



SeeUV[®] MZ-6[™] Bore Inspection System

Operation and Service Manual





Version 1.0 • July 2022

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Chapter 1 — Preface and General Information

About This Manual

Disclaimer



IMPORTANT: This manual contains information about the MZ-5™ FS, MZ-6™ & MZ-5 FS 120M™ Inspection System manufactured by InterTest, Inc. and contains information, which is reasonable and customary for this type of equipment.

No representations or warranties are made as to the accuracy or completeness of the information contained herein. In addition, no representations or warranties are made as to the completeness and compliance of any test procedures, which are performed using this Equipment. Because this manual was designed for quick reference, it is restricted in scope to the operation of the system. Should you have questions beyond the scope of this manual, please call the InterTest Customer Support Group.

Purpose

The intended audiences for this manual include InterTest, Inc., End Users, Field Support Personnel, Product Evaluators, and qualified third-party personnel. It is primarily intended for personnel who are using the equipment and those responsible for test procedures.

Major System Items

EM13240 MZ-6 Small Tube Inspection System

Designed to be used in 20-60MM ID tubes.

EM17201 MZ6 POLE SET

MZ-6 Poles for use in tubes up to 10 feet

EM17302 MZ6 MZ6 CAMERA HEAD ASSY

19mm x 3000mm used in 20 & 60mm ID tubes

EM18608 MZ6 CCU (

EM18010 MZ6 STANDALONE SYSTEM CASE (Holds MZ-6 Camera, Centering, Fixtures, Poles & Computer)

EM17187 CENTERING RING, 60MM, MZ6

EM17188 CENTERING RING, 80MM, MZ6

EM1664186 30MM SNAP RING SPIDER ASSY, MZ6



EM1664187 40MM SNAP RING SPIDER ASSY, MZ6

EM166427 25MM SNAP RING SPIDER ASSY, MZ6

OSHA Compliance and Safety Guidelines

OSHA (the Occupational Safety & Health Administration of the United States Department of Labor) has established specific standards for Personal Protective Equipment (PPE). The standards are detailed in the document entitled *General Requirements 1910.132, (Standards - 29 CFR)* and should be reviewed by all personnel prior to working on InterTest, Inc. equipment and systems. Refer to <http://www.osha.gov/> for information about steps that must be taken to protect the eyes, face, ears, hands, and other body parts from potential harm. It is the responsibility of the technician or other service personnel to adhere to all OSHA guidelines as they concern PPE devices and their proper use.

Revision Information

As it becomes necessary to revise this manual, InterTest will give the reasons for the revision in this section.

Revision	Description	Revised By	Approved By
Original	Initial Release	KB	

Manual Versions


Refer to the cover page & the document footer for the manual version.

When troubleshooting a problem that may occur, InterTest Customer Service and Support Personnel may ask for this information in order to ensure that the user is referencing a suitable version of the manual.

Cautionary Symbols and Symbol Terminology

Table A describes the various symbols that may be included in this manual and mounted on the equipment. The severity level of a potential hazard varies. Refer to Table B for hazard level descriptions.

Table A — Manual and Equipment Safety Symbols

Symbols	Definitions
	DANGER/WARNING/CAUTION: Risk of electric shock.





	DANGER/WARNING/CAUTION: Refer to instruction manual.
	DANGER/WARNING/CAUTION: Explosion Hazard.
	DANGER/WARNING/CAUTION: Avoid exposure to water and liquids.
	DANGER/WARNING/CAUTION: Avoid eye and skin exposure to UVA Light.

Table B — Description of Cautionary Terms

Cautionary Term	Description
DANGER	Indicates the presence of an extreme hazard that will probably cause death or severe personal injury. Hazards of this kind MUST be avoided at all cost.
WARNING	Indicates the presence of a hazard that could cause death or severe personal injury. Hazards of this kind MUST be avoided at all cost.
CAUTION	Indicates the presence of a hazardous condition that can or will cause minor personal injury or property damage if the hazard is not avoided. The Caution Indication is also used for property-damage-only accidents. The Caution Indicator may be used to warn against potential equipment damage and possible service interruption.

Safety Considerations

Preface

This manual describes this equipment, its functions, and its use. It also describes the precautions to be taken to ensure safe operation. Please read this manual thoroughly before attempting to operate the equipment. By doing so, you will familiarize yourself with the equipment's capabilities and understand its functions. After you finish reading this manual, store it in an accessible location for future reference.

Carefully follow all warnings and instructions included in this manual and marked on the equipment.

Operational, General Safety Considerations and Precautions

Always observe the guidelines and precautions that follow.



DANGER, Risk of Electric Shock: Unplug the power cord from the wall receptacle when advised to do so in a procedure. Be advised that the equipment must be turned off when service work is required.

Never remove the top cover of the controller. Electrical shock hazards exist due to high internal voltage. There are no user-serviceable parts inside the controller, except for fuses, which are accessible via the rear panel. Refer all service to the InterTest Customer Service and Support Group.



IMPORTANT: To ensure operator safety, read and understand this manual before using the system. Using any piece of this equipment in a manner not specified by the manufacturer does not protect the user from harm.

In addition, accessories listed in this manual are the only accessories considered suitable for use with this system. Accuracy of the rotary encoder is compromised when the probe is operated at steep angles.

To avoid injury, read and understand the associated documentation for MZ-5™ FS Inspection System component prior to attempting operation. Direct any questions about equipment operation to the InterTest Customer Service and Support Group at 908-496-8008 or via email to service@intertest.com.



DANGER, Explosion Hazard: Do not use this system in explosive environments. The controller requires adequate ventilation to prevent overheating. Do not cover or drape the controller. To ensure adequate airflow, provide a three-inch (7.6 cm) clearance between the controller chassis vents and any solid objects.



IMPORTANT If LED's need servicing. Contact InterTest



IMPORTANT: Proper use of this product requires a protective earth ground path at the AC power source. Using a two-conductor extension cord or any other device that compromises this ground path is in violation of safe operating guidelines.

The unit should never come in direct contact with any voltage or current source. Damage to the equipment and/or electrical shock to the operator may result.

The unit is equipped with a power supply mounted in the back of the equipment. It accepts a 3-wire grounding type plug only. It is necessary that the equipment be grounded. The plug will only fit into a grounding-type power outlet. This is a feature for the user's safety. Never use an adaptor to bypass this very important safety feature. If you cannot insert the plug into the wall outlet, contact an electrician to replace what may be an obsolete wall outlet. Under no circumstances should the user attempt to defeat the purpose of the grounding-type plug.



Never attempt to modify the power cord. Do not insert or unplug the power plug with wet hands. This could result in an electrical shock. When unplugging the power plug, always grasp its plug portion. Never pull on the power cord directly. Pulling on the power cord may expose or snap the internal wires, which would weaken or damage the power cord and result in an electrical shock.



Do not place anything on top of the power cord. Never locate the equipment where people will walk on the power cord or where heavy items may move over it. Never stretch or excessively bend the power cord. Always insert the power cord's plug completely into the socket. Failure to do so could result in a fire or an electrical shock.

Never use power cords other than the power cords that were provided. Using improper power cords could result in a fire or an electrical shock.

For safety reasons, the use of an extension cord is not recommended. If an extension cord must be used with the equipment, ensure that the total amperage rating of the extension cord is equal to or greater than 15 amperes. If an extension cord must be used, never allow other devices to share the extension cord.



IMPORTANT: Never use the equipment in a wet or overly damp location. Exposing the equipment to water or other liquids could result in a fire or an electrical shock.



IMPORTANT: The MZ-6™ Inspection System is to be used for inspecting gun tubes, Tank gun tube, mortar tube, ship gun tube, turbine rotor bores, generator rotor bores, shaft and pipe inspections ONLY. Improper use of this product for objects for which it is not intended or for environments for which it is not intended will void the warranty. Warranty information can be found [Warranty](#).



CAUTION: The UVA output is an eye and skin hazard. Do not allow close or prolonged exposure to the UVA output of the MZ-6™ FS Inspection System. UV Eye protection is required for close or prolonged exposure.

Warranty

InterTest, Inc. guarantees products manufactured by InterTest, Inc. to be free from defects in materials and workmanship for a period of one (1) year, from the date of original purchase. All other products not manufactured by InterTest, Inc. will carry the OEM's limited warranty, which will be passed to the purchaser through and supported by InterTest, Inc. InterTest, Inc.'s obligation under this limited warranty shall be confined to the repair or exchange of any part, or parts thereof, that prove defective under normal use and service for which the product was intended or designed.

This limited warranty covers products that upon our examination are deemed to be defective.

This limited warranty is in lieu of all other warranties, express or implied, including the warranties of merchantability and fitness for use. We neither assume, nor authorize any other person to assume for us, any other liabilities in connection with the sale of InterTest, Inc. equipment. This warranty



does not apply to any equipment that has been subject to accident, negligence, alteration, abuse, unauthorized repair, improper storage, or other misuse.

This limited warranty applies only to the original purchaser and cannot be assigned or transferred to any third party without express written consent from InterTest, Inc.

This limited warranty does not apply to consumable items, expendable items or normal wear and tear, nor does it apply to failure due to radiation, overheating and / or below freezing temperatures.

InterTest, Inc. assumes no responsibility, either expressed or implied, regarding the improper usage of this equipment or interpretation of test data derived from the use of this equipment. InterTest, Inc.'s responsibility and obligations, in all cases, are limited strictly to the repair and/or replacement costs outlined above. The laws of the State of New Jersey shall govern this warranty

Note: In the event the equipment cannot be returned to InterTest, Inc. The customer agrees to pay all travel and living expenses incurred to have an InterTest, Inc. representative evaluate, assess or affect a warranty repair in the field.

System Setup

Camera & Poles Case

Open the Case & Remove Camera & Poles

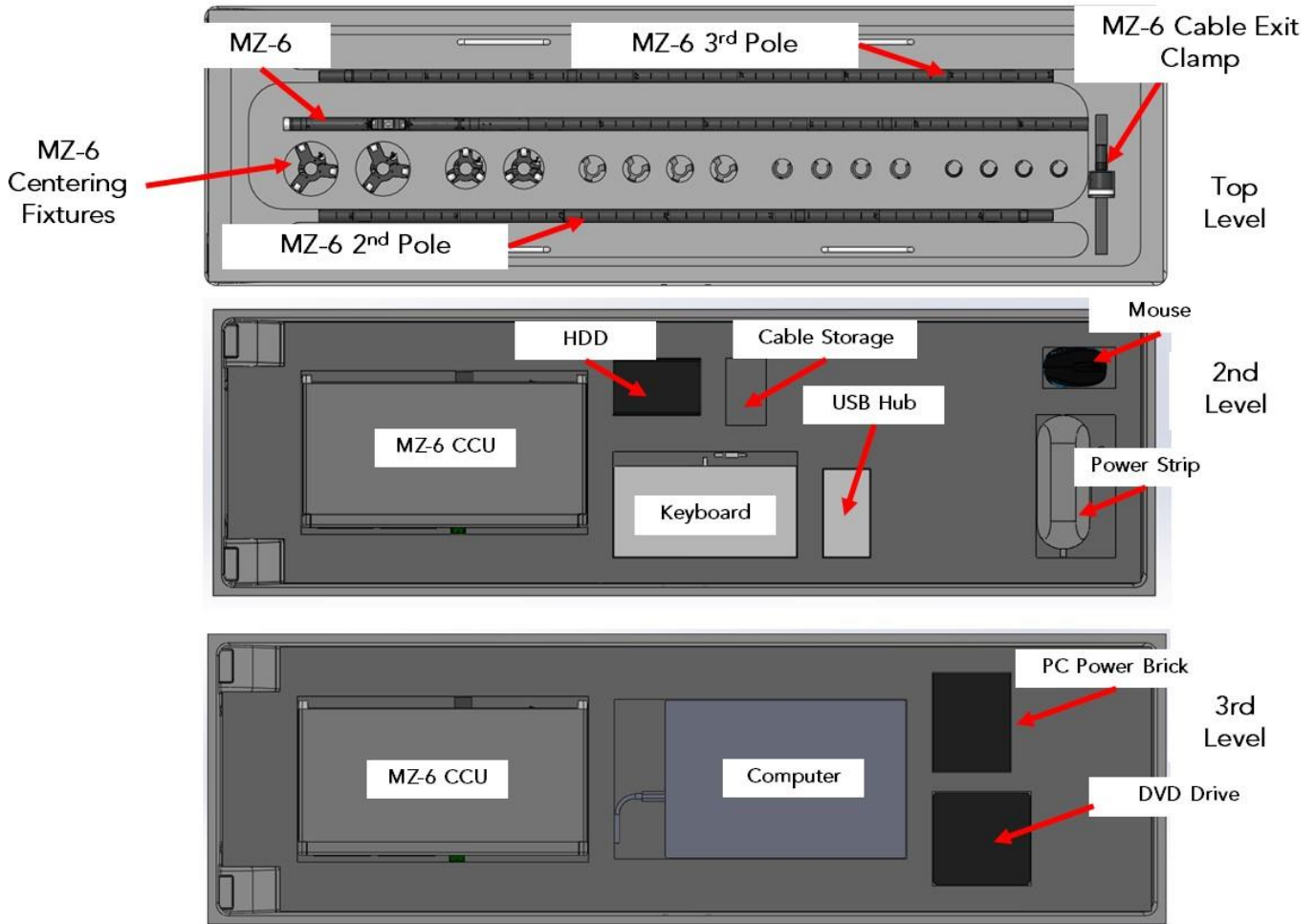


Figure 1 MZ-5 Camera, Poles & Centering Fixtures

MZ-6 Camera & Poles Setup

Install the appropriate Camera Centering Rings. These are stored in the “bottom of the case set See and Figure 2

Poles have the cable already feed through the poles. Snap poles together to use.



Figure 2 Centering Ring Notches

Control Unit (CCU)



Figure 3 MZ6 Control Unit

MZ-6 Operation

MZ-6 Connections

- 1) Connect the cameras. In the appropriate control unit connection. Cables are marked as "Forward" & "Side"
- 2) Connect the MZ6 Head
- 3) Connect the USB Cable from the rear of the Control Unit to the Laptop/Computer
- 4)



Figure 4 MZ-6 Connections



Figure 5 MZ-6 USB Video Cable



Figure 6 MZ6 Connections

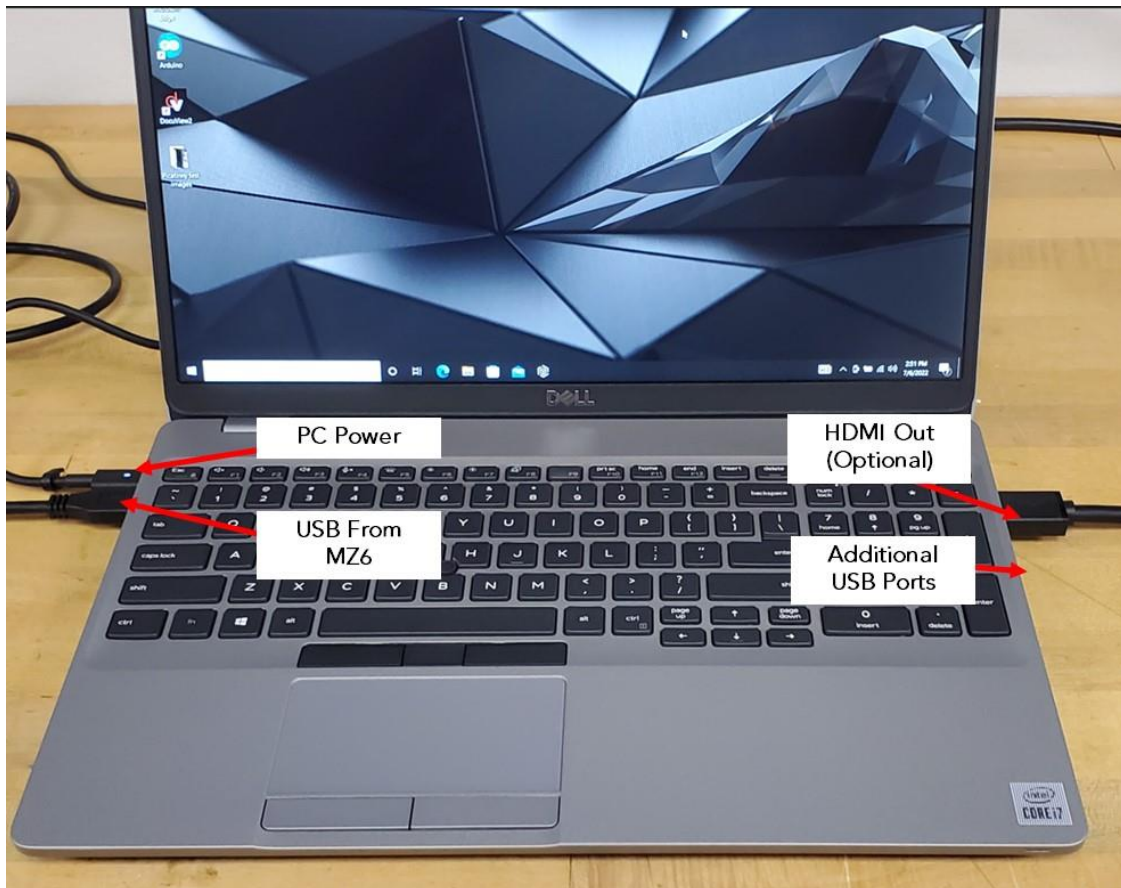


Figure 7 MZ6 Connection to Computer

Power ON the System

-Power on the CCU & Computer

- 1) Open the Windows

Select the **Start** button on the taskbar. Then, on the left side of the Start menu, select the account name icon (or picture) > **Switch user** > a different user.

- 2) Double Click on the DocuView2 Program Icon

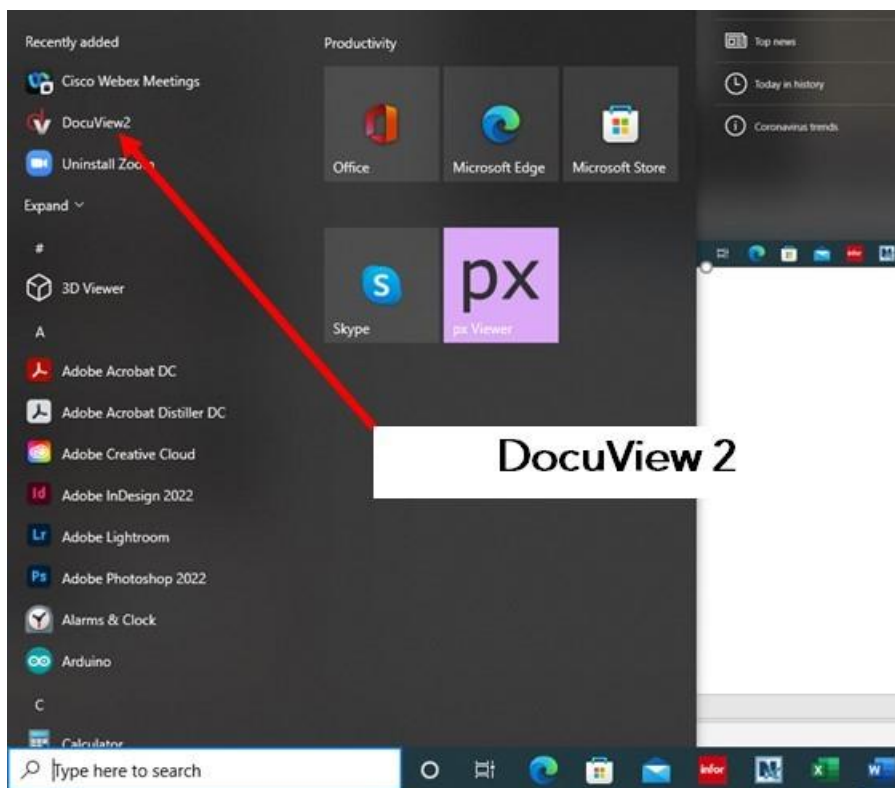


Figure 8 Switch User & Docuview

-Click On "File" & then "Settings".



Figure 9 System Settings

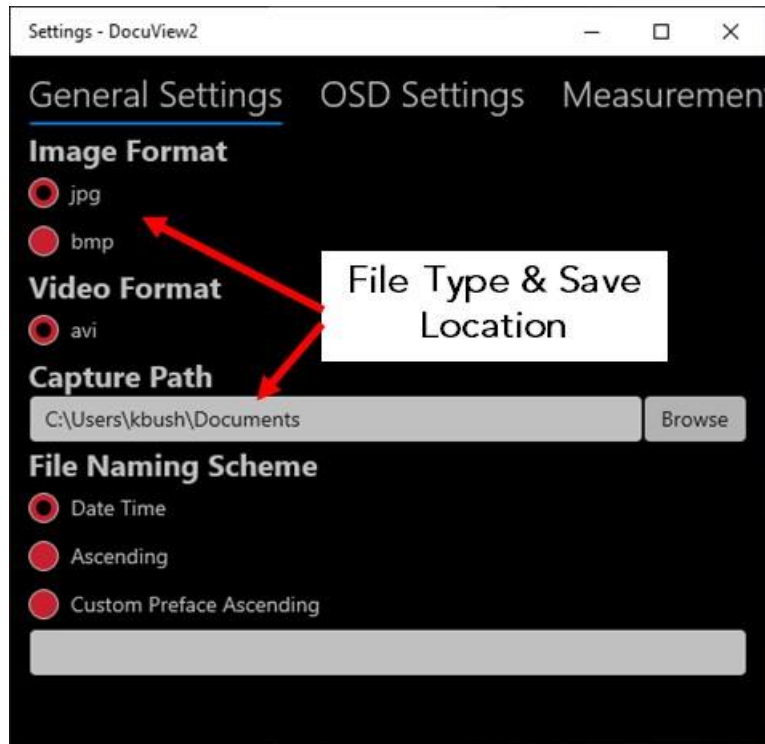
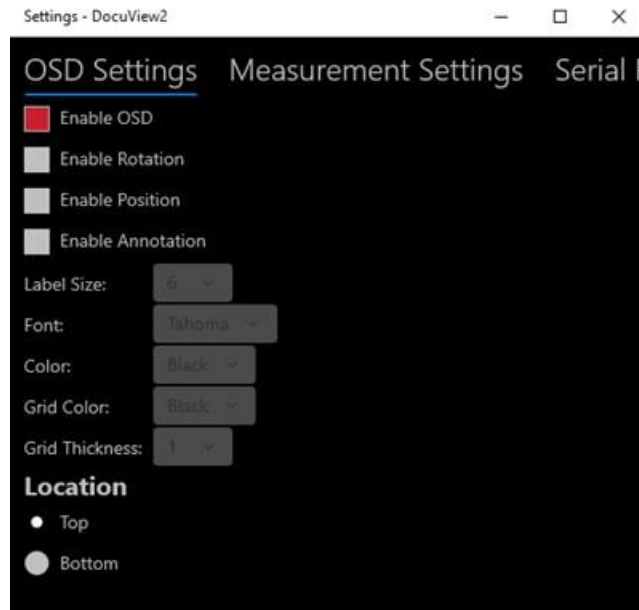


Figure 10 General System Settings

- 1) Select the file type & where the files will be stored. See Figure 10 General System Settings

- 2) Select file naming scheme.
 - a. Date Time
 - i. Example: 2022-06-23_151720 (Year, Month, Day & Time (24 Hour Clock))
 - b. Ascending
 - i. Example: 000XX-000YY
 - c. Custom Ascending
 - i. Example: User Entered Prefix 000XX-000YY



3)

4) Figure 11 OSD Settings

- 5) OSD Settings:
 - 6) Enable OSD. This turns on on-screen display including date & measurement
 - 7) Enable Rotation shows rotation of the camera (If equipped)
 - 8) Enable Insertion shows of the camera (If equipped)
 - 9) **Note:** Units selected under Measurement Settings. (See Figure 13 Measurement Settings)
 - 10) Enable Annotation: Displays date, time & measurement. Size of annotation & color are set here
 - 11) to include grid if enabled. See Error! Reference source not found.

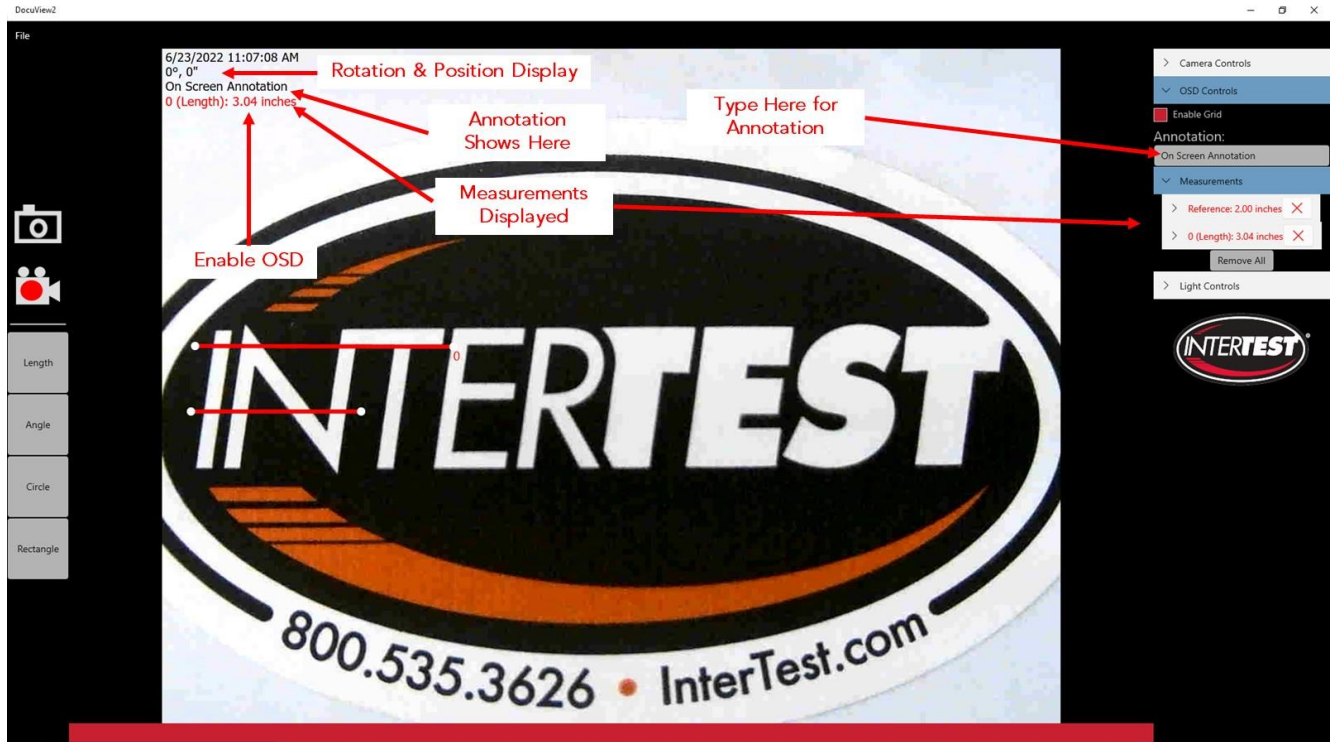


Figure 12 On-Screen Display Sample

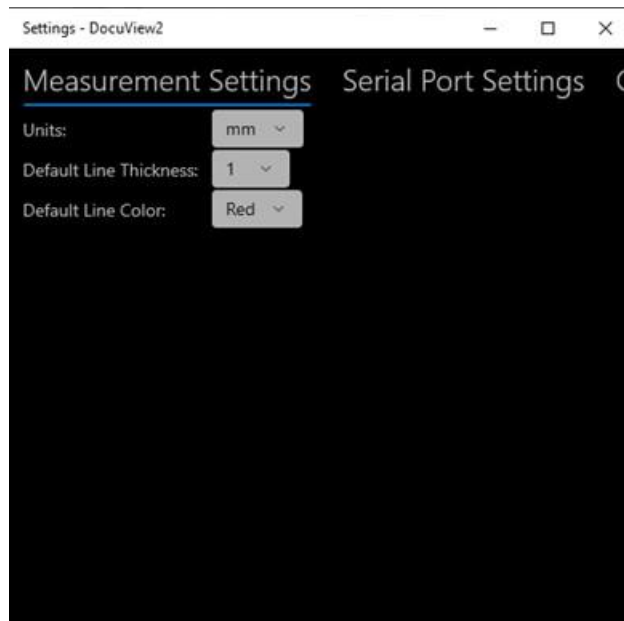


Figure 13 Measurement Settings

Measurement Units, Line Thickness & Color are set here. See Figure 13 Measurement Settings

mm or inches

Line thickness: 1-22

Line Color: red, black, white, grey or green

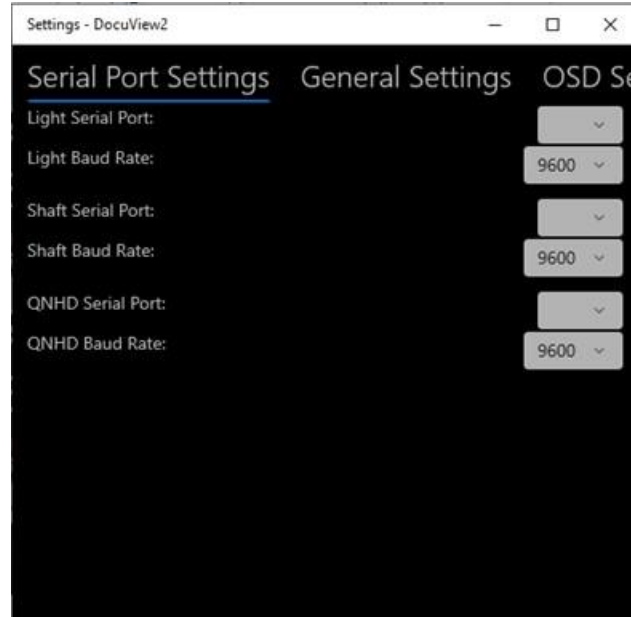
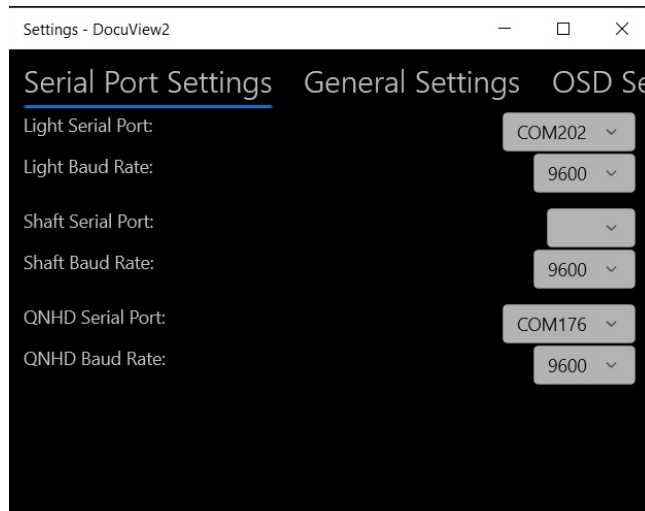


Figure 14 Serial Port Settings

See Default Settings Chart, Serial Port settings may not be used with all systems



Go into Camera Settings

a. Set Video Resolution(s) & COM Ports

QNHD Camera Settings	Forward	Side
Video Resolution	1920x1080 30fps	1920x1080 60fps
COM Port	175	176
Light COM Port	202	202

Figure 15 QNHD Camera Settings



Figure 16 Opening

Open the Camera Controls Menu. See Figure Figure 16 Opening, Figure 18 Camera Control and Figure 19 Camera Controls & Functions

Select the Camera

Select Video Resolution, Refer to Default Table(s) for proper settings

If needed select the flip function(s) See Figure 17 Flip Functions

White Balance. Slider bar of "manual"

QN Focus +/- (QN Cameras Only!) May not work with all systems



Note: It is highly recommended to only twist or rotate the camera head / cable 180° at any one time. Cabling may be damaged by turning the cable through multiple rotation

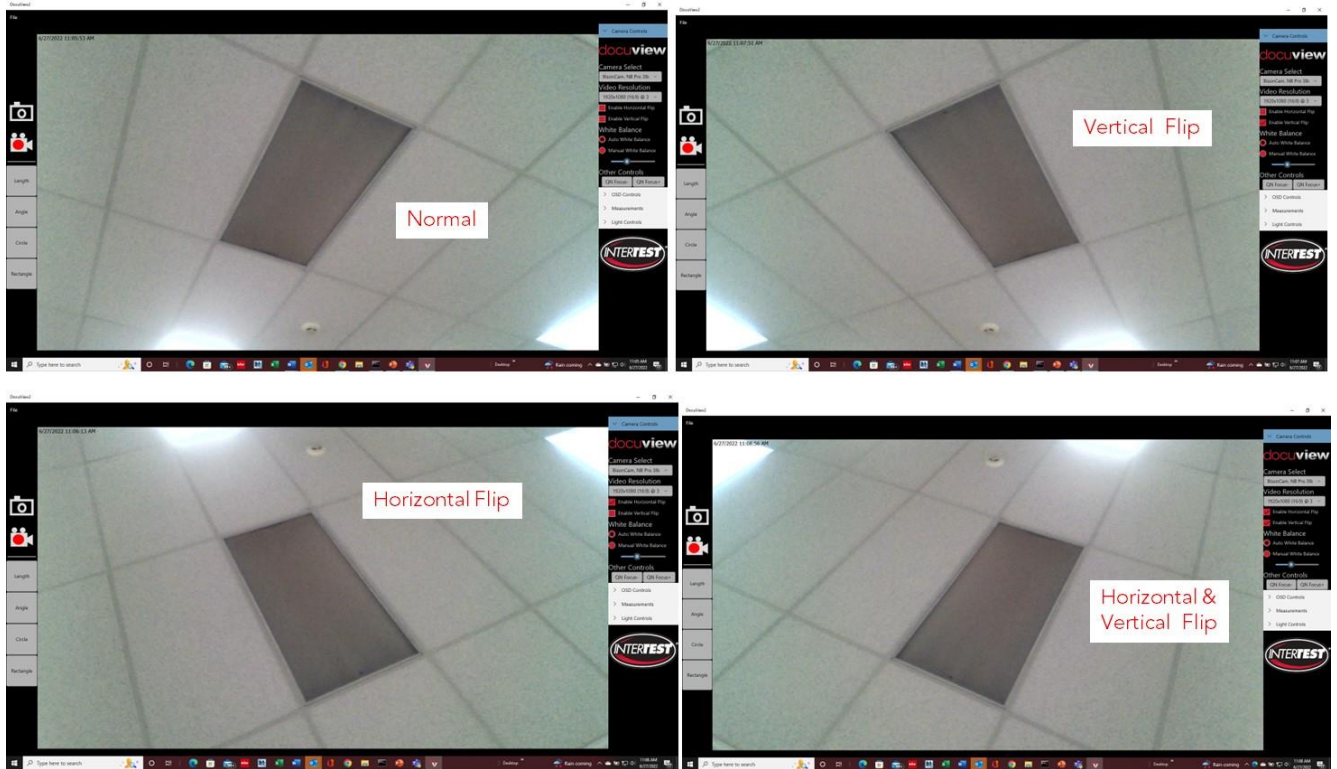


Figure 17 Flip Functions



Figure 18 Camera Control



Figure 19 Camera Controls & Functions



Figure 20 On-Screen Grid

On-Screen Grid. If enabled a grid is displayed on the screen. The number of horizontal & vertical pixels are set here. See Figure 20 On-Screen Grid and Figure 21 On Screen Grid Sample



Figure 21 On Screen Grid Sample

Measurement

The measurement function is performed on a pixel counting basis. It requires calibration on a known target at the same distance as the intended measurement. Typically a scale is placed in the field of view and the reference function is used for calibration of pixel to units of measure. For greatest accuracy limit the calibration and measurement to the center 1/3 of the view.



Figure 22 Open Measurement Window

Reference Dimension

- a) A reference dimension **MUST BE** set.
 - i) To "SET" Select "Line"
 - ii) Select Units, mm or inches (Done under settings, see Error! Reference source not found.)
 - iii) Once drawn, select "keep"
 - iv) "Click" on the screen while holding down the left mouse button.
 - v) Drag the to the second point & release the left mouse button
 - (1) If you make a mistake click "discard" & start over



Figure 23 Place Reference Line

When placing a Reference Line, be careful to not place it too far up in the corner. Other OSD measurements may become obscured. See Figure 26 Circle Placement



Figure 24 Line Placement



Figure 25 Angle Placement

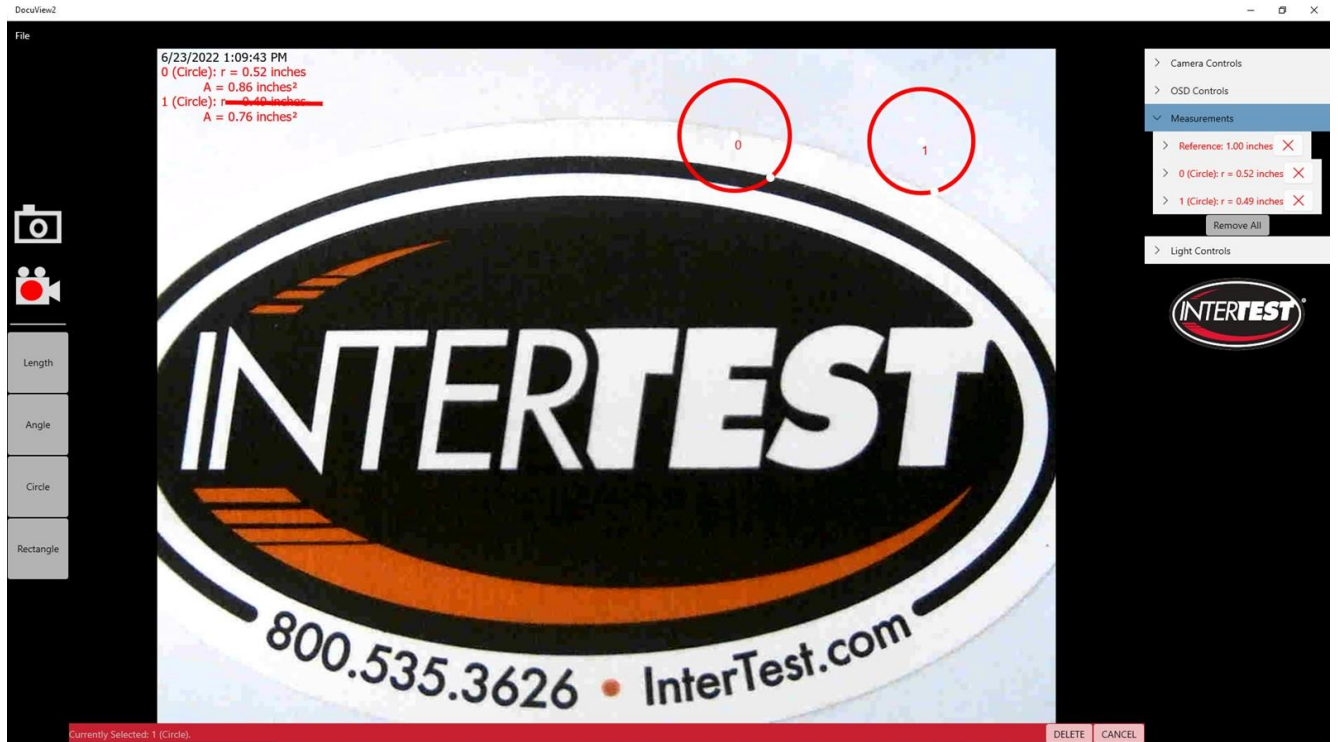


Figure 26 Circle Placement



Figure 27 Light Controls

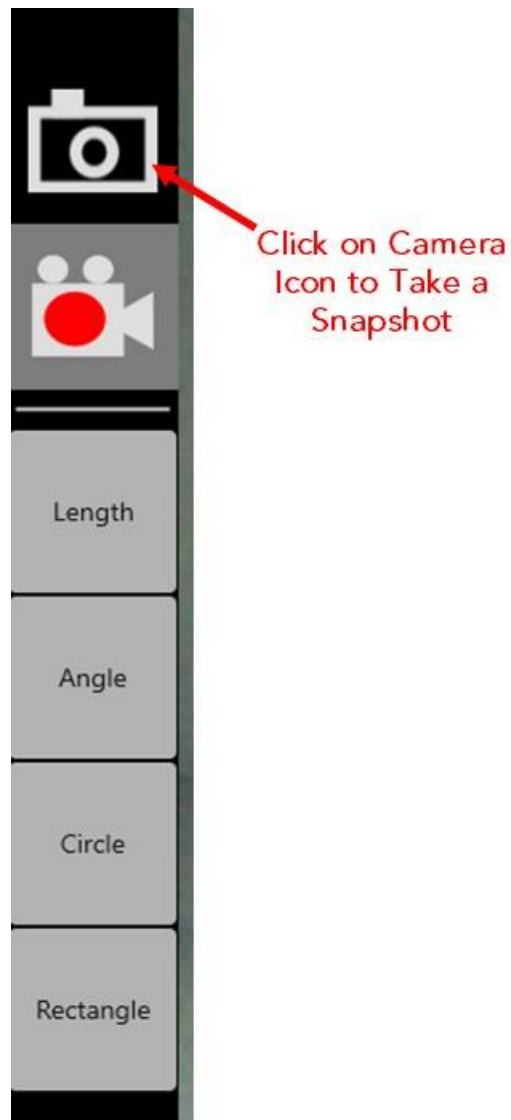


Figure 28 Picture / Snap Shot

Note Images are stored in the saved file location, See Figure 10 General System Settings

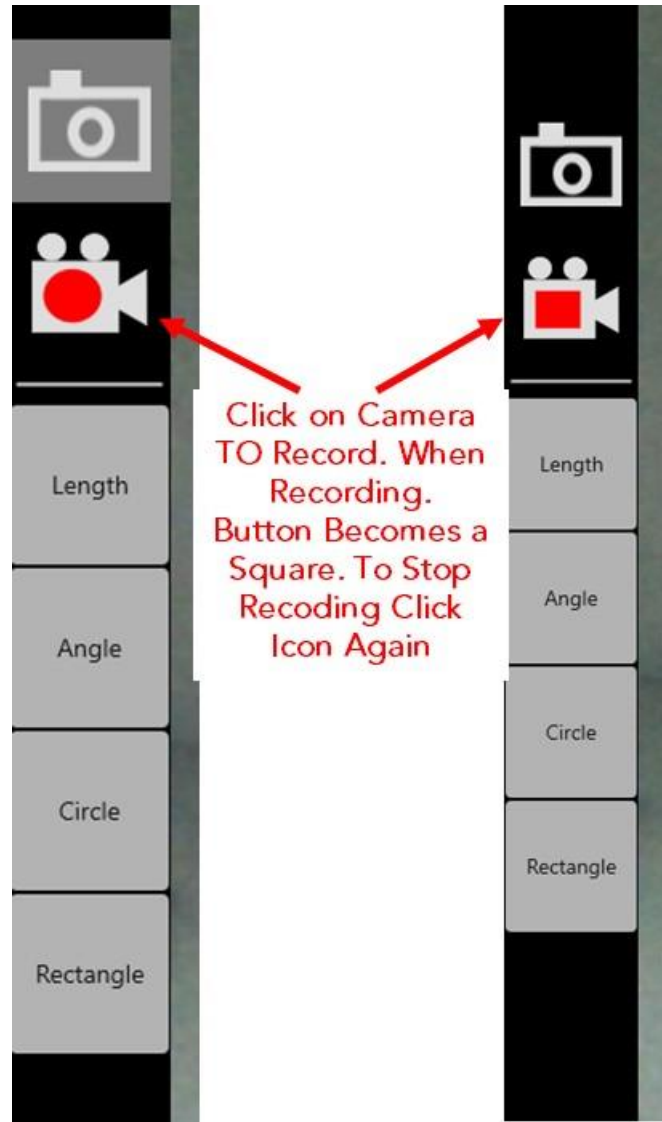


Figure 29 Video Recording

Note Videos are stored in the saved file location, See Figure 10 General System Settings



Chapter 4 — Specifications

Detailed System Specifications MZ-6

Introduction

The MZ-6 Small Bore Inspection System supports visual examinations of bore IDs during general white light visual inspections and/or UV fluorescent inspections. Independent White and UV LEDs provide for examination of surfaces with live color 1080 HD video. The MZ-6 utilizes two HD micro cameras to provide video or photos of bores from 20 mm to 60 mm diameter. The high-performance sensor is matched to display and capture hardware. It is operated from a notebook type PC with auxiliary monitor for ease of viewing. MZ-6 supports the visual examinations of 20, 25, 30, 40 and 60 mm bores up to 10' length. The head contains one camera for forward down tube view and one camera with remoted controlled focus for right angle viewing view.

Specifications*:

1. Video performance
 - a. 1080/30 HD video for general visual, or MPI and MT inspections
 - b. Sensor and optics optimized for both white and UV examinations
 - c. 2 MP (1920 x1080 pixel) motion and still image capture
 - d. 0° DOV down tube view
 - i. 90° HFOV
 - ii. 16:9 Format
 - iii. 1920 x 1080 CMOS pixel image sensor
 - iv. Manual adjustment of focus
 - e. 90° DOV right angle view
 - i. 60° HFOV
 - ii. 16:9 format
 - iii. 1920 x 1080 CMOS pixel image sensor
 - iv. Remote controlled motor driven focus
 - f. Optical and camera components protected from process fluids and other contaminants
2. Mechanical head and pole
 - a. .75" (19 mm) diameter inspection head and pole
 - b. 10' (30.5 cm) overall system length one piece carbon composite pole



- c. centering fixtures for 25, 30, 35, 40, 60 mm tubes
- d. Poles marked for down tube insertion position 1" increments
- 3. Illumination – High performance UV and White LEDs rated 10,000 hour life.
 - a. UV is 365nm at intensity > 2000 $\mu\text{W}/\text{cm}^2$ on the target surface with < 2 fc white content
 - b. 365 nm UV LED down bore and side view
 - c. White LED down bore and side view
 - d. Independent intensity control both white and UV
- 4. System Configuration and Packaging
 - a. 3 storage and transit cases. One each for:
 - i. Head, umbilical and pole
 - ii. Notebook PC, monitor, keyboard, mouse, centering fixtures, and power supply
 - iii. 24" auxiliary monitor
- 5. System Features User Interface
 - a. Notebook type PC based operation
 - i. 1 TB RAID 1 storage provides
 - 1. 1200+ hrs video or
 - 2. 400,000+ stills image at 1080 resolution
 - ii. 1920 x 1080 high performance graphics
 - iii. Windows 10 Pro OS
 - b. DocuView™ display, capture, annotation, measurement, and control interface
 - c. 24" 1920 x1080 resolution auxiliary display
 - d. Soft key selectable down tube and side views
 - e. On screen annotation
 - i. Manual entry of down tube and rotation positions
 - ii. Manual entry of other data such a part and serial number, comments, etc.
 - iii. Image file name and time / date
 - f. Video capture and measurement functions.
 - i. HD Video capture 1080/30p
 - ii. HD Image capture 1920 x 1080 pixel
 - iii. Capture to storage media
 - 1. Hard drive (1 TB RAID 1 standard)
 - 2. External DVD
 - 3. USB media
 - g. Inspector hand feeds the pole system into the gun tube. Manual insertion at rates suitable for inspection, adding centering fixtures at approx. 5' intervals



- h. Controls from PC Mouse & Keyboard
 - i. Illumination intensity UV & White
 - ii. Video Recorder on/off
 - iii. Still image capture
 - iv. Measurement (DocuView™) operations
 - i. Control from PC only
 - i. Annotation
 - ii. Measurement functions with DocuView™ software
 - iii. Grid functions
 - iv. Setup parameters
 - v. Video or image still capture
6. System Features mechanical.
- a. Control unit desktop based + notebook type PC, keyboard, mouse, and power supply.
 - b. Storage for centering fixtures.
 - c. Head, Pole & cable system
 - i. Pole, umbilical and extension pole
 - ii. Rugged umbilical (anaconda sheath) overall length from head to control unit nominal 20' overall length.
 - iii. Centering fixtures 25, 30, 40, 60 mm
7. System electrical
- a. 120V/60Hz 10a power required (alternate power input optional for DC operations)

*Specifications are Subject to Change Without Notice

MZ-6 QNHD CCU Menu Interface



Figure 30 QNHD Menu Controls

Use the above labeled controls to navigate the menus as outlined below, Figure 31

Note:

Preset 1 is for MZ6 Side View Camera

Preset 3 is for MZ6 Front View Camera

MZ-6 QNHD Menu Structure

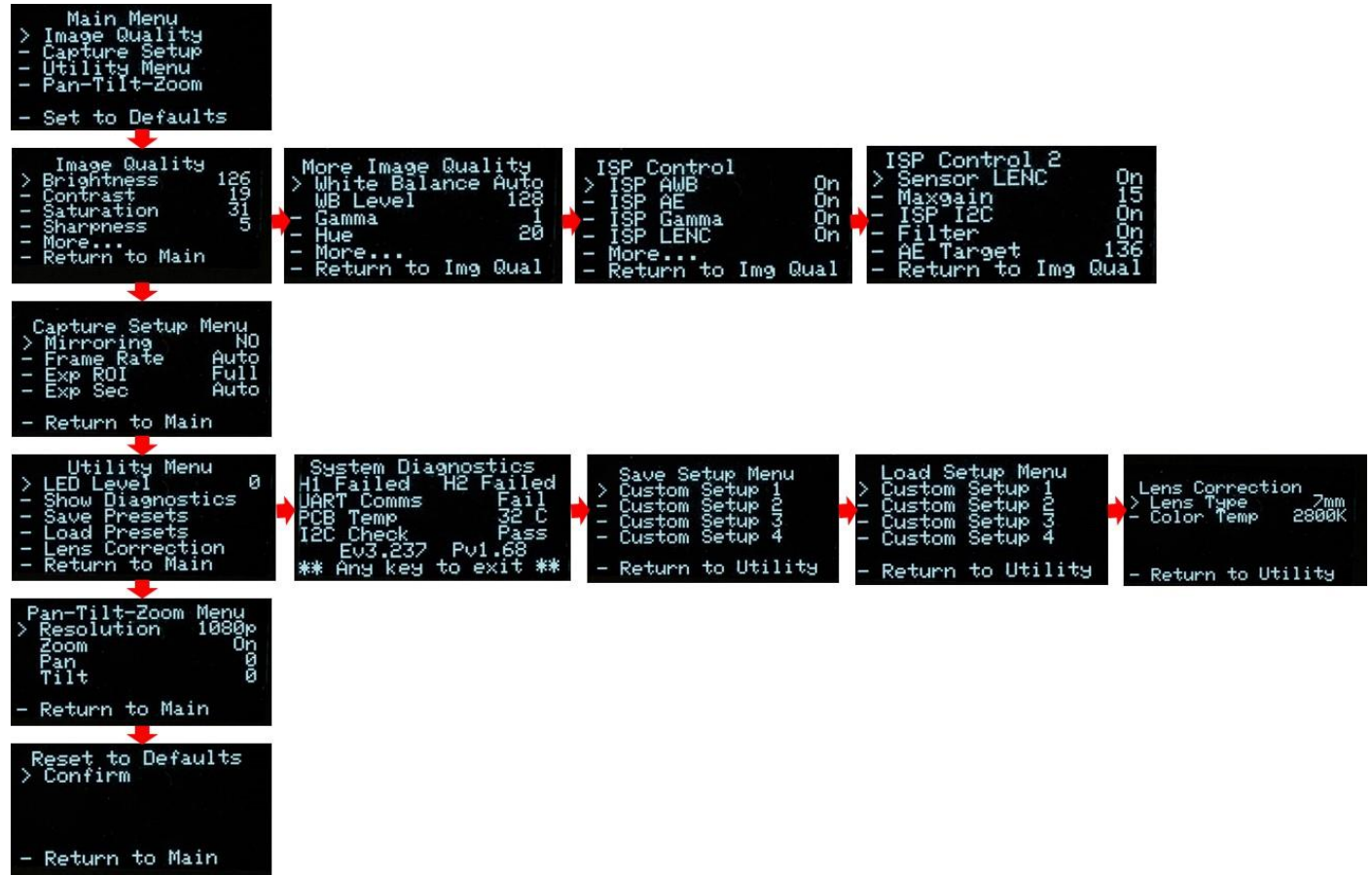


Figure 31 QNHD Menu Tree

Menu Tree

```
  Main Menu
> Image Quality
- Capture Setup
- Utility Menu
- Pan-Tilt-Zoom
- Set to Defaults
```

Menu tree home.

Image Quality

```
  Image Quality
> Brightness      126
- Contrast        19
- Saturation      31
- Sharpness       5
- More...
- Return to Main
```

□ Default

Brightness:	0 to 255,	Default: 187
Contrast:	0 to 63,	Default: 23
Saturation:	0 to 63,	Default: 31
Sharpness:	0 to 31,	Default: 5

More continues to options on More Image Quality page.

Return to Main: returns to top of menu tree and saves settings.

Image Quality I



□ Forward View

White Balance:	Auto or Set	Default Set
WB Level:	0 to 255	Default 50
Gamma:	0, 1, or 2	Default: 1
Hue:	-180 to 180	Default: 0

□ Side View

White Balance:	Auto or Set	Auto
Gamma:	0, 1, or 2	Default: 1
Hue:	-180 to 180	Default: 0

Return to Img Qual: returns to previous page, Image Quality.

Image Quality II

```

ISP Control
> ISP AWB           On
-  ISP AE           On
-  ISP Gamma        On
-  ISP LENC         On
-  More...
-  Return to Img Qual
    
```

□ Forward View

ISP AWB	Default	Off
ISP AE	Default	On
ISP Gamma	Default	On
ISP LENC	Default	On

□ Side View

ISP AWB	Default	On
ISP AE	Default	On
ISP Gamma	Default	On
ISP LENC	Default	On

Image Quality III

```

ISP Control 2
> Sensor LENC      On
-  Maxgain         15
-  ISP I2C         On
-  Filter          On
-  AE Target       136
-  Return to Img Qual
    
```

□ Forward View

Sensor LENC	Default	Off
Maxgain	Default	15
ISP I2C	Default	On
Filter	Default	On
AE Target	Default	59

□ Side View

Sensor LENC	Default	On
Maxgain	Default	15
ISP I2C	Default	On
Filter	Default	On
AE Target	Default	59

Capture Setup



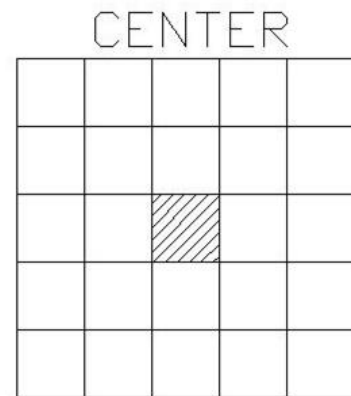
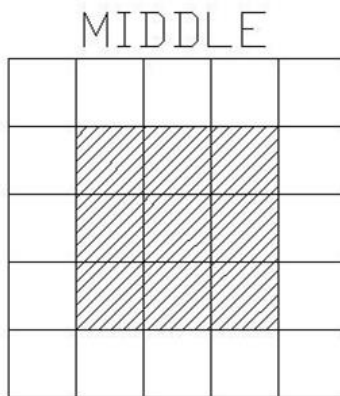
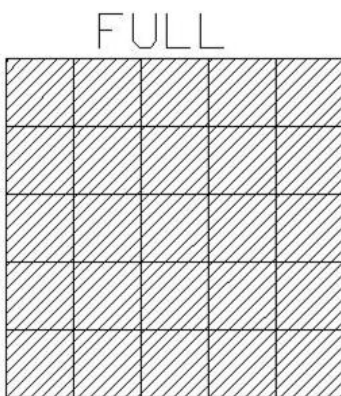
Mirror: No, H, V, HV. Default: No

Frame Rate: Auto, 1 to 30 Hz in 1080 Default: 60
 1 to 60 Hz in 720
 1 to 120 Hz in VGA

Exp ROI Default Middle

Exp ROI: Full, Middle, Center Exposure Region Of Interest. Area analyzed to adjust Image

Exp ROI: Full, Middle, Center Exposure Region Of Interest. Area analyzed to adjust Image



EXP Sec: Default: Auto



Length of time image is exposed per second

- 1/7, 1/8, 1/9, 1/10, 1/15
- 1/20, 1/25, 1/30, 1/50,
- 1/60, 1/100, 1/120, 1/250
- 1/500, 1/1000, 1/5000,
- 1/10000, 1/20000, 1/30000

□ Forward View

Mirroring	Default	No
Frame Rate	Default	30
ROI	Default	Middle
Exposure	Default	Auto

□ Side View

Mirroring	Default	No
Frame Rate	Default	Auto
ROI	Default	Full
Exposure	Default	Auto

Utility Menu



LED: 0 (N/A for MZ6)

0 to 10 Light intensity level Constant Current @ 8VDC

(See Aux Light QNHD Command List for RS232)

- Show Diagnostics Displays system diagnostics Status
 - Save Presets Allows current settings to be stored for later recall
 - Load presets Allows previously stored settings to be restored
 - Lens Correction For setting color correction of the lens installed
- For MZ6 see Lens Correction Settings

□ System Diagnostic

```
System Diagnostics
H1 Failed      H2 Failed
UART Comms     Fail
PCB Temp       32 C
I2C Check      Pass
Ev3.237 Pv1.68
** Any key to exit **
```

1080/30 (H1): Locked/Failed Camera type attached

1080/60 (H2): Locked/Failed Camera type attached

Note: Only one camera type will read as "Locked". The other will indicate fail

UART Comms:Pass/Fail USB communication functioning

PCB Temp: xx-xx C typ

(Temp on PCB)

I2C Error: 00xx

Ev#.### Pv#.## firmware revision loaded in CCU.

□ Save Setup Menu

```
Save Setup Menu
> Custom Setup 1
- Custom Setup 2
- Custom Setup 3
- Custom Setup 4
- Return to Utility
```

Allows up to 4 sets of camera settings to be stored for later recall and use.

□ Load Presets

```
Load Setup Menu
> Custom Setup 1
- Custom Setup 2
- Custom Setup 3
- Custom Setup 4
- Return to Utility
```

Allows recall and use of any of 4 previously store sets of camera settings.

□ **Lens Correction**



Allows setting lens installed and color temp for image correction.

LENS TYPE: A, B, C, D, E

Color Temp: 2800K, 4500K or 6500K

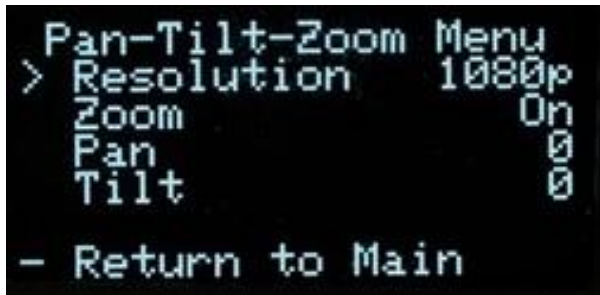
Forward View

Lens Type	Default	2.5
Color Temperature	Default	4500

Side View

Lens Type	Default	15 or 7
Color Temperature	Default	2800

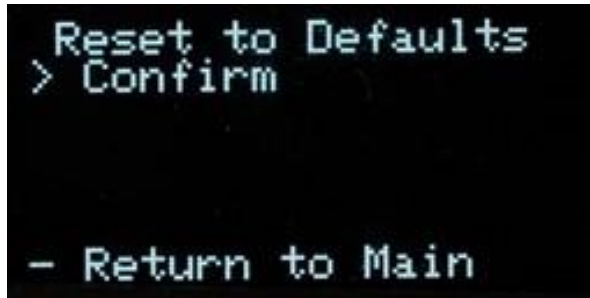
Pan Tilt Zoom Menu



Resolution:	USB output	1080p, 720p, 480	Default: 1080p
	DVI output	1080p, 720p	
	In 1080p	Pan, Tilt & Zoom Disabled	
Zoom: (On/Off)	Default: Disabled		
Pan:	+/- 320 in 720p	Default: Disabled	
	+/- 640 in 480		
Tilt:	+/-180 in 720p	Default: Disabled	

+/- 300 in 480

Set to defaults



Confirm: changes settings to the factory default settings and returns to Main Menu.

Return to Main: Returns to top of Menu Tree (Main Menu), without changing settings.

Chapter 5 — Care and Maintenance

- 1) Camera windows should only be cleaned with denatured alcohol & lens wipes
- 2) Wipe down system with clean cloth or wipes before storing in case
- 3) Return rings to proper storage space



Note: It is highly recommended to only twist or rotate the camera head / cable 180° at any one time. Cabling may be damaged by turning the cable through multiple rotations






Chapter 6 — Components and Part Catalog

The following is a list of components and parts that may be purchased as replacements or as optional accessories.


EM Number	Description	Reference Image
EM13240	MZ-6 Small Tube Inspection System	
EM18608	MZ6 CCU (REV 2)	
EM17302	MZ6 CAMERA HEAD ASSY	



EM Number	Description	Reference Image
EM17201 EM166450 EM166451 EM166452	MZ6 Pole Set POLE SECTION A, MZ6, ENGRAVED POLE SECTION B, MZ6, ENGRAVED ^{3RD} POLE SECTION C, MZ6, ENGRAVED	
EM17187	CENTERING RING, 60MM, MZ6	
EM17188	CENTERING RING, 81MM, MZ6	
EM1664186 EM1664187 EM166427	30MM SNAP RING SPIDER ASSY, MZ6 40MM SNAP RING SPIDER ASSY, MZ6 25MM SNAP RING SPIDER ASSY, MZ6	



MZ-6 Small Bore Inspection Systems

EM Number	Description	Reference Image
EM626610	Mouse** Commercially Purchased:	
EM62661	Keyboard** Commercially Purchased:	