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Display Group

Display
SP-101
Single 1-inch Numeric, Plasma Display

Technical Bulletin

SP-101

Babcock's MARATHON™ SP-101 is a bright, easily read, 1-inch numeric Plasma display. It is similar to the Babcock SP-200/SP-300 Series alphanumeric product family. The SP-101 is supplied in a single-digit package, allowing the units to be evenly or randomly spaced, thereby ensuring maximum message flexibility to the user.

Easily read from 60 feet or more, the SP-101 is intended for applications where bright and easily readable messages are required or where final product size dictates a larger character. This unsurpassed readability, even in direct sunlight, is derived from the bright, neon-orange color, continuous-line segments, wide viewing angle, and 1-inch characters.

Features

- 1 Inch Character Height
- 150° Viewing Angle
- 225 fL Brightness
- 60 ft. (18m) Viewing Distance
- Legible in Direct Sunlight
- Horizontally Stackable
- Neon-Orange Color

Applications

- Elevators
- Gas Pumps
- Outdoor Scales
- Industrial Timing Systems
- Toll Booths
- Destination Signs
- Industrial Instrumentation

Application Guidelines

The SP-101 may be driven in either the DC, pulsed DC, or multiplexed modes, with or without suppressed zeroes. Figure 3 shows a typical electrical schematic for DC-driven applications. Pulsed operation is a simple extension of DC-drive, wherein either the anode supply voltage or the DD-700 blanking input may be pulse controlled.

For pulsed or multiplexed operation, use of the keep-alive cathode is recommended. The keep-alive cathode provides an internal ion source that reduces ionization time to less than 30

microseconds. This enhances dynamic response and improves multiplex, low temperature, and dark ambient light performance.

Also available are mating connectors, Models Nos. CS-101 and CS-102.

Table I -- DC Characteristics

	MIN	TYP	MAX	VALUE
Display Supply Voltage[1]	160	180	Note 2	Vdc
Anode-to-Cathode Voltage Drop (segment b = 700 µA)		135		Vdc
Cathode Current - Per Segment[3,4]	350	700	1000	µA
Cathode Current - Plus Sign (SP-102)	650	1300	1900	µA
Cathode Current - Minus Sign (SP-102)	275	550	750	µA
Cathode Current - Decimal Point (SP-101)	100	200	300	µA
Cathode Current – Comma (decimal point included) (SP-101)	200	400	600	µA
Cathode Current - Each Colon Segments[5] (SP-101)	50	100	150	µA
Cathode Current - Keep-Alive	15	75	-	µA
Power Dissipation (with all segments lighted @ 700 µA typical)[4]		725		mW
Operating Temperature	0		70	°C
Storage Temperature	-55		125	°C

Table II -- Multiplex Characteristics

	MIN	TYP	MAX	VALUE
Anode on Time[6,7]	80	400	-	µs
Refresh Period			Note	

			6	
Display Supply Voltage	160	180	Note 2	Vdc
Anode Voltage Swing	30	45	90	Vdc
Cathode Voltage Swing	30[8]	50	120	Vdc
Cathode Bias Voltage ("ON" Anode to "OFF" Cathode voltage)[9]	90	110	120	Vdc

Notes

1. The minimum recommended supply voltage required to ionize the display is 160 volts DC. After the display has ionized, the voltage drop is approximately 135 volts. Typical b-segment cathode current of 700 µA is assumed.
2. Display supply voltage (including ripple) should not exceed 200 Vdc when display is used with DD700 decoder/driver. Higher display supply voltages are acceptable when the drive device breakdown exceeds 80 volts DC.
3. All segment currents are ratioed to b segment.

a, d, f and g Current Ratio	1
c Current Ratio	1.25
e Current Ratio	1.2
"Plus" Current Ratio	1.9
"Minus" Current Ratio	0.8

4. The lowest current for even glow on the largest segment is 350 µA. Currents up to 1.5 times the typical current may be used; however, life expectancy may be reduced by operation at excessively higher currents. For multiplexed (time shared) operation, segment currents may be increased to 2.8 mA with 0.25 or smaller duty cycle.
5. To ensure uniform operation of the two colon cathodes, it is recommended that each cathode have its own current limiting device (resistor or current sink). The current listed is the current required for each colon segment.
6. Use of the keep-alive cathode is recommended in all multiplexed applications. Three (3) milliseconds is maximum refresh period without keep-alive. Ten (10) milliseconds is typical with keep-alive.
7. No anode or cathode blanking is required for the display to perform properly; however some blanking may be advantageous to eliminate time overlap of signals due to circuit characters.
8. Under specific conditions, cathode voltage swings of as low as 30 volts are

acceptable.

9. The combination of cathode bias voltage and cathode voltage swing must be within recommended display supply voltage.

Figure 2a -- CS-101 Connector for use with the SP-101 Display

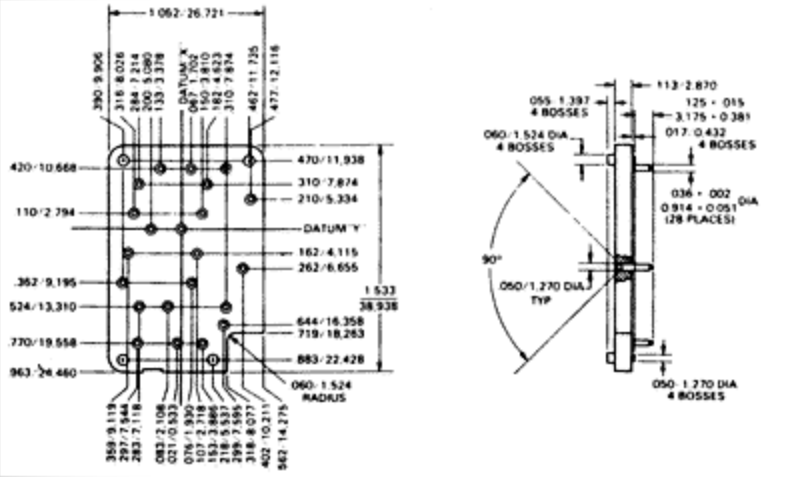


Figure 1a -- SP-101 Segment and Pin Locations and Designations

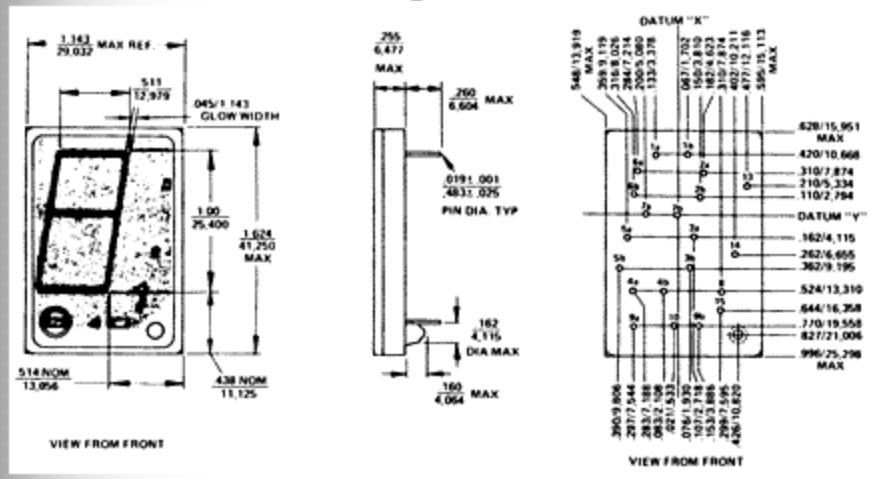
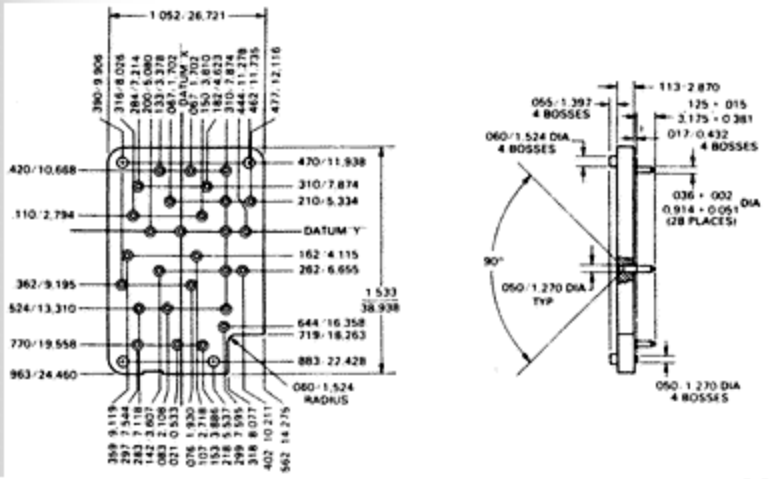
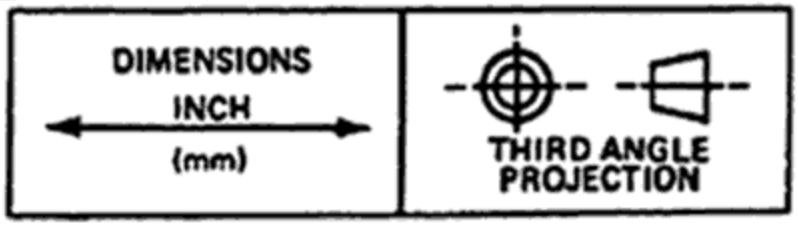


Figure 2b -- CS-102 Connector for use with the SP-101

Display





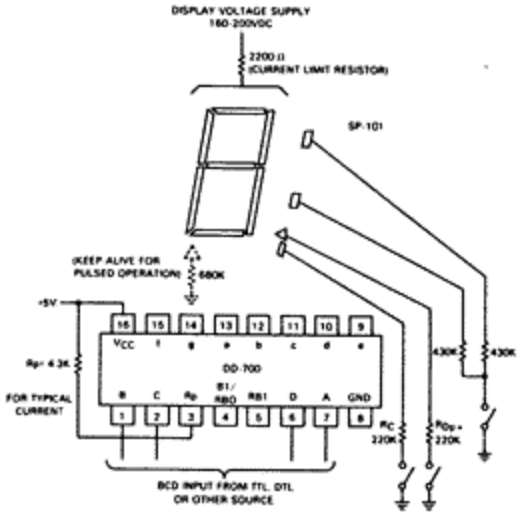
Tolerances unless otherwise specified
± .005 inch and ± 0,127 mm
angular ± 2°

Metric equivalents, based upon 1 inch = 25,4 mm are rounded to the same number of decimal places as in the original English units and are provided for general information only.

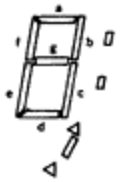
Notes

1. All digit and pin designations and pin locations are viewed from. the front of the display. Shaded areas indicate anode patterns.
2. Distance from digit centerline to edge of display is measured from Pin No. 7b.
3. Pin locations shown are nominal (approximately ±0.003"/,076mm tolerance). Allowances should be made for location tolerance by size of pc board hole diameter. For ease of insertion and solderability, recommend pc board hole diameter of 0.028"/,711mm-0.031"/ ,787mm.
4. For even centerline spacing of digits in separate envelopes, recommend that comparable pins on adjacent digits should be spaced 1.150"/29,210mm minimum.
5. Display pins are solder finned to within 0.100"/2,540mm of body.
6. The CS-102 Connector may be used with the SP-101 Display.

Figure 3a -- Typical DC Drive Circuit Showing Colon, Comma and D.P. Control for SP-101



Segment Designations -- SP-101



Segment/Symbol	Pin Number(s)
a	1a 1b*
b	2a, 2b*
c	3a , 3b*
d	4a, 4b*
e	6a, 6b*
f	7a, 7b*
decimal	8
comma	8 and 15

colon	13 and 14
anode	9a and 9b*
keep-.alive cathode	10

*Two pins are provided for each of the seven digit segments and for the anode. It is recommended that these pin pairs be electrically connected to ensure optimum performance. Pins should not be bent or cut off.

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* Items in bold and with an asterik (e.g. **RST***) indicates negative true logic (typically denoted by an overbar).

For further information, contact your local Babcock Representative or the factory.

This document is designed to assist a purchaser to make an independent determination as to the suitability of these products for his application. Therefore, performance under any use conditions must be based upon the purchaser's independent conclusions, and no conclusion, representation or warranty is made or implied as to the suitability of any of these devices for a particular requirement or use, due to the wide variety of possible applications, and/or conditions beyond our control.

Specifications subject to change without notice.

SPECIAL HANDLING INSTRUCTIONS

MOS circuit components in this assembly are susceptible to damage from static electricity and high voltage transients. A shorting pad of conductive foam has been installed across the interface connector. The shorting pad should not be removed until the terminating connector is wired and ready to be connected to the assembly. The interface connector should always be terminated with either the shorting pad or the terminating connector. DO NOT TOUCH the interface connector with fingers or tools in the absence of the shorting pad or the terminating connector unless properly grounded. The data connector should

connector unless properly grounded. The data connector should not be connected or disconnected while power is applied to the unit.

LIMITED WARRANTY

All Babcock displays have a one year limited warranty. Disassembly of the product will void the warranty. Damaged displays should be returned to the factory for analysis. Contact the factory for further details.

Specifications are for reference only.
9200-0003

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