

## BINAY LED (LIGHT EMITTING DIODE) - BASED INTEGRAL INDICATOR MODULES FOR PANEL INDICATION

BINAY is the pioneer in the manufacture of specialised types of filament and gas-discharge lamps in the country.

The Binay Integral LED Module has been perfected in keeping with the Binay philosophy of developing an LED replacement for every incandescent light source. This is **an original development — a world-wide first, invented by Binay and utilising self-developed patented technology** — and offers the following advantages:

- A long life of 1,00,000 hours (11 years calculated on a continuous burning basis, thus requiring **no further replacement once fitted**; as such, they are a ONE-TIME EXPENSE — we guarantee for **six years**)
- Low current consumption, and thus excellent energy conservation characteristics (e.g., half watt only at 220V AC), giving significant reduction in energy costs
- Solid-state reliability — shock-proof, vibration-resistant construction
- Ability to withstand an input voltage fluctuation of  $\pm 25\%$  without change in life or light output
- A short payback period

Binay Integral LED Module Indicators are integral, self-contained LED indicator units, and can be directly mounted on the panel. The rated input voltage can be directly applied to the Module input, as all controlling circuitry is built into the Module body itself. As a separate holder is not required, in many cases these Modules are more economical than standard makes of filament lamp/holder assembly combinations (as are available in the market).

**The design of the LED Indicator is dependent on the limitations of the LED. High intensity Industrial-grade LEDs are necessarily required, not only for effective luminosity, but — more importantly — for user reliability. Also, the electronic characteristics of the device necessitate the use of special protective circuits to safeguard the LED in the industrial environment. For example, the LED is a 2-volt device; for operation at high voltages such as 220V and 440V (especially in DC), the use of a series resistor to drop excess voltage would normally NOT be an efficient solution, but rather a non-technical arrangement which would waste power in the form of heat. Moreover, the excess heat would have a negative affect on the electronic characteristics of the LED which — being a semiconductor device — is heat-sensitive. Such a design may severely compromise the reliability of the indicator.**

Combining several years of experience with its patented technology in LED circuit design, Binay has devised innovative control circuits for its LED Modules which offer dependable operation and low power consumption. **Binay's primary objective is to satisfy the end-user's requirement of a bright, reliable, long-life indicator with MINIMAL power consumption.** Binay LED Modules come with a **SIX-YEAR free-replacement guarantee** against manufacturing defects.

Binay Integral LED Module Indicators are available in the following basic models:

**For panel cutout diameters of 22.5mm, 25.5mm, 27.5mm, 30.5mm, and 19.5mm**

**JUMBO Integral LED Module** (figures 8, 9, 10, 11, 12, 13, 14, 15 and 16)

- Available integrally in all voltage ratings up to 440VAC or 220VDC (as per requirement)
- Input cable termination by screw terminals

These Jumbo LED Modules are ideal for indications on electrical control panels and control desks. They are available in several ranges: the **Industrial Series**, the **Enhanced Series**, the **Primary Series**, and the **ECO Series**. Each Series offers successive levels of features, and as such the user can make a selection depending on the requirement.

### **INDUSTRIAL SERIES Jumbo LED Modules**

The Industrial type has been developed for more discerning industrial users. This series features heat-resistant, flame-retardant thermosetting epoxy/DMC material construction, with a chrome-plated brass bezel for mounting the polycarbonate lens. Light emission is through use of standard, industrial-grade LEDs. In addition, the speciality of the Industrial series is that each Module incorporates a **Low Voltage Glow Protection (LVGP) circuit and a series fuse**. The LVGP circuit prevents glowing of the LED at leakage voltages (which are very common in industrial environments, and are generated due to inductive coupling between ad-



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acent long runs of control cables). The internal fuse provides protection against an accidental short-circuit in the Module. Each Module undergoes a burn-in (ageing) process for 24 hours at an accelerated voltage of 280V.

#### **ENHANCED SERIES Jumbo LED Modules**

These Modules also feature heat-resistant, flame-retardant bodies made of thermosetting epoxy DMC material, with a chrome-plated brass bezel on which the polycarbonate lens is mounted. Standard, industrial-grade LEDs are used to provide a reliable indication. Each Module undergoes a burn-in (ageing) process for 12 hours at an accelerated voltage of 280V.

**SIMULATIVE ADAPTERS:** Industrial and Enhanced Series Jumbo Modules are available in **SIMULATIVE** (look-alike) **BEZEL/ADAPTER Sets** for different panel cutouts. The Bezels and top lenses of these Adapters simulate the frontal appearance of the lens assembly of popular makes of pilot lamps. The following types are presently available:

- For 22.5mm dia. panel cutout — "Siemens 3SB" Simulative Bezel/Adapter set (**see figure 9**)
- Square flat lens Bezel/Adapter set (suitable for legend imprinting) (**see figure 10**)
- For 25.5mm dia. panel cutout — "3SC" (similar to Siemens) Simulative Bezel/Adapter set (**see figure 12**)
- "English Electric ODL" Simulative Bezel/Adapter set (**see figure 11**)
- For 27.5mm dia. panel cutout — "3SD" (similar to ABB pilot light units) Simulative Bezel/Adapter set (**see fig. 13**)
- For 30.5mm dia. panel cutout — "Siemens 3SL" Simulative Bezel/Adapter set (**see figure 14**)
- "L&T" Simulative Bezel/Adapter set (**see figure 15**)
- "BCH" Simulative Bezel/Adapter Set (**see figure 16**)

#### **PRIMARY SERIES Jumbo LED Modules**

This series of Modules provides a basic, reliable indication. The body is made of industrial quality flame-retardant thermoplastic compound. The polycarbonate lens is mounted directly on the body. Standard, industrial-grade LEDs and components are utilised for reliable light service. Modules are available for 22.5mm $\phi$ , 25.5mm $\phi$ , and 30.5mm $\phi$  panel cutouts. Each Module undergoes a ageing procedure for 12 hours at an accelerated voltage of 250V.

#### **ECO SERIES Jumbo LED Modules**

This series is a cost-effective range, and is suitable for a basic yet reliable indication in standard applications.

**For 16.2mm $\phi$  panel cutout**      **16-L Integral LED Module (short type, up to 60V AC/DC)** (figure 7)  
**16-L Integral LED Module (long type, up to 220V AC/DC)** (similar to figure 7)

- Plated metal body of diameter 16mm (suitable for panel cutout of 16.5mm dia.)
- Available integrally in all voltage ratings up to 220V in AC or DC (as per requirement)
- Input cable termination by screw terminals

This type has a contemporary, attractive flat top face. The top lens is available in three variations — round, square, and rectangular. Legends can be imprinted on the top of the lens to provide a more legible indication.

**For 14.5mm $\phi$  panel cutout**      **UniMIDI Integral LED Module** (figure 6)

- Plated brass body of diameter 14mm (suitable for panel cutout of 14.5mm dia.)
- Available integrally in all voltage ratings up to 60V DC or 220V AC (as per requirement)
- Input cable termination by screw terminals, solderable lugs, 150 mm (6") flying leads, or pin/socket terminals

This utilises a single 10mm LED to provide a highly diffused illumination, and is aesthetically extremely pleasing. Ideal for use in control desks, 3-phase and status indications in small panels, power 'ON' indication in equipment panels, etc.

**For 14.5mm $\phi$  panel cutout**      **MultiMIDI Integral LED Module** (similar to figure 6)

Similar to the UniMidi type (as above), but utilises a cluster of multiple LEDs (with a top lens) for greater light intensity.

**For 12.5mm $\phi$  panel cutout**      **SubMIDI series (SubUniMIDI and SubMultiMIDI) Integral LED Module** (figure 5)

- Plated brass body of diameter 12mm (suitable for panel cutout of 12.5mm dia.)
- Available integrally in all voltage ratings up to 220V in AC or DC (as per requirement)
- Input cable termination by screw terminals, solderable lugs, 150 mm (6") flying leads, or pin/socket terminals

SubMultiMidi – similar to MultiMidi type, but suitable for a smaller panel cutout. This is also available in a single 10mm LED form (SubUniMidi – similar to the UniMIDI Modules described above).



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**For 9.5mmØ panel cutout      STANDARD Integral LED Module** (figure 3)

- Plated brass body of diameter 9mm (suitable for panel cutout of 9.5mm dia.)
- Available integrally in all voltage ratings up to 220V in AC or DC (as per requirement)
- Input termination by solderable lugs or 150 mm (6") flying leads

This is suitable for smaller indications such as in portable equipment, spot indications in "projected type" mimic diagrams, vehicle dashboard indications, etc. A clear ribbed lens is provided at the top, for wide-angle light diffusion .

**For 9.5mmØ panel cutout      STANDARD ARROWHEAD Integral LED Module** (figure 4)

Similar to the above type, but with the top formed into an arrowhead shape. It is ideal for applications such as Up/Down indicators in elevators, turn indicators in vehicles, process flow indication in mimic panels, direction indicators, etc.

**For 8mmØ panel cutout      MINI Integral LED Module** (figure 2)

- Plated brass body of diameter 7.5mm (suitable for panel cutout of 8mm dia.)
- Available integrally in all voltage ratings up to 60V AC or DC (as per requirement)
- Input termination by solderable lugs or 150 mm (6") flying leads

This type has the top formed into a conical reflector, and a 5mm LED is situated at the focus. There is no top lens.

**For 6mmØ panel cutout      LILIPUT Integral LED Module** (figure 1)

- Plated brass body of diameter 5.5mm (suitable for panel cutout of 6mm dia.)
- Available integrally in all voltage ratings up to 60V AC or DC (as per requirement)
- Input termination by 150mm (6") flying leads only

This is the smallest Integral Module available, and is especially suitable where space is a constraint.

### BICOLOUR INTEGRAL LED MODULES

Many of the above Modules are available in Bicolour versions. These utilise special dual-colour (red/green) LED arrangements. One Module can thus be used to indicate two states of operation.

### FLASHER type UniMIDI, MultiMIDI, 16-L and JUMBO INTEGRAL LED MODULES

UniMidi, MultiMidi, 16-L and Jumbo Modules are also available in FLASHER versions. These have an in-built circuit which causes the Module to flash at a rate of 2-4 Hertz when the rated input voltage is applied. This is extremely effective for drawing attention, and these Modules are suitable for positions which require to be attended to immediately.

### TRI-STATE JUMBO LED MODULES

Jumbo LED Modules (in certain ratings) are also available in tri-state versions. These have an extra input, which has a flasher function. A single Module can thus give ON, OFF, and FLASHING indications, serving dual purposes.

### HIGH VOLTAGE CONTROL CIRCUIT UNIT FOR USE WITH LED MODULES

Standard, Mini, and Liliput LED Modules, which cannot be made integrally in higher voltages or in flasher versions, can also be used at these ratings (above 60V — 110V, 220V, or 440V) or with the flasher function with the inclusion of our High Voltage Control Circuit (HVCC) Units. These are of basic dimensions 90mmX25mmX25mm (LxBxW). The Unit is fitted externally to the Module, and is provided with terminals for input (from high-voltage source) and output (to Module).

- RESISTIVE HVCC Unit: This is for use on AC/DC input conditions (**above 60V up to 110VDC only**)
- IMPEDANCE HVCC Unit: For use on high voltage AC input (**above 60VAC to 440VAC**)
- PULSED CIRCUIT: This is a special circuit for use on high voltage DC input (**above 120VDC to 220VDC**).
- FLASHER HVCC Unit: This circuit causes the Module to **flash** at a steady rate of 2-4 Hertz (**above 45VAC or 45VDC only**)

**OUR INTEGRAL LED MODULE INDICATORS ARE COVERED UNDER OUR VARIOUS PATENTS, AND AS SUCH ARE PROPRIETARY IN NATURE**



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### How To Order — Required Ordering Data

The following basic details should be provided to enable us to supply (or quote) the correct type for your requirement:

1. **Panel cutout diameter** in which the Module is desired to be fitted
2. Input **voltage rating**
3. **Current type** (AC or DC)
4. **Colour**
5. **Termination** method desired (screw terminals, solderable lugs, flying leads — as applicable, see Module descriptions above)
6. **Range** (Jumbo Modules only)
7. **Simulative Bezel/Adapter** (Industrial and Enhanced Series Jumbo Modules only)
8. **Options** (Round or Square top lens — only possible in some models)

Combinations of the various options are dependent on availability as described earlier in this document. For example, Jumbo Modules are not available in solderable lugs input; similarly, Liliput Modules are not available in screw terminals input or in 220V ratings.

### Basic Coding Key

<b>JB R -1 3SB /E 220V AC RED</b>							
MODULE TYPE	TOP BEZEL SHAPE	TERMINATION	ADAPTER (APPLICABLE TO JUMBO MODULES ONLY)	RANGE (APPLICABLE TO JUMBO MODULES ONLY)	VOLTAGE RATING	CURRENT TYPE	COLOUR
JB: Jumbo	R: Round	-1: Screw Terminals	(None: Not applicable)	(None: Not applicable)	220V (to 260V)	AC	Red
16L: 16 mm Module	S: Square	-2: Solderable Lugs	BSC: (19.5)	I: Industrial	110V (to 130V)	DC	Green
UM: UniMidi (Single 10mm LED)	T: Rectangular	-3: 6" Flying Leads	3SB/22.5	E: Enhanced	24V	AC/DC	Yellow
MM: MultiMidi (LED cluster)			3SC/25.5	P: Primary	48V		Amber
SUM: SubUniMidi (Single 10mm LED)			ODL/25.5	M: ECO	24V		Blue
SMM: SubMultiMidi (LED cluster)			3SD/27.5		12V		Orange
ST: Standard			3SL/30.5		6V		Violet
MN: Mini			BCH/30.5		(Or any other voltage)		Milky White
LP: Liliput			L&T/30.5				Lunar (pure) White

**NOTE: Not all combinations are valid.** This is merely an explanatory tool. See Module descriptions for possible options in each type

Examples:

- 16LS-1 110V AC Green: 16mm LED Module, square top bezel, screw terminal termination, in 110 volt AC rating, colour Green
- MMR-2 24V AC/DC Amber: MultiMidi LED Module, round top bezel, solderable lugs termination, in 24 volt AC/DC rating, colour Amber
- LPR-3 6V DC Red: Liliput LED Module, round top bezel, 6" flying leads termination, in 6V DC rating, colour Red



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INVENTING NEW TECHNIQUES OF PRODUCING LIGHT

OUR INTEGRAL LED MODULE INDICATORS ARE COVERED UNDER OUR VARIOUS PATENTS, AND AS SUCH ARE PROPRIETARY IN NATURE

**COMPARISON OF ELECTRICAL, OPTICAL, AND PHYSICAL FEATURES**

**binay**

PRIMARY SERIES, ENHANCED SERIES, AND INDUSTRIAL SERIES LED MODULES

**Binay's** different Module ranges offer varying levels of features, and are designed for differing applications and user requirements

		Binay MODULE SERIES		
		Primary Series	Enhanced Series	Industrial Series
<b>ELECTRICAL AND OPTICAL PARAMETERS</b>	<b>LEDs</b> (Composition of LED chip; dimensions approximately 0.4 sq. mm.)	P-N junction composition of GaAsP, GaP, or GaN on SiC	P-N junction composition of GaP, AlGaAs, AlInGaP or GaN on SiC	P-N junction composition of GaAsP, AlGaAs, AlInGaP, or GaN on SiC
	<b>Light Output</b>	50mcd nominal; 100mcd maximum	80mcd minimum 200mcd maximum	100mcd minimum 200mcd maximum
	<b>Peak Inverse Voltage of LED</b>	5 volts per LED	5 volts per LED	5 volts per LED
	<b>Current</b>	25mA – 30mA	18mA – 22mA	15mA – 18mA
	<b>Fuse Protection</b>	Not provided	Not provided	In-built circuit
	<b>Low Voltage Glow Protection (LVGP)</b>	Not provided	Not provided	In-built blocking LVGP circuit (25 volt)
	<b>Continuous over voltage capability</b> (Designed to withstand and function at higher voltage than rated)	Up to 260V continuous, or 10% of the rated voltage	Up to 280V continuous, or 20% of the rated voltage	Up to 300V continuous, or 25% of the rated voltage
	<b>Ageing</b>	Aged at 260V for 12 hours	Aged at 280V for 24 hours	Aged at 300V for 24 hours
	<b>Dielectric Strength</b>	N/A	2.5 KV	4KV
	<b>Operating temperature range</b>	45°C – 50°C	70°C – 80°C	70°C – 80°C
<b>Power consumption</b>	<ul style="list-style-type: none"> <li>AC: 0.5W</li> <li>DC: 2.5W max. (Resistive Circuit)</li> </ul>	<ul style="list-style-type: none"> <li>AC: 0.5W max.</li> <li>DC: 1.75W max. (Pulse Current Circuit)</li> </ul>	<ul style="list-style-type: none"> <li>AC: 0.5W max.</li> <li>DC: 1.75W max. (Pulse Current Circuit)</li> </ul>	
<b>PHYSICAL PARAMETERS</b>	<b>Body</b>	Fire-retardant thermoplastic material; can melt/deform if exposed to localised spot temperature over 100°C	Fire-retardant glass-filled thermosetting DMC material; will not melt/deform even at 300°C spot temperature. Unlike thermoplastic, will not degrade even after 15 years of operation.	Fire-retardant glass-filled thermosetting DMC material; will not melt/deform even at 300°C spot temperature. Unlike thermoplastic, will not degrade even after 15 years of operation.
	<b>Bezel/Adapter</b>	Moulded fire-retardant thermoplastic	Solid brass, chrome-plated	Solid brass, chrome-plated
	<b>Lens</b>	Fire-retardant (UL94V2) unbreakable polycarbonate	Fire-retardant (UL94V2) unbreakable polycarbonate	Fire-retardant (UL94V2) unbreakable polycarbonate
	<b>Internal Protection</b>	IP 54 (front protection)	IP 54 (front protection) IP 67 possible	IP 54 (front protection) IP 67 possible
	<b>Guarantee</b>	Three years	Six years	Six years



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