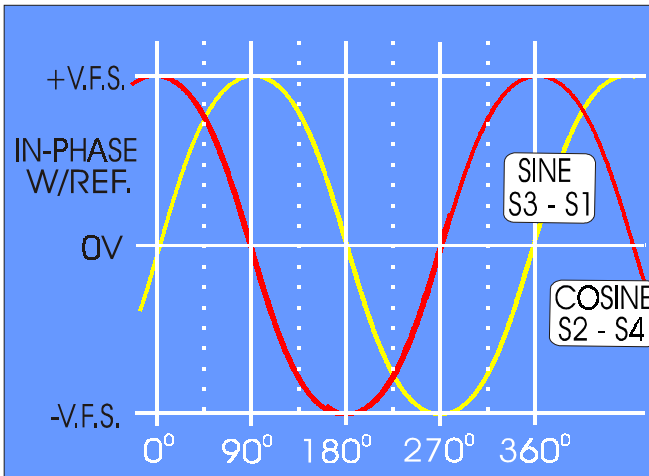


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Application Notes:

- A) **CAUTION HIGH VOLTAGES MAY BE PRESENT !**
- B) ARINC 407 : S1 =X, S3 = Y, S2 =Z (Z sometimes connected to ground)
- C) To Reverse Direction of Rotation: swap S1 with S3, else invert data.
- D) Reversing RH with RL will cause output to be 180 degrees out.
- E) RH = R1 = Normally Hot
- F) RH and RL inputs are (Internally) Transformer Isolated as required per MIL-STD-1399.

DC POWER INPUT REQUIREMENTS

All Units: +5VDC @ 100ma.

±15VDC Powered Models: Average DC Current Draw Each:

No Load
40ma.

1.5VA Load
160ma.

2VA Load
210ma.

±12VDC Powered Models: Average DC Current Draw Each:

No Load
45ma.

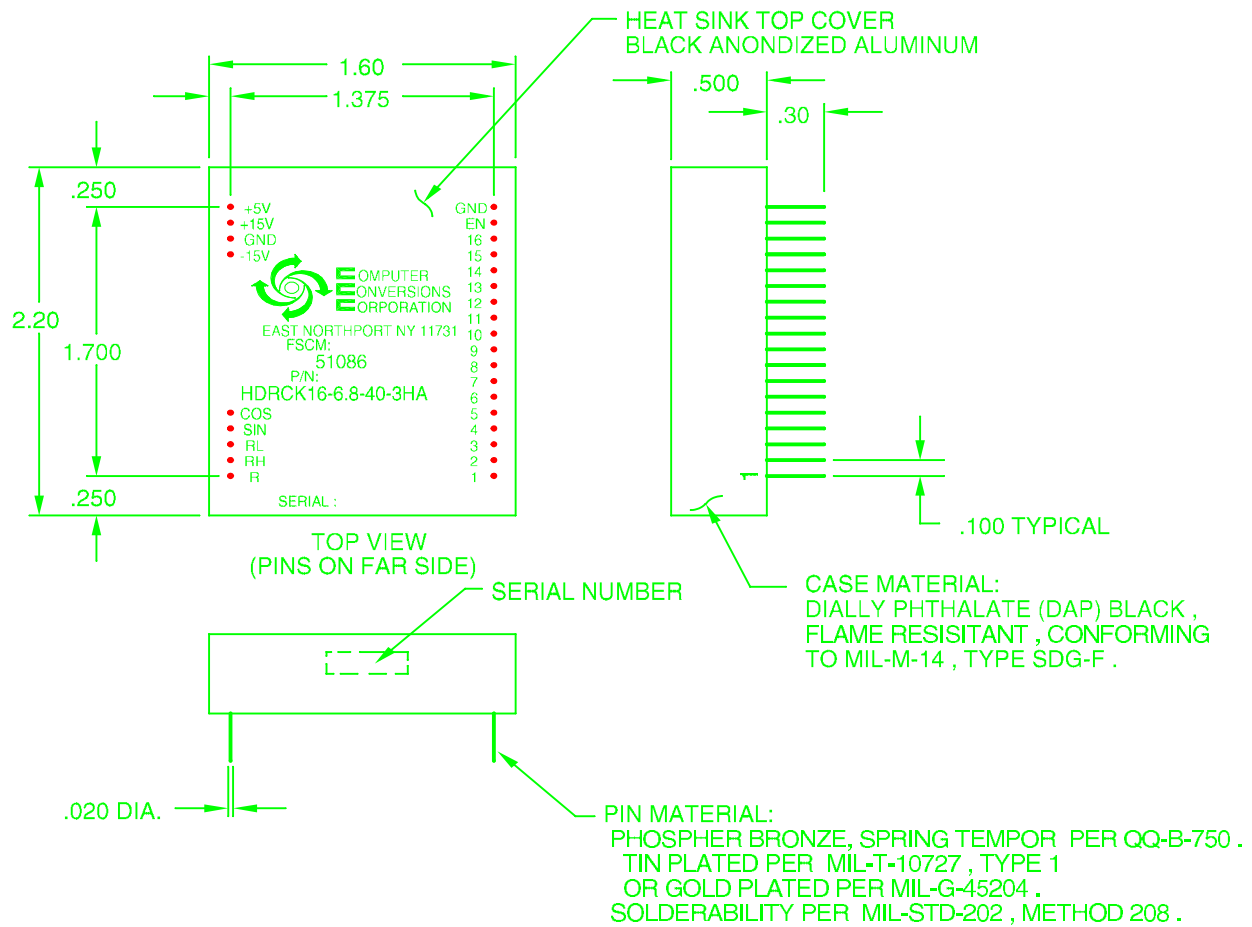
1.5VA Load
170ma.

2VA Load
225ma.

Notes

- 1) May be used to power external power amplifiers to up to 300VA., +/-15V units are 6.81V, +/-12V. units are 5.6V.L-L.
- 2) All units should have sufficient forced air cooling. Internal Thermal cut-off is at 125°C. , auto-restored.
- 3) The +/-12 or +/-15VDC supplies should feature foldback current limiting to enable the supplies to gradually increase the voltage with the load surge caused during power-on (turn-on short circuit current). Most reasonable supplies (including switchers) feature this.
- 4) Both the + and - supplies should power-up simultaneously to minimize turn-on surges (typical of all Class B type amplifiers). Tracking supplies should be considered where practical.

Mechanical Outline:



Model Selection Guide:

