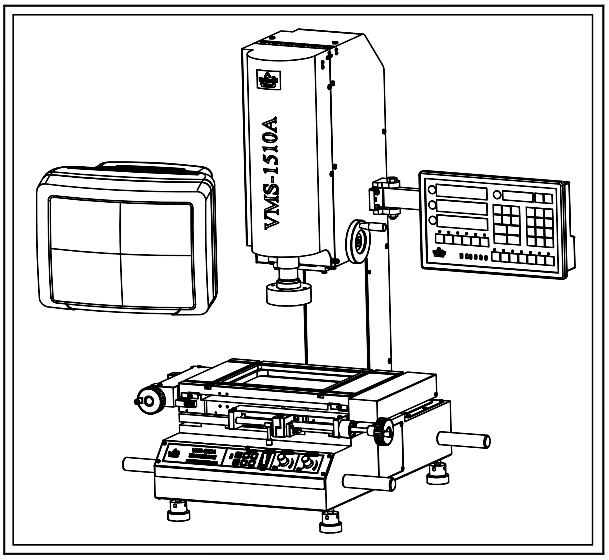
VMM Series

Video Measuring System

VMM-S/D SERIES

OPERATING MANUAL



Carmar Technology Co., Ltd.

CONTENT

I. Application

Video Measuring System is a photoelectric measuring system of high precision and efficiency. It is composed of a series of components, such as CCD color camera of high resolution, continuous zoom lens, color monitor, video crosshairs generator, precise linear scale, multi-functional Digit Readout (DRO), 2D measuring software and high precision worktable. It is mainly applied in 2D measurement, sometimes in 3D as well. It is widely used in different kinds of precision finishing industries, such as electronic part, precision mold, precision tool, spring, screw processing, plastic, rubber, oil seal valve, camera part, pedal cycle part, motor part, conductive rubber and PCB processing. It is a must for the metric room, laboratory or workshop of various sectors concerning to machinery, electronics, gauging instrument, watch, plastic and light industry as well as academies, research institutions and measurement-inspecting department.

II. Specification

Unit(length): mm

Model	VMM-1510S/D	VMM-2010S/D	VMM-2515S/D	VMM-3020S/D	VMM-4030S/D
Metal Table Size (mm)	354 x 228	404 x 228	450 x 280	500 x 330	606 x 466
Glass Table Size (mm)	210 x 160	260 x 160	306 x 196	350 x 280	450 x 350
X/Y Travel (mm)	150 x 100	200 x 100	250 x 150	300 x 200	400 x 300
Weight（kg）	100	110	120	140	240
Dimensions (mm)	540 x 560 x 860		760 x 600 x 900		970 x 670 x 940
Z axis travel (mm)	150 mm				
Z working range (mm)	VMM-S series: 92 mm VMM-D series: 105 mm				
Indication Error of X/Y axis	≤ (3 + L/75) μm ; L: measuring length (mm)				
Digital Display & Resolution of X/Y/Z-axis	Digital Display : DC3000 Resolution : 0.0005 mm				
Measuring Software	M2D series				
Video System	**VMM-S series**				
	● CCD Camera：Colour 1/2“ CCD Japan Camera ● Zoom Lens ： NAVITAR Zoom Lens， ➢ Magnification of field lens 0.7X - 4.5X ➢ Total Magnifications 30X - 190X ➢ Object View 10.6mm - 1.6mm (High precision zoom lens is optional)				
	VMM-D series				

	● CCD Camera：Colour 1/3“ CCD Camera ● Zoom Lens ： NAVITAR Zoom Lens， ➢ Magnification of field lens 0.7X - 4.5X ➢ Total Magnifications 40X - 255X ➢ Object View 7mm - 1.1mm
Aiming System	Cross line generator
Lightening System	Adjustable LED Surface and Transmission illumination
Power Supply	AC220V/110V 50/60 Hz

III. Structure & Working Principle

The photoelectric video measuring is one of the most advanced measuring methods for high precision and efficiency currently. The working principle is described in figure1.

1. Place the part on the worktable.
2. The surface light (5) or the contour light (within the base) of the LED illuminates it.
3. It is imaged by the zoom lens (16) and photographed by the CCD color camera (in the shell 20).
4. It is transferred to the color monitor (18) through S-Terminal. Based on the video crosshairs (17) produced by the crosshairs generator (15) on the monitor, it is measured by the way of aiming and the linear scales driven by the worktable (14) moving in the direction of X-Y axes.
5. The measurement is accomplished after the DC3000 DRO (2) displays the measured and processed data. The working principle of the video system is displayed as in figure2.

Main body of the instrument

base(11), mast(4), Z axis driving unit(3), X-Y worktable(14) and X-Y smooth steel bar driving unit(8,13)

Video system

* Zoom lens (16): range of the focus 0.7～4.5x, total video magnification 34～220x.
* CCD color camera (in the shell 20): convert the optical image photographed by the zoom lens into the electronic signal and then transfer the signal to the color monitor through S-Terminal.
* 15″ color monitor (18): convert the video signal transferred by the CCD color camera into video image.
* Crosshairs generator (15): generate the crosshairs used for aiming and edge detecting, its setup key and control key are displayed as in figure3. Please refer

to the DC3000 User's Manual for more details.

* Contour light (in the base)/surface light (5): adopt adjustable LED light(switch controller as in figure3), good effect of illumination with 10 times the longevity of the traditional bulbs

Digit Readout (DRO)

1. X axis (19), Y axis (7), Z axis (1) Linear Scale: convert geometric movement into digital signal and then transfer it to the DC3000 DRO, Z axis is usually used for aiding the measurement

DC3000 DRO (2): process and display the measured data. Please refer to the DC3000 User's Manual for more details.

RS232 communication interface and 2D professional software (optional): deal with the measured data of a drawing.

Micro printer (6, at the back right of the base): print and output the measured data

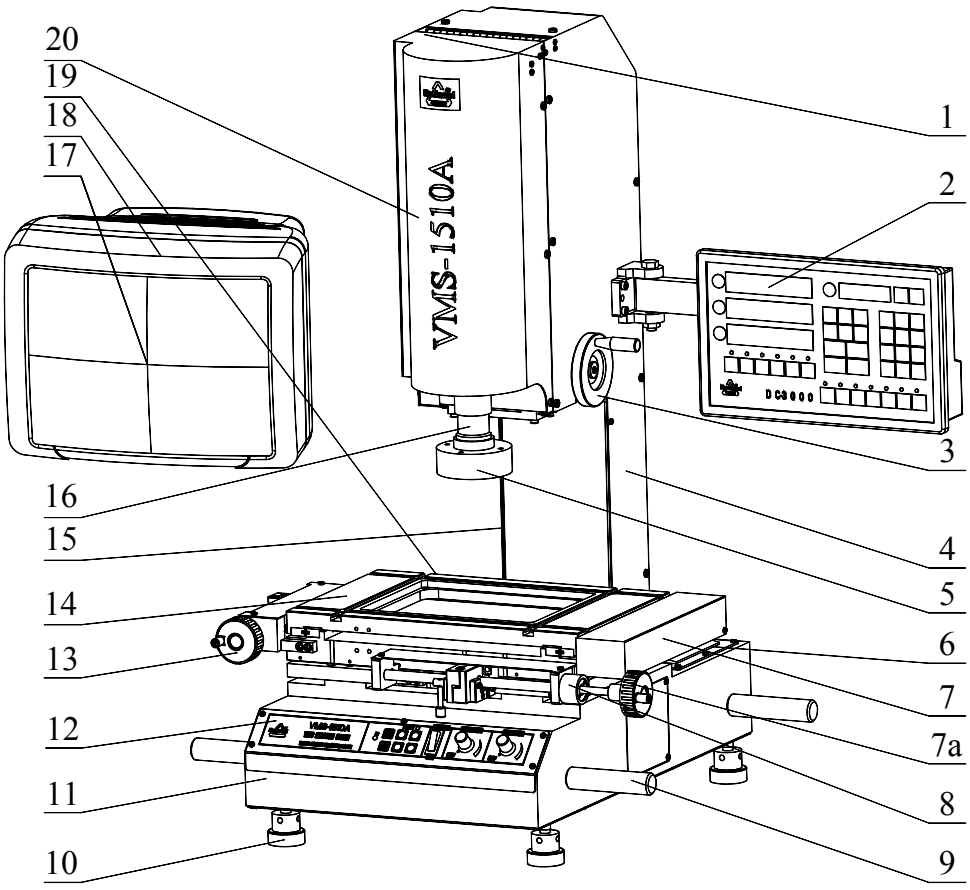


Figure1. The Overall Picture of VMS

1. Z axis linear scale 2.DC-3000 DRO 3. Z axis driving unit 4. Mast 5. Surface light unit 6. Micro printer 7. Y axis linear scale 7a. frosted glass sheet 8. X axis driving unit 9. Porting handle 10. Base screws 11. Base 12 . Panel 13. Y axis driving unit 14. Worktable 15. Crosshairs generator 16. Changeable focus lens 17. Video crosshairs 18. Color monitor 19. X axis linear scale 20. CCD color camera shell

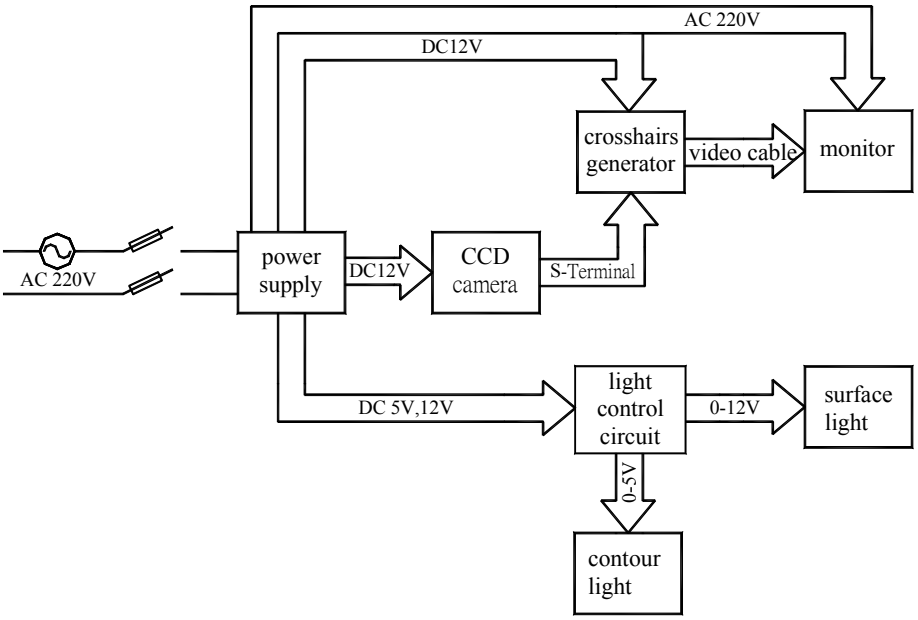


Figure2. Illustration of VMS Running

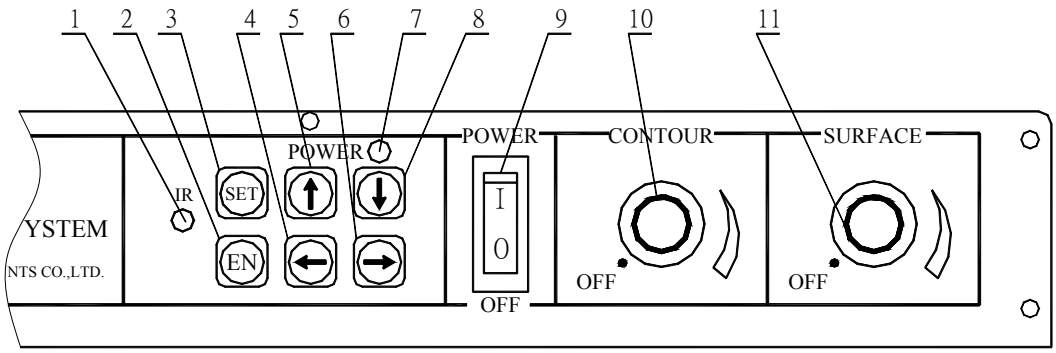


Figure3. Panel

1.Remote sensor 2.Menu key 3.Key for extending the functions of crosshairs or edge

detecting 4、6.Key for increasing or decreasing brightness 5、8.Menu selecting key 7.Indicator light 9.General power 10.Knob for adjusting brightness of contour light 11.Knob for adjusting brightness of surface light

IV. Installation

1. Unclose all the packages. Take out the User's Guide and read this section before operating.
2. Place the instrument on a stable stage and put on the horizontal base screws. Adjust its level with an air level.
3. Take away the board that is used to fix the X, Y and Z axes so that they can move.
4. Connect the VMS to the color monitor and make the power supply plugged, then the installation is over. The voltage of the power supply ranges from AC 110V～220V，50-60Hz.
5. Before operating the VMS, do remember to read the User's Guide provided carefully.
6. Basically, the checking work before installing and using should be executed by the dealer.

V. Measuring Method

The ways of video measuring generally fall into three: contour measuring, surface measuring and Z axis measuring.

1 Contour Measuring:

As the name implies, contour measuring refers to measuring the contour and edge of a part. The contour light is mostly used, but the surface light is also used if necessary, which makes the edge more clear and convenient for measuring.

2 Surface Measuring:

Surface measuring may be regarded as the main function of video measuring. The surface dimensions of a part that can be seen by eye, under the surface light, can be measured by the Video Measuring System. For example, the dimensions of the copper foil and IC circuit on the circuit board. Even though the part to be measured is black plastic or rubber, the VSM can also easily get the exact data through measuring.

3 Z axis Measuring:

When attached with high-magnification lens and given sufficient precision of aiming and positioning, under the surface light, the VMS can be used for Z-axis measuring. For example, it can measure the height of the step or the depth of shady hole of a part. Please refer to the DC3000 User's Manual for more details.

VI. Maintenance

The Video Measuring System is a precise measuring instrument integrating light, electricity and mechanics as an organic whole. It deserves regular maintenance to keep good measuring conditions, so that it can ensure the measuring precision and protract the service period.

1 Place the VMS in the clean and desiccative room(temp: 20℃±5℃, humidity:< 60%). Protect the optical surface against being damaged, the metal parts being rusted and the dust dropping in the rail.

2 Clean the working parts as often as possible after use; it is better to lay a dustproof covering on it.

3 Smear the driving unit and moving track with lube periodically. Ensure the instrument a good status for use.

4 Clean the stain on the worktable glass or the painting surface with neutral detergent or clean water, never with organic solution, for it will take away the luster of the painting surface.

5 The LED light can be used for quite a long time, but still inform the dealer when it is broken down, and ask for the professional to replace a new one for you.

6 The precision parts, such as video system, worktable, linear scale and Z axis driving unit are precisely adjusted. All the adjustable and fixing screws are already fixed. Do not disassemble them at your wishes. Do inform the dealer when problems rise. The hitch or decrease of precision caused by disassembling the VMS at your wishes is beyond our repair responsibility.

7 The DC3000 DRO has compensated the error of the worktable and the linear scale. Do not change at your wishes, otherwise, it will bring about wrong results

8 Do not unplug the plugs that are connected with the VMS, if they are unplugged, plug them correctly and fasten the screw. Incorrectly plugging, in a certain extent, may affect the function of the VMS and more importantly, may break down the whole system.

VII. Component Integrality

Name	Quantity	Name	Quantity
1. Main body	1Pcs	9. Foot Switch	1Pcs
2. CCD Color Camera	1Pcs	10. Power Supply wire	1Pcs
3. 0.7～4.5×Zoom lens	1Pcs	11. 3AFuse	5Pcs
5. 15" Monitor	1Pcs	12. User's Guide	1Pcs
6. Crosshairs Generator	1Pcs	13. Certificate	1Pcs
7. DC-3000 DRO	1Pcs	14. 2× Extra Lens	Option
8. Micro printer	1Pcs	15. 2× Extra Surface Light	Option