

PROGRAMMABLE CONTROLLERS

FX2NC-1HC

USER'S MANUAL

JY997D30701

April 2015

Manual Number

Revision

Date

JY997D30701C



This manual describes the part names, dimensions, mounting, wiring, and specifications of the product. Before use, read this manual and the manuals of all relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions.

Store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user.

Registration:

The company and product names described in this manual are registered trademarks or the trademarks of their respective companies

Effective April 2015

Specifications are subject to change without notice © 2007 Mitsubishi Electric Corpora

Safety Precaution (Read these precautions before use.)

This manual classifies the safety precautions into two categories:

AWARNING and CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on the circumstances, procedures indicated by ACAUTION also cause severe injury.

It is important to follow all precautions for personal safety

Associated Manuals

Manual name	Manual No.	Description	
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains the FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.	
FX3S/FX3G/FX3GC/FX3U/ FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.	
FX2NC (DSS/DS) Series Hardware Manual	JY992D76401 MODEL CODE: 09R509	Explains the FX2NC (DSS/DS) Series PLC specifications for I/O, wiring, installation, and maintenance.	
FX2NC (D/UL) Series Hardware Manual	JY992D87201	Explains the FX2NC (D/UL) Series PLC specifications for I/O, wiring, installation, and maintenance.	
FX Series Programming Manual II	JY992D88101 MODEL CODE: 09R512	Describes FX1S/FX1N/FX2N/ FX2NC Series PLC programming for basic/applied instructions and devices.	

How to obtain manuals

For product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased your product.

Certification of UL, cUL standards The following product has UL and cUL certification. III cIII File Number E95239 Models: MELSEC FX2NC series manufactured from December 1st, 2007 FX2NC-1HC

Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards. Compliance to EMC directive and LVD directive for the entire mechanical module should be checked by the user / manufacturer. For more details please contact the local Mitsubishi Electric sales site

Requirement for Compliance with EMC directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Attention

· This product is designed for use in industrial applications. Note

 Authorized Representative in the European Community; Mitsubishi Electric Europe B.V.

Programmable Controller (Open Type Equipment)

Standard	Remark		
000-6-4:2007 romagnetic compatibility Generic standards - Emission standard for Industrial environment	Compliance with all relevant aspects of the standard. (Radiated Emissions and Mains Terminal Voltage Emissions)		
1000-6-2:2005 romagnetic compatibility Generic immunity standard Industrial environment	Compliance with all relevant aspects of the standard.(RF Immunity, Fast Transients, ESD, Conduced, Surges, Power Magnetic Fields, Voltage dips and Voltage interruptions)		
1131-2:2007 rammable controllers Equipment requirements and tests	Voltage interruptions) Compliance with all relevant aspects of the standard. EMI Radiated Emissions Conducted Emissions EMS Radiated electromagnetic field Fast transient burst Electrostatic discharge High-energy surge Voltage drops and interruptions Conducted RF		

1. Outline

The hardware high-speed counter block is a 2-phase 50 kHz high-speed counter. It is a special function block for the FX2NC, FX3UC series PLC.

- · FROM/TO instruction transfers the PLC data (i.e. parameters, comparing value and present value).
- The FX2NC-1HC occupies 8 points of I/O on the FX2NC, FX3UC expansion bus. The 8 points can be allocated from either inputs or outputs.

However, 5V DC 90mA power is supplied from the main unit or extension power supply units. There must be no power overload from this or any other extension unit. Furthermore, another power supply is needed for the output circuit of the encoder or the transistor

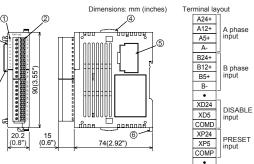
- Differential-Line-Driver (AM26C31 or equivalent) and open collector output encoders are available for FX2NC-1HC.
- The source of your input signal should be a 1 or 2 phase encoder. A 5V, 12V, or 24V power source can be used. An initial value setting command input (PRESET) and a count prohibit command input (DISABLE) are also available.
- . The FX2NC-1HC has two outputs. When the counter value coincides with an output compare value, the appropriate output is set ON. The output transistors are individually isolated to allow either sink or source connection methods.
- · Various counter modes, such as 1-phase or 2-phase, 16-bit or 32-bit modes, can be selected using commands from the PLC. Allow the FX2NC-1HC unit to run only after setting these mode parameters

1.1 Incorporated Items

Verify that the following product and items are included in the package:

Included Items	
FX2NC-1HC	1 Unit
Special unit/block No. label	1 Sheet
Manuals [Japanese version, English version]	1 manual each

1.2 External Dimensions. Part Names. and Terminal Lavout



No.	Name				
	Status LED				
PW (Green) Power LED ON when the 5V power supply is PLC.			power supply is normally supplied from the		
	UP (Red)	Up count LED	The respective LED is ON according to up/		
	DN (Red)	Down count LED	down count direction of the counter.		
\bigcirc	φA	A phase input	The respective LED is ON (flicker) according		
U	φB	B phase input	to ON/OFF of ϕA and ϕB input.		
	DS	DISABLE input LED	The respective LED is ON/OFF according		
	PR	PRESET input LED			
	YH	YH output LED	The respective LED is ON/OFF according to		
	YS	YS output LED	status of YH and YS output.		
2	Terminal block (European type)				

Extension connector (PLC side)

3 Used to connect this special function block to the FX2NC, FX3UC main unit or extension block.

Slide lock

4 Used to fix the FX2NC extension block on the right side of this special function block.

Extension connector (Extension side)

(5) Used to connect the FX2NC extension block to the right of this special function block. Remove this cover for connecting

6 DIN rail mounting hook

2. Installation, Connect to the PLC

NSTALLATION RECAUTIONS	
attempting installation	f all phases of the power supply externally before or wiring work. ause electric shock or damage to the product.
NSTALLATION RECAUTIONS	

- Use the product within the generic environment specifications described in PLC main unit manual.
- Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl2, H2S, SO2, or NO2), flammable gas, vibratior or impacts, or expose it to high temperature, condensation, or rain and wind. If the product is used in such conditions, electric shock, fire, malfunctions deterioration or damage may occur.
- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits.
- Failure to do so may cause fire, equipment failures or malfunctions. Connect FX2NC-1HC securely to their designated connectors.
- Loose connections may cause malfunctions Use screwdrivers carefully when performing installation work, thus avoiding accident or product damage

2.1 Installation

YH+ YH

YH-

YS+ YS

YS- output

output

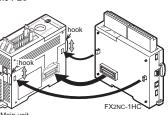
The FX2NC-1HC can be installed on a DIN46277 rail (35 mm (1.38") wide).

2.2 Number of the connectable units

- 1) FX2NC PLC
- Up to four special function units/blocks in total can be connected to the FX2NC Series PLC including those connected to the FX2NC-CNV-IF. 2) FX3UC PLC
- Up to eight special function units/blocks in total can be connected to the FX3UC*1 Series PLC including those connected to the FX2NC-CNV-IF or FX3UC-1PS-5V
- *1 Up to seven special function units/blocks in total can be connected to the FX3UC-32MT-LT(-2) PLC. Unit numbers assigned to special function units/ blocks begins with No.1

2.3 Connection to the PLC

When connecting the FX2NC-1HC to the FX2NC / FX3UC Series main unit or extension block. remove the extension port cover from the right side of the main unit or extension block, keep the slide lock in the main unit or Main unit extension block pulled upward, then align the hook



in the FX2NC-1HC with the mounting hole in the former step of the main unit or extension block

Then push the slide lock downward to fix the FX2NC-1HC. When connecting two or more FX2NC-1HC units, connect an FX2NC-1HC unit to another FX2NC-1HC unit in the same way.

3. Wiring

- WIRING WARNING PRECAUTIONS
- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work.
- Failure to do so may cause electric shock or damage to the product.

WIRING **CAUTION** PRECAUTIONS

Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product

Weight: Approx. 0.13kg (0.29lbs)

(Includes terminal block)

3

Gothaer Str. 8, 40880 Ratingen, Germany

Type: Models: MELSEC FX2NC series manufactured

from December 1st, 2007 FX2NC-1HC

ation	Standard	Remark
	EN61000-6-4:2007 Electromagnetic compatibility - Generic standards - Emission standard for Industrial environment	Compliance with all relevant aspect the standard. (Radiated Emissions Mains Terminal Voltage Emissions)
lous	EN61000-6-2:2005 Electromagnetic compatibility - Generic immunity standard Industrial environment	Compliance with all relevant aspect the standard.(RF Immunity, F Transients, ESD, Conducted, Surg Power Magnetic Fields, Voltage dips Voltage interruptions)
may	EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspect the standard. • Radiated Emissions • Conducted Emissions EMS • Radiated electromagnetic field • Fast transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF

WIRING PRECAUTIONS

- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
- 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more
- away from the main circuit or high-voltage lines. 2) Ground the shield wire or shield of the shielded cable at one point on the
- PLC. However, do not use common grounding with heavy electrical systems
- Make sure to properly wire to the terminal board (European type) in accordance with the following precautions Failure to do so may cause electric shock, equipment failures, a short-circuit,
- wire breakage, malfunctions, or damage to the product.
- The disposal size of the cable end should follow the dimensions described in the manual
- Tightening torgue should follow the specifications in the manual. - Twist the end of strand wire and make sure that there are no loose wires.
- Do not solder-plate the electric wire ends.
- Do not connect more than the specified number of wires or electric wires of unspecified size
- Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

3.1 Wire and Terminal Tightening Torque

3.1.1 Cable

1) Applicable cable

Applicable cable		
Type Wire siz		Wire size
Single wire 0.3mm ² to 0.5mm ² (AWG22		0.3mm ² to 0.5mm ² (AWG22 to 20)
Double wire 0.3mm ² (AWG22)*2		0.3mm ² (AWG22)*2

2) Termination

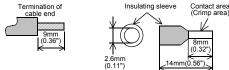
Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve.

Manufacturer	Model	Pressure bonding tool
Phoenix Contact	AI 0.5-8WH	CRIMPFOX 6 ^{*1} (or CRIMPFOX 6T-F ^{*2})

*1 Old model name: CRIMPFOX ZA 3

*2 Old model name: CRIMPFOX UD 6

· Stranded wire/solid wire · Bar terminal with insulating sleeve



When using a stick terminal with an insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, otherwise the wire cannot be inserted easily.

3.1.2 Tightening Torque

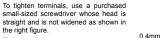
The tightening torque must be 0.22 to 0.25N-m. Do not tighten terminal screws exceeding the specified torque. Failure to do so may cause equipment failures or malfunctions

With

(0.1")

straight tip

Tool



Note:

If the diameter of screwdriver grip is too

small, tightening torque will not be able to be achieved. Use the following recommended screwdriver or an appropriate replacement (grip diameter: approximately 25mm).

(0.02")



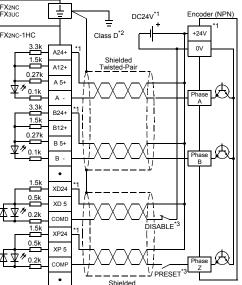
Phoenix Contact 3.2 Wiring

Note:

Make sure to properly wire in accordance with the encoder output specifications Incorrect wiring may cause accidents or damage to the product.

SZS 0.4×2.5

3.2.1 NPN output encoders





*1. Drive power supply of the encoder.

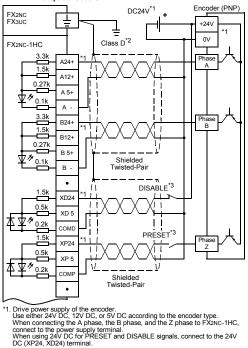
Use either 24V DC, 12V DC, or 5V DC according to the encoder type. When connecting the A phase, the B phase, and the Z phase to FX2NC-1HC,

when using 24V DC for PRESET and DISABLE signals, connect to the 24V DC (XP24, XD24) terminal.

*2. Grounding resistance 100 Ω or less.

*3. This wiring is unnecessary when not using the PRESET function and the DISABLE function.

3.2.2 PNP output encoders

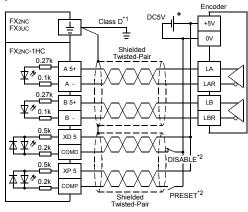




*3. This wiring is unnecessary when not using the PRESET function and the DISABLE function

3.2.3 Differential-Line-Driver output encoders

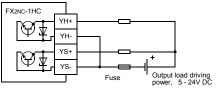
When applying the Differential-Line-Driver encoder (AM26C31 or equivalent) to FX2NC-1HC, connect the encoder output with the 5V DC terminal as shown in the left figure.



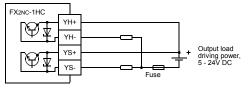
*1. Grounding resistance 100 Ω or less.

*2. This wiring is unnecessary when not using the PRESET function and the DISABLE function

3.2.4 YH, YS output wiring [Sink wiring]



3.2.5 YH, YS output wiring [Source wiring]



4. Specifications

DESI	
sy	ake sure to have the following safety circuits outside of the PLC to ensure safe stem operation even during external power supply problems or PLC failure. herwise, malfunctions may cause serious accidents.
1)	Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
2)	Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe
	machinery operation in such a case.
3)	Note that when an error occurs in a relay, triac or transistor output device, the output could be held either on or off.
	For output signals that may lead to serious accidents, external circuits and

mechanisms should be designed to ensure safe machinery operation in such a case

DESIGN PRECAUTIONS

 Do not bundle the control line together with or lay it close to the main circuit or power line. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or power line. Noise may cause malfunctions.

4.1 General Specifications

The general specifications are equivalent to the PLC main unit. (For general specifications, refer to the manual of the PLC main unit.)

4.2 Power Supply Specifications

Item	Specifications	
	5V DC, 90mA (Internal power supply from main unit or extension power supply unit)	

4.3 Performance Specifications

tem Specification Signal level (Selected tion) Phase A. Phase B [A24+]. [B12+1] 24V DC±10%, 7mA or less Input signal Signal (Selected ton) Phase A. Phase B [A12+]. [B12+1] 12V DC±10%, 7mA or less Imput signal Imput ton) [Press]. [Press]. [DSABLE 3.0V to 5.5V DC. [VP24]. [NP24]. [NP24]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP5]. [NP6]					
Signal level (Selected byterminal connec- tion) Phase A (H2+1, Phase B) TmA or less (H2+1) TmA or less (H2+1) Input signal Signal (Selected byterminal connec- tion) Phase A, (H2+1) 10.8V to 5.5V DC, (B5+1) 12.5mA or less Imput signal Imput (PRESET, DISABLE Imput (PRESET, DISABLE 10.8V to 26.4V DC, (MD24) 10.8V to 26.4V DC, (MD24) Imput signal Imput (PRESET, DISABLE 1 imput (PRESET, DISABLE 50kHz Imput signal Imput (Preset, Imput) 1 imput (PRESET, DISABLE 50kHz Imput signal Imput (Preset, Imput) 1 imput (PRESET, DISABLE 50kHz Imput signal Imput (Preset, Imput) 1 imput (Preset, Imput) 50kHz Imput signal Imput (Preset, Imput) 1 imput (Preset, Imput) 1 imput (Preset, Imput) Imput signal Imput signal Imput (Preset, Imput) 1 imput (Preset, Imput) 1 imput (Preset, Imput) Imput signal Format Imput (Preset, Imput) 1 imput (Preset, Imput) 1 imput (Preset, Imput) Imput signal Format Imput (Preset, Imput) 1 imput (Preset, Imput) 1 imput (Preset, Imput) Count- ing spect, Imput) </th <th>It</th> <th>em</th> <th colspan="3">Specification</th>	It	em	Specification		
Signal (Selected byterminal connec- tion) Phase B (B12+i) TmA or less 12.5mA or less Input signal PRESET, DISABLE [B5+i] 12.5mA or less MAX. frequency 1-phase input 1 input 2 input 5V DC±10%, BmA or less MAX. frequency 1-phase input 1 input 2 input 50kHz Pulse shape 1-phase input 1 input 2 edge count 25kHz Pulse shape 1 (Rise/fall time): input 3µs or less 2(ONOFF pulse): is or more (at 50kHz) 3.5µs or more (at 50kHz) 4.147/483,647 4.147/483,648 4.147/		level (Selected by terminal connec-			7mA or less
byterminal connec- tion [B5+] 12.5mA or less PRESET, isignal PRESET, DISABLE [PP24], (ND24] 10.8V to 26.4V DC, 15mA or less MAX. 1.ph ase input 1 input 2 input 50kHz MAX. 1 edge count 2 input 50kHz MAX. 1 edge count 2 input 50kHz Pulse shape 1 edge count 2 input 1 edge count 2 input Pulse shape 1 figure (Rise/fall time): input 3 us or less input 3 input 3 input Format 1 figure (Rise/fall time): input 3 us or more input 3 input 3 input Pulse shape 1 figure (Rise/fall time): input 3 us or more input 3 input 3 input Pulse shape 1 figure (Rise/fall time): input 3 us or more input 10 input					
tion) PRESET. DISABLE 10.8V to 26.4V DC, 15mA or less Input 15mA or less MAX. signal 1-ph ase input 1 input 2 input 5V DC±10%, 8mA or less MAX. input 1-ph ase input 1 input 2 input 50kHz Pulse 1-ph ase input 1 edge count 2 edge count 25kHz Pulse 1 (Rise/fall time): (20N/OFF pulse): 3µs or less 6µs or more (at 50kHz) 13(Phase difference between A and B): 3.5µs or more (at 50kHz) 3.5µs or more (at 50kHz) 20N/OFF pulse): 6µs or more (at 50kHz) 13(Phase difference between A and B): 3.5µs or more (at 50kHz) 3.5µs or more (at 50kHz) 20N/OFF pulse): 6µs or more (at 50kHz) VPRESET(2 phase) input 100µs or more DISABLE (count prohibit) input 100µs or more Vieware, When on 1-phase 1-input mode, UP/ DOWN is determined below. Hardware UP/DOWN Up/down count is decided by OFF/ON of the A- phase input terminal. Software UP/DOWN: Up/down count is decided by the current value (K0Kt) of BFM #1. Count- ification Range When 32-bit is specified: -2.147.483.648 to +2.147.483.647 When 16-bit is specified: 0 to bots 5.55 (upper limit is set up by BFM #3, #2.) Compari- son Type Compari- Yi: Direct output for seveed by hardware. YS: Software processed output with worst delay time of 300µs. Therefore, when the input frequency is 50 kHz, there is a worst case delay of 15 input pulses. Output signal					
Input signal Imput frequency 1 - phase input 1 input 2 input So 0 Jest 0.% BM or less MAX. 1 - phase input 1 - input 2 input 50kHz Pulse shape 1 - edge count 2 - edge count 2 - edge count 2 - edge count Pulse shape I - edge count 2 - edge count 2 - edge count 2 - edge count I (Rise/fall time): 3 - gs or less 1 - edge count 2 - edge count 2 - edge count I (Rise/fall time): 3 - gs or more (at 50kHz) 3 - gs or more (at 50kHz) 3 - gs or more (at 50kHz) I (Rise/fall time): 3 - gs or more (at 50kHz) 3 - gs or more (at 50kHz) 3 - gs or more (at 50kHz) I (Rise/fall time): 3 - gs or more (at 50kHz) 3 - gs or more (at 50kHz) 3 - gs or more (at 50kHz) I (Rise/fall time):					
Input signal MAX. frequency Imput input 2 input 50kHz 2 input 2 input 50kHz 50kHz 2 edge count 25kHz 2 edge count 25kHz 4 edge count 12.5kHz 12 edge count 12.5kHz Pulse shape 11 (Rise/fall time): 3µs or less 12(0NOFF pulse): 6µs or more (at 50kHz) 13(Phase difference between A and B): 3.5µs or more (at 50kHz) 50µs or more (at 50kHz) DISABLE (count prohibit) input 100µs or more DISABLE (count prohibit) is decided by OFF/ON of the A- phase input terminal. Software UP/DOWN: Up/down count is decided by OFF/ON of the A- phase input terminal. Software UP/DOWN: Up/down count is decided by OFF/ON of the A- phase input terminal. Compari- son Type Compari- Software UP/DOWN: Up/down count is decided by OFF/ON of the 2- phase input set whet the present value of the counter matches with the compare value, and is witched OFF by a reset command. YH: Direc			DISABLE		
Input signal MAX. frequency Imput Imput John Z 2 - ph ase input 1 edge count 25kHz 2 edge count 25kHz 4 edge count 12.5kHz 1 (Rise/fall time): 3µs or less 12(ONOFF pulse): 5 por more (at 50kHz) 13(Phase difference between A and B): 3 Spis or more (at 50kHz) 13(Phase difference between A and B): 3 Spis or more (at 50kHz) 13(Phase difference between A and B): 3 Spis or more (at 50kHz) 13(Phase difference between A and B): 3 Spis or more (at 50kHz) 13(Phase difference between A and B): 3 Spis or more (at 50kHz) 10(phase or more (at 50kHz) 13(Phase difference between A and B): 35(phase or more (at 50kHz) 13(Phase difference between A and B): 5(phase) input topus or more 10SABLE (count prohibit) input 100µs or more 10(phase difference between A and B): 10Pown veru					
Input frequency input 2-phase input 1edge count 2 edge count 4 edge count 12.5kHz Pulse shape IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		мах	Input	2 input	50kHz
Count- ingut 2 edge could 4 edge count 2 SkH2 Pulse shape t1 (Rise/fall time): 11(Rise/fall time): 12(ON/OFF pulse): 13(Phase difference between A and B): 3.5µs or more (at 50kH2) 13(Phase difference between A and B): 3.5µs or more (at 50kH2) 13(Phase difference between A and B): 3.5µs or more (at 50kH2) 13(Phase difference between A and B): 3.5µs or more (at 50kH2) 13(Phase difference between A and B): 3.5µs or more (at 50kH2) 10(SABLE (count prohibit) input 100µs or more DISABLE (count prohibit) input 100µs or more DISABLE (count prohibit) input 100µs or more DISABLE (count prohibit) input 100µs or more Automatic UP/DOWN However, when on 1-phase 1-input mode, UP/ DOWN is determined below. Format Automatic UP/DOWN However, when on 1-phase 1-input mode, UP/ DOWN is determined below. • Hardware UP/DOWN: Up/down count is decided by OFF/ON of the A- phase input terminal. • Software UP/DOWN: Up/down count is decided by the current value (KON1) of BH # 1. • When 32-bit is specified: • 2.147,483,647 When 16-bit is specified: • 2.147,483,648 tb + 2.147,483,647 When 16-bit is speci onmand. • 2.1			2-nhase	1 edge count	
Pulse shape ti ti (Rise/fall time): ti (Rise/fall tim	signai			2 edge count	
Pulse shape Image: Constraint of the shape Image: Conshape Image: Constraintis and the shape				4 edge count	12.5kHz
Count- ing spec- ification 12(ON/OFF pulse): 6µs or more (at 50kHz) 3.5µs or more (at 50kHz) PRESET(Z phase) input 100µs or more DISABLE (count prohibit) input 100µs or more DISABLE (count prohibit) input 100µs or more DISABLE (count prohibit) input 100µs or more Format Automatic UP/DOWN However, when on 1-phase 1-input mode, UP/ DOWN is determined below. Up/down count is decided by OFF/ON of the A- phase input terminal. • Software UP/DOWN: Up/down count is decided by the current value (K0/K1) of BFM #1. Count- ing spec- ification Range When 32-bit is specified: -2,147,483,648 to +2,147,483,647 When 16-bit is specified: -2,147,483,648 to +2,147,483,647 When 16-bit is specified: -2,147,483,648 to +2,147,483,647 When 32-bit is specified: -2,147,483,648 to +2,147,483,647 When 16-bit is specified: -2,147,483,6					
Count- ing spec- ification Format However, when on 1-phase 1-input mode, UP/ DOWN is determined below. Count- ing spec- ification Format Horware UP/DOWN: Up/down count is decided by OFF/ON of the A- phase input terminal. Range When 32-bit is specified: -2,147,483,648 to +2,147,483,647 When 16-bit is specified: -2,147,483,648 to +2,147,483,647 When 32-bit is specified: -2,147,483,648 to +2,147,483,647 When 32-bit is specified: (upper limit is set up by BFM #3, #2.) Compari- son Type Each output is set when the present value of the counter matches with the compare value, and is switched OFF by a reset command. 'H': Direct output processed by hardware. 'YS: Software processed output with worst delay time of 300_us. Therefore, when the input frequency is 50 kHz, there is a worst case delay of 15 input pulses. Output signal Types of outputs 'H+: transistor output for 'YH output 'S+: transistor output for 'YH output 'S+: transistor output for 'YS output 'S: transistor output for 'YS output 'S: 'transistor output for 'YS output 'S: 'transistor output for YS output			t2(ON/OFF pulse): 6μs or more (at 50kHz) t3(Phase difference between A and B): 3.5μs or more (at 50kHz) PRESET(Z phase) input 100μs or more DISABLE (count prohibit) input 100μs or more		
ing spec- ification Range -2,147,483,648 to +2,147,483,647 When 16-bit is specified: 0 to 65,536 (upper limit is set up by BFM #3, #2.) compari- son Type Each output is set when the present value of the counter matches with the compare value, and is switched OFF by a reset command. Output signal Types of outputs YH :: Direct output processed by hardware. YH: Direct output processed by hardware. YH: Direct output processed output with worst delay time of 300,s. Therefore, when the input frequency is 50 kHz, there is a worst case delay of 15 input pulses. Output signal Types of outputs YH +: transistor output for YH output YS :: transistor output for YS output Output capacity 5V ~ 24V DC, 0.5A	Format However, w DOWN is de Hardware Up/down phase inp Software Up/down		r, when on 1-phase 1-input mode, UP/ determined below. vare UP/DOWN: wn count is decided by OFF/ON of the A- input terminal. are UP/DOWN: wn count is decided by the current value		
Output signal Compari- son Type counter matches with the compare value, and is switched OFF by a reset command. 'H': Direct output processed by hardware. 'YS: Software processed output with worst delay time of 300 µs. Therefore, when the input frequency is 50 kHz, there is a worst case delay of 15 input pulses. Output Types of outputs 'H +: transistor output for 'YH output 'H +: transistor output for 'YH output VH +: transistor output for vH output 'YH +: transistor output for 'YS output 'YH +: 'YS output Output capacity 5V ~ 24V DC, 0.5A	ing spec-	Range	-2,147,483,648 to +2,147,483,647 When 16-bit is specified: 0 to 65,535		
Output signal Types of outputs TH output YH - it ransistor output for YH output YS +: transistor output for YS output YS -: transistor output for YS output TH+, YS+, YS+, YS-, YS-, YS-, YS-, YS-, YS-, YS-, YS-			Each output is set when the present value of the counter matches with the compare value, and is switched OFF by a reset command. YH: Direct output processed by hardware. YS: Software processed output with worst delay time of 300µs. Therefore, when the input frequency is 50 kHz,		
capacity 5V ~ 24V DC, 0.5A			YH output YH -: transistor output for YH output YS +: transistor output for YS output		
I/O occupation 8 points (can be either inputs or outputs)			5V ~ 24V DC, 0.5A		
	I/O occupation		8 points (can be either inputs or outputs)		

5. Buffer Memories (BFM)

5.1 Buffer memory List

Note:

- 1) When writing in BFM #0 (counter mode), the BFM #1 to #31 will be initialized. After setting the counter mode (BFM #0), other BFM(s) have to be setup. When setting the counter mode, use a TOP (pulsed) instruction, or M8002 (initial pulse) to drive the TO instruction.
- 2) Read/Write of 16 bit data

When using a positive value between K32,768 and K65,535 with 16 bit counters, read/writes of data, such as the current value, ring length, preset data, and the YH/YS compare value, should use the 32-bit forms of the FROM/TO instructions ((D) FROM, (D) TO).

BFM #	Description	Default	BFM Access	
BFM #0	Counter mode (Setting range: K0 to K7	1)	K0	R/W
BFM #1	DOWN/UP command 1-phase 1-input mode (S/W counter) o	nly	К0	R/W
BFM #2	Ring length	Lower	K65536	R/W
BFM #3		Upper	K00000	R/W
BFM #4	Command		K0	R/W
BFM #5 ~#9	Not available		-	-
BFM #10	Broast data	Lower	140	R/W
BFM #11	Preset data Upper		K0	R/W
BFM #12	YH compare value Lower Upper		K32767	R/W
BFM #13				R/W
BFM #14	YS compare value		K32767	R/W
BFM #15				R/W
BFM #16 ~ #19	Not available	-	-	
BFM #20	Counter current value	Lower	ко	R/W
BFM #21		Upper		R/W
BFM #22	Maximum count value	Lower	К0	R/W
BFM #23		Upper	KU	R/W
BFM #24	Minimum count value	Lower	к0	R/W
BFM #25		Upper	NU	R/W
BFM #26	Compare results		-	R
BFM #27	Terminal status		-	R
BFM #28	Not available		-	-
BFM #29	Error status		-	R
BFM #30	Model identification code: K4010	K4010	R	
BFM #31	Not available	-	-	

5.2 Details of buffer memories

5.2.1 Counter mode [BFM #0]

The counter mode is shown in the upper right table. (Default value: K0)

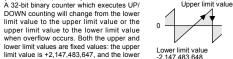
Note:

When writing in BFM #0 (counter mode), the BFM #1 to #31 will be initialized. After setting the counter mode (BFM #0), other BFM(s) have to be setup. When setting the counter mode, use a TOP (pulsed) instruction, or M8002 (initial pulse) to drive the TO instruction.

Count modes		32 bits	16 bits	Reference
2-phase	1 edge count	K0	K1	1), 2)
input (phase	2 edge count	K2	К3	1), 3)
difference pulse)	4 edge count	K4	K5	1), 4)
1-phase 2-input (add/subtract pulse)		K6	K7	1), 5)
1-phase 1-input	Hardware UP/DOWN	K8	K9	1), 6)
	Software UP/DOWN	K10	K11	1), 7)

1) 16/32-bit counter modes

a) 32-bit counter modes (K0, K2, K4, K6, K8, K10) A 32-bit binary counter which executes UP/ DOWN counting will change from the lower limit value to the upper limit value or the upper limit value to the lower limit value when overflow occurs. Both the upper and



Ring length

(BFM #3, #2) - 1

+2,147,483,647



(K1, K3, K5, K7, K9, K11) A 16-bit binary counter handles only positive values from 0 to 65,535. Changes to zero from the upper limit value or to the upper limit value from zero when overflow occurs; the upper limit value is determined by BFMs #3 and #2

2) 2-phase counter [1 edge-count] (K0, K1)

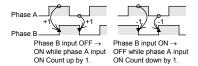
limit value is -2,147,483,648.

h) 16-bit counter modes

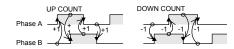


Phase B input $ON \rightarrow$ ON while phase A input OFF while phase A input ON Count up by 1. ON Count down by 1.

3) 2-phase counter [2 edge-count] (K2, K3)

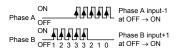


4) 2-phase counter [4 edge-count] (K4, K5)

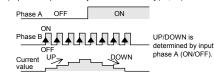


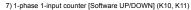
5) 1-phase 2-input counter (K6, K7)

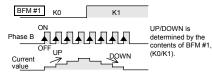
If both phase A and phase B inputs are received simultaneously, the counter value does not change



6) 1-phase 1-input counter [Hardware UP/DOWN] (K8, K9)







5.2.2 DOWN/UP command [BFM #1]

When using the 1-phase 1-input counter [Software UP/DOWN] (counter mode: K10, K11), set the count direction by the current value of BFM #1. (Default value: K0) \rightarrow For the operation, refer to the Subsection 5.2.17)

Count Direction Setting Value

Up count	К0
Down count	K1

5.2.3 Ring length [BFM #3, #2]

When setting the upper limit value of the 16 bit counters, the setting range is K2 to K65536 (Default value: K65536)

In this example, K100 is written to BFM #3, #2 of special function block No.2 as 32 bit data

IID



When ring length K100 is specified, the current value of the counter is changed as the right figure, and upper limit value is set to 99.

5.2.4 Command [BFM #4]

Bit No.	Setting Value		
Dit No.	OFF (0)	ON (1)	
b0	Count prohibit	Count permit	
b1	YH output prohibit	YH output permit	
b2	YS output prohibit	YS output permit	
b3	YH/YS independent action	Mutual reset action	
b4	Preset prohibit	Preset permit	
b5 ~ b7	Not available		
b8	No action	Error flag reset	
b9	No action	YH output reset	
b10	No action	YS output reset	
b11	No action	YH output set	
b12	No action	YH output set	
b13 ~ b15	Not available		

1) When b0 is set to ON and the DISABLE input terminal to OFF, the counter is permitted to start counting input pulses.

2) Unless b1 is set to ON, YH (hardware compared output) does not turn ON. 3) Unless b2 is set to ON, YS (software compared output) does not turn ON. 4) When b3=ON, YS output is reset if YH output is set, and YH output is reset if YS output is set. When b3=OFF, YH and YS output act independently, and do not reset each other.

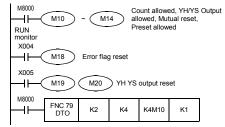
5) When b4=OFF, preset function by the PRESET input terminal is disabled. → For the preset details, refer to Subsection 5.2.5

6) When b8 is set to ON, all error flags are reset. 7) When b9 is set to ON, YH output is reset. 8) When b10 is set to ON, YS output is reset. 9) When b11 is set to ON, YH output is set ON 10)When b12 is set to ON, YS output is set ON.

Example program

The ON/OFF status of M25 to M10 is written in BFM #4 of special function block No.2 by the following program, and b15 to b0 action. Among these, b4 to b0 are always ON as controlled by M10-M14. Furthermore, b8 (M18), b9 (M19), and b10 (M20) are controlled by the input X004

of the PLC, and X005 by ON/OFF.



5.2.5 Preset data [BFM #11, #10]

When BFM #4 b4 is ON and the PRESET input is switched from OFF to ON. preset data is stored into BFM #21, #20 (counter current value) → For command details, refer to Subsection 5.2.4

5.2.6 YH compare value [BFM #13,#12], YH compare value [BFM #15,#14]

· After comparing the current value of the counter with the value written in BFM #13 and #12, BFM #15 and #14, the hardware and software comparator in the FX2NC-1HC outputs the comparison result.

• YH, YS output will not turn ON if using PRESET or the TO instruction to set the counter value equal to the comparison value. It will turn ON only when a match occurs by the counting of input pulses. However, when BFM #4 b1, b2 are OFF,

· Output occurs when the current value becomes equal to the compare value but only if b1 and b2 of BFM #4 are ON. Once an output is set, it remains ON until it is reset by b9 or b10 of BFM #4. If b3 of BFM #4 is ON, however, one of the outputs is reset when the other is set.

· The YS comparison operation takes about 300µs, and if a match occurs, the output goes ON.

5.2.7 Counter current value [BFM #21. #20]

The current value of the counter can be read by the PLC. It will not be the correct value during high-speed operations because of the communication delay. The current value of the counter can be forcibly changed by writing a 32-bit value into the appropriate BFMs from the PLC.

5.2.8 Maximum count value [BFM #23, #22], Minimum count value [BFM #25, # 24]

These store the maximum and minimum value reached by the counter. If the power is turned off, the stored data is cleared.

5.2.9 Compare results [BFM #26]

Bit No.	Target output	OFF (0)	ON (1)
b0		Set value \leq current value	Set value > current value
b1	YH	Set value ≠ current value	Set value = current value
b2		Set value \geq current value	Set value < current value
b3		Set value \leq current value	Set value > current value
b4	YS	Set value ≠ current value	Set value = current value
b5	1	Set value \geq current value	Set value < current value
b6 ~ b15		Not available	





Coincidence output

BFM #4

b9 b10

Coincidence output



it does not set.

5.2.10 Terminal status [BFM #27]

Bit N0.	Signal Name	OFF (0)	ON (1)
b0	PRESET input	OFF	ON
b1	DISABLE input	OFF	ON
b2	YH output	OFF	ON
b 3	YS output	OFF	ON
b 4 ~ b15	Not available		

5.2.11 Error status [BFM #29]

Bit N0.	Error Status		
b0	Set when any of b1 to b7 is ON.		
b1	Set when the value of the ring length is written incorrectly. (Except K2 to K65,536)		
b2	Set when the preset value is written incorrectly.		
b3	Set when the compare value is written incorrectly.	16-bit counter mode.	
b4	Set when the current value is written in correctly.		
b5	Set when the counter overflows the upper limit.	When the upper or lower limit is exceeded on a 32-bit	
b6	Set when the counter overflows the lower limit.		
b7	Set when the FROM/TO command is used incorrectly.		
b8	Set when the counter mode (BFM#0) is written incorrectly.	Except K0 to K11	
b9	Set when the BFM number is written incorrectly.	Except K0 to K31	
b10~b15	Not available		

Error status in the FX2NC-1HC can be checked by reading the contents of b0 to b9 of BFM #29 to auxiliary relays of the PLC. There error flags can be reset by b8 of BFM #4.

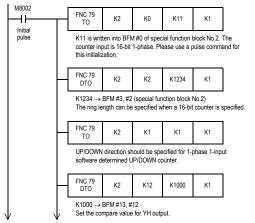
M8000 FNC 78 FROM K2	K29	K3M100	K1	
----------------------------	-----	--------	----	--

5.2.12 Model identification code [BFM #30]

This BFM stores the identification number for FX2NC-1HC. The identification number for the FX2N-1HC unit is K4010. By reading this identification number, the user may create built-in checking routines to check whether the physical position of the FX2NC-1HC matches to that of the software.

6. Example Program

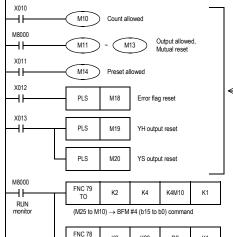
Please use the following program as a guide whenever you use the FX2NC-1HC unit. Other instructions to read the current value of the counter, status etc. can be added as required.





K900 → BFM #15, #14 Set the compare value for YS output (not necessary if only YH output is used).

Note that counting only occurs if count prohibit is OFF. Also, outputs will not be set from the counting process at all if the relevant output prohibit are set in the command register. Please reset the error flags and YH/YS output before you start. The mutual reset and preset initialization commands can be used as required.





 $\operatorname{BFM}(\text{\#21},\text{\#20}) \to \operatorname{Reads}$ the current value to the data registers D3 and D2.

7. Preliminary checks

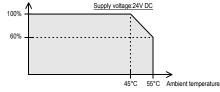
- 1) Check that the I/O wiring and extension cable of the FX2NC-1HC are properly connected.
- 2) The FX2NC-1HC occupies 8 points of I/O on the FX2NC, FX3UC expansion bus. The 8 points can be allocated from either inputs or outputs.
- 5V DC 90mA power is supplied from the main or extension power supply units (FX3UC only) for the FX2NC-1HC. Check that there is no power overload from this and other extension blocks.

3) The following derating curve shows the simultaneous ON ratio of available power for products connected to the FX2NC-1HC with respect to the ambient temperature.

Use the adjoined following product within the simultaneous input ON ratio range shown in the figure.

Target input extension block:FX2NC-16EX, FX2NC-16EX-DS, FX2NC-32EX, FX2NC-32EX-DS

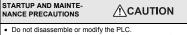
Derating curve: FX2NC-16EX(-DS), FX2NC-32EX(-DS) Simultaneous ON ratio



4) The counter works correctly only when data such as the counter mode (set with a pulse command), the TO command, the compare value, etc. are appropriately specified. Remember to initialize the count (BFM #4 b0), preset (BFM #4 b4), and output (BFM #4 b2, b1) prohibits. Reset the YH/YS outputs before you start. Note

Note that inputting the pulse higher than the maximum frequency may cause miscounting to FX2NC-1HC or a FROM/TO error to the PLC main unit.

8. Diagnostics



- Doing so may cause fire, equipment failures, or malfunctions.
- For repair, contact your local Mitsubishi Electric distributor.
 Do not drop the product or exert strong impact to it.

Doing so may cause damage.

DISPOSAL

 Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

TRANSPORT AND STOR-AGE PRECAUTIONS

 The product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product. After transportation, verify the operations of the product.

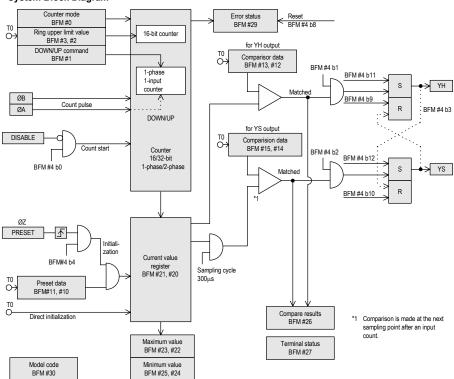
1) The following LEDs on the main panel of the FX2NC-1HC may help you to troubleshoot the unit.

- - Goes on/off as ϕA , ϕB input turn ON/OFF. It can be checked by rotating the encoder slowly.
- b) UP, DN:
- Lights up to indicate whether the counter is going up (UP) or down (DN).
- c) PR, DS: The appropriate LED lights up when the PRESET (PR) terminal or the
- DISABLE (DS) terminal is ON.
- d) YH, YS:

The appropriate LED lights up when YH/YS output is turned on.

2) You can check the error status by reading the content of BFM #29 to the PLC. \rightarrow For error contents, refer to the Subsection 5.2.11

9. System Block Diagram



This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi, opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Flertric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

MITSUBISHI ELECTRIC CORPORATION

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MITSUBISH ELECTRIC

PROGRAMMABLE CONTROLLERS MELSEG

FX2NC-1HC

Revision

USER'S MANUAL

April 2015



This manual describes the part names, dimensions, mounting, wiring, and specifications of the product. Before use, read this manual and the manuals of all relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and presentions. precautions

Store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user. Registration:

The company and product names described in this manual are registered trademarks or the trademarks of their respective companies.

Effective April 2015 Specifications are subject to change without notice

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Safety Precaution (Read these precautions before use.)

This manual classifies the safety precautions into two categories: WARNING and CAUTION.

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on the circumstances, procedures indicated by ACAUTION may also cause severe injury. It is important to follow all precautions for personal safety

Associated Manuals

Manual name	Manual No.	Description
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains the FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3S/FX3G/FX3GC/FX3U/ FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.
FX2NC (DSS/DS) Series Hardware Manual	JY992D76401 MODEL CODE: 09R509	Explains the FX2NC (DSS/DS) Series PLC specifications for I/O, wiring, installation, and maintenance.
FX2NC (D/UL) Series Hardware Manual	JY992D87201	Explains the FX2NC (D/UL) Series PLC specifications for I/O, wiring, installation, and maintenance.
FX Series Programming Manual II	JY992D88101 MODEL CODE: 09R512	Describes FX1S/FX1N/FX2N/ FX2NC Series PLC programming for basic/applied instructions and devices.

VIRING

RECAUTIONS

How to obtain manuals For product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased your product

Certification of UL, cUL standards he following product has UL and cUL cer UL, cUL File Number:E95239 MELSEC FX2NC series manufactured from December 1st, 2007 FX2NC-1HC

Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards. Compliance to EMC directive and LVD directive for the entire mechanical module should be checked by the user / manufacturer. For more details please contact the local Mitsubishi Electric sales site.

Requirement for Compliance with EMC directive The following products have shown compliance through direct testing (of the identified

standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation Attention

This product is designed for use in industrial applications.

Note · Authorized Representative in the European Community Mitsubishi Electric Europe B.V. Gothaer Str. 8, 40880 Ratingen, Germany

Programmable Controller (Open Type Equipment) MELSEC FX2NC series manufactured mber 1st, 2007 FX2NC-1HC Type: Models: from December 1st, 2007

Electromagnetic compatibility the - Generic standards - Emission standard for Industrial environment EN61000-6-2:2005 Con Electromagnetic compatibility the - Generic immunity standard Industrial environment Volta EN61131-2:2007 Con rogrammable controllers the - Equipment requirements and tests - Requipment requirements and tests Con - C	pliance with all relevant aspects of standard. (Radiated Emissions and s Terminal Voltage Emissions) pliance with all relevant aspects of standard.(RF Immunity, Fast sients, ESD, Conducted, Surges, er Magnetic Fields, Voltage dips and ge interruptions) pliance with all relevant aspects of
Electromagnetic compatibility the - Generic immunity standard Industrial EN61131-2:2007 rogrammable controllers - Equipment requirements and tests - Requipment requirements and tests	standard (RF Immunity, Fast sients, ESD, Conducted, Surges, er Magnetic Fields, Voltage dips and ge interruptions)
Programmable controllers the state of the st	pliance with all relevant aspects of
• Fi • E • H • V	andard. adiated Emissions onducted Emissions adiated electromagnetic field st transient burst ectrostatic discharge gh-energy surge gh-energy surge natucted RF ower frequency magnetic field

The hardware high-speed

present value).

- the transisto



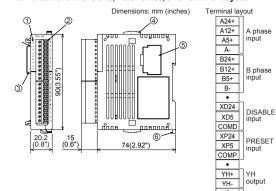
Verify that the following product and items are included in the package:

Included Items				
FX2NC-1HC	1 Unit			
Special unit/block No. label	1 Sheet			
Manuals [Japanese version, English version]	1 manual each			

1.2 External Dimensions, Part Names, and Terminal Layout

output

YS+ YS-VS-



Weight: Approx. 0.13kg (0.29lbs) (Includes terminal block)

No.	o. Name				
0	Status LED				
	PW (Green)	Power LED ON when the 5V PLC.	power supply is normally supplied from the		
	UP (Red)	Up count LED	The respective LED is ON according to up/		
	DN (Red)	Down count LED	down count direction of the counter.		
	φA	A phase input	The respective LED is ON (flicker) accordi		
	φB	B phase input	to ON/OFF of φA and φB input.		
	DS	DISABLE input LED	The respective LED is ON/OFF according to		
	PR	PRESET input LED	ON/OFF of PRESET and DISABLE input.		
	YH	YH output LED	The respective LED is ON/OFF according to		
	YS	YS output LED	status of YH and YS output.		
2	Terminal bloc	k (European type)			
3	Extension connector (PLC side)				

- Used to connect this special function block to the FX2NC, FX3UC main unit or extension block. Slide lock
- 4 Used to fix the FX2NC extension block on the right side of this special function
- Extension connector (Extension side)
- (5) Used to connect the FX2NC extension block to the right of this special function block. Remove this cover for connecting.

6 DIN rail mounting hook

2. Installation, Connect to the PLC

	STALLATION RECAUTIONS	WARNING
•	attempting installation or w	phases of the power supply externally befor viring work. e electric shock or damage to the product.
	STALLATION RECAUTIONS	

- or impacts, or expose it to high temperature, condensation, or rain and wind. If the product is used in such conditions, electric shock, fire, malfunctions deterioration or damage may occur.
- When drilling screw holes or wiring, make sure cutting or wire debris doe not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions. Connect FX2NC-1HC securely to their designated connectors.
- Loose connections may cause malfunctions. Use screwdrivers carefully when performing installation work, thus avoidin
- accident or product damage

2.1 Installation

The FX2NC-1HC can be installed on a DIN46277 rail (35 mm (1.38") wide). 2.2 Number of the connectable units

- 1) FX2NC PLC Up to four special function units/blocks in total can be connected to the
- FX2NC Series PLC including those connected to the FX2NC-CNV-IF. 2) FX3UC PLC Up to eight special function units/blocks in total can be connected to the
- FX3UC^{*1} Series PLC including those connected to the FX2NC-CNV-IF or FX3UC-1PS-5V.
- *1 Up to seven special function units/blocks in total can be connected to the FX3UC-32MT-LT(-2) PLC. Unit numbers assigned to special function units blocks begins with No.1

2.3 Connection to the PLC

When connecting the FX2NC-1HC to the FX2NC / FX3UC Series main unit o extension block, extension port cover from the right side of the main unit or extensi block, keep the block, keep the silde lock in the main unit or extension block Main unit pulled upward, then align the hook in the FX2NC-1HC with the mounting hole in the former step of the main unit or extension block

extension block. Then push the slide lock downward to fix the FX2NC-1HC. When connecting two

or more FX2NC-1HC units, connect an FX2NC-1HC unit to another FX2NC-1HC unit in the same way.

3. Wiring

remove the

WARNING WIRING PRECAUTIONS Make sure to cut off all phases of the power supply externally befor attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product. **ACAUTION** RECAUTIONS

Make sure to cut off all phases of the power supply externally before attempting installation or wiring work.
 Failure to do so may cause electric shock or damage to the product.

Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise: Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line.
 Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94^e) or more away from the main circuit or high-voltage lines. 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems. Make sure to properly wire to the terminal board (European type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit wire breakage, malfunctions, or damage to the product. The disposal size of the cable end should follow the dimensions describe in the manual. Tightening torque should follow the specifications in the manual Twist the end of strand wire and make sure that there are no loose wires Do not solder-plate the electric wire ends. Do not connect more than the specified number of wires or electric wires of unspecified size. Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed. 3.1 Wire and Terminal Tightening Torque Cable 3.1.1 1) Applicable cable Туре Wire size Single wire 0.3mm² to 0.5mm²(AWG22 to 20) Double wire 0.3mm²(AWG22)*2

2) Termination

Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve.



ulating	sleeve.	*3. This wiring is unnecessary will		
I	Pressure bonding tool		ISABLE function.	
ΝН	CRIMPFOX 6 ^{*1}	3.2.2	PNP output encoders	

With

straight tip

3.2.1 NPN output encoders FX2NC FX3UC Ŧ Encoder (NPN) DC24V^{*1} Class D^{*2} FX2NC-1HC +24V 0V A24+ 1.5k A12+ 0.27 A 5+ ۱Ð Α. 3.3k 1.5k B24+ B12-0.27 B 5+ ≯ _{0.1k} ٦Ð в ٠ XD24 0.5k XD 5 ± ± ≠ <u>0.2k</u> сом DISABLE 1.5k XP24 0.5k XP 5 ıQ <u>∖_</u>∕__Xi COMF Z PRESET . Shielded Twisted-Pair *1. Drive power supply of the encoder. Use either 24V DC, 12V DC, or 5V DC according to the encoder type. When connecting the A phase, the B phase, and the Z phase to FX2NC-1HC, connect to the power supply terminal. When using 24V DC for PRESET and DISABLE signals, connect to the 24V DC (XP24, XD24) terminal. *2. Grounding resistance 100 Ω or less ssary when not using the PRESET function and the

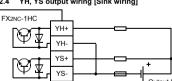
3.2.3 Differential-Line-Driver output encoders

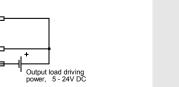
When applying the Differential-Line-Driver encoder (AM26C31 or equivalent) to FX2NC-1HC, connect the encoder output with the 5V DC terminal as shown in the left figure

DC5V Class D^{*1} FX2NC FX3UC +5V T Ļ 0V X2NC-1HC Twisted-Pai 0.27k A 5+ LA 0.1k LAR 0.27k LB [≁] <u>0.1k</u> 11 11 LBR XD 5 4 DISA 0.5k <u>↓</u> <u>*</u> 0.2k :OM PRESET*2 Shielded Twisted-Pair *1. Grounding resistance 100 Ω or less.

*2. This wiring is unnecessary when not using the PRESET function and the DISABLE function.

3.2.4 YH, YS output wiring [Sink wiring]



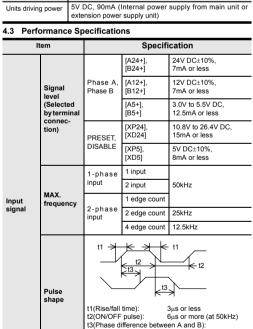




3.2.5 YH. YS output wiring [Source wiring]

The general specifications are equivalent to the PLC main unit. (For general specifications, refer to the manual of the PLC main unit.) 4.2 Power Supply Specifications ltem Specifications

General Specifications



E

special function block for th FROM/TO instruction tra

present value). The FX2KC-1HC occupies 8 points of I/O on the FX2NC, FX3UC expansion bus. The 8 points can be allocated from either inputs or outputs. However, 5V DC 90mA power is supplied from the main unit or extension power supply units. There must be no power overload from this or any other extension unit. Furthermore, another power supply is needed for the output circuit of the encoder or the respective.

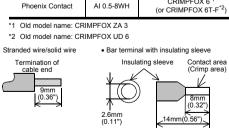
Differential-Line-Driver (AM26C31 or equivalent) and open collector output encoders are available for FX2NC-1HC.

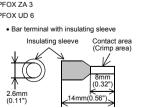
encoders are available for FX2RC-THC. The source of your input signal should be a 1 or 2 phase encoder. A 5V, 12V, or 24V power source can be used. An initial value setting command input (PRESET) and a count prohibit command input (DISABLE) are also available. The FX2RC-THC has two outputs. When the counter value coincides with an output compare value, the appropriate output is set ON. The output transistors are

individually isolated to allow either sink or source connection methods.

Various counter modes, such as 1-phase or 2-phase, 16-bit or 32-bit modes, can be selected using commands from the PLC. Allow the FX2NC-1HC unit to run only after setting these mode parameters.

	 Radiated electromagnetic field 			
	 Fast transient burst 	n		φA
	Electrostatic dischargeHigh-energy surge	0		φB
	 Voltage drops and interruptions Conducted RF Power frequency magnetic field 			DS
				PR
counter block is a the FX2NC, FX3UC	2-phase 50 kHz high-speed counter. It is a			YH
	data (i.e. parameters, comparing value and			YS
ing 0 points of 1/O	on the EVONO EVONO evenencian has The	2	т	erminal





When using a stick terminal with an insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, otherwise the wire cannot be inserted easily.

3.1.2 Tightening Torque

The tightening torque must be 0.22 to 0.25N-m. Do not tighten terminal screws exceeding the specified torque. Failure to do so may cause equipment failures or malfunctions

Tool

To tighten terminals, use a purchased small-sized screwdriver whose head is straight and is not widened as shown in the right figure.

Note: If the diameter of screwdriver grip is too

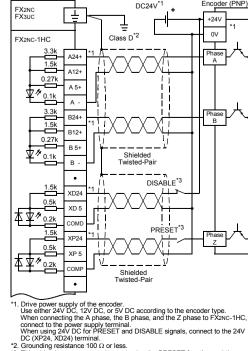
small, tightening torque will not be able to be achieved. Use the following recomdriver or an appropriate replacement (grip diameter: approximately 25mm)

(0.02

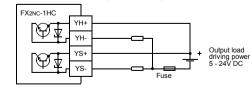
Manufacturer	Model
Phoenix Contact	SZS 0.4×2.5

3.2 Wiring

Make sure to properly wire in accordance with the encoder output specifications Incorrect wiring may cause accidents or damage to the product.



*3. This wiring is unnecessary when not using the PRESET function and the DISABLE function.



4. Specifications

DESI		Count- ing spec- ification	
sys Otl	ke sure to have the following safety circuits outside of the PLC to ensure safe tem operation even during external power supply problems or PLC failure. nerwise, malfunctions may cause serious accidents.		
1)	Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).		
2)	Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block,		
	output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.		
3)	Note that when an error occurs in a relay, triac or transistor output device, the output could be held either on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such	Output signal	
	a case.		I
		I/O occup	a

power line. As a guideline, lay the control line at least 100mm (3.94") or more way from the main circuit or power line. Noise may cause malfunctions.

		3.5µs or more (at 50kHz) PRESET(Z phase) input 100µs or more DISABLE (count prohibit) input 100µs or more			
	Format	Automatic UP/DOWN However, when on 1-phase 1-input mode, UP/ DOWN is determined below. • Hardware UP/DOWN: Up/down count is decided by OFF/ON of the A- phase input terminal. • Software UP/DOWN: Up/down count is decided by the current value (K0/K1) of BFM #1.			
Count- ing spec- ification	Range	When 32-bit is specified: -2,147,483,648 to +2,147,483,647 When 16-bit is specified: 0 to 65,535 (upper limit is set up by BFM #3, #2.)			
	Compari- son Type	 Each output is set when the present value of the counter matches with the compare value, and is switched OFF by a reset command. YH: Direct output processed by hardware. YS: Software processed output with worst delay time of 300 μs. Therefore, when the input frequency is 50 kHz, there is a worst case delay of 15 input pulses. 			
Output signal	Types of outputs	$\begin{array}{rcl} YH +: \mbox{ transistor output for } \\ YH \mbox{ output } \\ YH +: \mbox{ transistor output for } \\ YS +: \mbox{ transistor output for } \\ YS -: \mbox{ transistor output for } YS \mbox{ output } \end{array}$			
	Output capacity	5V ~ 24V DC, 0.5A			
I/O occupation		8 points (can be either inputs or outputs)			

5. Buffer Memories (BFM)

5.1 Buffer memory List

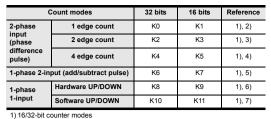
- Note
- 1) When writing in BFM #0 (counter mode), the BFM #1 to #31 will be initialized. After setting the counter mode (BFM #0), other BFM(s) have to be setup. When setting the counter mode, use a TOP (pulsed) instruction, or M8002 (initial pulse) to drive the TO instruction.
- 2) Read/Write of 16 bit data
- When using a positive value between K32,768 and K65,535 with 16 bit counters, read/writes of data, such as the current value, ring length, preset data, and the YH/YS compare value, should use the 32-bit forms of the FROM/TO instructions ((D) FROM, (D) TO).

BFM #	Description		Default	BFM Access
BFM #0	Counter mode (Setting range: K0 to K	11)	К0	R/W
BFM #1	DOWN/UP command 1-phase 1-input mode (S/W counter) o	nly	К0	R/W
BFM #2	Ring length	Lower	K65536	R/W
BFM #3	Ring length	Upper	K05550	R/W
BFM #4	Command		K0	R/W
BFM #5 ~#9	Not available		-	-
BFM #10	Preset data	Lower	ко	R/W
BFM #11	Preset data	Upper	KU	R/W
BFM #12	VII eemaara value	Lower	K32767	R/W
BFM #13	YH compare value	Upper	K32/0/	R/W
BFM #14	YS compare value	Lower	K32767	R/W
BFM #15	ro compare value	Upper K32767	R/W	
BFM #16 ~ #19	Not available		-	-
BFM #20	Counter current value	Lower	ко	R/W
BFM #21	Counter current value	Upper	KU	R/W
BFM #22	Maximum count value	Lower	ко	R/W
BFM #23	waximum count value	Upper		R/W
BFM #24	Minimum count value	Lower	ко	R/W
BFM #25	minimum count value	Upper		R/W
BFM #26	Compare results Terminal status Not available Error status		-	R
BFM #27			-	R
BFM #28			-	-
BFM #29			-	R
BFM #30	Model identification code: K4010		K4010	R
BFM #31	1 Not available		-	-

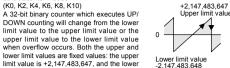
5.2 Details of buffer memories

5.2.1 Counter mode [BFM #0] The counter mode is shown in the upper right table. (Default value: K0)

When writing in BFM #0 (counter mode), the BFM #1 to #31 will be initialized. After setting the counter mode (BFM #0), other BFM(s) have to be setup. When setting the counter mode, use a TOP (pulsed) instruction, or M8002 (initial pulse) to drive the TO instruction.



a) 32-bit counter modes (K0, K2, K4, K6, K8, K10)



limit value is -2,147,483,648 b) 16-bit counter modes (K1, K3, K5, K7, K9, K11) A 16-bit binary counter handles only positive values from 0 to 65,535. Changes to zero from the upper limit value or to the upper Ring length (BFM #3, #2) - 1 limit value from zero when overflow occurs the upper limit value is determined by BFMs #3 and #2

2) 2-phase counter [1 edge-count] (K0, K1)

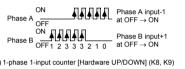
 \sim Phase A +1 ¥ ¥ Phase B Phase B input OFF \rightarrow Phase B input ON → OFF while phase A input ON Count down by 1. ON while phase A input ON Count up by 1. 3) 2-phase counter [2 edge-count] (K2, K3)

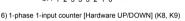
Phase A
$$+1$$

Phase B input OFF \rightarrow
ON while phase A input
OFF while phase A input
OF while phase A input
OF count up by 1. ON count down by 1.

4) 2-phase counter [4 edge-count] (K4, K5)

1-phase 2-input counter (K6, K7) If both phase A and phase B inputs are received simultaneously, the counter value does not change.

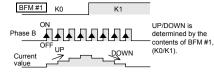






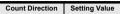


7) 1-phase 1-input counter [Software UP/DOWN] (K10, K11)



5.2.2 DOWN/UP command [BFM #1]

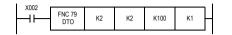
When using the 1-phase 1-input counter [Software UP/DOWN] (counter mode: K10, K11), set the count direction by the current value of BFM #1. (Default value: K0) \rightarrow For the operation, refer to the Subsection 5.2.17)



Up count	K0
Down count	K1

5.2.3 Ring length [BFM #3, #2]

When setting the upper limit value of the 16 bit counters, the setting range is K2 to K65536. (Default value: K65536) In this example, K100 is written to BFM #3, #2 of special function block No.2 as 32 bit data



When ring length K100 is specified, the current UP ______ 98 99 0 1 DOWN______ value of the counter is changed as the right figure, and upper limit value is set to 99.

5.2.4 Command IBEM #41

b12

Bit No.	Setting Value			
BIL NO.	OFF (0)	ON (1)		
b0	Count prohibit	Count permit		
b1	YH output prohibit	YH output permit		
b2	YS output prohibit	YS output permit		
b3	YH/YS independent action	Mutual reset action		
b4	Preset prohibit	Preset permit		
b5 ~ b7	Not av	ailable		
b8	No action	Error flag reset		
b9	No action	YH output reset		
b10	No action	YS output reset		
b11	No action	YH output set		

b13 ~ b15 Not availab

No action

1) When b0 is set to ON and the DISABLE input terminal to OFF, the counter is permitted to start counting input pulses 2) Unless b1 is set to ON. YH (hardware compared output) does not turn ON

YH output set

3) Unless b2 is set to ON, YS (software compared output) does not turn ON 4) When b3=ON, YS output is reset if YH output is set, and YH output is reset if YS output is set. When b3=OFF, YH and YS output act independently, and do not reset each other.

5) When b4=OFF, preset function by the PRESET input terminal is disabled. → For the preset details, refer to Subsection 5.2.5 6) When b8 is set to ON, all error flags are reset.

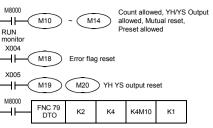
7) When b9 is set to ON, YH output is reset.

8) When b10 is set to ON, YS output is rese 9) When b11 is set to ON, YH output is set ON

10)When b12 is set to ON, YS output is set ON

Example program

The ON/OFF status of M25 to M10 is written in BFM #4 of special function block No.2 by the following program, and b15 to b0 action. Among these, b4 to b0 are always ON as controlled by M10-M14. pre, b8 (M18), b9 (M19), and b10 (M20) are controlled by the input X004 Furthe of the PLC, and X005 by ON/OFF



5.2.5 Preset data [BFM #11, #10]

When BFM #4 b4 is ON and the PRESET input is switched from OFF to ON, preset data is stored into BFM #21, #20 (counter current value). → For command details, refer to Subsection 5.2.4

5.2.6 YH compare value [BFM #13,#12], YH compare value [BFM #15,#14]

After comparing the current value of the counter with the value written in BFM #13 and #12, BFM #15 and #14, the hardware and software comparator in the FX2NC-1HC outputs the comparison result. YH, YS output will not turn ON if using PRESET or the TO instruction to set the PRESET or the TO instruction to set the counter value equal to the comparison value. It will turn ON only when a match occurs by the counting of input pulses. However, when BFM #4 b1, b2 are OFF, it does not set.

Setting value BFM #4 ¥ b9,b10 Coincidence output

Coincidence output

Setting value

BFM # ¥ b9,b10

· Output occurs when the current value becomes equal to the compare value but only if b1 and b2 of BFM #4 are ON. Once an output is set, it remains ON until it is reset by b9 or b10 of BFM #4. If b3 of BFM #4 is ON, however, one of the outputs is reset when the other is set. · The YS comparison operation takes

about 300µs, and if a match occurs, the output goes ON.

5.2.7 Counter current value [BFM #21, #20]

The current value of the counter can be read by the PLC. It will not be the correct value during high-speed operations because of the communication delay. The current value of the counter can be forcibly changed by writing a 32-bit value into the appropriate BFMs from the PLC.

5.2.8 Maximum count value [BFM #23, #22], Minimum count value [BFM #25, # 24]

These store the maximum and minimum value reached by the counter. If the power is turned off, the stored data is cleared.

5.2.9 Compare results [BFM #26]

Bit No.	Target output	OFF (0)	ON (1)
b0	ҮН	Set value ≤ current value	Set value > current value
b1		Set value ≠ current value	Set value = current value
b2		Set value \geq current value	Set value < current value
b3		Set value ≤ current value	Set value > current value
b4	YS	Set value ≠ current value	Set value = current value
b5		Set value \geq current value	Set value < current value
b6 ~ b15	Not available		

5.2.10 Terminal status [BFM #27]

Bit N0.	Signal Name	OFF (0)	ON (1)	
b0	PRESET input	OFF	ON	
b1	DISABLE input	OFF	ON	
b2	YH output	OFF	ON	
b 3	YS output	OFF	ON	
h 4 ~ h15	Not available			

Bit N0.	Error Status			
b0	Set when any of b1 to b7 is ON.			
b1	Set when the value of the ring length is written incorrectly. (Except K2 to K65,536)			
b2	Set when the preset value is written incorrectly.			
b3	Set when the compare value is written incorrectly.	When value \geq ring length i 16-bit counter mode.		
b4	Set when the current value is written in correctly.			
b5	Set when the counter overflows the upper limit.	When the upper or lower limit is exceeded on a 32-bit counter.		
b6	Set when the counter overflows the lower limit.			
b7	Set when the FROM/TO command is used incorrectly.			
b8	Set when the counter mode (BFM#0) is written incorrectly.	Except K0 to K11		
b9	Set when the BFM number is written incorrectly.	Except K0 to K31		
b10 ~ b15	Not available			

of BFM #29 to auxiliary relays of the PLC There error flags can be reset by b8 of BFM #4.

	$K900 \rightarrow BFN$ Set the compused).		r YS output (not necessary if only	YH output is
e counting proces	s at all if the re or flags and YI	elevant output H/YS output	is OFF. Also, outputs will not be ut prohibit are set in the command before you start. The mutual rese required.	d register.
:010 	M10) Count all		
8000	M11) ~ (M	13 Output allowed, Mutual reset	
011	M14	Preset al	lowed	
012	PLS	M18	Error flag reset	←

FNC 79 K2 K14 K900



8. Diagnostics

Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions.

- For repair, contact your local Mitsubishi Electric distributor.
- Do not drop the product or exert strong impact to it. Doing so may cause damage

DISPOSAL PRECAUTIONS

TRANSPORT AND STOR-AGE PRECAUTIONS **ACAUTION**

The product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product

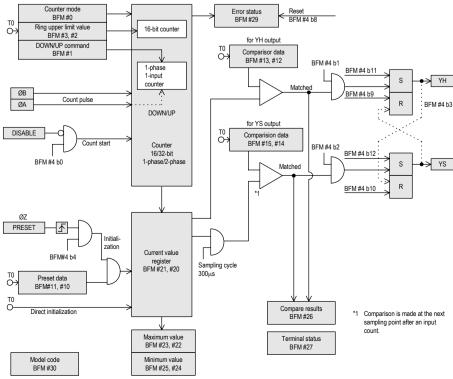
- 1) The following LEDs on the main panel of the FX2NC-1HC may help you to troubleshoot the unit
- a) $\phi A, \phi B:$ Goes on/off as $\phi A, \phi B$ input turn ON/OFF. It can be checked by rotating the encoder slowly.
- b) UP, DN:
- Lights up to indicate whether the counter is going up (UP) or down (DN). c) PR, DS

The appropriate LED lights up when the PRESET (PR) terminal or the DISABLE (DS) terminal is ON.

d) YH, YS: The appropriate LED lights up when YH/YS output is turned on

2) You can check the error status by reading the content of BFM #29 to the PLC. \rightarrow For error contents, refer to the Subsection 5.2.11

9. System Block Diagram



This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electri power, aerospace, medicine or passenger movement vehicles, consult with
- Mitsubishi Electric. This product has been manufactured under strict quality control. However,
- when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

After transportation, verify the operations of the product

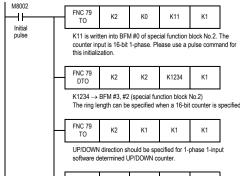


5.2.12 Model identification code [BFM #30]

This BFM stores the identification number for FX2NC-1HC. The identification number for the FX2N-1HC unit is K4010. By reading this identification number, the user may create built-in checking routines to check whether the physical position of the FX2NC-1HC matches to that

6. Example Program

Please use the following program as a guide whenever you use the FX2NC-1HC unit. Other instructions to read the current value of the counter, status etc. can be added as required



 FNC 79 DTO	К2	K12	K1000	K1

K1000 → BFM #13, #12 mpare value for YH output Set the co

7. Preliminary checks

X013

M8000

RUN monitor

PLS

PLS

FNC 79 TO

FNC 78 DFROM

M19

M20

K2

K2

YH output reset

YS output reset

K4M10

D2

K1

K1

K4

K20

BFM (#21, #20) → Reads the current value to the data registers D3 and D2

 $(M25 \text{ to } M10) \rightarrow BFM \#4 (b15 \text{ to } b0) \text{ command}$

1) Check that the I/O wiring and extension cable of the FX2NC-1HC are properly connected

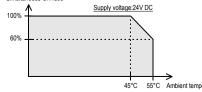
2) The FX2NC-1HC occupies 8 points of I/O on the FX2NC, FX3UC expansion bus.

The 8 points can be allocated from either inputs or outputs. 5V DC 90mA power is supplied from the main or extension power supply units (FX3UC only) for the FX2NC-1HC. Check that there is no power overload from this and other extension blocks.

3) The following derating curve shows the simultaneous ON ratio of available power for products connected to the FX2NC-1HC with respect to the ambient

Use the adjoined following product within the simultaneous input ON ratio range shown in the figure. Target input extension block:FX2NC-16EX, FX2NC-16EX-DS, FX2NC-32EX, FX2NC-32EX-DS

Derating curve: FX2NC-16EX(-DS), FX2NC-32EX(-DS) Simultaneous ON ratio



4) The counter works correctly only when data such as the counter mode (set with a pulse command), the TO command, the compare value, etc. are appropriately specified. Remember to initialize the count (BFM #4 b0), preset (BFM #4 b4), and output (BFM #4 b2, b1) prohibits. Reset the YH/YS outputs before you start.

Note

Note that inputting the pulse higher than the maximum frequency may cause mis-counting to FX2NC-1HC or a FROM/TO error to the PLC main unit.