



Nikon

CNC Video Measuring System iNEXIV

model

VMA-2520

Instructions
(Hardware)

Thank you for purchasing the Nikon products.

This instruction manual is written for the users of the Nikon CNC Video Measuring System iNEXIV "model VMA-2520".

To ensure correct usage, read this manual carefully before operating the instrument.

- It is prohibited to reproduce or transmit this manual in part or whole without Nikon's expressed permission.
- The contents of this manual are subject to change without notice.
- Some of the products described in this manual may not be included in the set you have purchased.
- Although every effort has been made to ensure the accuracy of this manual, if you note any points that are unclear or incorrect, contact your nearest Nikon representative.
- Also refer to the instruction manuals for any other system that you may be using in conjunction with this product (such as a personal computer, display, etc.).

Warning Symbol Used in This Manual

Although Nikon products are designed to provide you with the utmost safety during use, incorrect usage or disregard of the instructions can cause personal injury or property damage as well as voiding the terms of warranty. For your safety, read the instruction manual carefully and thoroughly before using the instrument. Do not discard this manual but keep it near the product for easy reference.

In this manual, safety instructions are indicated with the symbols shown below. Be sure to follow the instructions indicated with these symbols to ensure correct and safe operation.

Symbol	Meaning
 WARNING	Disregarding instructions marked with this symbol may lead to death or serious injury.
 CAUTION	Disregarding instructions marked with this symbol may lead to injury or property damage.

Meaning of Symbols on the Product

Symbol	Explanation
	Caution! Moving Parts! This symbol on the stage reminds you of the following cautions: • Do not touch the main body or the stage while the equipment is in motion. Your hands or fingers could be caught in the machinery. • Do not place your hands or fingers within the movement range of the stage in the X and Y directions or under the components that move in the Z direction. Your hands or fingers could be caught in the machinery. • When working on the stage, such as placing a workpiece on the stage, never move the movable components.

Symbol	Explanation
	Maximum permissible mass on stage: 15 kg This label on the stage reminds you of the following cautions: • The maximum mass that can be placed on the stage is 15 kg. • Never exceed the maximum permissible mass, taking into consideration not only the mass of the workpiece but also the mass of the clamps, etc. • Exceeding the maximum permissible mass could cause the stage glass to break.

Symbol	Explanation
	Caution! Moving Component in Rising Operation! This label, attached to the top part of the main body, draws your attention to the following cautions: • The top section of the main body is a moving component and it rises and lowers together with the vertical mover. • Do not bring your hand or face close to the moving component when the system is in operation. • Provide sufficient space above the equipment for the movement of the component, and make sure that this movement is not impeded by any interfering object.

Symbol	Explanation
	When the optional “Laser Auto Focus” is installed, the entire system is classified as a Class 1 Laser product, and this label is visible on the front side of the lower head section. This label reminds you of the following cautions: • Do not look directly at the laser beam (red light) intentionally for an extended period of time. Doing so can damage your eyes. • Be sure to read the instruction manual for the “VMA-LAF35 for iNEXIV VMA Series” carefully before using the system. The instruction manual contains important safety information.



WARNING

1. Purpose of system

This system is a precision optical measuring system. Do not use it for any purpose other than measurement and observation. The controller for this system was developed specifically for this system; do not use it for any other purpose.

2. Do not disassemble the system

Never attempt to disassemble this system except as specifically instructed in this instruction manual. Attempting to disassemble the system could harm the performance of the system, and also carries a risk of electric shock and injury.

The zoom head, guide, and scale are adjusted at the factory with extreme precision, so never attempt to disassemble them. If you notice a problem, contact your nearest Nikon representative.

3. Turn off the power when connecting or disconnecting cables

When connecting or disconnecting any of the cables, always turning off the power and unplug the power cord first to prevent any possible electric shock.

Before turning off the power, be sure to first close any programs that may be running.

4. Emergency stop

In a case of emergency, press the yellow STOP switch located on the top right of the joystick box. The system stops immediately.

To recover from an emergency stop, turn the power off, clear the condition that necessitated the emergency stop, and then restart the system.

5. Mass of the workpiece

The maximum mass that may be placed on the stage is 15 kg. Never exceed the maximum permissible mass, taking into consideration not only the mass of the workpiece but also the mass of the clamps, etc. Exceeding the maximum permissible mass could cause the stage glass to break, which could result in serious injury or a major accident.

6. System Setup

Moving the system creates a risk that the system may tip over and cause injuries. Always contact your Nikon representative before moving the system. Otherwise, Nikon shall not bear responsibility for any accidents or damage that occur while the system is being moved. (However, you can move the system if there is no ridge or slope in level along the path over which the system is to be moved. Be certain that you have read page 7 and understand all of the warnings and cautions described therein before attempting to move the system.)



CAUTION

1. Confirm the input voltage

- Before plugging in the power cord, confirm that the input voltage indications on the host computer and the display (located on labels near the power receptacles) match the supply voltage that is being used.

If the input voltage is not identical to the supply voltage, do not attempt to connect the power but contact your nearest Nikon representative. Using the incorrect supply voltage could cause a malfunction, fire, or electric shock.

- The input voltage for the VMA-2520 automatically switches within 100 - 240 V~, 50/60Hz. The power supply receptacle is located on the rear of the controller.
- Always plug the power cords for this system (including the VMA-2520, the computer, and the computer display) into a grounded three-conductor outlet. Improper grounding can result in electric shock or abnormal operation.
- Always be sure to turn OFF all of the power switches before plugging in the power cords.

2. Do not touch moving parts

Do not touch any moving parts, as these parts can trap your hands or fingers.

3. Cautions concerning heat from the controller

Note that the internal parts of the controller are extremely hot during and immediately after equipment operation.

- Do not bring highly flammable materials (gasoline, benzene, paint thinner, alcohol, etc.), cloth or paper near the controller. Doing so could start a fire.
- There are ventilation openings for a cooling fan on the rear of the controller. In order to allow the adequate dissipation of heat, install the controller so that there is an open space of at least 20 cm between the rear panel of the controller and the nearest wall. Do not obstruct the ventilation openings on the front of the controller.

Cautions Concerning Use

1. Installation Location

To avoid mis-operation and to perform safe and precise measurement, be sure to observe the following points when installing this system. Be especially careful not to pinch your fingers, etc., when installing the system.

- Install the system in a clean environment. Dust and oily vapors can have a clear and adverse impact on the performance of the system. Dirt and corrosion on the guide surfaces of the stage in particular can cause a deterioration in the precision of the system.
- Install the system in a location where the temperature ranges from 10 to 35 °C and where the humidity is less than 70%. Installation in a hot, humid location can result in condensation and malfunctions.
- Install the system in a controlled temperature environment (i.e., an environment that is not subject to rapid changes in temperature). Temperature changes can cause measurement errors.
- Before selecting the installation location, study the requirements described on page 17.
- Install the system in a location with little vibration.
- Install the system in a location that is not subject to sudden voltage fluctuations or electronic noise.
- If the ventilation holes for the cooling fan in the controller are blocked, a malfunction or fire could result.
- Install the controller so that there is an open space of at least 20 cm between the rear panel of the controller and the nearest wall. Do not obstruct the ventilation openings on the front of the controller.
- Make sure that the main body and the side of the measurement stand are at least 20 cm away from the nearest wall. When setting up a personal computer rack or other equipment next to the main body or the side of the measurement stand, also provide a space of at least 20 cm. Failure to follow this instruction may lead to the risk of collision between the stage and a wall or object.

2. Handle carefully

This system is a precision instrument that requires careful handling. Striking the system or operating it in a reckless manner could damage the system.

3. Measurement and temperature

Generally, the dimensions of a workpiece will change according to the temperature. (The amount of change depends on a coefficient that is inherent to the material.) The operation of this system is guaranteed over a wide temperature range, but in order to obtain stable and reproducible measurement results, the system should be used in an adequately controlled temperature environment with less temperature change. In addition, when using this system for the first time, be sure that you have allowed the system to become fully adjusted to the temperature environment. (Usually, this simply requires leaving the system in that temperature environment for about 24 hours.)

4. Measurement stand

The main body comes with a special measurement stand. If the special measurement stand is not used, be sure to use a stand with sufficient strength and rigidity. If a general-purpose working table is used, make sure it can withstand 1,000 kg of uniformly distributed load or more.

5. Z-axis motion prat

Do not let the optical head or the LEDs collide with the workpiece or the clamps. If there is a collision, press the STOP switch, turn off the power, and then remove the cause of the collision.

After restarting the system, even if it appears that everything is operating normally, be sure to “calibrate the optical head” and “check the Laser Autofocus focal position offset”. We also recommend that you have your nearest Nikon representative to inspect the system.

6. USB and IEEE1394 setting

Do not connect the supplied USB cable and IEEE1394 cable before the iNEXIV software is installed. If the cable is connected before the installation of the software, the device driver may not be set correctly.

The iNEXIV software can be used only when the appropriate driver is detected and installed when the cable is connected for the first time according to the instructions provided during the software installation.

7. Cleaning finished surfaces and plastic components

We recommend using a silicone cloth to clean finished surfaces and plastic components. If a surface is especially dirty, wipe it with a dilute, mild detergent. Do not use solvents (such as paint thinner, alcohol, or ether).

8. Isolation from the power supply

The weak electric power is running through the system even when its power switch is turned off. In the following conditions, be sure to unplug the power cord from the power outlet.

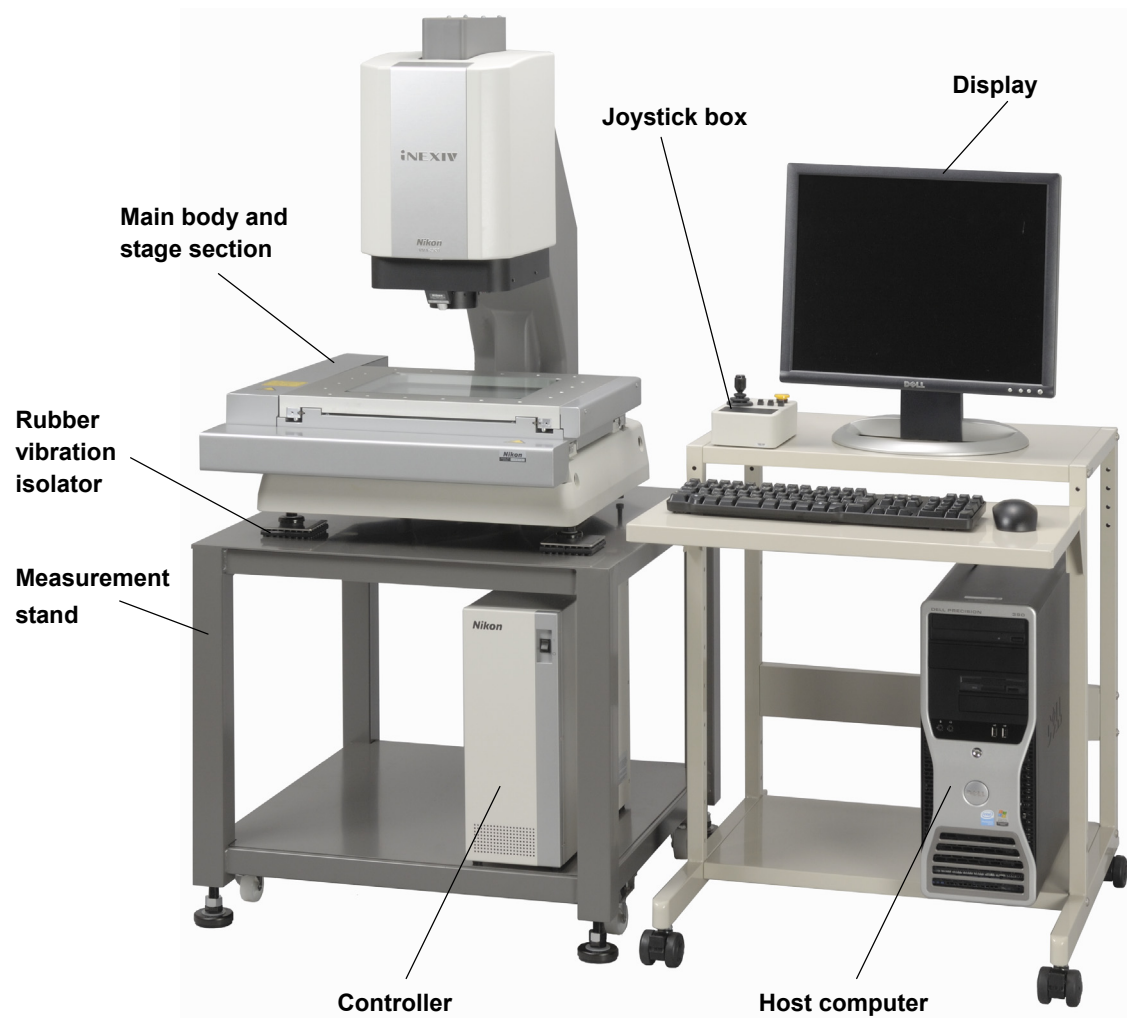
- When the system is not used for a long period of time.
- When you wish to isolate the system from the power source.
- In case of malfunction.

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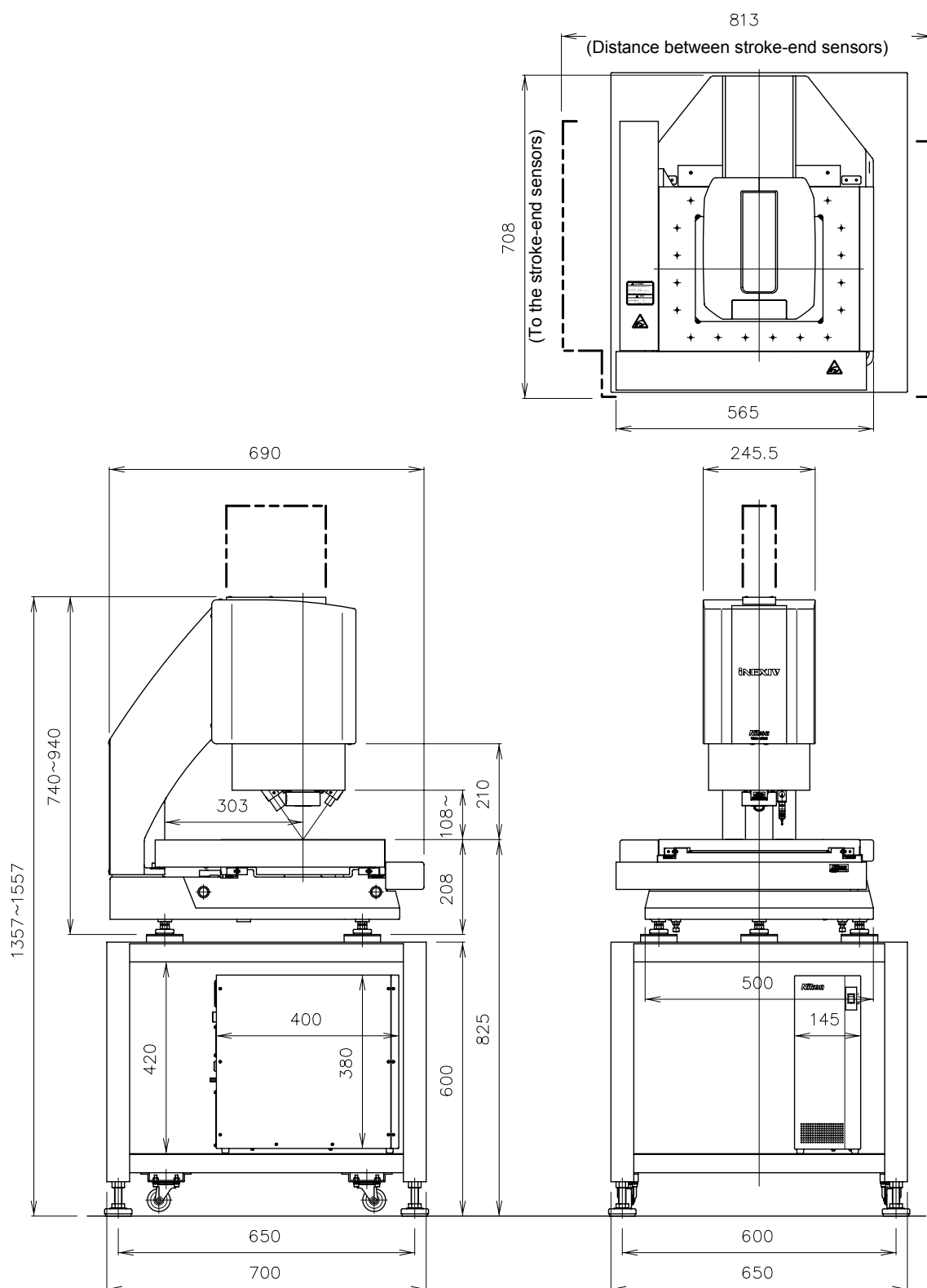
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Chapter I. Names of Parts and Their Functions

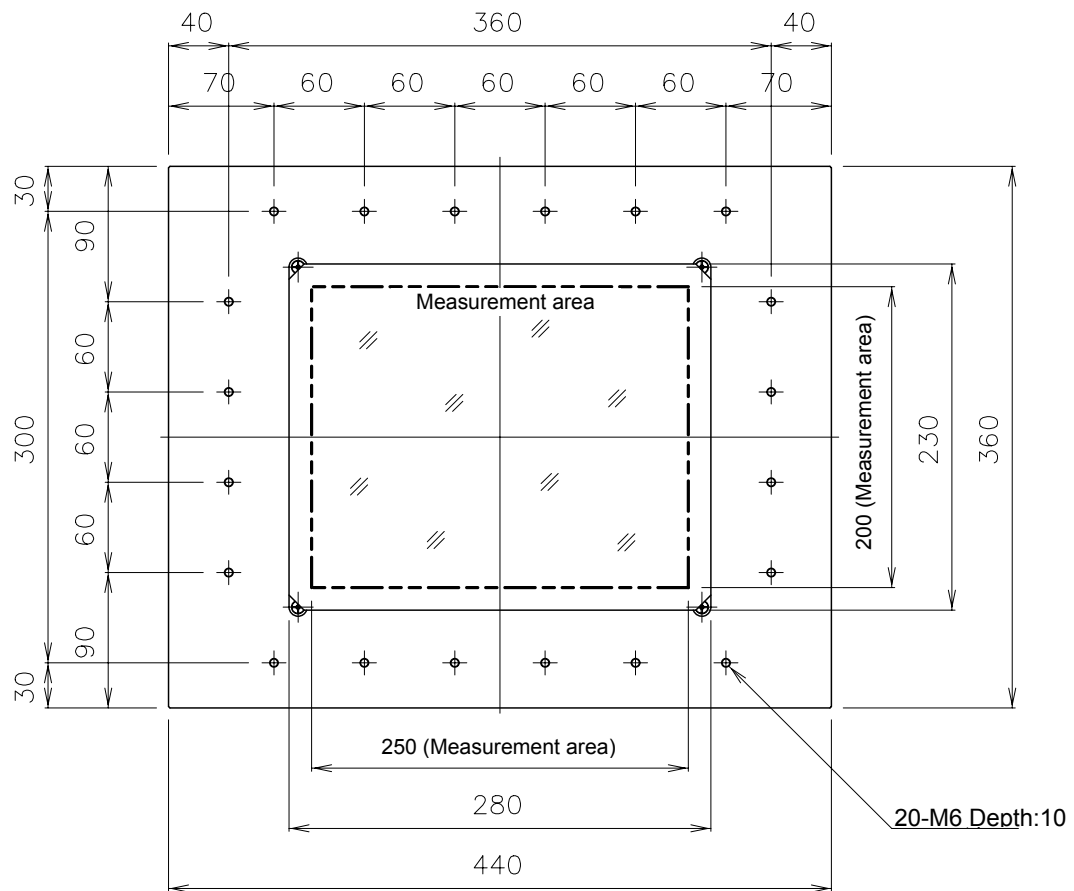
1.1 General



1.2 Main Body/Measurement Stand

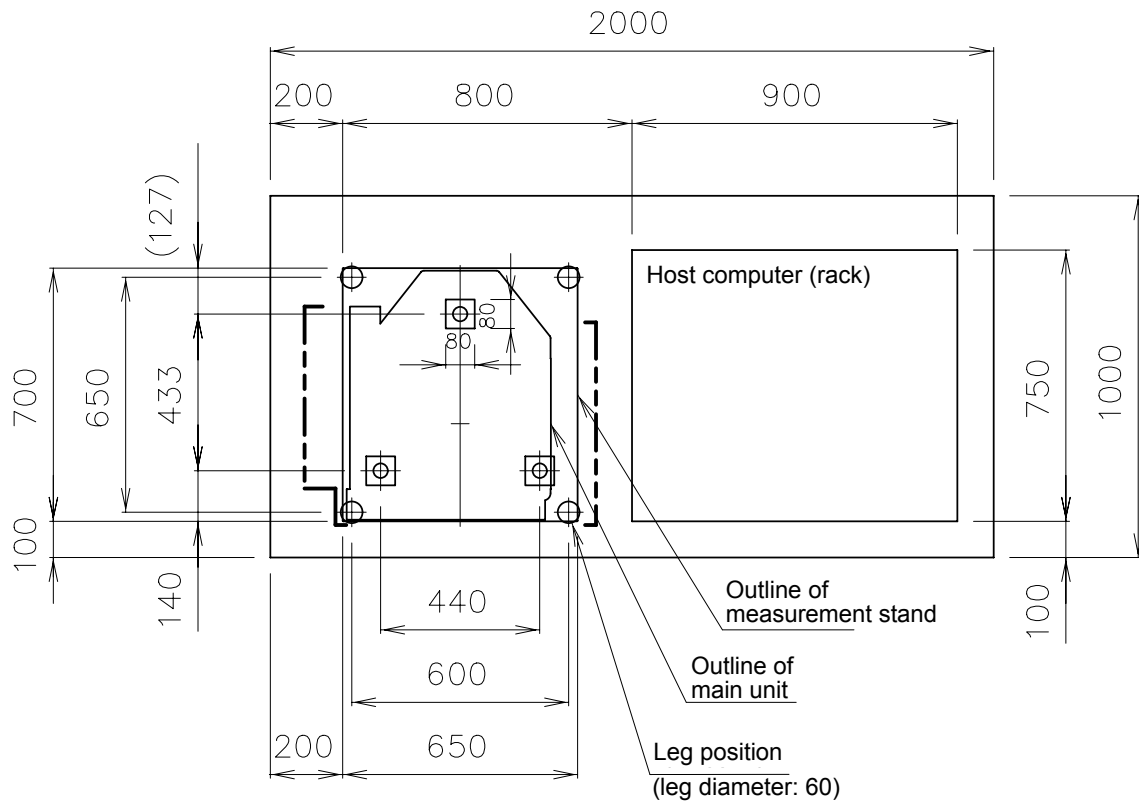


1.3 Top View of Stage

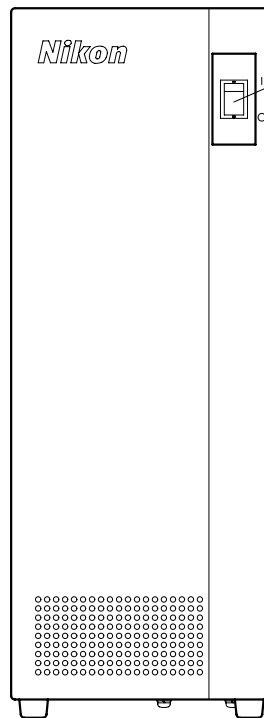


Maximum permissible mass: 15 kg
The weight of clamps used for securing the workpiece should be taken into consideration.

1.4 System Layout



1.5 Controller



Power switch

Turns on and off the power of the main unit.

| : ON

○ : OFF

Fan motor

MOTOR connector

Connect to the MOTOR connector on the main body with the provided cable.

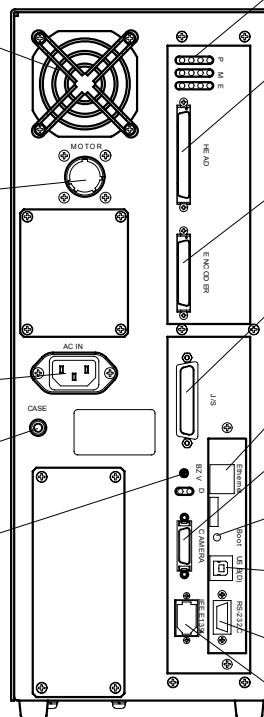
Power receptacle

Connect to the AC power supply with the provided cable.

CASE terminal

Buzzer volume

Adjusts the sound level of the buzzer.



Status indicator LEDs

Indicate the status of the controller.

HEAD connector

Connect to the HEAD connector on the main body with the provided cable.

ENCODER connector

Connect to the ENCODER connector on the main body with the provided cable.

J/S connector

Connect to the connector on the joystick unit with the provided cable.

ETHERNET connector

Not used in normal use.

CAMERA connector

Connect the CAMERA cable from the main body to this connector.

BOOT ROM switch

This switch is used when writing firmware.

USB connector

Connect to the USB connector on the host PC with the provided cable.

RS232C connector

Not used in normal use.

IEEE1394 connector

Connect to the IEEE1394 connector on the host PC with the provided cable.

1.6 Joystick Box

J/S connector

Connects to the J/S connector on the controller with the provided cable.

STOP switch

Press this switch to stop all moving components. To resume operation, restart the system.

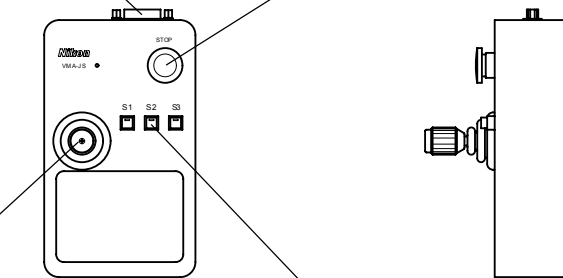
Joystick

Use the joystick to move the workpiece in the X and Y directions or to move the vertical mover in the Z direction for focusing. The drive speed changes according to the tilting angle of the joystick and the rotating angle of the knob.

Soft keys

Each soft key can be set with a function from the host computer. The soft keys can be set with the following functions:

- Joystick slow drive mode
- Clamping of each axis
- Zoom factor



Chapter II. System Setup

WARNING

Moving the system creates a risk that the system may tip over and cause injuries. This chapter describes the procedures for moving the system when there is no ridge or slope on the path over which the system is to be moved and the main unit does not need to be separated from the measurement stand.

If the system is to be moved to another location from its original installation site, follow the procedures described below, provided that no ridge or slope lies along the path of movement. Before moving the system, be sure to attach the retaining fixtures.

If there is a ridge or slope along the path over which the system is to be moved or if a truck or similar transport equipment is to be used, contact your Nikon representative in advance. Otherwise, Nikon shall not bear responsibility for any accidents or damage that occur while the system is being moved.

2.1 Warnings

WARNING

- 1) The system may tip over if it is tilted to an angle of 15° or more. Be sure to keep the system level while it is being moved.
- 2) Be sure to use the provided retaining fixtures to secure the stage and vertical mover in place when moving or transporting the system.
- 3) If there is a ridge or slope on the path along which the system is to be moved, separate the main unit from the measurement stand and place them in pallet boxes to move them.
- 4) When the system is transported on a truck, the pallet boxes must be used.
- 5) Do not allow condensation to form on the system during transportation. Should condensation form on the system, do not supply power until the system has air dried. Never use a dryer or heater to dry the system; doing so may lead to equipment malfunction or degrade system accuracy.

2.2 Required Tools

- Phillips screwdriver
- Hexagonal wrenches (3 mm, 4 mm)
- Adjustable wrench
- Level
- Lifting bars provided with the system

2.3 Setup Procedures

1) Unpack the boxes.

Open the product boxes at a location as close to the system installation site as possible, making sure that the area has no ridge and is not inclined. The boxes contain the main unit, controller and accessories, measurement stand (when the special measurement stand is used), host computer, etc.

2) Position the rubber vibration isolators.

Place the rubber vibration isolators (3 sheets) on the special measurement stand (or working table to be used). Referring to the system layout, position a rubber vibration isolator where each of the (3) adjustable legs of the main unit will be placed, and place one supplied stainless steel plate on top of each rubber vibration isolator.

3) Place the main unit on the measurement stand.

Using the provided lifting bars, lift the main unit and place it onto the measurement stand (working table). This task should be performed using a fork lift or by four or more persons. In this step, adjust the positions of the rubber vibration isolators carefully so that the (3) adjustable legs of the main unit are located exactly at the centers of the isolators.

After the main unit is positioned properly, detach the (4) lifting bars, and insert the provided caps into the holes (installation of caps is not mandatory).

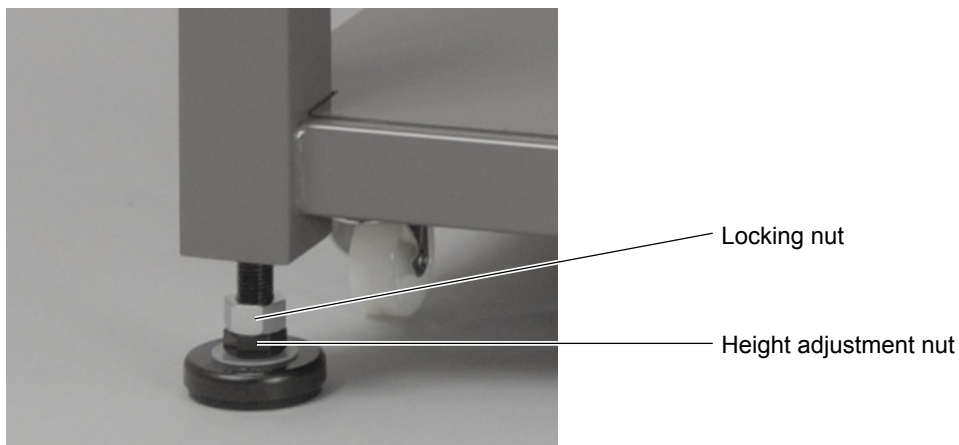
4) Move the system to the installation site.

Using the casters on the measurement stand, move the system to the installation site. Push the measurement stand and move the system slowly. Do not push the main unit to move the system.

5) Secure the measurement stand in place.

After the system has been moved to the installation site, turn the height adjustment nuts on the adjustable legs of the measurement stand to set the measurement stand securely on the floor. Make sure that all four casters are lifted off the floor.

Tighten the locking nuts on the adjustable legs after completing the procedure described in step 8 ("Level the system").



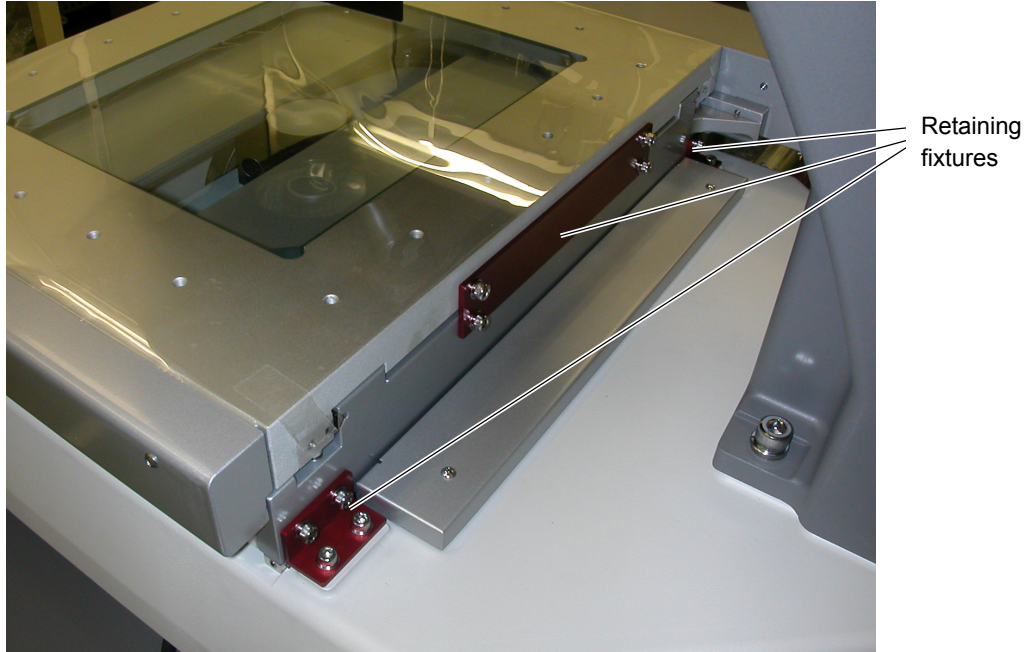
Locking nut

Height adjustment nut

Adjustable leg of the measurement stand

- 6) Detach the retaining fixtures from the stage (see the photo).

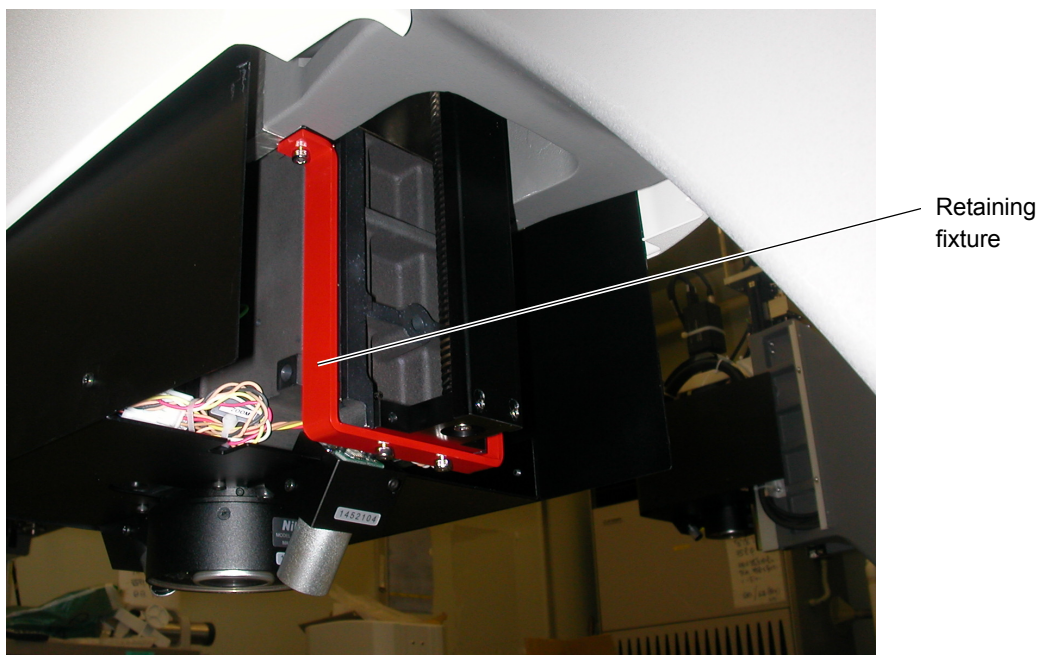
Using a hexagonal wrench (4 mm), remove the red retaining fixtures from the two locations on the X axis and the location on the Y axis on the back side of the stage. Be careful not to apply excessive force to the stage when removing the retaining fixtures.



- 7) Remove the retaining fixtures from the Z-axis vertical mover (see the photo).

Place an appropriate cover over the top surface of the stage so that it is not scratched or otherwise damaged by any bolts or retaining fixtures that fall or are accidentally dropped.

Using a hexagonal wrench (3 mm), remove the red retaining fixture located on the bottom section of the vertical mover. Be careful not to apply excessive force to the vertical mover or surrounding areas when removing the retaining fixture.

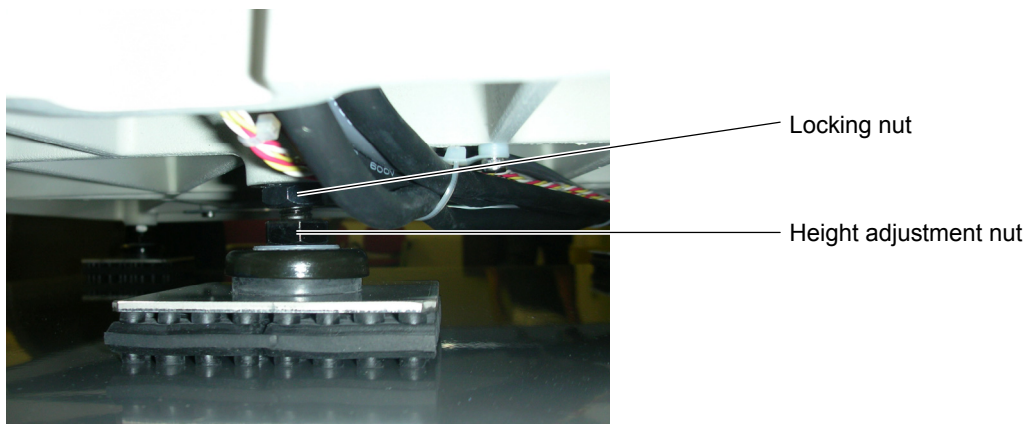


8) Level the system.

If there is a protective material (blue plate) on the top surface of the stage, remove it. If the controller is to be set up on the shelf under the measurement stand, place the controller in position at this time.

With the stage positioned near the center in both X and Y directions, place a level on the stage glass and adjust the height adjustment nuts on the adjustable legs of the measurement stand and main unit until the stage glass is level. Use the four adjustable legs of the measurement stand for rough adjustment, and use the three adjustable legs on the main unit for fine adjustment. After all adjustments have been completed, be sure to tighten the locking nuts on all of the adjustable legs on the measurement stand and the main unit.

In this process, make sure that all four adjustable legs of the measurement stand are in secure contact with the floor and that the stand is stable.



Adjustable leg of the main unit

9) Connect the cables between the main unit and controller.

Connect the cables between the main unit and the controller, referring to the illustration on the following page.

* Note: Do not connect the USB cable or IEEE1394 cable to the host computer at this time.

10) Connect the power cord.

Plug the power cord of the controller into a three-prong power outlet.

11) Operation check 1

After making sure that the above procedures have been completed properly, turn on the power switch of the controller.

When the LED indicators for the soft keys on the joystick unit turn off, operate the joystick and make sure that the stage and vertical mover respond appropriately.

* Note: If the stage and/or vertical mover move without the joystick being operated, press the STOP switch immediately to turn off the power, unplug the power cord, and contact your Nikon representative.

If the stage or vertical mover does not move when the joystick is operated, check the following:

- (1) Is the power cord plugged securely into the power outlet?
- (2) Is the power supply capacity adequate?
- (3) Are the cords (cables and power cord) connected to the controller properly?
- (4) Is the power switch of the controller turned on?
- (5) Have all of the retaining fixtures been removed?

If the system still does not operate correctly after confirming all of the above items, stop using the system and contact your Nikon representative.

(Note that the Nikon representative may ask you to check the status indicator LEDs on the rear panel of the controller.)

12) Connect the cables between the controller and host computer.

Turn off the power switch of the controller. Connect the USB cable and IEEE1394 cable to the host computer, referring to the illustration on the following page.

* Note: Keep the power switch of the controller turned off until an instruction to turn on the switch is given in the directions in the separate Startup Guide manual.

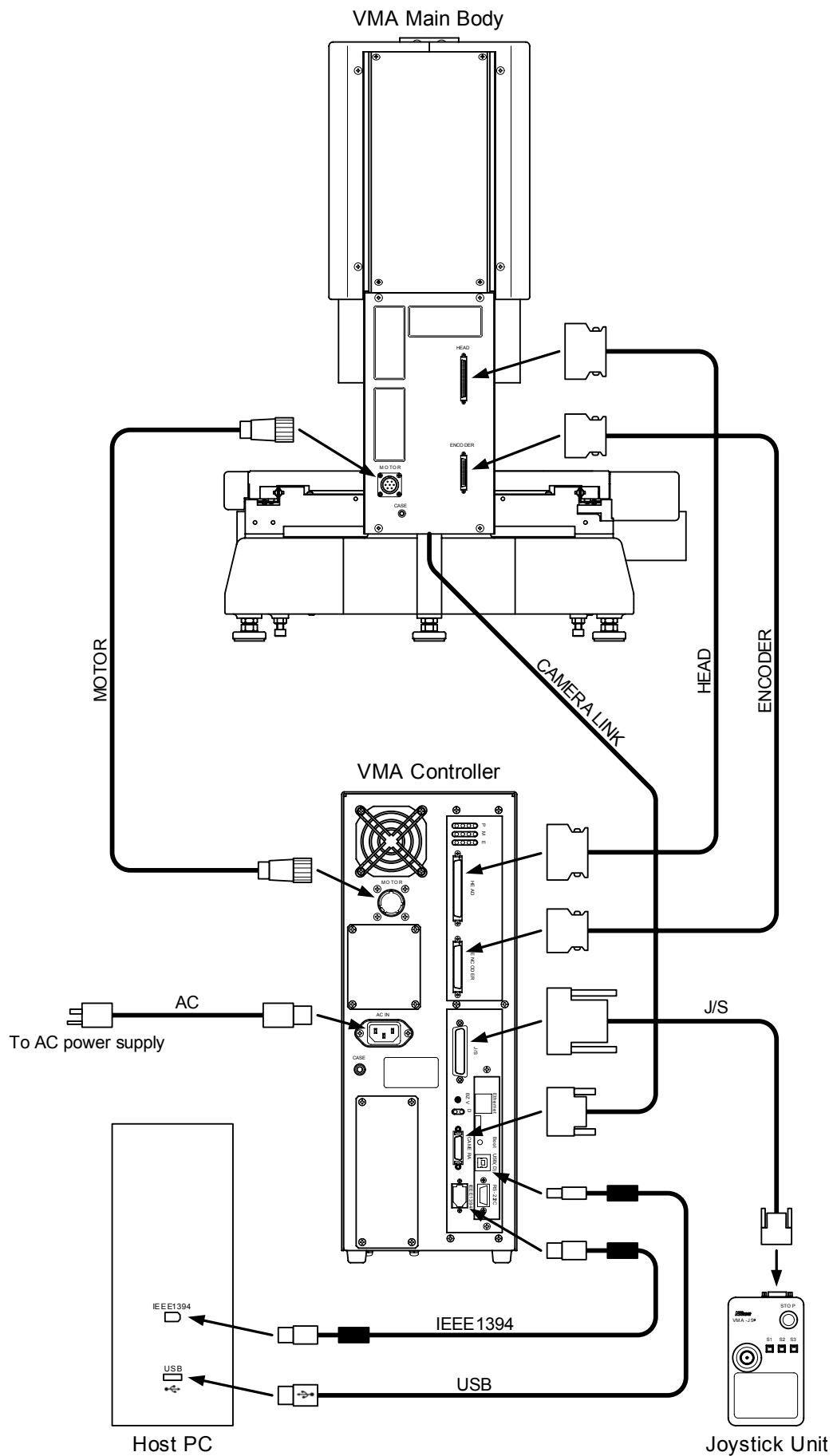
* Note: Descriptions of the connection and setup of the host computer and peripheral devices (display, printer, etc.) are omitted in this manual. For the connection and setup of those devices, follow the instructions in the manuals provided with the respective products.

13) Install the iNEXIV software in the host computer.

Take out the floppy disk titled "Compensation Data Disk" which is provided with the controller. Make sure that the label No. on the compensation data disk matches the serial No. indicated on the front side of the stage of the main unit.

Install and set up the iNEXIV software and device driver according to the directions in the separate Startup Guide manual.

* Note: During the installation process, you will be requested to insert the correction data disk into the floppy disk drive.



14) Operation check 2

After confirming that all the procedures described above have been completed properly, start up the entire system and check system operation.

Operation using the joystick

- Zoom magnification adjustment operation
- On, off, and intensity adjustment of all lights
- CNC operation (destination coordinates can be specified by double-clicking the counter window.)
- Edge detection, image auto focus operation
- Operation of Laser Auto Focus (option)
- Confirmation of error message of output window

If the system does not operate properly, check the following:

- (1) Is the power cord plugged securely into the power outlet?
- (2) Is the power supply capacity adequate?
- (3) Is the power switch of the controller turned on?
- (4) Are the cables connected properly?
- (5) Are the cables for the host computer connected properly?
- (6) Are all four adjustable legs of the measurement stand in firm contact with the floor and is the stand stable?
- (7) Is the main unit level?
- (8) In the case the special measurement stand is not used, is the table used strong enough?
(It is recommended that a table capable of withstanding weight of 1,000 kg or more be used.)
- (9) Are the floor strength and floor vibration parameters within the specified ranges?
- (10) Are the special rubber vibration isolators used? Is each adjustable leg positioned accurately at the center of a rubber vibration isolator?

If the system still does not operate correctly after confirming all of the above items, stop using the system and contact your Nikon representative.

15) Calibrate the optical head.

Before conducting measurement, perform calibrations (1) through (3) described below. It is recommended that these calibrations be performed regularly (about once a month).

* Note: Failure to calibrate the optical head will result in significant measurement errors.

- (1) Magnification compensation
- (2) Optical axis compensation
- (3) Camera rotation compensation

Chapter III. Operation

Basically, this system is operated through the host computer. For details on making measurements, refer to the instruction manual for the “VMA Automeasure.” This chapter explains how to turn the system on and off, how to clean the system, and how to lubricate.

3.1 Turning the Power On and Off

Power ON: Turn on the power switch on the front of the controller.
Turn on the power switch on the host computer.

Power OFF: Close all of the applications that are currently running, including iNEXIV.
Shut down Windows, which will shut off the host computer.
Turn off the power switch on the front of the controller.

3.2 Cleaning

Use this system in as clean an environment as possible in order to prevent dust and grease from accumulating on the system. In particular, clean the guide faces of the stage regularly to make sure they remain clean at all times.

3.3 Lubricating the System

Supply Sukuwaral M-1 grease manufactured by Riken to the guide faces of the stage to clean and lubricate the surfaces.

It is not necessary to lubricate the vertical-motion lead screw frequently. If it produces a squeaking noise, however, apply an appropriate amount of Epnoc Grease AP0 manufactured by Nippon Oil Corp. (ENEOS). Note that applying an excessive amount of grease may cause the grease to spatter during operation. Using a small brush, apply a small amount of grease at a time and operate the unit so that it moves up and down; repeat this process to spread the grease evenly.

Chapter IV. Performance and Specifications

4.1 Style

- Type: Single-column X-Y stage type
- Dimensions (W × D × H)
 - Main body: 565 × 690 × 740 mm (in clamped condition)
 - Controller: 145 × 400 × 390 mm
 - Joystick box: 100 × 177 × 98 mm
 - Special measurement table: 650 × 700 × 600 mm
- Mass
 - Main body (including head): 72 kg
 - Controller: 13 kg
 - Joystick unit: 1 kg

4.2 Digital Read Out

- Measurement range: 255 × 205 × 155 mm (X × Y × Z)
- Measurement method: Diascopic linear encoder
- Minimum resolution: 0.1 μm

4.3 Motion Control

- Drive method: All-axis DC servo motor
- Maximum drive speed:
 - X,Y: 100 mm/s
 - Z: 50 mm/s
- Positioning accuracy: 1.0 μm (for X, Y, Z)

4.4 Sections

- X-Y stage section
 - Effective stroke: 250 × 200 mm
 - Size of stage: 500 × 400 mm
 - Size of stage glass: 280 × 230 mm
 - Workpiece mass for which precision is guaranteed: 5 kg
 - Workpiece mass for load bearing capacity is guaranteed: 15 kg
 - Maximum permissible mass on stage glass: 15 kg
- Z-axis motion section
 - Effective stroke: 200 mm
- Optical zoom head section
 - Zoom factor: 10 ×
 - Magnification range: 0.35 to 3.5 ×
 - N.A.: 0.027 to 0.11
 - Zoom position: 0.35 / 0.6 / 1 / 1.8 / 3.5 ×
 - Viewfield on workpiece: 13.3 × 10 to 1.33 × 1 mm
 - W.D.: 73.5 mm (63 mm when Laser Auto Focus is used)
- Illumination
 - Diascopic: White LED, diffused light
 - Vertical episcopic: White LED, telecentric
 - Ring: White LED, 8 segments, average incidence angle at 18°
- Camera
 - Size: Type 1/3
 - Output signal: Camera Link
 - Effective pixels: 640 × 480
- Laser Auto Focus (option)
 - System: Light spot deviation detection system
(incidence angle = detection angle = 35°)
 - Laser class: Class 1 Laser product (IEC60825-1 1993/Amd.2:2001)
 - WD: 63 mm

4.5 Measurement Accuracy

- Total accuracy (X, Y axes)

When a traceable standard scale or a conforming evaporation pattern is placed on the stage glass and is measured with a fixed zoom position, at the center of the viewfield ("L" represents any measured length in mm)

Repeatability (when magnification is 3.5 ×):	1 μm (2σ)
Maximum permissible indication error for single-axis measurement MPE_{E1} (when magnification is 3.5 ×):	$2 + 8L/1000 \text{ μm}$
Maximum permissible indication error for dual-axis measurement MPE_{E2} (when magnification is 3.5 ×):	$3 + 8L/1000 \text{ μm}$
- Total accuracy (Z axis)

Indication error for measurement using a laser scale

Maximum permissible indication error for single-axis measurement MPE_{E1} :	$3 + L/50 \text{ μm}$
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4.6 Operating Conditions

- Operating environment

Temperature:	10 °C to 35 °C
Humidity:	70% max.
Altitude:	2000 m max.
Pollution:	Degree 2

Indoor use only
- Environment in which accuracy is guaranteed

Temperature:	20 °C ± 0.5 K
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- Floor strength

Average load bearing capacity:	Must be able to bear the mass on the total floor surface, including the maximum mass of the system (main body with parts and components assembled: 140 kg; miscellaneous: 50 kg)
Collapsing load:	Greater than the total mass of main body with parts and components assembled
- Permissible floor vibration

Vibration frequency of 10 Hz or less:	Amplitude of 3 μm _{P-P} max.
Vibration frequency of 10 to 1000 Hz:	Vibration acceleration of 0.012 m/s ² (1.2 gal) max.

4.7 Electrical Standards

- Input ratings (controller)
 - Input supply voltage: 100 to 240 V AC (automatic switching)
 - Input supply voltage: 50/60 Hz
 - Current consumption: 5A to 2.5A
 - Supply voltage fluctuation: within $\pm 10\%$
- Electric shock protection class: Class 1 (grounded connection type)
- Installation category: Category 2
- Power cord: Use only the power cord described below. Using the wrong power cord could lead to fire or other dangerous conditions.

Because this product belongs to electric shock protection class 1, this product must be grounded.

In Japan:
Use only a PSE-marked detachable three-conductor power cord set.
125 V AC, 7A minimum.

In a 100 V, 120 V region:
Use only a UL-certified detachable three-conductor power cord set with a ground prong.
3-conductor grounding type SVT, No. 18 AWG, 3 m long maximum, rated at 125 V AC minimum.

In a 220 V, 230 V, 240 V region:
Use only a EU/EN-certified three-conductor power cord.
3-conductor grounding type H05VV-F, 3 m long maximum, rated at 250 V AC minimum.

4.8 Applicable Electrical Safety Standards

- In a 100 V, 120 V region:

This product meets FCC 15B Class A requirements.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Class A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.
- In a 220 V, 230 V, 240 V region:

This product satisfies the EU's low voltage directive.

This product satisfies the EU's EMC directive.



En Symbol for separate collection applicable in European countries



This symbol indicates that this product is to be collected separately. The following apply only to users in European countries.

- This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.
- For more information, contact the retailer or the local authorities in charge of waste management.

No Symbol for kildesortering i europeiske land



Dette symbolet indikerer at produktet skal kildesorteres. De nedenstående punktene gjelder for alle europeiske brukere.

- Dette produktet skal kildesorteres og innleveres til dedikerte innsamlingspunkter. Må ikke kastes med normalt husholdningsavfall.
- For mer informasjon, ta kontakt med din forhandler eller lokale myndigheter.

De Symbol für getrennte Wertstoff-/Schadstoffsammlung in europäischen Ländern



Dieses Symbol zeigt an, dass dieses Produkt separat entsorgt werden muss.

Folgendes gilt für Verbraucher in europäischen Ländern:

- Dieses Produkt darf nur separat an einer geeigneten Sammelstelle entsorgt werden. Eine Entsorgung im Hausmüll ist unzulässig.
- Wenden Sie sich für nähere Informationen bitte an Ihren Händler oder die örtlich für Abfallentsorgung zuständigen Behörden.

Se Symbol för separat upphämtning i europeiska länder



Den här symbolen anger att produkten måste hämtas separat. Följande gäller bara användare i europeiska länder.

- Den här produkten är avsedd för separat upphämtning vid ett lämpligt uppsamlingsställe. Produkten får inte kastas i hushållsavfall.
- För mer information, kontakta återförsäljaren eller de lokala myndigheter som ansvarar för avfallshantering.

Fr Symbole pour la collecte sélective applicable aux pays européens



Ce symbole indique que ce produit doit être collecté séparément. Les mesures suivantes concernent uniquement les utilisateurs européens.

- Ce produit doit être jeté séparément dans un point de collecte approprié. Ne jetez pas ce produit dans une poubelle réservée aux ordures ménagères.
- Pour plus d'information, contactez le détaillant ou les autorités locales responsables de la gestion des ordures.

Fi Erillisen keräyksen merkki Euroopan maissa



Tämä merkki osoittaa, että tuote kerätään erikseen. Seuraavat maininnat koskevat vain eurooppalaisia käyttäjiä.

- Tämä tuote kerätään erikseen asianmukaisista keräyspisteistä. Älä hävitä tuotetta talousjätteen mukana.
- Lisätietoja saat jälleenmyyjältä tai paikallisilta jätehuoltoviranomaisilta.

Es Símbolo para recogida separada aplicable en países Europeos



Este símbolo indica que este producto se recogerá por separado. Lo siguiente sólo se aplicará en países Europeos.

- Este producto ha sido designado para su recogida en un punto de almacenamiento apropiado. No lo tire como un deshecho doméstico.
- Para más información, contacte con el vendedor o autoridades locales al cargo de la gestión de residuos.

Ru Символ сортировки мусора, использующийся в европейских странах



Данный символ означает, что этот продукт должен утилизироваться отдельно от других.

Приведенная ниже информация касается только пользователей из стран Европы.

- Данный продукт должен утилизироваться отдельно от других в соответствующих приемных пунктах. Не выбрасывайте данный продукт вместе с бытовым мусором.
- Дополнительную информацию Вы можете получить у продавца или у местных властей, отвечающих за утилизацию мусора.

Dk Symbol for special bortskaffelse af denne type produkter i de europæiske lande



Dette symbol angiver, at dette produkt skal bortskaffes specielt. Det efterfølgende er kun til forbrugere i de europæiske lande.

- Dette produkt skal bortskaffes på fx en genbrugsplads el .lign. Det må ikke smides væk som normalt husholdningsaffald.
- For yderligere information kontakt din forhandler eller de lokale myndigheder, som fx teknisk forvaltning.

Gr Σύμβολο για την ξεχωριστή αποκομιδή απορριμμάτων στις Ευρωπαϊκές χώρες



Αυτό το σύμβολο υποδηλώνει ότι η αποκομιδή αυτού του προϊόντος πρέπει να γίνει ξεχωριστά.

Τα κάτωθι απευθύνονται μόνο σε Ευρωπαίους χρήστες.

- Αυτό το προϊόν είναι σχεδιασμένο έτσι ώστε να γίνεται η αποκομιδή του σε ειδικά σημεία. Μην το πετάτε μαζί με τα υπόλοιπα απορρίμματα.
- Για περισσότερες πληροφορίες, επικοινωνήστε με τον διανομέα του προϊόντος ή με τις υπεύθυνες τοπικές αρχές για θέματα διαχείρισης απορριμμάτων.

Nl Symbool voor gescheiden inzameling zoals dat wordt gebruikt in Europese landen



Dit symbool betekent dat dit product apart moet worden ingezameld. Het volgende is alleen van toepassing op gebruikers in Europa

- Dit product dient gescheiden ingezameld te worden op een daartoe bestemd inzamelpunt. Niet wegwerpen bij het normale huisvuil.
- Neem voor meer informatie contact op met het verkooppunt, of met de lokale instantie die verantwoordelijk is voor het verwerken van afval.

Pl Symbol oznaczający segregowanie odpadów, stosowany w krajach Europy



Ten symbol oznacza, że produkt musi być wyrzucany oddzielnie.

Poniższe uwagi mają zastosowanie tylko dla użytkowników z Europy.

- Ten produkt jest przeznaczony do oddzielnej utylizacji i powinien być dostarczony do odpowiedniego punktu zbierającego odpady. Nie należy go wyrzucać z odpadami gospodarstwa domowego.
- Aby uzyskać więcej informacji, należy skontaktować się z przedstawicielem przedsiębiorstwa lub lokalnymi władzami odpowiedzialnymi za zarządzanie odpadami.

Pt Símbolo para recolha de resíduos em separado utilizado nos países Europeus



Este símbolo indica que este produto é para ser recolhido separadamente.

Esta norma aplica-se só para os utilizadores nos países Europeus.

- Este produto está designado para recolha de resíduos em separado num recipiente apropriado. Não deitar no caixote do lixo doméstico.
- Para mais informações, contactar o revendedor ou as autoridades locais responsáveis pela gestão dos resíduos.

Hu Európai országokban érvényes "Elkülönített hulladékgyűjtés" jelzése



Ez a jelzés azt jelenti, hogy ezt a terméket elkülönítve kell gyűjteni.

Az alábbiak csak az európai országokban élő felhasználókra érvényes.

- Ezt a terméket a megfelelő hulladékgyűjtőhelyen, elkülönítve kell gyűjteni. Ne dobja ki háztartási hulladékként.
- További információkért forduljon a forgalmazóhoz, vagy a helyi hatóság hulladékgyűjtésért felelős részlegéhez.

It Simbolo per la raccolta differenziata applicabile nei paesi europei



Questo simbolo indica che il prodotto va smaltito separatamente. La normativa che segue si applica soltanto agli utenti dei paesi europei.

- Il prodotto è designato per lo smaltimento separato negli appositi punti di raccolta. Non gettare insieme ai rifiuti domestici.
- Per maggiori informazioni, consultare il rivenditore o gli enti locali incaricati della gestione dei rifiuti.

Cz Symbol pro oddělení sběr odpadu platný v evropských zemích



Tento symbol znamená, že tento produkt se má odkládat odděleně. Následující pokyny platí pro uživatele z evropských zemí.

- Tento produkt se má odkládat na místě sběru k tomuto účelu určeném. Neodhazujte spolu s domácím odpadem.
- Více informací o způsobu zacházení s nebezpečným odpadem vám podá příslušná místní instituce.



This symbol is provided for use in the People's Republic of China, for environmental protection in the fields of electronic information products.

このマークは、中国のお客様に向けたもので、電子情報製品分野における環境保護を目的としています。

Jp ユーロッパにおける廃棄物個別回収のシンボルマーク



このシンボルマークは本製品が個別に回収されなければならないことを示しています。

次項は本製品をヨーロッパ（EU）で使用する場合にのみ適用されます。

- 本製品は指定された収集場所でも個別に回収されるように定められています。家庭ゴミとして廃棄しないでください。
- 詳細については販売代理店または地域の廃棄物処理機関にご連絡ください。

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