



SERIES
1681, 1685

revised June 1985

SOLID STATE CONTROL DIFFERENTIAL TRANSMITTER

FEATURES:

- Accuracy: ± 4 minutes of arc
- Resolution: 14 bits
- Transformer Isolated Input
- Low power Schottky TTL inputs eliminate the need for special precautions against static electricity
- Reverse polarity protected
- Available for either 0°C to $+70^{\circ}\text{C}$ or -55°C to $+105^{\circ}\text{C}$
- Hermetic sealed units on request
- Meets MIL-STD-202D, Methods 101C, 105B, 106C, 107C, 202D, 204B and 205D
- High reliability 883B or MIL-M-38510 units on request
- Completely protected against any possible latch-up condition due to any combination of loss or sequence of reference, signal or power



DESCRIPTION:

This small, low cost solid state control differential transmitter accepts inputs from a synchro together with a 14 bit digital angle and converts these into an AC resolver output that represents the difference between the two input angles. This function can be described as $K \sin \omega t \sin (\theta - \phi)$ and $K \sin \omega t \cos (\theta - \phi)$.

Model 1685 includes a power amplifier and Scott-T output transformer that will drive various Control Transformers with loads up to 1.3VA.

SPECIFICATIONS:

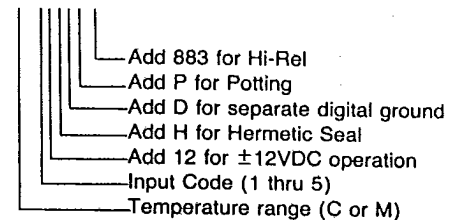
Accuracy*	± 4 minutes of arc			
Resolution:	14 bits (1 LSB=1.3 arc minutes)			
Tracking Speed:	25 rps min.			
Digital Input (ϕ):	Parallel, Positive Logic, TTL levels Binary Coded Angle			
Fan In:	1 LPTTL			
Synchro Input (θ):	INPUT CODE	INPUT	Freq. (1) $\pm 10\%$	L-L Vrms ⁽¹⁾ $\pm 10\%$ L-L Imped. Min
	1	Synchro	400Hz	11.8 40K
	2	Synchro	400Hz	90 100K
	3	Synchro	50/400Hz	90 100K
	5	Resolver	400Hz	11.8 40K
	6	Resolver	400Hz	7.07 40K

Outputs: $K \sin \omega t \sin (\theta - \phi)$ and $K \sin \omega t \cos (\theta - \phi)$.
Magnitude variation is less than 0.03% over full input range of 0 to 360°

- Output Voltages:** 6.5VRMS Max.
- Output Load:** 2K ohms min.
- Settling Time: (180° step)** 100 μ sec. max.
- Phase Shift:** $\pm 1^{\circ}$ max.
- Power Requirements:** +5VDC $\pm 5\%$ at 50ma; ± 15 VDC $\pm 5\%$ at 60 ma
- Operating Temperature:** Model C: 0°C to $+70^{\circ}\text{C}$; Model M: -55°C to $+105^{\circ}\text{C}$
- Storage Temperature:** -65°C to $+125^{\circ}\text{C}$
- Potting:** For high shock or vibration applications, units should be potted. See part number designation.
- Weight:** Approx. 7 oz.
- Option:** Analog and digital grounds are common internally. A separate digital ground is available on request. See part number designation.

PART NUMBER DESIGNATION

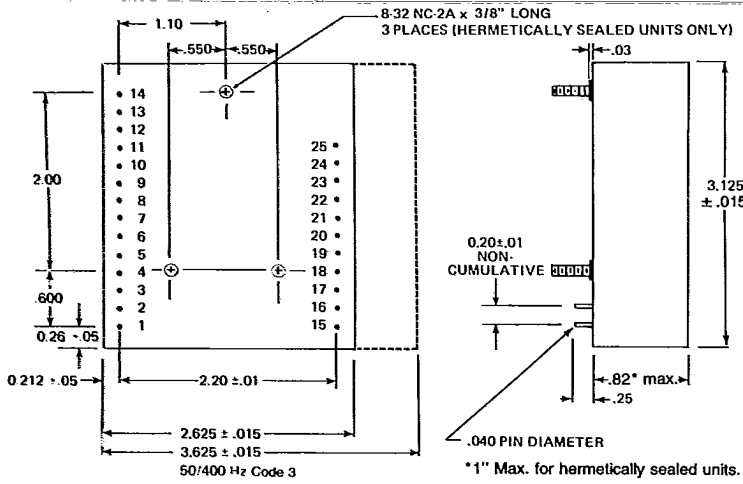
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(1) Other voltages and frequencies are available.

*Accuracy applies over the operating temperature range, $\pm 5\%$ Power supply, $\pm 10\%$ input signal and frequency variation, and 10% harmonic distortion.





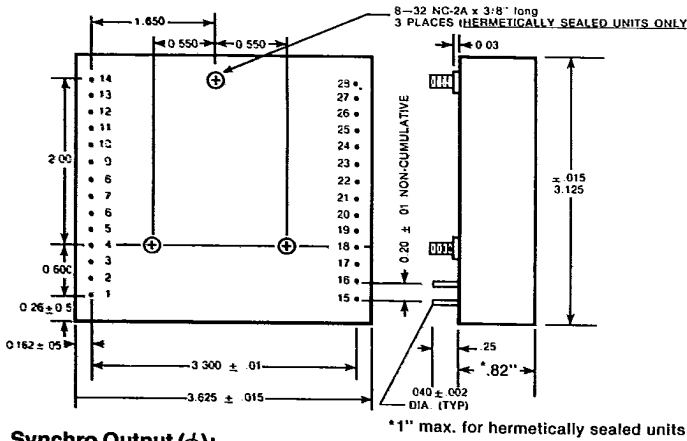
PIN ASSIGNMENTS

- | | |
|------------------|-------------------------------|
| 1 MSB (180°) | 15 K Sin ωt Cos (θ-φ) |
| 2 | 16 K Sin ωt Sin (θ-φ) |
| 3 | 17 +5VDC |
| 4 | 18 -15VDC |
| 5 | 19 Logic Gnd (+5VDC return) * |
| 6 | 20 Analog Gnd (±15VDC return) |
| 7 BINARY | 21 +15VDC |
| 8 INPUTS | 22 S1 |
| 9 φ | 23 S2 } INPUT θ |
| 10 | 24 S3 } |
| 11 | 25 S4 (Resolver only) |
| 12 | |
| 13 | |
| 14 LSB (.02197°) | |

*When specified. Otherwise Digital and Analog grounds are connected internally to pin 20 with pin 19 omitted.

MODEL 1685: Incorporates a Scott-T Output Transformer and Power Output Stage.

The output Scott-T frequency characteristics must be identical to the Synchro input characteristics. Accuracy: ± 6 arc minutes.



Phase shift: +5° at no load
+10° at full load

PIN ASSIGNMENTS

- | | |
|--------------|---------------|
| 1 MSB (180°) | 15 N/A |
| 2 | 16 S1 Out |
| 3 | 17 S2 Out |
| 4 | 18 S3 Out |
| 5 | 19 S4 Out |
| 6 BINARY | 20 +5 VDC |
| 7 INPUTS | 21 -15 VDC |
| 8 | 22 Logic Gnd |
| 9 | 23 Analog Gnd |
| 10 | 24 +15 VDC |
| 11 | 25 S1 Input |
| 12 | 26 S2 Input |
| 13 | 27 S3 Input |
| 14 LSB | 28 S4 Input |

Synchro Output (φ):

OUTPUT Code	Freq. ±10%	L-L VRMS ±10%	OUTPUT LOAD Min
1	400	11.8	125 ohms
2	400	90	6K ohms
3	50/400	90	6K ohms (use STM 1685)

POWER REQUIREMENTS:

	+5 VDC (±5%)	+15 VDC(1) (±5%)	-15 VDC(1) (±5%)
No Load	50 mA	40 mA	40 mA
Average with Full Load	50 mA	150mA	150mA
Peak with Full Load	50 mA	200mA	200mA

Power supplies should be able to supply the peak currents indicated without current limiting.

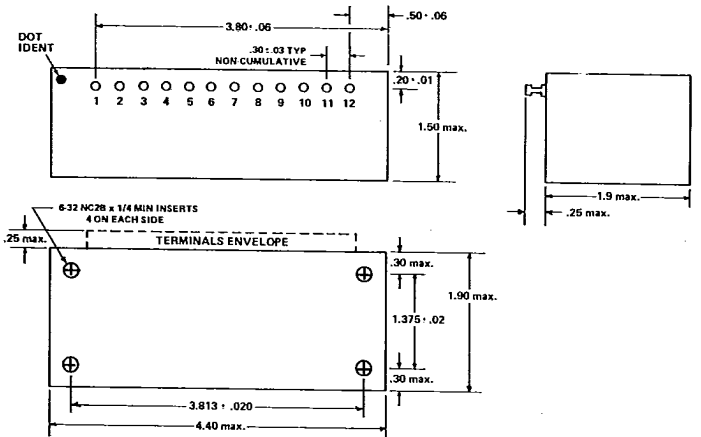
±12VDC operation available. See Part Number Designation.

PART NUMBER DESIGNATION

1685 *-----

- └─ Add 883 for Hi-Rel
- └─ Add P for potting
- └─ Add D for separate logic ground
- └─ Add H for Hermetic seal
- └─ Add 12 for ±12VDC operation
- └─ Input/Output Code (11, 22, 33 or 51)
- └─ Temperature range (C or M)

STM 1685 TRANSFORMER CONNECTIONS



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