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PROGRAMMABLE CONTROLLERS

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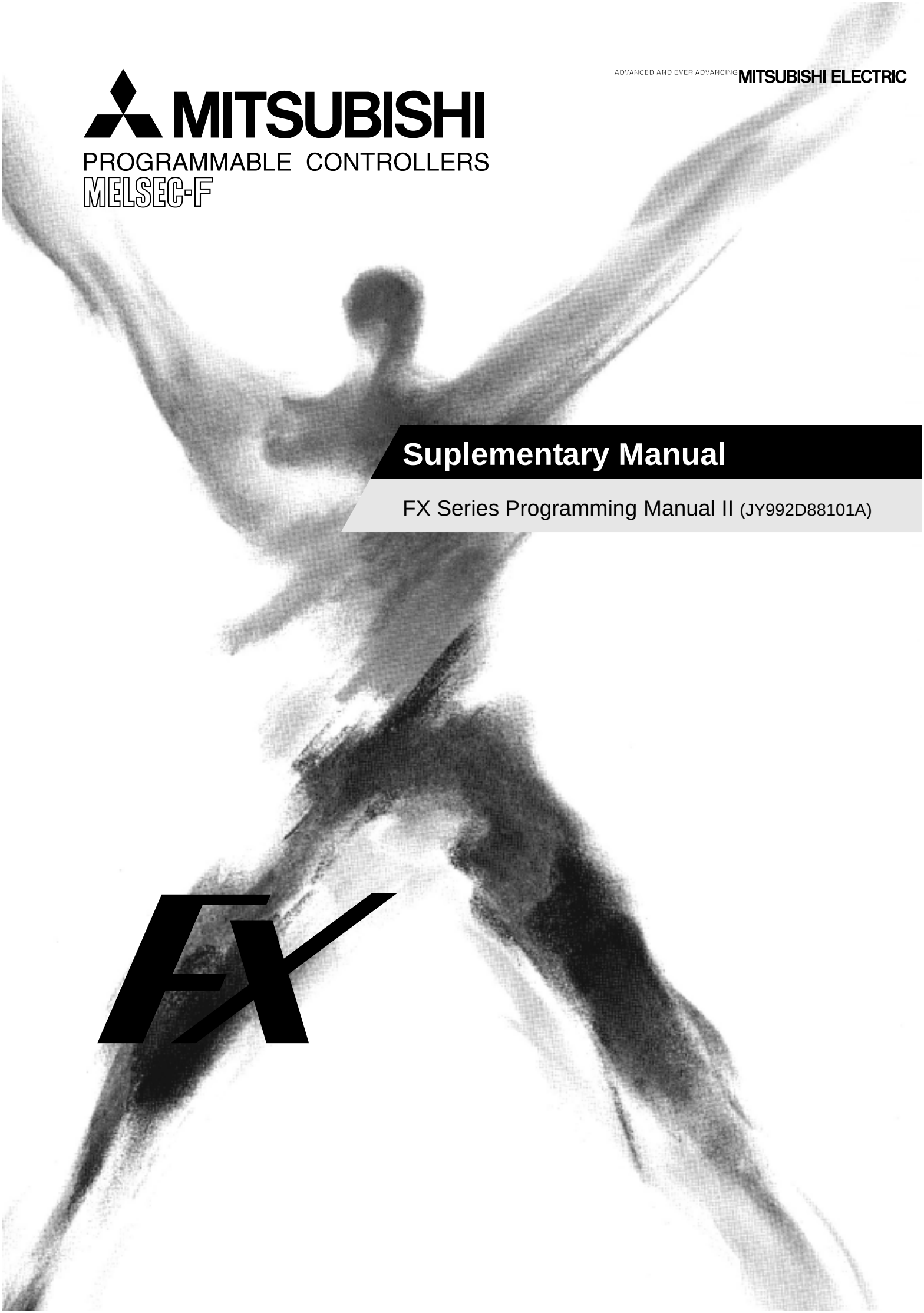


Suplementary Manual

FX Series Programming Manual II (JY992D88101A)

Foreword

- This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of an FX series PLC. It should be read and understood before attempting to install or use the unit.
- Further information can be found in the Programming Manual II and the relavent PLC's associated Hardware Manual.
- If in doubt at any stage of the installation a PLC or related system always consult a professional electrical engineer who is qualified and trained to the local and national standards which apply to the installation site.
- If in doubt about the operation or use of the PLC please consult the nearest Mitsubisi Electric distributor.
- This manual is subject to change without notice.

FX Series Programming Manual II

SUPPLEMENTARY MANUAL

(Diagnostic Devices)

Manual number : JY992D95601
Manual revision : A
Date : March 2001

Guidelines for the Safety of the User and Protection of the Programmable Controller

This manual provides information for the use of the FX family of PLC's. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows;

a) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.

b) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.

c) All operators of the completed equipment should be trained to use that product in a safe and coordinated manner in compliance to established safety practices. The operators should also be familiar with documentation which is connected with the actual operation of the completed equipment.

Note : Note: the term 'completed equipment' refers to a third party constructed device which contains or uses the product associated with this manual.

Notes on the Symbols Used in this Manual

At various times through out this manual certain symbols will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of equipment. Whenever any of the following symbols are encountered its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware Warnings

1) Indicates that the identified danger **WILL** cause physical and property damage.

2) Indicates that the identified danger could **POSSIBLY** cause physical and property damage.

3) Indicates a point of further interest or further explanation.

Software Warnings

4) Indicates special care must be taken when using this element of software.

5) Indicates a special point which the user of the associate software element should be aware of.

6) Indicates a point of interest or further explanation.

- Under no circumstances will Mitsubishi Electric be liable responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

Table of Contents

FX1S	FX1N	FX2N	FX2NC

1. Introduction

1.1 Overview

1) Scope of this manual
This manual gives details on all available diagnostic devices for FX1S, FX1N, FX2N and FX2NC programmable controllers (PLCs). It is intended to be used in place of the published data of Chapter 6 'Diagnostic Devices' in the FX Series Programming Manual II, Version A. (JY992D88101A). For all information relating to the PLC hardware and installation, refer to the appropriate manual supplied with the unit. For all other information regarding the programming of the unit, please refer to the FX Series Programming Manual II

2) How to use this manual
This manual covers all the devices of the highest specification Programmable (Logic) Controller (PLC). For this reason, the following indicator is included in relevant section titles to show which PLCs that section applies to;

FX1S	FX1N	FX2N	FX2NC

Shaded boxes indicate the applicable PLC type

- "FX1S" - All FX1S PLCs
- "FX1N" - All FX1N PLCs
- "FX2N" - All FX2N PLCs
- "FX2NC" - All FX2NC PLCs

FX1S	FX1N	FX2N	FX2NC

If an indicator box is half shaded, as shown to the left, this means that not all the functions described in the current section apply to that PLC. The text explains in further detail or makes an independent reference.

If there are no indicator boxes then assume the section applies to all PLC types unless otherwise stated.

3) FX family
This is a generic term which is often used to describe all Programmable Controllers without identifying individual types or model names.

4) CPU version numbers and programming support
As Mitsubishi upgrades each model different versions have different capabilities.
   - Please refer to FX Series Programming Manual II section 1.4 for details about peripheral support for each model.

Memo

2. Diagnostic Devices

FX1S FX1N FX2N FX2NC

The following special devices are used by the PLC to highlight the current operational status and identify any faults or errors that may be occurring. There are some variations in the application of these devices to members of the FX PLC family, these are noted where appropriate.
The Internal diagnostic devices consist of both auxiliary (M) coils and data (D) registers.
Often there is a correlation between both M and D diagnostic devices for example M8039 identifies that the PLC is in constant scan mode but D8039 contains the value or length of the set constant scan.

Devices unable to be set by user:

Any device of type M or D that is marked with a "(✗)" cannot be set by a users program. In the case of M devices this means the associated coil cannot be driven BUT all contacts can be read. For data devices (D) new values cannot be written to the register by a user BUT the register contents can be used in a data comparison.

Default Resetting Devices:

- Certain devices reset to their default status when the PLC is turned from OFF to ON. These are identified by the following symbol "(✍)".

Symbol summary:

- ✗ not able to be set by user
- ✍ automatically reset to default at power ON.
- ✍R Also reset to default when CPU is switched to RUN.
- ✍S Also reset to default when CPU is switched to STOP.

2.1 Device Lists

Device	FX1S	FX1N	FX2N	FX2NC
M8000	✭	✭	✭	✭
M8001	✭	✭	✭	✭
M8002	✭	✭	✭	✭
M8003	✭	✭	✭	✭
M8004	✭	✭	✭	✭
M8005	-	-	✭	✭
M8006	-	-	✭	✭
M8007	-	-	✭	✭
M8008	-	-	✭	✭
M8009	-	-	✭	✭
M8010	Reserved			
M8011	✭	✭	✭	✭
M8012	✭	✭	✭	✭
M8013	✭	✭	✭	✭
M8014	✭	✭	✭	✭
M8015	✭	✭	✭	✭
M8016	✭	✭	✭	✭
M8017	✭	✭	✭	✭
M8018	✭	✭	✭	✭
M8019	✭	✭	✭	✭
M8020	✭	✭	✭	✭
M8021	✭	✭	✭	✭
M8022	✭	✭	✭	✭
M8023	Reserved			
M8024	-	-	✭	✭
M8025	-	-	✭	✭
M8026	-	-	✭	✭
M8027	-	-	✭	✭
M8028	(✭) *1	-	✭	✭
M8029	✭	✭	✭	✭
M8030	-	-	✭	✭
M8031	✭	✭	✭	✭
M8032	✭	✭	✭	✭
M8033	✭	✭	✭	✭
M8034	✭	✭	✭	✭
M8035	✭	✭	✭	✭
M8036	✭	✭	✭	✭
M8037	✭	✭	✭	✭
M8038	✭	✭	✭	✭
M8039	✭	✭	✭	✭
M8040	✭	✭	✭	✭
M8041	✭	✭	✭	✭
M8042	✭	✭	✭	✭
M8043	✭	✭	✭	✭
M8044	✭	✭	✭	✭
M8045	✭	✭	✭	✭
M8046	✭	✭	✭	✭
M8047	✭	✭	✭	✭
M8048	-	-	✭	✭
M8049	-	-	✭	✭

Device	FX1S	FX1N	FX2N	FX2NC
D8000	✭	✭	✭	✭
D8001	✭	✭	✭	✭
D8002	✭	✭	✭	✭
D8003	✭	✭	✭	✭
D8004	✭	✭	✭	✭
D8005	-	-	✭	✭
D8006	-	-	✭	✭
D8007	-	-	✭	✭
D8008	-	-	✭	✭
D8009	-	-	✭	✭
D8010	✭	✭	✭	✭
D8011	✭	✭	✭	✭
D8012	✭	✭	✭	✭
D8013	✭	✭	✭	✭
D8014	✭	✭	✭	✭
D8015	✭	✭	✭	✭
D8016	✭	✭	✭	✭
D8017	✭	✭	✭	✭
D8018	✭	✭	✭	✭
D8019	✭	✭	✭	✭
D8020	✭	✭	✭	✭
D8021	Reserved			
D8022				
D8023				
D8024				
D8025				
D8026				
D8027				
D8028	✭	✭	✭	✭
D8029	✭	✭	✭	✭
D8030	✭	✭	-	-
D8031	✭	✭	-	-
D8032	Reserved			
D8033				
D8034				
D8035				
D8036				
D8037				
D8038				
D8039	✭	✭	✭	✭
D8040	✭	✭	✭	✭
D8041	✭	✭	✭	✭
D8042	✭	✭	✭	✭
D8043	✭	✭	✭	✭
D8044	✭	✭	✭	✭
D8045	✭	✭	✭	✭
D8046	✭	✭	✭	✭
D8047	✭	✭	✭	✭
D8048	Reserved			
D8049	-	-	✭	✭

Note *1: M8028 offers a different functionality for FX1S than it does for FX2N and FX2NC. See page 2-9 for details

Device	FX1S	FX1N	FX2N	FX2NC
M8050	✭	✭	✭	✭
M8051	✭	✭	✭	✭
M8052	✭	✭	✭	✭
M8053	✭	✭	✭	✭
M8054	✭	✭	✭	✭
M8055	✭	✭	✭	✭
M8056	-	-	✭	✭
M8057	-	-	✭	✭
M8058	-	-	✭	✭
M8059	-	-	✭	✭
M8060	-	-	✭	✭
M8061	✭	✭	✭	✭
M8062	-	-	✭	✭
M8063	✭	✭	✭	✭
M8064	✭	✭	✭	✭
M8065	✭	✭	✭	✭
M8066	✭	✭	✭	✭
M8067	✭	✭	✭	✭
M8068	✭	✭	✭	✭
M8069	-	-	✭	✭
M8070	✭	✭	✭	✭
M8071	✭	✭	✭	✭
M8072	✭	✭	✭	✭
M8073	✭	✭	✭	✭
M8074	Reserved			
M8075	-	-	✭	✭
M8076	-	-	✭	✭
M8077	-	-	✭	✭
M8078	-	-	✭	✭
M8079	-	-	✭	✭
M8080	Reserved			
M8081				
M8082				
M8083				
M8084				
M8085				
M8086				
M8087				
M8088				
M8089				
M8090	Reserved			
M8091				
M8092				
M8093				
M8094				
M8095				
M8096				
M8097				
M8098				
M8099	-	-	✭	✭

Device	FX1S	FX1N	FX2N	FX2NC
D8050	Reserved			
D8051				
D8052				
D8053				
D8054				
D8055				
D8056				
D8057				
D8058				
D8059				
D8060	-	-	✭	✭
D8061	✭	✭	✭	✭
D8062	-	-	✭	✭
D8063	✭	✭	✭	✭
D8064	✭	✭	✭	✭
D8065	✭	✭	✭	✭
D8066	✭	✭	✭	✭
D8067	✭	✭	✭	✭
D8068	✭	✭	✭	✭
D8069	✭	✭	✭	✭
D8070	✭	✭	✭	✭
D8071	Reserved			
D8072				
D8073				
D8074			✭	✭
D8075	-	-	✭	✭
D8076	-	-	✭	✭
D8077	-	-	✭	✭
D8078	-	-	✭	✭
D8079	-	-	✭	✭
D8080	-	-	✭	✭
D8081	-	-	✭	✭
D8082	-	-	✭	✭
D8083	-	-	✭	✭
D8084	-	-	✭	✭
D8085	-	-	✭	✭
D8086	-	-	✭	✭
D8087	-	-	✭	✭
D8088	-	-	✭	✭
D8089	-	-	✭	✭
D8090	-	-	✭	✭
D8091	-	-	✭	✭
D8092	-	-	✭	✭
D8093	-	-	✭	✭
D8094	-	-	✭	✭
D8095	-	-	✭	✭
D8096	-	-	✭	✭
D8097	-	-	✭	✭
D8098	-	-	✭	✭
D8099	-	-	✭	✭

Device	FX1S	FX1N	FX2N	FX2NC
M8100	Reserved			
M8101				
M8102				
M8103				
M8104				
M8105				
M8106				
M8107				
M8108				
M8109	-	-	✭	✭
M8110	Reserved			
M8111				
M8112				
M8113				
M8114				
M8115				
M8116				
M8117				
M8118				
M8119				
M8120	Reserved			
M8121	✭	✭	✭	✭
M8122	✭	✭	✭	✭
M8123	✭	✭	✭	✭
M8124	✭	✭	✭	✭
M8125	Reserved			
M8126	✭	✭	✭	✭
M8127	✭	✭	✭	✭
M8128	✭	✭	✭	✭
M8129	✭	✭	✭	✭
M8130	-	-	✭	✭
M8131	-	-	✭	✭
M8132	-	-	✭	✭
M8133	-	-	✭	✭
M8134	Reserved			
M8135				
M8136				
M8137				
M8138				
M8139				
M8140	✭	✭	-	-
M8141	Reserved			
M8142				
M8143				
M8144				
M8145	✭	✭	-	-
M8146	✭	✭	-	-
M8147	✭	✭	-	-
M8148	✭	✭	-	-
M8149	Reserved			

Device	FX1S	FX1N	FX2N	FX2NC
D8100	Reserved			
D8101				
D8102	✭	✭	✭	✭
D8103	Reserved			
D8104				
D8105				
D8106				
D8107				
D8108				
D8109	-	-	✭	✭
D8110	Reserved			
D8111				
D8112				
D8113				
D8114				
D8115				
D8116				
D8117				
D8118				
D8119				
D8120	✭	✭	✭	✭
D8121	✭	✭	✭	✭
D8122	✭	✭	✭	✭
D8123	✭	✭	✭	✭
D8124	✭	✭	✭	✭
D8125	✭	✭	✭	✭
D8126	Reserved			
D8127	✭	✭	✭	✭
D8128	✭	✭	✭	✭
D8129	✭	✭	✭	✭
D8130	-	-	✭	✭
D8131	-	-	✭	✭
D8132	-	-	✭	✭
D8133	-	-	✭	✭
D8134	-	-	✭	✭
D8135	-	-	✭	✭
D8136	✭	✭	✭	✭
D8137	✭	✭	✭	✭
D8138	Reserved			
D8139				
D8140	✭	✭	✭	✭
D8141	✭	✭	✭	✭
D8142	✭	✭	✭	✭
D8143	✭	✭	✭	✭
D8144	Reserved			
D8145	✭	✭	-	-
D8146	✭	✭	-	-
D8147	✭	✭	-	-
D8148	✭	✭	-	-
D8149	Reserved			

Device	FX1S	FX1N	FX2N	FX2NC
M8150	Reserved			
M8151				
M8152				
M8153				
M8154				
M8155				
M8156				
M8157				
M8158				
M8159				
M8160	-	-	✲	✲
M8161	✲	✲	✲	✲
M8162	✲	✲	✲	✲
M8163	Reserved			
M8164	-	-	✲	✲
M8165	Reserved			
M8166				
M8167	-	-	✲	✲
M8168	-	-	✲	✲
M8169	Reserved			
M8170	✲	✲	✲	✲
M8171	✲	✲	✲	✲
M8172	✲	✲	✲	✲
M8173	✲	✲	✲	✲
M8174	✲	✲	✲	✲
M8175	✲	✲	✲	✲
M8176	Reserved			
M8177				
M8178				
M8179				
M8180	Reserved			
M8181				
M8182				
M8183	✲ M504	✲	✲	✲
M8184	✲ M505	✲	✲	✲
M8185	✲ M506	✲	✲	✲
M8186	✲ M507	✲	✲	✲
M8187	✲ M508	✲	✲	✲
M8188	✲ M509	✲	✲	✲
M8189	✲ M510	✲	✲	✲
M8190	✲ M511	✲	✲	✲
M8191	✲ M503	✲	✲	✲
M8192	Reserved			
M8193				
M8194				
M8195				
M8196				
M8197				
M8198				
M8199				

Device	FX1S	FX1N	FX2N	FX2NC
D8150	Reserved			
D8151				
D8152				
D8153				
D8154				
D8155				
D8156				
D8157				
D8158	✲	✲	-	-
D8159	✲	✲	-	-
D8160	Reserved			
D8161				
D8162				
D8163				
D8164	-	-	✲	✲
D8165	Reserved			
D8166				
D8167				
D8168				
D8169				
D8170	Reserved			
D8171				
D8172				
D8173	✲	✲	✲	✲
D8174	✲	✲	✲	✲
D8175	✲	✲	✲	✲
D8176	✲	✲	✲	✲
D8177	✲	✲	✲	✲
D8178	✲	✲	✲	✲
D8179	✲	✲	✲	✲
D8180	✲	✲	✲	✲
D8181	Reserved			
D8182	✲	✲	✲	✲
D8183	✲	✲	✲	✲
D8184	✲	✲	✲	✲
D8185	✲	✲	✲	✲
D8186	✲	✲	✲	✲
D8187	✲	✲	✲	✲
D8188	✲	✲	✲	✲
D8189	✲	✲	✲	✲
D8190	✲	✲	✲	✲
D8191	✲	✲	✲	✲
D8192	✲	✲	✲	✲
D8193	✲	✲	✲	✲
D8194	✲	✲	✲	✲
D8195	✲	✲	✲	✲
D8196	Reserved			
D8197				
D8198				
D8199				

Note;

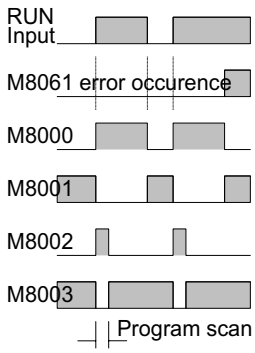
When using an N:N network configuration with the FX1S, M503 to M511 are used in place of the regular M devices as shown above. D208 to D218 are used in place of the regular D devices shown on the next page.

Device	FX1S	FX1N	FX2N	FX2NC
M8200	-	☆	☆	☆
M8201	-	☆	☆	☆
M8202	-	☆	☆	☆
M8203	-	☆	☆	☆
M8204	-	☆	☆	☆
M8205	-	☆	☆	☆
M8206	-	☆	☆	☆
M8207	-	☆	☆	☆
M8208	-	☆	☆	☆
M8209	-	☆	☆	☆
M8210	-	☆	☆	☆
M8211	-	☆	☆	☆
M8212	-	☆	☆	☆
M8213	-	☆	☆	☆
M8214	-	☆	☆	☆
M8215	-	☆	☆	☆
M8216	-	☆	☆	☆
M8217	-	☆	☆	☆
M8218	-	☆	☆	☆
M8219	-	☆	☆	☆
M8220	-	☆	☆	☆
M8221	-	☆	☆	☆
M8222	-	☆	☆	☆
M8223	-	☆	☆	☆
M8224	-	☆	☆	☆
M8225	-	☆	☆	☆
M8226	-	☆	☆	☆
M8227	-	☆	☆	☆
M8228	-	☆	☆	☆
M8229	-	☆	☆	☆
M8230	-	☆	☆	☆
M8231	-	☆	☆	☆
M8232	-	☆	☆	☆
M8233	-	☆	☆	☆
M8234	-	☆	☆	☆
M8235	☆	☆	☆	☆
M8236	☆	☆	☆	☆
M8237	☆	☆	☆	☆
M8238	☆	☆	☆	☆
M8239	☆	☆	☆	☆
M8240	☆	☆	☆	☆
M8241	☆	☆	☆	☆
M8242	☆	☆	☆	☆
M8243	☆	☆	☆	☆
M8244	☆	☆	☆	☆
M8245	☆	☆	☆	☆
M8246	☆	☆	☆	☆
M8247	☆	☆	☆	☆
M8248	☆	☆	☆	☆
M8249	☆	☆	☆	☆
M8250	☆	☆	☆	☆
M8251	☆	☆	☆	☆
M8252	☆	☆	☆	☆
M8253	☆	☆	☆	☆
M8254	☆	☆	☆	☆
M8255	☆	☆	☆	☆

Device	FX1S	FX1N	FX2N	FX2NC
D8200	Reserved			
D8201	☆ D201	☆	☆	☆
D8202	☆ D202	☆	☆	☆
D8203	☆ D203	☆	☆	☆
D8204	☆ D204	☆	☆	☆
D8205	☆ D205	☆	☆	☆
D8206	☆ D206	☆	☆	☆
D8207	☆ D207	☆	☆	☆
D8208	☆ D208	☆	☆	☆
D8209	☆ D209	☆	☆	☆
D8210	☆ D210	☆	☆	☆
D8211	☆ D211	☆	☆	☆
D8212	☆ D212	☆	☆	☆
D8213	☆ D213	☆	☆	☆
D8214	☆ D214	☆	☆	☆
D8215	☆ D215	☆	☆	☆
D8216	☆ D216	☆	☆	☆
D8217	☆ D217	☆	☆	☆
D8218	☆ D218	☆	☆	☆
D8219	Reserved			
D8220	Reserved			
D8221				
D8222				
D8223				
D8224				
D8225				
D8226				
D8227				
D8228				
D8229				
D8230	Reserved			
D8231				
D8232				
D8233				
D8234				
D8235				
D8236				
D8237				
D8238				
D8239				
D8240	Reserved			
D8241				
D8242				
D8243				
D8244				
D8245				
D8246				
D8247				
D8248				
D8249				
D8250	Reserved			
D8251				
D8252				
D8253				
D8254				
D8255				

2.2 PLC Status (M8000 to M8009 and D8000 to D8009)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8000 (✗) RUN monitor NO contact	
M8001 (✗) RUN monitor NC contact	
M8002 (✗) Initial pulse NO contact	
M8003 (✗) Initial pulse NC contact	
M8004 (✗) Error occurrence	ON when one or more error flags from the range M8060 to M8067 are ON
M8005 (✗) Battery voltage Low *(Not FX1S, FX1N)*	On when the battery voltage is below the value set in D8006
M8006 (✗) Battery error latch *(Not FX1S, FX1N)*	Latches the battery Low error
M8007 (✗) Momentary power failure *(Not FX1S, FX1N)*	See note 2
M8008 (✗) Power failure *(Not FX1S, FX1N)*	Power loss has occurred See note 2
M8009 (✗) 24V DC Down *(Not FX1S, FX1N)*	Power failure of 24V DC service supply

Diagnostic Device	Operation
D8000 (✍) Watchdog timer	FX1S, FX1N, FX2N, FX2NC: 200ms See note 1
D8001 (✗) PLC type and version	FX1S: 22 FX1N: 26 E.g. 26100 = FX1N, V1.00 FX2N: 24 FX2NC: 24
D8002 (✗) Memory capacity (see also D8102)	0002: 2K steps (FX1S only) 0004: 4K steps (FX2N, FX2NC) 0008: 8K or 16k steps (FX1N, FX2N, FX2NC)
D8003 (✗) Memory type	00H = Option RAM, 01H = Option EPROM, 02H = Option EEPROM, 0AH = Option EEPROM (protected) 10H = Built-in MPU memory
D8004 (✗) Error number M☆☆☆☆	The contents of this register ☆☆☆☆ identifies which error flag is active, i.e. if ☆☆☆☆ = 8060 identifies M8060
D8005 (✗) Battery voltage *(Not FX1S, FX1N)*	E.g. 36 = 3.6 volts
D8006 (✗) Low battery voltage *(Not FX1S, FX1N)*	The level at which a low battery voltage is detected
D8007 (✗) Power failure count *(Not FX1S, FX1N)*	The number of times a momentary power failure has occurred since power ON.
D8008 Power failure detection. *(Not FX1S, FX1N)*	The time period before shut down when a power failure occurs (default 10ms) See note 2
D8009 (✗) 24V DC failed device *(Not FX1S, FX1N)*	Lowest device affected by 24V DC power failure

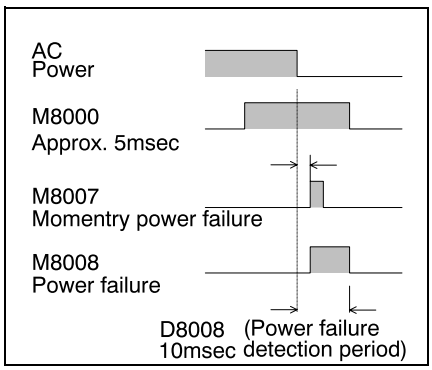
For symbol key see page 2-1.

Note 1:

- The contents of this register can be changed by the user. Settings in 1 msec steps are possible. The value should be set greater than the maximum scan time (D8012) to ensure constant scan operation.

Note 2:

- When the power supply used is 200V AC, the power down detection period is determined by the value of D8008. This can be altered by the user within the allowable range of 10 to 100msec.



2.3 Clock Devices (M8010 to M8019 and D8010 to D8019)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8010	Reserved
M8011 (✗) 10 msec clock pulse	Oscillates in 10 msec cycles
M8012 (✗) 100 msec clock pulse	Oscillates in 100 msec cycles
M8013 (✗) 1 sec clock pulse	Oscillates in 1 sec cycles
M8014 (✗) 1 min clock pulse	Oscillates in 1 min cycles

Diagnostic Device	Operation
D8010 (✗) Present scan time	Current operation cycle / scan time in units of 0.1 msec (waiting time for constant scan mode is included)
D8011 (✗) Minimum scan time	Minimum cycle/ scan time in units of 0.1 msec (waiting time for constant scan mode is included)
D8012 (✗) Maximum scan time	Maximum cycle/ scan time in units of 0.1 msec (waiting time for constant scan mode is included)

The following devices apply to FX2N, FX1N and FX1S PLC's as standard and to the FX2NC PLC when a real time clock option board installed.

M8015 Time setting	When ON - clock stops, ON ⇨ OFF restarts clock
M8016 Register data	When ON D8013 to 19 are frozen for display but clock continues
M8017 Min. rounding	When pulsed ON set RTC to nearest minute
M8018 (✗) RTC available	When ON Real Time Clock is installed
M8019 Setting error	Clock data has been set out of range

D8013 Seconds	Seconds data for use with an RTC (0 - 59)
D8014 Minute data	Minute data for use with an RTC (0-59)
D8015 Hour data	Hour data for use with an RTC (0-23)
D8016 Day data	Day data for use with an RTC (1-31)
D8017 Month data	Month data for use with an RTC (1-12)
D8018 Year data	Year data for use with an RTC (00-99 or 1980-2079, can be selected)
D8019 Weekday data	Weekday data for use with an RTC (0-6)

For symbol key see page 2-1.

2.4 Operation Flags (M8020 to M8029 and D8020 to D8029)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8020 (✗) Zero	Set when the result of an ADD (FNC 20) or SUB (FNC 21) is "0"
M8021 (✗) Borrow	Set when the result of a SUB (FNC 21) is less than the min. negative number
M8022 (✍) Carry	Set when 'carry' occurs during an ADD (FNC 20) or when an overflow occurs as a result of a data shift operation
M8024 *(Not FX1S, FX1N)*	BMOV (FNC 15) reverse mode. See note 3
M8025 *(Not FX1S, FX1N)*	When ON HSC (FNC 53 - 55) instructions are processed even when the external HSC reset input is activated
M8026 *(Not FX1S, FX1N)*	RAMP (FNC 67) hold mode
M8027 *(Not FX1S, FX1N)*	PR (FNC 77) 16 element data string
M8028 **Note:** *Separate FX1S and FX2N/2NC operation (Not FX1N)*	FX1S: Change timers T32 ~ T62 to 10ms type FX2N, FX2NC:Permit FROM/TO to interrupt program. (V3.00 and above)
M8029 (✗) Instruction execution complete	Set on the completion of operations such as DSW (FNC 72), RAMP (FNC 67) etc.

Diagnostic Device	Operation
D8020 (✍) *See note 4*	Input filter setting for devices; X000 to X017 (FX2N,FX2NC) default value = 10 msec, zero value = 50 µsec (X000, X001: 20 µsec) X000 to X007 (FX1S,FX1N) default value = 10msec zero value = 50 µsec (X000, X001: 10 µsec)
D8021 (✍) *(Not FX1N, FX@N, FX2NC See note 4*	Input filter setting for devices; X010 to X017 (FX1S) default value = 10 msec, zero value = 50 µsec
D8022 -D8027	Reserved
D8028 (✗)	Current value of the Z0 index register See note 5
D8029 (✗)	Current value of the V0 index register See note 5

For symbol key see page 2-1.

Note 3

- If M8024 is used with a BMOV (FNC 15) instruction, it will operate as follows;
  M8024 OFF - Normal operation (Forwarding direction is [S] to [D])
  M8024 ON - Reverse operation (Forwarding direction becomes [D] to [S])
  This device is not supported in FX1S and FX1N

Note 4

- The settings for input filters only apply to the main processing units which use 24V DC inputs. AC input filters are not adjustable.

Note 5

- For Z1~Z7 and V1~V7 (D8128~D8195) please see page 2-20.

2.5 PLC Operation Mode (M8030 to M8039 and D8030 to D8039)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
M8030 (✍) Battery LED OFF *(Not FX1S, FX1N)*	Battery voltage is low but BATT.V LED not lit
M8031 (✍) Non-latch memory all clear	Current device settings are reset at next END, i.e. contacts, coils and current data values for Y, M, S, T, C and D devices respectively. Special devices and file registers which have default settings are refreshed with those defaults
M8032 (✍) Latch memory all clear	
M8033 (✍) Memory hold in 'stop' mode	The device statuses and settings are retained when the PLC changes from RUN to STOP and back into RUN
M8034 (✍) All outputs disable	All of the physical switch gear for activating outputs is disabled. However, the program still operates normally.
M8035 (✍S) Forced operation mode	By using forced operation mode, i.e.M8035 is turned ON, it is possible to perform remote RUN/STOP or pulsed RUN/ STOP operation. Please see Chapter 10 (Programming Manual II) for example operation
M8036 (✍S) Forced RUN signal	
M8037 (✍S) Forced STOP signal	
M8038 N to N networking	For the setting of devices when using an N to N network
M8039 (✍) Constant scan mode	When ON the PLC executes the user program within a constant scan duration. The difference between the actual end of the program operation and the set constant scan duration causes the PLC to 'pause'.

→

Diagnostic Device	Operation
D8030 (✗) *(Not FX2N, FX2NC)*	Value read from first setting "pot" in msec, (0 to 255)
D8031 (✗) *(Not FX2N, FX2NC)*	Value read from second setting "pot" in msec, (0 to 255)
D8032 -D8038	Reserved
D8039 (✍) Constant scan duration	This register can be written to by the user to define the duration of the constant scan. Resolutions of 1msec are possible. This register has a default setting 0 msec which will be initiated during power ON.

For symbol key see page 2-1.

2.6 Step Ladder (STL) Flags (M8040 to M8049 and D8040 to D8049)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
M8040 (✍) STL transfer disable	When ON STL state transfer is disabled
M8041 (✍S) Transfer start	When ON STL transfer from initial state is enabled during automatic operation (ref. IST FNC 60)
M8042 (✍) Start pulse	A pulse output is given in response to a start input (ref. IST FNC 60)
M8043 (✍S) Zero return complete	On during the last state of ZERO RETURN mode (ref. IST FNC 60)
M8044 (✍S) Zero point condition	ON when the machine zero is detected (ref. IST FNC 60)
M8045 (✍) All output reset disable	Disables the 'all output reset' function when the operation mode is changed (ref. IST FNC 60)
M8046 (✗) STL state ON	ON when STL monitoring has been enabled (M8047) and there is an active STL state
M8047 (✍) Enable STL monitoring	When ON D8040 to D8047 are enabled for active STL step monitoring
M8048 (✗) Annunciator ON *(Not FX1S, FX1N)*	ON when Annunciator monitoring has been enabled (M8049) and there is an active Annunciator flag
M8049 (✍) Enable Annunciator monitoring *(Not FX1S, FX1N)*	When ON D8049 is enabled for active Annunciator state monitoring

Diagnostic Device	Operation
D8040 (✗) Lowest active STL step	Up to 8 active STL states, from the range S0 to S899, are stored in D8040 to D8047 in ascending numerical order. (Updated at END)
D8041 (✗) 2nd active STL state	
D8042 (✗) 3rd active STL state	
D8043 (✗) 4th active STL state	
D8044 (✗) 5th active STL state	
D8045 (✗) 6th active STL state	
D8046 (✗) 7th active STL state	
D8047 (✗) 8th active STL state	
D8048	Reserved
D8049 (✗) Lowest active Annunciator *(Not FX1S, FX1N)*	Stores the lowest currently active Annunciator from the range S900 to S999 (Updated at END)

For symbol key see page 2-1.

General note:

- M8046 to M8049 STL states are updated when the END instruction is executed.

2.7 Interrupt Control Flags (M8050 to M8059 and D8050 to D8059)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
M8050 (✍) I00❑ disable	When the EI (FNC 04) instruction is driven in the user program, all interrupts are enabled unless the special M devices noted here are driven ON. In that case for each special M coil that is ON, the associated interrupt is disabled, i.e. will not operate. Note ❑❑ denotes all types of that interrupt
M8051 (✍) I10❑ disable	
M8052 (✍) I20❑ disable	
M8053 (✍) I30❑ disable	
M8054 (✍) I40❑ disable	
M8055 (✍) I50❑ disable	
M8056 (✍) I6❑❑ disable *(Not FX1S, FX1N)*	
M8057 (✍) I7❑❑ disable *(Not FX1S, FX1N)*	
M8058 (✍) I8❑❑ disable *(Not FX1S, FX1N)*	
M8059(✍) I010 to I060 disabled as a single group *(Not FX1S, FX1N)*	I010 ~ I060 is disabled for high speed counter interrupt (FNC53) When this flag is ON, the associated interrupt is disabled and therefore will not operate.

Diagnostic Device	Operation
D8050 -D8059	Reserved

For symbol key see page 2-1.

2.8 Error Detection Devices (M8060 to M8069 and D8060 to D6069)

FX1S | FX1N | FX2N | FX2NC

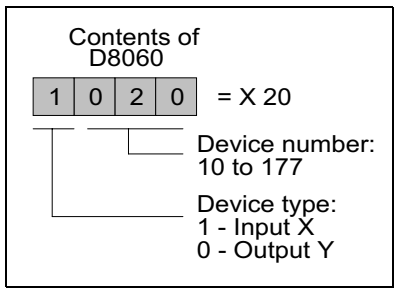
Diagnostic Device	Operation: Detection ON-OFF	Operation: Detection OFF-ON	Operation: Detection Other	Operation: PROG.E LED	Operation: PLC STATUS
M8060 (✗) I/O configuration error *(Not FX1S, FX1N)*	✓	✓	While the PLC is in RUN	OFF	RUN
M8061 (✗) PLC hardware error	✓	-		ON	STOP
M8062 (✗) PC/HPP comms error on programming port *(Not FX1S, FX1N)*	-	-	When a signal from the programming port is received	OFF	RUN
M8063(✗)(R) Parallel link/ RS232-C and RS485 (422) comms error on optional port			When a signal from the optional port is received		
M8064 (✗) Parameter error	✓	✓	When the program is changed (PLC in STOP) and when a program is transferred (PLC in STOP)	Flash	STOP
M8065 (✗) Syntax error					
M8066 (✗) Program error					
M8067(✗)(R) Operation error	-	-	While in PLC is in RUN	OFF	RUN
M8068 (R) Operation error latch					
M8069 (R) I/O bus error *(Not FX1S, FX1N)*			See note 7	-	-

Diagnostic Device	Operation
D8060 (✗) *(Not FX1S, FX1N)*	The first I/O number of the unit or block causing the error - See note 6
D8061 (✗)	Error code for hardware error - See appropriate error code table
D8062 (✗) *(Not FX1S, FX1N)*	Error code for PC/HPP Communications error - See appropriate error code table
D8063(✗)(-R)	Error code for parallel link error - See FX communication users manual
D8064 (✗)	Error code identifying parameter error - See appropriate error code table
D8065 (✗)	Error code identifying syntax error - See appropriate error code table
D8066 (✗)	Error code identifying program construction error See appropriate error code table
D8067(✗)(R)	Error code identifying operation error. See appropriate error code table
D8068 (R)	Operation error step number latched
D8069(✗)(R)	Step numbers for found errors corresponding to flags M8065 to M8067

For symbol key see page 2-1.

- Please see the following page for the notes referenced in this table.

Note 6:



•If the unit or block corresponding to a programmed I / O number is not actually loaded, M8060 is set to ON and the first device number of the erroneous block is written to D8060.

Note 7:

•An I/O bus check is executed when M8069 is turned ON. If an I/O bus error occurs, error code 6103 is written to D8069 and M8061 is turned ON.
If an Extension unit 24V failure occurs, error code 6104 is written to D8061 and M8061 is turned ON. M8009 will then be turned ON and the I/O address of the lowest numbered device affected by the 24V DC power failure is written to D8009

General note:

•HPP refers to Handy programming panel.

2.9 Link and Special Operation Devices (M8070 to M8099 and D8070 to D8099)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
M8070 (✍R)	Driven when the PLC is a master station in a parallel link application
M8071 (✍R)	Driven when the PLC is a slave station in a parallel link application
M8072 (✗)	ON while the PLC is operating in a parallel link
M8073 (✗)	ON when M8070/ M8071 are incorrectly set during parallel link operations
M8074	Reserved
M8075 *(Not FX1S, FX1N)*	When executing Sampling trace in GX-Developer or FX-PCS/WIN-E, these devices are used by the PLC internal system
M8076 *(Not FX1S, FX1N)*	
M8077 *(Not FX1S, FX1N)*	ON during sampling trace
M8078 *(Not FX1S, FX1N)*	ON when sampling trace complete
M8079 *(Not FX1S, FX1N)*	When executing Sampling trace in GX-Developer or FX-PCS/WIN-E, this device is used by the PLC internal system
M8080 -M8098	Reserved
M8099 (✍) *(Not FX1S, FX1N)*	High speed free timer operation When ON, continue counting free ring timer (D8099)

→

Diagnostic Device	Operation
D8070 (✗)	Parallel link watchdog time - 500 msec
D8071 - D8073	Reserved
D8074 *(Not FX1S, FX1N)*	When executing Sampling trace in GX-Developer or FX-PCS/WIN-E, these devices are used by the PLC internal system
D8075 *(Not FX1S, FX1N)*	
D8076 *(Not FX1S, FX1N)*	
D8077 *(Not FX1S, FX1N)*	
D8078 *(Not FX1S, FX1N)*	
D8079 *(Not FX1S, FX1N)*	
D8080 to D8095 *(Not FX1S, FX1N)*	
D8096 to D8098 *(Not FX1S, FX1N)*	
D8099 *(Not FX1S, FX1N)*	Free ring timer, range: 0-32,767 in units of 0.1 msec (for use in measuring high speed pulse input durations) See section 10.9.2 FX Programming manual II

For symbol key see page 2-1.

2.10 Miscellaneous Devices (M8100 to M8119 and D8100 to D8119)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8109 (✗) *(Not FX1S, FX1N)*	Output refresh error

Diagnostic Device	Operation
D8102 (✗) Memory Capacity	0002: 2K steps (FX1S only) 0004: 4K steps (FX2N, FX2NC) 0008: 8K steps (FX1N, FX2N, FX2N) 0016: 16K steps (FX2N, FX2NC)
D8109 (✗) *(Not FX1S, FX1N)*	Output refresh error, lowest device number; 0, 10, 20, etc.

2.11 Communication Adapter Devices, i.e. 232ADP, 485ADP (M8120 to M8129 and D8120 to D8129)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8120	Reserved
M8121(✗)(✍R)	Data transmission delayed (RS instruction)
M8122 (✍R)	Data transmission flag (RS instruction)
M8123 (✍R)	Finished receiving data (RS instruction)
M8124(✗)	Carrier detection flag (RS instruction)
M8125	Reserved
M8126	Global flag (Computer link)
M8127 (✍)	On Demand handshake flag (Computer link)
M8128 (✍)	On Demand error flag (Computer link)
M8129 (✍)	On Demand Byte/Word changeover (Computer link), Time out evaluation flag (RS instruction)

Diagnostic Device	Operation
D8120	Communications format (RS instruction, Computer link)
D8121	Station number setting (Computer link)
D8122(✗)(✍R)	Amount of remaining data to be transmitted (RS instruction)
D8123(✗)(✍R)	Amount of data already received (RS instruction)
D8124 (✍)	Data header, default STX (02H) (RS instruction)
D8125 (✍)	Data terminator, default ETX (03H) (RS instruction)
D8126	Reserved
D8127 (✍)	On Demand head device register (Computer link)
D8128 (✍)	On Demand data length register (Computer link)
D8129	Data network 'time-out' timer value (RS instruction, Computer link)

For symbol key see page 2-1.

2.12 High Speed Zone Compare Table Comparison Flags (M8130 to M8148 and D8130 to D8148)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
M8130 *(Not FX1S, FX1N)* See note 8	Selects comparison tables to be used with the HSZ instruction
M8131 (✗)(✍) *(Not FX1S, FX1N)* See note 8	ON when the HSZ comparison table has been completed.
M8132 *(Not FX1S, FX1N)* See note 8	Selects the use of the PLSY instruction with the HSZ comparison tables
M8133 (✗)(✍) *(Not FX1S, FX1N)* See note 8	ON when the HSZ comparison table (when used with the PLSY instruction) has been completed.
M8134- M8139	Reserved

Diagnostic Device	Operation
D8130 (✗)(✍) *(Not FX1S, FX1N)*	Contains the number of the current record being processed in the HSZ comparison table
D8131 (✗)(✍) *(Not FX1S, FX1N)*	Contains the number of the current record being processed in the HSZ comparison table when the PLSY operation has been enabled
D8132 D8133 (✗)(✍) *(Not FX1S, FX1N)*	Contains the source (output pulse frequency) data for the PLSY instruction when used with the HSZ comparison table
D8134 D8135 (✗) (✍) *(Not FX1S, FX1N)*	Contains a copy of the value for the current comparison when the HSZ comparison table and combined PLSY output are used. This data is only available in 32 bit or double word format.
D8136 D8137 (✗) (✍)	Contains the total number of pulses that have been output using the PLSY (or PLSR) instruction on Y000 and Y001. This data is only available in 32 bit or double word format
D8138 - D8139	Reserved

Note 8

- See section 5.6.6 in FX Programming Manual II for full explanation and use.

Diagnostic Device	Operation
M8140 (✗)(✍) *(Not FX2N, FX2NC)*	When ON, clears pulse output in FNC156(ZRN) instruction
M8141 to M8144	Reserved
M8145 (✍) *(Not FX2N, FX2NC)*	Y000 Pulse output stop command
M8146 (✍) *(Not FX2N, FX2NC)*	Y001 Pulse output stop command
M8147 (✗) *(Not FX2N, FX2NC)*	Y000 Pulse output monitor (Busy/Ready)
M8148 (✗) *(Not FX2N, FX2NC)*	Y001 Pulse output monitor (Busy/Ready)

Diagnostic Device	Operation
D8140 D8141 (✗) (✍)	Contains the total number of pulses that have been output to Y0 using the PLSY or PLSR instructions. This data is only available in 32 bit or double word format.
D8142 D8143 (✗) (✍)	Contains the total number of pulses that have been output to Y1 using the PLSY or PLSR instructions. This data is only available in 32 bit or double word format.
D8145 (✍) *(Not FX2N, FX2NC)*	FNC156(ZRN), FNC158(DRVI), FNC159(DRVA) Bias value setting (default:0)
D8146 (✍) *(Not FX2N, FX2NC)*	FNC156(ZRN), FNC158(DRVI), FNC159(DRVA) Max. speed setting (default:100,000)
D8147 (✍) *(Not FX2N, FX2NC)*	
D8148 (✍) *(Not FX2N, FX2NC)*	FNC156(ZRN), FNC158(DRVI), FNC159(DRVA) Acceleration/ Deceleration time setting (default:100)

For symbol key see page 2-1

2.13 Miscellaneous Devices (M8160 to M8199)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
M8160 (✍) *(Not FX1S, FX1N)*	Selection of XCH operation to swap bytes in a single data word
M8161 (✍)	Selection of 8 bit operations for applied instructions ASC, RS, ASCI, HEX, CCD
M8162 (✍)	High speed mode for Parallel link, 2 data words Read/write only
M8164 (✍) *(Not FX1S, FX1N)*	When ON, a value in D8164 is used as the number of FROM/TO exchange points. (FX2N/2NC CPU Version 2.00 and above)
M8167 (✍) *(Not FX1S, FX1N)*	Selection of hexadecimal input mode for the HKY instruction
M8168 (✍) *(Not FX1S, FX1N)*	Selection of BCD mode for use with the SMOV instruction
M8169	Reserved
M8170 (✍R) X0 pulse catch	When the leading edge of a pulse is received at an input from the range X0 to X5 the associated M device detailed here is set ON. By resetting the same device within the user program the next pulse occurrence will again set the M coil ON. Hence, fast input pulses are 'caught' and stored. This operation requires the EI (FNC04) instruction to be active. For details see page 2-12
M8171 (✍R) X1 pulse catch	
M8172 (✍R) X2 pulse catch	
M8173 (✍R) X3 pulse catch	
M8174 (✍R) X4 pulse catch	
M8175 (✍R) X5 pulse catch	

Diagnostic Device	Operation
M8176 -M8199	Reserved

For symbol key see page 2-1.

2.14 Miscellaneous devices (D8158 to D8164) and Index Registers (D8182 to D8199)

FX1S FX1N FX2N FX2NC

Diagnostic Device	Operation
D8158 (✍) *(Not FX2N, FX2NC)*	Control device for FX1N-5DM*1 Default: k-1
D8159 (✍) *(Not FX2N, FX2NC)*	Control device for FX1N-5DM*1 Default: k-1
D8164 (✍) *(Not FX1S, FX1N)*	Number of FROM/TO exchange points (FX2N/2NC CPU Version 2.00 and above)
D8181 (✗)	Reserved
D8182 (✗)	Value of Z1 index register
D8183 (✗)	Value of V1 index register
D8184 (✗)	Value of Z2 index register
D8185 (✗)	Value of V2 index register
D8186 (✗)	Value of Z3 index register

Diagnostic Device	Operation
D8187 (✗)	Value of V3 index register
D8188 (✗)	Value of Z4 index register
D8189 (✗)	Value of V4 index register
D8190 (✗)	Value of Z5 index register
D8191 (✗)	Value of V5 index register
D8192 (✗)	Value of Z6 index register
D8193 (✗)	Value of V6 index register
D8194 (✗)	Value of Z7 index register
D8195 (✗)	Value of V7 index register

For symbol key see page 2-1.

*1 See Chapter 10.19.2, FX Programming Manual II (JY992D88101)

2.15 N:N Network Related Flags and Data Registers

FX1S	FX1N	FX2N	FX2NC

Note: Functionalily available for FX2N CPU Version 2.00 and above

Diagnostic Device	Operation
M8183 (✗) (For FX1S use M504)	ON when communication error in master station
M8184 (✗) (For FX1S use M505)	ON when communication error in 1st slave station
M8185 (✗) (For FX1S use M506)	ON when communication error in 2nd slave station
M8186 (✗) (For FX1S use M507)	ON when communication error in 3rd slave station
M8187 (✗) (For FX1S use M508)	ON when communication error in 4th slave station
M8188 (✗) (For FX1S use M509)	ON when communication error in 5th slave station
M8189 (✗) (For FX1S use M510)	ON when communication error in 6th slave station
M8190 (✗) (For FX1S use M511)	ON when communication error in 7th slave station
M8191 (✗) (For FX1S use M503)	ON when communicating to another station

Diagnostic Device	Operation
D8173 (✗)	Station number
D8174 (✗)	Total number of slave stations
D8175 (✗)	Refresh range
D8176 See note 10	Station number setting Default value k0
D8177 See note 10	Total number of slave stations setting Default value k7
D8178 See note 10	Refresh range setting Default value k0
D8179 See note 10	Retry count setting Default value k3
D8180 See note 10	Comms time-out setting Default value k5
D8201 (✗) (For FX1S use D201)	Current network scan time
D8202 (✗) (For FX1S use D202)	Maximum network scan time
D8203 (✗) (For FX1S use D203)	Number of communication error at master station
D8204 to D8210 (✗) (For FX1S use D204 to D210)	Number of communication error at respective slave station
D8211 (✗) (For FX1S use D2113)	Code of communication error at master station
D8212 to D8218 (✗) (For FX1S use D212 to D218)	Code of communication error at respective slave station

Note 9

- Devices M503-M511 and D201-D255 in the FX1S cannot be applied to other functions in the user program. These devices are used exclusively for the N:N Network.

Note 10

- When these devices are not being used for an N:N Network their respective default vaues are all ‘0’. The relavent default values are assumed at each power ON.

2.16 Up/Down Counter Control (M8200 to M8234 and D8219 to D8234)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8200 - M8234 (✍)	When M8☆☆☆ is operated, counter C☆☆☆ functions as a down counter. When M8☆☆☆ is not operated the associated counter operates as an up counter

Diagnostic Device	Operation
D8219 -D8234	Reserved

For symbol key see page 2-1.

2.17 High Speed Counter Control (M8235 to M8255 and D8235 to D8255)

FX1S | FX1N | FX2N | FX2NC

Diagnostic Device	Operation
M8235 -M8245 (✍)	When M8☆☆☆ is operated, the 1 phase high speed counter C☆☆☆ functions as a down counter. When M8☆☆☆ is not operated the associated counter operates as an up counter. The available counters depends upon the PLC type.
M8246 - M8255 (✗)(✍)	When M8☆☆☆ is operated, the 2 phase high speed counter C☆☆☆ functions as a down counter. When M8☆☆☆ is not operated the associated counter operates as an up counter. The available counters depends upon the PLC type.

Diagnostic Device	Operation
D8235 -D8255	Reserved

For symbol key see page 2-1.

2.18 Error Code Tables

FX1S FX1N FX2N FX2NC

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8061 **PLC Hardware error**	0000	No error	Check the cable connection between the extension unit/block and the PLC
	6101	RAM error	
	6102	Operation circuit error	
	6103	I/O bus error (M8069 = ON)	
	6104	Extension unit 24V failure (M8069=ON)	
	6105	Watch Dog Timer error	Scan time has exceeded the WDT time value set in D8000. Check user program.

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8062 **PC/HPP communication error** **(Not FX1S, FX1N)**	0000	No error	Check the cable connection between the programming device and the PLC
	6201	Parity/ overrun/ framing error	
	6202	Communications character error	
	6203	Communication data sum check error	
	6204	Data format error	
	6205	Command error	

Error Detection Device	Stored Error Number	Associated Meaning	Note
D8063 **Serial communication errors**	0000	No error	Check communication settings, parameters and applicable devices. (Computer link, N:N network, Parallel link etc.) Refer to FX Communication Users Manual for wiring techniques
	6301	Parity/ overrun/ framing error	
	6302	Comms character error	
	6303	Comms data sum check error	
	6304	Comms data format error	
	6305	Command error Computer link - received command other than GW (global) when station number was FF	
	6306	Watchdog timer error	
	6312	Parallel link character error	
	6313	Parallel link data sum check error	
	6314	Parallel link data format error	

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8064 **Parameter error**	0000	No error	STOP the PLC, check parameter, if incorrect change to a suitable value
	6401	Program sum check error	
	6402	Memory capacity setting error	
	6403	Latched device area setting error	
	6404	Comment area setting error	
	6405	File register area setting error	
	6406 - 6408	Reserved	
	6409	Other setting error	

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8065 **Syntax error**	0000	No error	During programming, each instruction is checked as it is entered. If a syntax error is detected, re-enter the instruction correctly
	6501	Incorrect instruction/ device symbol/ device number combination	
	6502	No timer or counter coil before setting value	
	6503	1)No setting value following either a timer or a counter coil 2)Insufficient number of operands for an applied instruction	
	6504	1)The same label number is used more than once 2)The same interrupt input or high speed counter input is used more than once	
	6505	Device number is outside the allowable range	
	6506	Invalid applied instruction	
	6507	Invalid Pointer device [P] assignment for Jump or Call instruction	
	6508	Invalid Interrupt pointer device [I] assignment	
	6509	Other error	
	6510	MC nesting (N) number error	
	6511	The same interrupt input or high speed counter input is used more than once	

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8066 **Circuit error**	0000	No error	A circuit error occurs if a combination of instructions is incorrect or badly specified. Select programming mode and correct the identified error.
	6601	LD and LDI is used continuously 9 or more times in succession	
	6602	1)No LD/ LDI instruction. The use of LD/LDI or ANB/ORB instruction is incorrect. 2)The following instructions are not connected to the active bus line: STL, RET, MCR, (P)ointer, (I)nterrupt, EI, DI, SRET, IRET, FOR, NEXT, FEND and END 3)When MPP is missing	
	6603	MPS is used continuously more than 12 times	
	6604	The use of MPS, MRD, MPP instruction is incorrect.	
	6605	1)The STL instruction is continuously used 9 times or more 2)MC, MCR instruction, (I)nterrupt pointer or SRET instruction is used within an STL program area 3)RET has not been used in the program or is not connected to an STL instruction	
	6606	1)No (P)ointer, (I)nterrupt pointer 2)No SRET/ IRET 3)An (I)nterrupt pointer, SRET or IRET has been used within the main program 4)STL, RET, MC or MCR have been used within either a subroutine or an interrupt routine	
	6607	1)The use of FOR and NEXT is incorrect 2)The following instructions have been used within a FOR -NEXT loop: STL, RET, MC, MCR, IRET, SRET, FEND or END	
	6608	1)The use of MC/ MCR is incorrect 2)Missing MCR N0 3)SRET, IRET instruction or an (I)nterrupt pointer has been used within an MC/ MCR instruction area	
	6609	Other error	

Continued on next page...

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8066 **Circuit error**	6610	LD, LDI is used continuously 9 or more times in succession	A circuit error occurs if a combination of instructions is incorrect or badly specified. Select programming mode and correct the identified error.
	6611	Number of LD/LDI instructions is more than ANB/ORB instructions	
	6612	Number of LD/LDI instructions is less than ANB/ORB instructions	
	6613	MPS is used continuously more than 12 times	
	6614	MPS instruction missing	
	6515	MPP instruction missing	
	6616	Unauthorized use of the MPS/ MRD/ MPP instructions; possible coil missing	
	6617	One of the following instructions is not connected to the active bus line: STL, RET, MCR, (P)ointer, (I)nterrupt pointer, EI, DI, SRET, IRET, FOR, NEXT, FEND and END	
	6618	STL, RET, MC or MCR programmed within either a subroutine or an interrupt routine	
	6619	Invalid instruction programmed within a FOR - NEXT loop: STL, RET, MC, MCR,(I)nterrupt pointer, IRET and SRET	
	6620	FOR - NEXT instruction nesting levels (5) exceeded	
	6621	The number of FOR and NEXT instructions does not match	
	6622	NEXT instruction not found	
	6623	MC instruction not found	
	6624	MCR instruction not found	
	6625	The STL instruction is continually used 9 times or more	
	6626	Invalid instruction programmed within an STL - RET program area: MC, MCR, (I)nterrupt pointer, IRET and SRET	
	6627	RET instruction not found	
	6628	(I)nterrupt pointer, SRET and IRET incorrectly programmed within main program	
	6629	(P)ointer or (I)nterrupt pointer label not found	
	6630	SRET or IRET not found	
	6631	SRET programmed in invalid location	
	6632	IRET programmed in invalid location	

Error Detection Device	Stored Error Number	Associated Meaning	Action
D8067 **Operation error**	0000	No error	These error occur during the execution of an operation. When an operation error occurs, STOP the PLC enter programming ode and correct the fault. Note: operation errors can occur even when the syntax or circuit design is correct, e.g. D500Z is a valid statement within an FX1N PLC. But if Z had a value of 10000, the data register D10500 would be attempted to be accessed. This will cause an operation error as there is no D10500 device available.
	6701	1)No jump destination (pointer) for CJ or CALL instructions 2)(P)ointer is designated in a block that comes after the END instruction 3)An independent label is designated in a FOR-NEXT loop or a subroutine	
	6702	6 or more CALL instruction nesting levels have been used	
	6703	3 or more interrupt nesting levels have been used	
	6704	6 or more FOR - NEXT instruction nesting levels have been used	
	6705	An incompatible device has been specified as an operand for an applied instruction	
	6706	A device has been specified outside of the allowable range for an applied instruction operand	
	6707	A file register has been accessed which is outside of the users specified range	
	6708	FROM/ TO instruction error	
	6709	Other error, i.e. missing IRE/ SRET, unauthorized FOR - NEXT relationship	
D8067 **PID Operation error**	6730	Sampling time T_S (T_S<0 or >32767)	The identified parameter is specified outside of its allowable range Execution ceases PID instruction must be reset before execution will resume
	6732	Input filter value α (α<0 or >=101)	
	6733	Proportional gain K_P (K_P<0 or >32767)	
	6734	Integral time constant T_I (T_I<0 or >32767)	
	6735	Derivative gain K_D (K_D<0 or >=101)	
	6736	Derivative time constant T_D (T_D<0 or >32767)	
	6740	Sampling time TS is less than the program scan time.	TS is set to program scan time - Execution will continue.
	6742	Current value Δ exceeds its limits	Data affected resets to the nearest limit value. For all errors except 6745, this will either be a minimum of -32768 or a maximum of +32767. Execution will continue, but user should reset PID instruction.
	6743	Calculated error ε exceeds its limits	
	6744	Integral result exceeds its limits	
	6745	Derivative gain over, or differential value exceeds allowable range	
	6746	Derivative result exceeds its limits	
	6747	Total PID result exceeds its limits	
	6750	SV - PV_{nf} < 150, or system is unstable (SV - PV_{nf} has wide, fast variations)	The error fluctuation is outside the normal operation limits for the PID instruction. Execution ceases. PID instruction must be reset.
	6751	Large Overshoot of the Set Value	
	6752	Large fluctuations during Autotuning Set Process	

Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation, use and/or programming of the products associated with this manual.
All examples and diagrams shown in this manual are intended as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
Owing to the very great variety of possible applications, users must satisfy themselves as to the suitability of each specific application.

SUPLEMENTARY MANUAL

FX SERIES PROGRAMMING MANUAL II (JY992D88101A)

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