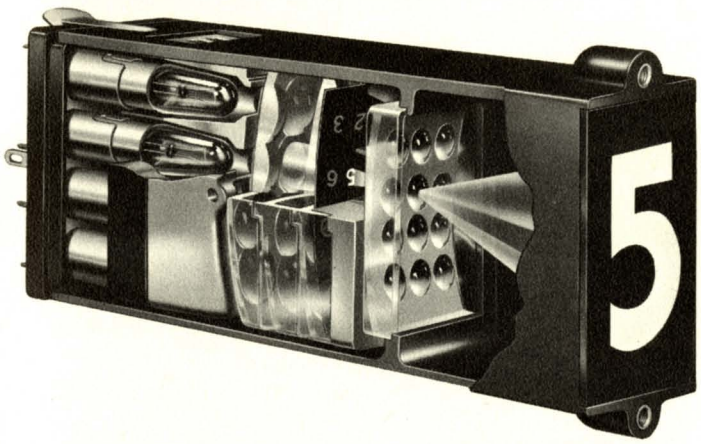
series 10 ONE-PLANE

standard rear-projection readout



BRIGHTNESS-BUILDING LENS SYSTEM INCREASES CHARACTER BRIGHTNESS

The Series 10 Readout operates on a rear-projection principle. When one or more of the 12 lamps at the rear of the unit is lighted, it illuminates the corresponding film message, focuses it through a lens system and projects it onto the viewing screen at the front of the unit. You may specify your own message displays, which may be anything that is photographically reproducible, such as numbers, letters, words, multi-words, symbols, special characters, and colors.

All units are now equipped with a new brightness building lens system that provides increased character brightness. This increased brightness makes for unmistakable clarity at wide viewing angles, over longer distances, and provides greater readability even under high ambient light conditions. The lamp chart below illustrates how a slight reduction in lamp voltage will still provide a substantial increase in brightness plus providing 10-times longer lamp life.

IDEAL FOR

- **Numeric Displays**
- **Alphabetic and Symbolic Displays**
- **Digital Voltmeters, Ohmeters, etc.**
- **Computers**
- **Counters**
- **Annunciator Boards**
- **Signal Alarm Systems**
- **Remote Control Systems**
- **Test Equipment**

SPECIFICATIONS:

- WEIGHT: 12 oz. per unit.
- PROJECTED COLORS AVAILABLE: White (Standard), Amber, Yellow, Blue, Red, Green.
- COMMON lamp return for all 12 terminals supplied as standard. Separate return for each lamp available on special order.
- METAL CASE: Isolated from electrical circuit.
- INPUT: Straight decimal (one lamp per message position)
- VIEWING ANGLE: Both vertical and horizontal: 160° included angle, V-line viewing screen (Standard); 175° included angle, V-1 viewing screen (Optional)
- CHARACTER SIZE: Any character or message within a 1" square area.
- VOLTAGE: Determined by lamps.
- QUICK DISCONNECT lamp assembly supplied as standard.

ACTUAL SIZE OF VIEWING SCREEN AND MAXIMUM CHARACTER SIZE

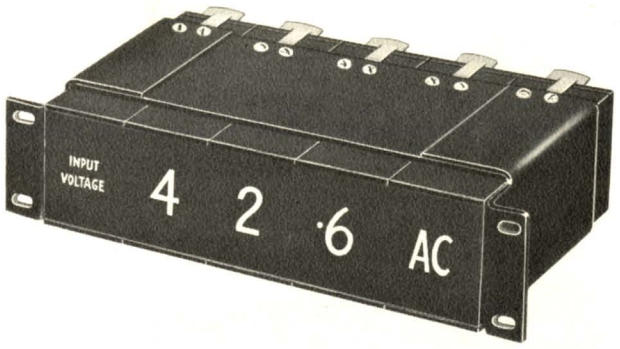
LAMP SPECIFICATION AND CHARACTER BRIGHTNESS CHART

Lamps Available For Series 10 By Lamp Number	Rated Voltage	Current at Rated Voltage	Watts Per Lamp at Rated Voltage	Life Per Lamp at Rated Voltage	Character Brightness** of Center Terminal Positions at Rated Voltage Using New Four Lens System	Average*** Overall Character Brightness of all 12 Terminal Positions at Rated Voltage Using New Four Lens System	Operating at Reduced Voltage			
							Reduced Voltage	Life Per Lamp at Reduced Voltage	Character Brightness** of Center Terminal Positions at Reduced Voltage Using New Four Lens System	Average*** Overall Character Brightness of All 12 Terminal Positions at Reduced Voltage Using New Four Lens System
44*	6.3	250 ma.	1.6	3000 HRS.	90	75	5.3	30,000 HRS.	45	38
47	6.3	150 ma.	.9	3000 HRS.	50	42	5.3	30,000 HRS.	25	21
1909****	14	100 ma.	1.4	1500 HRS.	30	25	11.5	15,000 HRS.	15	12
1815	14	200 ma.	2.8	3000 HRS.	72	60	11.5	30,000 HRS.	36	30
1819	28	40 ma.	1.1	1000 HRS.	14	12	23	10,000 HRS.	7	6
1820	28	100 ma.	2.8	1000 HRS.	38	32	23	10,000 HRS.	19	16
1829	28	70 ma.	2.0	1000 HRS.	24	20	23	10,000 HRS.	12	10
1847	6.3	150 ma.	.9	10,000 HRS.	36	30	5.3	100,000 HRS.	18	15

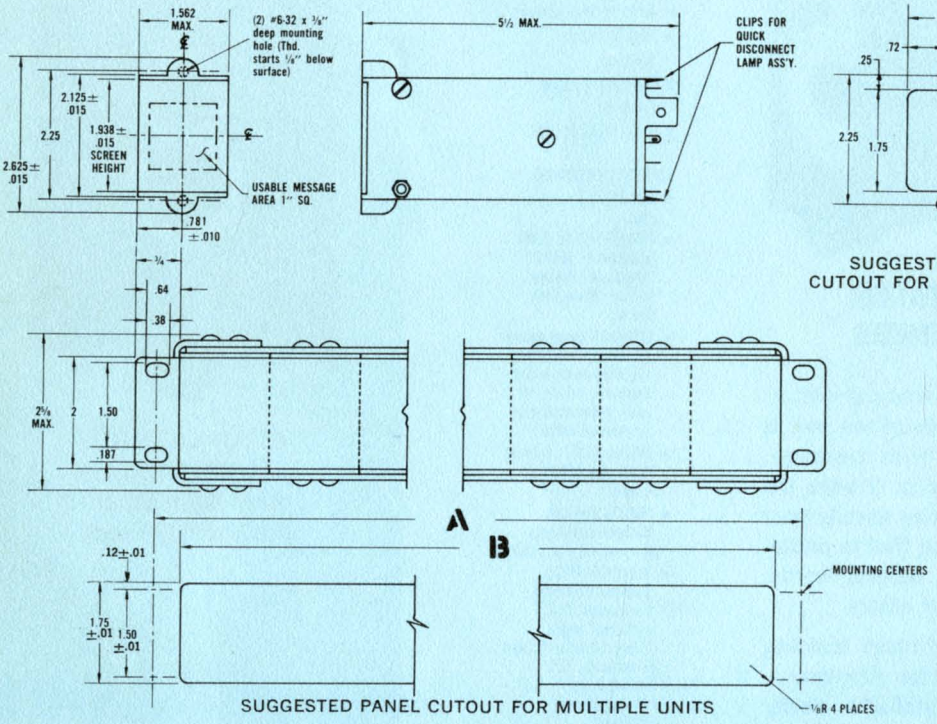
* Recommended for optimum performance.
** Measurements taken at 2 center terminal positions (#5 and #8) with values in foot lamberts as measured by a spot-light meter.
*** Measurements averaged for all 12 terminal positions with values in foot lamberts as measured by a spot-light meter.
**** Replaces lamp No. 1813.

assemblies · series 20

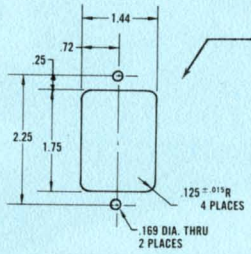
This is an assembly of Series 10 units, which is designated as Series 20. Assemblies are supplies with a continuous viewing screen for fast, accurate reading. The individual readouts desired should be specified either by model number, or by written information of what the display unit should contain. The proper sequence of individual display units within the assembly should be listed from left to right as seen from the viewing screen. Once a customer has been assigned an "assembly number" for a particular grouping of readout units, this number may be used for all future re-orders.



MOUNTING DIMENSIONS FOR SINGLE UNITS AND ASSEMBLIES



SUGGESTED PANEL CUTOUT FOR MULTIPLE UNITS

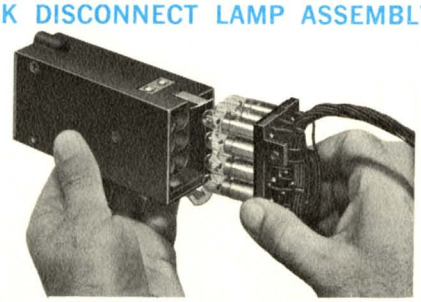


SUGGESTED PANEL CUTOUT FOR SINGLE UNITS

All dimensions for single unit cut-out except hole diameter have a tolerance of ±.01

SERIES 20 ASSEMBLIES		
NUMBER OF UNITS	DIM. A ± .010	DIM. B ± .01
1	2.500	1.44
2	4.062	3.00
3	5.625	4.56
4	7.187	6.12
5	8.750	7.69
6	10.312	9.25
7	11.875	10.81
8	13.437	12.37

all units now furnished as standard with
QUICK DISCONNECT LAMP ASSEMBLY



The standard Series 10 Rear-projection Readout now comes equipped with a Quick Disconnect Lamp Assembly. The entire lamp and socket assembly is held in position by a spring clip on the top and bottom of the case. Lifting these spring clips permits quick and easy withdrawal of the lamp assembly, so that lamps may be changed on the spot or a completely new readout snapped into position on the present lamps. A bracket is provided as part of the lamp assembly for mounting a cable clamp to relieve strain on the lamp terminal wires.

Amp "Faston" receptacle #42067-1 may be used on wiring to provide snap-on terminal connections.

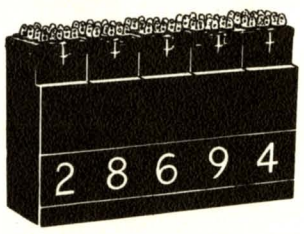
Design details subject to change without notice.

special units for **VERTICAL MOUNTING**

series 60

90° adaptation of series 10

For special applications, where depth behind panel is a problem, special 90° adaptations of the standard Series 10 unit are available for vertical mounting. Consult factory for detailed information and mounting specifications.



series 70

Assembly of 90° series 60 units.

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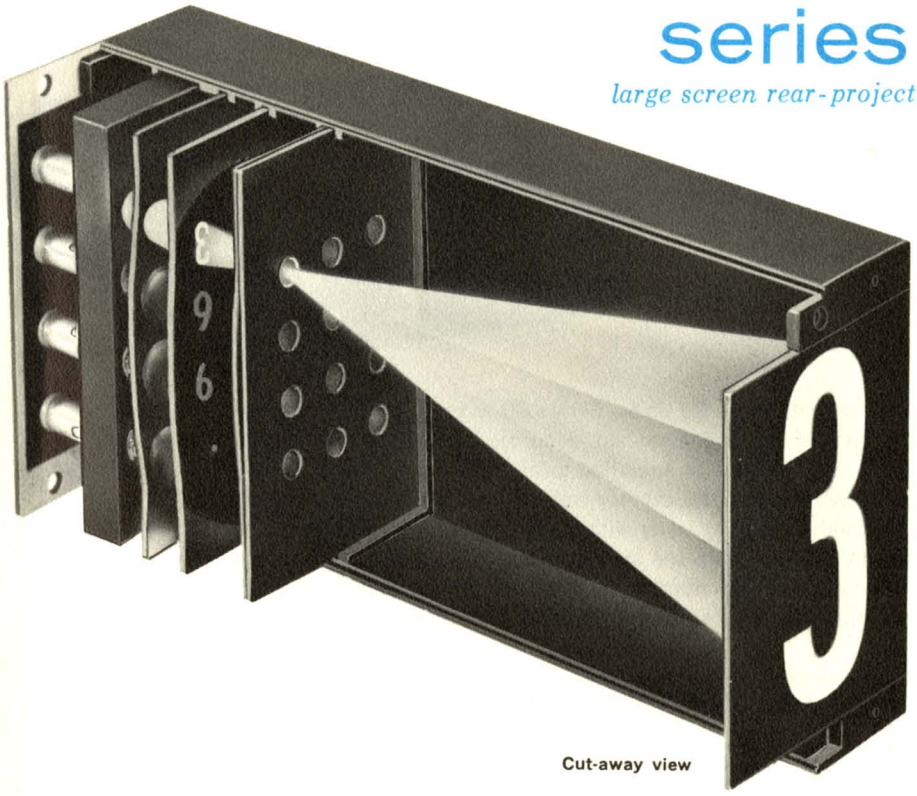
series 80

large screen rear-projection readout

ONE-PLANE



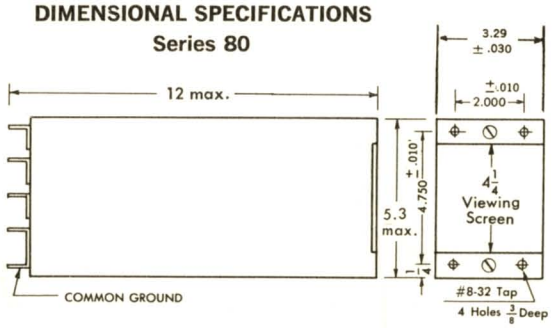
Cut-away view

3

MAXIMUM CHARACTER SIZE

The Series 80 readout employs a rear projection principle. When one or more of the twelve lamps at the rear of the unit is lighted, the lamp projects the corresponding message on the condensing lens through a projection lens onto the viewing screen at the front of the unit. If desired, you may select colors, words, symbols, and numbers for your special applications.

DIMENSIONAL SPECIFICATIONS
Series 80



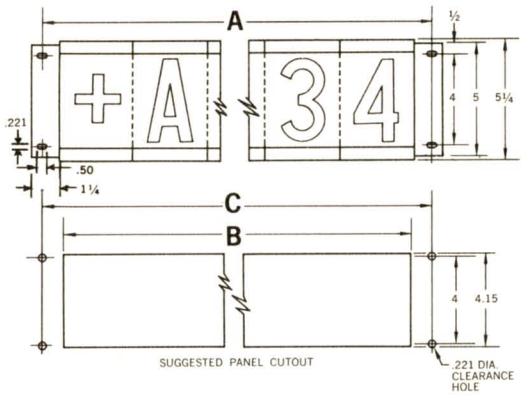
specifications

- DIMENSIONS: 3.29 in. wide, 5.30 in. high, 12 in. long.
- WEIGHT: 3¾ lbs. per unit.
- CHARACTER COLORS AVAILABLE: White (Standard), Amber, Yellow, Blue, Red, Green.
- LAMP COMMON: Insulated from case.
- CASE: Die cast aluminum.
- INPUT: Straight decimal system.
  VIEWING ANGLES: Both vertical and horizontal:
  160° included angle, V-line viewing screen (Standard)
  175° included angle, V-1 viewing screen (Optional)
- CHARTER SIZE: ⅜″ minimum; 3⅜″ maximum.

assembly · series 90

This is an assembly of Series 80 units. Series 90 assemblies are supplied with a continuous viewing screen for fast, accurate reading. The individual readout units desired should be specified either by model number, or by written information of what the display unit should contain. The proper sequence of individual display units within the assembly should be listed from left to right as seen from the viewing screen. Once a customer has been assigned an "assembly number" for a particular grouping of read-out units, this number may be used for all future re-orders.

MOUNTING DIMENSIONS FOR SERIES 90 ASSEMBLIES

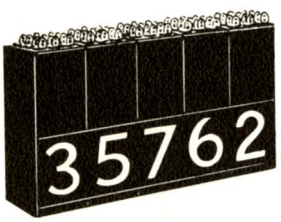


No. of Units Per Assembly	Dim. A ±.12	Dim. B ±.015	Dim. C ±.015
2	8.06	6.37	8.06
3	11.34	9.66	11.34
4	14.62	12.95	14.62
5	17.90	16.24	17.90
6	21.18	19.53	21.18
7	24.46	22.82	24.46
8	27.74	26.11	27.74

SERIES 80 LAMP CHART

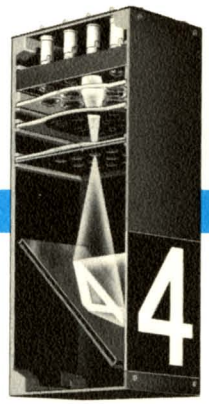
Lamp No.	Voltage	Amps.	Wattage	Life at Rated Voltage	Average Brightness* Character
1855	6.3	.80	5	3000 hrs.	26
1495	28.	.30	8.4	500 hrs.	19
** 1886	6.3	.90	5.9	3000 hrs.	45

** Values in foot lamberts as measured with a spot-light meter.*
*** Manufacturer's recommendation for optimum brilliance and clarity.*



series 100

90° adaption of Series 80
character size 3⅜ in. max.



series 110

Assembly of 90° Series 100
character size 3⅜ in. max.

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series 120

miniature rear-projection readout

ONE-PLANE

Cut-away view

ACTUAL SIZE OF VIEWING SCREEN AND MAXIMUM CHARACTER SIZE

- Designed for use with digital computers, airborne equipment, control systems, instruments, production and inventory controls, and other electronic or electrical test equipment.
- Features quick disconnect at the rear for fast easy lamp replacement.

The Series 120 miniature readout employs a rear-projection principle. When one or more of the twelve lamps at the rear of the unit is lighted, the lamp projects the corresponding message on the condensing lens through a projection lens onto the viewing screen at the front of the unit. If desired, you may select colors, words, symbols, and numbers for your special applications.

specifications

DIMENSIONS: 1 in. wide, $1\frac{5}{16}$ in. high, 4 in. long.

WEIGHT: 4 oz. per unit.

COLOR PROJECTIONS AVAILABLE: White (Standard), Amber, Yellow, Blue, Red, Green.

COMMON LAMP TERMINAL: Insulated from case.

CASE: Die cast aluminum.

INPUT: Straight decimal system.

VIEWING ANGLE: Both vertical and horizontal:
160° included angle, V-line viewing screen (Standard)
175° included angle, V-1 viewing screen (Optional)

CHARACTER SIZE: Any character or message within an area bounded by a $\frac{5}{8}$ in. wide horizontal band drawn centrally through an .8 in. diameter circle.

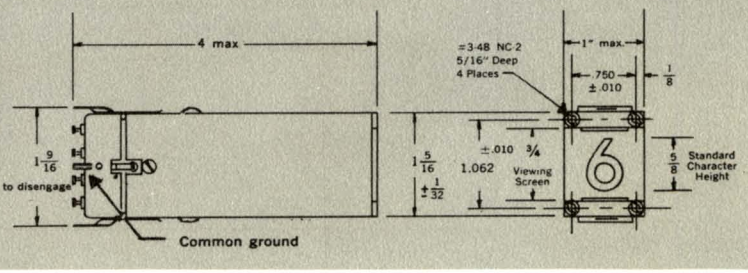
VOLTAGE: Determined by lamps.

LAMP SELECTION TABLE

Lamp No.	Rated Voltage	Current at Rated Voltage	Watts Per Lamp at Rated Voltage	Life Per Lamp at Rated Voltage	Average** Character Brightness at Rated Voltage	Reduced Voltage	Life Per Lamp at Reduced Voltage	Average** Character Brightness at Reduced Voltage
*328	6.	200 ma.	1.20	500 hrs.	50	5	5000 hrs.	27
349	6.	200 ma.	1.20	5000 hrs.	35	5	50,000 hrs.	19
330	14.	80 ma.	1.12	750 hrs.	16	12	5000 hrs.	9
327	28.	40 ma.	1.12	1000 hrs.	20	24	6000 hrs.	11

*Manufacturer's recommendation for optimum brilliance and clarity.
**Values in foot lamberts as measured with a spot-light meter.

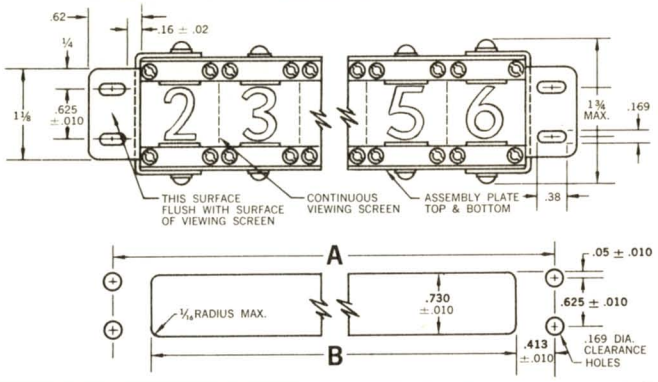
DIMENSIONAL SPECIFICATIONS Series 120ooo



assembly · series 130

This is an assembly of Series 120 units. Series 130 assemblies are supplied with a continuous viewing screen for fast, accurate reading. The individual readout units desired should be specifed either by model number, or by written information of what the display unit should contain. The proper sequence of individual display units within the assembly should be listed from left to right as seen from the viewing screen. Once a customer has been assigned an "assembly number" for a particular grouping of readout units, this number may be used for all future re-orders.

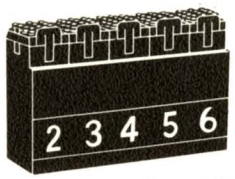
MOUNTING DIMENSIONS FOR SERIES 130 ASSEMBLIES



No. of Units Per Assembly	Dim. A ±.010	Dim. B ±.010
2	2.700	1.875
3	3.700	2.875
4	4.700	3.875
5	5.700	4.875
6	6.700	5.875
7	7.700	6.875
8	8.700	7.875

series 140

90° adaption of Series 120 character size ⅝ in. Maximum.*

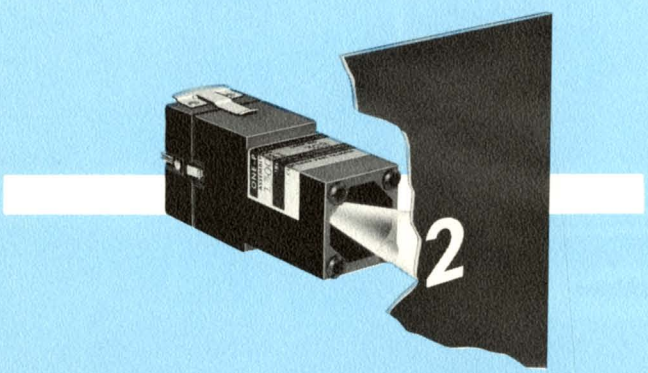


series 150

Assembly of Series 140 Units character size ⅝ in. Maximum.*

*Any character or message within an area bounded by a ⅝" wide horizontal band drawn centrally through an .8 inch diameter circle.

series 120 SP



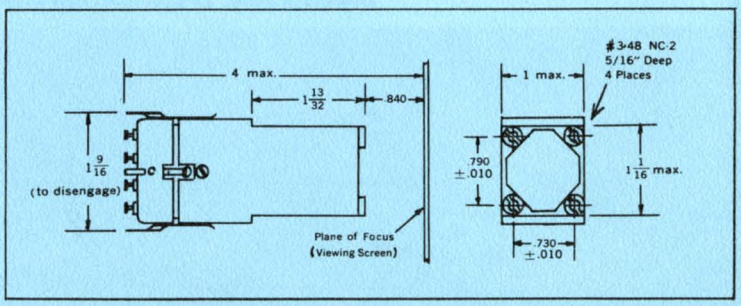
PROJECTS MESSAGE ONTO SCREEN

The Miniature Readout Series 120SP is positioned .840 in. behind a panel mounted translucent viewing screen and projects the message onto the screen. Readout units are easily accessible for replacement or maintenance since the viewing screen is not an integral part of the readout and may be quickly swung out of position.

The sub-panel Readouts may be random-positioned behind the panel screen.

Extremely compact and light weight (only 3 oz.), the Series 120SP Miniature Readout is ideally suited for those applications where space and weight are at a premium. The size of the character displayed on the viewing screen is ⅝ in. maximum.*

*Any character or message within a circular area of .8 in. diameter.



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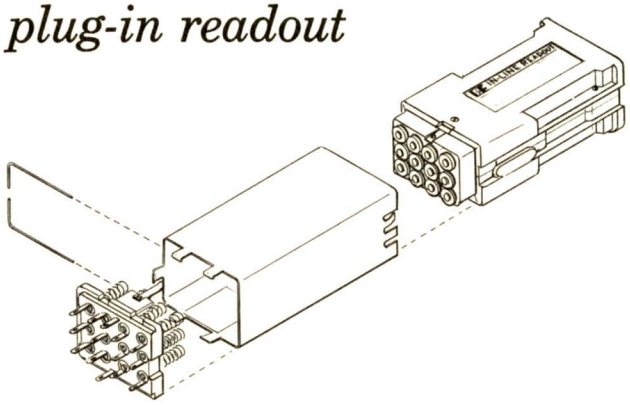
series 220ooo

front plug-in readout



ONE-PLANE

C

ACTUAL SIZE OF VIEWING SCREEN AND MAXIMUM CHARACTER SIZE

IEE Series 220ooo front plug-in readouts permit quick, easy lamp replacement, allow permanent wiring and eliminate the need for flexible cabling.

To remove a readout, it is necessary only to release the latching spring by pressing on the viewing screen until the insert snaps. The readout then can be withdrawn from the front of its case for convenient bulb replacement, or for changing readout inserts.

Series 220ooo miniature readouts use the rear-projection principle. When one or more of the 12 lamps in the rear of the unit lights, the corresponding message is projected onto the viewing screen in front. Colors, polarity, words, multi-digit numbers and symbols are available in addition to numerals and letters.

SPECIFICATIONS:

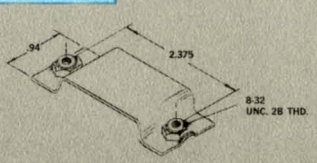
DIMENSIONS: 1 1/16 in. wide, 1 1/2 in. high.
WEIGHT: 4.5 oz. per unit.
COLOR PROJECTIONS AVAILABLE: White (Standard), Amber, Yellow, Blue, Red, Green.
COMMON LAMP TERMINAL: Insulated from case. (Separate grounds available on special order.)
CASE: 24 ga. steel.
INSERT BODY: Glass-filled nylon.
INPUT: Straight decimal system.
VIEWING ANGLE: Both vertical and horizontal:
160° included angle, V-line viewing screen (Standard).
175° included angle, V-1 viewing screen (Optional).
CHARACTER SIZE: Any character or message within an .8 in. diameter circle.
VOLTAGE: Determined by lamps. (see table below)

LAMP SELECTION TABLE

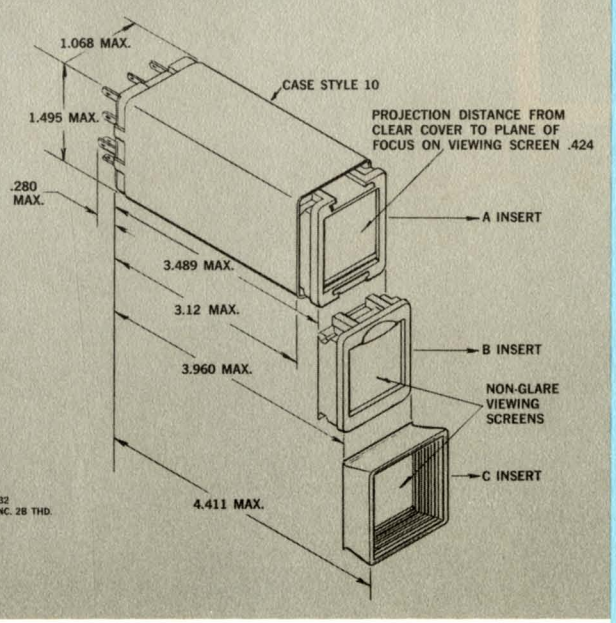
Lamp No.	Voltage v	Current ma	Wattage w	Life at Rated v Hours	Average Character Brightness**
*328	6	200	1.20	500	20 50
349	6	200	1.20	5000	15 35
330	14	80	1.12	750	8 16
327	28	40	1.12	1000	12 20

*Recommended for optimum brilliance and clarity.

**Values in foot lamberts as measured with a spot-light meter.



WHEN MOUNTING FOOT ADDED UNIT BECOMES CASE STYLE 11



assembly · series 230ooo

Inserts easily removed from the front for replacing inserts or lamp replacement.

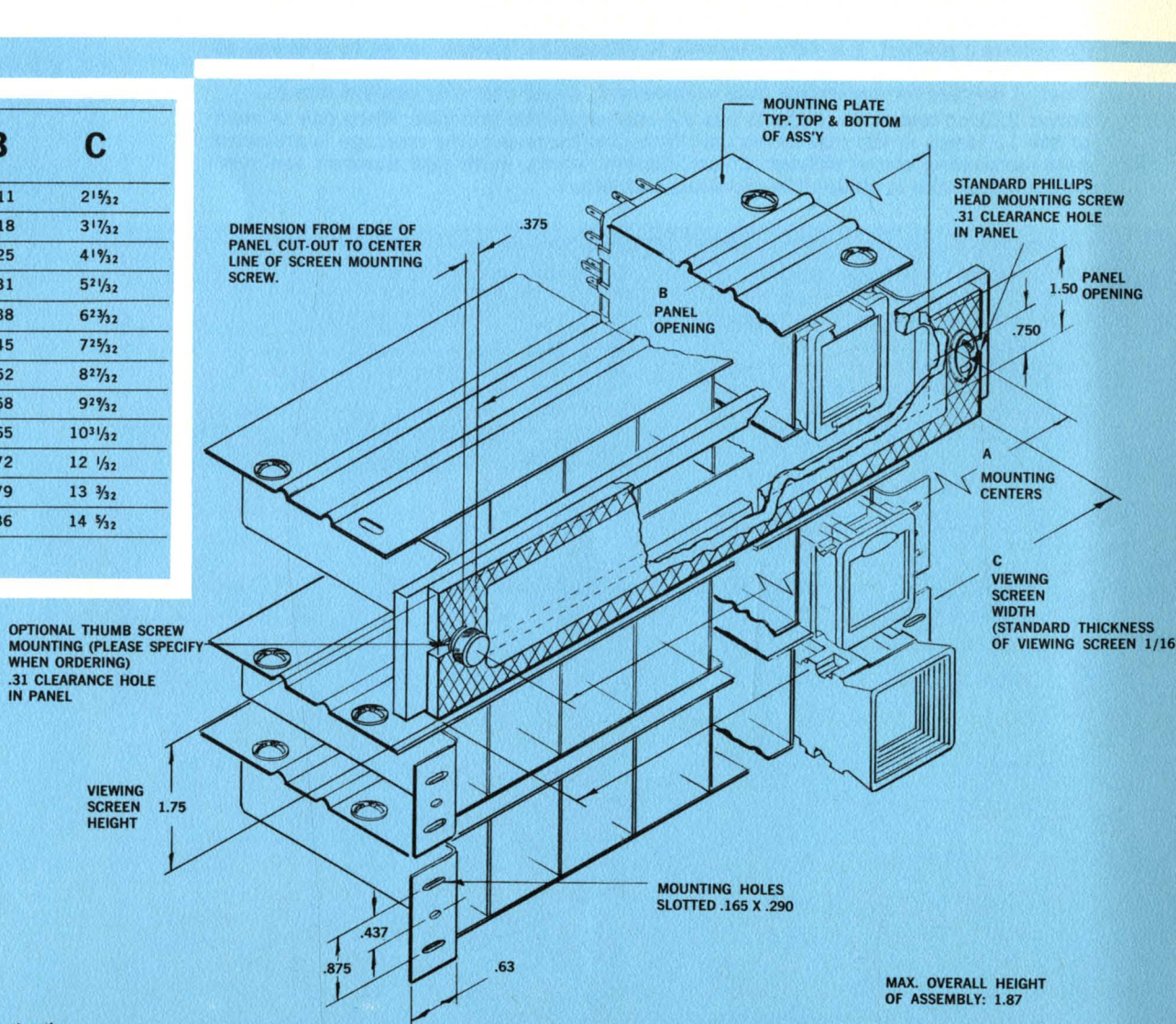
Series 230ooo Assemblies are composed of individual Series 220ooo units. Several screen arrangements are available . . . sub-panel mounting with common screen (Series 230oooA), panel mounting with individual screens (Series 230oooB) and panel mounting with individual bezels (Series 230oooC).

Series 230ooo assemblies can be wired permanently into place. Front accessibility for bulb replacement or for changing inserts eliminates the need for access doors and special cabling. Access to the individual units behind the 230oooA common screen is accomplished easily by removing the two screws that hold the screen in place.

When ordering, the proper sequence of individual display units within the assembly should be listed from left to right as seen when looking at the viewing screens.

No. of Units per Assem.	A	B	C
1	1.858	1.11	2 15/32
2	2.926	2.18	3 17/32
3	3.994	3.25	4 19/32
4	5.062	4.31	5 21/32
5	6.130	5.38	6 23/32
6	7.198	6.45	7 25/32
7	8.266	7.52	8 27/32
8	9.334	8.58	9 29/32
9▲	10.402	9.65	10 31/32
10▲	11.470	10.72	12 1/32
11▲	12.538	11.79	13 3/32
12▲	13.606	12.86	14 5/32

▲Special Assembly, Contact I.E.E.



Design details subject to change without notice.

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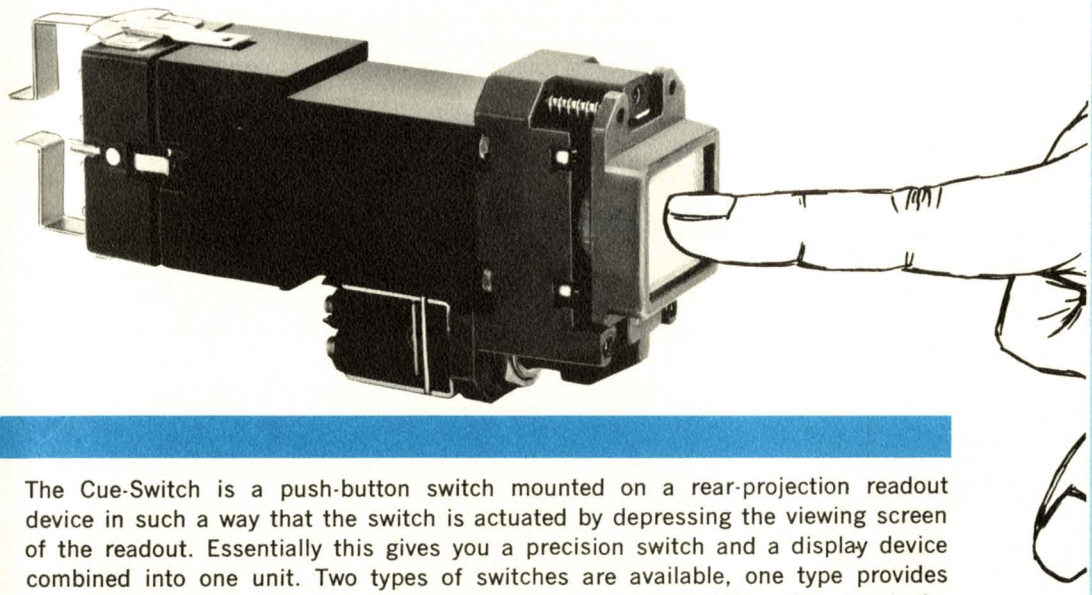
5528 VINELAND AVENUE, NORTH HOLLYWOOD, CALIFORNIA • PHONE TRiangle 7-1144 • TWX N HOL 8383
ENGINEERS and MANUFACTURERS COMPONENTS • INSTRUMENTS

cue-switch*

- *rear-projection readout with push-button viewing screen*
- *displays up to 12 different legends*
- *2PDT switch mounted on readout to control external circuits*

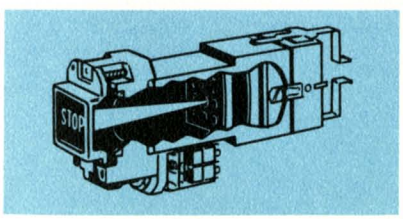


The Cue-Switch is a push-button switch mounted on a rear-projection readout device in such a way that the switch is actuated by depressing the viewing screen of the readout. Essentially this gives you a precision switch and a display device combined into one unit. Two types of switches are available, one type provides momentary contact; the other type provides alternate action. When depressed, the viewing screen closes the switch contacts to control external circuits.

Each Cue-Switch can display up to 12 legends, which may be numbers, letters, words, symbols, and colors . . . virtually anything that is photographically reproducible. These 12 legends are photographed on one piece of film and mounted in front of a 12 lamp assembly in the back of the unit. As each lamp is lit, it illuminates the corresponding legend, focuses it through a lens system and projects it onto the viewing screen. All unused messages or legends are completely invisible.

SAVE SPACE — The one inch square push button face requires about the same amount of space as many Back-lighted indicator switches. But, 10 Cue-Switch Readout could replace as many as 120 conventional switches on a control panel.

REDUCES HUMAN ERROR — The operator has only one Cue-Switch Readout to watch compared to as many as twelve conventional indicator switches. In sequential action, guided instructions from the Cue-Switch Readout can virtually eliminate search time and reduce the possibility of pushing the wrong button. In many cases training time for operators can be substantially reduced.



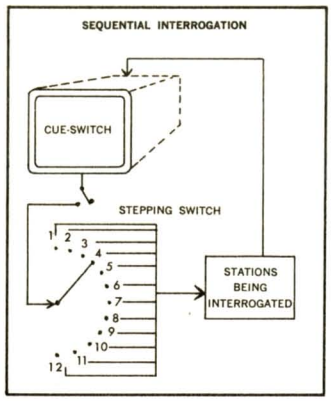
Messages are displayed by the use of a rear projection display system. The viewing screen also acts as the "push button."

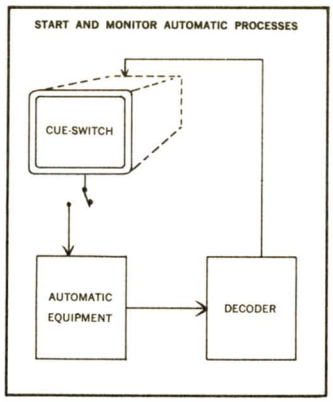
ONE-PLANE

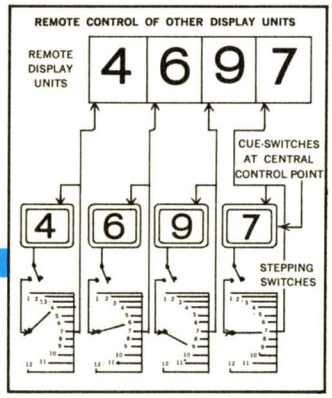
B

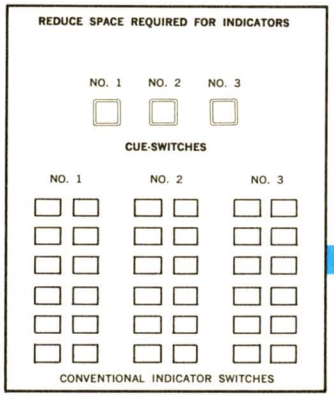
ACTUAL SIZE OF VIEWING SCREEN AND MAXIMUM CHARACTER SIZE

*Trademark of Industrial Electronic Engineers, Inc.







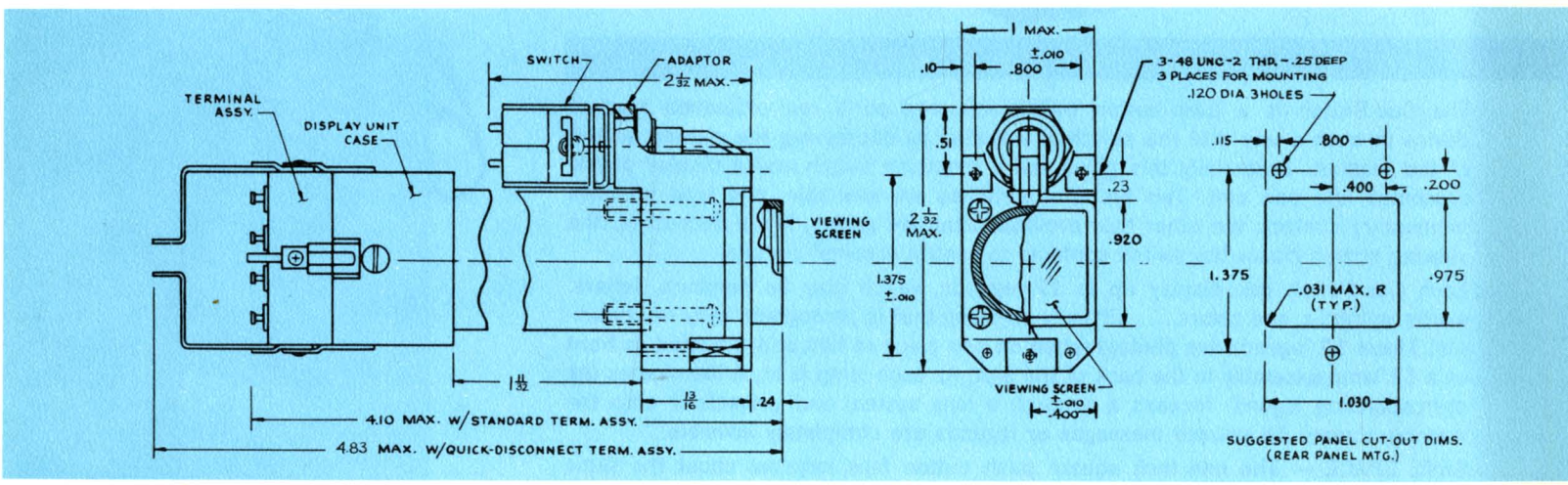


control and monitor multiple operations with the cue-switch

The Cue-Switch is one of the most versatile readouts made . . . combining both a readout device and a precision switch. It may be used to interrogate remote stations and readout the existing conditions of these stations. It is ideal for applications where an operator must follow a check list and wait for an "OK" before proceeding to the next step. It also may be used to start automatic processes and then monitor the cycle with the ability to shut-down the process if a warning condition is indicated. The Cue-Switch may be used to control other remote readout indicators and at the same time provide a display of what has been set up in these readouts.

Three Cue-Switch Readouts can replace as many as 36 conventional back-lighted switches that are used to display non-simultaneous conditions.

An optional quick disconnect feature provides almost instant access to lamps from the rear with just fingertip pressure. Lamp replacements can be made in seconds in the field.



technical specifications:

DIMENSIONS: 1 in. wide; 2 in. high; 4.10 in. long (with standard terminal assembly), 4.83 in. long (with quick disconnect terminal assembly).

WEIGHT: 6 oz. per unit.

COLOR OF CHARACTERS AVAILABLE: White (Standard), Amber, Yellow, Red, Blue, Green.

CHARACTER SIZE: 5/8 in. maximum.

PANEL THICKNESS: 1/8 in. nominal (Units for other panel thickness are available.)

VARIATIONS: With Identical Front Panel Appearance: Switch-Display, Switch only, Display only, Switch-pilot light, identical front panel appearance.

SWITCHES	OPERATING FORCE	ELECTRICAL RATINGS
2 PDT mom. contact	4½ lbs.	5 a. AT 250 VAC
2 PDT alt. action	5 lbs.	3 a. AT 30 VDC

LAMPS: Single contact midget flanged.

LAMP NO.	VOLTAGE	CURRENT	WATTAGE	LIFE AT RATED VOLTAGE	AVERAGE CHARACTER BRIGHTNESS*
328	6	200 ma	1.20	500 hrs.	50
330	14	80 ma	1.12	750 hrs.	16
327	28	40 ma	1.12	1000 hrs.	20
349	6	200 ma	1.20	5000 hrs.	35

Values in foot-lamberts as measured with a spotlight meter.

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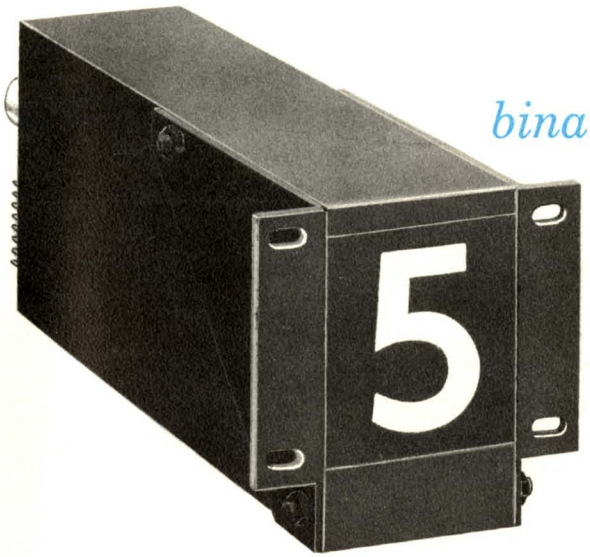
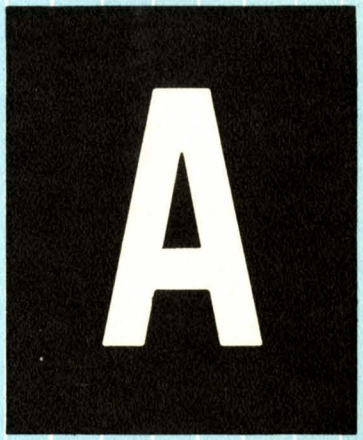


bina-view®

binary input, self-decoding readout display unit

ONE-PLANE



ACTUAL SIZE OF VIEWING SCREEN AND MAXIMUM CHARACTER SIZE

DECODES BINARY TO DECIMAL OR ALPHA-NUMERIC

LOW POWER

NO AMPLIFIER NEEDED

ELECTRO-MAGNETIC OPERATION

MEMORY

DISPLAYS COLORS ON COMMAND

The Bina-View Readout accepts any binary or teletype code up to six bits, does its own decoding, and displays the proper character. No auxiliary translators, relays, or diodes are required.

Low Power. The Bina-View may be operated with as little as 100 milliwatts per bit, four watts for setup. It may be driven directly from computers and other electronic equipment.

Memory. The Bina-View will continue to display the last character entered after all signal-pulse and set-pulse power have been removed. In addition, should all power be removed for any reason, such as a power failure, the character information will be retained and will be redisplayed when the power is restored.

Optional Check-Back feature. When required, contact closures may be provided to verify input signals. These contact closures may also be used to transmit the input signals back into the source equipment, or other related equipment.

Color Displays. Various colors in addition to white may be displayed on command. To provide any color and white an extra bit coil is used, which provides one color and white or 2 colors and no white. By adding a second extra bit coil you can have 3 colors and white or 4 colors. Each color, except for white, requires a color plate.

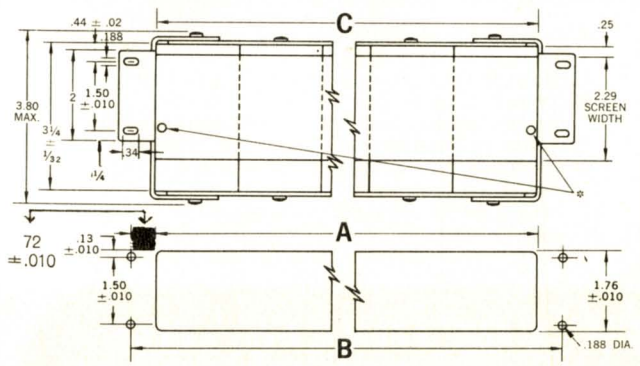
Optional Floating Decimal Point. A separate decimal point can be added to the Bina-View, which will display with any character on command. It is illuminated by a separate lamp circuit and does not require any bit coils or character plate. Lamp operates at 6.3 volts, .3 watts, and has a 60,000 hour life.

Optional Quick Disconnect. A Quick Disconnect Connector is available, which permits the Bina-View to be easily unplugged and removed from equipment without disturbing wiring connections. It also permits less expensive assembly-line wiring to connector without requiring a technician to wire directly to the Bina-View.

assemblies

Bina-View Readouts may be grouped to form in-line assemblies. When assemblies are desired, the units must be pre-assembled by the manufacturer. A continuous viewing screen extends the full width of the assembly for ease of reading. The individual Bina-View Readouts desired should be specified by written information of what each unit should contain. The proper sequence of individual Bina-View Readouts within the assembly should be listed from left to right as seen from the viewing screen. Once a customer has been assigned an "assembly number" for a particular grouping of units this number may be used for all future re-orders.

MOUNTING DIMENSIONS FOR BINA-VIEW ASSEMBLIES



No. of Units	A ±.010	B ±.010	C (Ref.)
2	3.34	4.45	3.68
3	5.18	6.30	5.52
4	7.02	8.14	7.36
5	8.86	9.98	9.20
6	10.70	11.82	11.04
7	12.54 ±.015	13.66 ±.015	12.88
8	14.38 ±.015	15.50 ±.015	14.72

B ±.010
4.78
6.62
8.46
10.30
12.14
13.98 ±.015
15.82 ±.015

* Dimension "A" is not applicable when optional decimal point is used in positions shown

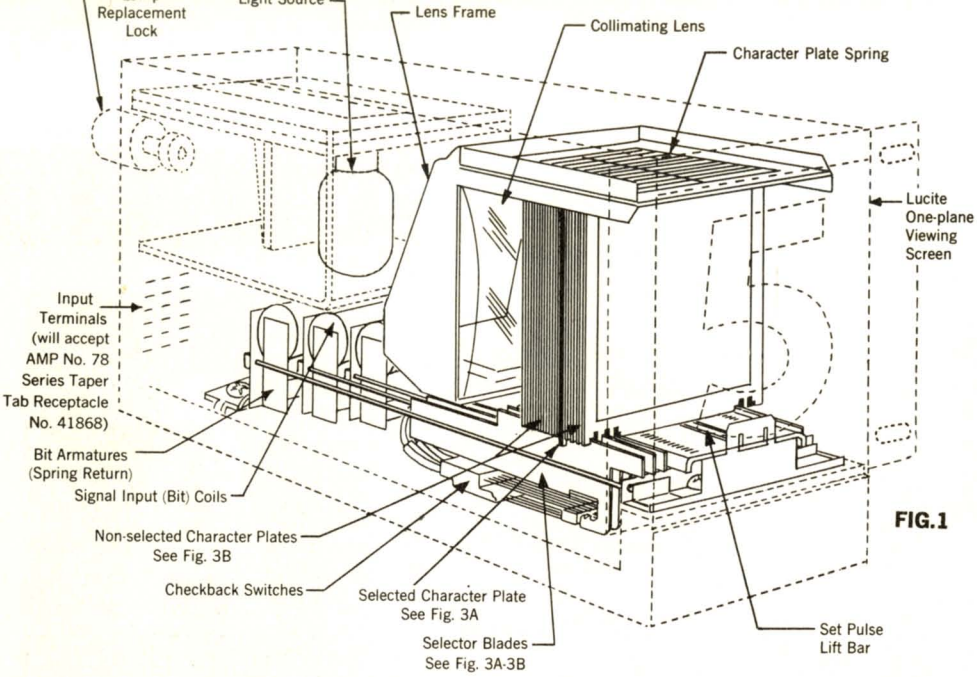


FIG.1

The **Bina-View** accepts any binary code up to six bits, does its own translating, and displays the proper character. No auxiliary translators, relays or diodes required.

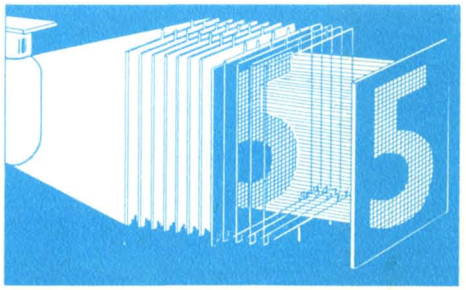


FIG. 2 The Bina-View employs a light interference technique as illustrated.

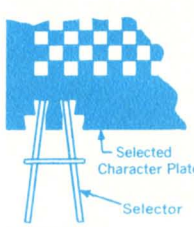


FIG. 3A

The selected character plate has all the selector blades aligned with the deep portion of the binary notching allowing the selected plate to drop into "display" position.

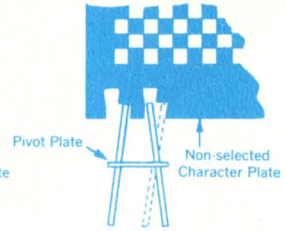
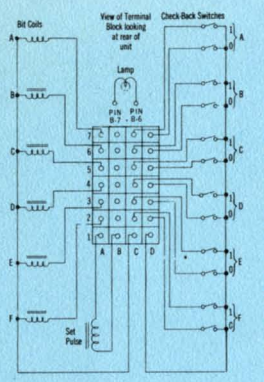


FIG. 3B

The non-selected character plates have at least one selector blade aligned with the shallow portion of the binary notching, maintaining all non-selected character plates in a lifted "non-display" position.



NOTE: For 5 Bit Codes, coil "A" and check-back switches "A" are omitted. For 4 Bit Codes, coils "A" and "B" and check-back switches "A" and "B" are omitted. If unit is ordered without check-back switches, then all switches are of course omitted.

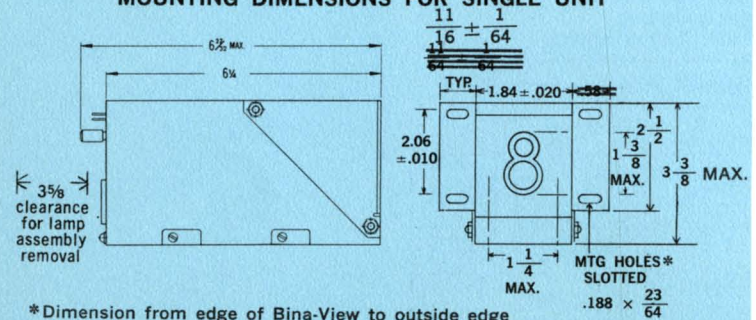
FIG. 4 CIRCUIT OPERATION

The Bina-View has 100 milliwatt signal input coils, one per bit, and one medium power set pulse coil. The signal input coils decode the proper character from the binary data upon command from the set pulse coil. The character is displayed by energizing the set-pulse coil for a minimum period of 30 milliseconds. Additional signal inputs may now be accepted into the unit without disturbing the character on display. Note that 30 ms. is the minimum duration for the set pulse, but that 50 ms. is the minimum signal input time. Futhermore, at least 30 ms. of the bit pulse must be coincident with the set pulse, plus an additional 20 ms. (minimum) extending beyond the set pulse.

The Bina-View is a non-complementary input device and requires that the coil of each bit be energized for "one." The absence of signal allows the bit to be spring returned to "zero."

The optional Check Back feature consists of two isolated reeds per bit, making contact with a common return. An unselected bit holds one reed from making contact with the common, and allows the other of the pair to make contact. When the bit is selected, this situation is reversed, so that either condition of a bit may be checked both as an open and a closed circuit. During operation of the set pulse, however, **all** reeds make contact to the common.

MOUNTING DIMENSIONS FOR SINGLE UNIT



*Dimension from edge of Bina-View to outside edge of mounting slot is .58" ± .01.

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specifications:

1. SIGNAL INPUT COIL

Voltage (DC)	Current (ma.)	Power (watts)	Resistance (ohms)
6 ± 10%	14.5 min., 19.6 max.	.10 nominal	360 nominal
12 ± 10%	7.25 min., 9.81 max.	.10 nominal	1440 nominal
24 ± 10%	3.6 min., 4.9 max.	.10 nominal	5760 nominal

2. SET PULSE COIL

	For Units with Up To 12 Character Plates and without Optional Check Back			For Units with up to 12 Char. Plates and with Optional Check Back or 13 to 26 Char. Plates without Optional Check Back			For Units with 27 to 38 Char. Plates without Optional Check Back or 13 to 26 Char. Plates with Optional Check Back			For Units with 27 to 38 Character Plates with Optional Check Back		
Voltage (DC)	Current (Amps)	Power (Watts)	Resistance (Ohms)	Current (Amps)	Power (Watts)	Resistance (Ohms)	Current (Amps)	Power (Watts)	Resistance (Ohms)	Current (Amps)	Power (Watts)	Resistance (Ohms)
6	.67	4	9	1.33	8	4.5	2.0	12	3	4.0	24	1.5
12	.33	4	36	.67	8	18	1.0	12	12	2.0	24	6
24	.17	4	144	.33	8	72	.5	12	48	1.0	24	24
48	.08	4	576	.17	8	288	.25	12	192	.5	24	96
	*100%			*50%			*25%			*15%		

*Duty Cycle (over 1 minute Period)

3. Lamps available for light source;

Lamp #1855	6.3 Volts	.80 Amps.	5. Watts	3000 Hrs.*	80**
Lamp #1495	28 Volts	.30 Amps.	8.4 Watts	500 Hrs.*	60**
Lamp #1886	6.3 Volts	.90 Amps.	5.9 Watts	3000 Hrs.*	120**

*@ Rated Voltage. **Average character brightness for a 12 plate unit; measured in foot lamberts, using a spot-light meter.

4. **Electrical Life Rating:** (Check Back Contacts); 10 million operations @ 2 watts A.C. or 1 watt D.C.
5. **Operating Time:** 50 milliseconds (approx.)
6. **Standard Character Size:** 1⅜ in. Maximum.
7. **Special characters,** words, or numerals available in sizes ⅜ in. to 1⅜ in.
8. **Number of characters** available per unit up to 38.
9. **Dimensions:** 3 11/32 in. high, 1 27/32 in. wide, 6 27/32 in. long.
10. **Weight:** 2⅓ lbs. approx.
11. **Life:** 10 million operations of set pulse.
12. **Ambient Temp:** 160° F maximum.

NOTE—Specify code and characters, signals input coil voltage, set pulse coil voltage, and lamp desired when ordering.

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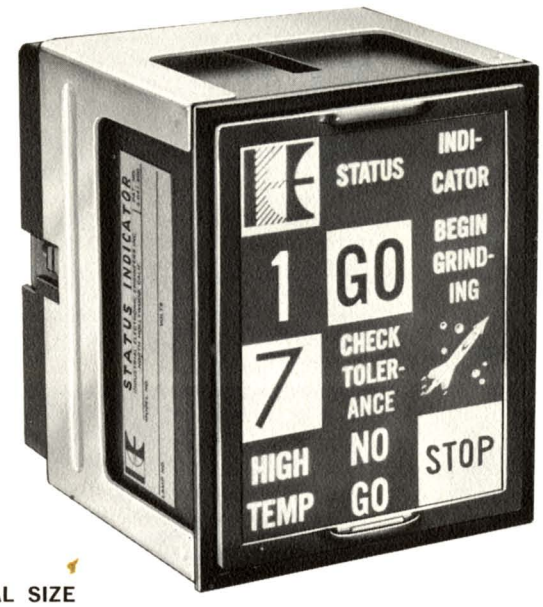
series 280

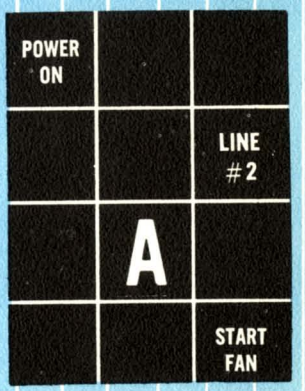
status indicator *

ONE-PLANE



ACTUAL SIZE

- Up to 12 back-lighted message indications in 5 sq. in.
- Messages may be illuminated individually, in any combination, or all at one time
- Optional vertical or horizontal mounting of unit
- Front panel accessibility



ACTUAL SIZE OF VIEWING SCREEN AND 12 INDIVIDUAL MESSAGE AREAS

The IEE Series 280 Status Indicator is a back-lighted, simultaneous message indicator with a 12-lamp assembly in the rear of the unit to illuminate each of 12 possible message displays. It is a low-cost, compact, space-saving message display. All messages are displayed on one-plane and may be illuminated individually, in any combination, or all at one time by lighting the corresponding lamp or lamps. This unit is ideal for indicating more than one condition in a system at a time, the status of a process at various stages, a check list of operating procedures, sequential instructions for a machine operator, or with call boards, signal alarm systems, etc.

specifications

MESSAGE DISPLAYS: May be numbers. letters, words, symbols, and colors.

MESSAGE AREAS: Maximum of 12 message areas per unit; each $^{7}/_{16}$" sq. On special order, adjacent areas may be combined to form larger displays.

VIEWING ANGLE: 160° included angle, both vertical and horizontal.

VOLTAGE: Determined by lamp.

INPUT: Straight decimal system.

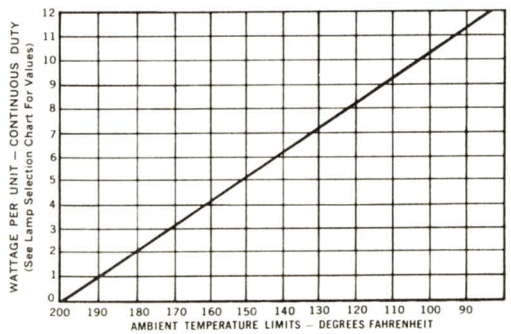
LAMP TERMINALS: Common ground for all 12 terminals standard; separate returns for each lamp also available.

WEIGHT: Approx. 12 oz.

LAMP SELECTION TABLE

Lamp No.	Rated Voltage	Current at Rated Voltage	Watts Per Lamp at Rated Voltage	Life Per Lamp at Rated Voltage	Average** Character Brightness at Rated Voltage	Reduced Voltage	Life Per Lamp at Reduced Voltage	Average** Character Brightness at Reduced Voltage
44***	6.3	250 ma.	1.6	3,000 hrs.	145	5.3	30,000 hrs.	75
47*	6.3	150 ma.	.9	3,000 hrs.	75	5.3	30,000 hrs.	45
1909	14	100 ma.	1.4	1,500 hrs.	60	11.5	15,000 hrs.	35
1815***	14	200 ma.	2.8	3,000 hrs.	90	11.5	30,000 hrs.	50
1819	28	40 ma.	1.1	1,000 hrs.	15	23		
1820***	28	100 ma.	2.8	1,000 hrs.	75	23	10,000 hrs.	45
1829***	28	70 ma.	2.0	1,000 hrs.	30	23		
1847*	6.3	150 ma.	.9	10,000 hrs.	60	5.3	100,000 hrs.	35
NE 51 H (Neon)	115VAC 150VDC	1.2 ma. 1.9 ma.	1/7 3/10	25,000 hrs. 12,000 hrs.	12 20			

*Recommended for optimum performance.
**Values in foot lamberts as measured with a spot-light meter.
***Not recommended for use requiring more than 3 lamps to be lit at one time, due to high wattage.



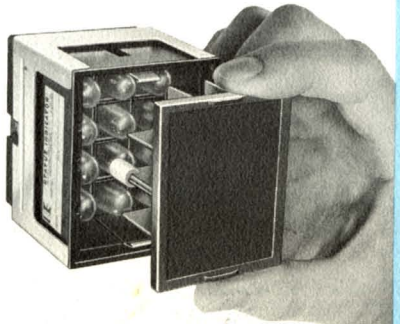
AMBIENT TEMPERATURE CHART

Ambient temperature limits should be considered in the selection of the proper lamp to be used in a Status Indicator. To determine ambient temperature limits, multiply the wattage per lamp by the number of lamps required to be on simultaneously per unit for over 30 minutes at a time.

VIEWING SCREEN REMOVABLE FROM FRONT PANEL

PROVIDES EASY MESSAGE EXCHANGE OR LAMP REPLACEMENT

UNIT IS SELF MOUNTING; NO EXTERNAL HARDWARE NECESSARY



*Trademark of Industrial Electronic Engineers, Inc.

ACTUAL SIZE OF VIEWING SCREEN AND INDIVIDUAL MESSAGE AREAS

FIG. 1

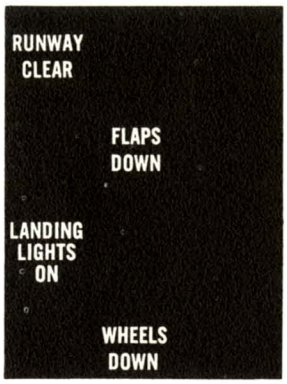


FIG. 2

FIG. 3

FIG. 4

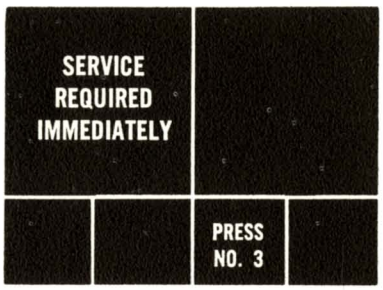


FIG. 5

VERSATILITY OF DISPLAYS

Displays may be illuminated to provide white or colored messages on black backgrounds or black messages on white or colored backgrounds.

PHOTGRAPHIC FILM DISPLAYS: Messages may be photographed and the film mounted behind the viewing screen. Only illuminated messages will be visible, as in Fig. 2 when using frosted viewing screen. Film displays may also have white or colored backgrounds and black or colored characters, as in Fig. 4. Clear viewing screen can be provided so that all messages will be visible, but only those with lamps turned on will be brightly illuminated, as in Fig. 1.

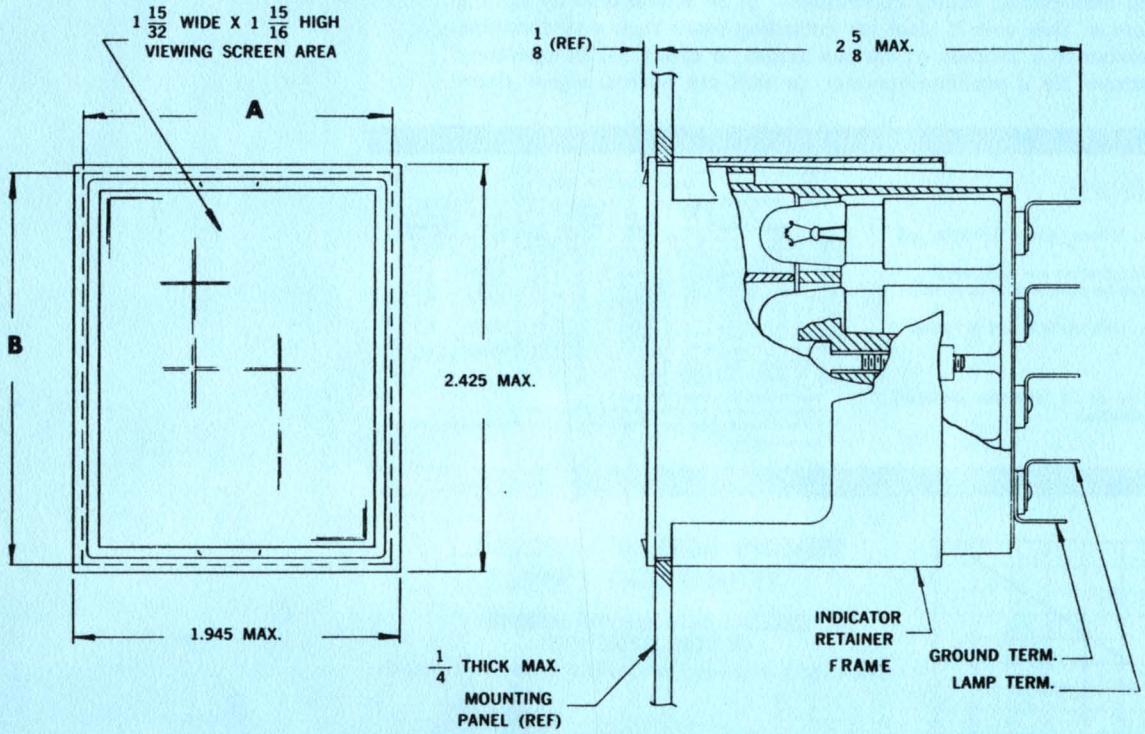
TYPED OR HAND LETTERED DISPLAYS: Messages may be typed or hand lettered on translucent film and mounted behind the viewing screen, as in Fig. 3. Message background may be white or colored with black characters. Messages will be either visible or hidden, when not illuminated, depending on whether clear or frosted viewing screens are used.

ENGRAVED VIEWING SCREEN: Messages or dividing lines between message areas may be engraved on the viewing screen. All messages will be visible at all times, but only those with lamps turned on would be brightly illuminated, as in Fig. 1.

COMBINATION DISPLAYS: Fig. 5 shows dividing lines engraved on viewing screen, but messages have been photographed on film and mounted behind viewing screen so that only illuminated displays are visible.

LARGER DISPLAY AREAS: Standard message areas are $\frac{7}{16}$" square. On special order, adjacent areas may be combined in any combination to provide larger displays, as in Fig. 3, Fig. 4, and Fig. 5.

INSTALLATION: Unit may be installed vertically or horizontally through a cut-out in the panel. Two screws inside the Status Indicator draw a retainer frame tight against the front panel and secure the unit in position.



PANEL CUT-OUT DIMENSIONS		
VERTICAL MOUNTING		
NO. OF UNITS	A ± .010	B ± .010
1	1.840	2.320
2	1.840	4.770
3	1.840	7.200
4	1.840	9.630
5	1.840	12.060
6	1.840	14.490
HORIZONTAL MOUNTING		
NO. OF UNITS	A ± .010	B ± .010
1	1.840	2.320
2	3.810	2.320
3	5.760	2.320
4	7.710	2.320
5	9.660	2.320
6	11.610	2.320

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DESIGNATION OF MODEL NUMBER

Model numbers for IEE rear projection readouts are designed to provide as complete information as possible about each readout. Coded in the model number are the series designation, color of characters used, the set of characters and lamp number in each readout. Below are shown typical model numbers for the three major series. The following notes explain the meaning of each part of the model number.

Model No. 10 007 -44 - B

Model No. 84 069 -1855

Model No. 125 000 -328

NOTE A NOTE B NOTE C NOTE D

NOTE A This part of the number indicates the series number and the character color. The last figure indicates the color of characters used according to the chart below.

0 – white (standard)
1 – amber
2 – yellow
3 – blue
4 – red
5 – green

Thus, the first example is a Series 10 unit with white characters. The second example is a Series 80 unit with red characters and the third is a Series 120 unit with green characters.

USE OF COLOR

For some applications it may be desirable to use color. Two basic variations are possible: one is the use of colored characters on the black screen; the second is the use of a colored circle to illuminate the background of a white number. In the second, the background color may be projected intermittently to indicate special conditions without interfering with the normal presentation, or it may be operated continuously if desired. Color film is available for multiple color projections, from a single lamp.

NOTE B This part of the model number identifies the particular set of displays contained in the readout. In the first example, the readout contains the set of displays shown on the standard display chart next to display set No. 007, see chart. Similarly, the other two examples contain standard display sets, 069 and 000 respectively (from the standard chart).

When ordering special sets of displays, other than those shown on the standard chart below, use a sketch or written information. A similar number will be assigned to your set of displays at the factory and may be used for reorders of the same model.

STANDARD SETS OF DISPLAYS

NUMBER	TERMINAL 1	2	3	4	5	6	7	8	9	10	11	12
000	1	2	3	4	5	6	7	8	9	0	•	•
003*					+			—				
004*	1	2	3	4	5	6	7	8	9	0	Red	F
005		Green			+			—			Red	
006*	A	C	F	M	P	Q	R	T	O	1	+	•
007*	1	2	3	4	5	6	7	8	9	0	Red	0
009	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8				
010	0	1	2	3	4	5	6	7	8	9	10	11
011	1	2	3	4	5	6	7	8	9	0	+	—
013*	A	B	C	E	F	L	M	N	P	S	T	X
014*	2	1	O	•	4	3	7	6	5	•	9	8
019	1	2	3	4	5	6	7	8	9	0	Red	•
052	1	2	3	4	5	6	7	8	9	0	Red	Green
056	0	S	L	C	Red	R	E	Green	F	X	Y	Z
057*	1	2	3	4	5	6	7	8	9	0	A	B
069*	1	2	3	4	5	6	7	8	9	0	Red	Blue
070*	A	B	C	D	E	F	G	H	I	J	K	L
079*	B	C	E	F	H	L	O	P	S	T	V	Z
085	1	2	3	4	5	6	7	8	9	10	11	12
086	A	B	C	D	E	F	G	H	K	L	M	N
087	O	P	Q	R	S	T	U	V	W	X	Y	Z
099	A	B	C	E	F	L	M	N	P	S	Red	U
100	ALPHA-NUMERIC BAR MATRIX											
103*	A	B	C	D	E	F	S	+	—	AC	DC	NN
133	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
135	0	10	20	30	40	50	60	70	80	90	100	120
146	X	Y	Z	A	B	C	D	E	F	G	+	—
149	T	R	L	Z	A	S	E	W	F	+	—	
160*	1	2	M	G	+	—	×	÷	=	Δ	<	>
200*	2	1	2	3	4	5	6	7	8	1	9	0
216*	P	T	M	E	L	V	S	D	Z	A	0	1
221	1	2	3	4	5	6	7	8	9	0	Amber	Green
266*	1	2	3	4	5	6	7	8	9	0	—	•
330*	1	2	3	4	5	6	7	8	9	0	:	•
684*	N	S	E	W	Red	Green						
775*	—0	—1	—2	—3	—4	—5	—6	—7	—8	—9		
776*	09	19	29	39	49	59	69	79	89	99		

COLORS REPRESENT PROJECTED CIRCLE BACKGROUNDS OF COLOR INDICATED
*Available as a standard on Series 10 only
All others available for 10, 80, and 120 series units.

lamp selection and specifications...

NOTE C This number preceded by a dash indicates the lamp number used. See lamp charts for each series.

NOTE D

This letter indicates case style (A or B) for Series 10 only. Style A is used in assemblies and does not have front mounting lugs. Style B has mounting lugs on the front.

Series 10 LAMP CHART

Lamp Number	Voltage	Current	X Wattage/Lamp	Life at Rated Voltage	Average Character Brightness*
44	6.3	250 ma.	1.6	3000 hrs.	27
47	6.3	150 ma.	.9	3000 hrs.	12
1815	14	200 ma.	2.8	3000 hrs.	23
1813	14	100 ma.	1.4	3000 hrs.	8
1819	28	40 ma.	1.1	1000 hrs.	4
1820	28	100 ma.	2.8	1000 hrs.	11
1829	28	70 ma.	2.0	1000 hrs.	8

If voltage only is specified, the units will be supplied with lamps as follows:
6.3 V – #44 14 V – #1815 28 V – #1820

**Values in foot lamberts as measured with a spot-light meter.*

Under and over voltage applications have a marked influence on life and light (relative brightness) output. For specific recommendations, consult the factory or nearest representative.

X CAUTION:

To determine ambient temperature limits, multiply the wattage per lamp by the number of lamps energized simultaneously per unit. Then refer to adjacent chart (Fig. 6) for temperature limits per unit.

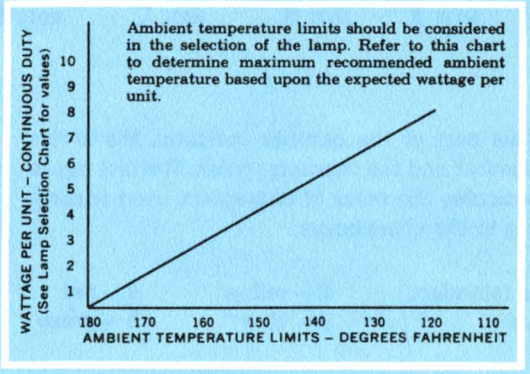

Figure 6

example:

A Typical Model Number Would Be:
Model No. 14010-1815

This unit would have red characters, the characters would conform to those shown in the Standard Character Chart (Fig. 5), and the unit would be for 14V operation using the #1815 lamp.

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Design details subject to change without notice.

industrial electronic engineers, inc.
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INDUSTRIAL ELECTRONIC ENGINEERS, INC.

LAMP SELECTION AND SPECIFICATION

LAMPS AVAILABLE FOR SERIES 10 AND STATUS INDICATOR*							
LAMP NUMBER	RATED VOLTAGE	CURRENT AT RATED VOLTAGE	WATTAGE AT RATED VOLTAGE	OPERATING LIFE PER LAMP AT RATED VOLTAGE	**AVERAGE CHARACTER BRIGHTNESS AT RATED VOLTAGE		LAMP REPLACEMENT PRICE EACH
					SERIES 10	STATUS INDICATOR	
44 • •••	6.3	250 ma.	1.6	3,000 hrs.	90	145	$ .10
47 ••	6.3	150 ma.	.9	3,000 hrs.	50	75	.10
1815 •••	14	200 ma.	2.8	3,000 hrs.	72	90	.13
1909	14	100 ma.	1.4	3,000 hrs.	30	60	.16
1819	28	40 ma.	1.1	1,000 hrs.	14	15	.30
1820 •••	28	100 ma.	2.8	1,000 hrs.	38	75	.26
1829 •••	28	70 ma.	2.0	1,000 hrs.	24	30	.23
1847 ••	6.3	150 ma.	.9	10,000 hrs.	36	60	.13
NE51H (Neon) (Status Indicator Only)	115 V.AC	1.2 ma.	1/7	25,000 hrs.		12	.23
	150 V.DC	1.9 ma.	3/10	12,000 hrs.		20	

• Recommended for optimum performance in Series 10 •• Recommended for optimum performance in Status Indicator
••• Not recommended for Status Indicator use requiring 3 or more lamps to be lit simultaneously for over 30 minutes, due to high wattage.

LAMPS AVAILABLE FOR SERIES 80 AND BINA-VIEW®							
LAMP NUMBER	RATED VOLTAGE	CURRENT AT RATED VOLTAGE	WATTAGE AT RATED VOLTAGE	OPERATING LIFE PER LAMP AT RATED VOLTAGE	**AVERAGE CHARACTER BRIGHTNESS AT RATED VOLTAGE		LAMP REPLACEMENT PRICE EACH
					SERIES 80	BINA-VIEW••	
1886 •	6.3	.90 amps	5.7	3,000 hrs.	45	120	$ .20
1855	6.3	.80 amps	5.	3,000 hrs.	26	80	.20
1495	28	.30 amps	8.4	500 hrs.	19	60	.26

• Recommended for optimum performance in both Series 80 and Bina-View •• Average character brightness for 12 plate unit

LAMPS AVAILABLE FOR SERIES 120, 220, AND CUE-SWITCH*						
LAMP NUMBER	RATED VOLTAGE	CURRENT AT RATED VOLTAGE	WATTAGE AT RATED VOLTAGE	OPERATING LIFE PER LAMP AT RATED VOLTAGE	**AVERAGE CHARACTER BRIGHTNESS AT RATED VOLTAGE	LAMP REPLACEMENT PRICE EACH
328 •	6	200 ma.	1.20	1,000 hrs.	50	$ .47
349	6	200 ma.	1.26	5,000 hrs.	35	.50
330	14	80 ma.	1.12	750 hrs.	16	.66
327	28	40 ma.	1.12	1,000 hrs.	20	.59

• Recommended for optimum performance in Series 120, 220, and Cue-Switch

LAMP AVAILABLE FOR DIGIVISOR LAMP NUMBER	RATED VOLTAGE	CURRENT AT RATED VOLTAGE	WATTAGE AT RATED VOLTAGE	OPERATING LIFE PER LAMP AT RATED VOLTAGE	**AVERAGE CHARACTER BRIGHTNESS AT RATED VOLTAGE	LAMP REPLACEMENT PRICE EACH
44	6.3	250 ma.	1.6	3,000 hrs.	60	$ .10

* Trade mark of Industrial Electronic Engineers, Inc.
** Values in foot lamberts as measured with a spotlight meter

GENERAL FACTS TO GUIDE LAMP SELECTION

1. The choice of the lamp should always be based on the environmental conditions before active service as well as after.
2. Lamps designed for 6 or 6.3 volts are inherently stronger than those designed for 14 or 28 volts because the filaments are shorter and heavier.
3. You will get a brighter, more distinct character with less power input by using a 6 or 6.3 volt lamp, because it provides the best point source of light.
4. If noise is a problem, the 6 or 6.3 volt lamps are less likely to exaggerate the condition than the 14 or 28 volt lamp.
5. The lamps having a long life rating (5,000 hrs. or more) have a better chance to survive shock than those of the normal life rating; all other factors being the same.
6. Lamps may be operated at less than their rated voltage which will considerably extend their operating life. Although this also will decrease the character brightness, in many cases the brightness is still sufficient to warrant operating at reduced voltage to increase lamp life.

LAMP INFORMATION

LAMP SELECTION. The lamps used in the digital display unit are mass produced items, and as such have certain manufacturing tolerances. As a result, a certain amount of lamp selection is required during our manufacturing process, and should also be expected by the customer when changing lamps in the field. This only pertains to projection type readouts, rather than a back lighted readout, such as the Status Indicator.

The procedure to follow in selecting lamps is to first examine the projected image for even illumination and for sharpness of character lines. If the quality of any of the characters is less than desired, it may in most cases be corrected by rotating the associated lamp 180° in the socket. If after re-examination no improvement is noted, then a new lamp should be installed and the process repeated. In general there are relatively few cases that cannot be corrected by simply rotating the lamp.

It should be noted that occasionally a lamp will have to be reselected in a unit that has just been received by the customer to achieve maximum sharpness of the character. This has been an infrequent occurrence, and is probably due to a slight shift in the position of a marginal lamp during shipping or installation of the unit. In any event, when a unit is received and the quality of the image is less than anticipated, it is generally wise to check the lamp selection first before making a final decision as to rejecting the unit.

INTERMITTENT OPERATING OF LAMPS. The life figures shown for each lamp are of course average values, and may vary slightly, up or down for individual lamps. The hours of life listed are for actual hours of use, and do not vary to any appreciable extent between continuous and intermittent use provided that the power source is well regulated to prevent a temporary overvoltage being applied to the lamp during the time the filament is reaching operating temperature and the correct filament resistance is attained. A poorly regulated power supply may result in a 10 or 20 percent voltage fluctuation at the time the lamp is energized and even though this will only be for a very short period of time the effect is extremely detrimental. This is substantiated by noting the curves on the chart below showing lamp characteristics.

As with vacuum tubes, the incandescent lamps tend to fail after only a very short period of operation, if they are going to fail at all prior to their rated life. Normally a very small percentage (about 1%) will fail during the first 50 to 100 hours of operation. If only a small number of display units are involved in a given installation the effect of this is negligible. However, in a large installation involving perhaps several hundred display units, there will be a short initial period where several lamps per day may fail. This is to be expected and should not be cause for alarm. Once the minimum break-in period is past, the display units should operate for extended periods with little or no failure due to lamp burn-out. In cases where the various lamps within the display are used evenly and with random distribution the unit may operate for years without additional failures.

LAMP FILAMENT DESIGN. Since the lamp filament is an important part of the projection system of the display unit, it is worthwhile to consider the filament design of the lamp in relation to the optical design of the display unit. (This does not apply to a back-lighted readout, such as the Status Indicator, which does not use a projection system).

Basically the optical system is designed to utilize a point source of light. From a practical viewpoint a true point source is not available in the miniature lamps, and therefore the resultant efficiency of the system depends to a large extent upon how close the lamp filaments approach the desired point source of light. In the type of lamps used in the display unit, two different filament designs predominate. First is the type used in the 6.3 volt lamp which consists of a short length of coiled wire suspended between two support wires. Of the lamps available, this is the closest to the point source, and for the power required results in the brightest projected image, and with a minimum of distortion and lack of sharpness. The other type filament, used in the 28 volt lamps, consists of a much longer coiled wire that runs from a point near the glass bead out to the end of the lamp, then across the end, and finally back down the side of the lamp to a point near the bead. As a result the light available is spread out along the full length of this filament, and even though there is considerably more wattage available, the optical system is focused only on a point at the top part of the filament and as such utilizes only a small portion of the light available.

An additional drawback to this type of filament is that the optical system will have a tendency to pick up light from a second point, and some sharpness of line will be lost. This can be corrected in most cases by additional lamp selection, but it is a factor to be recognized when selecting or replacing lamps in 28 volt units. The 14 volt filaments are somewhere in between the 6.3 and 28 volt filaments, and efficiency and sharpness are in the same category.

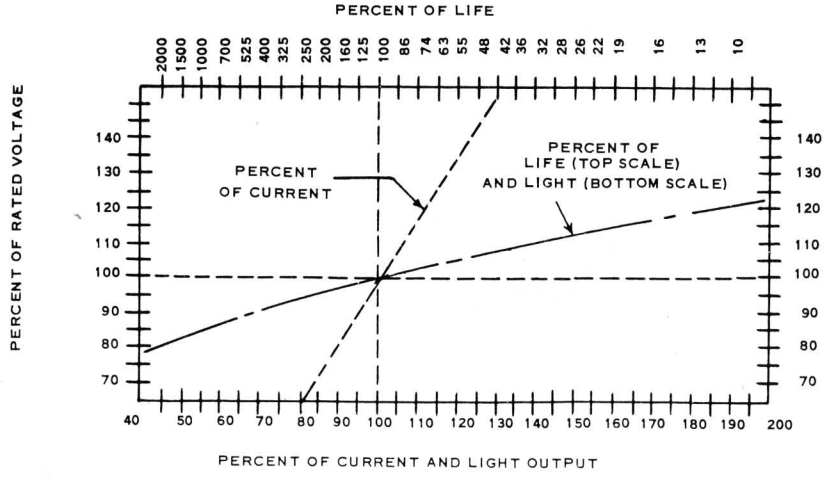
PREMATURE BLACKENING OF GLASS BULB OF LAMP. During the life of the lamp the tungsten of the filament is gradually discharged until such time as the strength is reduced to a point when the filament breaks and the lamp is said to be "burned-out". Under normal conditions there is no great decrease in the light output as the lamp ages. However, if a severe overvoltage is applied for any length of time the tungsten is actually deposited to a considerable degree on the end of the glass bulb and as such will materially reduce the transmission of light through the optical system. The projected image on the screen of the display may appear to be 20 to 30 percent dimmer under this condition, and for all practical purposes the lamps should not be used with the display. It is possible that other causes such as improper evacuation of all air during manufacture will cause discoloration of the glass bulb, but in general if any number of lamps in a display are observed to be blackened, it would be well to check the circuitry involved, as well as the history of the use of the units.

OPERATING SPEED. The maximum operating speed, that is, the fastest time that the display may change from one character to another without interference, is approximately 100 ms. This is essentially based upon the length of time required for the filament of the lamp to reach operating temperature and the length of time for the filament to cool when de-energized. Both of these times are about 50 ms. of duration. As such, the maximum number of discrete characters that may be displayed per second is ten. This is faster than the eye can follow and is certainly adequate for most conditions. However, if a situation does arise where it is necessary to record data at a higher rate, (for example, to record data with a camera) it is possible to increase this to some extent by letting the heating time of one lamp overlap the cooling time of another and thus approach the rate of 20 readings per second. In addition, since the lamp will not produce sufficient light at an applied voltage of one or two volts to show on the viewing screen, it would be possible to apply this voltage to all the lamps as a constant pre-load, and as a result reduce the heating time. This should be done with caution as even a voltage of two volts per lamp will create a reasonable quantity of heat when applied to all 12 lamps, and adequate ventilation should be provided.

PHOTOGRAPHIC AND TELEVISION USES OF DISPLAY UNITS. The unit has been successfully used both for purposes of still or motion picture photography, and for use with television cameras. There are certain limitations in that the unit cannot be subjected to the full glare of spotlights and the size of the character must be considered so that when reduced by the camera, the picture is still legible. In general most applications have been quite successful. The television cameras as well as most films are red sensitive and as such pick up the image quite well as the primary color of the lamp filament is red.

MINIATURE INCANDESCENT LAMP CHARACTERISTICS

LAMP CHARACTERISTICS. The following chart may be used to determine the effect on life, light output, and current when the voltage is varied above or below the rated voltage of the lamp. As the relationship of life to light output is generally the most important aspect so far as the display unit is concerned, one line is used to represent both of these values, with the scale at the top representing percentage of life as compared to percentage of light output, which is represented by the scale at the bottom. As an example, if you want to see what happens when operating the lamps at 90% of rated voltage, draw a horizontal line from 90% until it intersects the "Life/Light" curve. Then draw a vertical line from this point down to the bottom scale, and you can see that you would have 70% of the light output; continuing this vertical line up to the top scale, it shows that lamp life is increased 400%. To see how reduced voltage affects current continue the horizontal line on across until it intersects the dotted line representing current. Draw a vertical line from this point down to the bottom scale, and you see that you still use 95% of the current.



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INDUSTRIAL ELECTRONIC ENGINEERS, Inc.

PRICE SCHEDULE

10 SERIES	COMBINED QUANTITY							
Series No.	1 to 9	10 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000-over
10	20.00	18.50	17.50	16.50	15.75	15.00	14.50	14.00
10P[1]	32.50	30.00	28.25	27.00	25.75	24.50	23.50	22.75
10C[2]	21.50	20.00	19.00	18.00	17.25	16.50	16.00	15.50
10S[3]	23.00	21.50	20.50	19.50	18.75	17.50	16.75	16.00
60 (90° model)	29.00	26.75	25.25	23.75	22.50	21.50	20.75	20.00
60C[2] (90° model)	30.50	28.25	26.75	25.25	23.50	22.50	21.75	21.50
60S[3] (90° model)	34.50	32.25	30.25	28.25	26.25	24.50	23.00	22.00
ASSEMBLIES								EXTRA $
SERIES 20 (Assembly of Series 10 Units)	Assemblies of 2-8 units may be provided with mounting hardware and continuous viewing screen. For assemblies larger than 8 units, please consult the factory.							$1.50 Per Unit Per Assembly
SERIES 70 (Assembly of Series 60 Units)								

360 SERIES	COMBINED QUANTITY							
Series No.	1 to 9	10 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000-over
360	33.00	30.50	28.75	27.25	26.00	24.75	23.75	23.00
360P[1]	45.50	42.00	39.50	37.75	36.00	34.25	32.75	32.00
360C[2]	34.50	32.00	30.25	29.00	27.50	26.00	25.00	24.00
360S[3]	36.00	33.50	31.75	30.25	29.00	27.25	26.00	25.00
ASSEMBLIES								EXTRA $
SERIES 370 (Assembly of Series 360 Units)	Assemblies of 2-8 units may be provided with mounting hardware and continuous viewing screen. For assemblies larger than 8 units, please consult the factory.							$1.50 Per Unit Per Assembly

80 SERIES	COMBINED QUANTITY							
Series No.	1 to 9	10 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000-over
80	43.00	39.50	37.50	35.50	34.00	32.50	31.00	30.00
80P[1]	57.00	52.50	50.00	47.50	45.50	43.50	41.50	40.00
80S[3]	46.00	42.50	40.50	38.50	37.00	35.00	33.25	32.00
100 (90° model)	58.00	53.00	50.00	47.50	45.50	43.50	41.50	40.00
100S[3] (90° model)	63.50	57.75	54.25	51.50	49.25	47.00	44.75	43.00
ASSEMBLIES								EXTRA $
SERIES 90 (Assembly of Series 80 Units)	Assemblies of 2-8 units may be provided with mounting hardware and continuous viewing screen. For assemblies larger than 8 units, please consult the factory.							$1.50 Per Unit Per Assembly
SERIES 110 (Assembly of Series 100 Units)								

1. P=Plug-In type unit including mating corrector (Amphonol #26-190-16 Blue Ribbon Connector).
2. C=Split ground return.
3. S=Separator ground terminal for each lamp.

120 SERIES	COMBINED QUANTITY							
Series No.	1 to 9	10 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000-over
120	35.00	33.00	32.00	31.00	30.00	29.00	28.00	27.00
120SP (sub-panel)	35.00	33.00	32.00	31.00	30.00	29.00	28.00	27.00
140 (90° model)	50.00	47.00	45.00	43.00	41.50	40.00	38.50	37.00
ASSEMBLY								EXTRA $
SERIES 130 (Assembly of Series 120 Units)	Assembly of 2-8 units may be provided with mounting hardware and continuous viewing screen. For assemblies larger than 8 units, please consult the factory.							$1.50 Per Unit Per Assembly
SERIES 150 (Assembly of Series 140 Units)								

220 SERIES	COMBINED QUANTITY							
Series No.	1 to 9	10 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000-over
220-10	40.00	37.00	35.00	34.00	33.00	32.00	31.00	30.00
220-11	41.25	38.25	36.00	35.00	34.00	33.00	32.00	30.75
220-10S[3]	45.00	41.75	39.50	38.25	37.00	35.75	34.75	33.50
220-11S[3]	46.25	43.00	40.50	39.25	38.00	36.75	35.75	34.25
Above Units Available with Type A "Sub-Panel" Insert; Type B "Panel" Insert; or Type C "Bezel" Insert								

ASSEMBLIES (Series 230)		Amount Extra per Unit	Amount Extra per Assembly
Assembly of 2-8 units may be provided with mounting hardware. Continuous viewing screen is supplied with sub-panel A insert only. For assemblies larger than 8 units, please consult the factory.	230-A	$1.50	$7.50
	230-B	$1.50	None
	230-C	1.50	None

SET-UP CHARGE: Standard models or sets of displays, as listed in Catalog No. 101, are available at the above prices. An additional charge of $40.00 is required for other models to cover the cost of art and master film which is kept on file for 12 months from its last use. **Reorders within this period will not** incur the $40.00 initial set-up charge.

MODEL NUMBERS:

Typical Single Unit Model Number: 220 139 – B S – 328 – 11

A B C D E F

Typical Assembly Model Number: 230 447 – A – 328 – 10

A G C E F

Complete model numbers should be designated on all orders. A breakdown of the information included in a typical model number for both single units and assemblies is provided on the left.

A. Series Number (Type of Unit: 10; 360; 80; 120; 220).

B. Designates film for character display. Standard film numbers listed in catalog; numbers for specials obtained from factory.

C. Type of Insert (A, B, or C): applies to Series 220 and 230 only.

D. Designates lamp socket assembly with separate ground terminal provided for each lamp (optional). If separate ground is not specified, unit is furnished with common ground.

E. Lamp Number.

F. Case Style. (Applies to 10 Series, 360 Series and 220 Series only. 10 and 360 Series style "L" has front mounting lugs for individual mounting; style "K" is without front mounting lugs and is used in assemblies with end bracket mounting. 220 Series uses Style "11" for individual mounting and Style "10" for end bracket mounting with assemblies.)

G. Identifying number assigned by factory for a particular grouping of models within an assembly.

QUANTITY DISCOUNTS ON EXTENDED SHIPMENTS

1. To break an order down into more than one shipment, the order must total 100 or more display units.
2. Each shipment must equal at least 10% of total order or 25 units (whichever is larger).
3. Shipments on a particular order must be complete within 12 months from receipt of order.
4. Quantity orders cancelled before completion will be billed at prices based on the Price Schedule for the number of displays actually shipped.

TERMS AND CONDITIONS

1. MINIMUM BILLING—$5.00.
2. F.O.B.—All prices F.O.B. our plant Van Nuys, California.
3. TERMS: ½ of 1% 10 days; net 30 days.
4. DELIVERY — For standard displays, 30 days depending upon quantity. For special displays, 30 to 45 days after receipt of order.
5. RETURN OF GOODS—Positively no products may be returned without factory authorization. All claims must be made within 10 days after receipt of goods.
6. All prices subject to change without notice.

INDUSTRIAL ELECTRONIC ENGINEERS, INC.
7720 Lemona Avenue, Van Nuys, California • Phone: (213) 787-0311 • TWX: (213) 781-8115

BINA-VIEW® PRICE SCHEDULE

QUANTITY	BASIC COST OF UNIT LESS CHARACTER & COLOR PLATES, CHECK BACK, FLOATING DECIMAL POINT & Q.D.						CHARACTER PLATE PRICE EACH	OPTIONAL CHECK-BACK FEATURE	ADDITION* FOR EACH COLOR PLATE	ADDITION FOR FLOATING DECIMAL POINT	ADDITION FOR QUICK DISCONNECT
	1 BIT	2 BIT	3 BIT	4 BIT	5 BIT	6 BIT					
	2 PLATES MAX.	4 PLATES MAX.	8 PLATES MAX.	16 PLATES MAX.	32 PLATES MAX.	38 PLATES MAX.					
1-9	$ 70.00	$ 77.50	$ 85.00	$ 92.50	$102.50	$112.50	$2.00	$27.50	$5.50	$5.00	$6.00
10-24	64.50	71.50	78.25	85.00	94.25	103.50	1.85	25.25	5.35	5.00	5.75
25-49	61.00	67.50	74.00	80.50	89.00	98.00	1.75	24.00	5.25	5.00	5.50
50-99	58.00	64.50	70.50	76.75	85.00	93.50	1.65	23.00	5.15	5.00	5.25
100-249	55.50	61.50	67.00	73.00	81.00	89.00	1.55	22.00	5.05	5.00	5.00
250-499	53.00	58.50	63.50	69.25	77.00	84.50	1.50	21.00	5.00	5.00	4.75
500-999	50.50	56.00	61.00	66.50	74.00	81.00	1.45	20.25	4.95	5.00	4.50
1,000-OVER	49.00	54.25	59.50	65.00	71.75	78.75	1.40	19.50	4.90	5.00	4.25

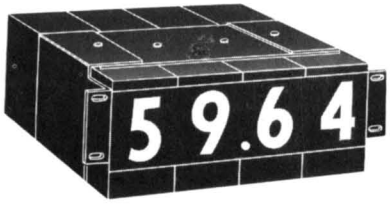
* To be able to display either white or a color on command, an extra bit coil is used, which provides 1 color and white or 2 colors and no white. By adding a second extra bit coil you can have 3 colors and white or 4 colors. Maximum number of bit coils is 6. Each color, except for white, requires a color plate.

INSTRUCTIONS FOR PRICING: To determine the cost of each Bina-View Display Unit, start with the basic cost of the unit, which depends upon the number of bits required. Next add the cost of the total character plates in the unit, plus the cost of any optional features you desire, such as check-back, floating decimal point operated by separate lamp circuit, color, or quick disconnect wiring connector.

AS AN EXAMPLE: Model 001 (0-9, + and -) would require 12 character plates. This is a 4 bit unit and the basic cost is $92.50 plus $2.00 times 12 or $116.50. If you want the unit to have the check-back feature, floating decimal and the quick disconnect connector, you would add $27.50, $5.00, and $6.00 for a total of $155.00. If you want to be able to display either white or a color on command, you must add a 5th bit to the unit, making the basic price $102.50 plus $24.00 for the 12 character plates and $5.50 for the color plate or a total of $132.00. If you also want the other optional features you must add their cost to this price.

ASSEMBLIES:

The above individual models can be assembled into groups of 2 through 8 units in any sequence at no additional charge. For assemblies of more than 8 units, please consult the factory.



SPECIAL NOTE: The above prices apply only to the standard Bina-View models and standard characters shown on the reference chart on the reverse side. For special codes and/or characters not listed on the standard reference chart or previously purchased, a non-recurring artwork charge is necessary for each character plate. For information on these charges, consult your local representative or contact the factory directly.

BINA-VIEW

Translates coded binary to decimal, alphabetic, or alphanumeric display. Maximum character size 1-3/8 inches.

QUANTITY DISCOUNTS ON EXTENDED SHIPMENTS

Quantity discounts may be applied to orders on an extended shipment basis where the following conditions are met.

1) To break an order down into more than one shipment, the order must total 100 or more display units.
2) Each shipment must equal at least 10% of the total order or 25 units (whichever is larger).
3) Shipments on a particular order must be completed within 12 months from receipt of order.
4) Quantity orders cancelled before completion will be billed at prices based on the price schedule for the number of displays actually shipped. All prices subject to change without notice.

NOTES:

1) MINIMUM BILLING — $5.00 per order.
2) F.O.B. POINT — All prices are F.O.B. our plant, North Hollywood, California.
3) TERMS — net 30 days.
4) DELIVERY — For standard display units, 6 weeks. For special display units, 8 weeks.
5) STANDARD TERMS AND CONDITIONS — "Positively no products may be returned without factory authorization. All claims must be made within 10 days after receipt of goods."

TYPICAL MODEL NUMBERS

UNIT NO. AA (A) 6 (B) / 12 (C) — 001 (D) E (H) — 1855 (E) — C (F)

ASSEMBLY NO. AA0007 (G) -1855 (E) — C (F)

A. Series Number
B. Signal Input Coil Voltage.
C. Set-Pulse Coil Voltage.
D. Model Number (see reverse side).
E. Lamp Number
F. Optional Check Back Feature
G. Number assigned by factory for a particular grouping of models.
H. Designates Quick Disconnect Connector

industrial electronic engineers, inc.
5528 VINELAND AVENUE, NORTH HOLLYWOOD, CALIFORNIA • PHONE (AREA 213) 877-1144 TWX NO. 769-1636

INDUSTRIAL ELECTRONIC ENGINEERS, INC.
5528 Vineland Avenue
North Hollywood, California

ORDERING REFERENCE CHART FOR STANDARD BINA-VIEW DISPLAY UNITS

MODEL NUMBER, CODE NAME, AND CHARACTER ASSIGNMENT

	CODE 32-16-8-4-2-1	001 Pure Binary	002 2421	003 Excess Three	004 Cyclic Grey	005 7421	006 5421	007 Pure Binary	015	017 Baudot	117	118	089	090	091	093	101	119	083	105	111	126 Tele-Type
1-4 BIT INPUT	0 0 0 0 0 0	0	0		0	0		0	+			0		0	0	0			0	ACV	0	
	0 0 0 0 0 1	1	1		1	1	1	1	–	3	A	1		1	1	1			1	DCV	1	E
	0 0 0 0 1 0	2	2		3	2	2	2			B	2		2	2	2	E		2	VOLTS	2	
	0 0 0 0 1 1	3	3	0	2	3	3	3			C	3		3	3	3			3	SEC	3	A
	0 0 0 1 0 0	4	4	1	7	4	4	4			D	4		4	4	4			4	OHMS	4	
	0 0 0 1 0 1	5		2	6	5	0	5			E	5		5	5	5			5	CPS	5	S
	0 0 0 1 1 0	6		3	4	6		6		8	F	6		6	6	6	A		6		6	I
	0 0 0 1 1 1	7		4	5			7		7	G	7		7	7	7	0	½	7		7	U
	0 0 1 0 0 0	8		5		7	5	8			H	8		8	8	8			8		8	
	0 0 1 0 0 1	9	+	6		8	6	9			I	9		9	9	9			9		9	D
	0 0 1 0 1 0		–	7		9	7			4	J	10					S		A		10	R
	0 0 1 0 1 1		5	8			8				K	11						¾	B		11	J
	0 0 1 1 0 0		6	9	8		9				L	12					I		C		12	N
	0 0 1 1 0 1		7		9						M	13						¾	D		13	F
	0 0 1 1 1 0	+	8	+	+	+	+				N	14					U		E		14	C
	0 0 1 1 1 1	–	9	–	–	–	–				O	15					I		F		15	K
5 BIT INPUT MINIMUM	0 1 0 0 0 0									5	P	16										T
	0 1 0 0 0 1										Q	17										Z
	0 1 0 0 1 0										R	18			S		D	¼				L
	0 1 0 0 1 1									2	S	19	0		T			¾				W
	0 1 0 1 0 0										T	20	1	A	U		R	¼				H
	0 1 0 1 0 1									6	U	21	2	B	V			¾				Y
	0 1 0 1 1 0									0	V	22	3	C	W		J					P
	0 1 0 1 1 1									1	W	23	4	D	X		2					Q
	0 1 1 0 0 0									9	X	24	5	E	Y		N	¼				O
	0 1 1 0 0 1										Y	25	6	F	Z							B
	0 1 1 0 1 0										Z	26	7	G			F					G
	0 1 1 0 1 1											27	8	H								
	0 1 1 1 0 0											28	9	I			C					M
	0 1 1 1 0 1											29										X
	0 1 1 1 1 0											30					K					V
	0 1 1 1 1 1																3					
6 BIT INPUT MINIMUM	1 0 0 0 0 0												A			A	T					
	1 0 0 0 0 1												B		J	B						3
	1 0 0 0 1 0												C		K	C	Z	¼				
	1 0 0 0 1 1												D		L	D						
	1 0 0 1 0 0												E	J	M	E	L	½				
	1 0 0 1 0 1												F	K	N	F						
	1 0 0 1 1 0												G	L	O	G	W					8
	1 0 0 1 1 1												H	M	P	H	4					7
	1 0 1 0 0 0												I	N	Q	I	H	½				
	1 0 1 0 0 1												J	O	R	J						
	1 0 1 0 1 0												K	P		K	Y					4
	1 0 1 0 1 1												L	Q		L						
	1 0 1 1 0 0												M	R		M	P					
	1 0 1 1 0 1												N			N						
	1 0 1 1 1 0												O			O	Q					
	1 0 1 1 1 1												P			P	5					
	1 1 0 0 0 0												Q			Q	O					5
	1 1 0 0 0 1												R		A	R		½				
	1 1 0 0 1 0												S		B	S	B					
	1 1 0 0 1 1												T		C	T						2
	1 1 0 1 0 0												IJ		D	U	G					
	1 1 0 1 0 1												V	S	E	V						6
	1 1 0 1 1 0												W	T	F	W						0
	1 1 0 1 1 1												X	U	G	X	6					1
	1 1 1 0 0 0												Y	V	H	Y	M					9
	1 1 1 0 0 1												Z	W	I	Z						
	1 1 1 0 1 0													X			X					
	1 1 1 0 1 1													Y								
	1 1 1 1 0 0													Z			V					
	1 1 1 1 0 1																					
	1 1 1 1 1 0																					
	1 1 1 1 1 1																7					
PRICE	1-9 QUANTITY	← 116.50 →						112.50	74.00	122.50	154.50	164.50	← 184.50 →				180.50	136.50	124.50	104.50	124.50	184.50

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INDUSTRIAL ELECTRONIC ENGINEERS, INC.

''CUE'' INDICATOR SWITCH (STANDARD UNIT)

ORDERING INFORMATION

SWITCH TYPES:

EFFECTIVE DATE DECEMBER 1, 1961

ORDERING DESIGNATION	DESCRIPTION *
2 MC	DOUBLE POLE, DOUBLE THROW (2 PDT) MOMENTARY CONTACT
2 AC	DOUBLE POLE, DOUBLE THROW (2 PDT) ALTERNATE CONTACT

* SEE CATALOG SHEET FOR ELECTRICAL RATINGS

LAMP NUMBERS	
327	28 VOLT @ 40 MA
328	6 VOLT @ 200 MA
330	14 VOLT @ 80 MA
349	6.3 V @ 200 MA

When ordering, select a set of numbers from the charts on this page to form a complete designation as shown below:

CSD	-	000	-	2MC	-	327	-	T
Note A		Note B		Note C		Note D		Note E

Note A - Ordering designation for standard ''Cue'' Switch Display Unit.

Note B - Model Number assigned by the factory to each set of characters.

Note C - Switch type ordering designation.

Note D - Lamp Number.

Note E - ''T'' Designates top mounted switch.
''B'' Designates bottom mounted switch.

A complete range of displays may be ordered including letters, whole words, numbers, symbols, sets of words, and combinations of these.

Color is represented by a 3/4'' diameter circle alone or as background. A $40.00 ''set-up'' charge applies to the first unit ordered. Subsequent reorders of the same set of characters are without a ''set-up'' charge. The set-up charge will apply however, when reordering a new and different set of characters.

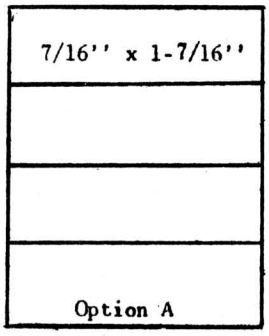
PRICES - STANDARD UNIT			ADDED COST/UNIT OPTIONAL QUICK-DISCONNECT FEATURE
QUANTITY	2 MC	2 AC	
1 - 9	$55.00	$61.00	$2.25
10 - 24	51.50	57.00	2.10
25 - 49	49.50	54.50	2.00
50 - 99	47.50	52.50	1.90
100 - 249	45.50	50.50	1.80
250 - 499	44.00	48.50	1.70
500 - 999	42.50	46.75	1.65
1000 & OVER	41.00	45.25	1.60

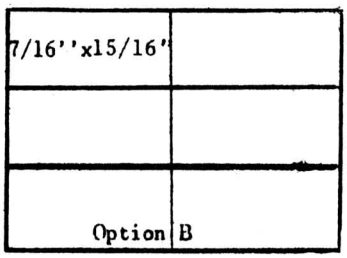
Industrial Electronic Engineers, Inc.
Engineers and Manufacturers Components . Systems Instruments
5528 Vineland Avenue, North Hollywood, California
Telephone 877-1144 TWX 213-769-1636

STATUS INDICATOR* SERIES 280
PRICE SCHEDULE

Quantity of Units	PRICE OF STANDARD UNIT WITH VARIOUS LAMPS				Additional Per Unit For Removing Light Separators To Enlarge Message Areas **	ENGRAVED VIEWING SCREENS		
	Lamp Nos. 44, 47, 1847	Lamp Nos. 1813 1815	Lamp Nos. 1819, 1820 1829	Lamp No. NE51H		Cost Per Letter	Master Charge Per Letter For First Order	Set Up Charge Per Order
1 - 9	$ 12.50	$ 13.50	$14.50	$ 15.00	$ 1.50	$ .15	$ .35	$ 7.50
10 - 24	11.50	12.50	13.25	13.75	1.50	.12	.35	7.50
25 - 49	11.00	11.75	12.50	13.00	1.25	.10	.35	7.50
50 - 99	10.50	11.25	12.00	12.50	1.25	.09	.35	7.50
100 - 249	10.00	10.75	11.50	12.00	1.00	.08	.35	7.50
250 - 499	9.50	10.25	11.00	11.50	1.00	.07	.35	7.50
500 - 999	9.00	9.75	10.50	11.00	1.00	.06	.35	7.50
1000 & Over	8.75	9.50	10.25	10.75	1.00	.06	.35	7.50

** Two standard options for increasing message area. For price additive on removing separators to combine areas other than these options, consult factory.





SET-UP CHARGE FOR PHOTOGRAPHIC FILM DISPLAYS:

An additional charge of $40.00 is required for non-standard displays to cover the cost of art and master film. This is kept on file for 12 months from its last use, and reorders within this period will not incur the $40.00 initial set-up charge.

ENGRAVED VIEWING SCREENS:

1. Engraving will be on opaque white plexiglas on outside surface and filled with black, unless otherwise specified.
2. Gorton Condensed Copy Dies will be used, unless otherwise specified.
3. Example of pricing for engraved screen: Assume a 4 letter word in each of the 12 positions. 4 x 12 = 48 total letters. If 15 units are required, cost per unit is 48 letters x 12¢ per letter = $5.76 additive to standard unit cost. Also $7.50 set-up cost would apply and if first order, master charge would be 48 letters x 35¢ per letter = $16.80.

QUANTITY DISCOUNTS ON EXTENDED SHIPMENTS

Quantity Discounts May Be Applied to Orders on an extended shipment basis where following conditions are met.

1. To break an order down into more than one shipment, the order must total 100 or more display units.
2. Each shipment must equal at least 10% of the total order or 25 units (whichever is larger.)

MODEL NUMBER

280	000	-	S	-	47	-	V OR H
A	B		C		D		E

A. Series Number (Type of Unit, i.e. Status Indicator)
B. Designates character displays. Consult factory for number designation.
C. Indicates separate ground for each lamp. Common ground is automatically furnished unless ''S'' is designated.
D. Lamp Number.
E. Standard mounting is vertical, indicated by letter ''V''. Horizontal mounting indicated by letter ''H''.

NOTES

1. Minimum Billing - $5.00 per order.
2. F.O.B. Point - All Prices are F.O.B. our plant North Hollywood, California.
3. Terms - net 30 days.
4. Delivery - For standard display units, 30 to 45 days after receipt of order.
5. Standard Terms and Conditions - ''Positively no products may be returned without factor authorization. All claims must be made within 10 days after receipt of goods.''

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3. Shipments on a particular order must be completed within 12 months from receipt of order.
4. Quantity orders cancelled before completion will be billed at prices based on the price schedule for the number of displays actually shipped. All prices subject to change without notice.

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