

Model 8758

Picomotor™ Handpad



User's Manual

Package Contents:

This package contains the following components:

- Model 8758 Handpad
- User's Manual

Getting Started:

The 8758 Handpad is intended to be used with Model 8742 or 8743-CL Picomotor controller. Please refer to the 8742 or 8743-CL controller's User's Manual, starting with the section on Safety Precautions. The complete User's Manual is available in electronic format (PDF file). It is included in those products' accompanying USB flash drive, and is automatically installed on your computer's hard drive during controller software installation. Additionally, the latest version of the User's Manual can be found at www.Newport.com on the product's web page.

Safety:

The Model 8742 or 8743-CL contains numerous safety warnings and cautions. The user must read it prior to applying power to the Model 8758 Picomotor™ Handpad.

Voltages of up to 130 V are accessible inside the Controller and Picomotors™ devices. DO NOT operate with the Controller cover removed. If the wire of a Picomotor™ is damaged, discontinue use and return it for repair. If the device is used in a manner not specified by New Focus, the protection provided by the device may be impaired.

EU27 Declaration of Conformity

Application of Council Directive(s):

- Electromagnetic Compatibility Directive (EMCD) – 2014/30/EU
- Restriction of Hazardous Substances Directive (RoHS2) – 2011/65/EU ⁽⁷⁾
- Restriction of Hazardous Substances Directive (RoHS3) – (EU) 2015/863 ⁽⁷⁾
- Waste Electrical and Electronic Equipment – Directive 2012/19/EU



Standard(s) to which conformity is declared:

- EN 61326-1:2013 – (EMC)

Emissions:

- CISPR 11:2015 Industrial, Scientific and Medical Equipment Radio-Frequency Disturbance Characteristics - Limits and Methods of Measurement
- IEC 61000-3-2:2018 EMC/Limits for Harmonic Current Emission ⁽¹⁾
- IEC 61000-3-3:2013 + AMD1:2017 EMC/Limitations of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems⁽²⁾

Immunity:

- IEC 61000-4-2:2008 EMC/Electrostatic Discharge Immunity Test
- IEC 61000-4-3:2006+AMD1:2007+AMD2:2010 EMC/Radiated Radio - Frequency Electromagnetic Field Immunity Test
- IEC 61000-4-4:2012 EMC/Electrical Fast Transient/Burst Immunity Test
- IEC 61000-4-5:2014 + AMD 1:2017 EMC/Surge Immunity Test ⁽³⁾
- IEC 61000-4-6:2013 EMC/Conducted Disturbances induced by Radio Frequency Fields Immunity Test
- IEC 61000-4-8:2009 EMC/Power Frequency Magnetic Field Immunity Test
- IEC 61000-4-11:2004 + AMD 1:2017 EMC/Voltage Dips, Short Interruptions and Variations Immunity Test ⁽⁵⁾

Manufacturer's Name: MKS Instruments, Inc., 2 Tech Drive, Andover, MA 01810 USA

Authorized Representative's Name & Location: MICRO-CONTROLE Spectra-Physics S.A.S., Zone Industrielle, 45340
Beaune la Rolande, France

Equipment Type/Description: Electrical equipment for measurement, control and laboratory use

Model Number(s) ⁽⁶⁾: 8758, 8758-VariouS

The object of the declaration described above is in conformity with the relevant Community harmonization legislation. MKS product conforms to the above Directive(s) and Standard(s) only when installed in accordance with manufacturer's specifications. This declaration has been issued under the sole responsibility of the manufacturer.

Date: 1/5/2021

Signature: 

Full Name: **Le Cointe Hervé**

Title: Quality director

-
- 1) Applicable to AC powered product only. Class B
 - 2) Applicable to AC powered product; DC powered connections must not connect to a D.C. distribution network; I/O Signal and Control Lines must be less than 30m and not exit the building.
 - 3) Applicable to AC powered product; DC powered connections and may connect to a D.C. distribution network.
 - 5) Applicable to AC powered product only.
 - 6) Compliance of the above model numbers requires the use of a braided shielded cable properly terminated at both ends – if so noted in the MKS Instruction Manual.
 - 7) RoHS Directive has to be checked for in scope products; cannot CE mark without compliance to RoHS. RoHS Directive can be unchecked only for systems which MKS sells which qualify for "Large Scale Industrial Tool" exclusion.

UK DECLARATION OF CONFORMITY

Application of Council Directive(s):

- Electromagnetic Compatibility Directive (EMCD) – 2014/30/EU
- Restriction of Hazardous Substances Directive (RoHS2) – 2011/65/EU ⁽⁷⁾
- Restriction of Hazardous Substances Directive (RoHS3) – (EU) 2015/863 ⁽⁷⁾
- Waste Electrical and Electronic Equipment – Directive 2012/19/EU



Standard(s) to which conformity is declared:

- BS EN 61326-1:2013 – (EMC)

Emissions:

- CISPR 11:2015 Industrial, Scientific and Medical Equipment Radio-Frequency Disturbance Characteristics - Limits and Methods of Measurement
- IEC 61000-3-2:2018 EMC/Limits for Harmonic Current Emission ⁽¹⁾
- IEC 61000-3-3:2013 + AMD1:2017 EMC/Limitations of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems ⁽²⁾

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 - 7) RoHS Directive has to be checked for in scope products; cannot CE mark without compliance to RoHS. RoHS Directive can be unchecked only for systems which MKS sells which qualify for "Large Scale Industrial Tool" exclusion.

Warranty

New Focus warrants that this product will be free from defects in material and workmanship and will comply with New Focus's published specifications at the time of sale for a period of one year from date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at New Focus's option.

To exercise this warranty, write or call your local New Focus office or representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the product, freight prepaid, to the indicated service facility. Repairs will be made and the instrument returned freight prepaid. Repaired products are warranted for the remainder of the original warranty period or 90 days, whichever first occurs.

Limitation of Warranty

The above warranties do not apply to products which have been repaired or modified without New Focus's written approval, or products subjected to unusual physical, thermal or electrical stress, improper installation, misuse, abuse, accident or negligence in use, storage, transportation or handling. This warranty also does not apply to fuses, batteries, or damage from battery leakage.

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3635 Peterson Way
Santa Clara, CA, 95054
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Part No. 90059501 Rev E

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Service Information

This section contains information regarding factory service for the source. The user should not attempt any maintenance or service of the system or optional equipment beyond the procedures outlined in this manual. Any problem that cannot be resolved should be referred to New Focus.

Technical Support Contacts

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Telephone: (408) 919-1500

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Newport Corporation Calling Procedure

If there are any defects in material or workmanship or a failure to meet specifications, promptly notify Newport's Returns Department by calling 1-800-222-6440 or by visiting our website at www.newport.com/returns within the warranty period to obtain a **Return Material Authorization Number (RMA#)**. Return the product to Newport Corporation, freight prepaid, clearly marked with the RMA# and we will either repair or replace it at our discretion. Newport is not responsible for damage occurring in transit and is not obligated to accept products returned without an RMA#.

E-mail: rma.service@newport.com

When calling New Focus Corporation, please provide the customer care representative with the following information:

Your Contact Information

Serial number or original order number

Description of problem (i.e., hardware or software)

To help our Technical Support Representatives diagnose your problem, please note the following conditions:

- Is the system used for manufacturing or research and development?
- What was the state of the system right before the problem?
- Have you seen this problem before? If so, how often?
- Can the system continue to operate with this problem? Or is the system non-operational?
- Can you identify anything that was different before this problem occurred?

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1 Safety Precautions

1.1 Definitions and Symbols

The following terms and symbols are used in this documentation and also appear on the Model 8758 Picomotor Handpad where safety-related issues occur.

1.1.1 General Warning or Caution



Figure 1 *General Warning or Caution Symbol*

The Exclamation Symbol in the figure above appears on the product and in Warning and Caution tables throughout this document. This symbol designates that documentation needs to be consulted to determine the nature of a potential hazard, and any actions that have to be taken.

1.1.2 European Union CE Mark



Figure 2 *CE Mark*

The presence of the CE Mark on New Focus equipment means that this instrument has been designed, tested and certified compliant to all applicable European Union (CE) regulations and recommendations.

1.1.3 UKCA Mark



Figure 3 *UKCA Mark*

The presence of the UKCA Mark on New Focus equipment means that this instrument has been designed, tested and certified compliant to all applicable United Kingdom regulations and recommendations.

1.1.4 ONFigure 4 *On Symbol*

The symbol in the figure above represents a power switch position on a Model 8758. This symbol represents a Power On condition.

1.1.5 OFFFigure 5 *Off Symbol*

The symbol in the figure above represents a power switch position on the Model 8758. This symbol represents a Power Off condition.

1.1.6 Waste Electrical and Electronic Equipment (WEEE)

This symbol on the product or on its packaging indicates that this product must not be disposed with regular waste. Instead, it is the user responsibility to dispose of waste equipment according to the local laws. The separate collection and recycling of the waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For information about where the user can drop off the waste equipment for recycling, please contact your local New Focus representative.

1.1.7 Control of Hazardous Substances



This label indicates the products comply with the EU Directive 2002/95/EC that restricts the content of six hazardous chemicals.

1.2 Warnings and Cautions

The Model 8758 is a component of a system that will contain one or more Picomotors and other items. Since New Focus cannot control these other system components, the User is ultimately responsible for ensuring that the complete system meets all applicable product and workplace safety regulations.

The following are definitions of the Warnings, Cautions and Notes that are used throughout this manual to call your attention to important information regarding your safety, the safety and preservation of your equipment or an important tip.

	WARNING
	Situation has the potential to cause bodily harm or death.

	CAUTION
	Situation has the potential to cause damage to property or equipment.

NOTE

	Situation has the potential to cause the product to not comply with applicable European Union regulations.
---	--

	Situation has the potential to cause the product to not comply with applicable United Kingdom regulations.
---	--

1.2.1 **General Warnings**

Observe these general warnings when operating or servicing this equipment:

- Heed all warnings on the unit and in the operating instructions.
- Do not use this equipment in or near water.
- The Model 8758 is intended to be used as a component in a larger system. When this product is included as part of a larger assembly, the user **MUST** ensure that appropriate additional safety and EMC-compliance features are incorporated the assembly.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp lint-free cloth.
- Lockout all electrical power sources before servicing the equipment.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Qualified service personnel should perform safety checks after any service.
- The Model 8758 is intended for use **ONLY** with approved New Focus devices such as the Model 8742 and Model 8743-CL. Use of the Model 8758 with unapproved devices can result in shock hazards, fire hazards, and other undesirable conditions and events.

1.2.2 **General Cautions**

Observe these cautions when operating this equipment:

- If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.
- Do not block ventilation openings.
- Use only the specified replacement parts.
- Follow precautions for static sensitive devices when handling this equipment.
- This product should only be powered as described in the manual.
- There are no user-serviceable parts inside the Model 8758.

1.2.3 Summary of Warnings and Cautions

The following general warning and cautions are applicable to this instrument:

	<p style="text-align: center;">WARNING</p> <p>Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact New Focus technical support for advice before attempting to plug in and operate damaged equipment.</p>
	<p style="text-align: center;">WARNING</p> <p>The Model 8758 is intended for use ONLY with New Focus Picomotor Controller/Driver units. Connection of other devices to the unit's motor connectors may cause damage to the unit or the connected device, fire, and/or personal injury.</p>
	<p style="text-align: center;">WARNING</p> <p>Before operating the Model 8758, please read and understand all of Section 0.</p>
	<p style="text-align: center;">WARNING</p> <p>Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact New Focus technical support for advice before attempting to plug in and operate damaged equipment.</p>
	<p style="text-align: center;">WARNING</p> <p>Before cleaning the enclosure of the 8758, the attached USB cable must be disconnected from all other equipment.</p>
	<p style="text-align: center;">CAUTION</p> <p>There are no user serviceable parts inside the Model 8758. Work performed by persons not authorized by New Focus will void the warranty.</p>
	<p style="text-align: center;">WARNING</p> <p>If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.</p>

	<p style="text-align: center;">WARNING</p> <p>This instrument is intended for use by qualified personnel who recognize thermal, shock, or laser hazards and are familiar with safety precautions required to avoid possible injury. Read the instruction manual thoroughly before using, to become familiar with the instrument's operations and capabilities.</p>
	<p style="text-align: center;">CAUTION</p> <p>The Model 8758 Picomotor handpad is designed to be safe when operated under Normal Environmental Conditions as defined in EN61010-1:2010. Operation under harsher environmental conditions can result in severe injury.</p>
	<p>The Model 8758 Picomotor handpad is intended for use in an industrial laboratory environment. Use of this product in other environments, such as residential, may result in electromagnetic compatibility difficulties due to conducted as well as radiated disturbances.</p>
	<p>The Model 8742 Picomotor Controller/Driver is intended for use in an industrial laboratory environment. Use of this product in other environments, such as residential, may result in electromagnetic compatibility difficulties due to conducted as well as radiated disturbances.</p>

2 Initial Setup

2.1 Overview

The model 8758 Handpad, or Handheld Controller, facilitates local (non-computer) control of positioners connected to 8742 and 8743-CL Picomotor controllers. It draws its electrical power from the Picomotor controller via USB interface and, hence, does not require a separate power supply.

IMPORTANT: 8742 & 8743-CL controllers must run firmware version 2.2 (or later) to be compatible with the 8758 Handpad.

Model 8758 control functions are organized into four basic groups: (1) controller selection, (2) motor selection, (3) variable speed jog control, and (4) forward/reverse single-step & continuous jog control.

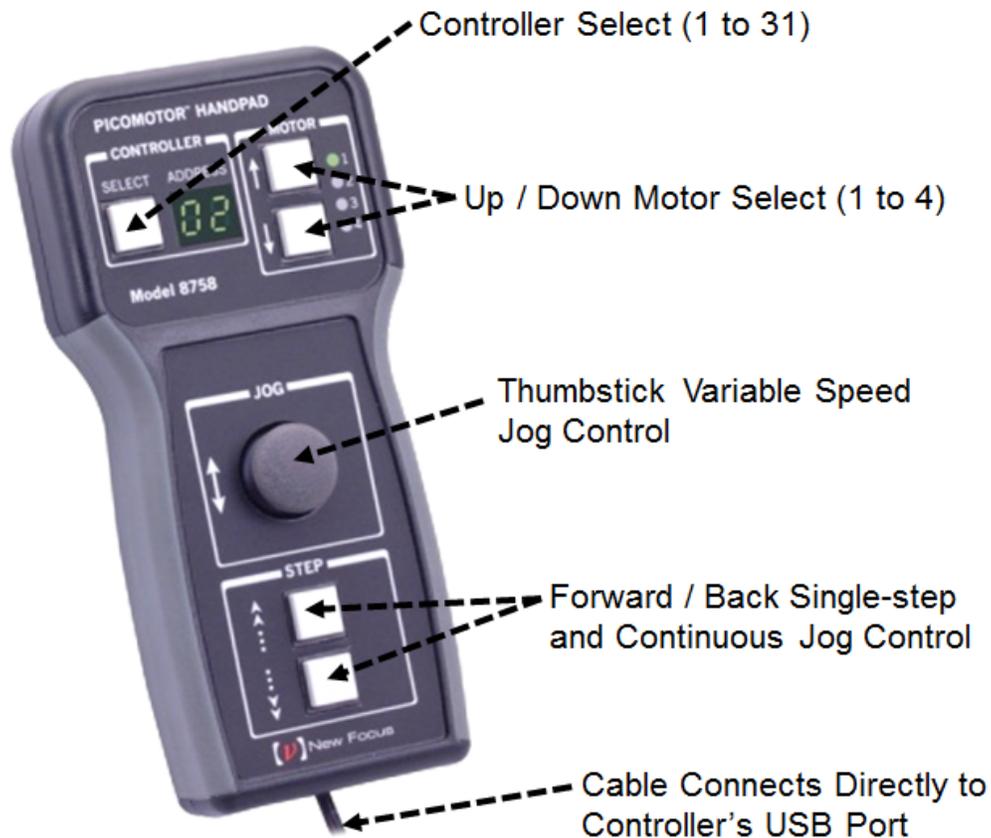


Figure 8 *Function Overview & Location*

2.2 Power ON/OFF Switch

To power ON the unit (a) plug the 8758 USB cable to the designated 'Master' Picomotor controller, (b) turn ON all Picomotor controllers and (c) slide the power ON/OFF switch located at the top of the unit to the ON ("I") position. The controller will then supply power to the handpad and start communicate it. LED status indicator on the controller will change from solid green to slowly flashing amber color signifying its readiness for use. The controller address on the handpad will change from "- -" to the last selected controller, and the last selected motor LED indicator will be turned ON.



Figure 9 Power ON/OFF Switch

2.3 Connecting the 8758 to Single Controller

The 8758 Handpad connects directly to the 8742 & 8743-CL controller's USB port. Therefore, only the controller's Ethernet and RS-485 port will be available for computer interfacing, if needed.

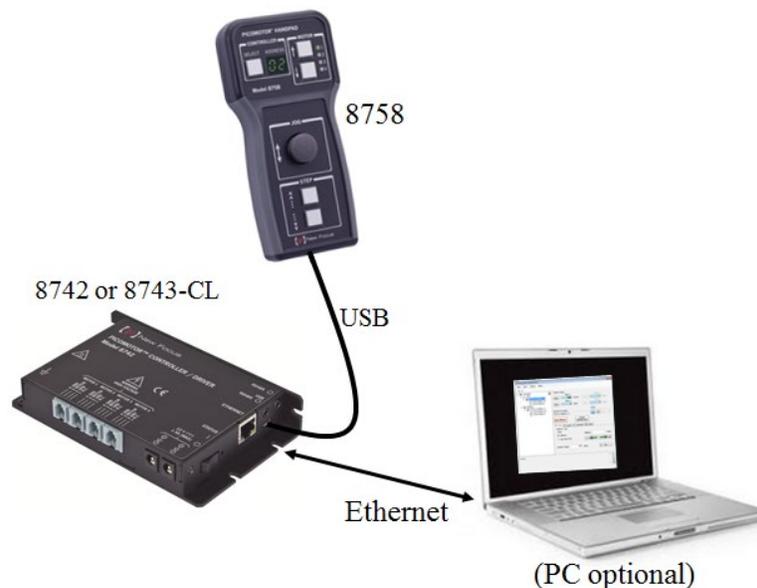


Figure 10 Single Controller Setup

2.4 Connecting the 8758 to Multiple Controllers

The 8758 Handpad is capable of interfacing with up to 31 Picomotor controllers when configured in the RS-485 daisy-chained “Master/Slave” setup shown below.

The controller that has the 8758 connected to it automatically becomes the designated Master Controller. A Master Controller initiates and arbitrates RS-485 communication to all Slave controllers on behalf of the 8758 Handpad or PC.

To avoid RS-485 LAN message conflicts only one network Master is allowed. Therefore, only the 8758 designated LAN Master Controller is permitted to connect to a PC via its available Ethernet port, if computer communication is also desired.

NOTE: Picomotor controllers will only execute move commands from one source (8758 or PC) at any given time.

NOTE: Do not connect the PC to any Slave controller’s USB, Ethernet, or RS-485 port. Only connect the PC to the Master controller.

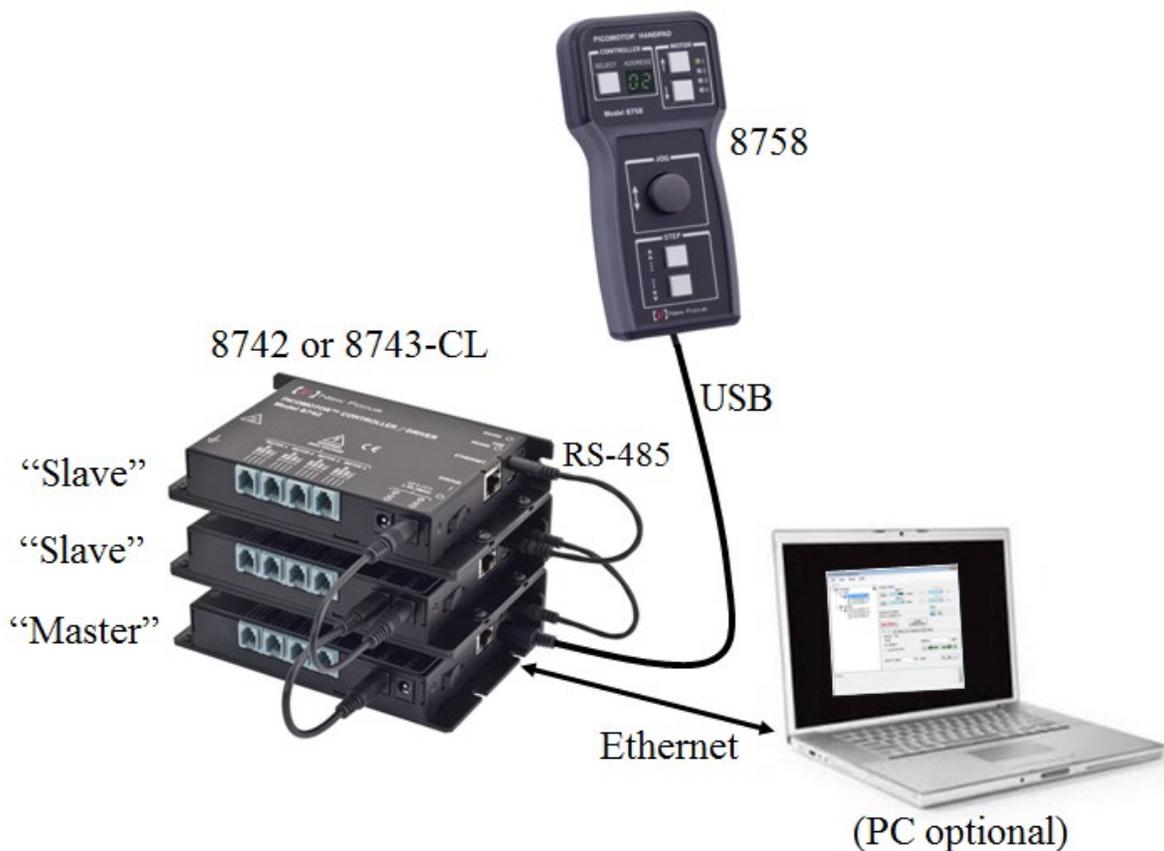


Figure 11 Multiple Controller Setup

2.5 Using Optical Table Mounting Plate

For applications where it is desirable that the model 8758 Handpad be securely fastened to an optical table surface, there is an accessory model # 8758-MTG-KIT available. This kit provides all the necessary hardware to accomplish that objective. The 8758-MTG-KIT accessory is specifically designed for the 8758 handpad and is available for purchase at www.Newport.com

The 8758-MTG-KIT comes complete with one metal plate, two 1/4-20 screws, two washers, and two countersunk flathead screws. (See image below).

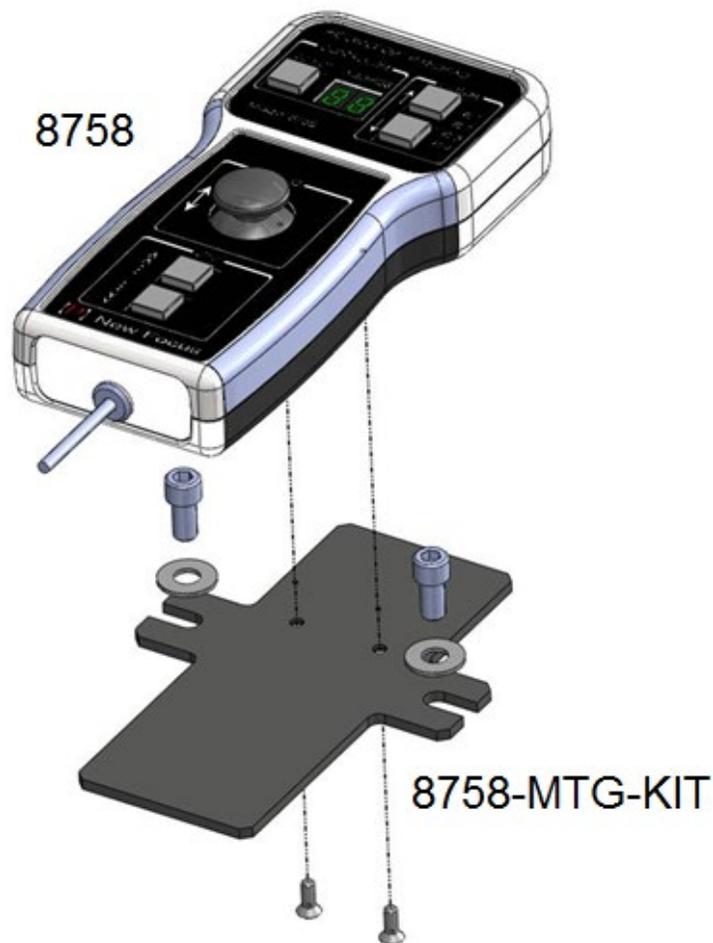


Figure 12 *Mounting Plate*

3 Using the 8758

3.1 Controller Selection

The total number of Picomotor controllers available for selection by the 8758 Handpad is limited by the number of controllers interconnected via daisy-chained RS-485 local area network (LAN).

NOTE: The controller that has the 8758 connected to its USB port automatically becomes the RS-485 LAN Master Controller.

When the designated Master Controller detects the presence of an 8758, it first checks to see if it has scanned the RS-485 LAN since it has been powered ON. If it has never scanned before, it will automatically initiate a scan process to check for all connected Slave Controllers. If it finds two or more controllers with the same address during this process, it will resolve the address conflicts automatically (please refer “SC” command description in the controller’s User’s Manual for further details with regard to address conflict resolution). At the end of a scan, all controllers on the RS-485 LAN will have unique addresses between 1 and 31. This scan process can take an extra 2-3 seconds to complete. Thereafter, when the controller detects the presence of the 8758, it will refer to the last scan data to know what other controllers are connected to the LAN.

NOTE: Always power ON the 8758 handpad AFTER all RS-485 connections have been made and all controllers are powered.

Press the ‘Select’ button to choose from available model 8742 or 8743-CL controllers on the RS-485 LAN for handheld control.



Figure 13 *Controller Selection*

NOTE: Do not connect the PC to any Slave controller’s USB, Ethernet, or RS-485 port. Only connect the PC to the Master controller.

3.2 Motor Selection

The model 8742 controller supports up to four open-loop Picomotors positioners while the model 8743-CL controller supports up to two closed-loop Picomotor positioners. Hence, the controller model will constrain maximum possible motors that can be selected.

The 8758 Handpad motor selection area includes two buttons and four LEDs. The top, up pointing arrow (↑) button decreases the motor selection number while the bottom, down pointing arrow (↓) increases the motor selection number. The green LED indicators to the right of the button show the current motor selected. (See figure below)

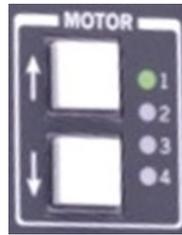


Figure 14 *Motor Selection*

If the selected controller is a model 8742 then any one(1) of four(4) motors can be selected. If the selected controller is a model 8743-CL then only motor one(1) or motor two(2) can be selected.

NOTE: It will only be possible to select between motors 1 and 2 when a two(2) axis 8743-CL controller is selected.

If no Picomotors are actually connected to the controller at the time a jog or step move is initiated then a “MOTOR NOT CONNECTED” error is generated and stored in the controller. There will not be any outward signs either with the controller or 8758 handpad indicating that an error has occurred.

NOTE: Connect the Master controller to a PC via Ethernet interface and run the Picomotor software to retrieve and view stored controller errors.

3.3 Variable Speed Jog Control

The variable speed jog control, or thumbstick, makes it possible for the user to jog the one selected motor in either forward (positive) or reverse (negative) direction at varying speeds. As the thumbstick is gradually tilted vertically upward, the connected motor will correspondingly jog forward with increasing speed. Tilting the thumbstick vertically downward will achieve the same effect but in the opposite direction. **Note that all horizontal tilting is ignored.**

The thumbstick can also be pressed into the handpad to set the controller and motor selection back to the last jogged motor. This “selection return” feature can only be used when motors are not being jogged.

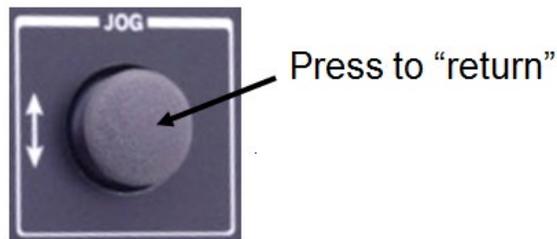


Figure 15

Thumbstick

k

There are 20 distinct jog speed settings which can be customized by the user to best suit the application needs. The factory default settings start at 1 step/second and end at 2,000 steps/second – unless the Picomotor is of type ‘Tiny’, in which case the speed is automatically constrained by the controller to 1750 steps/second (max.).

The Master controller’s Jog Speed command (“JS”) is used to change the default speed settings. For example, “1JS1” sets setting #1 to 1 step/second whereas “20JS500” sets setting #20 to 500 steps/second. Also, the current settings value can be queried by appending a “?” to the command such as, “20JS?” which returns “500”.

NOTE: Remember to send the Save command (“SM”) after changes are made so they are stored in non-volatile memory.

NOTE: To change default speed settings connect the Master controller to a PC and run the Picomotor software application. Then use the command ‘Terminal’ tab to send “JS” and “SM” commands.

3.4 Single-Step & Continuous Jog Control

The single-step & continuous jog control buttons – or step buttons – makes it possible for the user to move the selected motor in either forward (positive) or reverse (negative) direction – one controlled step at a time. It also has as dual function in that the same buttons can be used to perform continuous motion at a predetermined speed.

The way it works is that the top button, with up pointing double-arrow next to it, increments the motor position by one step. The bottom button, with down pointing double-arrow next to it, decrements the motor position one step. (See figure below).

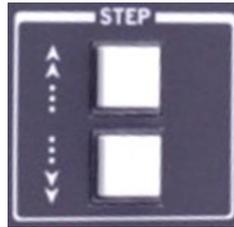


Figure 16 *Step Control*

Additionally, if either button is held down for longer than 2 seconds then the motor will continuously jog in the target direction at a speed equal to jog speed setting # 20, which is 2000 steps/second (factory default).

If necessary, the Master controller's speed setting #20 can be customized using the Jog Speed command ("JS"). For example, "20JS1500" sets setting #20 to 1500 steps/second. Also, the current value can be queried by appending a "?" to the command such as, "20JS?" which returns "1500".

NOTE: If the Picomotor is of type 'Tiny' then the speed is automatically constrained by the controller to 1750 steps/second (max.).

NOTE: Remember to send the Save command ("SM") after changes are made so they are stored in non-volatile memory.

NOTE: To change default speed settings connect the Master controller to a PC and run the Picomotor software application. Then use the command 'Terminal' tab to send "JS" and "SM" commands.

4 Maintenance and Service



WARNING

There are no user serviceable parts inside the Model 8758. Work performed by persons not authorized by New Focus will void the warranty.

4.1 Enclosure Cleaning



WARNING

Before cleaning the enclosure of the Model 8758, the USB cord must be disconnected from the 8743-CL or 8742 controller unit.

The source enclosure should only be cleaned with a mild soapy water solution applied to a damp lint-free cloth. Do not use an acetone or alcohol solution; this will damage the finish of the enclosure.

4.2 Technical Support

Information and advice about the operation of any New Focus product is available from our technical support engineers. For quickest response, ask for “Technical Support” and know the model and serial number for your product.

Hours: 8:00–5:00 PST, Monday through Friday (excluding holidays).

Toll Free: 1-866-NUFOCUS (1-866-683-6287)

(from the USA & Canada only)

Phone: (408) 284-6808

Support is also available by fax and email:

Fax: (408) 980-4300

Email: techsupport@newfocus.com

We typically respond to faxes and email within one business day.

4.3 Service

Your model 8758 Handpad has been designed to provide years of trouble-free operation. Virtually no maintenance is required except for

ensuring that the unit is not damaged, contaminated, or used in an unsafe manner.

4.4 Obtaining Service

The 8758 handheld controller contains no user serviceable parts. To obtain information regarding factory service, contact New Focus or your New Focus representative. Please have the following information available:

1. Instrument model number (bottom of enclosure).
2. Instrument serial number (bottom of enclosure).
3. Description of the problem.

If the instrument is to be returned to New Focus, you will be given a Return Number, which you should reference in your shipping documents. Please fill out a copy of the service form, located on the following page, and have the information ready when contacting New Focus. Return the completed service form with the instrument.

4.5 Warranty

New Focus, a division of Newport Corp, guarantees its products to be free of defects for one year from the date of shipment. This is in lieu of all other guarantees, expressed or implied, and does not cover incidental or consequential loss.

4.6 Service Form

New Focus U.S.A.
Office: 408-919-1500
FAX: 408-980-6083

Name _____ Return Authorization # _____
(Please obtain RA# prior to return of item)

Company _____
(Please obtain RA # prior to return of item)

Address _____ Date _____

Country _____ Phone Number _____

P.O. Number _____ FAX Number _____

Item(s) Being Returned:

Model # _____ Serial # _____

Description _____

Reason for return of goods (please list any specific problems):

**New Focus
Worldwide Headquarters**

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Santa Clara, CA 95054

(In U.S.): 877-835-9620
Tel: 408-980-4300
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