



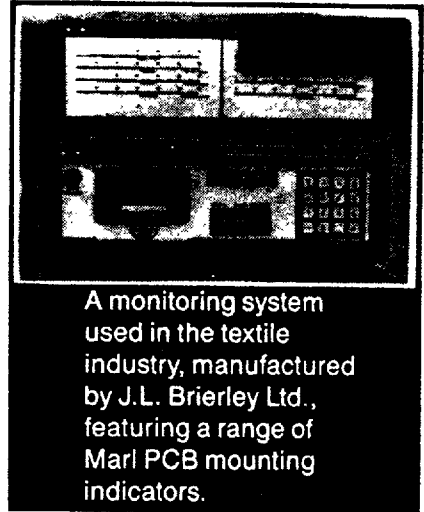
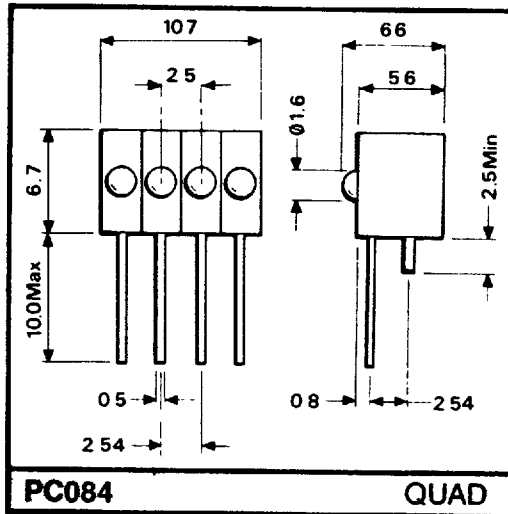
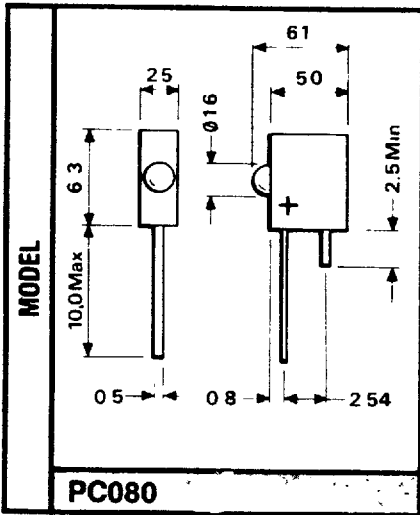
080 SERIES SINGLE AND QUAD LOGIC STATUS INDICATORS

T-41-23

- SAVE BOARD SPACE AND ASSEMBLY TIME
- OPTIONAL INTEGRAL RESISTOR
- IMPROVES MECHANICAL AND ELECTRICAL RELIABILITY

2.5mm sized sub miniature, right angle mounting, single and quad LED logic status indicators. 0.1" Pitch allows mounting of ten devices per linear inch.

An integral resistor can be fitted in both models for a range from 5 to 24Vdc and includes low current versions as standard.



- DRAWING NOTES: a) ALL DIMENSIONS ARE IN MILLIMETRES  
b) ALL DRAWINGS ARE SHOWN TWICE SIZE

CHARACTERISTICS	COLOUR	PEAK WAVELENGTH λp (nm)	TYPICAL LUMINOUS INTENSITY Iv (mcd @ 10mA)	OPERATING TEMPERATURE RANGE °C	STORAGE TEMPERATURE RANGE °C	ORDER CODE	VOLTAGE	FORWARD VOLTAGE (VDC)	MAX POWER DISSIPATION (mW)	TYPICAL CURRENT (mA)	ORDER CODE
								RED	635	5	-30 to +50
AMBER	583	5	-30 to +50	-30 to +100	A	2.2	40	10	2		
GREEN	565	5	-20 to +50	-30 to +100	G	5	100	4	15		
						5	100	10	5E		
						12	240	18	12		
						24	240	9	24		

NOTE: A LONG TAG VERSION OF THIS PRODUCT IS AVAILABLE, CONSULT FACTORY FOR DETAILS

ORDERING INFORMATION IS ON PAGE 4

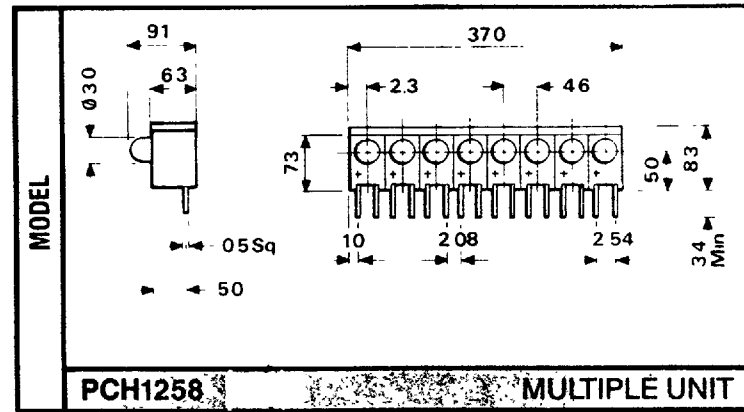
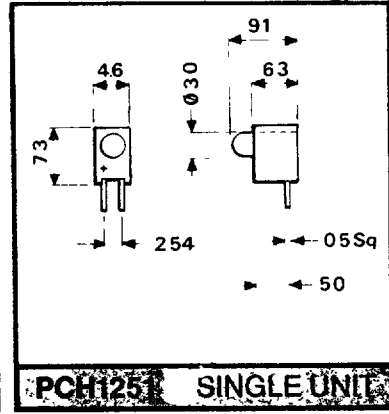
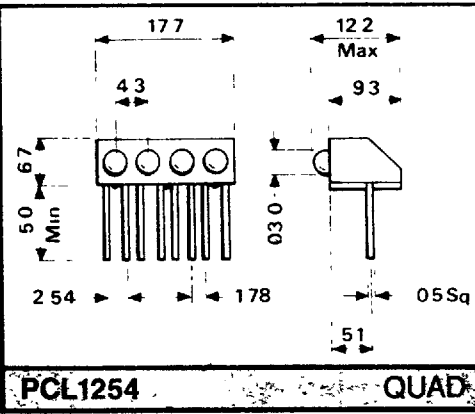
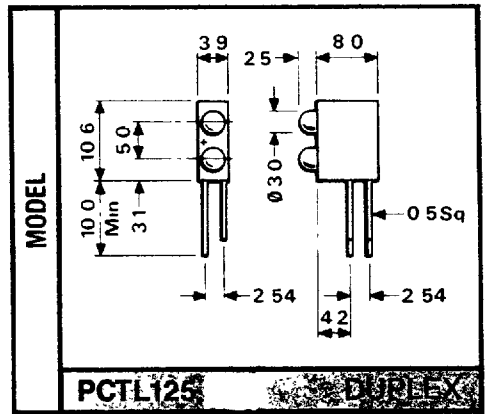
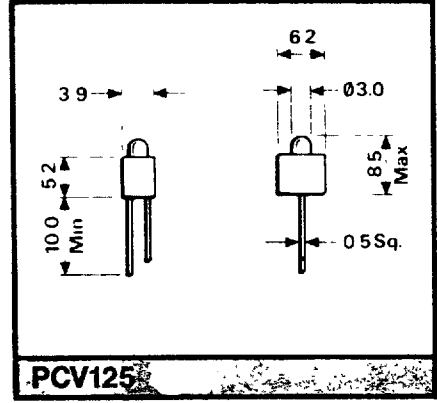
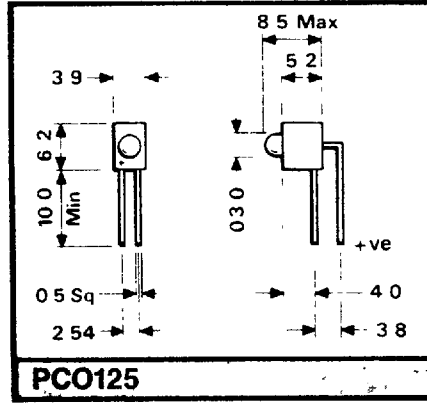
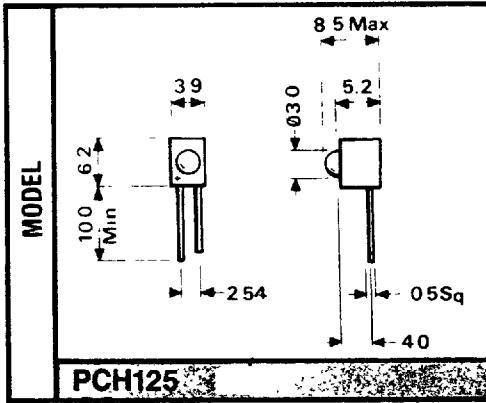
<b>CONTENTS &amp; TECHNICAL DATA</b>	<b>CONTENTS</b>	<b>GENERAL CHARACTERISTICS—ALL MODELS</b>
	Pg 1 080 SERIES indicators	<b>MATERIALS</b> LED LENS : EPOXY HOUSING : NYLON 66 TERMINAL PINS : MILD STEEL SILVER PLATED/TIN DIPPED
	Pg 2 125 SERIES indicators	<b>CHARACTERISTICS</b> RELIABILITY : CALCULATIONS PREDICT AN MTBF (MEANTIME BETWEEN FAILURE) FIGURE OF OVER 1,000,000 HOURS (500,000 HOURS FOR BI- AND TRI-COLOUR DEVICES). MAX LEAD SOLDERING TEMP. 260°C FOR 5 secs.
	Pg 3 160 SERIES indicators	<b>GENERAL DESCRIPTION</b> ALL PRODUCTS FEATURE WELL DEFINED COLOURS, AND TINTED DIFFUSED LENS ENCAPSULATION TO MAXIMISE VIEWING ANGLE AESTHETIC APPEARANCE AND ON/OFF CONTRAST RATIO IS FURTHER ENHANCED BY THE RUGGED BLACK HOUSING WHICH INCLUDES INDELIBLE POLARITY IDENTIFICATION.
Pg 4 190 SERIES indicators		
Pg 5 200 SERIES indicators		
Pg 6 200 SERIES BI/TRI COLOUR indicators		



125 SERIES, SINGLE, DUPLEX, QUAD AND VARIABLE ARRAY PCB MOUNTING INDICATORS

- COMPACT SIZE
  - WIDE VARIETY OF MOUNTING STYLES
  - ALLOWS TOTAL FLEXIBILITY OF DESIGN
- Right angle mounting indicators featuring 3.0mm (T1) LED's. Quad and variable array units feature stand

offs for compatibility with vapour phase processes. Variable array configurations are available in prescribed combinations of one to eight elements. A snap tie bar holds the single units firmly together and optional integral resistors offer further savings on board space and production time.



**VARIABLE ARRAYS**

THESE ARE BUILT UP FROM SINGLE UNITS ASSEMBLED ON TO A TIE BAR, WHICH LOCKS ON TO THE HOUSING BY A TONGUE AND GROOVE ARRANGEMENT. ARRAYS OF ANY LENGTH UP TO A MAXIMUM OF EIGHT ARE AVAILABLE AND THESE ARE SUPPLIED ALREADY ASSEMBLED ON TO THE TIE BAR.

**DRAWING NOTES:**  
 a) ALL DIMENSIONS ARE IN MILLIMETRES  
 b) ALL DRAWINGS SHOWN ARE ACTUAL SIZE

CHARACTERISTICS	LED COLOUR	PEAK WAVELENGTH λ <sub>D</sub> (nm)	TYPICAL LUMINOUS INTENSITY I <sub>v</sub> (mcd @ 10mA)	OPERATING TEMPERATURE RANGE °C	STORAGE TEMPERATURE RANGE °C	COLOUR ORDER CODE	VOLTAGE	FORWARD VOLTAGE (V <sub>dc</sub> )	MAX POWER DISSIPATION (mW)	TYPICAL CURRENT (mA)	VOLTAGE ORDER CODE
	BRIGHT RED	635	5	-30 to +100	-30 to +100	BR		2	30	10	†
BRIGHT AMBER	585	5	-30 to +100	-30 to +100	BA	2	25	2	2L		
BRIGHT GREEN	565	5	-30 to +100	-30 to +100	BG	3-6.3	125	10	5V		
RED	635	5	-30 to +100	-30 to +100	MR						
AMBER	583	5	-30 to +100	-30 to +100	MA						
GREEN	565	5	-30 to +100	-30 to +100	MG						

\*MX versions only available as 2V devices.

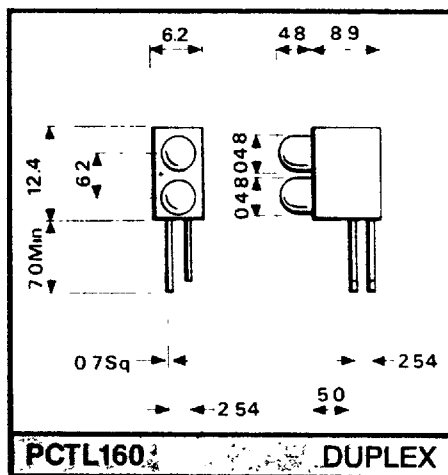
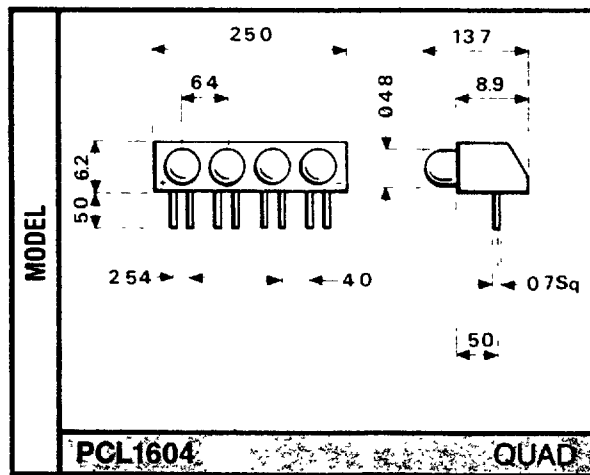
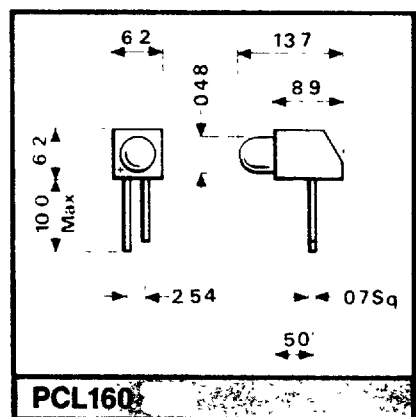
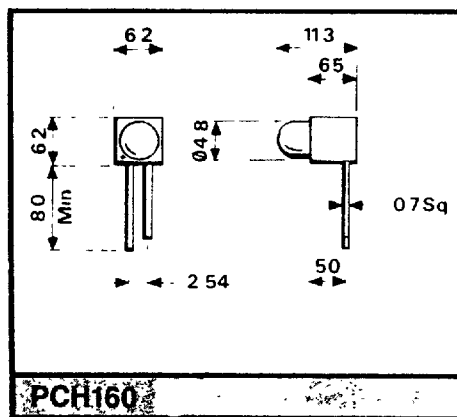
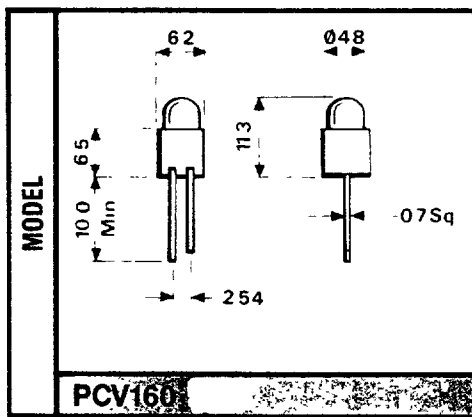
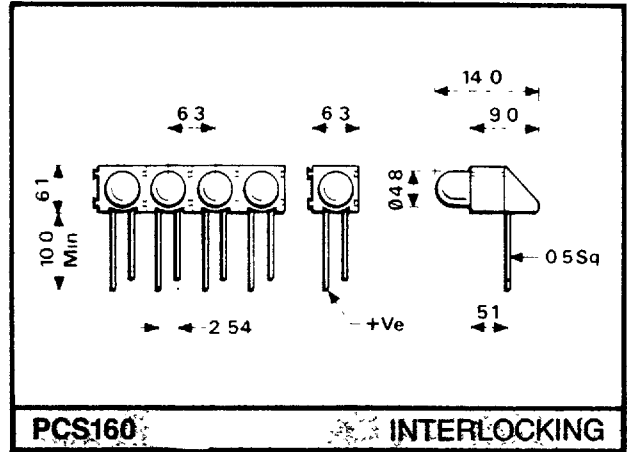
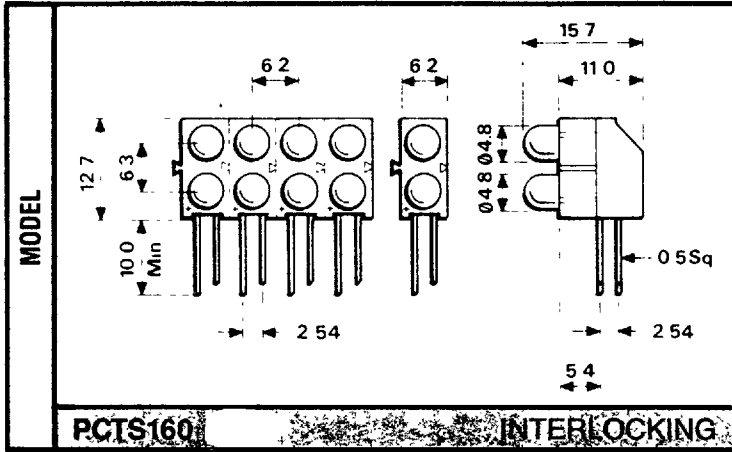
† No voltage order code is required for 2 volt devices.



160 SERIES SINGLE, DUPLEX, QUAD AND INTERLOCKING PCB MOUNTING INDICATORS

- REDUCES ASSEMBLY TIME
- SAVES BOARD SPACE
- FULLY ADAPTABLE DESIGN

Right angle and vertical styling, single, duplex, quad and interlocking PCB Mounting indicators featuring 5.0mm (T1¾) LED's. Interlocking versions are available as single and duplex forms. These indicators are easily assembled to form arrays of any length to suit volume applications, where speed of assembly and long term reliability are essential.



DRAWING NOTES.  
a) ALL DIMENSIONS ARE IN MILLIMETRES  
b) ALL DRAWINGS SHOWN ARE ACTUAL SIZE

CHARACTERISTICS	COLOUR	PEAK WAVELENGTH (nm)	TYPICAL LUMINOUS INTENSITY (mcd @ 10mA)	OPERATING TEMPERATURE RANGE (°C)	STORAGE TEMPERATURE RANGE (°C)	ORDER CODE	VOLTAGE	FORWARD VOLTAGE (V <sub>DC</sub> )	MAX POWER DISSIPATION (mW)	TYPICAL CURRENT (mA)	ORDER CODE
								2	40	10	†
	RED	660	2.2	-50 to +100	-50 to +100	R					
	AMBER	595	20	-50 to +100	-50 to +100	A					
	GREEN	565	15	-50 to +100	-50 to +100	G					

† No voltage order code is required for 2 volt devices.

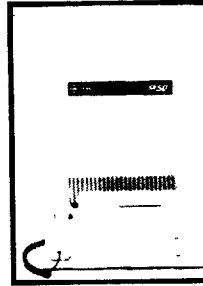


190 SERIES LOW PROFILE  
PCB MOUNTING INDICATOR UNITS

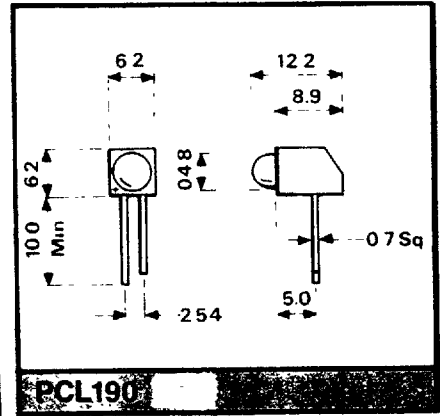
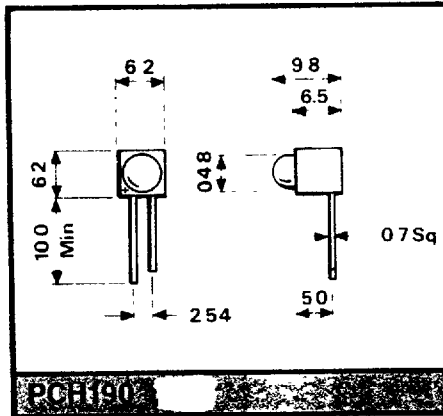
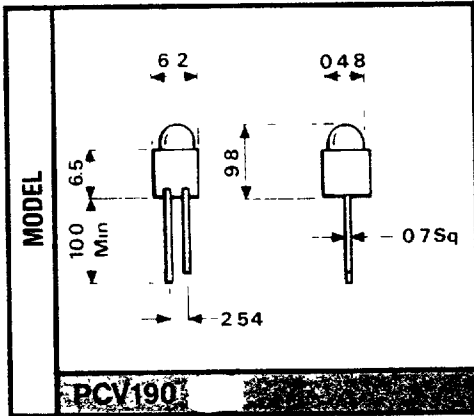
- LOW PROFILE STYLING
- OUTSTANDING RELIABILITY
- HIGH PERFORMANCE

Right angle and vertical styling PCB Mounting LED Indicators featuring 5.0mm (T1¼) LED's.

This cost conscious range is ideal for high volume applications such as communications equipment and all types of computer control system.



A digital PABX system manufactured by Mitel Telecommunications. Marl LED's are used in these units and Mitel recently awarded Marl their quality suppliers certificate.



DRAWING NOTES: a) ALL DIMENSIONS ARE IN MILLIMETRES b) ALL DRAWINGS SHOWN ARE ACTUAL SIZE

CHARACTERISTICS	COLOUR	PEAK WAVELENGTH (nm)	TYPICAL LUMINOUS INTENSITY (mcd @ 10mA)	OPERATING TEMPERATURE RANGE (°C)	STORAGE TEMPERATURE RANGE (°C)	ORDER CODE	VOLTAGE	FORWARD VOLTAGE (V <sub>F</sub> )	MAX POWER DISSIPATION (mW)	TYPICAL CURRENT (mA)	ORDER CODE
								2	40	10	†
	RED	635	5	-30 to +100	-30 to +100	MR					
	AMBER	583	4	-30 to +100	-30 to +100	MA					
	GREEN	565	5	-30 to +100	-30 to +100	MG					

† No voltage order code is required for 2 volt model.



ORDERING INFORMATION  
ALL PCB PRODUCTS

ORDERING INFORMATION	MODEL	PCL200 BR 2L
	COLOUR	
	VOLTAGE	

NOTES  
 DUPLEX UNITS - SPECIFY LED TYPE WHERE APPLICABLE (MX AND BX TYPES) FOLLOWED BY UPPER LEVEL COLOUR/LOWER LEVEL COLOUR  
 e.g. PCTL 125 M A/G 2L  
 QUAD UNITS - SINGLE COLOUR DEVICES—SPECIFY AS SINGLE UNITS  
 e.g. ALL RED DEVICE PCL 1604R  
 MIXED COLOUR DEVICES—SPECIFY LED TYPE WHERE APPLICABLE (MX AND BX TYPES) FOLLOWED BY COLOURS, IN ORDER e.g. PCL 1254 B R/R/A/G/2L  
 VARIABLE ARRAY DECIDE ON CONFIGURATION AND SPECIFY COLOUR AND LED TYPE AS FOR QUAD UNITS  
 e.g. 3 UNIT SINGLE COLOUR DEVICE  
 PCH 1253 MR  
 5 UNIT MIXED COLOUR DEVICE  
 PCH 1255 B R/R/G/G/R 5Y

- OPTIONS
- 1) WHERE NOT SHOWN OTHER BODY STYLES e.g. QUAD, DUPLEX ETC MAY BE AVAILABLE
  - 2) MODELS FITTED WITH HIGH INTENSITY ELEMENTS (UP TO 250 mcd) WITH TINTED CLEAR OR TRANSPARENT LENS ENCAPSULATION CAN BE MANUFACTURED
  - 3) ADDITIONAL COLOURS, SUCH AS YELLOW, ORANGE AND EMERALD GREEN CAN BE SUPPLIED. CONTACT OUR FACTORY FOR DETAILS.
  - 4) MOST PRODUCTS ARE AVAILABLE WITH CROPPED TAGS TO SUIT YOUR REQUIREMENTS
- OUR SALES STAFF ARE ALWAYS AVAILABLE TO PROVIDE DESIGN AND APPLICATIONS ADVICE.

THE COMPANY'S APPROVAL HAS BEEN UPGRADED TO CONFORM WITH INTERNATIONALLY RECOGNISED QUALITY SYSTEM BS5750 PART 1 1987 ISO9001 AND EN29001. QUALIFICATION APPROVAL AGAINST DEF STAN 59-61 (PART 90) IS IN PROGRESS.

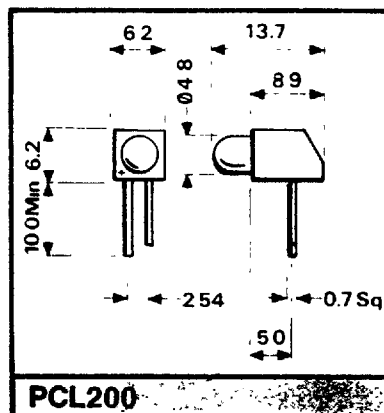
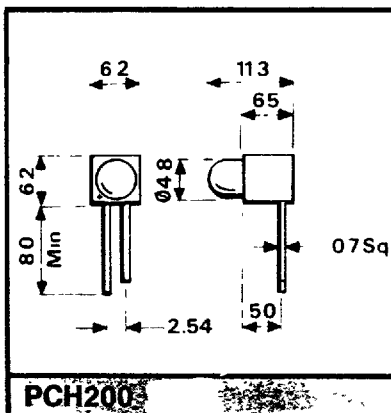
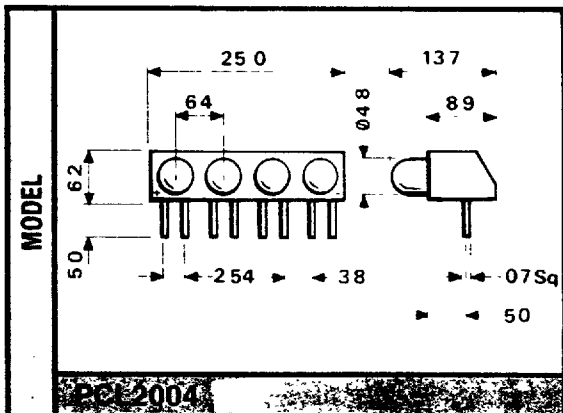


200 SERIES PCB INDICATORS  
WITH OPTIONAL INTEGRAL RESISTOR

- EXCELLENT VIEWING CHARACTERISTICS
- LOW CURRENT VERSIONS AVAILABLE
- COMPATIBLE WITH VAPOUR PHASE SOLDER PROCESSES

Right angle mounting single and quad indicators featuring 5.0mm (T1¾) LED's. Available in three well defined colours utilising the highest quality superbright elements which have tinted diffused lens encapsulation to maximise viewing range and consistency of light output.

An integral series resistor can be fitted in all models for supplies of 5 and 12 Vdc. This range has been designed and developed for professional applications and will satisfy extreme demands of operational performance and reliability both electrically and mechanically.



- DRAWING NOTES:
- ALL DIMENSIONS ARE IN MILLIMETRES
  - ALL DRAWINGS SHOWN ARE ACTUAL SIZE

CHARACTERISTICS	LED COLOUR	PEAK WAVELENGTH (nm)	TYPICAL LUMINOUS INTENSITY (mcd @ 10mA)			OPERATING TEMPERATURE RANGE (°C)	STORAGE TEMPERATURE RANGE (°C)	COLOUR ORDER CODE	VOLTAGE	FORWARD VOLTAGE (Vdc)	MAX POWER DISSIPATION (mW)	TYPICAL CURRENT (mA)	VOLTAGE ORDER CODE
			2 Vdc	5 Vdc	12 Vdc								
	RED	635	10	5	5	-30 to +85	-30 to +100	BR	2	40	10	†	
	AMBER	585	12	5	4	-30 to +85	-30 to +100	BA	2	25	2	2L	
	GREEN	565	10	5	5	-20 to +85	-30 to +100	BG	5	125	10	5V	
									12	225	13	12V	

† No voltage order code is required for 2 volt model

ORDERING INFORMATION IS ON PAGE 4

NEW PRODUCTS—CONTACT FACTORY FOR DETAILS

— BAR GRAPHS

These can be supplied with any colour of LED or colour combination, and in a range of sizes. Ideal for use as level meters, the high response rate of MARL LED's make these devices an attractive replacement for moving coil meters.

— A range of indicators featuring AlGaAs LED's—these devices give exceptional light output at low drive current levels.

— To complement our range of T1¾ sized interlocking indicators a T1 size range is being introduced. Available in duplex and right angle versions this design gives complete flexibility for applications using arrays of indicators.



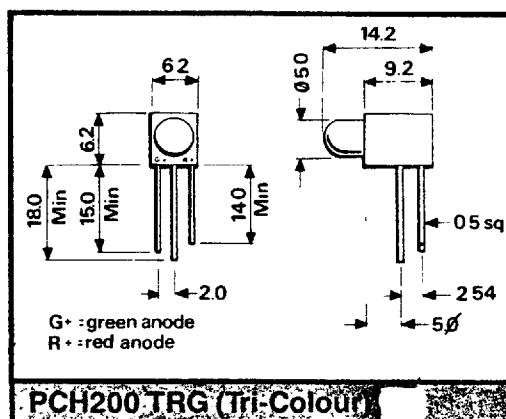
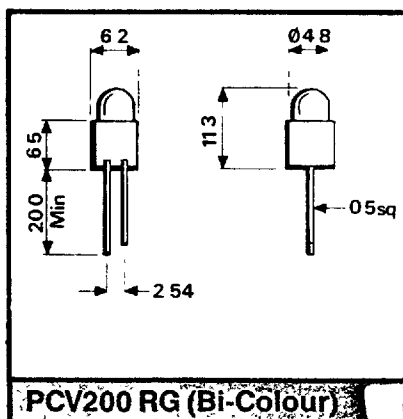
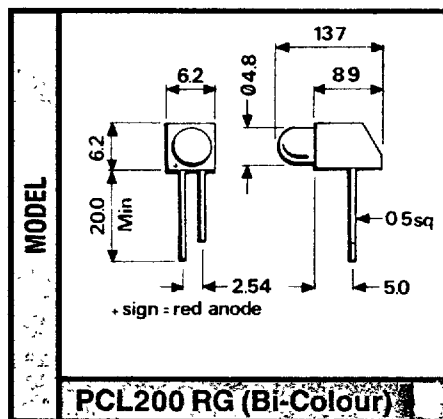
200 SERIES BI-COLOUR AND TRI-COLOUR PCB MOUNTING INDICATOR UNITS

T-41-25

- FLEXIBILITY OF CONFIGURATIONS
- WELL DEFINED COLOURS
- HIGH PERFORMANCE AND OUTSTANDING RELIABILITY

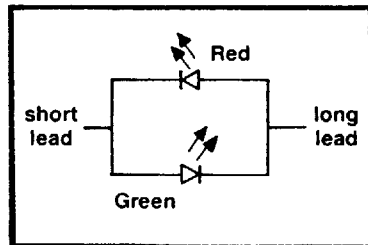
Right angle and vertical styling PCB mounting indicators featuring 5.0mm (T1¾) sized LED's. Fitted with either a red/green two lead element, or a common cathode three lead element which produces well defined amber emission when both circuits are energised.

Both options have non-coloured translucent ("milky") lens encapsulation to maximise light output and viewing angle. Aesthetic appearance and on/off contrast ratio is further enhanced by the rugged black housing which includes indelible polarity identification.

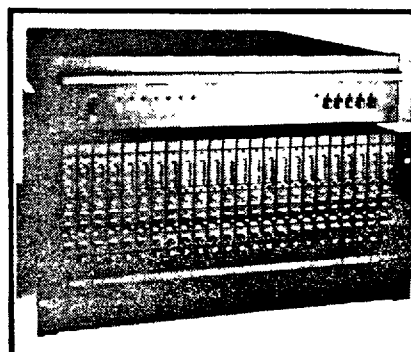
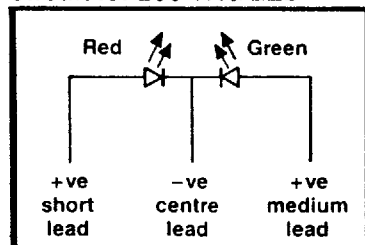


DRAWING NOTES: a) ALL DIMENSIONS ARE IN MILLIMETRES  
b) ALL DRAWINGS SHOWN ARE ACTUAL SIZE

Reverse Polarity Circuit for 200 RG LED



Centre Cathode Circuit for 200 TRG LED



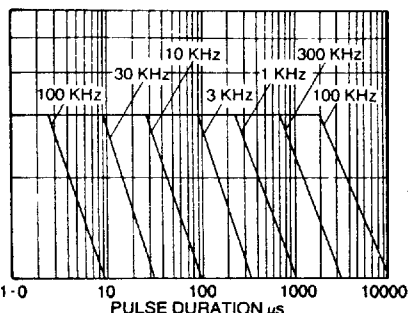
A multi-track noise reduction unit produced by Dolby Laboratories. These units which are used in the music and broadcasting industry feature a range of Mar PCB LED's

CHARACTERISTICS	LED COLOUR	PEAK WAVELENGTH λp (nm)	TYPICAL LUMINOUS INTENSITY Iv (mcd@10mA)	OPERATING TEMPERATURE RANGE °C	STORAGE TEMPERATURE RANGE °C	COLOUR ORDER CODE	VOLTAGE	FORWARD VOLTAGE (Vdc)	MAX POWER DISSIPATION (mW) PER DIODE	TYPICAL CURRENT (mA)	VOLTAGE ORDER CODE
	RED/GREEN	697/565	2/2	-30 to +100	-30 to +100	RG		2	40	16	†
RED/AMBER/GREEN	630/585/565	2/3/2	-30 to +100	-30 to +100	TRG						

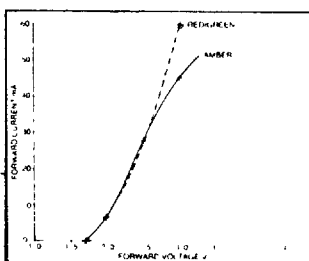
† No voltage order code is required for 2 volt model.

ORDERING INFORMATION IS ON PAGE 4

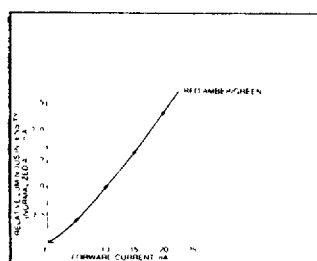
SOME TYPICAL CHARACTERISTICS FOR 160 SERIES INDICATORS



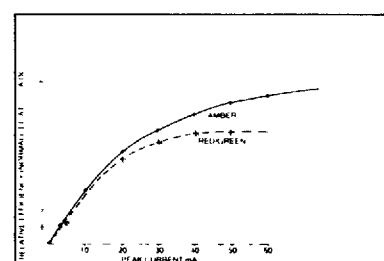
Maximum Tolerable Peak Current vs. Pulse Duration. (DC MAX as per MAX Ratings)



Forward Current vs. Forward Voltage Characteristics.



Relative Luminous Intensity vs. DC Forward Current.



Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.