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You can read the recommendations in the user guide, the technical guide or the installation guide for OMRON CQM1-SRM21-V1. You'll find the answers to all your questions on the OMRON CQM1-SRM21-V1 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

**User manual OMRON CQM1-SRM21-V1**  
**User guide OMRON CQM1-SRM21-V1**  
**Operating instructions OMRON CQM1-SRM21-V1**  
**Instructions for use OMRON CQM1-SRM21-V1**  
**Instruction manual OMRON CQM1-SRM21-V1**

Cat. No. W286-E1-09

C200HW-SRM21-V1  
CS1W-SRM21  
CJ1W-SRM21  
CQM1-SRM21-V1  
SRT1 Series  
SRT2 Series

**CompoBus/S**

**OPERATION MANUAL**

**OMRON**



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**Manual abstract:**

No. @@@@Always heed the information provided with them. @@Additionally, there may be severe property damage. @@Additionally, there may be severe property damage. Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage. !Caution 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. The abbreviation "Ch," which appears in some displays and on some OMRON products, often means "word" and is abbreviated "Wd" in documentation in this sense. The abbreviation "PLC" means Programmable Controller and is not used as an abbreviation for anything else. Visual Aids The following headings appear in the left column of the manual to help you locate different types of information.

Note Indicates information of particular interest for efficient and convenient operation of the product. 1,2,3... 1.

Indicates lists of one sort or another, such as procedures, checklists, etc. OMRON, 1996 All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of OMRON. No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice.

Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication. v TABLE OF CONTENTS PRECAUTIONS . . . . .

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Section 4 explains the functions of each Master Unit, including information on specifications, switch settings and allocation of Slave I/O. Section 5 explains the functions of each Slave, including information on specifications, switch settings, and I/O. Section 6 provides information on error processing, periodic maintenance operations, and troubleshooting procedures needed to keep the CompoBus/S System operating properly. We recommend reading through the error processing procedures before operation so that operating errors can be identified and corrected more quickly. The Appendix provides tables of standard models including Masters, Slaves, and connecting devices. In this manual, only the specifications of the CompoBus/S system and devices are described.

For details on Units, refer to their respective manuals. (Suffixes have been omitted from the catalog numbers.) Product Name CS-series Programmable Controllers CJ-series Programmable Controllers Series CS Series CJ Series Manual Name SYSMAC CS Series Operation Manual SYSMAC CJ Series Operation Manual SYSMAC CS/CJ Series Programming Manual SYSMAC C200HX/C200HG/ C200HE-(Z)E Programmable Controllers Installation Guide SYSMAC C200HX/C200HG/ C200HE-(Z)E Programmable Controllers Operation Manual SYSMAC C200HS Operation Manual SYSMAC C200HS Installation Guide SYSMAC CQM1H Operation Manual SYSMAC CQM1H Programming Manual Cat. No. W339 W393 W394 W302 CS/CJ-series Programmable Control- CS/CJ Series lers C200HX/C200HG/C200HE-(Z)E Pro- C200HX/C200HG/ grammable Controllers C200HE-(Z)E C200HX/C200HG/C200HE-(Z)E Pro- C200HX/C200HG/ grammable Controllers C200HE-(Z)E C200HS Programmable Controllers C200HS Programmable Controllers CQM1H Programmable Controller CQM1H Programmable Controller C200HS C200HS CQM1H CQM1H W322 W235 W236 W363 W364 CQM1 Programmable Controller CQM1 SYSMAC CQM1 Operation Man- W226 ual ix Product Name CQM1/CPM1/CPM1A/SRM1 Programmable Controller CompoBus/S SRM1 Master Control Unit CPM2C-S Programmable Controller CPM1A/CPM2A I/O Link Unit CPM2C I/O Link Unit Series CQM1/CPM1/ CPM1A/SRM1 SRM1(-V2) Manual Name SYSMAC CQM1/CPM1/CPM1A/ SRM1 Programming Manual Cat. No. W228 CPM2C-S CPM1A-SRT21 CPM2C-SRT21 W318 SYSMAC CompoBus/S SRM1 Master Control Units Operation Manual SYSMAC CPM2C-S Programma- W377 ble Controllers Operation Manual SYSMAC CPM2A I/O Link Units Operation Manual SYSMAC CPM2C I/O Link Units Operation Manual W352 W356

**WARNING** Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given. x 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 manual is provided as a guide for the user in determining suitability and does not constitute a warranty.

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 manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions. **xiii PRECAUTIONS** This section provides general precautions for using the CompoBus/S Units, Programmable Controllers, and related devices. The information contained in this section is important for the safe and reliable application of the CompoBus/S and PLC.

You must read this section and understand the information contained before attempting to set up or operate a CompoBus/S and PLC system. 1 2 3 4 5 6

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· The PLC will turn OFF all outputs when its self-diagnosis function detects any error or when a severe failure alarm (FALS) instruction is executed. As a countermeasure for such errors, external safety measures must be provided to ensure safety in the system. xvi Operating Environment Precautions 4 · The PLC outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system. · When the 24-VDC output (service power supply to the PLC) is overloaded or short-circuited, the voltage may drop and result in the outputs being turned OFF. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system. !WARNING Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock. !Caution Execute online edit only after confirming that no adverse effects will be caused by extending the cycle time.

Otherwise, the input signals may not be readable. !Caution Confirm safety at the destination node before transferring a program to another node or editing the I/O area. Doing either of these without confirming safety may result in injury. !Caution Tighten the screws on the terminal block of the AC Power Supply Unit to the torque specified in the operation manual. The loose screws may result in burning or malfunction.

4 Operating Environment Precautions !Caution Do not operate the control system in the following places: · Locations subject to direct sunlight · Locations subject to temperatures or humidity outside the range specified in the specifications · Locations subject to condensation as the result of severe changes in temperature · Locations subject to corrosive or flammable gases · Locations subject to dust (especially iron dust) or salts · Locations subject to exposure to water, oil, or chemicals · Locations subject to shock or vibration !Caution Take appropriate and sufficient countermeasures when installing systems in the following locations: · Locations subject to static electricity or other forms of noise · Locations subject to strong electromagnetic fields · Locations subject to possible exposure to radioactivity · Locations close to power supplies xvii Application Precautions 5 !Caution The operating environment of the PLC System can have a large effect on the longevity and reliability of the system. Improper operating environments can lead to malfunction, failure, and other unforeseeable problems with the PLC System. Be sure that the operating environment is within the specified conditions at installation and remains within the specified conditions during the life of the system. 5 Application Precautions Observe the following precautions when using the CompoBus/S Units or the PLC. !WARNING Failure to abide by the following precautions could lead to serious or possibly fatal injury.

Always heed these precautions. · Always connect to 100 or less when installing the Units. Not connecting to a ground of 100 or less may result in electric shock. · Always turn OFF the power supplies to the PLC, slaves, and communications before attempting any of the following. Not turning OFF the power supplies may result in malfunction or electric shock. · Mounting or dismounting Power Supply Units, I/O Units, CPU Units, memory cassettes, Master Units, or any other Units · Mounting or dismounting circuits for Remote I/O Terminals with 3-tier terminal blocks · Assembling the Units or Racks · Setting DIP switches or rotary switches · Connecting or wiring the cables · Connecting or disconnecting the connectors !Caution Failure to abide by the following precautions could lead to faulty operation or the PLC or the system or could damage the PLC or PLC Units. Always heed these precautions. · Failsafe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes. · Provide external interlock circuits, limit circuits, and other safety circuits in addition to any provided within the PLC to ensure safety. · Configure the control circuits to turn ON the power supply to I/O slaves before turning ON the power supply to the PLC (Master Unit).

If the I/O slave power supply is turned ON after the PLC, correct operation may temporarily not be possible. · Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock. · Do not drop the Unit or subject it to excessive vibration or shock. · Be sure that all the Backplane mounting screws, slave mounting screws, terminal screws, and cable connector screws are tightened to the torque specified in the relevant manuals. Incorrect tightening torque may result in malfunction. · Wire correctly according to specified procedures. xviii Application Precautions 5 · Pay careful attention to the polarity (+/-) when connecting the terminal blocks or connectors. Wrong connections may cause malfunction of the system. ·

Wire all terminals, communications paths, power supplies lines, and I/O lines with the specified polarity and voltages.

Improper wiring may result in faulty operation. · Install external breakers and take other safety measures against short-circuiting in external wiring.

Insufficient safety measures against short-circuiting may result in burning. · Do not mount the Unit near equipment that generates strong high-frequency noise. · Leave the label attached to the Unit when wiring to prevent wire clippings and other foreign matter from entering the Unit.

Removing the label may result in malfunction. · Remove the label after the completion of wiring to ensure proper heat dissipation. Leaving the label attached may result in malfunction. · Use crimp terminals for wiring. Do not connect bare stranded wires directly to terminals.

Connection of bare stranded wires may result in burning. · Wire correctly and double-check all the wiring or the setting switches before turning ON the power supply. Incorrect wiring may result in burning. · Be sure that the terminal blocks, connectors, expansion cables, and other items with locking devices are properly locked into place. Improper locking may result in malfunction. · Disconnect the LG and GR terminals on the Power Supply Unit before performing insulation resistance or dielectric strength tests. · Always use the power supply voltage specified in the operation manual. An incorrect voltage may result in malfunction or burning. · Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied.



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Be particularly careful in places where the power supply is unstable.

An incorrect power supply may result in malfunction. · Do not apply voltages to the Input Units in excess of the rated input voltage. Excess voltages may result in burning. · Do not apply voltages exceeding the maximum switching capacity to Output Units. The Output Units may be destroyed. · Check the user program for proper execution before actually running it on the Unit. Not checking the program may result in an unexpected operation. · Always turn OFF the power supplies to the PLC, slaves, and communications before attempting any of the following. Not turning OFF the power supply may result in malfunction or electric shock. · Mounting or dismounting Power Supply Units, I/O Units, CPU Units, memory cassettes Master Unit, or any other Units · Mounting or dismounting circuits for Remote I/O Terminals with 3-tier terminal blocks.

· Assembling the Units · Setting DIP switches or rotary switches · Connecting or wiring the cables xix Application Precautions · Connecting or disconnecting the connectors 5 · Before touching the Unit, be sure to first touch a grounded metallic object in order to discharge any static built-up. Not doing so may result in malfunction or damage. · Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation. · Changing the operating mode of the PLC.

(including the Startup Mode setting) · Force-setting/force-resetting any bit in memory. · Changing the present value of any word or any set value in memory. · When replacing parts, be sure to confirm that the rating of a new part is correct. Not doing so may result in malfunction or burning. · Resume operation only after transferring to the new CPU Unit and/or Special I/O Units the contents of the DM and HR Areas required for resuming operation.

Not doing so may result in an unexpected operation. · When transporting the Units, use special packing boxes and protect them from excessive vibration or shock during transportation. · Connect all communications cables within the limits given in the specifications. · Observe the following precautions when wiring communications cables. · Separate the communications cables from power lines or high-tension lines. · Do not bend the communications cables. · Do not pull on the communications cables with an excessive force. · Do not place heavy objects on the communications cables. · Be sure to put the communications cables inside conduits. · Water-resistant Terminals used as Slaves are of IP67 construction.

Do not attempt to use the Watertight Terminals for applications where the Watertight Terminals are always underwater. · Install the Unit properly as specified in the operation manual. Improper installation of the Unit may result in malfunction. xx Conformance to EC Directives 6 6 6-1 6-2 Conformance to EC Directives Applicable Directives · EMC Directives 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 (see the following note). 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. Note Applicable EMC (Electromagnetic Compatibility) standards are listed in the following table. Unit C200HW-SRM21-V1 CS1W-SRM21 CJ1W-SRM21 CQM1-SRM21-V1 EMS (Electromagnetic Susceptibility) EN61131-2 EN61131-2 EN61000-6-2 (See note 1.

) EN61131-2 EMI (Electromagnetic Interference) EN61000-6-4 (See note 2.) SRM1-C0@-V2 EN61000-6-2 (See note 1.) CPM2C-S@@@C(-DRT) EN61131-2 SRT1 and SRT2 Series EN61000-6-2 (See note 1.) Note 1. These products have configurations with less than 30 m of I/O wiring, and less than 10 m of power supply wiring.

2. Radiated emission for EN61000-6-4: 10-m regulations 6-3 Conformance to EC Directives Observe the follow precautions when installing the CompoBus/S Units that conform to the EC Directives. 1,2,3...

1. Since the CompoBus/S Units are classified as built-in types, be sure to install the Units inside a control panel. 2. Provide reinforced insulation or double insulation for the DC Power Supplies that are used as power sources for the alarm output, communications circuits, and I/O circuits. 3. The CompoBus/S Units that conform to the EC Directives also conforms to the Common Emission Standard (EN61000-6-4). When incorporated into a device, however, the requirements may vary depending on the configuration of the control panel to be used, relationship with other devices to be connected, wiring, etc. Users are therefore requested to confirm Unit conformance to the EC Directives by themselves. xxi SECTION 1 System Design This section provides an overview of the CompoBus/S System and functions, and describes the various Masters, Slaves, and connection devices that are used to configure a CompoBus/S System. 1-1 System Overview and Features .

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..... 1 System Overview and Features Section 1-1 1-1 1-1-1 System Overview and Features System Overview The CompoBus/S System is a remote I/O communications system with reduced wiring that retains the functionality and ease of use of the original remote I/O system (wired type), while providing higher-speed, longer-distance, and highly reliable communications. The CompoBus/S System allows connection of up to 32 I/O devices (Slaves) to a Master Unit using only two signal wires, even on long production lines that require multiple I/O control.



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Connect up to 32 Slaves (256 Points) for Each Master Unit Each CompoBus/S Master Unit can be connected to up to 32 Slaves of various types, including I/O Terminals and Sensor Terminals, and allows I/O communications for up to 256 points (128 inputs, 128 outputs). CompoBus/S Master Unit SYSMAC CS Series, C200HX/HG/HE-(Z)E, C200HS, CJ Series, CQM1/CQM1H (SRM1, CPM2C-S) Main line length: 500 m max. Slaves Terminator Up to 32 Slaves of various types Flexible Wiring Configuration CompoBus/S Master Unit SYSMAC CS Series, C200HX/HG/HE-(Z)E, C200HS, CJ Series, CQM1/CQM1H (SRM1, CPM2C-S) Total length: 200 m max.

Terminator Up to 32 Slaves of various types I/O Data Exchange without Special Programming I/O data can be exchanged between the Master and Slaves without requiring any special ladder programming for communications. I/O information for each Slave is exchanged between Slaves and the corresponding I/O Area in the Master by simply setting the node number of each Slave. 2 System Overview and Features Input Slave CPU Unit's I/O Area Word CIO 2000 CIO 2001 OUT data CIO 2002 to CIO 2007 CIO 2008 IN data CIO 2009 CIO 2010 to CIO 2015 Bit 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 00 to 07 08 to 15 Node number 00 01 02 03 04 05 to 14 15 00 01 02 03 04 05 to 14 15 Output OUT node 0 8-point Output Slave Section 1-1 OUT node 2 16-point Output Slave OUT node 4 8-point Output Slave IN node 0 8-point Input Slave IN/OUT node 1 8-point Input/ 8-point Output Slave Input IN node 2 32-point Input Slave Example settings using CJ1W-SRM21 Master Unit with unit #00, connected to 32 Slaves. IN node 14 16-point Input Slave 1-1-2 Network Features The CompoBus/S has the following features. Select either a High-speed Communications Mode or Long-distance Communications Mode for the CompoBus/S according to the system configuration.

The differences between the High-speed Communications Mode and the Long-distance Communications Mode are described in 1-1-3 Communications Modes. In Long-distance Communications Mode, flexible wiring is possible up to a total cable length of 200 m with no restrictions on branching or node connections, provided that 4-conductor VCTF cable or Special Flat Cable is used. In Long-distance Communications Mode, communications over the main line of up to 500 m are possible to control I/O devices in a wide area, provided that 2-conductor VCTF cable is used. In this case, however, each branch line can be connected to a single Slave only, because the branch line cannot be further branched. Furthermore, the Master must be connected to either end of the main line.

In High-speed Communications Mode, up to 16 Slaves with 128 I/O points can be connected with a high-speed communications cycle time of only 0.5 ms. This cycle is fast enough for time-critical factory automation applications. Water-resistant Terminals (IP67) can be used as Slaves to exchange I/O in places exposed to water. Water-resistant Terminals are, however, available only when the communications cable is 4-conductor VCTF cable. A Slave can be connected to a Master or another Slave with just one connecting cable. If the 4-wire Special Flat Cable or 4-conductor VCTF cable is used, the Slave's communication power supply is also supplied through the cable, so floor wiring can be reduced dramatically. Also, special connectors simplify branching from a main cable. Communications Modes Flexible Wiring Up to 200 m Long-distance Communications Up to 500 m High-speed Communications Water-resistance Slaves Reduced Wiring 3 System Overview and Features Connecting to 4-conductor VCTF Cable Use Both T-branch and Multidrop Methods Section 1-1 Easy-to-obtain 4-conductor VCTF cable can be used instead of the Special Flat Cable. Furthermore improvement in the environmental resistance of the system is possible by using shielded connectors.

Both the T-branch and multidrop methods can be combined flexibly when wiring. In combination with the floor cables, this wiring feature allows a very flexible system configuration. There are three types of cables (2-conductor VCTF cable, 4-conductor VCTF cable, and Special Flat Cable), and when the Special Flat Cable is used, T-branch Connectors can be installed by simply snapping the connector on. Master Units are available as Special I/O Units for the CS-series, C200HX/C200HG/C200HE-(Z)E, C200HS, CS-series, CJ-series, and CQM1 PLCs and also available integrated with a CPU for the SRM1 and CPM2C-S. The variety of Masters provides flexibility in configuring a system to match your application needs. Units in a wide range are available as I/O Slaves for a variety of applications. Such Units include Remote Terminals and Sensor Terminals, which vary with the number of I/O points or I/O type, Connector Terminals, which allow easy wiring, and Water-resistant Terminals, which have a better protective construction. There are many Slaves available with advanced functions, including Analog I/O Terminals for analog-to-digital or digital-to-analog conversion, and CPM1A/CPM2A/CPM2C I/O Link Units for sharing data with the host PLC. The CompoBus/S System can be started just by wiring the cables and making some simple settings. Replacement of earlier Remote I/O Systems is also easy.

Troubleshooting is easy because the Slave's node number is shown on the Master's indicators if an error occurs with a Slave. When a CS-series, C200HX/HG/HE-(Z)E, or C200HS Master Unit is used, error information is also stored in PLC memory. When an error occurs with a Slave using a CS-series or CJ-series Master Unit, the Slave's node number is stored in the DM Area using the Slave registration function. Wide Variety of Masters Wide Variety of Slaves Easy Startup Slave Node Number Provided on Indicators and in PLC Memory Slave Monitoring for Improved Reliability Reliability of the CS-series and CJ-series Master Units has been further improved by the addition of the following functions. Slave Registration Function Registering Slaves in the Master allows the user to check whether connected Slaves are joined to the network, and to detect whether Slaves are illegally joined due to incorrect connection, or missing from the network due to a delay in startup or malfunction of registered Slaves.

Communications Stop Mode System malfunctions can be avoided by setting remote I/O communications to stop when a communications error occurs. 4 System Overview and Features Section 1-1 1-1-3 Communications Modes Both High-speed Communications Mode and the Long-distance Communications Mode are supported by the CompoBus/S. Item Communications baud rate Communications cycle time High-speed Communications Mode 750 kbps Long-distance Communications Mode 93.75 kbps 0.5 ms or 0.

8 ms (depending 4.0 ms or 6.0 ms (dependon maximum number of I/O ing on maximum number of points) I/O points) The communications distance and the connection configuration vary with the communications mode and communications cable.



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Cable 2-conductor VCTF cable High-speed Communications Mode Length of main line: 100 m max. Length of branch line: 3 m max. Total length of branch lines: 50 m max. Length of main line: 30 m max. Length of branch line: 3 m max. Total length of branch lines: 30 m max. Length of main line: 30 m max.

Length of branch line: 3 m max. Total length of branch lines: 30 m max. Long-distance Communications Mode Length of main line: 500 m max. Length of branch line: 6 m max. Total length of branch lines: 120 m max. Flexible branching, provided that the total length of cable is a maximum of 200 m. Flexible branching, provided that the total length of cable is a maximum of 200 m. 4-conductor VCTF cable Special Flat Cable Note The I/O response time may be slower when using Long-distance Communications Mode compared with High-speed Communications Mode. Refer to 2-5 I/O Response Time

Characteristics. 5 CompoBus/S System Configuration Section 1-2 1-2 1-2-1 CompoBus/S System Configuration Basic System Configuration Master Unit C200HW-SRM21-V1 for CS1, C200HX/C200HG/C200HE (-ZE), and C200HS CS1W-SRM21 for CS Series, CJ1W-SRM21 for CJ Series, CQM1-SRM21-V1 for all CQM1 PLCs SRM1 Master Control Unit CPM2C-S Series Remote Output Terminals Remote Output Terminals (3-tier terminal block) Remote I/O Terminals (3-tier terminal block) Connector I/O Terminals Sensor Terminals Remote Input Terminals Remote Input Terminals (3-tier terminal block)

Photoelectric Sensors, Proximity Sensors, or Limit Switches Photoelectric Sensors, Proximity Sensors, Limit Switches Solenoids or valves Solenoids or valves Photoelectric Sensors or Proximity Sensors with connectors Fiber Amplifier Communications Units Fiber Amplifier Units Remote I/O Module Analog Input Terminal Analog Output Terminal CPM2A or CPM1A Terminal-block Terminator I/O Link Unit for CPM1A/CPM2A PCB Optical Fiber Sensors 1 to 5 V, 4 to 20 mA Inverters or valves Master Characteristics CS-series, C200HX/HG/HE-(Z)E, C200HS Master Units · Multiple Masters (up to 16) can be connected to a single PLC.

· Up to 128 or 256 I/O points (DIP switch used to switch setting). · Communications status stored in CPU Unit's I/O Area. CS-series Master Units · Multiple Masters (up to 96) can be connected to a single PLC. · Up to 128 or 256 I/O points (DIP switch used to switch setting). · Communications status stored in CPU Unit's I/O Area.

· Uses the Slave registration function to monitor which Slaves are joined to the network. · Communications can be stopped when a communications error occurs. CJ-series Master Units · Multiple Masters (up to 40) can be connected to a single PLC. · Up to 128 or 256 I/O points (DIP switch used to switch setting). · Communications status stored in CPU Unit's I/O Area.

6 CompoBus/S System Configuration Section 1-2 · Uses the Slave registration function to monitor which Slaves are joined to the network. · Communications can be stopped when a communications error occurs. CQM1 Master Units · Only one Master can be connected to a single PLC. · Up to 32, 64, or 128 I/O points (DIP switch used to switch setting). · Alarm output terminal provided to detect errors. SRM1 and CPM2C-S Master Units with Built-in CPU Units · Compact CPU Unit with built-in CompoBus/S communications functions. · Up to 256 I/O points for CompoBus/S functions. · Communications status stored in CPU Unit's AR Area. Slave Characteristics Remote Terminals · Input or Output Terminals for general-purpose use. · 4-point, 8-point, and 16-point Transistor Remote Terminals.

· Remote Terminals with no-contact transistor I/O, connector transistor outputs, or relay contact outputs. Remote Terminals (3-tier Terminal Blocks) · Input or Output Terminals for general-purpose use. · 16 points: 8 inputs and 8 outputs mixed. · Wiring is simple because common terminals for I/O wiring are located at each point on the 3-tier terminal block. Connector Terminals · All I/O wiring can be done using connectors, reducing the amount of labor for wiring. · Mounting brackets allow the direction of mounting to be changed. Water-resistant Terminals · Input or output terminals of IP67 construction. · 4 or 8 inputs or outputs. · Connecting to communications cable, I/O power supply, and I/O through shielded connectors. Remote I/O Modules · Modular type that allows PCB mounting.

· 16-input model and 16-output model. · User's devices can be customized as CompoBus/S Slaves. Sensor Terminals · Easily connects to Photoelectric Sensor or Proximity Sensor with XS8 Connectors. · 8-input/8-output model and 4-input/4-output model. · Remote teaching and external diagnosis are possible by using output signals of the Sensor Terminal.

Fiber Amplifier Communications Units · Reduced wiring with ON/OFF output and power supply wiring not required. · Connecting a Fiber Amplifier Unit allows connection of up to 14 Optical Fiber Sensors. 7 CompoBus/S System Configuration Section 1-2 · Mobile Console can be connected without the Head (Photoelectric Sensor setting, teaching, and adjustment can be executed on site.) Analog Input Terminals · Convert analog inputs to binary data. · The number of analog input points can be switched between 4 points, 3 points, 2 points, and 1 point using a DIP switch.

· The following input ranges are supported: 0 to 5 V, 1 to 5 V, 0 to 10 V, 10 to 10 V, 0 to 20 mA, 4 to 20 mA Analog Output Terminals · Convert binary data to analog outputs. · The number of analog output points can be switched between 2 points and 1 point using a DIP switch. · Supports the following output ranges: 1 to 5 V, 0 to 10 V, 10 to 10 V, 0 to 20 mA, 4 to 20 mA I/O Link Terminals for CPM1A/CPM2A · Create I/O Links (8 inputs, 8 outputs) with CPM1A and CPM2A PLCs. CPM2C I/O Link Unit · Creating I/O Links (8 inputs, 8 outputs) with CPM2C-series PLCs. 1-2-2 CompoBus/S System Components The diagram below shows a CompoBus/S System in which the main line must be distinguished from the branch lines under either of the following conditions. · The system operates in High-speed Communications Mode. · The system operates in Long-distance Communications Mode with 2-conductor VCTF cable. (The maximum length of the main line varies with the type of communications cable.) Communications Cable Terminator Master Communications Power Supply System with Distinct Main and Branch Lines Slave Slave Slave Slave Slave Slave Main line Branch line T: T-branch connection M: Multidrop connection

Power supply cable Master The Master administers the CompoBus/S System and manages the external I/O of the Slaves. There is only 1 Master in a CompoBus/S System and the Master must be connected at the end of the main line, as shown in the preceding diagram.



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(Power is supplied from the PLC.) 11 Compatible Devices PLC C200HX-CPU3@-(Z)E/ CPU4@-(Z)E, C200HG-CPU3@-(Z)E/CPU4@-(Z)E, C200HE, C200HS C200HX-CPU5@-(Z)E/ CPU6@-(Z)E/ CPU8@-(Z)E, C200HG-CPU5@-(Z)E/ CPU6@-(Z)E, CS Series CS Series CJ Series Section 1-3 CQM1, CQM1H Terminal Not provided for connecting communications power supply for Slaves Provided Not provided Status indi- The PLC's AR Area contains the active The PLC's Auxiliary Area contains the There is an alarm cators node flags and communications error flags active node flags and communications output terminal in for each Slave. error flags for each Slave. The DM Area the terminal block. contains an area for Slave registration and setting communications stop mode. Note 1.

Previous Master Unit models (without -V1), which do not support the Longdistance Communications Mode, cannot be used when an Analog I/O Terminal is connected as a Slave. If used, incorrect data may be transmitted. 2. Refer to SECTION 4 Master Unit Specifications and Operations for more details on the Master Units. Master with Built-in CPU The following Master Control Unit models, which have a built-in CPU Unit, are used for distributed I/O control in CompoBus/S Systems.

Refer to the SRM1 Master Control Unit Operation Manual (W318-E1-@) and the CPM2C-S PLC Operation Manual (W377-E1-@) for details. SRM1 Master Control Unit Item Peripheral port RS-232C port Program capacity Max. number of I/O points Communications mode Number of points per node number Number of usable node numbers per Master Status indicators Yes --Master Control Unit SRM1-CPU01-V2 SRM1-CPU02-V2 Yes Yes 4K words 256 (128 inputs/128 outputs) High-speed Communications Mode or Long-distance Communications Mode (switched using PLC Setup) 8-point mode IN0 to IN7 and OUT0 to OUT7 or IN0 to IN15 and OUT0 to OUT15 The PLC's AR Area contains the active node flags and communications error flags for each Slave. CPM2C-S PLC The CPM2C-S PLC has built-in CompoBus/S Master and DeviceNet Slave functions. Models that support I/O links with host PLCs are available as well.

Item Peripheral port RS-232C port Program capacity Max. number of I/O points Communications mode Master Control Unit CPM2C-S@@@C CPM2C-S@@@C-DRT The same connector is used. 4K words 256 (128 inputs/128 outputs) High-speed Communications Mode or Long-distance Communications Mode (switched using PLC Setup) 12 Compatible Devices Item Number of points per node number Number of usable node numbers per Master Status indicators DeviceNet Slave function Section 1-3 Master Control Unit CPM2C-S@@@C CPM2C-S@@@C-DRT 8-point mode IN0 to IN7 and OUT0 to OUT7 or IN0 to IN15 and OUT0 to OUT15 The PLC's AR Area contains the active node flags and communications error flags for each Slave. Not provided Provided Master Units and Corresponding Communications Modes Master Units support only High-speed Communications Mode or both Highspeed Communications Mode and Long-distance Communications Mode. Slave Analog Terminals can be connected to the Units that support both Highspeed and Long-distance Communications Modes. These Units are an upgraded version and, by switching the communications mode, can be used instead of the Units that support only the High-speed Communications Mode. Item Unit supporting High-speed Communications only Unit supporting High-speed and Long-distance Communications Yes Yes Yes Communications modes High-speed Communica- Yes tions Mode Long-distance Communications Mode Analog I/O Terminal connections No The following models are available. PLC Units supporting High-speed Communications C200HW-SRM21 Units supporting Highspeed and Long-distance Communications C200HW-SRM21-V1 CS-series, C200HX/C200HG/ C200HE-(Z)E, and C200HS Master Units CS-series Master Units CJ-series Master Units CQM1 Master Units SRM1 CPM2C-S ---CQM1-SRM21 SRM1-C0@ SRM1-C0@-V1 --- CS1W-SRM21 CJ1W-SRM21 CQM1-SRM21-V1 SRM1-C0@-V2 CPM2C-S@@@ (-DRT) Note Master Units that do not support Long-distance Communications Mode cannot be used when connecting an Analog Terminal as a Slave. If used, incorrect data may be transmitted. 1-3-2 Slave Units The SRT1/SRT2 Series provides Slaves that support only High-speed Communications Mode or both High-speed Communications Mode and Long-distance Communications Mode.

The SRT2-series Slaves that support Highspeed and Long-distance Communications Modes are an upgraded version 13 Compatible Devices Section 1-3 and, by switching the communications mode, can be used instead of the Slaves that support only the High-speed Communications Mode. Item Slaves supporting High-speed Communications SRT1 Series High-speed Communi- Yes cations Mode Long-distance Communications Mode No Slaves supporting High-speed and Long-distance Communications SRT2 Series Yes Yes Slave Series Communications modes Available models are shown in the following table. Type Slave Remote Terminals with Transistors Previous models SRT1 Series SRT1-ID04 SRT1-ID04-1 SRT1-ID08 SRT1-ID08-1 SRT1-ID16 SRT1-ID16-1 SRT1-ID16T SRT1-ID16T-1 SRT1-OD04 SRT1-OD04-1 SRT1-OD08 SRT1-OD08-1 SRT1-OD16 SRT1-OD16-1 SRT1-OD16T SRT1-OD16T-1 SRT1-MD16T SRT1-MD16T-1 New models SRT2 Series SRT2-ID04 SRT2-ID04-1 SRT2-ID08 SRT2-ID08-1 SRT2-ID16 SRT2-ID16-1 SRT2-ID16T SRT2-ID16T-1 SRT2-OD04 SRT2-OD04-1 SRT2-OD08 SRT2-OD08-1 SRT2-OD16 SRT2-OD16-1 SRT2-OD16T SRT2-OD16T-1 SRT2-MD16T SRT2-MD16T-1 I/O points 4 inputs (NPN) 4 inputs (PNP) 8 inputs (NPN) 8 inputs (PNP) 16 inputs (NPN) 16 inputs (PNP) 16 inputs (NPN, 3-tier terminal block) 16 inputs (PNP, 3-tier terminal block) 4 outputs (NPN) 4 outputs (PNP) 8 outputs (NPN) 8 outputs (PNP) 16 outputs (NPN) 16 outputs (PNP) 16 outputs (NPN, 3-tier terminal block) 16 outputs (PNP, 3-tier terminal block) 8 inputs, 8 outputs (NPN, 3-tier terminal block) 8 inputs, 8 outputs (PNP, 3-tier terminal block) Power supply Multiple supplies 14 Compatible Devices Type Slave Connector Terminals (8-point/16point Transistors) Previous models SRT1 Series None New models SRT2 Series SRT2-VID08S SRT2-VID08S-1 SRT2-VID16ML SRT2-VID16ML-1 SRT2-VOD08S SRT2-VOD08S-1 SRT2-VOD16ML SRT2-VOD16ML-1 Connector Terminals (32-point Transistors) SRT2-ID32ML SRT2-ID32ML-1 SRT2-OD32ML SRT2-OD32ML-1 SRT2-MD32ML SRT2-MD32ML-1 Remote Terminals with Relays Remote Terminals with Power MOS FETs SRT1-ROC08 SRT1-ROC16 SRT1-ROF08 SRT1-ROF16 SRT2-ROC08 SRT2-ROC16 SRT2-ROF08 SRT2-ROF16 SRT2-ID04CL SRT2-ID04CL-1 SRT2-ID08CL SRT2-ID08CL-1 SRT2-OD04CL SRT2-OD04CL-1 SRT2-OD08CL SRT2-OD08CL-1 Sensor Terminals SRT1-ID08S SRT1-ND08S SRT1-OD08S Remote I/O Modules SRT1-ID16P SRT1-OD16P SRT2-ID08S SRT2-ND08S SRT2-OD08S SRT2-ID16P SRT2-OD16P I/O points 8 inputs (NPN, sensor connectors) 8 inputs (PNP, sensor connectors) 16 inputs (NPN, MIL connectors) 16 inputs (PNP, MIL connectors) 8 outputs (NPN, sensor connectors) 8 outputs (PNP, sensor connectors) 16 outputs (NPN, MIL connectors) 16 outputs (PNP, MIL connectors) 32 inputs (NPN, MIL connectors) 32 inputs (PNP, MIL connectors) 32 outputs (NPN, MIL connectors) 32 outputs (PNP, MIL connectors) 16 inputs, 16 outputs (NPN, MIL connectors) 16 inputs, 16 outputs (PNP, MIL connectors) 8 outputs 16 outputs 8 outputs 16 outputs 4 inputs (NPN) 4 inputs (PNP) 8 inputs (NPN) 8 inputs (PNP) 4 outputs (NPN) 4 outputs (PNP) 8 outputs (NPN) 8 outputs (PNP) 8 inputs 4 inputs, 4 outputs 8 outputs (NPN, connector outputs) 16 inputs (NPN, PCB attachment) 16 outputs (NPN, PCB attachment) Section 1-3 Power supply Multiple supplies Local Water-resistant Ter- None minals (Transistors) Multiple supplies Network Local --- 15 Compatible Devices Type Slave Fiber Amplifier Communications Unit Previous models SRT1 Series None New models SRT2 Series E3X-SRT21 I/O points Section 1-3 Power supply 8-point input or 16 point input (with Network Fiber Amplifier Unit connected) Switchable between 4-point, 3point, 2-point, and 1-point analog input Switchable between 2-point and 1point analog output 8 inputs, 8 outputs (For CPM1A/CPM2A) 8 inputs, 8 outputs (For CPM2C) ----- Analog Input Termi- None nals Analog Output Terminals I/O Link Units CPM2C I/O Link Units None None None SRT2-AD04 SRT2-DA02 CPM1A-SRT21 CPM2C-SRT21 Note 1.



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The power supply requirements are described below. Refer to 2-3 Supplying Power to the Slaves for details on these power supplies. 2. Refer to SECTION 5 Slave Specifications and Operations for details on Slaves. Network Power Supply Multiple Power Supplies These Slaves use a single power supply and can be supplied with power from the Special Flat Cable for CompoBus/S. These Slaves require two separate power supplies for communications and I/O. The communications power can be supplied from the Special Flat Cable for CompoBus/S.

These Slaves require a single external power supply. The power cannot be supplied from the Special Flat Cable for CompoBus/S. Local Power Supply 1-3-3 Cables Cables The following table lists the cables that can be used in a CompoBus/S System. Cable 2-conductor VCTF cable (sold commercially) Specifications Vinyl-clad VCTF JIS C 3306 Two 0.75 mm<sup>2</sup> conductors (2 signal wires) Resistance: 25.

1 /km at 20°C Use only 2-conductor VCTF cable. Vinyl-clad VCTF JIS C 3306 Four 0.75 mm<sup>2</sup> conductors (2 signal wires and 2 power supply wires) Resistance: 25.1 /km at 20°C. Four 0.

75 mm<sup>2</sup> conductors (2 signal wires and 2 power supply wires) Maximum ambient temperature: 60°C 4-conductor VCTF cable (sold commercially) Special Flat Cable (OMRON SCA1-4F10, 100 m) Note 1. Do not use cables other than those specified above. 2. For information on communications cables specified by overseas manufacturers, refer to Appendix Standard Models. 16 Compatible Devices Section 1-3 The communications distance depends on the cable used, as follows: Cable Mode Main line length Branch line length Total branch line length 50 m max. 120 m max. 30 m max. (See note.) 2-conductor VCTF cable High-speed Commu- 100 m max. 3 m max.

nications Mode Long-distance Communications Mode 500 m max. 6 m max. 3 m max. (See note.) 4-conductor VCTF cable High-speed Commu- 30 m max. nications Mode (See note.) Long-distance Communications Mode Flexibly branched, provided that the total length of cable is a maximum of 200 m. 3 m max. (See note.) 30 m max.

(See note.) Special Flat Cable High-speed Commu- 30 m max. nications Mode (See note.) Long-distance Communications Mode Flexibly branched, provided that the total length of cable is a maximum of 200 m. Note When 4-conductor VCTF cable or Special Flat Cable is used to connect fewer than 16 Slaves, the main line can be up to 100 m long and the total branch line length can be up to 50 m in High-speed Communications Mode.

(These are the same conditions as when 2-conductor VCTF cable is used.) 1-3-4 Connectors/Terminal Blocks The following table lists the connectors that can be used in a CompoBus/S System. Connector Branch Connector Model SCN1-TH4 Comments Use this connector to create a branch line from the main line. (Used with Special Flat Cable only.) Use this connector to extend the Special Flat Cable.

This connector has a built-in terminator. (Used with Special Flat Cable only.) Connectors with cable used to connect the Water-resistant Terminal to a T-joint. Can be used as a power supply cable (with the female socket connected to the Water-resistant Terminal). Can be used as an I/O cable for sensors that have connectors (with the male plug connected to the Water-resistant Terminal, if the product has a model number suffix "A"). A connector with cable used to connect the Water-resistant Terminal to a T-branch connector. Can be used as a power supply cable (with the female socket connected to the Water-resistant Terminal) and the other end wired to a commercially available terminal block. A connector with a cable used to connect the Water-resistant Terminal to an I/O device. Can be used as an I/O cable (with the male plug connected to the Water-resistant Terminal) and the other end wired to the I/O device. Extension Connector Connector Terminator Connectors with Cable with a socket and plug SCN1-TH4E SCN1-TH4T XS2W-D42@-@81-@ Connector with Cable with a female socket XS2F-D42@-@80-@ Connector with Cable with a male plug XS2H-D421-@80-A 17 Compatible Devices Connector Connector Socket Assembly (female for screw, crimp, solder terminals) Model XS2C-D4S7 Section 1-3 Comments A connector used to connect to the communications connector or external power supply connector of the Water-resistant Terminal or a T-joint plug.

Applicable cable dia.: 6 to 8 mm Applicable conductor size: 0.18 to 0.75 mm<sup>2</sup> A connector used to connect to the external power supply connector of the Water-resistant Terminal or a T-joint plug. Applicable cable dia.: 3 to 6 mm Applicable conductor size: 0.18 to 0.3 or 0.5 to 0.75 mm<sup>2</sup> A connector used to connect to the T-joint socket.

Applicable cable dia.: 6 to 8 mm Applicable conductor size: 0.18 to 0.75 mm<sup>2</sup> XS2G-D4@@ A connector used to connect to the I/O connector of the Water-resistant Terminal or a T-joint socket. Applicable cable dia.

: 3 to 6 mm Applicable conductor size: 0.18 to 0.3 or 0.5 to 0.75 mm<sup>2</sup> A joint used to T-branch a VCTF cable (e.

g., a communications cable or power supply cable). A communications connector for connecting CJ-series Master Units. The connector can be connected simultaneously to the communications cable (BD H, BD L, BS+, BS) and communications power supply (BS+, BS). This connector has screwless terminals for signal lines and connector lock screws. A communications connector for connecting CJ-series Master Units. The connector can be connected simultaneously to the communications cable (BD H, BD L, BS+, BS) and communications power supply (BS+, BS). This connector has screw terminals for signal lines and connector lock screws. A shielded connector terminator model connected to a T-joint. This terminal block has a built-in terminator.

(Can be used with VCTF cable and Special Flat Cable.) XS2C-D4@@ Connector Plug Assembly XS2G-D4S7 (male for screw, crimp, solder terminals) T-joint XS2R-D427-5 Communications Connector (6 pins) FK-MCP1.5/6-STF3.81 MC1.5/6-STF-3.81 Shielded Terminator Plug (Male) Terminal-block Terminator SRS2-1 SRS1-T Note 1. Connect a terminator (Connector Terminator, Shield Terminator, or Terminal-block Terminator) to the following point in the system. · System with Distinction between Main and Branch Lines: The end of the main line farthest from the Master. · System with No Distinction Main and Branch Lines: The end of the communications cable farthest from the Master. 2.

Use a commercially available terminal block or T-joint to branch or extend VCTF cable. 18 Compatible Devices Dimensions Section 1-3 The following diagram shows the dimensions (after assembly). All dimensions are in mm. SCN1-TH4 Branch Connector 18.5 17 15 SCN1-TH4E Extension Connector 18.5 17 15 SCN1-TH4T Connector Terminator 18.5 17 15 20 20 20 SCN1 1 Connectors with Cables XS2W-D42(-@81-( socket and plug) Plug (male) Socket (female) XS2F-D42(-@80-( socket on one end) XS2H-D421(-@80-A (plug on one end) Socket (female) Plug (male) 19 Startup Procedure Connector Assembly Section 1-4 Socket (Female) (Crimp terminals/Solder terminals) XS2C-D4S7 (Communications) XS2C-D4(( Power supply and I/O) Plug (Male) (Crimp terminals/Solder terminals) XS2G-D4S7 (Communications) XS2G-D4(( Power supply and I/O) Socket (female) Plug (male) XS2R-D427-5 T-joint Socket (female) Socket (female) Plug (male) SRS2-1 Shield Terminator Plug (male) Plug (male) SRS1-T Terminal-block Terminator 21 20 40 20 Mounting Holes

Two, 4.



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