VIVISUN®

VIVISUN LR3

Manufactured by
Applied Avionics

Applied Avionics is the exclusive manufacturer of the VIVISUN brand of MIL-PRF-22885 lighted pushbutton switches and programmable displays. VIVISUN combines reliability, mil-spec quality and superior performance in sunlight readable, lighted pushbutton switches or indicators for avionics, naval shipboard or military ground applications in the most demanding environments.

VIVISUN is the choice of leading aircraft manufacturers and military services worldwide, and Applied Avionics, Inc. has been a trusted supplier and technology leader for over 40 years.

The VIVISUN LR3 rectangular switch/indicator applies the same innovative LED integration techniques pioneered in the successful ¾ inch square VIVISUN LED. Utilizing a uniquely engineered drive circuit in a fully separable cap design, the VIVISUN LR3 integrates 24 LEDs into a 1 X 1.2 inch package producing the traditional VIVISUN high quality lighting. The VIVISUN LR3 fulfills an immediate industry need: a replacement for outdated incandescent rectangular switches.

VIVISUN LR3

LR3 Application

The VIVISUN LR3 switches/indicators combine the rugged requirements of MIL-PRF-22885/113 with the extreme performance requirements of safety-critical designs. Where legend readability is important at extreme viewing angles, in direct sunlight and at NVIS levels, the LR3 meets these demands and others as detailed on our website, www.appliedavionics.com.

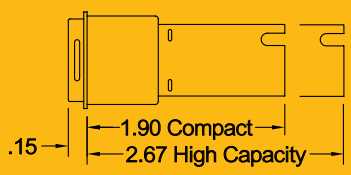
The increased legend capacity of the VIVISUN LR3 makes it possible to have four electrically separate messages that may be displayed on a single LR3 unit. Each message may appear in a different color and with character sizes that exceed most human-factor recommendations. Saving panel real estate and reducing costs through combining multiple discrete controls into a single VIVISUN LR3 is a distinct LR3 advantage.

The VIVISUN LR3, unlike other operator interface technologies, maintains a traditional tactile response and a raised bezel that assures a positive tactile signature, preventing inadvertent actuation. Further, the VIVISUN LR3 encompasses a patented, dedicated drive circuit that provides layered fault tolerance to the 24 LEDs in the pushbutton cap. Where safety-critical performance is imperative, the VIVISUN LR3 shines through.

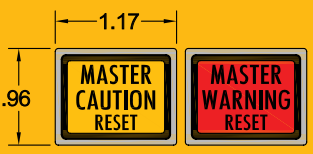
Outstanding Customer Service

Our commitment to customer service is unparalleled. We can handle quick turnaround time, and our team takes personal pride in delivering the right part within the customer's delivery requirements. At Applied Avionics, you get the rare combination of quality, reliability, delivery, and service.

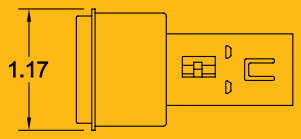
Unsealed Switch/Indicator



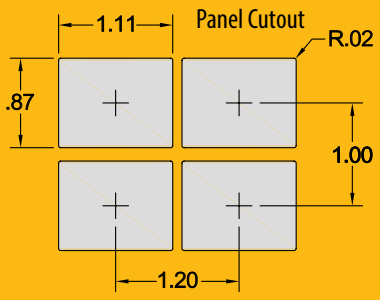
Side View



Front View

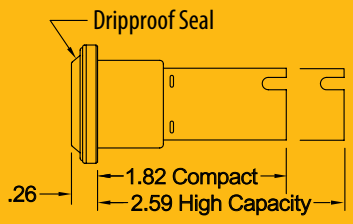


Top View

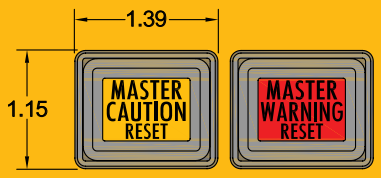


NOTE: Shown without mounting sleeve.
Nominal dimensions.

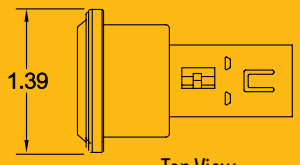
Sealed Switch/Indicator



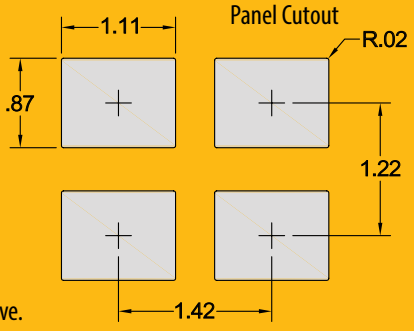
Side View



Front View



Top View



NOTE: Shown without mounting sleeve.
Nominal dimensions.

Technical Specification Summary

Features	Description / Compliance
Terminations	Solderless CTS, turret, PCB and wirewrap
Switch Poles	Indicator, 1, 2 or 4 poles
Enclosure Design	Unsealed or dripproof/watertight/splashproof
Cap Actuation Travel / Force	0.150" Nominal / 2 to 5 pounds
Mechanical Life	100,000 cycles minimum
Electrical Life	100,000 cycles logic level, 50,000 cycles at 7A
Circuit Configurations	5 lighting circuit styles, 1 or 2 commons
Operating Voltage	28 VDC Polarity Insensitive
Power Consumption	1.5 watts typical at 28 VDC (entire cap)
Minimum Illumination Current	300uA / quadrant
EMC	RTCA/DO-160 and MIL-STD-461
Reliability	MIL-HDBK-217F, AIC, 85°C, 150,000 hours MTTF MIL-HDBK-217F, NS, 85°C, 200,000 hours MTTF MIL-HDBK-217F, GB, 85°C, 1,400,000 hours MTTF
Environmental Conditions	MIL-PRF-22885, MIL-STD-202, MIL-STD-810 and DO-160
Electrical Environmental Conditions	RTCA/DO-160
Shielding Efficiency Option	60 dB, 0.1-1.0 GHz, on conductive panel
NVIS Option	MIL-L-85762A and MIL-STD-3009
Altitude	Sea Level to 50,000 ft.

VIVISUN LR3

Rugged Worry-Free Electronics

Polarity insensitive 28 VDC/28 VAC, 100% passive solid state circuitry that meets the RTCA/DO-160 and MIL-STD-461E EMC requirements, including 600 V spikes and 200 V/m radiated susceptibility.

Standard and NVIS Colors with Multiple Types and Styles

Blue, green, white, yellow, red and NVIS blue, NVIS green A, NVIS green B, NVIS white, NVIS yellow and NVIS red. For available Types and Styles, see pages 5 and 6.

Wide Temperature Range

-55°C to +85°C operating.

High Reliability

Life of the platform 150,000 hours MTTF, Airborne Inhabited Cargo environment at 85°C.

Wide Viewing Angle

Uniform LED lighting is readable over a 120° viewing cone.

Sunlight Readable and Low Power

Readable in direct sunlight and uses only 1.5 watts at 28 volts. Low touch temperature is provided by low power LEDs driven by a uniquely engineered, efficient, fault tolerant drive circuit.

Voltage Dimming

All colors, including red and green, trim together uniformly from over 300 fl down to 0.1 fl using simple voltage control.

Layered Fault Tolerance

The LR3 cap contains 24 LEDs organized into four electrically independent quadrants of six LEDs each, and each quadrant is designed to provide fault tolerant lighting.

Mil-Spec Quality

Designed and tested to the requirements of MIL-PRF-22885/113 and manufactured under Applied Avionics' ISO9001/AS9100 certified quality management system.

Easy Wiring

Wiring harness and connector can be wired and tested prior to switch installation. The CTS connector can accommodate 20, 22 or 24 gauge wires with MIL-C-39029/22-192 sockets.

Modular Construction

Switch body, cap and connector may be ordered separately for immediate delivery.

Sealed CTS Connector

Solderless Common Termination System (CTS) connector protects connections and wiring from moisture, sand and dust.

NEXSYS LOGIC Compatibility

Internal switch poles can be combined or replaced with a wide range of Applied Avionics' NEXSYS branded LOGIC components, including Electronic Latching and Solid State Relays, among others.

Unsealed Switch

High Reliability Switches

100,000 cycles for logic level or 50,000 cycles at 7 amps.

Easy Installation/Pushbutton Cap Replacement

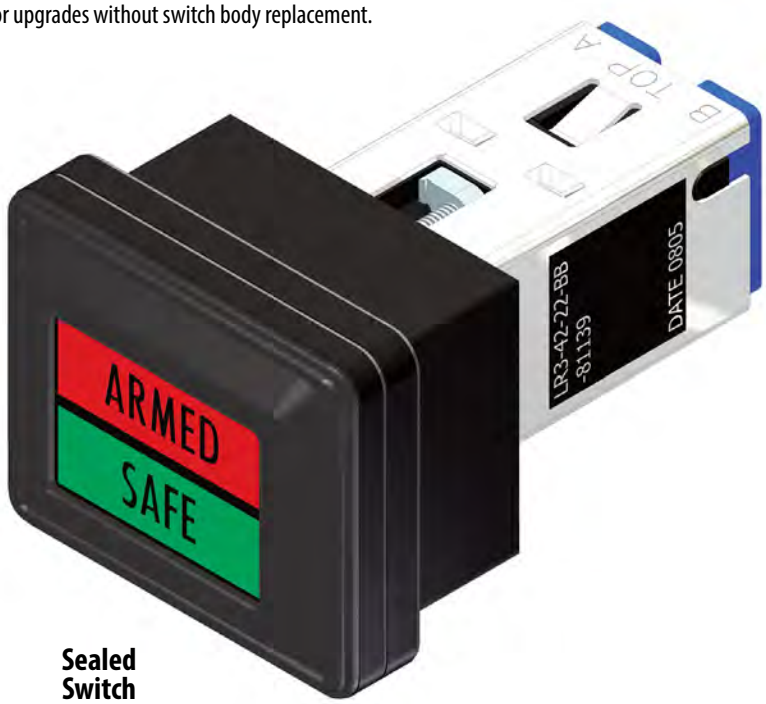
Front mountable using two internal screws, including a mounting spacer that provides multiple panel mounting configurations. Pushbutton cap retainer provides for extraction and separation as needed for upgrades without switch body replacement.

Pushbutton Cap Markings

Part number, circuit diagram, operating voltage and date code are permanently marked on pushbutton cap. NVIS Class and Type designations are marked when applicable.

Advanced Electrical and Structural Materials

Advanced engineering polymers for high performance, strength and low weight.



Sealed Switch

Dripproof/Watertight/Splashproof Seal

Silicone rubber seal meets the sealing requirements of MIL-PRF-22885 over the full operating temperature range of -55˚C to +85˚C.

Visit our Part Configurator online at: www.appliedavionics.com/configurator

We've made the accurate configuration of VIVISUN and NEXSYS products quick and easy. For manual part configuration, see the instructions below.

HOW TO ORDER VIVISUN LR3 SWITCHES

VIVISUN LR3 pushbutton switches/indicators are ordered by specifying a basic 14 character part number as shown on Line 1. The detailed artwork description on Line 2 includes detail on legend position, type of lighting, color, character height and specific legend. The 5 digit artwork number at the end of Line 1 is determined by Applied Avionics at the time of order.

For Ordering Assistance
Call 1-888-848-4786
E-Mail: sales@appliedavionics.com
Website: www.appliedavionics.com

Sample Line 1 LR3 — 42 — 15 — KB — 8101 1

- LR3 Product Code
- Termination per Table 1.
- Switch Poles & Contact Material per Table 2
- Enclosure Design & EMI per Table 3
- Pushbutton Actuation & LED Circuit Configuration per Table 4
- Pushbutton Cap Display Style per Table 5
- LED Circuit Style per Table 6
- Artwork Part Number assigned by Applied Avionics at time of first order

PART NUMBER EXAMPLE

- 2 pole CTS housing, silver contacts
- Unsealed with 2 commons
- K Style NVIS pushbutton cap display
- Type D, NVIS Green B legend, position 2
- Type S NVIS Green B symbol, position 3
- Character size 2, height 0.109"

Non-Illuminated

Illuminated

Sample Line 2 (2DJ2 HF AUDIO, XFER; 3SJ0 ////)

- Legend Position per Table 7
- Display Type per Table 8
- Lighting Color per Table 9
- Character size per Table 10
- Top Half Legend; separate lines with comma
- Insert semicolon between legend positions
- Legend Position per Table 7
- Display Type per Table 8
- Lighting Color per Table 9
- Character size per Table 10 (NOTE: Code **0** designates custom symbology)
- Legend on first line "////"

NOTE: For repeat orders of the switch, only the 14 character part number on line 1 is required.

HOW TO ORDER SPARE COMPONENTS

1. To order a typical spare VIVISUN LR3 pushbutton cap only (from example above):

   LR3 — XX — 15 — KB — 8101 1

   Insert X's in body type spaces to denote pushbutton cap only.
2. To order a typical spare VIVISUN LR3 compact body only (from example above):

   LR3 — 42 — 15
3. To order the proper CTS connector plug, see Table 1.
4. To a order CTS Extraction Tool specify P/N **18-234**.

YOUR PART NUMBER

Line 1 LR3 — — — — — ##### — 5 digit artwork P/N assigned by Applied Avionics

Line 2

TABLE 1 Terminations

Solderable	Indicator, 1 Pole, or 2 Pole	Turret		**1**
		Spade		**2**
		PCB / Wire Wrap		**3**
Solderless (Uses CTS Connector Plug)		*Conn. Plug Required*	*Plug Ord. Separately*	*Plug Incl. with Body*
	Compact (Ind., 1 or 2 Pole)	18-200	**4**	**5**
	High Capacity (4 Pole)	18-240	**6**	**7**
	Compact Body with LOGIC (*)	18-442	**F**	**G**
	High Cap. Body with LOGIC (*)	18-440	**D**	**E**

(*) Bodies contain at least one component from the NEXSYS LOGIC Series.

TABLE 2 Switch Poles and Contact Material

	Contact Material			Contact Material	
	Silver	Gold Plate		Silver	Gold Plate
Single Pole / Single Break (SPDT-SB)	**1**	**5**	Four Pole / Single Break (4PDT-SB)	**A**	**F**
Single Pole / Double Break (SPDT-DB)	**3**	**7**	Four Pole / Double Break (4PDT-DB)	**C**	**7**
Double Pole / Single Break (DPDT-SB)	**2**	**6**	Indicator (no switches)	**0**	
Double Pole /Double Break (DPDT-DB)	**4**	**8**	Compact or High-Cap w/LOGIC (*)	**M**	

(*) Use with F, G, D, or E from Table 1.

TABLE 3 Enclosure Design and EMI

1 - Unsealed
2 - Dripproof/Watertight/Splashproof
4 - Unsealed with EMI Shielding(2)
5 - Dripproof/Watertight/Splashproof with EMI Shielding(2)

(2) 60 dB Shielding Efficiency from 0.1 to 1.0 GHz per MIL-PRF-22885

TABLE 4 Pushbutton Actuation and LED Circuit Configuration

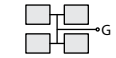
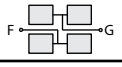
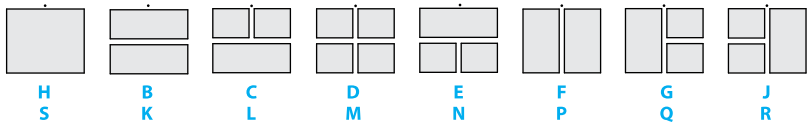
LED Circuit Configuration		Actuation Designation		
Description	Block Diagram	Momentary	Alternate	Indicator
Single Circuit, One Common		**1**	**4**	**7**
Horizontal Split Circuit, Two Commons		**2**	**5**	**8**

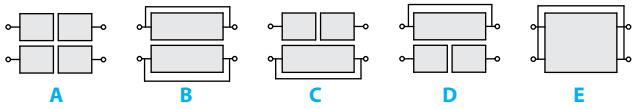
TABLE 5
Pushbutton Cap Display Styles

Standard Cap Style
NVIS Cap Style



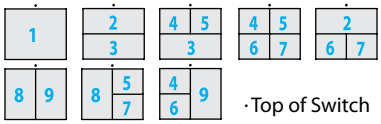
·Top of Switch (Shown in landscape orientation)

TABLE 6
LED Circuit Styles



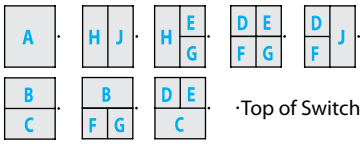
Note: Pushbutton Cap Display Styles F, G, J, P, Q and R from Table 5 are only available in Circuit Style A.

TABLE 7
Legend Position



·Top of Switch

Landscape Orientation
Switch in Normal Orientation



·Top of Switch

Portrait Orientation
Switch Rotated 90° Clockwise

TABLE 8
Display Type

Display Type	Lighting Description	Non-Illuminated	Illuminated
Standard			
S	**Display Type S:** MIL-PRF-22885 sunlight readable legends on an opaque black background that are indiscernible until illuminated. When illuminated, the legends appear in color, producing a typical luminance of 300 fl at 28 volts.		TYPE S
Background			
B	**Display Type B:** Black legends on an obscure black background. When illuminated, the legend remains black and the background appears in color, producing a typical luminance of 300 fl at 28 volts.		TYPE B
A	**Display Type A:** Always visible white legends on an obscure black background. When illuminated, the background appears in color, producing a typical luminance of 300 fl at 28 volts.	TYPE A	TYPE A
W	**Display Type W:** Always visible white background with visible black legends. When illuminated, the background appears in color, producing a typical luminance of 100 fl at 28 volts for standard colors (75 fl at 28 volts for NVIS colors).	TYPE W	TYPE W
Visible			
D	**Display Type D:** Always visible white legends on an opaque black background. When illuminated, the legends light in color, producing a typical luminance of 100 fl at 28 volts for standard colors (75 fl at 28 volts for NVIS colors).	TYPE D	TYPE D
N	**Display Type N:** Always visible white legends on an opaque black background. When illuminated, the legends light in color, producing a typical luminance of 2 fl at 28 volts.	TYPE N	TYPE N
Special			
X	**Display Type X:** Always visible white opaque lettering, does not illuminate, does not contain internal electronics.	TYPE X	
0	**Display Type 0:** No display, does not illuminate, does not contain internal electronics.		

TABLE 9
Lighting Color

T - Blue	R - Red	J - NVIS Green B	0 - No Color
G - Green	Q - NVIS White	K - NVIS Yellow Class A	
A - White	E - NVIS Blue	U - NVIS Yellow Class B	
Y - Yellow	H - NVIS Green A	S - NVIS Red	

TABLE 10
Character Size and Character Capacity

Code	Character Height	Maximum Lines Per Position By Legend Position per Table 7			
		1, 8, 9	2,3,4,5,6,7	A,H,J	B,C,D,E,F,G
3	.072	6 *(Note 1)*	2	8	3
A	.090	5 *(Note 1)*	2 *(Note 1)*	6	3
2	.109	4	2	5	2
1	.125	3	1	5	2
4	.156	3	1	4	1
5	.180	2	1	3	1
6	.220	2	-	3	1
0	Custom Symbology or Blank Legend				

Note 1: One fewer available line when using Type B, A, or W from Table 8
Note 2: The number of characters per line is dependent on the actual text legend used. The online Part Configurator will allow viewing of the actual cap legend and spacing. Font types will be optimized based on character height and lighting type selected

ACCESSORIES

Switch Guard with Clear Lens

Standard	Dripproof
21-601- Black	21-604- Black
21-602- Yellow	21-605- Yellow
21-603- Red	21-606- Red

EMI shielded switch guards also available.

Panel Plug
21-585- Black
21-586- Dark Grey
21-587- Light Grey

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