VIDEO CALIPER
Operation Manual

Model VMU800

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UNPACKING

The VMU800 system includes the following components:

VMU800 HD Video Caliper Unit
12 volt universal power supply
This operation manual

Please inspect all items carefully and report damaged or missing items to your dealer or MicroImage Video Systems. Do not power up any damaged unit.

CONNECTIONS

Power

The VMU800 HD Video Calipers ship with a standard 12VDC universal power supply that is compatible with 120V or 230V power.

A power plug or cord suitable for use in North America is included. The power supply has either a standard IEC (computer style) connector for a detachable power cord, or an adapter set that allows for use in most countries. MicroImage Video Systems does not supply power cords for countries other than those in North America.

Connect the power supply to the power input on the VMU unit. Also, connect the power supply to a suitable power receptacle/outlet which meets the appropriate ratings on the power supply.

All VMU800 units may be optionally powered from an external +12VDC (+10 to +20V), negative ground power source which is relatively clean. Contact MicroImage Video Systems for additional information.

Video Input

Connect the video source (i.e. video camera) to the INPUT connector on the rear of the Video Caliper unit. Use a high quality HDMI cable for cameras with an HDMI connector or use a DVI to HDMI cable for cameras that have a DVI connector.

Video Output

Connect the OUTPUT signal from the Video Caliper unit to the video displays as required. Use a high quality HDMI cable for monitors with an HDMI connector or use a DVI to HDMI cable for monitors that have a DVI connector.

MicroImage Video Systems offers appropriate quality cables for the above if required.

Other Connections

If you have a custom option installed which requires an external connection, please see the supplement to this user guide for additional information.

Power Switch

The power switch is located in the lower right corner of the front panel. Pressing it once turns the unit on, pressing it again turns the unit off. When off, the unit draws minimal power. All VMU units will remember their settings when the power is turned off. More information is provided later in this text.

Position Control 1

This rotary control will move the left or top cursor (depending on the setting of the X/Y switch) or it will move both (same axis) cursors together if the track function is enabled.

Position Control 2

This rotary control will move the right or bottom cursor (depending on the setting of the X/Y switch). If track mode is on, it will adjust the spread between the two (same axis) lines.

Lock Switch 1 & Lock Switch 2

Enabling the lock function will cause the related rotary position control to have no effect while lock is on (indicated by the RED lamp below the switch). Lock functions are remembered independently for the X and Y axes. A Lock override can be set in the menu system to lock a control regardless of the switch setting (which will also be indicated by the light).

Track

Enabling the tracking function (LED indicator on) will cause the left position control to move both lines of the same axis together (keeping the spacing constant). The right control will adjust the spacing between the lines. When the tracking function is disabled (indicator extinguished), the two controls will move the lines fully independently.

Position

The position set function allows the user to relocate the numeric display. Pressing the POSITION switch will turn on (indicator blinking) the position set function for the numeric dimension display. When the position function is enabled, turn the left (#1) rotary control to move the horizontal position and the right (#2) rotary control to change the vertical position. Press the POSITION switch again when finished to disable the position set function. Note that many other functions are disabled while position set is on.

Display

Pressing the DISPLAY switch will toggle the overlay on and off including the character and line display. This makes it easy to go to a “clean source image” and back to the measurement mode. When the display is off, many switches and the controls are inactive to prevent accidental changes. The indicator is illuminated when the display is on. The Display Switch will cycle through three different states: 1) overlay completely off, 2) Only lines displayed, the numeric (coordinate) display is off, and 3) both lines and the numeric (coordinate) display are enabled.

X/Y

The X/Y switch chooses between X or Y axis movement. There is an indicator for each direction. Note that the positions and lock information are remembered independently for each axis.

B/W

The B/W switch activates the Line Color menu on HD Video Caliper units. This switch does not affect the color of the numeric display or menu system.

Menu

Pressing the MENU switch places the unit in the menu mode allowing the user to set his or her preferences. The exact menus are covered in a later chapter in this manual.

If the password protection is turned on, you may have to enter a password before using this function

Set

Pressing SET will allow the user to calibrate the unit and also set the unit of measure. Operation is through simple menus.

If the password protection is turned on, you may have to enter a password before using this function.

← (backspace)

Pressing the backspace button will allow you to edit the numeric calibration or the password as it is being entered. Backspace deletes beginning with the character last entered.

0 thru 9 and . (decimal point)

These keys are used to enter the calibration reference, enter the password and to navigate the menu systems. They are used in a way similar to a calculator.

Enter

Completes the entry of a calibration setting, password or menu operation.

Store

Pressing the STORE key will blink the indicator next to it and display a message on the screen asking you to press a number key. After pressing the STORE key, you must press one of the number keys (0 through 9) to specify which memory, which will extinguish the indicator. You can also cancel the storage by pressing STORE a second time (which will also extinguish the indicator). Each memory will save most of the settings of the unit, allowing easy access to multiple calibrations. See the section on Memories later in this manual.

If the password protection is turned on, you may have to enter a password before using this function.

Recall

Pressing the RECALL key will blink the indicator next to it and display a message on the screen asking you to press a number key. After pressing the RECALL key, you must press one of the number keys (0 through 9) to specify which memory location you choose, which will extinguish the indicator. You can also cancel the recall by pressing RECALL a second time (which will also extinguish the indicator). See the section on Memories later in this manual.

Overview

Main Menu

1. Line Color Settings
2. Line Styles & Enables
3. Line Width Settings
4. Lock Overrides
5. Origin
6. Line/ Box Mode
7. Dimension Display Settings
8. Password Options

0 Exit this Menu

Press a Number Key to Select Item

The VMU series of Video Calipers are designed for ease of use. Commonly used functions are easily changed with front panel switches while less used functions can be changed only with the menus. This section will describe the various menus and how they work. For the calibration set menus and units of measure, please see the next section.

If you have the Password Protection enabled, you may need to enter a password before you can enter the menu. See the section on Password Protection for additional information.

The menu system is divided into a hierarchy, or tree structure. Each branch has several related menus that can be changed. The main or top menu is the first one you see after pressing the MENU button. You then choose one of the categories and press the number key relating to that menu. This will bring up another menu where you can use the number keys or rotary controls to change the functionality of the unit as indicated. Pressing the 0 (zero) key will exit each menu back up to the previous menu.

Main Menu

Each menu will be described below:

Line Color Settings

Two of the four line entries in the Line Color menu will display either “CTRL 1>” or “CTRL 2>” to the left of them. The colors of these two lines may be changed by turning the Position Control corresponding to that number. Pressing the “X/Y” key will change the active set of lines, so “CTL 1>” and “CTRL 2>” will appear before the other two entries. The color of each line may be set individually.

Pressing the number “1" key will take you to the Coordinate Color menu.
Pressing the number “0" will return you to the Main Menu.

Line Styles & Enables

Two of the four line entries in the Line Styles menu will display either “CTRL 1>” or “CTRL 2>” to the left of them. The styles of these two lines may be changed by turning the Position Control corresponding to that number. Pressing the “X/Y” key will change the active set of lines, so “CTL 1>” and “CTRL 2>” will appear before the other two entries. Each line may be individually set to Solid, a wide variety of serrated values, or Off.

Pressing the number “0" will return you to the Main Menu.

Line Widths

The Line Width menu allows you to change the widths of the vertical and horizontal reference lines on the display. Only one X Axis and one Y Axis line width may be selected.

1. X Axis Line Width = Thin	Pressing the “1" key will cause both X Axis lines to be displayed as Thin. The entry will be highlighted.
2. X Axis Line Width = Medium	Pressing the “2" key will cause both X Axis lines to be displayed as Medium. The entry will be highlighted.
3. X Axis Line Width = Thick	Pressing the “1" key will cause both X Axis lines to be displayed as Thick. The entry will be highlighted.
4. Y Axis Line Width = Thin	Pressing the “1" key will cause both Y Axis lines to be displayed as Thin. The entry will be highlighted.
5. Y Axis Line Width = Medium	Pressing the “2" key will cause both Y Axis lines to be displayed as Medium. The entry will be highlighted.
6. Y Axis Line Width = Thick	Pressing the “1" key will cause both Y Axis lines to be displayed as Thick. The entry will be highlighted.

Pressing the “0" key will return you to the Main Menu.

Lock Overrides

The Forced Line Lock menu allows you to enable lock overrides for each line to prevent unauthorized movement. If these are set to on, the line will remain locked regardless of how the front panel lock switch is set (lock indicators will light).

1. Forced Lock X1	Pressing “1" will toggle the status of the X1 line between “Front Switch” and “Always Locked”. In “Front Switch” mode, the lock buttons will determine whether or not the control is locked. In “Always Locked”, the control will not move the line position regardless of pressing the lock button. The status will be displayed in the menu.
2. Forced Lock X2	Toggles the displayed lock status for the X2 Line.
3. Forced Lock Y1	Toggles the displayed lock status for the Y1 Line.
4. Forced Lock Y2	Toggles the displayed lock status for the Y2 Line.

Origin

The Origin menu allows you to select either the Upper Left corner of the display or the Lower Left corner of the display as the “0 Origin”.

Press the “1" key to set the Origin to Upper Left. This will cause a clockwise rotation of the Line Position Controls to move the horizontal lines downward from the Upper Left origin.

Press the “2" key to set the Origin to Lower Left. This will cause a clockwise rotation of the Line Position Controls to move the horizontal lines upward from the Lower Left origin.

The currently selected Origin will be highlighted in the menu.

Pressing the “0" key will return you to the Main Menu.

Line/ Box Mode

The Line/Box menu allows you to select either Line Mode or Box Mode. Pressing the “1" key will activate Line Mode, and the reference lines will extend from one edge of the display to the opposite end. Pressing the “2" key will activate Box Mode, and the lines will be cropped off past their points of intersection to form a box with movable sides. The currently selected mode will be highlighted.

Dimension Display Settings

1. Dimension Select This option brings up the Dimension Display Settings menu. This allows you to choose between displaying only the X measurement, only the Y measurement, or only the Diagonal (Z) measurement. You can also choose to display any combination of the three, or none of them. The currently selected mode will be highlighted.

2. Dimension Colors This brings up the Dimension Color Menu. This allows you to choose the foreground (character) color of the alpha-numeric digits by rotating the left-hand Position Control and the background (box) color of the alphanumeric display by rotating the right-hand Position Control. It does not affect the line color (see the B/W switch or Line Color menu to change the line color). Over a hundred different color settings are possible. A number corresponding to each color will be displayed to allow for easier finding of favorite colors.

3. Dimension Magnify This brings up the Dimension Magnify Menu. This allows you to choose the size of the displayed dimensions and surrounding box. The dimension text and surrounding box can be displayed at the normal (default) size, double width (Wide), double height (Tall), or both double width and height (Large).

Pressing “0” will return you to the previous menu.

Password Settings

1. Password Enable Settings This brings up the Password System Enable menu, which allows you to choose when, if at all, the password protection will activate. This can allow time to make additional changes without having to re-enter the password, or activate the protection system immediately. There are five (5) different modes of operation for the password system, detailed further below.

2. Protect Now Protect Now immediately reinstates the password requirement regardless of the Password System Enable menu setting. Use this when you make changes and need to have the unit password protected before leaving the location.

3. Change Password This allows you to change the password to any number up to 8 digits. You need to enter the number, press Enter, then enter the number again. The backspace key can be used to correct an entry. Passwords do not have to be eight digits, use the number of digits you feel necessary to secure the unit. In fact, if no number is entered in either box, then that becomes the password, just pressing enter will get you past the password screen but that is not recommended for security. Both entry boxes must match to complete the function. If they do not, a screen will inform you that they don’t match and ask you to try again. There is no cancel

function, turn the unit off to cancel this command. When both input numbers match, a screen will be display that indicates the password has been changed and asks you to press the Enter key to continue.

Note: It is recommended that the password be changed from the default password the unit is shipped with, since that password is in the manuals and on the internet.

WARNING: DO NOT FORGET YOUR CHANGED PASSWORD!

Pressing “0" will return you to the Main Menu, or pressing the Menu button will exit the menu system.

Password System Enable

1. Disable Password Protection
This allows you to use the unit freely without password restrictions. This is the default mode for the unit.

2. Protect at Power Cycle
This will activate the Password Protection System when the unit is powered off. You may continue to use the unit without password restrictions until it is turned off. The unit will be password protected when it is turned on again, until the password is entered.

3. Protect at Menu Exit
This will activate the Password Protection System when the user exits the menu system, but will be freely usable until then. A password will be required each time the user accesses the Menu, Set, or Store functions.

4. Protect at Menu Exit + 1 Minute
This will activate the Password Protection System 1 minute after the user exits the menu system, unless the Menu, Set, or Store functions are reactivated within that time. If these functions are activated again within the time window, the Password Protection System will not activate until 1 minute after exiting the menu again. It is possible to continue using the unit without entering a password as long as one of these functions is accessed every minute or less.

5. Protect at Menu Exit + 5 Minutes
This will activate the Password Protection System 5 minutes after the user exits the menu system, and functions identically to the option before it except for the longer time delay upon menu exit.

The currently selected Password System Enable option will appear highlighted. Pressing “0" will return you to the “Password Settings” menu, or pressing the Menu button will exit the menu system.

Scale and Unit Parameters

1. Set Scale Using X Axis
2. Set Scale Using Y Axis
3. Clear Scale
4. Select Unit
5. Define Custom Unit

0 Exit this Menu

Press number for selection

Overview

The SET menu is similar in operation to the MAIN MENU, however the SET menu is used to set the calibration for the unit and the unit of measure. See the section about operation (setting the scale) for additional information on using the SET menu. Below, each menu is described in detail. Calibration only needs to be set for one axis to calibrate all directions.

If you have the Password System enabled, you may need to enter a password before you can enter the set menu. See the section on Password Protection for additional information.

Set Scale Using X Axis

This will set the calibration using the horizontal (left to right) axis, or the distance between two vertical (up-down) lines. It will accept any number, up to four digits between 0.0001 and 9999999 for the calibration. In a case with a leading “0" such as “0.2", the initial “0" will not display until the decimal point is pressed.

Note that measuring is much more precise when setting the calibration on the X axis, as opposed to the Y axis. Calibration is also more precise when the distance between the two lines is as wide as possible during calibration.

Set Scale Using Y Axis

This will set the calibration Using the vertical (top to bottom) axis, or the distance between two horizontal (left-right) lines. Enter any number, up to four digits between 0.0001 and 9999999 for the calibration.

Note that measuring is much more precise when setting the calibration on the X axis. Y axis calibration is provided for those places where X axis calibration is impractical. Calibration is also more precise when the distance between the two lines is as wide as possible during calibration.

Clear Scale

Clear scale will set the calibration to a value of 1.0000 per pixel regardless of the line positions. This can be handy for making absolute position measurements with the lines and measuring in pixels.

Select Unit

You may choose one of the eight units of measure shown, or no visible unit of measure. Four of the units may be customized from the “Define Custom Units” option in the previous menu.

1 - 4. You may select one of these units of measure by pressing the appropriate number key. These units may be customized by the user from the previous menu screen.

5-8. You may select one of these units of measure by pressing the appropriate number key. These units are factory defined.

9. (Off) Press “9" for the unit to display no unit of measure after the numerical value.

The currently selected unit of measure will appear highlighted. The displayed unit of measure is the same for all three axes.

Define Custom Units

Up to four different user defined units can be entered. Each can be one or two characters long. Once defined here, they will be available in the Select Unit menu described above. To set a unit, press the appropriate number for the location where you want to save the unit. Next, rotate the Left Position Control to change the left character. Rotate the Right Position Control to change the right character. Press the ENTER key when complete.

MEMORIES

Overview

The VMU800 incorporates ten user accessible memories which save most system settings. This allows you to save calibration settings for different zoom factors. The unit will retain the information in memory after power is removed for up to several years.

Memory Store

At any time during normal operation, you can save the current calibration and cursor positions into one of the ten memories. To save a setting into memory, press the save button (the red indicator next to it should illuminate). Next press a number from 0 through 9 which corresponds to the memory location you want to save to. To cancel a save, before pressing the number, press the save button a second time or press the enter button.

If you have the Password System enabled, you may need to enter a password before you can enter the store function. See the section on Password Protection for additional information.

Note: It may take up to 5 seconds after the save button is pressed for the setting to be stored into the non-volatile (long term) memory. This is due to the multi-tasking nature of the unit’s operating system. Do not turn the unit off or remove power until at least five seconds after pressing the number key of the save operation.

Memory Recall

At any time, you can recall one of the ten memories. To recall one of the settings, press the recall key and then press one of the number keys that corresponds to the desired memory.

PASSWORD PROTECTION

Overview

The VMU800 incorporates a password protection system to disallow entry to the menus as well as the set and store functions. This is to help protect against accidental or intentional corruption of settings in a production or unsupervised environment.

To be secure, the password should be changed before the unit is deployed. Use main menu item 8 to set a new password and change the mode. Write down and secure your new password where you will be able to find it. If your password is lost, you may have to send the unit back to MicroImage Video Systems to have the password reset.

The factory default password is: 123
The default mode is: Password Protection Disabled

Note: Performing a factory defaults reset will not change the password or password mode.

OPERATION

Overview

This section will describe the basic use of the Video Caliper. The unit should be properly connected and operating. Make sure that the cursors and dimensions are displayed before continuing.

Calibration

In order to use the caliper, it must first be calibrated. Place an object with a known dimension (the reference object) in the field of view, at the same distance from the optics (lens) as the object(s) you wish to measure. It is best to set the reference dimension using the X axis as this provides better accuracy. This is due to the lower vertical distance available.

Once the reference object is fully visible in the monitor, move the cursors to a known dimension on the object. Using a reference dimension that is one half the screen width or more will result in the best measurement accuracy.

Setting the Scale

Press the SET button to bring up the SET SCALE menu.

Press 1 to set the scale using the X axis or press 2 to set the scale using the Y axis.

Enter the dimension of the reference object that is between the cursors.

> The value entered must be in the range of 0.0001 to 9999999.
> You can use the Backspace (←) key to delete an incorrectly entered digit.
> Press the Enter Key when done.

When the reference dimension is entered as above, you can remove the reference object and measure any item at that distance from the optics (lens) in either the X, Y or diagonal directions.

Adding a unit of measure

You may also wish to add a unit of measure to your dimension display. The following procedure is used to add a unit of measure to the dimension display:

Press the SET button to bring up the SET SCALE menu.
Press 4 to access the SELECT UNIT menu.
Choose a unit from the four pre-defined units of measure by pressing the corresponding buttons from 5 through 8, or press 1 through 4 to use a custom defined unit. If you need to set a custom unit, return to the SET SCALE menu, then press 5 and follow the procedure in the section describing custom units.

Press 0 to return to the SET SCALE menu, or press the SET button to exit the calibration menu.

Saving the current configuration

Once you set a calibration, you may want to store it in memory for use later, so you don't have to keep re-calibrating for the same zoom or magnification factor. You can save the data in one of ten memories by doing the following:

Memory Store

Set the cursors and scale for your application

Press the STORE key (the indicator should blink and a screen will ask you to enter a number)

Press a number (0 through 9) to select one of the ten memory locations (indicator should extinguish after pressing the number). Pressing the STORE key again will cancel the operation.

Within five seconds the state of the machine will be saved to that memory number which will be retained after power off.

Note: If power is turned off immediately after pressing the memory location, the data may not be saved or may be corrupted. It takes up to five sends to write the data to memory.

Note: If you have the Password Protection enabled, you may have to enter a password to use the Memory Store function.

Memory Recall

To recall from memory, press the RECALL key (which will cause the indicator next to it to blink) and a screen will ask you to press a numeric key. Next, press a number key (0 thru 9) relating to the memory you wish to recall from. There are ten memories 0 through 9. The indicator should stop blinking after pressing the numeric key. Pressing the RECALL key again will cancel the operation.

Overview

The VMU800 can be returned to factory defaults at any time. Use the following procedure to reset the unit:

1. Turn the unit off
2. Depress the backspace key and hold it while turning the power on. Keep pressing the backspace key for at least 3 seconds or until after you see the lines and coordinate (numeric) display come on.

The unit will now be reset and ready for use.

Note: All user settings except the password settings will be lost, this includes the 10 user memories.

Note that the reset WILL NOT reset the password or the password mode. If you have lost your password, please contact Technical Support at MicroImage Video Systems for solutions.

Calibration Entry range	0.00000001 to 999999999
Numeric Display Range	0.00000001 to 19199999808
Line Resolution	Defined by Video System
Significant Digits	Dynamically Selected
Password Size	0 to 8 digits, may also be disabled as a user selectable option.
Scale Display Layout	Column
Calibration Axes	Can be calibrated on X or Y axis
Measurement Axes	Any combination of X, Y and Diagonal measurements
Scale Display Position	Movable anywhere within 95% center of screen
Line Attributes	Individually selectable as off, solid or multiple serrated options
Rule Mode	Full lines or box display
User Defined Memories	10
User selectable units of measure	4 predefined, 4 user definable (2 digits each)
Display colors	Over 100 selectable colors for foreground and background
Character Cell Display	16x24 pixel cell, interlaced (HxV)
Non-Volatile Memory type	EEPROM (50 year typical retention)
System Microprocessor	32 bit architecture
Line Generation	Digitally generated by custom circuit
Display controller	Custom MicroImage Video Systems integrated display controller
Front panel controls	(2) Line position controls, multi-turn precision optical encoders
Front panel switches	(25 total) Power, Lock 1, Lock 2, Track, Scale Position, Scale Set, Display On/Off, B/W, X/Y, Menu, Store, Recall, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, Decimal Point (.), Backspace, Enter
Front Panel Indicators	(10) Power, Lock 1 on, Lock 2 on, Track on, Scale Position on, Display on, X, Y, Store, Recall
X axis line width	1, 2, or 3 pixels
Y axis line width	1, 2, or 3 pixels
Adjustment range	98% of normal visible raster area minimum
Sync system	Based on video source
Color System	Based on video source
Horizontal Frequency	Based on video source
Vertical Timing	24 to 60Hz
Scan Lines	480 to 1200
Input	HDMI or DVI-D video
Output	HDMI or DVI-D video
Connectors	
Video	HDMI Female
RS232	8 pin mini-DIN Female
Power	2.1mm Coaxial Power Connector Female
Remote port (optional-consult factory)	
Data format	EIA-232 (RS-232)
Language	MicroImage Control Language
Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200
Data Bits	7 or 8, selectable
Parity	Off or Even, selectable
Stop Bits	1
Temperature	
Operating	0 deg ~ 40 deg C (32 deg - 104 deg F)
Storage	-40 deg ~ 60 deg C (-40 deg - 140 deg F)
Humidity	
Operating	10% ~ 90% (non-condensing)
Storage	5% ~ 95% (non-condensing)
Power	(120-230VAC Universal Power adapter included)
Voltage	12VDC (+9 to +20 VDC)
Consumption	Approximately 270mA typical at +12VDC
Size	9.00" (W) x 7.63" (D) x 2.88" (H)229 mm (W) x 194 mm (D) x 73 mm (H)
Weight	1 lbs. 14 oz., (851g)
Country of Origin	Manufactured in the USA by MicroImage Video Systems

Specifications are subject to change without notice.

WARRANTY

MicroImage Video Systems warrants that each VMU800 is free from defects due to faulty materials or improper workmanship for a period of one (1) year. MicroImage Video Systems further warrants that any part which proves defective in materials or workmanship within one (1) year, will be replaced or repaired at no cost to the user. Labor to replace defective parts will be done without charge, provided the equipment is returned to MicroImage Video Systems prepaid, insured and properly packaged. Prior return authorization must be obtained from MicroImage Video Systems.

NOTE

This warranty covers the MicroImage VMU800 only.

CONDITIONS

This warranty is void if the warranted part has been altered or subjected to abuse or misuse. Defective parts must be returned to MicroImage Video Systems.

SOLE WARRANTY

This Warranty is in lieu of all other warranties expressed or implied including, without limitation, any implied warranty or any implied warranty of fitness for a particular purpose. MicroImage Video Systems shall have the final right to determination as to the existence and cause of any defect and its appropriate adjustment in accordance with the terms of this warranty. In no event shall MicroImage Video Systems be liable for any consequential or collateral damages.

RETURNS

All returns MUST have an RMA number. Please call, fax or email for an RMA form. The RMA form will have the proper shipping address for returns.

Phone	610-754-6800
Fax	610-754-9766
Email	techsupport@mivs.com