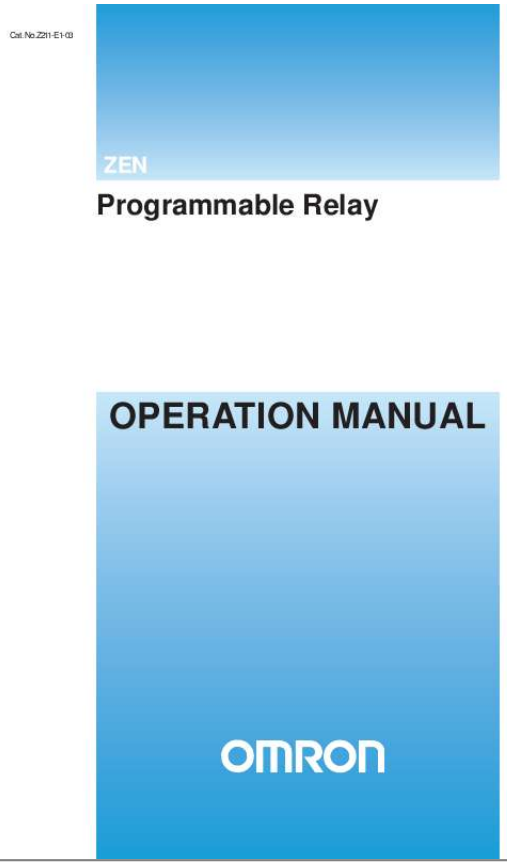

Manual abstract:

@@@@No. @@@@Its development has drawn on OMRON's advanced control technology and expertise in manufacturing various types of controllers. Version 2 of the ZEN includes Economy-type CPU Units and Communications-type CPU Units. Twin timer operation and operation between days for weekly timers have been added. Pulse output operation and 8-digit counters with high-speed counting have also been added, and Expansion I/O Units have been downsized to half the width. This manual describes how to use version 2 of the ZEN. Before using the ZEN, read this manual carefully so that you can use the ZEN correctly. Keep the manual close at hand so that you can refer to it whenever necessary. Intended Audience This manual is intended for the following readers. · · · · Persons in charge of introducing FA devices Persons who design FA systems Persons who install or connect FA devices Persons who manage working FA installations Persons who use this product must have sufficient knowledge of electrical systems (i.
e., an electrical engineer or the equivalent). iv Warranty and Application Considerations Read and Understand this Manual Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments. Warranty and Limitations of Liability Warranty and Limitations of Liability WARRANTY OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.
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It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability. ERRORS AND OMISSIONS The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions. Copyright and Copy Permission Copyright and Copy Permission COPYRIGHT AND COPY PERMISSION This document shall not be copied for sales or promotions without permission. This document is protected by copyright and is intended solely for use in conjunction with the product.
Please notify us before copying or reproducing this document in any manner, for any other purpose. If copying or transmitting this document to another, please copy or transmit it in its entirety. vii OMRON Product References All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product. Visual Aids The following headings appear in the left column of the manual to help you locate different types of information.
Note 1,2,3... Indicates information of particular interest for efficient and convenient operation of the product. 1. Indicates lists of one sort or anther, such as procedures, checklists, etc.

Precautions for Correct Use Precautions for Safe Use Indicates precautionary information that should be heeded in using the ZEN. viii About this Manual This operation manual is for version-2 (-V2) ZEN Programmable Relays only. @@No. Z183.

When using a CPU Unit with an LED display (without LCD display), refer to the ZEN Support Software Operation Manual (Cat. No. Z184). Manual Contents Section 1 gives an outline of the ZEN, including descriptions of ZEN features and functions. Section 2 explains how to mount and wire the ZEN and how to connect sensors. Section 3 explains basic settings required to operate the ZEN and setting methods for internal bits. Section 4 describes the many convenient functions provided by the ZEN. Section 5 describes how to use optional products, such as Battery Units and Memory Cassettes. Section 6 lists the error messages and provides probable causes and countermeasures for troubleshooting. The Appendices provide specifications, technical references, version update information, allocations and setting sheets, and other information related to ZEN operation.
Related Manual Manual ZEN Support Software Operation Manual Communications Manual Contents Describes installation and operating procedures for the ZEN Support Software. Z184 Cat. No. Describes the communications functions Z212 of the ZEN. ix Visual Aids The following headings appear in the left column of the manual to help you locate different types of information.
Note 1,2,3... Indicates information of particular interest for efficient and convenient operation of the product. 1.
Indicates lists of one sort or another, such as procedures, checklists, etc. Precautions for Correct Use Indicates precautionary information that should be heeded to ensure correct use of the ZEN. Precautions for Safe Use Indicates precautionary information that should be heeded to ensure safe use of the ZEN. RUN PARAMETER SET CLOCK LANGUAGE Indicates that the display (the word "LANGUAGE" in this case) is flashing. In this manual, this state is described by saying that the "flashing cursor" is at the word "LANGUAGE". In this state it is possible to change settings and the position of the cursor. Indicates that the display (the letter "H" in this case) is flashing in reverse video. In this manual, this state is described by saying that the "highlighted cursor" is at the word "H". In this state it is not possible to change settings but the cursor can be changed to the flashing cursor by pressing the OK button. Indicate the buttons that needs to be pressed in operating procedures.

Press each button once. LANGUAGE ENGLISH Indicate buttons that needs to be pressed in operating procedures. Press one of the buttons once or more.

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injury or death. Additionally, there may be significant property damage.
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage. WARNING CAUTION Symbols Symbol Meaning General Caution Indicates non-specific general cautions, warnings, and dangers. Caution Electrical Shock Caution Indicates possibility of electric shock under specific conditions. Explosion Caution Indicates possibility of explosion under specific conditions. Disassembly Prohibition Indicates prohibitions when there is a possibility of injury, such as from electric shock, as the result of disassembly.
General Caution Indicates non-specific general cautions, warnings, and dangers. Prohibition Mandatory Caution xiv Precautions Precautions WARNING Serious human hazard may occasionally occur due to ignition or rupture of the lithium battery used in the Battery Unit. Do not short the battery terminals or charge, disassemble, deform under pressure, or incinerate the battery.

Never use any battery that has been dropped on the floor or otherwise subjected to excessive shock. CAUTION Electric shock, fire, or malfunction may occur. Do not disassemble, modify, or repair the ZEN or touch any of the internal parts. Electrical shock may occur. Never touch the I/O terminals, computer connector, Expansion Unit connector, or Battery Unit connector while power is being supplied. Electrical shock may occur. Do not remove the Expansion Unit connector cover unless an Expansion I/O Unit will be permanently installed.

Fires may occasionally occur. Tighten the terminal screws to a torque of 0.565 to 0.6 N·m (5 to 5.3 in-lb). xv Precautions Precautions for Safe Use Please observe the following precautions for safe use of this products. Circuit Design 1. All interface connectors and battery connector are live parts, they may not be directly connected to Softy Extra Low Voltage (SELV) circuit or to accessible conductive parts. For the programming units and Personal Computers use only the ZEN-CIF01 Connecting Cable (optional accessory) manufactured by OMRON. ZEN-CIF01 provides safe (reinforced) insulation between Personal Computers and ZEN.

Provide emergency stop circuits, external interlock circuits, limit circuits, and other safety circuits in addition to any provided within the ZEN control circuits to ensure safety of the overall system in the event of ZEN failure or external factors. If the ZEN discovers an error during self-diagnosis, operation will be stopped and all outputs will be turned OFF. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the overall system. Outputs from the ZEN may remain ON or OFF due to faults in internal circuits such as output relay fusing or burning, or output transistor destruction. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the overall system.

Fail-safe measures must be taken by the user to ensure overall system safety in the event of broken signal lines or momentary power interruptions. The durability of the output relays is largely affected by the switching conditions. Confirm the operation of the system under actual operating conditions and set the switching frequency to ensure that adequate performance will be provided. Insulation faults and burning in the ZEN may result if relays are used after their performance has deteriorated. Supply power to both the CPU Unit and Expansion I/O Units from the same power supply and turn them ON and OFF at the same time.

When connecting Expansion I/O Units with DC inputs to a CPU Unit with an AC power supply, the burst noise immunity will be 1 kV (IEC 61000-4-4). Expansion I/O Units with AC inputs (ZEN-8E1AR) cannot be connected to a CPU Unit with a DC power supply. Check the user program for proper execution before actually running it on the Unit. Disconnect the output lines from the system before testing operation in any system in which incorrect operation can result in injury or equipment damage. Confirm safety before attempting any of the following operations. · Changing the operating mode (RUN/STOP). 2. 3. 4. 5.

6. Connecting Expansion I/O Units 1. 2. 3. System Startup and Program Changes 1. 2. 3. xvi Precautions · Using the button switches. · Changing bit status or parameter settings. 4.

5. Double-check all wiring before turning ON the power supply. Refer to Cycle Time Calculation Method on page 130 and confirm that the increase in the cycle time will not affect operation. If the cycle time is too long, it may become impossible to read input signals accurately. The increase in the cycle time will be particularly noticeable when set values are written in RUN mode for a CPU Unit with communications (ZEN-10C4@R-@-V2).

Do not allow the ZEN to fall during installation. Be sure that the DIN Track mounting levers, Expansion I/O Units, Memory Cassettes, Battery Units, cable connectors, and other items with locking devices are properly locked into place. Improper locking may result in malfunction. When mounting the ZEN to the surface of the control panel, tighten mounting screws to the following torques. CPU Units: 1.

03 Nm max. Expansion I/O Units: 0.46 Nm max. Use wires with cross-sectional areas of 0.2 to 2.5 mm2 (equivalent to AWG24 to AWG14) for wiring and strip them for 6.5 mm. The environment of use of ZEN is "Pollution degree 2" and "Overvoltage category II" specified in IEC60664-1. Always use the ZEN within the rated ambient operating temperature and humidity. The rated ambient operating temperature is 0 to 55°C for LCD-type CPU Units and 25 to 55°C for LED-type CPU Units.

If the ZEN is used near sources of heat, such as a power supply, the internal temperature of the ZEN may increase, lowering the durability of the ZEN. Discharge static electricity from your body, e.g., by touching a grounded metal plate, before touching any Unit. The exterior of the Units will be damaged if it comes into contact with organic solvents (e.g., benzene or paint thinner), strong alkalies, or strong acids. Never allow such substances to come into contact with the Units. Do not apply voltages exceeding the rated voltages. Internal elements may be destroyed.

Short failures or open failures may result from the destruction of output elements. Do not use loads that exceed the rated output current. Installation and Wiring 1. 2. 3.

4. Handling 1. 2. 3. 4.

5. 6. Maintenance When replacing a CPU Unit, transfer to the new Unit and confirm all settings for clock data, internal holding bits, holding timers, and counters before starting operation again. Transportation and Storage 1. Use special packaging boxes when transporting the ZEN and do not subject it to excessive shock or vibration or drop it during shipment. xvii Precautions 2. Store the ZEN at an ambient temperature of -40 to 75°C for LED-type CPU Units and -20 to 75°C for all other types of CPU Units. If the ZEN has been stored at -10°C or lower, allow it to stand at room temperature for 3 hours or longer before turning ON the power supply. xviii Precautions Precautions for Correct Use Installation Environment 1. Do not install the ZEN in the following locations.

· Locations subject to radical changes in temperature · Location with high humidity subject to condensation · Locations subject to excessive dust or dirt · Locations subject to corrosive gas · Locations subject to direct sunlight Do not install the ZEN in locations subject to shock or vibration. Extended use in such location may cause damage from stress. In environments subject to static electricity (e.g., close to pipes conveying forming materials, powders, or fluid materials), separate the ZEN as far as possible from the source of static electricity. The ZEN is neither waterproof nor oil-proof. Do not use it in locations subject to water or oil. Use the ZEN within the allowable power supply voltage range. Be particularly careful in locations with bad power supply conditions, e.

g.

, large fluctuations in the power supply voltage. Do not install the ZEN in locations subject to excessive noise, which may cause the ZEN to fail. Take appropriate and sufficient countermeasures when installing systems in the following locations: · Locations subject to strong electromagnetic fields · Locations subject to possible exposure to radioactivity Always turn OFF the power supply to the ZEN (CPU Unit and Expansion I/O Units) before attempting any of the following. · Assembling the ZEN · Attaching or removing Expansion I/O Units · Connecting or disconnecting any cables or wiring · Attaching or removing the Memory Cassette · Attaching or removing the Battery Unit If the power supply is interrupted for 2 days or more (at 25°C), the internal capacitor will discharge and internal bit status and the contents of PV areas will be lost or corrupted and dates and times will be reset. When restarting operation after the power supply has been interrupted for an extended period of time, check the system in advance to confirm that no errors will occur.

Connect connectors only after confirming that the direction or polarity is correct. Failures could result if dust or dirt enters the ZEN. Always connect the connector cover to the computer connector whenever it is not being used. 2. 3.

4. 5. 6. 7. Power Supply 1. 2. Handling 1. 2. xix Precautions 3. Do not remove the label from the left side of the CPU Unit if a Battery Unit is not mounted.

The execution of the ladder program in the ZEN is different from that for other PLCs. Refer to Appendix B Ladder Program Execution when writing the ladder program. Abide by all local ordinances and regulations when disposing of the ZEN. The Battery Unit (ZEN-BAT01, sold separately) contains a lithium battery. Observe all applicable legal requirements for your area when disposing of the lithium battery. Other 1. 2. 3. xx Precautions Conformance to EC Directives Applicable Directives · EMC Directives · Low Voltage Directive Concepts EMC Directives OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards.

The ZEN complies with IEC/EN61131-2 clause 8. Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards. Low Voltage Directive Always ensure that devices operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC meet the required safety standards.

The ZEN complies with IEC/EN61131-2 clause 11 except for 11.7.2.2. Conformance to EC Directives The ZEN complies with EC Directives.

To ensure that the machine or device in which the ZEN is used complies with EC Directives, the ZEN must be installed as follows: 1. The ZEN is an open-structure device. To meet the requirements of IEC/EN 61131-2 for open-structure devices, the ZEN must be mounted inside a control panel and protected from mechanical impact as described on page 36. Do not exceed a cable length of 10 m when connecting transistor outputs. Burst immunity will no longer meet IEC/EN 61131-2 requirements if an Expansion I/O Unit with DC inputs is connected to a CPU Unit with an AC power supply. ZEN models complying with EC Directives also conform to the Common Emission Standard (IEC/EN61131-2 clause 8). Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. You must therefore confirm that the overall machine or equipment complies with EC Directives. 2. 3.

4. xxi Precautions Relay Output Noise Reduction Methods The ZEN conforms to EN 61131-2 of the EMC Directives. However, noise generated by relay output switching may not satisfy these Standards. In such a case, a noise filter must be connected to the load side or other appropriate countermeasures must be provided external to the ZEN. Countermeasures taken to satisfy the standards vary depending on the devices on the load side, wiring, configuration of machines, etc. Following are examples of countermeasures for reducing the generated noise. Countermeasures (Refer to EN61131-2 for more details.) · Countermeasures are not required if the frequency of load switching for the whole system with the ZEN included is less than 5 times per minute. · Countermeasures are required if the frequency of load switching for the whole system with the ZEN included is 5 times per minute or higher. Countermeasure Examples When switching an inductive load, connect an surge protector, diodes, etc.

, in parallel with the load or contact as shown below. Circuit CR method Current AC Yes DC Yes If the load is a relay or solenoid, there is a time lag between the moment the circuit is opened and the moment the load is reset. If the supply voltage is 12 to 48 V, insert the surge protector in parallel with the load. If the supply voltage is 100 to 200 V, insert the surge protector between the contacts. The capacitance of the capacitor must be 1 to 0.

5 µF per contact current of 1 A and resistance of the resistor must be 0.5 to 1 per contact voltage of 1 V. These values, however, vary with the load and the characteristics of the relay. Decide these values from experiments, and take into consideration that the capacitance suppresses spark discharge when the contacts are separated and the resistance limits the current that flows into the load when the circuit is closed again. The dielectric strength of the capacitor must be 200 to 300 V.

If the circuit is an AC circuit, use a capacitor with no polarity. Characteristic Required element R Power supply xxii Inductive load C Precautions Circuit Diode method Current AC No DC Yes The diode connected in parallel with the load changes energy accumulated by the coil into a current, which then flows into the coil so that the current will be converted into Joule heat by the resistance of the inductive load. This time lag, between the moment the circuit is opened and the moment the load is reset, caused by this method is longer than that caused by the CR method. Varistor method Yes Yes The varistor method prevents the imposition of high voltage between the contacts by using the constant voltage characteristic of the varistor. There is time lag between the moment the circuit is opened and the moment the load is reset. If the supply voltage is 12 to 48 V, insert the varistor in parallel with the load. If the supply voltage is 100 to 200 V, insert the varistor between the contacts.

The reversed dielectric strength value of the diode must be at least 10 times as large as the circuit voltage value. The forward current of the diode must be the same as or larger than the load current. The reversed dielectric strength value of the diode may be two to three times larger than the supply voltage if the surge protector is applied to electronic circuits with low circuit voltages.

Characteristic Required element Power supply Inductive load --- Power supply Inductive load xxiii Precautions xxiv SECTION 1 Outline This section gives an outline of the ZEN, including example applications, the system configurations and basic operations. 1-1 1-2 Outline . . . . . .

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. 33 1 Outline Section 1-1 1-1 Outline One CPU Unit provides 12 inputs and 8 outputs (with CPU Unit with 20 I/O points). Economical, Small-scale Automatic Control Water-supply facilities in apartments, lighting control in offices. Easy Operation with an Inexpensive Controller Ladder programming is possible directly from CPU Unit. When using LED-type CPU Units (without LCD display) with Memory Cassettes (optional), ladder programs can be easily copied.
Smaller Control Panels The ZEN is very small at 90 x 70 x 56 mm (H x W x D) and mounts essentially anywhere. Note Dimensions are 90 x 122.5 x 56 mm (H x W x D) for CPU Units with 20 I/O points. 70 mm 90 mm Less Assembly and Wiring Time Required for Control Panels Simple one-touch DIN Track mounting. Built-in timers and counters so only power supply and I/O circuit wiring required. Solid wires can be easily connected using only a screwdriver. 2 Outline Refer to page 38. Section 1-1 Future System Expandability I/O capacity can be expanded to up to 24 inputs and 20 outputs by connecting 3 Expansion I/O Units. Refer to page 9 and 37. CPU Unit I6 I7 I8 I9 Ia Ib Expansion I/O Units (up to 3) 20C1AR-A-V2 Q4 Q5 Q6 Q7 12 inputs/8 outputs + (4 inputs/4 outputs) × 3 Power Failure Countermeasures EEPROM backs up the program and system settings data when no power is supplied to the ZEN.

Use a Battery Unit (optional) to back up work bits, holding timers, counters, and date/time data. Refer to page 110. Battery Unit Easy Saving and Copying of Programs Use an optional Memory Cassette to easily save and copy programs. Refer to page 111. Ladder program data/settings. Memory Cassette 3 Outline Section 1-1 Windows-based ZEN Support Software is available and provides a complete simulation function. Refer to page 114. ZEN Support Software (CD-ROM) Programming and Monitoring from a Personal Computer Greater Switching Capacity The output contacts have 8-A switching capacity (250 VAC). All contacts are independent (for CPU Units with 10 I/O points). Refer to page 51.
8 A max. MC 250 V AC Inputs For CPU Units with AC power supply inputs, 100 to 240 VAC can be directly connected. Refer to page 41. 100 to 240 VAC L N Circuit protector L N NC I0 I1 I2 I3 I4 I5 L N IN0 IN1 IN2 IN3 Easy Program Design There are 3 different operations that can be set for bit outputs. Selfholding bits also can be easily programmed.
Refer to page 65. Ry Normal operation Set/reset operation Alternate operation 4 Outline Section 1-1 Any of the 16 timers support 5 types of operation and 3 timing ranges. There are also 8 built-in holding timers that hold data during power interruptions. Refer to page 74. TIM Complicated Timers without Additional Programming ON delay OFF delay One-shot pulse Flashing pulse Twin timer 0.
01 to 99.99 s 1 s to 99 min 59 s 1 min to 99 h 59 min Incremental and Decremental Counters There are 16 built-in counters that can be switched between incrementing and decrementing. Use Comparators to enable programming multiple outputs from a counter. Counters: Refer to page 78. Comparators: Refer to page 91. C D CNT R Control number of cars entering and leaving a car park. Season- or Day-dependent Operating Times CPU Units with built-in calendar and clock functions have 16 weekly timers and 16 calendar timers. Seasonal control is possible using calendar timers and day/time control is possible with weekly timers. Weekly timers: Refer to page 81. Calendar timers: Refer to page 86.

MO - FR SA - SU For gardens, parks, and recreational ponds. 5 Outline Section 1-1 CPU Units with DC power supply inputs have 2 analog input points (0 to 10 V) and 4 analog comparators. Refer to page 87. Direct Analog Inputs Temperature control for hot houses and tanks. Prevent freezing of swimming pools. Easier Maintenance Use the display function in CPU Units to display user-specified messages, the date, time, or other data. Button switches can also be used as input contacts. Applications include usage as a simple display operation panel. Refer to page 96. Longer Backlight for Dark Situations The automatic cutout time for the backlight for CPU Units can be set to 2, 10, or 30 minutes, or set to operate continuously.
With the display function, the backlight can also be set to turn ON when a message is displayed. Refer to page 106. 6 Outline Section 1-1 Set the input filters to extend the filter timer and prevent malfunctions. Refer to page 104. Prevent Chattering and Noise-related Malfunctions Filter timer ON Exporting Systems Overseas Display for CPU Units is available in 6 languages.
A Daylight Saving Time (DST) function also supported. Changing display language: Refer to page 57. Daylight Saving Time (DST) settings: Refer to page 107. ENGLISH JAPANESE GERMAN FRENCH ITALIAN SPANISH Programming Security Programs can be protected by setting a password. Refer to page 102.
PASSWORD 0000 RUN 3 9 5 4 7 Features and Models Section 1-2 1-2 1-2-1 Features and Models Features and System Configuration The ZEN is small but has a wide range of functions and is easy to use. The ZEN facilitates small-scale automatic control. Standard LCD-type, Economy-type, and Communications-type CPU Units · Simple button-operated programming. · Highly visible, backlit LCD. · Adjustable automatic cutout time for the backlight. · Six-language display. · Display function for user-specified messages (4 lines x 12 characters), time, or timer, counter, or analog-converted value displays.

· Button switches allowing operation buttons to be used as input contacts. · Built-in weekly and calendar timers to allow simple seasonal, daily, or time-based operation. · Remote monitoring via RS-485 communications (Communications-type CPU Units).

Common Features · Both 100 to 240-VAC and 12 to 24-VDC power supply models available. · Built-in analog comparator for temperature control and other analog applications (provided on CPU Units with DC power supply inputs, two analog inputs 0 to 10 V). · Input filter settings to prevent noise-related malfunctions for both CPU Units and Expansion I/O Units. · Program and settings data backed up on built-in EEPROM. · Programming using ladder diagrams. · Password function to protect programs. · Connect up to 3 Expansion I/O Units for a maximum of 24 inputs and 20 outputs. 8 Features and Models Work bits, holding timer data, counter data, and date/time data will be backed up during long-term power supply interruptions if a Battery Unit (optional) is mounted. ZEN-BAT01 Battery Unit Section 1-2 CPU Unit Expansion I/O Units (up to 3 can be connected) ZEN-ME01 Memory Cassette Programs can be saved and copied by using a Memory Cassette (optional). Personal computer connecting cable ZEN-SOFT01-V4 ZEN Support Software Programs can be created, edited, saved, and printed, and operation can be simulated using the ZEN Support Software (optional).

9 Features and Models Section 1-2 1-2-2 List of Models Shape Power supply/ input voltage 100 to 240 VAC, 50/60 Hz 12 to 24 VDC 12 to 24 VDC Economy type (Expansion I/O Units cannot be connected) 100 to 240 VAC, 50/60 Hz 12 to 24 VDC Transistors Relays Inputs Outputs Analog inputs Model number CPU Units with 10 I/O Points With display Standard LCD type and operation buttons 6 Relays inputs 4 No outputs Yes Yes No ZEN-10C1AR-A-V2 ZEN-10C1DR-D-V2 ZEN-10C1DT-D-V2 ZEN-10C3AR-A-V2 Yes 3 No outputs Yes 4 No outputs Yes Transistors Yes ZEN-10C3DR-D-V2 ZEN-10C4AR-A-V2 Communi- 100 to cations type 240 VAC, 50/60 Hz 12 to 24 VDC LED type Without display 100 to 240 VAC, 50/60 Hz 12 to 24 VDC 12 to 24 VDC ZEN-10C4DR-D-V2 ZEN-10C2AR-A-V2 ZEN-10C2DR-D-V2 ZEN-10C2DT-D-V2 Note Refer to Input Specifications on page 123 for input specifications. 10 Features and Models Section 1-2 CPU Units with 20 I/O Points Shape With display Standard and operation LCD type buttons I6 I7 I8 I9 Ia Ib Power supply 100 to 240 VAC, 50/60 Hz 12 to 24 VDC 12 to 24 VDC Inputs 12 inputs Outputs Analog inputs Model number ZEN-20C1AR-A-V2 Relays 8 No outputs Yes Transistors Relays Yes No ZEN-20C1DR-D-V2 ZEN-20C1DT-D-V2 ZEN-20C3AR-A-V2 20C1AR-A-V2 Q4 Q5 Q6 Q7 Economy type (Expansion I/O Units cannot be connected) LED type Without display I6 I7 I8 I9 Ia Ib 100 to 240 VAC, 50/60 Hz 12 to 24 VDC 100 to 240 VAC, 50/60 Hz 12 to 24 VDC Yes No ZEN-20C3DR-D-V2 ZEN-20C2AR-A-V2 Yes Transistors Yes ZEN-20C2DR-D-V2 ZEN-20C2DT-D-V2 20C2AR-A-V2 Q4 Q5 Q6 Q7 12 to 24 VDC Note Refer to Input Specifications on page 123 for input specifications. 11 Features and Models Section 1-2 Differences between LCD- and LED-type CPU Units Item LCD-type CPU Units (See note 1.) AC power supply Program editing, parameter settings, operation monitoring Operating mode switching Calendar and clock function Bits Input, output, work, holding bits Timer, holding timer, counter High-speed counting with 8-digit counter Weekly timer, calendar timer Analog comparator Button switches Display function Settings Display language Backlight cutout time Input filters Password Memory ZEN to Memory Cassette Cassette transfer functions Memory Cassette to ZEN transfer Memory Cassette initialization Battery Unit connection ZEN Support Software connection DC power supply LED-type CPU Units (See note 2.) AC power supply DC power supply Yes (Also possible with ZEN Support Software.) Yes (Also possible with ZEN Support Software) Yes Yes Yes No Yes No Yes Yes Yes (Also possible with ZEN Support Software.) Yes (Also possible with ZEN Support Software.) Yes (Also possible with ZEN Support Software.) Yes (Also possible with ZEN Support Software.) Yes Yes Yes Yes Yes Yes Yes ZEN Support Software required.

ZEN Support Software required. No Yes Yes No No No Yes No No ZEN Support Software required. ZEN Support Software required. No Yes (Automatic transfer when power is turned ON.) No Yes Yes Yes Yes Timer/counter comparator Yes Note 1. 2. 3. Standard LCD-type, Economy-type, and Communications-type CPU Units: All models except ZEN-@C2@@-@-V2 LED-type CPU Units: ZEN-@C2@@-@-V2 Operations using ZEN Support Software are also possible. 12 Features and Models Section 1-2 Expansion I/O Units No. of I/O points 8 I/O Inputs 100 to 240 VAC, 50/60 Hz 12 to 24 VDC 12 to 24 VDC 4 inputs Outputs Relays 4 outputs Relays 4 outputs Transistors 4 outputs Connectable CPU Units ZEN-@C1AR-A-V2 ZEN-@C2AR-A-V2 ZEN-10C4AR-A-V2 ZEN-@C1@@-@-V2 ZEN-@C2@@-@-V2 ZEN-10C4AR-A-V2 Model number ZEN-8E1AR (See note 1.

) ZEN-8E1DR ZEN-8E1DT 4 inputs 4 inputs Note 1. 2. The ZEN-8E1AR cannot be connected to a CPU Unit with DC power supply. Refer to Input Specifications on page 123 for input specifications. Power Supply Unit Name and appearance Switching Power supply Unit Input voltage: Output voltage: Output capacity: Capacity: Specifications 100 to 240 VAC 24 VDC 1.3 A 30 W Model number ZEN-PA03024 Programming Device Name and appearance ZEN Support Software Functions Runs on Windows 98, 98SE, ME, 2000, XP, NT4.0 Service Pack 3, or Vista (CD-ROM) Used for offline programming, all parameter settings, program transfers, and printing. Personal Computer Connecting Cable Connects the computer and ZEN when the ZEN Support Software is used. (Cable length: 2 m) ZEN-CIF01 Model number ZEN-SOFT01-V4 13 Features and Models Section 1-2 Optional Products Name and appearance Memory Cassette EEP-ROM Used to save and copy programs. Functions Model number ZEN-ME01 Battery Unit Uses a battery to back up programs and data.

Mount a Battery Unit if the loss of calendar, clock, holding bit, holding timer, and counter present values will cause problems in systems with long power interruptions. (Battery life: 10 years minimum) ZEN-BAT01 Training Kit This kit is recommended for firsttime users. Contains the following products and manuals as a kit. CPU Unit ZEN-SOFT01-V4 ZEN Support Software ZEN-CIF01 Personal Computer Connecting Cable ZEN Operation Manual (Z211) ZEN Support Software Operation Manual (Z184) ZEN-10C1AR-A-V2 CPU Unit (AC power supply) ZEN-KIT01-EV4 ZEN-10C1DR-D-V2 CPU Unit (DC power supply) ZEN-KIT02-EV4 14 Nomenclature and Basic Operation Section 1-3 1-3 1-3-1 Nomenclature and Basic Operation Nomenclature Standard LCD-type, Economy-type, and Communications-type CPU Units Models with 10 I/O Points Left Side Front Power supply Input terminals terminals Right Side LCD Operation buttons Output terminals Battery Unit connector (Remove the seal to connect the Battery Unit.

) ZEN Support Software connector (also used for Memory Cassette.
) Expansion Unit connector cover. (See note.) Remove this cover to connect Expansion Unit. Note Economy-type CPU Units do not have an Expansion Unit connector. Do not remove the Expansion Unit connector cover on these CPU Units.
Models with 20 I/O Points Left Side Front Power supply Input terminals terminals I6 I7 I8 I9 Ia Ib Right Side 20C1AR-A-V2 LCD Operation buttons Q4 Q5 Q6 Q7 Battery Unit connector (Remove the seal when connecting the Battery Unit.) Output terminals ZEN Support Software connector (also used for Memory Cassette.) Remove this cover to connect Expansion Unit. Expansion Unit connector cover. Note Economy-type CPU Units do not have an Expansion Unit connector. Do not remove the Expansion Unit connector cover on these CPU Units. 15 Nomenclature and Basic Operation Display Screen and Operation Button LCD DEL Button ALT Button Section 1-3 Cursor Buttons ESC Button OK Button Icon Meanings RUN ERR Icon RUN ERR Indicates an error. Meaning Displayed while in RUN mode. Displayed when there is a higher-level menu or ladder program line than the one currently displayed. Displayed when there is a lower-level menu or ladder program line than the one currently displayed.

Displayed when a password has been set. 16 Nomenclature and Basic Operation Operation Button Names and Operations Button Menus --DEL --ALT Function Writing ladder program Deletes inputs, outputs, connection lines, and blank lines. Switches between normally open and normally closed conditions. Changes to connection line write mode. Inserts a line. Moves the cursor up and down. Moves the cursor up and down. Selects bit types and functions. Moves the cursor up and down. Changes numerals and parameters.
Setting parameters --- Section 1-3 Button switch (See page 99.) B6 ON --- B7 ON B5 ON Up B2 ON Down --Left B4 ON Right Returns to the previous screen. Selects the menu item at the cursor position. Cancels the setting and returns to the previous operation. Confirms the setting.
Cancels the setting and returns to the previous operation. B0 ON Moves the cursor right and left. Moves the cursor right and left. B3 ON ESC Confirms the setting. B1 ON OK 17 Nomenclature and Basic Operation Section 1-3 LED-type CPU Units without Display Models with 10 I/O Points Left Side Front Right Side Power supply Input terminals terminals 2 Output terminals Battery Unit connector (Remove the seal to connect the Battery Unit.
) Personal computer connector (also used for Memory Cassette.) LED indicators Expansion Unit connector cover Remove this cover to connect Expansion I/O Unit. LED Indicators Name POWER RUN ERROR Color Green Green Red Lit Not lit Lit Not lit Lit Not lit Meaning Power supplied No power Operating (RUN) Stopped (STOP) Error Normal 18 Nomenclature and Basic Operation Models with 20 I/O Points Left Side Front Power supply terminals Input terminals I6 I7 I8 I9 Ia Ib Section 1-3 Right Side 20C2AR-A-V2 Q4 Q5 Q6 Q7 Output terminals Battery Unit connector (Remove the seal to connect the Battery Unit.) Personal computer connector (also used for Memory Cassette.) LED indicators Expansion Unit connector cover Remove this cover to connect Expansion I/O Unit. LED Indicators Name POWER RUN ERROR Color Green Green Red Lit Not lit Lit Not lit Lit Not lit Meaning Power supplied No power Operating (RUN) Stopped (STOP) Error Normal Expansion I/O Units Left Side Front Input terminals Right Side Expansion Unit connector Output terminals Expansion Unit connector cover. Remove this cover to connect Expansion I/O Unit. 19 Nomenclature and Basic Operation Section 1-3 1-3-2 Screen Transitions RUN Mode When power is turned ON STOP Mode When leaving RUN Mode RUN When Expansion I/O Unit is connected. When Expansion I/O Unit is connected. RUN Display Function Screen (Userspecified message) Note: The display will be blank if the display function is not being used.

Display Function Screen (Userspecified message) RUN Note: The display will be blank if the display function is not being used. STOP Mode PROGRAM RUN PARAMETER SET CLOCK RUN Mode MONITOR STOP PARAMETER SET CLOCK RUN PARAMETER SET CLOCK LANGUAGE OTHER PARAMETER SET CLOCK LANGUAGE OTHER RUN 20 Nomenclature and Basic Operation Section 1-3 Display Screens Main Screen Day Operating mode Time (min:s) CPU input bit (I) status (: OFF/: ON) CPU Units with 10 I/O I0 I1 I2 I3 I4 I5 points CPU output bit (Q) status (@: OFF/: ON) CPU Units @@@@ Q0 Q1 Q2 Q3 with 10 I/O points I0 I1 I2 I3 I4 I5 I6 I7 I8 I9 Ia Ib CPU Units with 20 I/O points @@@@@@@@ Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7 CPU Units with 20 I/O points When One or More Expansion I/O Units Are Connected Expansion I/O Unit input bit (X) status (: OFF/: ON) X0 X1 X2 X3 X4 X5 X6 X7 X8 X9 Day display SU: Sunday MO: Monday TU: Tuesday WE: Wednesday TH: Thursday FR: Friday SA: Saturday Xa Xb Note: The display depends on the number of input points on the connected Expansion I/O Units. Expansion I/O Unit output bit (Y) status (@: OFF/: ON) @@ Ya Yb @@@@@@@@@@ Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 Note: The display depends on the number of output points on the connected Expansion I/O Units. 21 Nomenclature and Basic Operation Section 1-3 Menu Screen Configuration RUN Mode MONITOR STOP PARAMETER SET CLOCK RUN Ladder Monitor Screen The ON/OFF status of input bits can be checked by monitoring the ladder program. RUN STOP Mode PROGRAM RUN PARAMETER SET CLOCK Switches to STOP mode. The operation status of the timers, counters, and analog comparators can be monitored and the settings changed during operation. Refer to page 27. Ladder Program Edit Screen (Refer to page 25.) EDIT PROG DELETE PROG CASSETTE EDIT PROGRAM NO YES Creates and edits ladder program. Deletes ladder program and parameters.
Memory Cassette Operation (Refer to page 111.) SAVE(CPU-MC) Transfers programs LOAD(MC-CPU) between ZEN and ERASE the Memory Cassette and initializes the Memory Cassette. Select YES with Note: Displayed only when a Memory Cassette is mounted. Switches to RUN mode. Changes the settings for timers, counters, and analog comparators.
(Refer to page 30.) Date and Time Settings (Refer to page 58.) PROGRAM SET CLOCK SET CLOCK Sets the date and yy/mm/dd RUN SUMMER TIME time. 00/01/01 PARAMETER SET CLOCK 00:03(SA) Display Language Settings (Refer to page 57.) SET CLOCK LANGUAGE LANGUAGE Set when shipping to countries that use summer time.
(Refer to page 107.) The display language can be changed. English, Japanese, German, French, Italian, and Spanish ENGLISH Communications Settings (Models with Communications Only) PARAMETER SET CLOCK LANGUAGE RS485 NODE NO COM SPEED DATA BIT STOP BIT COM SPEED DATA BIT STOP BIT PARITY Settings are made for communications with external devices.

(Refer to the ZEN Communications Manual (Z212).) Other Settings PARAMETER SET CLOCK LANGUAGE OTHER PASSWORD BACKLIGHT INPUT FILTER SYSTEM INF Other settings can be made. Refer to the following page for details. 22 Nomenclature and Basic Operation Other Submenus PASSWORD BACKLIGHT INPUT FILTER SYSTEM INF BACKLIGHT INPUT FILTER SYSTEM INF MODEM INI Section 1-3 Set a password when you want to protect programs from being read. The password setting range is 0000 to 9999. Setting Passwords (Refer to page 102.) PASSWORD 0000 Changing Cutout Time for Backlight (Refer to page 106.

) Set the automatic cutout time for the backlight in the LCD screen. 2 min, 10 min, 30 min, Always ON Setting Input Filters (Refer to page 104.) 2min INNER EXP1 EXP2 EXP3 BACKLIGHT Set the input filters to ON or OFF for the CPU Unit or Expansion I/O Units. Set to ON when noise or chattering may affect operation. "EXP1" to "EXP3" will be displayed depending on the number of Expansion I/O Units connected. Reading System Information (Refer to page 108.) U03.00 060201 INT:I06O04 EX1:I04O04 EX2:I04O04 EX3:I04O04 RMT:I00000 LCD:YES RMT:I00000 LCD:YES RTC:YES ADC:YES Read system information, such as the CPU Unit software version or the date it was created, the number of I/O points on the CPU Unit or the Expansion I/O Units, and whether or not LCD, RTC, or analog input functions are supported. For future expansion. Do not set.
23 Nomenclature and Basic Operation Section 1-3 1-3-3 Basic Operation Main menu display RUN PARAMETER SET CLOCK LANGUAGE Menu Selection Example Use the Up/Down Buttons to move the cursor. Flashing cursor LANGUAGE ENGLISH Press the OK Button to select the flashing menu. The settings will flash on a reversed display. Settings cannot be changed during reversed display. Press the OK Button to change from a highlighted cursor to a flashing cursor.
Settings can now be changed. Use the Up/Down Buttons to change the setting. Use the Up Button to select GERMAN. Highlighted cursor LANGUAGE ENGLISH Flashing cursor LANGUAGE GERMAN LANGUAGE SET? OK/ESC GERMAN A confirmation message will be displayed asking if you want to change to German display. RUN PARAMETER SET CLOCK LANGUAGE RUN PARAMETER KALENDER SPRACHE Press the OK Button to change from English to German.
Press the ESC Button to cancel the change and return to the previous screen. 24 Nomenclature and Basic Operation Section 1-3 The highlighted cursor will appear in the initial write position. During highlighted cursor display, the cursor can be moved to the input or output write positions. Example Operation in the Ladder Program Edit Screen Select Program/ Edit. Line No. at cursor Highlighted cursor Up/Down Buttons: Move the highlighted cursor up and down. Left/Right Buttons: Move the highlighted cursor Left/Right. Press the OK Button at the input write position to display the input default setting IO and the normally open condition symbol. "I" will flash. · Flashing Cursor at the I Position Up/Down Buttons: Change the bit type.

Right Button: Moves the flashing cursor to the right. OK Button: Sets the bit type and moves the flashing cursor to the bit address position. · Flashing Cursor at the 0 Position Up/Down Buttons: Change the bit address. OK Button: Completes the writing of the bit. · Switching between Normally Open and Normally Closed Conditions You can use the ALT Button to switch between the N.O. and N.C. conditions, regardless of the position of the flashing cursor. When the first input has been written, the highlighted cursor moves to the next input position.
Use the above procedure to enter program input conditions in series. When writing serial inputs, the connecting line between inputs is drawn automatically. 25 Nomenclature and Basic Operation Section 1-3 Press the ALT Button with the highlighted cursor in the input writing position to change the cursor to a flashing left arrow to enable connecting lines to be drawn. Up/Down Buttons: Draw vertical connecting lines. Left/Right Buttons: Draw horizontal connecting lines.
Press the Right Button twice to draw a line to the output bit. The cursor will change to a highlighted cursor at the output bit write position. Press the OK Button at the output bit write position to display the default output Q0. Q will flash. · Flashing Cursor at the Q (Bit Type) Position Up/Down Buttons: Change the type of output Right/Left Buttons: Move the flashing cursor.
OK Button: Sets the bit type and moves the flashing cursor to the bit address position. · Flashing Cursor at the (Additional Output Function) Position Up/Down Buttons: Selects the additional output function OK Button: Sets the additional output function and moves the flashing cursor to the bit address position. · Flashing Cursor at the 0 (Bit Address) Position Up/Down Buttons: Select the bit address OK Button: Completes the output write. 01 Press the OK Button to complete the bit write and to move the highlighted cursor to the first input position ON the next line. Press the ESC Button to complete the writing of the ladder program and to return to the menu screen. 26 Nomenclature and Basic Operation Section 1-3 When PARAMETER is selected, the settings for bits that are being used by the ladder program are displayed. Example Parameter Settings Screen Operation Select Parameters on menu screen. (1) Selecting Parameters to Display Press the OK Button to change the highlighted cursor to a flashing cursor. / Use the Up/Down Buttons to select another timer. When multiple parameters of the same type have been selected, use the Up/Down Buttons to scroll through the numbers.

Press the Left Button to switch to another type, move the flashing cursor to the bit type position and use the Up/Down Buttons to select the bit type. / Move the flashing cursor to the bit type position and use the Up/Down Buttons to select another bit type. (2) Setting and Changing Parameters Use the Left/Right Buttons to move the highlighted cursor to the parameter to be set. Press the OK Button to confirm the set position. The cursor will change to a flashing cursor. / Use the Up/Down Buttons to set the parameter. Press the OK Button to confirm the setting. 27 Nomenclature and Basic Operation Section 1-3 Use the Left/Right or Up/Down Buttons to move the highlighted cursor to the parameter to be set. Press the OK Button to confirm the set position. The cursor will change to a flashing cursor.
Use the Left/Right Buttons to select the digit to be set. Use the Up/Down Buttons to change the value of each digit. Press the OK Button to confirm the setting. Press the ESC Button to complete the settings. Note If the ESC Button is pressed while ladder program or parameter settings are being input, the input to that point will be canceled and the settings will return to the original settings.

28 Memory Areas Section 1-4 1-4 Name Memory Areas Type Bit No. addresses of bits 0 to 5 0 to b 6 12 12 Function Ladder Page programs N.O./N.C. inputs 32 I/O, Work, and Internal Holding Bits CPU Unit input bits I CPU Units Reflect the ON/OFF with 10 I/O pts status of the input devices connected to CPU Units with 20 I/O pts the CPU Unit input terminals. Reflect the ON/OFF status of the input devices connected to the Expansion I/O Unit input terminals. Turn ON when the operation buttons are pressed in RUN mode. Cannot be used for LED-type CPU Units. Output the comparison result for analog inputs. Can only be used for models with a 24-VDC power supply. Compare the present value of timers (T), holding timers (#), and counters (C), and outputs the comparison result. Compare the present value of 8-digit counters (F) with a constant and outputs the comparison result Output the ON/OFF CPU Units with 10 I/O pts status of the output (See note 1.) bits to the outputs devices connected to CPU Units with 20 I/O pts the CPU Unit. Output the ON/OFF status of the output bits to the outputs devices connected to the Expansion I/O Unit.

Can only be used within the program. Cannot output to an external device. Same as for work bits however the holding bits maintain ON/OFF status when power is turned OFF. Expansion I/O Unit input bits Button input bits X 0 to b 32 B 0 to 7 8 99 A Analog comparator bits Comparator bits P 0 to 3 4 87 0 to f 16 91 G 8-Digit comparator bits CPU Unit output bits Q 0 to 3 4 94 0 to 3 4 N.O./N.C. inputs Outputs (See note 2.) 32 0 to 7 Expansion I/O Unit output bits Work bits Holding bits Y 0 to b 8 12 32 M H 0 to f 0 to f 16 16 - Note 1. 2.
Output bit Q3 of CPU Units with communications cannot be output externally. It can be used as a work bit. The following additional functions can be selected for bit outputs. Execution condition Bit address Bit type Additional function ([, S, R, A) 29 Memory Areas Normal output [Set/Reset Alternate S (set) R (reset) A Section 1-4 Turns ON or OFF according to the ON/OFF status of the execution condition. Holds ON status after the execution condition turns ON once. Holds OFF status after the execution condition turns ON once. Alternates between ON and OFF whenever the execution condition turns ON (input latch operation). Timers and Counters Name Type Bit addresses 0 to f No. of timers/ counters 16 Function Use in ladder programs Page Timer T N.O. /N.C. Can be switched between ON delay, OFF delay, one-shot, flashing condition pulse, and twin timer operation.(See note.) Hold the present value during counting even if the trigger input or power supply is turned OFF. Continues the timing when the trigger input or power supply is turned ON again. Four-digit reversible counters that can be incremented and decremented. An eight-digit reversible counter that can be incremented and decremented. CPU Units with DC power supplies support a highspeed counter up to 150 Hz. Can be switched between normal operation, operation between days, and pulse output operation.

Cannot be used for LED-type CPU Units. Can turn ON or OFF during a specified date period. Cannot be used for LED-type CPU Units. 74 Holding timer # 0 to 7 8 74 Counter C 0 to f 16 78 8-Digit counter F 0 1 78 Weekly timer @ 0 to f 16 81 Calendar timer 0 to f 16 86 Timer Types X ON delay Times down while the trigger input is ON and turns ON the timer bit when the set time is reached. OFF delay Turns ON the timer bit while the trigger input is ON, starts timing down when the trigger input turns OFF, and turns OFF the timer bit when the set time is reached. O One-shot Turns ON the timer bit for the set period when the trigger input changes from OFF to ON only. F Flashing pulse W Twin Timer bit repeatedly turns ON/OFF at set intervals while the trigger input is ON. Timer bit repeatedly turns ON/OFF at set intervals while the trigger input is ON. The ON time and OFF time can be set separately. 30 Memory Areas Section 1-4 Display Bits Name Type Bit addresses 0 to f No.
of bits 16 Function Use in ladder programs Output Page Display D Display user-specified character strings, times, timer present values, counter present values, or analog-converted values. Cannot be used for LED-type CPU Units. 96 D Display No. Function switching D Display Clear display C Function switching 31 Allocating I/O Bit Numbers Section 1-5 1-5 Allocating I/O Bit Numbers For CPU Units with 10 I/O points, the input bit addresses I0 to I5 and output bit addresses Q0 to Q3 (Q0 to Q2 for CPU Units with communications) are always allocated to the CPU Unit. For CPU Units with 20 I/O points, the input bit addresses I0 to Ib and output bit addresses Q0 to Q7 are always allocated to the CPU Unit.
Up to 3 Expansion I/O Units can be added and input bit addresses X0 to Xb and output bit addresses Y0 to Yb are allocated in the order the Units are connected. Connection Example for 4-point Expansion Input Unit, 4-point Expansion Output Unit, and 8-point Expansion I/O Unit CPU Units with 10 I/O Points Input bit address I0 I1 I2 IN 0 IN 1 IN 2 I3 I4 IN 3 IN 4 I5 IN 5 X0 X1 X2 X3 IN 0 IN 1 IN 2 IN 3 X4 X5 X6 X7 IN 0 IN 1 IN 2 IN 3 X8 X9 Xa Xb IN 0 IN 1 IN 2 IN 3 CPU Unit (10 I/O points) OUT OUT OUT OUT 0 1 2 3 Expansion I/O Unit 1 OUT OUT OUT OUT 0 1 2 3 Expansion I/O Unit 2 OUT OUT OUT OUT 0 1 2 3 Expansion I/O Unit 3 OUT OUT OUT OUT 0 1 2 3 Output bit address Q0 Q1 Q2 Q3 (See Y0 Y1 Y2 Y3 note.) Y4 Y5 Y6 Y7 Y8 Y9 Ya Yb Note Output bit Q3 of CPU Units with communications cannot be output externally. It can be used as a work bit. CPU Units with 20 I/O Points Input bit address I0 I1 I2 I3 I4 I5 I6 I7 I8 I9 Ia Ib IN IN IN 012 IN IN IN IN IN 34567 IN IN IN 89a IN b X0 X1 X2 X3 X4 X5 X6 X7 X8 X9 Xa Xb IN IN IN IN 0123 IN IN IN IN 0123 IN IN IN IN 0123 CPU Unit (20 I/O points) OUT OUT OUT OUTOUT OUT OUT OUT 2 0 1 3 4 5 6 7 Expansion I/O Unit 1 (8 I/O points) Expansion I/O Unit 2 (8 I/O points) Expansion I/O Unit 3 (4 inputs) OUT OUT OUT OUT 0 1 2 3 OUT OUT OUT OUT OUT OUT OUT OUT 0 1 2 3 0 1 2 3 Output bit address Q0 Q1Q2 Q3Q4 Q5Q6 Q7 Y0 Y1 Y2 Y3 Y4Y5 Y6 Y7 Y8Y9 Ya Yb 32 Preparations for Operation Section 1-6 1-6 Preparations for Operation DIN Track Mount ZEN to Control Panels The ZEN can be mounted to either a DIN Track or directly onto the surface of the control panel. Refer to page 36. Connect Power Supply, Input, and Output Devices Wire the ZEN to the power supply, input, and output devices. Refer to page 38. Power supply Inputs Make Initial Settings Make the settings required before programming, such as date, time, and display language. Refer to pages 57 and 58. Output Load Load Load Write Program Input the ladder program, including timers, counters, and other parameters.