No. 99MCA081A
SERIES No. 198

QM-Data

QM-Data 300

3D Data Processing Unit

User's Manual (Hardware Guide)

Read this User's Manual thoroughly
before operating the instrument. After reading,
retain it close at hand for future reference.

Mitutoyo

CONVENTIONS USED IN THIS MANUAL

Safety Precautions

To ensure that instruments are operated correctly and safely, Mitutoyo manuals use various safety symbols (Signal Words and Safety Alert Symbols) to identify and warn against hazards and potential accidents.

The following signs indicate **general** warnings:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in serious injury or death.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

The following signs indicate **specific** warnings or prohibited actions, or indicate a mandatory action:

Alerts the user to a specific hazardous situation. The given example means “Caution, risk of electric shock”.

Prohibits a specific action. The given example means “Do not disassemble”.

Specifies a required action. The given example means “Ground”.

CONVENTIONS USED IN THIS MANUAL

Types of Notes

The following types of **notes** are used in this manual to help the operator obtain reliable measurement data through correct instrument operation.

IMPORTANT

- An *important note* provides information essential to the completion of a task. You cannot disregard this note to complete the task.
- An *important note* is a type of precaution, which if neglected could result in a loss of data, decreased accuracy or instrument malfunction/failure.

NOTE A *note* emphasizes or supplements important points of the main text. It also supplies information about specific situations (e.g., memory limitations, equipment configurations, or details that apply to specific versions of a program).

TIP A *tip* is a type of note that helps the user apply the techniques and procedures described in the text to his or her specific needs.
It also provides reference information associated with the topic being discussed.

Mitutoyo assumes no liability to any party for any loss or damage, direct or indirect, caused by use of this instrument not conforming to this manual.
Information in this document is subject to change without notice.

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WARRANTY

In the event that the Mitutoyo data processing unit “QM-Data” should prove defective in workmanship or material, within one year from the date of original purchase for use, it will be repaired or replaced, at our option, free of charge upon its prepaid return to us.

If the unit fails or is damaged for any of the following reasons, it will be subject to a repair charge, even if it is still under warranty.

1. Failure or damage owing to inappropriate handling or unauthorized modification.
2. Failure or damage owing to transport, dropping, or relocation of the instrument after purchase.
3. Failure or damage owing to fire, salt, gas, abnormal voltage, or natural disaster.

This warranty is effective only where the instrument is properly installed and operated in conformance with the instructions in this manual.

PRECAUTIONS FOR USE

1. Prohibition of Disassembly or Unauthorized Modification

Do not disassemble or modify the data processing unit “QM-Data”. Otherwise, the measuring accuracy or functions may be adversely affected, or an accident may occur. For inspection or repair the internal parts of the data processing unit, please contact the Mitutoyo office.

2. Batteries

A Li (lithium) battery is used for memory backup. Please observe the following precautions.

Li (lithium) battery

CAUTION

• The Li battery is mounted on the printed circuit board in the data processing unit “QM-Data”. Do not dispose of the data processing unit by burning it. If the data processing unit is thrown into fire, the battery may leak chemicals, burst, or burn violently. Comply with government regulations regarding the disposal method.

3. General Precautions for Handling the Data Processing Unit “QM-Data”

Action to take if a problem occurs

• When overheating, smoke, or an abnormal smell occurs in the data processing unit, turn off the power switch immediately, then unplug the AC adapter from the power outlet. Contact the Mitutoyo office for repair. If you continue to use the data processing unit “QM-Data” under such conditions, electric shock or fire may occur.

WARNING

• If foreign matter (such as water or metal) enters the data processing unit “QM-Data”, turn off the power switch immediately, then unplug the AC adapter from the power outlet. Then, contact the Mitutoyo office for repair. If you continue to use the data processing unit “QM-Data” when there is foreign matter in the data processing unit, electric shock or fire may occur.

• If the data processing unit “QM-Data” is bumped so hard that the cover or other part is broken, turn off the power switch, then unplug the AC adapter from the power outlet. Contact the Mitutoyo office for repair. If you continue to use the data processing unit “QM-Data” in its damaged condition, electric shock or fire may occur.

Handling

- If a malfunction occurs, such as no picture is displayed on the LCD (liquid crystal display) even though the power switch is on, do not use the data processing unit “QM-Data”. Contact the Mitutoyo office for repair. If you continue to use the data processing unit in its damaged condition, electric shock or fire may occur.

- Do not let any foreign matter such as metal or water, or other liquids get into the data processing unit “QM-Data” through the opening around the connectors on the rear panel. Otherwise, electric shock or fire may occur.

- Do not damage or modify the cord of the AC adapter. If a heavy object is placed on the cord, or if the cord is pulled, bent, twisted, or heated, the AC adapter could be damaged, and electric shock or fire may occur.

- When a thunderstorm occurs nearby, unplug the AC adapter and the modular jack. Otherwise, a malfunction, electric shock, or fire may occur.

- Do not touch the power plug of the AC adapter or the modular jack with wet hands. Otherwise, electric shock may occur.

WARNING

- When the power plug is inserted in the power outlet, do not touch the metallic portions of the modular jack of the AC adapter with your hands. Doing so could result in an electric shock.

- Do not directly touch the pin of the connector on the rear panel with your hands. Otherwise, the resultant static electricity could cause a malfunction or a failure in the internal circuitry. Use the supplied covers to cover any unused connectors.

- If the power cord or the modular jack of the AC adapter is damaged, or if the power outlet is loose, do not use the data processing unit “QM-Data”. Contact the Mitutoyo office for repair. If you continue to use the data processing unit under such conditions, electric shock or fire may occur.

- Do not connect the AC adapter to a power supply in which large electric current is flowing, for example, to a machine tool or a large CNC measuring machine. Furthermore, avoid complicated wiring.

- If the metallic portion of the AC adapter’s modular jack or the power outlet is dusty, wet or greasy, wipe with a dry cloth. Otherwise, fire may occur.

- Do not disassemble or modify the data processing unit “QM-Data”. Doing so may result in failure. If the data processing unit needs to be inspected or repaired, contact the Mitutoyo office.

Handling

• Do not bump the LCD panel. Furthermore, do not press against the LCD panel with a sharp implement. Doing so can crack the LCD panel. If the LCD panel cracks and the liquid contents get on your skin, wash your skin under running water for at least 15 minutes. If the liquid enters your eyes, flush them with running water for at least 15 minutes, then consult a doctor. The LCD contains acutely irritating substances.

CAUTION

• Be sure to press the keys with your fingers. Do not press them with a pencil, a ball-point pen, or a sharp metal implement. Doing so may break the keys.

• Be sure to use the specified AC adapter only. Otherwise, failure of the internal circuit, fire, or injury may occur.

• When pulling out the power plug or the modular jack of the AC adapter, be sure to hold the plug or the jack, not the cord. Otherwise, the core of the cord may be exposed or broken, possibly resulting in electric shock or fire.

• Be sure to securely insert the modular jack and the power plug of the AC adapter. Otherwise, fire or failure may occur.

4. Optional Accessories

4.1. Receipt Printer (Small Thermal Printer) (Part No. 06AAX264, 06AAX266, or 06AAX265)

• Before connecting the receipt printer to the data processing unit “QM-Data”, be sure to turn off the power switch of the data processing unit and unplug the AC adapter. When the battery operating time becomes very short, the battery may be depleted. In that case, contact the Mitutoyo office.

CAUTION

• The receipt printer uses a Ni-MH (nickel-metal hydride) battery for its power supply. Be sure to read the precautions in the User’s Manual and to observe the following precautions.

• When charging the battery, be sure to keep the ambient temperature between 0°C and 40°C. Otherwise, the battery may leak or overheat, adversely affecting the performance and life of the battery.

• Refer to the instructions supplied with the receipt printer to see how the battery is charged.

4.2. **Floppy Disk Drive** (Part No. 06AAX263)

CAUTION

- Before mounting or removing the floppy disk drive from the data processing unit “QM-Data”, be sure to turn off the power switch on the data processing unit. Furthermore, if you are using the AC adapter, unplug the modular jack.
- When setting or removing a floppy disk, do not insert your finger into the slot of the floppy disk drive. Doing so could cause injury.

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MEMO

1 INTRODUCTION

This chapter describes the outline of the data processing unit “QM-Data”, and the name and function of each component.

1.1 Outline

This data processing unit “QM-Data” is used to process data from a manual coordinate measuring machine (manual CMM).

In this data processing unit, measurement instructions, measurement values, and various calculation results are displayed graphically on an LCD in a form that is easy to understand.

Measurement results can be output using the receipt printer, which is a small thermal printer (an optional accessory), or on a printer handling A4-size paper or continuous paper.

Created part programs, measured data, and measurement results can be stored on a floppy disk (in this case, the optional floppy disk drive is necessary); the stored part programs, measured data, and measurement results can then be used when necessary.

1.2 Component Names and Functions

This section describes the names and functions of the components of the data processing unit “QM-Data”.

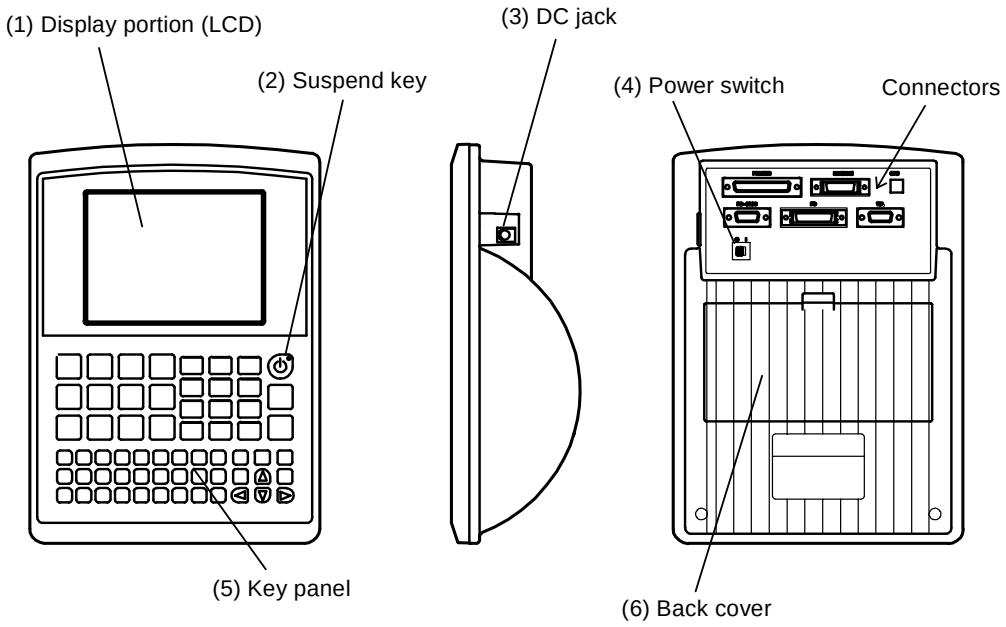

Fig. 1-1

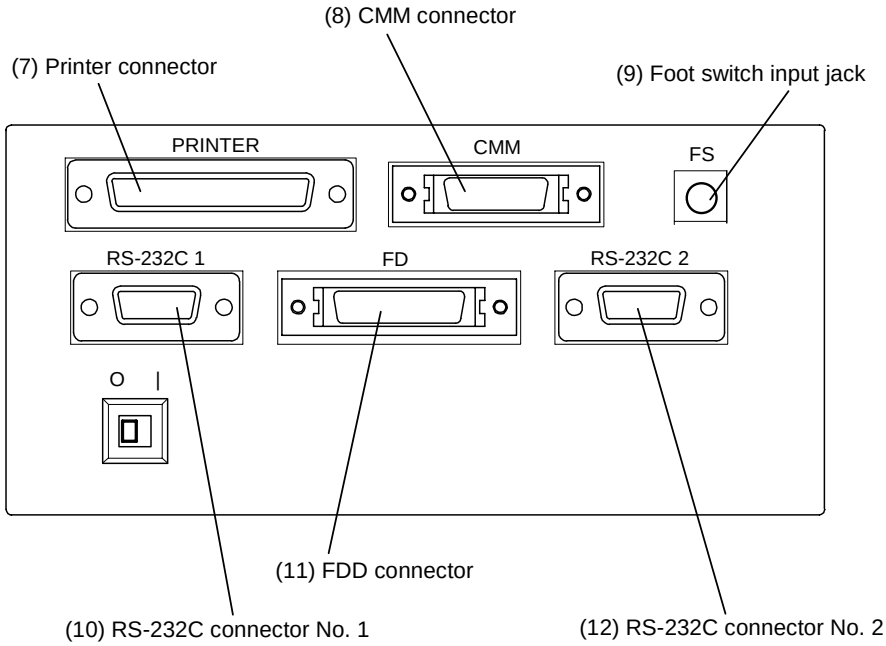

Fig. 1-2

(1) LCD

The LCD (Liquid Crystal Display) displays measurement result.

(2) Suspend key

When the data processing unit “QM-Data” is in Suspend Mode, the LED corresponding to this Suspend key lights. If this key is pressed in Suspend Mode, then the system starts up in the state prior to Suspend Mode. The measured data, obtained before the Suspend Mode was entered, is retained.

When the data processing unit will not be used for some time, for example during lunch, activate the Suspend Mode to reduce the power consumed by the data processing unit.

Unlike when the power switch is OFF, a small amount of electricity is used in Suspend Mode. Consequently, if you do not intend to use the data processing unit for a long time, for example over a holiday, turn off the power switch on the data processing unit.

(3) DC jack

This is a jack used to connect the AC adapter which is a standard accessory.

(4) Power switch

Setting the power switch knob to the “**|**” position turns the power ON; and setting the power switch knob to the “**O**” position turns the power OFF.

When electric power is supplied from the AC adapter, the built-in green LED lights.

When you turn off the power switch, internal setting will be retained, but measured data that has not been stored will be lost.

(5) Key panel

From this key panel, you can create various settings and perform input. This key panel includes the measurement command keys.

(6) Back cover

Do not open the back cover. The back cover is for maintenance.

(7) Printer connector (**PRINTER** connector)

This is a connector for connecting the printer.

(8) CMM connector (**CMM** connector)

This is a connector for connecting the CMM (Coordinate Measuring Machine).

(9) Foot switch input jack (**FS** jack)

This is a jack for connecting the optional foot switch.

(10) RS-232C connector No. 1 (**RS-232C 1** connector)

This is a connector for connecting a personal computer.

(11) FDD connector (**FD** connector)

This is a connector for connecting the optional floppy disk drive (Part No. 06AAX263).

(12) RS-232C connector No. 2 (**RS-232C 2** connector)

This is a connector for connecting the optional temperature sensors via the temperature sensor unit.

2 SETTING UP

This chapter describes the required environment for installing the data processing unit “QM-Data”, and the installation of the data processing unit.

2.1 Required Environment for Installation

Because this data processing unit “QM-Data” is used along with a CMM (Coordinate Measuring Machine), make sure to install the data processing unit in an environment that satisfies the conditions required for installing the CMM in terms of temperature, humidity, vibration, and dust. Furthermore, the installation environment should satisfy the following conditions.

(1) Power supply

Confirm that the power outlet meets the power requirements of the AC adapter before connecting the AC adapter to the power outlet.

Do not use any AC adapter other than the one provided.

(2) Electromagnetic noise

Do not connect the AC adapter to a power supply that has a large electric current flowing through it, such as one for machine tools or large CNC measuring instruments.

Place the data processing unit “QM-Data” well away from equipment that generates electromagnetic noise, such as welding equipment or electric discharge machines (EDMs).

2.2 Mounting the Data Processing Unit

Refer to the User’s Manual of the main unit of the CMM for the method to mount the data processing unit “QM-Data” on the CMM (Coordinate Measuring Machine).

MEMO

3 BASIC OPERATIONS

This chapter describes the basic operations of the data processing unit “QM-Data” and its optional accessories.

3.1 Start-up

(1) Connect the AC adapter.
(2) Turn on the power switch. Then wait until the screen shown in Fig. 3-1 is displayed.

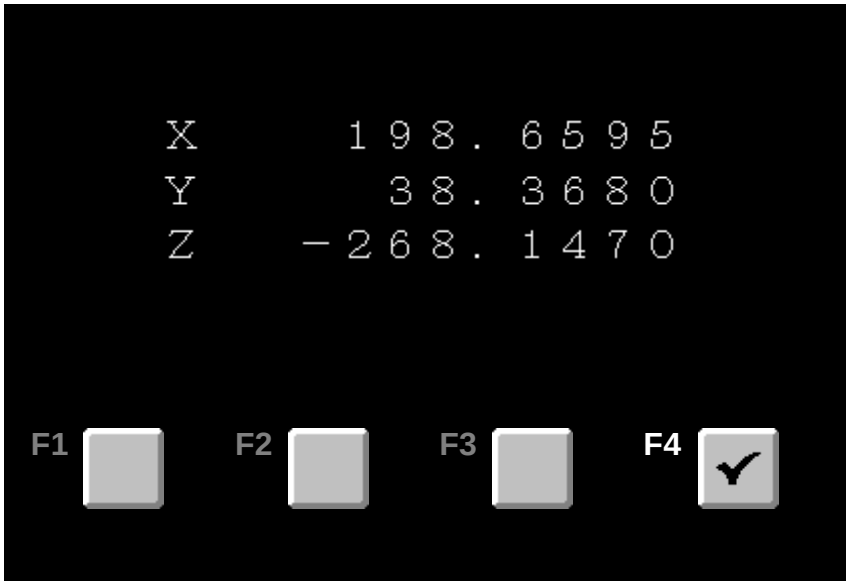

Fig. 3-1

TIP Refer to the “User’s Manual (Software Guide (1) & (2)) (MANUAL Nos. 99MCA082 & 99MCA083)” for information on the settings and measurement methods.

3.2 Compensation Functions

You can utilize the following compensation functions.

(1) Volumetric error compensation

Volumetric error compensation can be used by setting the scale absolute origin for each axis in the CMM (Coordinate Measuring Machine) in accordance with the instructions displayed.

TIP Refer to Chapter 1 of the “User’s Manual (Operation Guide) (MANUAL No. 99MCA084)” for an explanation of the volumetric error compensation function.

(2) Temperature compensation (optional)

By inputting data from the temperature sensors attached to the CMM and the workpiece, the relative amount of thermal expansion in the workpiece and the CMM can be compensated for.

TIP Refer to the “Temperature Compensation Function (MANUAL No. 99MCA089)” for an explanation of the temperature compensation function.

3.3 Optional Accessories

3.3.1 Printer

Use the printer cable to connect the printer to the PRINTER connector on the rear of the data processing unit.

Refer to the printer's operation manual for an explanation of how to set up and operate the printer.

3.3.1.1 Receipt Printer

The receipt printer is a small thermal printer. Measured data can be printed on the receipt printer.

Refer to the "User's Manual" of the Main Unit of the CMM (Coordinate Measuring Machine) for an explanation of how to mount the receipt printer.

IMPORTANT

- Do not use any other AC adapter than the AC adapter supplied with the receipt printer. Otherwise, the receipt printer might be damaged.
- Before connecting the receipt printer and the data processing unit, be sure to turn off their power switches.

3.3.1.2 ESC/P Printer

The measured data, the measurement results, and the part programs can be printed on the ESC/P printer.

IMPORTANT Be sure to turn off their power switches before connecting the ESC/P printer and the data processing unit.

TIP Check the specifications described in 5.3.1 "Output to Printer" to find out which printers are compatible.

3.3.2 Floppy Disk Drive

Use the supplied connection cable to connect the floppy disk drive (FDD) with the FD connector on the rear of the data processing unit.

The floppy disk drive is used to store and retrieve the part programs or measured data on the floppy disk.

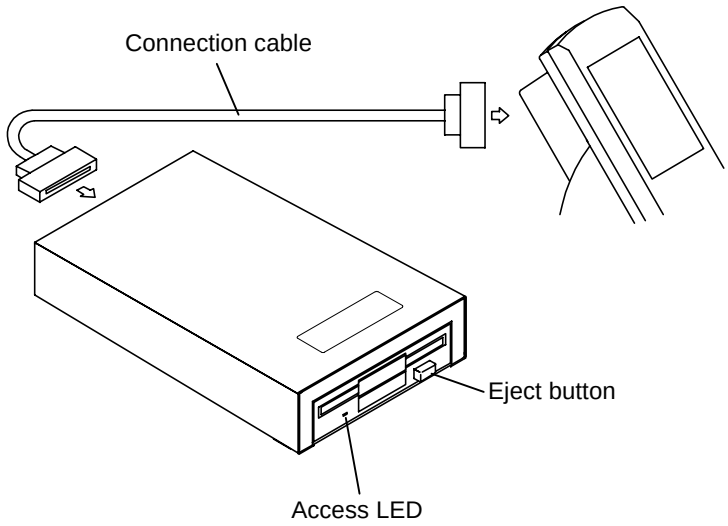

Fig. 3-2

IMPORTANT

- Make sure to turn off the power switch on the data processing unit before connecting the floppy disk drive and the data processing unit.
- For the floppy disk drive, use a 3.5” floppy disk (2HD, 1.44 MB) that has been formatted for MS-DOS.
- Do not use a cleaning disk in the floppy disk drive.
- When the access LED on the front of the floppy disk drive is lit, do not use the eject button or connect or disconnect the connection cable.

NOTE **Handling floppy disk**

When using a floppy disk, pay attention to the following matters. Mishandling can result in damaged data.

1) Do not touch the disk surface directly.
2) Do not put the floppy disk near a magnet or magnetized item.
3) Do not leave the floppy disk where the temperature is outside the range of 0°C through 60°C.

TIP Refer to the “User’s Manual” of the Main Unit of the CMM (Coordinate Measuring Machine) for information on how to mount the floppy disk drive.

3.3.3 RS-232C Interface

3.3.3.1 RS-232C No. 1

The RS-232C No. 1 interface of the data processing unit is used to communicate with a personal computer or equipment having an RS-232C interface.

IMPORTANT

- The signal names and pin numbers may be different depending on the equipment. Before setting up the connection, be sure to check that equipment's manual.
- If the connection cable you are using has been manufactured by a vendor other than Mitutoyo Corporation, or if you set up the connection cable by yourself, be sure to use core wire shielded by a knitted shield and ground each end of the knitted shield to the shell of the RS-232C connector. If you use a core wire without a knitted shield, the data processing unit "QM-Data" may malfunction owing to outside noise, or the television or the radio may malfunction owing to high-frequency noise from the data processing unit.

NOTE Before using the RS-232C No. 1 interface, set up the communication conditions (namely, baud rate, word length, parity check, stop bit) for the other piece of equipment.

TIP

- Refer to Section 5.3.2 "RS-232C Input and Output" for the connection specifications and the pin arrangement of the connector.
- Refer to Chapter 14 of the "User's Manual (Software Guide (2)) (MANUAL No. 99MCA083)" for information on how to set up the RS-232C No. 1 interface.

3.3.3.2 RS-232C No. 2

The RS-232C No. 2 interface on the data processing unit is connected to the temperature sensors via the temperature sensor unit.

IMPORTANT Do not use any other temperature sensor than Mitutoyo's temperature sensor. Furthermore, do not use any other cable than the specified cable.

TIP • The communication conditions (namely, baud rate, word length, parity check, stop bit) were set when the unit shipped.

3.3.4 Foot Switch

Insert the foot switch plug into the foot switch input jack (FS jack) on the rear of the data processing unit.

If you step on the foot switch during a measurement, the measured data at that time will be input to the data processing unit.

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4 MAINTENANCE AND TROUBLESHOOTING

This chapter describes maintenance and troubleshooting.

4.1 Daily Care

Wipe the plastic portion of the data processing unit “QM-Data” lightly with a cloth that was moistened with a neutral detergent diluted in water, and then wrung out.

IMPORTANT Do not apply any solvent to the plastic portion of the data processing unit.

4.2 Troubleshooting

If you think that operation is abnormal, follow the troubleshooting instructions below.

IMPORTANT If you cannot solve the problem, make a note of the model name, model number, and serial number, and then contact your supplier.

(1) No picture is displayed even when the power switch is on.

Point to check	Cause and remedy
Is the AC adapter connected correctly?	• Confirm that the plug and the modular jack of the AC adapter are securely connected. When those connections are normal, the green LED built in the power switch will light up. • Confirm that the voltage of the power supply meets the AC adapter ratings.
Is the Suspend Mode LED lit?	Press the Suspend key.

(2) The displayed characters are hard to read.

Point to check	Cause and remedy
Has the contrast been adjusted?	• Adjust the contrast of the LCD, referring to Chapter 14 of the “User’s Manual (Software Guide (2)) (MANUAL No. 99MCA083)”. • The LCD display quality varies depending on the ambient temperature. Slight variation is normal. Adjust the contrast so that you can clearly read the characters.

(3) It is not possible to move from the initial screen to the next screen; or, although no operation has been done, the screen returns to the initial screen.

Point to check	Cause and remedy
Is there any source generating noise, for example a machine tool, an electric discharge machine, a welding machine etc., near the data processing unit “QM-Data”?	Move the data processing unit “QM-Data” away from the source generating the noise. If the data processing unit uses the same power supply as the source generating the noise, use a different power outlet.
Does the power supply voltage fluctuate?	If the wiring is complicated, or if the data processing unit “QM-Data” uses the same power supply as an equipment through which a large current flows even briefly, use a different power outlet.

(4) The buzzer volume is too low or too high.

Point to check	Cause and remedy
Have you adjusted the volume setting?	Adjust the volume setting, referring to Chapter 14 of the “User’s Manual (Software Guide (2)) (MANUAL No. 99MCA083)”.

(5) The displayed date and time are not correct.

Point to check	Cause and remedy
Have you set the date and time? Have you set the date and time correctly?	Set the date and time, referring to Chapter 14 of the “User’s Manual (Software Guide (2)) (MANUAL No. 99MCA083)”. Input the date and time according to the specified format.
Are you resetting the time periodically?	Since the built-in clock bears a slight error, set the time periodically.

(6) An error message concerning the memory backup battery appears.

Point to check	Cause and remedy
(Memory backup battery error)	• This error message indicates that the memory backup battery is low, and that if you continue to use the data processing unit “QM-Data”, backup will not be performed. Save the part programs and measured data stored in the internal memory of the data processing unit to the floppy disk or to a personal computer. • Contact your supplier to replace the battery.

IMPORTANT Replacing the battery will initialize the internal memory. Be sure to create the necessary backups.

(7) The retained values are different from the values that were set.

Point to check	Cause and remedy
Is there an error message about the memory backup battery?	The data processing unit “QM-Data” is in a state in which it cannot back up memory. Those part programs or measured data not saved to a personal computer or floppy disk will be lost.

(8) Errors related to the Digital Scale unit occur frequently.

Point to check	Cause and remedy
Is the ambient noise appropriate?	• Connect the AC adapter to a different power supply, one that does not have large current flowing through it. • Use the data processing unit “QM-Data” away from equipment generating electromagnetic noise, for example a welding machine or electric discharge machine. • If the problem persists, it may be necessary to adjust the Digital Scale unit. In that case, contact your supplier.

(9) It is not possible to print from the printer.

1) Confirm that the connector attached to the connection cable is securely connected.
2) Check whether or not an error message is displayed on the printer. If an error message is displayed, correct the error by following the instructions in the printer manual.
3) Disconnect the connection cable between the printer and the data processing unit, then try the test print described in the printer manual.

(10) It is not possible to write or read data using a floppy disk.

Point to check	Cause and remedy
Is the floppy disk set to write-protect?	Shift the write-protect tab on the floppy disk to the write-enable position.
Is the floppy disk inserted correctly?	Insert the floppy disk correctly, then try again.
Are the connectors in the connection cable between the floppy disk drive and the data processing unit “QM-Data” securely connected?	Confirm the connection of the connectors in the connection cable.
Is the floppy disk formatted properly?	Reformat the floppy disk using your personal computer (1.44 MB; 2HD).
Is the floppy disk formatted?	Format the floppy disk using your personal computer (1.44 MB; 2HD).
The contents of the floppy disk might be damaged.	The damaged contents cannot be recovered. If there is a backup floppy disk, use it.

(11) Data cannot be input using the touch signal probe.

Point to check	Cause and remedy
Is the touch signal probe’s cable connection OK?	Check the connection between the touch signal probe's cable and the main unit of the CMM (Coordinate Measuring Machine).

(12) Data cannot be input by stepping on the foot switch.

Point to check	Cause and remedy
Is the foot switch cable connection OK?	Check the connection between the foot switch cable and the data processing unit “QM-Data” .

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5 SPECIFICATIONS

This chapter describes the specifications for the data processing unit "QM-Data", the standard accessories, and the optional accessories.

5.1 Basic Specifications

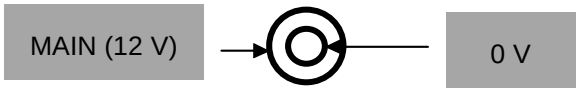
Item	Specification
Monitor	Graphic LCD (320 × 240 dots; with backlight)
Displayable languages	Japanese / English / German / French / Italian / Spanish / Portuguese
Power supply	AC adapter
Electric power consumption	Max. 24 W (not including any optional accessories)
Dimensions	200 (W) × 90 (D) × 280 (H) mm
Mass	1.2 kg
Operating temperature range	10 ~ 30 °C
Operating humidity range	20 ~ 80 %RH (Must be free from condensation)
Storage temperature range	-10 ~ 50 °C
Storage humidity range	5 ~ 90 %RH (Must be free from condensation)

TIP Refer to the "User's Manual (Software Guide (1) & (2)) (MANUAL Nos. 99MCA082 & 99MCA083)" for information on the data processing functions.

5.2 Power Supply Specifications

Standard accessories include an AC adapter and a power cord for the AC adapter. The power cord corresponds to the power source voltage in the country where the data processing unit “QM-Data” is used.

1) Specifications of the AC adapter

Item		Specification
Part No.		357651
Device specifications	External dimensions	121 (D) x 60 (W) x 34.5 (H) mm
	Mass	0.35 kg
	Range of input voltage from power supply	100 ~ 240 V ±10%
	DC output	+12 V ± 5% (Output current: 0.3 ~ 3.5A) 
	Display	When the power supply is on, the green LED is lit.

2) Power cord for the AC adapter

Part No.	Corresponding country
930966T	For 100 V / for Japan
930966T	Meeting the UL, CSA regulations / for United States of America, Canada
930967	Meeting the CEE regulation / for Germany, Europe
930968	Meeting the BS regulation / for the United Kingdom
933098	Meeting the SAA regulation / for Australia

5.3 Input and Output Specifications for the Data Processing Unit

The data processing unit “QM-Data” has the following input and output connectors for connecting to external devices.

5.3.1 Output to Printer (Centronics; 8-bit parallel)

The measured data and graphs can be output to the receipt printer (optional accessory) or the ESC/P printer. Graphs can be output only to the ESC/P printer.

1) Printer specifications

(1) Centronics; 8-bit parallel input.
(2) Printer control code: ESC/P.
(3) Being operable by MS-DOS.
(4) Paper size: A4-size or Letter-size for pieces of paper; and 8-inch width (80 characters) for continuous paper.
(5) Color mode printout using a color ribbon cartridge.

<Recommended printer model>: LQ-300 or LQ570+ (by EPSON Inc.)

2) Printer connection cable

Use the following dedicated cable to connect the printer.

(1) Cable for connecting the receipt printer

Use the cable supplied with the receipt printer.

(2) Cable for connecting the ESC/P printer

2 m (Part No. 12AAA804) or 4 m (Part No. 12AAA805)

5.3.2 RS-232C Input and Output

5.3.2.1 RS-232C No. 1

The RS-232C No. 1 interface is used storing and reading measured data or part programs on a personal computer.

1) Specifications

- Communication specification: Half-duplex
- Communication method: Asynchronous
- Communication speed: 1200, 2400, 4800, or 9600 bps.

2) Pin arrangement of the connector

Connector: JES-9P-2A3A (9-pin, D-sub)
manufactured by Nihon Attyaku Tanshi Inc.

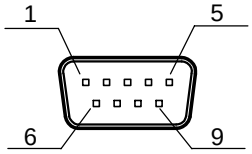


Fig. 5-1

The connection specifications for connecting the RS-232C No. 1 interface to data terminal equipment (DTE), such as a personal computer are as follows:

Data terminal equipment (DTE), such as personal computer (PC/AT compatible)

Signal name	Pin No.
DCD	1
RxD	2
TxD	3
DTR	4
SG	5
DSR	6
RTS	7
CTS	8
RI	9
Shield	Shell

9-pin, D-sub

Data processing unit “QM-Data”: (Data terminal equipment (DTE))

Pin No.	Signal name	Description
1	NC	No connection
2	RxD	Received data
3	TxD	Transmit data
4	DTR	Data terminal ready
5	SG	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	NC	No connection
Shell	Shield	Frame ground

9-pin, D-sub

Fig. 5-2

5.3.2.2 RS-232C No. 2

RS-232C connector No. 2 (**RS-232C 2** connector) is used to connect the temperature sensors via the temperature sensor unit.

NOTE RS-232C connector No. 2 (**RS-232C 2** connector) is exclusively used for connecting the temperature sensors via the temperature sensor unit. Do not connect any device other than the temperature sensor unit to this connector.

5.4 Standard Accessories

Part No.	Part name	Quantity
357651	AC adapter	1
-	Power cord for AC adapter	1
06AAE848A	CMM connection cord (3 m) (UD cable-2)	1
99MCA081 99MCA082 99MCA083 99MCA084 99MCA085	User's manual (hardware guide) User's manual (software guide (1)) User's manual (software guide (2)) User's manual (operation guide) Quick help manual	1 set
-	Inspection certificate	1

5.5 Optional Accessories

5.5.1 List of Optional Accessories

Part No.	Part name
	Receipt printer (with cable)
06AAX264	For 100 V
06AAX266	For 230 V
06AAX265	For 120 V
06AAX290	Printer paper for receipt printer (10 pieces)
12AAA804	Printer cable for ESC/P printer (2 m)
12AAA805	Printer cable for ESC/P printer (4 m)
06AAX263	Floppy disk drive (with exclusively used cable)
12AAA807	RS-232C cable (2 m)
12AAA808	RS-232C cable (4 m)
937179T	Foot switch

5.5.2 Floppy Disk Drive

Item		Specification
Part No.		06AAX263
Device specifications	External dimensions	44 (W) x 200 (D) x 125 (H) mm
	Mass	1.1 kg
	Power consumption	Max. 3.85 W
	Storage media	3.5” formatted floppy disk (2HD, 1.44 MB, MS-DOS format)

5.5.3 Foot Switch

Item		Specification
Part No.		937179T
Device specifications	External dimensions	80 (W) x 75 (D) x 35 (H) mm
	Mass	200 g
	Cable length	1.8 m

MEMO

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