HIOKI

INSTRUCTION MANUAL

2342-20

OUTPUT MODULE

HIOKI E. E. CORPORATION

Contents

Introduction

Thank you for purchasing the HIOKI “Model 2342-20 OUTPUT MODULE.” To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

Inspection

When you receive the instrument, inspect it carefully to ensure that no damage occurred during shipping. In particular, check the panel connector. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

Accessories

Instruction manual 1

Safety Notes

⚠DANGER This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

Safety Symbols

In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the instrument.

The ⚠ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.

Indicates a grounding terminal.

Indicates DC (Direct Current).

Indicates AC (Alternating Current).

The following symbols in this manual indicate the relative importance of cautions and warnings.

DANGER	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
WARNING	Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
CAUTION	Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.
NOTE	Indicates advisory items related to performance or correct operation of the instrument.

Other Symbols

	Indicates the prohibited action.
❖	Indicates the reference.

Notes on Use

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

⚠CAUTION

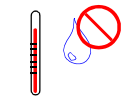
Do not allow the instrument to get wet.

Corrosive or combustible gases

Electromagnetic radiation or highly electrically charged object

- **Operation and Installation environment.**
  This instrument should be installed and operated indoors only, between 0 and 50°C (32 to 122°F) and 80% RH or less.
- **Do not allow the instrument to get wet, and do not take measurements with wet hands.**
  The instrument may be damaged.
- **Do not use the instrument where it may be exposed to corrosive or combustible gases.**
  The instrument may be damaged.
- **Do not use the instrument near a source of strong electromagnetic radiation, or near a highly electrically charged object.**
  These may cause a malfunction.
- **This instrument is not designed to be entirely water- or dust-proof.**
  Do not use it in an especially dusty environment, nor where it might be splashed with liquid. This may cause damage.
  When the module is used in a dusty environment, place it in a dustproof case and take measures to ensure heat dissipation.

⚠CAUTION



Temperature or humidity

Dust

Direct sunlight

- **Do not store or use the instrument where it could be exposed to direct sunlight, high temperature or humidity, or condensation.**
  Under such conditions, the instrument may be damaged and insulation may deteriorate so that it no longer meets specifications.

- **To avoid damage to the instrument, protect it from physical shock when transporting and handling.**
  Be especially careful to avoid physical shock from dropping.

- **Do not obstruct the ventilation holes.**
  Ventilation holes for heat radiation are provided on the top and rear panels of the instrument. Leave sufficient space around the ventilation holes and install the instrument with the holes unobstructed. Installation of the instrument with the ventilation holes obstructed may cause a malfunction or fire.

- **When using the instrument in the case, drill ventilation holes.**
  Drill ventilation holes or install a ventilation fan to prevent heat buildup.

⚠WARNING

- A qualified electrician shall perform the wiring to prevent electric shock.
- Avoid live-line electrical work to prevent electric shock and accidents due to short-circuiting.
- When tightening the screws, confirm that all screws are securely tightened. A loose screw may result in module errors, fire, or electric shock.
- Tighten the screws within the specified torque. Excessive torque may damage the terminals. Inadequate torque may result in module errors, fire, or electric shock.
- Ensure that the power supply module and input are OFF until all wiring work is finished. This will prevent module trouble and electric shock.
- Ensure that the power supply module and input are OFF when connecting or disconnecting the module to the system. This will prevent electric shock, errors, and malfunction.
- Avoid using an unused terminal for relaying or any other purpose to prevent electric shock, errors, and malfunction.

⚠CAUTION

- Connect the module to a power source that matches the rating in order to prevent fire.
- Ensure that the power supply, input, and output are correctly wired according to the wiring diagram. (See the chapter on "Preparations" in the instructions manual for each module.) This will prevent fire, malfunction, and errors.
- Use cables of the proper sizes for the rated current. This will prevent entire system errors and fire resulting from broken wire.
- If power supply noise poses a problem, use of a noise filter is recommended.
- When the power and signal lines may be subject to a lightning-induced surge, install a lightning arrester between another instrument or module connected to this module and line to protect the system.
- Avoid stepping on or pinching cables, which could damage the cable insulation.
- Keep the cables well away from heat sources, as bare conductors could be exposed if the insulation melts.

Preliminary Checks

- Before using the instrument the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.
- Before using the instrument, make sure that the insulation on the cables is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.

Overview Chapter 1

1.1 Product Overview

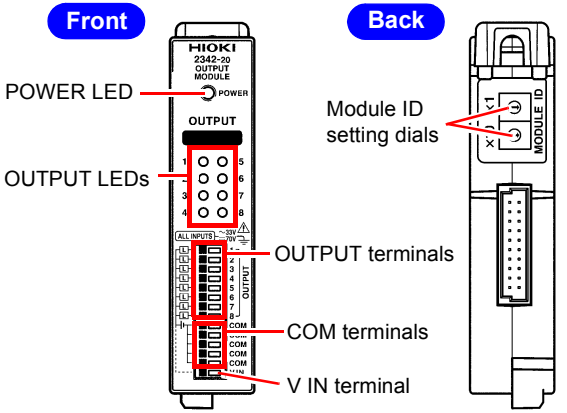
The 2342-20 is a control signal output module for the Hioki Smart Site (remote measurement system). The module outputs control signals, monitors commands from the host, and records data on measurement modules and input modules connected to this communications module. If the module detects any changes in status, It writes this data to a log held in memory.
It is used with a power supply module, a communications module, and a module base.

Number of output channels	8 channels
Output signal	Open collector output

1.2 Major Features

- The module records changes in the status of output signals along with time information (30,000 records).
- The module has a logic output function and calculates data for the channels of an input module based on Boolean logic, then outputs the result.
- Output is selectable between "logic output function" and "module measurement judgment function."
- The module has a filter function that outputs the judgment result, which is held for a certain period of time.
- The module has a channel-linking function that groups several channels and prioritizes their output.

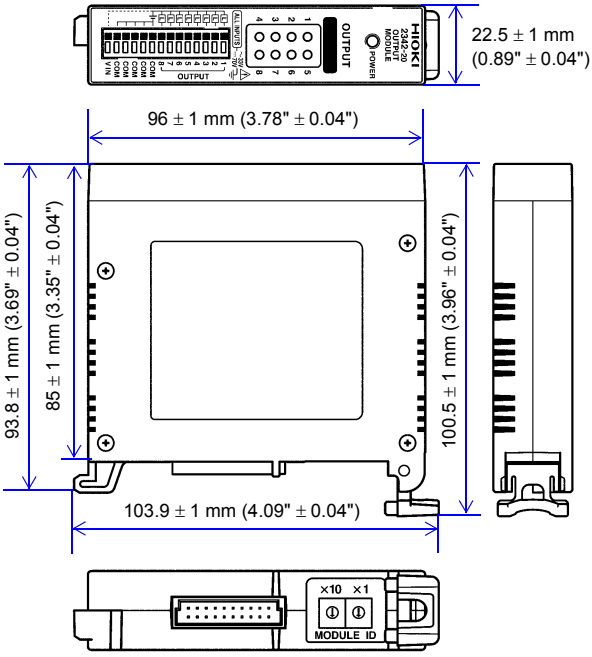
1.3 Name and Function of the Parts



POWER LED	Goes on or flashes when power is supplied to the module. Remains on, flashes, or changes to another color according to the state of the module. **POWER LED indication** Lit in green : Data being recorded. Flashing in green : Standing by. Flashing in yellow : Setting error *1 Lit in red : Non-recoverable error occurred. *2 Flashing in red : Recoverable error occurred. *3
OUTPUT LEDs	Lights up in green when the output transistor is ON (open collector output).
OUTPUT terminals	These are the output signal terminals (open collector output). Up to 8 output channels are available.
COM terminals	This is a low-potential terminal shared by the INPUT, V IN and V OUT terminals.
V IN terminal	Connect the power supply for the relay drive circuit to this terminal (with protective diode, Input range: 30 VDC max.). *4
Module ID setting dials	Use the dial to set the module's identification No.

*1: No module has an ID registered as a module to be monitored.
*2: The module needs repair. Contact your dealer or Hioki representative.
*3: The same module ID may be used by another module.
*4: When using the V IN terminal, make sure the input voltages to the OUTPUT terminals do not exceed the input voltage to the V IN terminal.
If you do not use the V IN terminal, these channels may be connected to power supplies with different voltage levels.

1.4 Dimension Diagrams

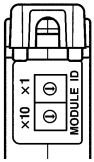


Settings Chapter 2

Setting the Module ID

You can connect up to 63 modules (measurement, input/output, and link) to one communications module.

Setting Procedure



Use the module ID setting dial to set the ID No. of the module to a number from 01 and to 63. (You cannot set a number other than the above.)

NOTE

- Ensure that the set ID is not used for any other module connected to the same communications module.
- The ID numbers of modules need not be consecutive.
- Setting the ID to 99, then turning on the power resets all internal settings to the defaults.
- The module ID and COM ID are not related and can be set independently.
- For COM ID, see the instruction manual for the communications module.

Preparations Chapter 3

3.1 Installing the Module

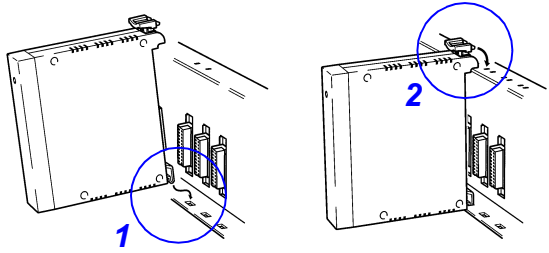
3.1.1 Installing the Module Base

⚠CAUTION Do not mount the module base on the ceiling where it may fall off.

Fasten the module base to a DIN rail or the wall according to the procedure described in the 2391 or 2392 series MODULE BASE instruction manual.

3.1.2 Mounting a Module on the Module Base

Mount a module on the module base as shown below. Ensure that the lever clicks.



3.2 Connecting Input/Output Cables

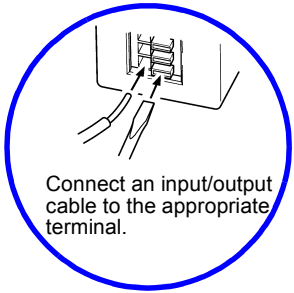
⚠CAUTION The channels are not insulated from each other. Take care to avoid short circuits. A short-circuit may result in errors or module malfunctions.

Recommended Cable

Single-wire : 0.32 to 65 mm
(Recommended: 0.65 mm)
Stranded-wire : 0.08 to 0.32 mm^2
Strand diameter: 0.125 or more
(Recommended: 0.32 mm^2
Strand diameter: 0.18 or more)
AWG : 22 to 28
(Recommended: AWG22)
Cable strip length: 9 to 10 mm

3.2.1 Connecting the Input/Output Terminal block

⚠WARNING The maximum input voltage and current is 30 VDC, 250 mA/ 1 channel. Ensure that the input does not exceed the maximum input voltage to avoid instrument damage, short-circuiting and electric shock resulting from heat building.



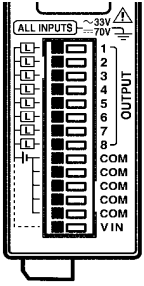
Connect an input/output cable to the appropriate terminal.

1. Hold down the button of the terminal using a flat-blade screwdriver or similar tool.
2. While holding down the button, insert an input/output cable into the lead connection hole.
3. Release the button to lock the cable.

NOTE Make sure the cable length does not exceed 30 m (98 feet). If the cable is longer than 30 m, measurement may be affected by external noise or other electromagnetic environment.

3.2.2 The Location of the Input/Output Cable

⚠CAUTION When using the V IN terminal, set input voltages to the OUTPUT terminals lower than the input voltage to the V IN terminal. This prevents heat buildup and prevents damage to internal and connected circuits.



Terminal	Function
OUTPUT terminal (Output)	Open collector output (Between OUTPUT1 to 8 and COM)
V IN terminal (Input)	Input of power supply for the relay drive circuit (Between V IN and COM, 30 VDC Max., with protective diode)

Others Chapter 4

4.1 Output Circuit

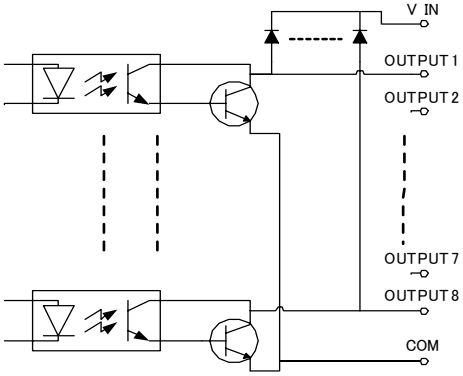
4.1.1 Output Rating

⚠WARNING Ensure that the input does not exceed the maximum input voltage or current to avoid instrument damage, short-circuiting and electric shock resulting from heat building.

Output Method	Open collector
Maximum input voltage/current	30 V, input current of 250 mA / 1 channel

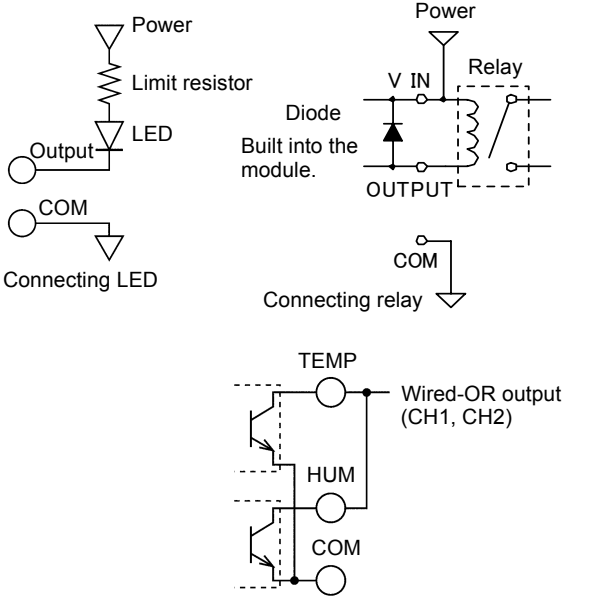
4.1.2 Internal Circuit

The output circuit is configured as shown below.



NOTE The output transistor works as a switch between signal output and ground in the module. When output becomes enabled, the switch is turned on and current flows from the output signal to COM in the module. Therefore, a relay or LED lamp can be connected directly to the output terminal (page 21).

Circuit diagram

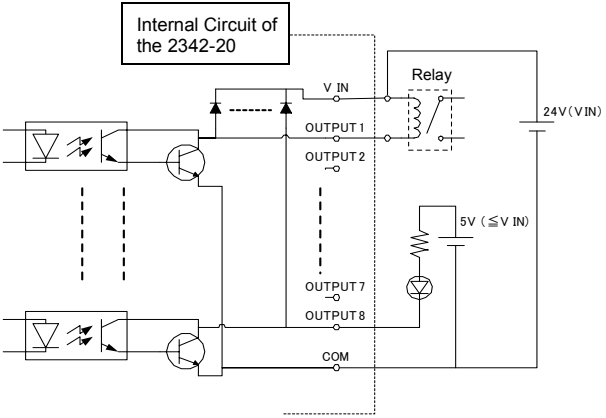


Using on Wired-OR Logic

NOTE

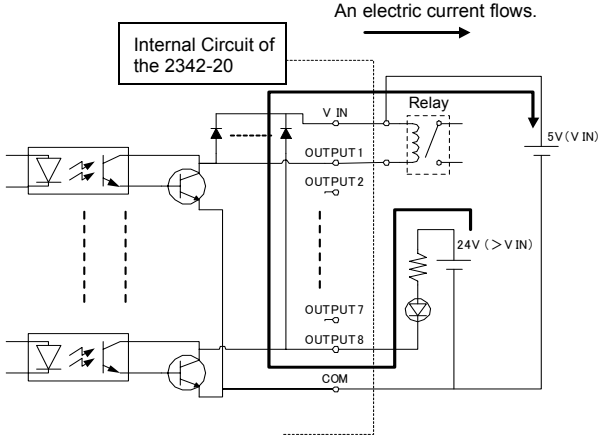
- The relays and LED lamps connected to this module must operate at currents lower than 30 V and 250 mA. The module is equipped with a built-in diode to absorb counter-electromotive force if a relay is connected.
- The open collector output operates on wired OR logic, choosing channels from CH1 to CH8 and connecting them to each other. If an alarm is issued on one of the channels, an alarm signal is issued.

4.1.3 Using V IN Terminal



Example of Correct Use

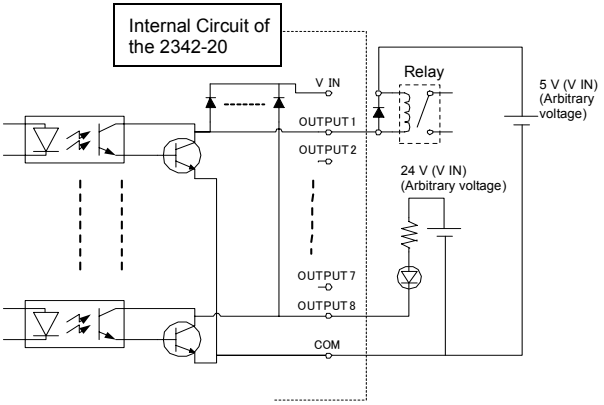
NOTE The OUTPUT terminals must be set within an input voltage range ≦ V IN ≦ +30 V.



Example of Incorrect Use

⚠CAUTION The OUTPUT terminals must be set within an input voltage range ≦ V IN ≦ +30 V.
Improper use of the V IN terminal may result in the flow of an electric current as shown above, generating heat and potentially damaging internal and connected circuits.

4.1.4 Not Using V IN Terminal



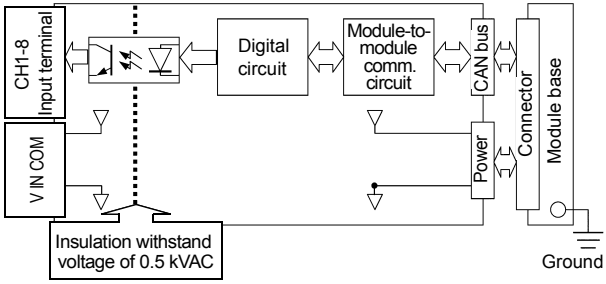
Example of Correct Use

NOTE The input voltage of each OUTPUT terminal channel can be set to an arbitrary level (Maximum input voltage/current are 30 VDC and 250 mA/ 1 channel.)

4.2 Insulation of Internal Circuit

⚠CAUTION The output terminals are not insulated from each other. When connecting signals with different potentials to these terminals, use an additional module, or insulate the signals externally before connecting them to the terminals. This will prevent errors and module malfunctions.

In the instrument, the input circuit and alarm output are insulated from the CAN bus as shown in the block diagram below. (Withstand voltage: 0.5 kVAC, 50/60 Hz, Response current: 5 mA, 1 minute)



NOTE The COM terminal of the alarm output terminal is used for both TEMP and HUM.

Specifications Chapter 5

5.1 Basic Specifications

Operation	Outputs control signals based on commands from the host or measurement module data.
Number of Outputs	8 channels
Output Signal	Open collector output (photocoupler insulation)
Internal Insulation Power Supply	N/A
External Input Power Supply	Between V IN and COM 30 VDC Max.
Maximum Sink Current	250 mA/ 1 channel
Maximum Input Voltage	30 VDC
Output Status Indication	Green LED lights up when output transistor is ON (each channel).
Output Terminal	Terminal block

5.2 Function Specifications

Actual Time Management	Time management using PC application
Recording Method	Instantaneous value recording (A log event is recorded only when the recording is started or stopped, or when changes in status are detected.) * Recording is initiated by a command (transmitted via the CAN bus).
Recorded Data	1 data set contains the time and data for the 8 channels. * New data is appended to previous data when recording begins.
Recording End Condition	Memory full stop or indefinite * Set the condition before the start of recording.
Quantity of Recorded Data	512 K bytes Flash memory (30,000 data)
Alarm Output	All logged data, data for a specified time, or the current status (monitored)
Data Deletion	All logged data can be deleted by a command.
Power Outage Protection	After recovering from a power outage, the instrument automatically returns to the state held before the outage.

5.3 Each Channel Output Function

Host Command

Output State	Held * Released via the reset switch or by a command.

Module Monitoring

Sampling	Once/second
Threshold	High and low limits may be set.
Logic Output Function	Outputs the result of Boolean logic calculations for the channels of an 8-channel input module. * Selects "Logic output function" or "module measurement judgment function" (for each channel).
Judgment Parameter	The instantaneous value is determined each second.
Output Hold	Selects Hold or Not Hold. Released via the reset switch or by a command.
Filter Function	If the judgment results during the specified time are the same, the result is output.

Output Relating Function

Related Channel	The channels do not issue output while the high-priority channel is doing likewise.

5.4 General Specifications

Clock Accuracy	±100 ppm (Reference value at temperature from 0 to 50°C (32 to 122°F) without the communications module)
Backup	Recorded data (saved in flash memory) * Data loss for up to 2 minutes before and after a power outage may occur.
Communication Interface	CAN bus (500 kps)
Maximum Rated Voltage to Earth	33 Vrms, 70 VDC (Sum with input voltage)
Maximum Rated Voltage to Earth	5 ± 0.25 VDC
Maximum Rated Power	1.4 W
Withstand Voltage	500 VAC Between output terminal and CAN bus (50/60 Hz, Response current 5 mA, one minutes
Dimensions	Approx. 22.5W × 96H × 85D mm (0.89"W × 3.78"H × 3.35"D) (excluding projections)
Mass	Approx. 120 g (4.2 oz.)
Accessories	Instruction manual
Operating Temperature and Humidity	0 to 50°C (32 to 122°F), 80%RH or less (with no condensation)
Storage Temperature and Humidity	-10 to 50°C (14 to 122°F), 80%RH or less (with no condensation)
Operating Environment	Indoors, <2000 m (6562 feet) ASL
Standards Applying	Safety EN61010-1:2001 Pollution degree 2 EMC EN61326:1997+A1:1998+A2:2001 Class A

Maintenance and Service Chapter 6

6.1 Cleaning

To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.

6.2 Service

⚠CAUTION Never modify the instrument. Only Hioki service engineers should disassemble or repair the instrument. Failure to observe these precautions may result in fire, electric shock, or injury.

- If the instrument seems to be malfunctioning, confirm that the cables are not open circuited before contacting your dealer or Hioki representative.
- When sending the instrument for repair, pack carefully to prevent damage in transit. Include cushioning material so the instrument cannot move within the package. Be sure to include details of the problem. Hioki cannot be responsible for damage that occurs during shipment.
- When transporting the instrument or a system containing this module, tape the front of the module or take similar measures to avoid losing internal components.

HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION

Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan

Product Name: OUTPUT MODULE

Model Number: 2342-20

The above mentioned product comforms to the following product specifications:

Safety: EN61010-1:2001

EMC: EN61326:1997+A1:1998+A2:2001
Class A equipment
Equipment intended for use in industrial location

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

HIOKI E.E. CORPORATION

16 July 2004

Yuji Hioki

President

2342A999-00

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Instruction Manual

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