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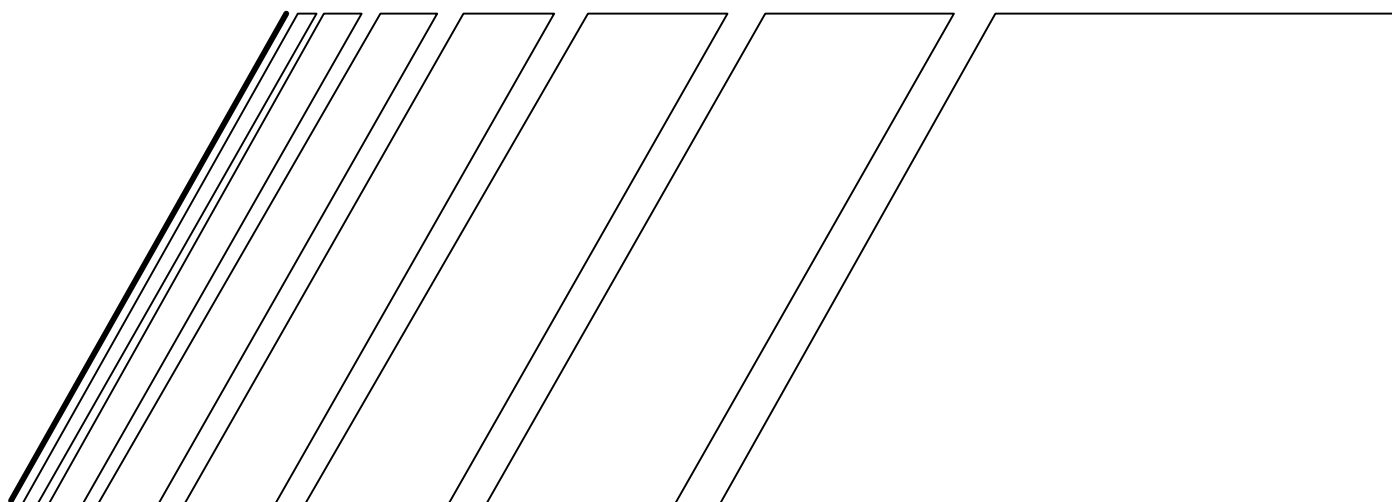

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OMRON

USER'S MANUAL

Programmable Controller Option Board

MODELS 3G3RV- P10ST8-E
AND 3G3RV- P10ST8-DRT-E
(For Varispeed F7Z/E7Z/L7Z/G7C Inverters)

3G3RV-P10ST PLC Option Board

User's Manual

Revised March 2005

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always consult the information provided with them. Failure to heed precautions can result in injury to people or damage to the product.

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

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

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

OMRON Product References

All OMRON products are capitalised in this manual. The word "Unit" is also capitalised 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.

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About this Manual:

The 3G3RV-P10ST is a high-speed Programmable Controller (PLC) with a build-in F7Z/E7Z/L7Z/G7C Inverter interface. There are two manuals describing the setup and operation of the 3G3RV-P10ST: The *3G3RV-P10ST Operation Manual* (this manual) and the *CPM1/ CPM1A/CPM2A/CPM2C/SRM1(-V2) Programming Manual* (W353). (The *CPM1/CPM1A/CPM2A/ CPM2C/SRM1(-V2) Programming Manual* is referred to as simply the *Programming Manual* in this manual.) This manual describes the system configuration and installation of the 3G3RV-P10ST and provides a basic explanation of operating procedures for the Programming Consoles. Read this manual first to acquaint yourself with the 3G3RV-P10ST.

Refer to the following User's manuals for descriptions of the specifications and installation of the applicable Inverters: Varispeed L7 (TOMCC71067600AA-OY), Varispeed F7 (YEG-TOE-S616-55.1-OY), Varispeed E7 (YEG-TOE-S616-56.1-OY), Varispeed G7 (TOE-S616-60.2).

The *SYSMAC Support Software Operation Manuals: Basics* and *C-series PLCs* (W247 and W248) provide descriptions of SSS operations for the 3G3RV-P10ST and other SYSMAC C-series PLCs. The *SYS-MAC-CPT Support Software Quick Start Guide* (W332) and *User Manual* (W333) provide descriptions of ladder diagram operations in the Windows environment. The *CX-Programmer User Manual* (W361) and the *CX-Server User Manual* (W362) provide details of operations for the WS02-CXPC1-E CX-Programmer.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the 3G3RV-P10ST.

Section 1 describes the special features and functions of the 3G3RV-P10ST, shows the possible system configurations, and outlines the steps required before operation. Read this section first when using the 3G3RV-P10ST for the first time.

Section 2 provides the technical specifications of the 3G3RV-P10ST and describes the main components of these Units.

Section 3 provides information on installing and wiring a 3G3RV-P10ST. Be sure to follow the directions and precautions in this section when installing the 3G3RV-P10ST in a panel or cabinet, wiring the power supply, or wiring I/O.

Section 4 describes the PLC setup for the communication ports, the counter and pulse-output functionality

Section 5 explains the interface with the F7Z/E7Z/L7Z/G7C Inverter.

Section 6 explains exchanging data with CompoBus/S slaves.

Section 7 explains exchanging data with DeviceNet masters.

Section 8 explains the high-speed Encoder interface.

Appendix A provides the instruction set.

Appendix B provides examples.

⚠️ **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.

PRECAUTIONS

This section provides general precautions for using the Programmable Controller (PLC) and related devices.

The information contained in this section is important for the safe and reliable application of the Programmable Controller. You must read this section and understand the information contained before attempting to set up or operate a PLC system.

1 Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of installing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of managing FA systems and facilities.

2 General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.

Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

This manual provides information for installing and operating OMRON-YASKAWA F7 Inverter PLC Option Units. Be sure to read this manual before operation and keep this manual close at hand for reference during operation.

⚠ **WARNING** It is extremely important that a PLC, and all PLC Units, be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying a PLC system to the above mentioned applications.

Observe the following precautions when using the OMRON-YASKAWA Inverters and peripheral devices.

This manual may include illustrations of the product with protective covers removed in order to describe the components of the product in detail. Make sure that these protective covers are on the product before use.

Consult your OMRON representative when using the product after a long period of storage.

⚠ **WARNING** Do not touch the inside of the Inverter. Doing so may result in electrical shock.

⚠ **WARNING** Operation, maintenance, or inspection must be performed after turning OFF the power supply of the Inverter, confirming that the CHARGE indicator (or status indicators) are OFF, and after waiting for the time specified on the front cover. Not doing so may result in electrical shock.

⚠ **WARNING** Do not damage, pull on, apply stress to, place heavy objects on, or pinch the cables. Doing so may result in electrical shock.

⚠ **WARNING** Do not touch the rotating parts of the motor under operation. Doing so may result in injury.

⚠ **WARNING** Do not modify the product. Doing so may result in injury or damage to the product.

⚠ **Caution** Do not store, install, or operate the product in the following places. Doing so may result in electrical shock, fire or damage to the product.

- 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 exposure to combustibles.
- 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** Do not touch the Inverter radiator, regenerative resistor, or motor while the power is being supplied or soon after the power is turned OFF. Doing so may result in a skin burn due to the hot surface.

⚠ **Caution** Do not conduct a dielectric strength test on any part of the Inverter. Doing so may result in damage to the product or malfunction.

⚠ **Caution** Take appropriate and sufficient countermeasures when installing systems in the following locations. Not doing so may result in equipment damage.

- Locations subject to static electricity or other forms of noise.
- Locations subject to strong electromagnetic fields and magnetic fields.
- Locations subject to possible exposure to radioactivity.
- Locations close to power supplies.

3 Safety Precautions

⚠ **WARNING** The Unit refreshes I/O even when the program is stopped (i.e., even in PROGRAM mode). Confirm safety thoroughly in advance before changing the status of any part of memory allocated to I/O or the Inverter. Any changes to the data allocated to any of these may result in unexpected operation of the loads connected to the Unit or Inverter. Any of the following operation may result in changes to memory status.

- Transferring I/O memory data from a Programming Device to the Unit.
- Changing present values in memory with a Programming Device.
- Force-setting/-resetting bits with a Programming Device.
- Transferring I/O memory from a host computer or from another PLC on a network.

⚠ **WARNING** Do not attempt to take any Unit apart while the power is being supplied. Doing so may result in electric shock.

⚠ **WARNING** Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.

⚠ **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 changing contents of the I/O memory area. Doing either of these without confirming safety may result in injury.

4 Maintenance and Inspection Precautions

⚠ **WARNING** Do not touch the Inverter terminals while the power is being supplied.

⚠ **WARNING** Maintenance or inspection must be performed only after turning OFF the power supply of the Inverter, confirming that the CHARGE indicator (or status indicators) is turned OFF, and after waiting for the time specified on the front cover. Not doing so may result in electrical shock.

⚠ **WARNING** Maintenance, inspection, or parts replacement must be performed by authorized personnel. Not doing so may result in electrical shock or injury.

⚠ **WARNING** Do not attempt to take the Unit apart or repair. Doing either of these may result in electrical shock or injury.

⚠ **Caution** Carefully handle the Inverter because it uses semiconductor elements. Careless handling may result in malfunction.

⚠ **Caution** Do not change wiring, disconnect connectors or Operator, or replace fans while power is being supplied. Doing so may result in injury or malfunction.

⚠ **Caution** Be sure to wire correctly and securely. Not doing so may result in injury or damage to the product.

5 Operation and Adjustment Precautions

⚠ **WARNING** Turn ON the input power supply of the Inverter only after mounting the front cover, terminal covers, bottom cover, Operator, and optional items. Not doing so may result in electrical shock.

⚠ **WARNING** Do not remove the front cover, terminal covers or optional items while the power is being supplied. Not doing so may result in electrical shock.

⚠ **WARNING** Do not operate the Operator or switches with wet hands. Doing so may result in electrical shock.

⚠ **WARNING** Do not touch the inside of the Inverter. Doing so may result in electrical shock.

⚠ **WARNING** Provide a separate emergency stop switch because the STOP Key on the Operator is valid only when function settings are performed. Not doing so

may result in injury.

6 Wiring Precautions

⚠ **WARNING** Wiring must be performed only after confirming that the power supply of the Inverter has been turned OFF. Not doing so may result in electrical shock.

⚠ **WARNING** Wiring must be performed by authorized personnel. Not doing so may result in electrical shock or fire.

7 Application Precautions

Observe the following precautions when using the PLC Unit.

⚠ **WARNING** Failure to abide by the following precautions could lead to serious or possibly fatal injury. Always heed these precautions.

- Always ground the system with 100 Ω or less when installing the system, to protect against electrical shock.

- Always turn off the power supply of the Inverter before attempting any of the following. Performing any of the following with the power supply turned on may lead to electrical shock:

    - Assembling any devices or racks.

    - Connecting or disconnecting any connectors, cables or wiring.

    - Setting DIP switches or rotary switches.

⚠ **WARNING** Failure to abide by the following precautions could lead to faulty operation of the PLC or the system, or could damage the PLC or PLC Units. Always heed these precautions.

- Fail-safe 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.

- Interlock circuits, limit circuits, and similar safety measures in external circuits (i.e., not in the Programmable Controller) must be provided by the customer.

- Use the Units only with the power supplies and voltages specified in the operation manuals. Other power supplies and voltages may damage the Units.

- Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in malfunction.

- 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 apply voltages exceeding the rated input voltage to Input Units. The Input Units may be destroyed.

- Do not apply voltages exceeding the maximum switching capacity to Output Units. The Output Units may be destroyed.

⚠ **Caution**

- Install the Units properly as specified in the operation manuals. Improper installation of the Units may result in malfunction.
- Wire all connections correctly. Double-check all wiring and switch settings before turning on the power supply. Incorrect wiring may result in burning.
- Mount Units only after checking terminal blocks and connectors completely.
- Be sure that the terminal blocks, Memory Units, expansion cables, and other items with locking devices are properly locked into place. Improper locking may result in malfunction.
- Check switch settings, the contents of the DM Area, and other preparations before starting operation. Starting operation without the proper settings or data may result in an unexpected operation.
- Check the user program for proper execution before actually running it on the Unit. Not checking the program may result in an unexpected operation.
- 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.
    - Force-setting/force-resetting any bit in memory.
    - Changing the present value of any word or any set value in memory.
- Resume operation with a new CPU Unit only after transferring the contents of the DM Area, HR Area, and other data required for resuming operation to the new Unit. Not doing so may result in an unexpected operation.
- Do not pull on the cables or bend the cables beyond their natural limit. Doing either of these may break the cables.
- Do not place objects on top of the cables or other wiring lines. Doing so may break the cables.
- Before touching a 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.
- Do not touch circuit boards or the components mounted to them with your bare hands. There are sharp leads and other parts on the boards that may cause injury if handled improperly.
- Do not attempt to take any Units apart, to repair any Units, or to modify any Units in any way.

8 EC Directives

8-1 Applicable Directives

- EMC Directives
- Low Voltage Directive

8-2 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 as follows:

EMS (Electromagnetic Susceptibility): EN61800-3

EMI (Electromagnetic Interference): EN50081-2/EN55011

(Radiated emission: 10-m regulations)

Low Voltage Directive
Safety standard: EN50178: 1997

8-3 Conformance to EC Directives

The 3G3RV-P10ST series products comply with EC Directives. To ensure that the machine or device in which the PLC is used complies with EC Directives, the PLC must be installed as follows:

1, 2, 3...
1. The PLC must be installed within a control panel.

2. You must use reinforced insulation or double insulation for the DC power supplies used for the communications power supply and I/O power supplies.

3. OMRON PLCs complying with EC Directives also conform to the Common Emission Standard (EN50081-2). Radiated emission character-istics (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.

SECTION 1
Introduction

This section describes the special features and functions of the 3G3RV-P10ST, shows the possible system configurations, and outlines the steps required before operation. Read this section first when using the 3G3RV-P10ST for the first time. Refer to the *CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programming Manual* (W353) for details on programming operations.

1-1 3G3RV-P10ST Features and Functions

1-1-1 3G3RV-P10ST Features

The 3G3RV-P10ST PLC Option Units are compact CPM2C PLCs that have been equipped with an F7Z/E7Z/L7Z/G7C-Inverter interface. The 3G3RV-P10ST incorporates a variety of special features just like the CPM2C, including synchronized pulse control, interrupt inputs, pulse outputs, and a clock function.

- The Inverter interface reduces wiring, and saves space. Instead of using a CPM2C with CIF11 to communicate to an F7-Inverter, the P10SDT communicates directly to the Inverter without the overhead.
- The 3G3RV-P10ST itself can handle a wide range of machine control applications. In addition, the 3G3RV-P10ST is capable of communications with devices such as personal computers and OMRON Programmable Terminals so it is ideal to use to expand or upgrade existing systems.
- The 3G3RV-P10ST CPU Unit has a total of 10 I/O points: 6 inputs and 4 transistor outputs.
- The 3G3RV-P10ST has a dedicated Encoder interface, capable of reading positions of encoders with a maximum frequency input of 50kHz.
- The communications port can be used simultaneously as two ports: Peripheral and RS-232C. The peripheral port supports Programming Devices, Host Link, and no-protocol communications. The RS-232C port supports Host Link, no-protocol (serial), 1:1 PLC Link, and 1:1 NT Link communications.
- Included is also an RS-422/485 interface which allows for a cheap connection to other 3G3RV-P10ST's, other Inverters, NT-terminals, etc.
- Extra I/O can be created by connecting CompoBus/S-slaves to the 3G3RV-P10ST.
- The 3G3RV-P10ST-DRT version also includes a DeviceNet slave interface, allowing it to be connected to a DeviceNet master.

Loss of Inverter functionality

Whenever the 3G3RV-P10ST is attached to an F7 Inverter, the following functionality of the Inverter is lost:

- MEMOBUS communication through the RS-422/485 interface of the Inverter is disabled. The MEMOBUS communication through the RJ-45 connector is still available.

1-1-2 Overview of 3G3RV-P10ST Functions

Main function	Variations/Details	
Inverter interface	Direct interface with E7/F7/L7/G7 Inverter through • IR-memory • DM-memory • Transfer command	
CompoBus/S Master functions	• Remote I/O devices can be allocated up to 256 I/O points (128 inputs and 128 outputs) in input area IR 020 to IR 027 and output area IR 030 to IR 037. • The node numbers can be set to 0 to 7 (128-point mode) or 0 to 15 (256-point mode). • The communications mode can be set to high-speed mode (max. length 100 m) or long-distance mode (max. length 500 m).	

DeviceNet Slave functions	• Up to 64 words (32 input words and 32 output words) can be allocated to the DeviceNet Master's I/O. The Master's I/O can be allocated to the following data areas.
	    IR 000 to IR 049
	    IR 200 to IR 227
	    DM 0000 to DM 2047
	    LR 00 to LR 15
	    HR 00 to HR 19
	    AR 00 to AR 23 (3G3RV-P10ST → Master; read-only)
	    TC 000 to TC 255
	• Explicit message communications are supported. Any 3G3RV-P10ST data area can be accessed from the DeviceNet Master.
	• The communications speed can be set to 500 kbps (total network length 100 m max.), 250 kbps (total network length 250 m max.), or 125 kbps (total network length 500 m max.).	

Interrupts	Interrupt inputs 2 inputs Response time: 50 μs	

	Interval timer interrupts
	1 input
	    Set value: 0.5 to 319,968 ms
	    Precision: 0.1 ms
		Scheduled interrupts

		One-shot interrupt

High-speed counters	High-speed counter
	1 input, see note 1.
	    Differential phase mode (5 kHz)
	    Pulse plus direction input mode (20 kHz)
	    Up/down input mode (20 kHz)
	    Increment mode (20 kHz)
		No interrupt

		Count-check interrupt (An interrupt can be generated when the count equals the set value or the count lies within a preset range.)

	Interrupt inputs (counter mode)
	2 inputs
	    Incrementing counter (2 kHz)
	    Decrementing counter (2 kHz)
		No interrupt

		Count-up interrupt
Pulse outputs	• 2 outputs: Single-phase pulse output without acceleration/deceleration (See note 2.) 10 Hz to 10 kHz • 2 outputs: Variable duty ratio pulse output (See note 2.) 0.1 to 999.9 Hz, duty ratio 0 to 100% • 1 output: Pulse output with trapezoidal acceleration/deceleration (See note 2.) Pulse plus direction output, up/down pulse output, 10 Hz to 10 kHz	

Main function	Variations/Details

Synchronized pulse control	1 point, see notes 1 and 2.
	    Input frequency range: 10 to 500 Hz, 20 Hz to 1 kHz, or 300 Hz to 20 kHz
	    Output frequency range: 10 Hz to 10 kHz

Quick-response input	2 inputs Minimum input signal width: 50 μs
Input time constant	Determines the input time constant for all inputs. (Settings: 1, 2, 3, 5, 10, 20, 40, or 80 ms)
Calendar/Clock	Shows the current year, month, day of the week, day of the month, hour, minute, and second.

Encoder interface	3 input modes:
	    Differential-phase (up/down)
	    Pulse plus direction
	    Up/down pulse
	Maximum input frequency 50 kHz
	Maximum counter range 4,294,967,295 (2^{32}-1)
	Two capture registers, 3 selectable registration inputs
	One comparison value
	Counter reset through software or Z-phase
	Interrupt function

Note 1.   This input is shared by the high-speed counter and synchronized pulse control functions.

2.   This output is shared by the pulse output and synchronized pulse control functions.

1-2 System Configurations

1-2-1 Unit types

3G3RV-P10ST Units

Item	3G3RV-P10ST8-E	3G3RV-P10ST8-DRT-E
PLC core	CPM2C-S	CPM2C-S
Inputs	6 24 VDC inputs	6 24 VDC inputs
Outputs	4 sourcing transistor outputs	4 sourcing transistor outputs
Peripheral port	Yes	Yes
RS-232C port	Yes	Yes
RS-422/485 port	Yes	Yes
Calendar/Clock	Yes	Yes
Memory backup	Flash memory and battery	Flash memory and battery
CompoBus/S master interface	Yes	Yes
Encoder interface	Yes	Yes
DeviceNet slave interface	No	Yes

1-3   3G3RV-P10ST Structure and Operation

1-3-1   3G3RV-P10ST Structure

The following diagram shows the internal structure of the Unit.
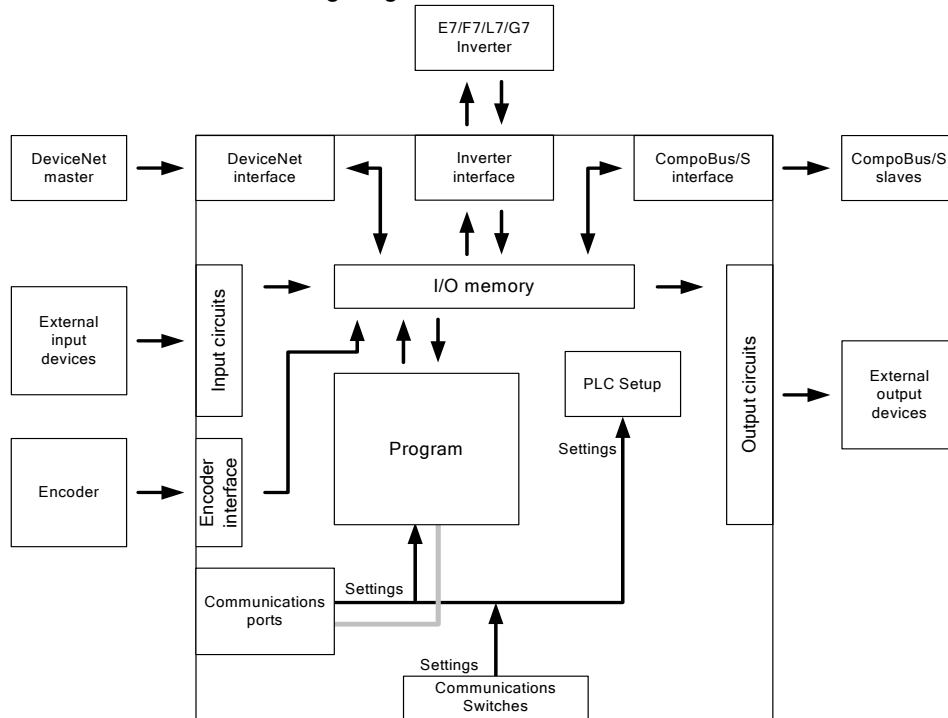
I/O Memory	The program reads and writes data in this memory area during execution. Part of the I/O memory contains the bits that reflect the status of the PLC's inputs and outputs. Parts of the I/O memory are cleared when the power is turned ON and other parts are retained.
Program	This is the program written by the user. The 3G3RV-P10ST executes the program cyclically. (Refer to section *1-3-4 Cyclic Operation and Interrupts* for details.) The program can be divided broadly into two parts: the "main program" that is executed cyclically and the "interrupt programs" that are executed only when the corresponding interrupt is generated.
PLC Setup	The PLC Setup contains various startup and operating parameters. The PLC Setup parameters can be changed from a Programming Device only; they cannot be changed from the program. Some parameters are accessed only when PLC's power supply is turned ON and others are accessed regularly while the power is ON. It will be necessary to turn the power OFF and then ON again to enable a new setting if the parameter is accessed only when the power is turned ON.
Note	Refer to *4-1 PLC-setup* for details on the PLC Setup.
Communications Switches	The Communications Switches determine whether the peripheral port and RS-232C port connected through the communications port operate with the standard communications settings or the communications settings in the PLC Setup.
Inverter Interface	The PLC core communicates to the Inverter through IR-, DM-memory, either by direct mapping or through the Transfer command.
Note	Refer to *section 5-4 Transfer command* for more details.

1-3-2 Operating Modes

3G3RV-P10ST Units have 3 operating modes: PROGRAM, MONITOR, and RUN.

PROGRAM Mode The program cannot be executed in PROGRAM mode. This mode is used to perform the following operations in preparation for program execution.
- Changing initial/operating parameters such as those in the PLC Setup
- Writing, transferring, or checking the program
- Checking wiring by force-setting and force-resetting I/O bits

⚠ **Caution** The PLC continues to refresh I/O bits even if the PLC is in PROGRAM mode, so devices connected to output points may operate unexpectedly if the corresponding output bit is turned ON by transferring I/O memory or force-setting output bits from a Programming Device.

MONITOR Mode The program is executed in MONITOR mode and the following operations can be performed from a Programming Device. In general, MONITOR mode is used to debug the program, test operation, and make adjustments.
- Online editing
- Monitoring I/O memory during operation
- Force-setting/force-resetting I/O bits, changing set values, and changing present values during operation

RUN Mode The program is executed at normal speed in RUN mode. Operations such as online editing, force-setting/force-resetting I/O bits, and changing set values/ present values cannot be performed in RUN mode, but the status of I/O bits can be monitored.

1-3-3 Operating Mode at Startup

The operating mode of the 3G3RV-P10ST when the power is turned ON depends upon the setting of pin 2 on the DIP switch on the front of the 3G3RV-P10ST, the PLC Setup settings in DM 6600, and the Programming Console's mode switch setting if a Programming Console is connected.

PLC Setup setting			Operating mode
Word	**Bits**	**Setting**	
DM 6600	08 to 15	00 (Hex)	See note 1.
		01 (Hex)	Startup mode is the same as the operating mode before power was interrupted.
		02 (Hex)	Startup mode is determined by bits 00 to 07.
	00 to 07	00 (Hex)	PROGRAM mode
		01 (Hex)	MONITOR mode
		02 (Hex)	RUN mode

Note 1. The operating mode at startup depends upon the setting of DIP switch pin 2 and the Programming Device connected to the communications port (peripheral port).

Programming Device	**Pin 2 OFF**	**Pin 2 ON**
None	PROGRAM mode	RUN mode
Programming Console	Operating mode set on the Programming Console's mode switch	
Other device	PROGRAM mode	

The default setting for bits 08 to 15 of DM 6600 is 00. If this default setting is used and pin 2 is OFF, the 3G3RV-P10ST will automatically start operating in RUN mode when the power is turned ON.

Note 2. If pin 2 is OFF and only an RS-232C cable is connected to the communications port (i.e., there is no peripheral port connection), the 3G3RV-P10ST will automatically start operating in RUN mode when the power is turned ON.
Example Cable Connections:
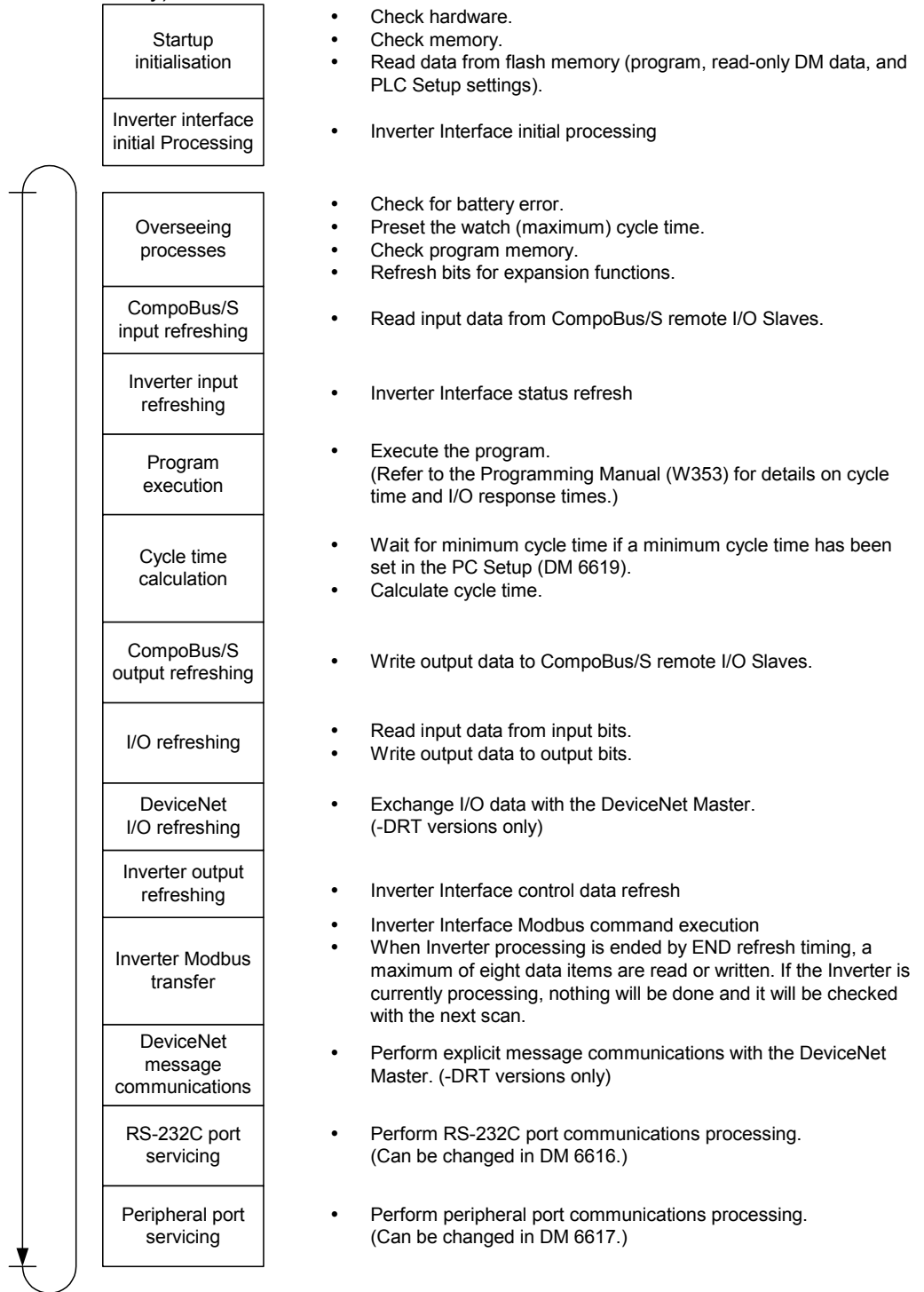CS1W-CN118 and XW2Z-200S/500S
CS1W-CN118 and XW2Z-200S-V/500S-V
CPM2C-CN111 and XW2Z-200S/500S (no peripheral port connection)
CPM2C-CN111 and XW2Z-200S-V/500S-V (no peripheral port connection)

1-3-4 Cyclic Operation and Interrupts

Basic CPU Operation

Initialisation processing is performed when the power is turned on. If there are no initialisation errors, the overseeing processes, program execution, I/O refreshing, and communications port servicing are performed repeatedly (cyclically).

Process	Description
Startup initialisation	• Check hardware. • Check memory. • Read data from flash memory (program, read-only DM data, and PLC Setup settings).
Inverter interface initial Processing	• Inverter Interface initial processing
Overseeing processes	• Check for battery error. • Preset the watch (maximum) cycle time. • Check program memory. • Refresh bits for expansion functions.
CompoBus/S input refreshing	• Read input data from CompoBus/S remote I/O Slaves.
Inverter input refreshing	• Inverter Interface status refresh
Program execution	• Execute the program. (Refer to the Programming Manual (W353) for details on cycle time and I/O response times.)
Cycle time calculation	• Wait for minimum cycle time if a minimum cycle time has been set in the PC Setup (DM 6619). • Calculate cycle time.
CompoBus/S output refreshing	• Write output data to CompoBus/S remote I/O Slaves.
I/O refreshing	• Read input data from input bits. • Write output data to output bits.
DeviceNet I/O refreshing	• Exchange I/O data with the DeviceNet Master. (-DRT versions only)
Inverter output refreshing	• Inverter Interface control data refresh
Inverter Modbus transfer	• Inverter Interface Modbus command execution • When Inverter processing is ended by END refresh timing, a maximum of eight data items are read or written. If the Inverter is currently processing, nothing will be done and it will be checked with the next scan.
DeviceNet message communications	• Perform explicit message communications with the DeviceNet Master. (-DRT versions only)
RS-232C port servicing	• Perform RS-232C port communications processing. (Can be changed in DM 6616.)
Peripheral port servicing	• Perform peripheral port communications processing. (Can be changed in DM 6617.)

The cycle time can be read from a Programming Device.
AR 14 contains the maximum cycle time and AR15 contains the present cycle time in multiples of 0.1 ms.