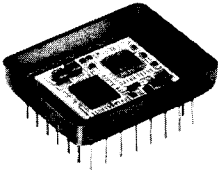


12 BIT LVDT/RVDT TO DIGITAL CONVERTER



PRELIMINARY

FEATURES

DESCRIPTION

The DTC-19305 series are 12-bit tracking LVDT (Linear Variable Differential Transformer) or RVDT (Rotary Variable Differential Transformer) to digital converters. The DTC-19305, packaged in a small 26 pin plug-in (0.8" x 1.0") hybrid features: resistor programmable sum and difference input range, low power: $\pm 5v$ dc at 10 ma=100 mw typ, 12-bit ratiometric tracking converter, convenient microprocessor digital interface, high reliability and low cost- single monolithic chip, **BIT** output for converter malfunction, and under and over-range indication. An analog velocity voltage

(VEL) is a standard output for the DTC-19305.

APPLICATIONS

The DTC-19305 provides many features previously supplied by individual system components. The need for other system circuits is minimized because of the fault indicator (**BIT**) and velocity output (**VEL**). The DTC-19305 is an excellent choice for applications using the LDVT transducer for position feedback, such as military/commercial aerospace and industrial control systems.

- **SMALL SIZE: 0.8" X 1.0" HYBRID PACKAGE**
- **RESISTOR PROGRAMMABLE SUM AND DIFFERENCE INPUT RANGE**
- **LOW POWER: $\pm 5V$ DC AT 10 MA 100 MW TYP**
- **12-BIT RATIOMETRIC TRACKING CONVERTER**
- **HIGH RELIABILITY AND LOW COST- SINGLE MONOLITHIC CHIP**
- **BIT OUTPUT FOR CONVERTER MALFUNCTION**
- **UNDER AND OVER-RANGE INDICATION**

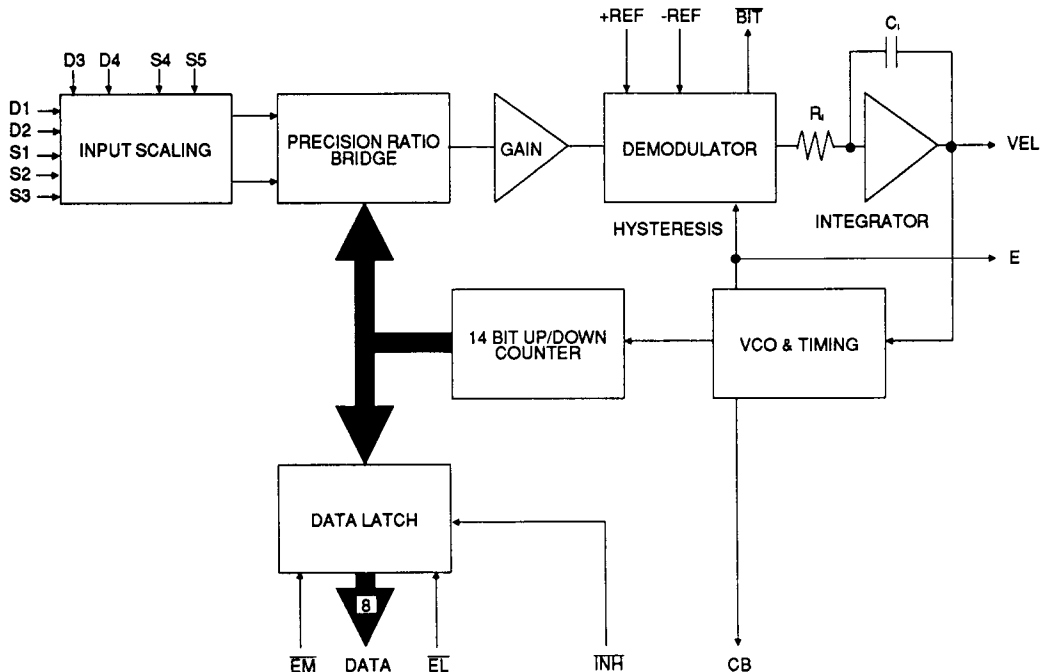


FIGURE 1. DTC-19305 BLOCK DIAGRAM

TABLE 1. DTC-19305 SPECIFICATIONS

PARAMETER	UNIT	VALUE
RESOLUTION	Bits	12
ACCURACY	%	0.15 + 3 LSB (see note)
REPEATABILITY	LSB	1 max
DIFFERENTIAL LINEARITY	LSB	0.5 max
DIFFERENCE INPUT		
Frequency	Hz	360 - 5000
Voltage Range	Vrms	2 nom, for no scaling resistor to 20 with scaling resistor
Input Impedance		
single ended	Ohm	40k ±1%
differential	Ohm	80k ±1%
Common Mode Range	V	20 peak max, 100 pk transient
SUM INPUT		
Frequency	Hz	360 - 5000
Voltage Range	Vrms	2 nom, for no scaling resistor to 20 with scaling resistor
Input Impedance		
single ended	Ohm	40k split ±1%
differential	Ohm	80k split ±1%
Common Mode Range	V	20 peak max, 100 pk transient
DC ERROR OUTPUT (E)		
Gradient	Vdc	-1.25 per +1 LSB of error, nom
Range	LSBs	±3 min
Load	mA	±0.5 max
DIGITAL INPUT/OUTPUT		
Logic Type		TTL/CMOS compatible
Inputs		Logic 0 = 0.8V max. Logic 1 = 2.0V min. Loading = 10µa max P.U. current source to +5V //5pf max. CMOS transient protected
Inhibit (\overline{INH})		Logic 0 inhibits; Data stable within 0.3µs
Enable Bits 1 to 6 (\overline{EM})		Logic 0 enables; Data stable within 150 nS
Enable Bits 7 to 12 (\overline{EL})		Logic 1 = High Impedance Data High Z within 100 nS
Outputs		
Parallel Data (1-12)	bits	12, 2 bytes, 8 parallel lines; offset binary, positive logic
Built-In-Test (\overline{BIT})		Logic 0 for BIT condition. ±100 LSBs of error with a filter of 2.5 mS
OR1, OR2		Over Range; enable with \overline{EM}
Drive Capability		50 pF + Logic 0; 1 TTL load, 1.6 mA at 0.4V max Logic 1; 10 TTL loads, -0.4 mA at 2.8V min High Z; 10 µA //5 pF max

TABLE 1. DTC-19305 SPECIFICATIONS (continued)

PARAMETER	UNIT	VALUE
DYNAMIC CHARACTERISTICS		
Tracking Rate	FRPS	20 min
Bandwidth(Closed Loop)	Hz	47
Ka	1/s ²	11k
A	1/sec	105
B	1/sec	56
Settling Time (half scale step)	msec	120 max
POWER SUPPLIES		
Nominal Voltage	V	+5 -5
Voltage Range	±%	5 10
Max Volt. w/o Damage	V	+7 -7
Current	mA	10 typ, 15 max
TEMPERATURE RANGE		
Operating	°C	0 to +70
-30X	°C	-55 to +125
-10X	°C	-65 to +150
Storage	°C	-65 to +150
PHYSICAL CHARACTERISTICS		
Size	in	1.0 x 0.8 x 0.2; 26 pins
Weight	oz	0.66 max

NOTE: % of Reading

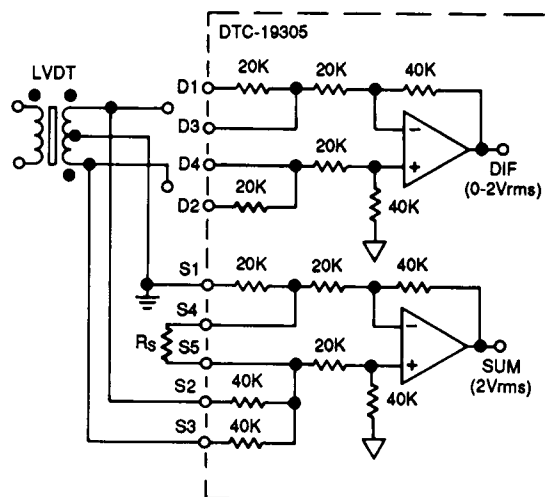


FIGURE 2. 3-WIRE LVDT HOOKUP DIAGRAM

$$\text{Open Loop Transfer Function} = \frac{A^2 (S/B + 1)}{S^2 (S/10B + 1)}$$

Dimensions are in inches (millimeters).

LVDT Output	MSB 1	12 LSB
+ over full travel	01 xxxx xxxx xxxx	1111 1111
+ full travel -1LSB	00 1111 1111 1111	0000 0000
+0.5 travel	00 1100 0000 0000	0001
+ 1 LSB	00 1000 0000 0000	0000
null	00 1000 0000 0000	1111
- 1 LSB	00 0111 1111 1111	0000
-0.5 travel	00 0100 0000 0000	0000
-full travel	00 0000 0000 0000	0000
-over full travel	11 xxxx xxxx xxxx	0000

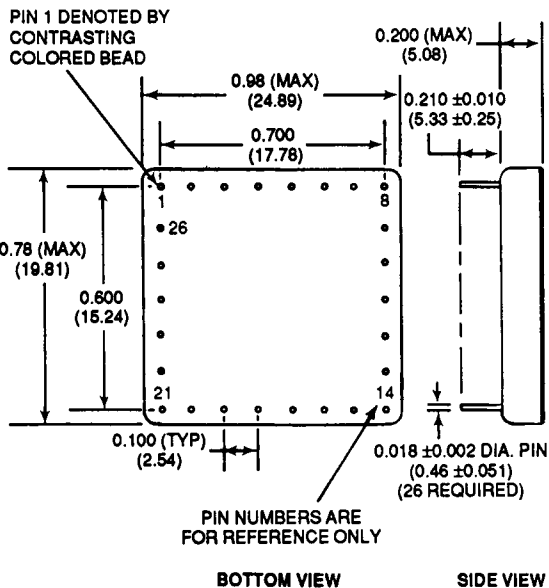


FIGURE 3. DTC-19305 MECHANICAL OUTLINE

PIN#	NAME	PIN#	NAME
1	ENM	14	E
2	N.C.	15	GND
3	OR 1/7	16	-5V
4	OR 2/8	17	S1
5	1/9	18	S2
6	2/10	19	S3
7	3/11	20	S4
8	4/12	21	S5
9	5	22	D1
10	6	23	D2
11	BIT	24	D3
12	ENL	25	D4
13	TRF	26	+5V

ORDERING INFORMATION

DTC-19305-X X X

Accuracy:

1 = 0.15% of reading +3 LSB

Reliability Grade:

0 = Standard DDC procedures.

1 = Fully compliant with MIL-STD 883.

2 = Screened to MIL-STD-883 but without QCI testing.

Temperature Range:

1 = -55°C to +125°C

3 = 0°C to +70°C