Miniature Colour Analyser, PM 5639/25
Miniature Colour Sensor, PM5639/93

- **High speed operation for automatic manufacturing systems**
- **Up to 25 sensors simultaneously on 17” screens**
- **Communicates with standard RS-232 interface**
- **Program source code for integration into automatic manufacturing systems**
- **True CIE Standard Observer characteristics**
- **Numerical outputs of CIE XYZ values**
- **Calibration to any white reference**
- **Operates independent of field rate, also computer graphics and HDTV**
- **Calibration traceable to international standards**
- **Independent of phosphor type**

The PM 5639/25 Miniature Colour Analyser is used for automatic manufacturing of CRT based display monitors and for quality control. The size of the sensor allows measurement at different positions on the monitor, even very close to the corners, in order to evaluate display uniformity. The adjustment may include black level, the colour of “black”, contrast level, the colour of “white” and the colour balance and luminance level at any point in between. The communication between the sensor and the controller is based on an RS-232 standard interface. The PM 5639/26 includes a PM 5639/93 Miniature Colour Sensor, a power supply, cables and a software package.

The PM 5639/93 Miniature Colour Sensor can be used in multi-sensor automatic manufacturing systems. Monitors used in TV sets have traditionally been aligned based on measurements taken in the centre only. In modern microprocessor controlled monitors used for graphics it is now possible to make individual alignment at different positions on the display.

Multi-sensor applications

The size of the sensor allows the use of up to 25 sensors on 17” CRTs though normally 2, 5 or 9 sensors are used simultaneously. The PM 5639/93 communication speed can be selected to either 4800 baud or 9600 baud.

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The higher speed is used in multisensor applications. The sensor delivers the output directly on a standard RS-232 line, which makes the use of a display box between the sensor and the computer superfluous. When several sensors are used they must each be connected to a standard multiport RS-232 interface.

The Display Software Module

The display software can show the measured results directly as CIE values, or as differences between the pre-programmed white reference and the actual measured colour. The results may also be shown as relative RGB values. The display software module uses the 4800 baud mode only. Two sensors may be used simultaneously with the display software module.

- The xyY, u'v' and uv modes.
  The chromaticity coordinates are plotted in the relevant CIE chromaticity diagram:
  xy uses CIE 1931 definition
  u'v' uses CIE 1976 definition
  uv uses CIE 1960 definition
  The luminance value Y and the colour difference between the reference and the measurement are displayed as numerical values below the display.
- The äxäy, äu'äv' and äuäv modes.
  The difference modes displays a coordinate system with origin at the selected white reference and the measured colour deviation from this reference. The numerical values are shown below the coordinate system.
- The bargraph modes
  The XYZ and RGB modes shows the measured values as bar graphs. The graphs may be normalised to a selected phosphor, a specific luminance level or relative to the measured luminance.

The Communication Software

The communication with the PM 5639/25 sensor is with standard RS 232 interface. The communication software modules show how to communicate with the sensor. This explains how to implement application specific programs. The example modules are written in Basic, C and Pascal. The modules in Basic and Pascal can be used in the 4800 baud mode only, whereas the C modules are for both 4800 and 9600 baud modes.

Product Data

Measurement Range

- Luminance 0.1 to 1000 cd/m^2 (0.03 to 300 FtL)
- x and y values 0.000 to 0.800
- Correlated Colour Temperature: 1900 K CCT to 12,000 K CCT

Accuracy

- The following specifications apply to a measurement with an illuminant D6500 standard monitor[1]) at a luminance level of >10 cd/m^2 (3 FtL) and at an ambient temperature of 15°C to 30°C (59°F to 86°F)
- xy coordinates: ±0.002
  Repeatability: ±0.002
- Luminance (Y): ±2%±1 digit
  Repeatability: ±0.3% ±1 digit
- XYZ/RGB bars: ±1%
  Repeatability: ±1%
  Luminance(Y): ±2% ±1 digit
- Measuring rate:
  When used with the display software:
  3 and 10 measurements/second.
  When used wth the communication modules: up to 15 measurements/second programmable
- Correlated colour temperature: ±50 K CCT

1) Calibration of the standard monitor is traceable to NIST, USA with respect to chromaticity, and to BIPM, France with respect to luminance

Memory

- References: The white references are stored in the controller. The number is limited by the computer only. Legal values for x and y are between 0.200 and 0.600
- CRT/Phosphors: 30 different phosphors may be stored in the sensor, additional phosphors may be stored in the controller. Phosphors may be stored via the "Learn phosphor" function. The phosphors are only applicable when using the RGB bar graph display
- Set-ups: an unlimited number of measuring set-ups may be stored in the controller. A measuring set-up includes the display mode, CRT/Phosphor (RGB displays only), white reference and measuring units
- Measurements: an unlimited number of measurements may be stored and recalled for later investigation and statistical analysis. Stored measurements may also be used as white references

Factory Programming

- White references:
  D6500 (x=0.313, y=0.329)
  3200K (x=0.423, y=0.399)
  9300K (x=0.285, y=0.293)
  Other white references may be stored by using the "Learn white reference" function. The numbers, as measurements, can also be input directly into the file.

General Specification

Power Supply

- The colour sensor is powered from a power supply box inserted between the controller and the sensor.
- Sensor consumption: 5 V, <50 mA
- Power consumption: 85 to 250 V AC, 15 VA, 48 to 65 Hz

Environmental condition

- Operating temperature: 10°C to 40°C (50°F to 104°F) (non-condensing)
- Storage temperature: -10°C to 70°C (-14°F to 158°F) (non-condensing)
- Vibration: IEC 68-2-6 F; 5-50-200 Hz 0.7 mm_{PP} 50 m/s^2; 1 octave/min; 3x30 min
- Bump: IEC 68-2-29 part 2; 350 m/s 1000 bumps in 3 directions
- Repetitive bump: 120 m/s^2

Mechanical data

Colour Sensor

- Diameter of sensor: 40 mm (1.6")
- Diameter rubber shadow pad: approx. 65mm
- Length: 200 mm (7.9")
- Weight: 270 g (0.6 lb)

Power supply box:

- Size: 185 x 95 x 65 mm (7.3 x 3.8 x 2.6")

Hardware Requirements

- PC with RS 232 port
- Floppy disk drive 3½"
- Operating system: MS-DOS, Windows 95 and 98.
- The software is DOS-based with a Windows like appearance. It runs on most Windows 95 or 98 environments in a DOS-box

Accessories

Accessories: PM 5639/25

The PM 5639/25 Miniature Colour Analyser package includes:

- PM 5639/93 Miniature LCD Colour Sensor
- Software package with display module and communication modules with source code in Pascal, C and Basic
- Power supply box for one sensor
- Interface cable for use between controller and power supply (9 pole sub-D connectors)
- Interface cable for use between sensor and power supply (9 pole sub-D connectors)
- Mains cable
- Operating manual, including source code documentation

Accessories: PM 5639/93

The PM 5639/93 is delivered without accessories. For multi-sensor applications the required accessories are to be agreed upon.

PM 5639 Related Products

PM 5639/00	9449 056 39001	CRT colour analyser with hand-held display unit
PM 5639/01	9449 056 39011	CRT colour analyser with PC interface & software
PM 5639/02	9449 056 39021	CRT Colour Alignment System for Barco® Monitors
PM 5639/03	9449 056 39031	CRT Colour Alignment System for Sony® Monitors Projector
PM 5639/06	9449 056 39061	LCD Colour Analyser with handheld display unit
PM 5639/20	9449 056 39201	Industrial CRT Colour Analyser, single sensor version
PM 5639/21	9449 056 39211	Industrial CRT Colour Analyser, double sensor version
PM 5639/25	9449 056 39251	Miniature CRT Colour Analyser
PM 5639/26	9449 056 39261	LCD Colour Analyser for Industrial and PC-applications
PM 5639G/82	9449 056 39823	Colour Alignment Generator, component 625 lines
PM 5639M/82	9449 056 39828	Colour Alignment Generator, component 525 lines
PM 5639G/83	9449 056 39833	Colour Alignment Generator, composite 625 lines, PAL
PM 5639M/83	9449 056 39838	Colour Alignment Generator, composite 525 lines, NTSC

Options

PM 5639/61	9449 056 39611	Expansion kit - to upgrade PM 5639/20 to PM 5639/21
PM 5639/62	9449 056 39621	Expansion kit -.to upgrade PM 5639/00 to PM 5639/01
PM 5639/63	9449 056 39631	CRT Auto Colour Alignment Option for Barco® Monitors
PM 5639/64	9449 056 39641	CRT Auto Colour Alignment Option for Sony® Monitors
PM 5639/80	9449 056 39801	Display unit
PM 5639/90	9449 056 39901	CRT Colour sensor
PM 5639/92	9449 056 39921	Industrial CRT sensor
PM 5639/93	9449 056 39931	Miniature CRT colour sensor
PM 5639/94	9449 056 39941	LCD Colour Sensor
PM 8549/06	9449 085 49061	6 m extension cable for PM 5639
PM 8549/10	9449 085 49101	10 m extension cable for PM 5639
PM 8550	9449 085 50001	Calibrating software for PM 5639/90 and PM 5639/92-93
PM 8563	9449 085 63001	Interface cable for PM5639/80 to connect to PM8639/93 and PM5639/94
PM 8664	9449 085 64001	Auto set-up cable for auto alignment of Barco HDM 5049 monitor series

Ordering Information

PM 5639/25	9449 056 39251	Miniature Colour Analyser
PM 5639/93	9449 056 39931	Miniature Colour Sensor

FOR FURTHER INFORMATION

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