

HAMLIN

T-41-38

FLUID PERFORMANCE SPECIFICATIONS FOR DIRECT DRIVE LCDs

Hamlin offers four grades of liquid crystal LC fluid for use in a wide variety of applications —

Type 2: A wide temperature fluid with enhanced speed of response at extremely low temperatures.

Type 7: An extremely wide temperature range fluid (-30°C to $+105^{\circ}\text{C}$) for extreme outdoor applications. Closest material available for "MIL-SPEC" type applications.

Type 5: Our most economical, intended for use in applications not requiring storage or operation in extreme humidity and temperature levels.

Type 8: A very low viscosity fluid with an extreme temperature range. This fluid combined with our array process LCD technology, offers a 7 second combined T on + T off time at -40°C .

	FLUID TYPE 2			FLUID TYPE 5			FLUID TYPE 7			FLUID TYPE 8			Units
Operating Voltage	Min. 4	Typ. 7	Max. 15	Min. 3	Typ. 5	Max. 12	Min. 5	Typ. 7	Max. 15	Min. 5	Typ. 7	Max. 15	Vrms
DC Drive Component Allowable	-	50	-	-	-	50	-	-	50	-	-	50	mV
Operating Frequency Range	30	60	100	30	60	100	30	60	100	30	60	100	Hz
Current (all segments on)*	-	5	20	-	5	20	-	5	20	-	5	10	μA
Capacitance (all segments on)*	-	3000	-	-	3000	-	-	3000	-	-	3000	-	pF
DC Resistance (all segments on)*	-	50	-	-	50	-	-	50	-	-	50	-	M Ω
Visual Threshold													
10% ON @ 25°C	-	2.2	-	-	1.7	-	-	2.3	-	-	1.8	-	Vrms
10% ON @ 0°C	-	2.4	-	-	2.0	-	-	2.6	-	-	2.4	-	Vrms
90% ON @ 25°C	-	3.1	-	-	2.8	-	-	3.4	-	-	2.6	-	Vrms
90% ON @ 0°C	-	3.2	-	-	3.1	-	-	3.7	-	-	3.2	-	Vrms
Typical Response Time* (T on and T off) at 25°C	Less than 50ms total			Less than 225ms total			Less than 60ms total			Less than 55ms total			
Segment ON (TA = 25°C)	-	15	20	-	50	100	-	20	30	-	15	-	ms
Segment OFF (TA = 25°C)	-	30	60	-	175	300	-	30	50	-	40	-	ms
Segment ON (TA = 0°C)	-	50	180	-	150	600	-	70	90	-	35	75	ms
Segment OFF (TA = 0°C)	-	150	320	-	1000	1500	-	80	110	-	110	150	ms
Contrast Ratio	-	20:1	-	-	20:1	-	-	20:1	-	-	20:1	-	-
Operating Temperature Range	-20 ¹	-	+85	-10	-	+55	-30 ²	-	+105	-40 ³	-	+85	$^{\circ}\text{C}$
Storage Temperature Range	-55	-	+85	-55	-	+55	-55	-	+105	-55	-	+85	$^{\circ}\text{C}$
Expected Life	-	100,000	-	-	100,000	-	-	100,000					

T-41-38

TWISTED NEMATIC DIRECT DRIVE ORDERING INFORMATION

Hamlin offers a wide range of Twisted Nematic Direct Drive displays. To develop a complete part number for ordering you must determine the following: **MODEL**, **VIEWING MODE**, **FLUID TYPE**, **CONNECTION METHOD**.

EXAMPLE: The part number for a four digit display, with 0.5" high figures, black segments against a silver transfective background, with wide temperature fluid and standard DIL 0.25" long pins would be:

Part Number 3906-365-020.

MODEL 3 9 0 6	+	VIEWING MODE 3 6 5	+	FLUID TYPE X 2	+	CONNECTION METHOD 0
MODEL Select from Displays on Pages 12 through 15. VIEWING MODE Examples on Page 9. 160 - Black segments against clear transmissive background. 260 - Clear transmissive segments against dark background. 270 - Clear transmissive segments against dark background. 313 - Black segments against green reflective background. 315 - Black segments against green transfective background. 333 - Green segments against reflective silver background. 353 - Blue segments against silver reflective background. 363 - Black segments against reflective silver background. 365 - Black segments against silver transfective background. 373 - Black segments against reflective silver background. 383 - Black segments against reflective gold background. 413 - Reflective silver segments against black background. 443 - Reflective silver segments against red background. 465 - Transfective segments against dark background. 473 - Reflective segments against dark background.				CONNECTION METHOD Examples on page 21. 0 - Standard DIL/SIL pins (0.25" length) 1 - Elastomeric-Elastomers supplied separately 3 - Special DIL/SIL Pins (other than 0.25") Indicate pin length required. 5 - w/o pins for use with snap-on connectors FLUID TYPE Select from fluid types on page 10. 2 - Wide Temperature 5 - Commercial Grade 7 - Extreme High Temperature 8 - Avionics Grade		

STOCKED DISPLAYS

Since thousands of part numbers can be developed for Hamlin LCD s, it is impossible to stock all models. However, a selection of off-the-shelf displays, to satisfy many applications, is available. Below is a list of stocked twisted nematic direct drive displays available for immediate shipment.

PART NUMBER	DUAL IN-LINE CONNECTOR	DESCRIPTION	GLASS SIZE	LOCATED ON PAGE
3900-365-020	Pin	4.0 digit (.35") 40 contacts	2.00" x 0.90", 0.70"	12
3901-365-020	Pin	3.5 digit (.5") 40 contacts	2.00" x 1.20", 0.90"	12
3902-365-020	Pin	3.5 digit (.5") 40 contacts	2.00" x 1.20", 0.90"	12
3906-365-020	Pin	4.0 digit (.5") 40 contacts	2.00" x 1.20", 0.90"	12
3918-365-020	Pin	6.0 digit (.5") 50 contacts	2.75" x 1.20", 0.90"	13
3919-365-020	Pin	6.0 digit (.7") 50 contacts	3.70" x 1.50", 1.20"	13
3920-365-020	Pin	6.0 digit (1.0") 70 contacts	5.40" x 1.80", 1.50"	14
3922-365-020	Pin	8.0 digit (.5") 68 contacts	3.70" x 1.20", 0.90"	14
3935-365-020	Pin	2.0 digit (.5") 18 contacts	1.20" x 1.20", 0.90"	14
3975-365-020	Pin	Single 32-Bar Graph 35 contacts	4.00" x 1.20", 0.90"	15

HAMLIN

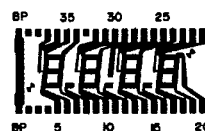
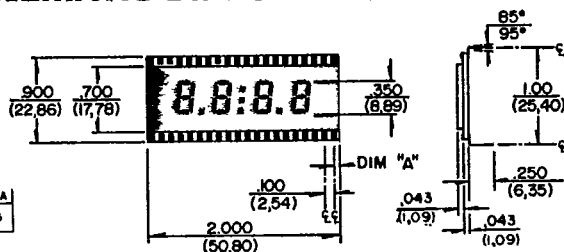
HAMLIN

T-41-38

TWISTED NEMATIC DIRECT DRIVE**MODEL 3900**

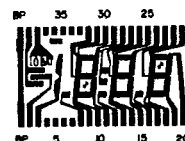
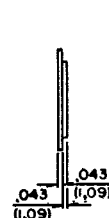
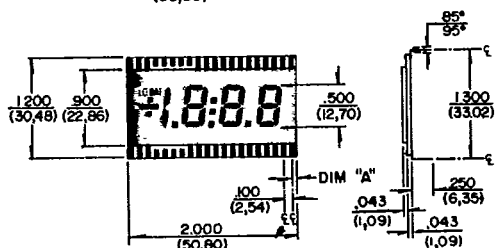
Pins

DIM "A"	DIL	ZEBRA
	050	035

**MODEL 3950**
Elastomeric**MODEL 3901**

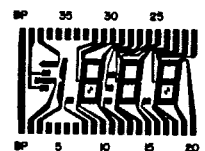
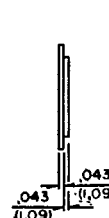
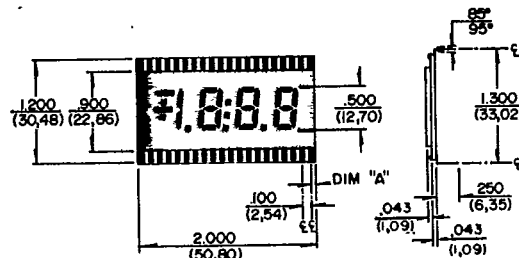
Pins

DIM "A"	DIL	ZEBRA
	050	035

**MODEL 3933**
Elastomeric**MODEL 3902**

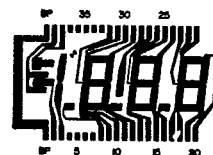
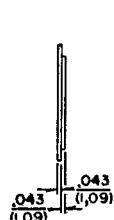
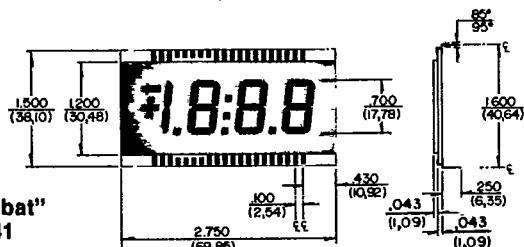
Pins

DIM "A"	DIL	ZEBRA
	050	035

**MODEL 3962**
Elastomeric**MODEL 3903**

Pins

Model 3903 is also available in a "lo bat" version - Model 3941

**MODEL 3953**
Elastomeric

Model 3953 is also available in a "lo bat" version - Model 3991

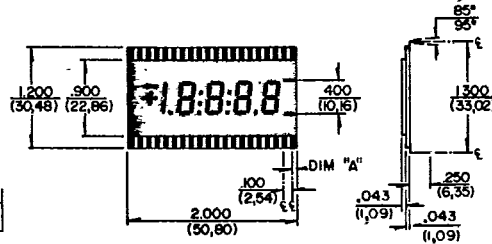
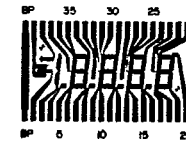
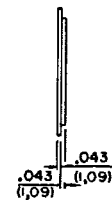
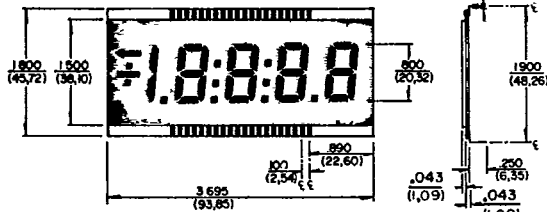
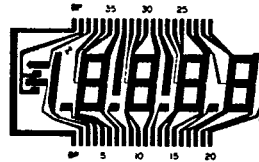
MODEL 3906

Pins

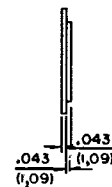
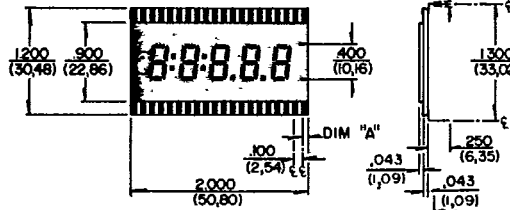
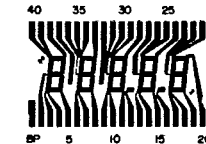
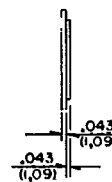
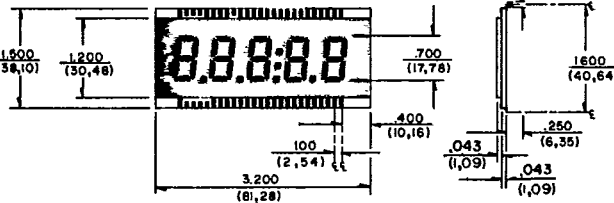
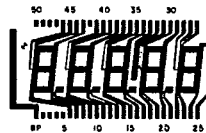
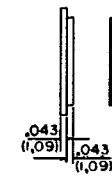
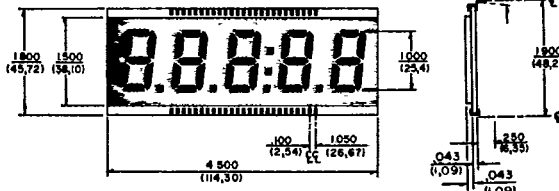
TWISTED NEMATIC DIRECT DRIVE

MODEL 3909
Pins

DIL	ZEBRA
050	035

**MODEL 3959**
Elastomeric**MODEL 3912**
Pins**MODEL 3952**
Elastomeric**MODEL 3913**
Pins

DIL	ZEBRA
050	035

**MODEL 3963**
Elastomeric**MODEL 3915**
Pins**MODEL 3965**
Elastomeric**MODEL 3916**
Pins

HAMLIN

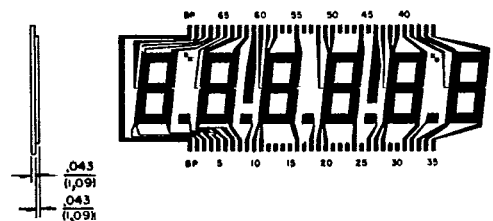
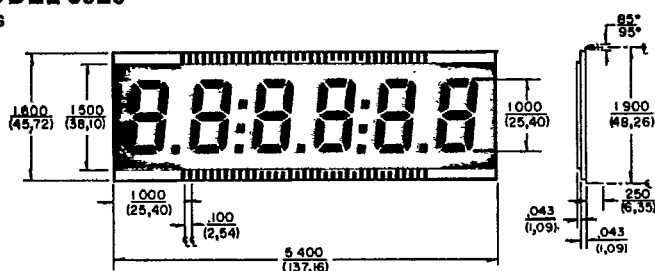
T-41-38

TWISTED NEMATIC DIRECT DRIVE**MODEL 3920**

Pins

MODEL 3980

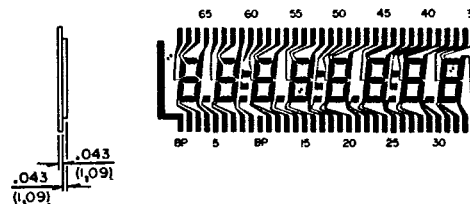
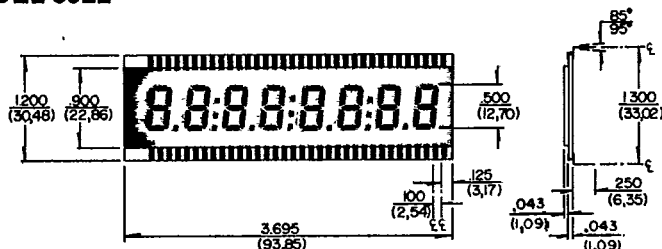
Elastomeric

**MODEL 3922**

Pins

MODEL 3972

Elastomeric

**MODEL 3935**

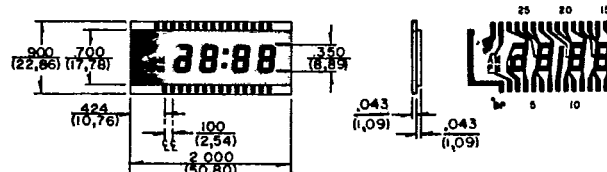
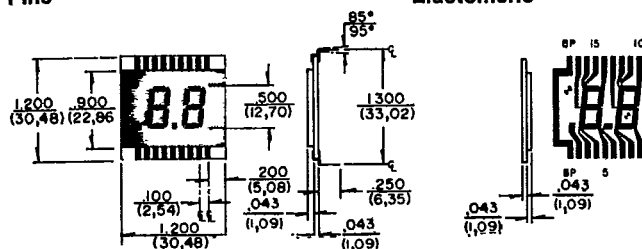
Pins

MODEL 3985

Elastomeric

MODEL 3936

Elastomeric

**MODEL 3937**

Pins

MODEL 3987

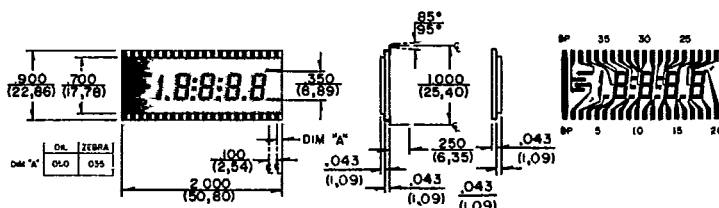
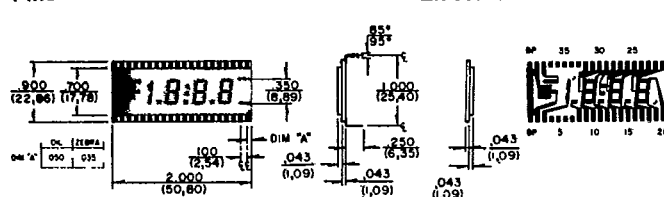
Elastomeric

MODEL 3938

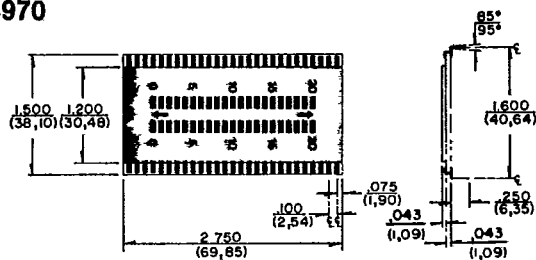
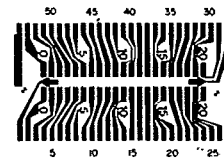
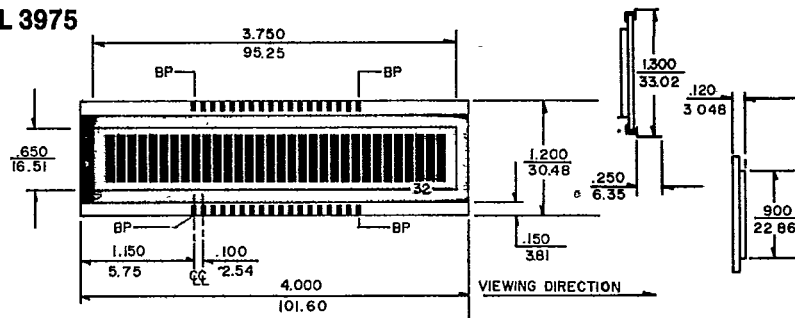
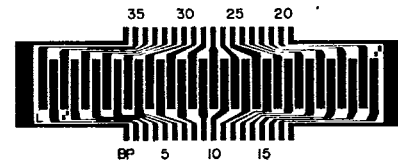
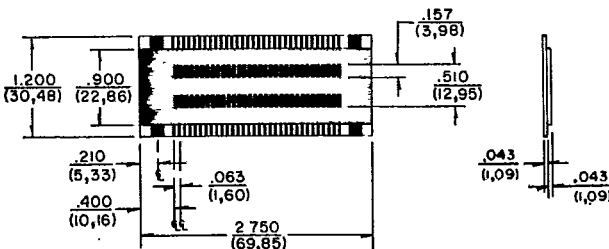
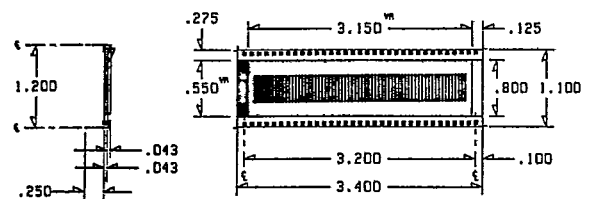
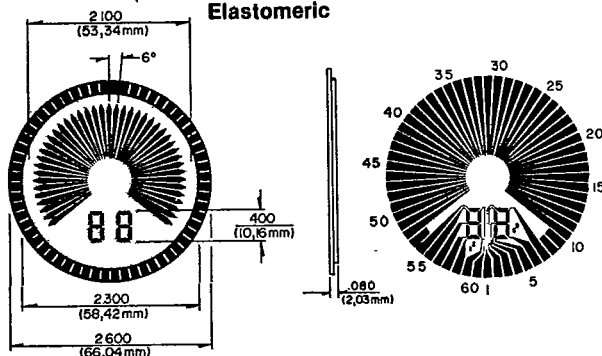
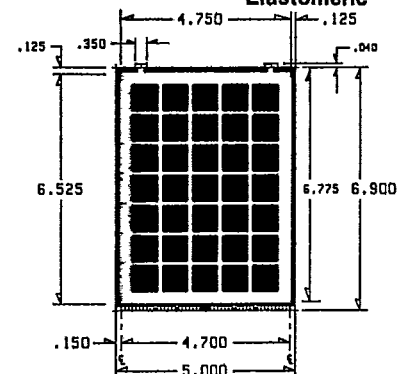
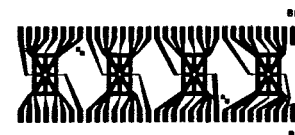
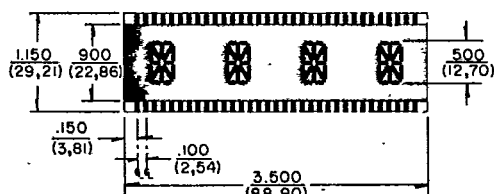
Pins

MODEL 3988

Elastomeric



TWISTED NEMATIC DIRECT DRIVE

MODEL 3970
Pins**MODEL 3995**
Elastomeric**MODEL 3975**
Pins**MODEL 3981**
Elastomeric**MODEL 3996**
Elastomeric**MODEL 3982**
Pins**MODEL 3998 (SQUARE VERSION AVAILABLE MODEL 3997)**
Elastomeric**MODEL 3994**
Elastomeric**MODEL 4572**
Pins**MODEL 4578**
Elastomeric