Mitsubishi □□ □□□ □□□ Series Service Manual

FX1N-60MT-001

1. Description

FX1N-60MT-001

3. Product Information

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FX1N-60MT-001| Mitsubishi Electric | Fx1n Series Programmable Controllers

Manufacturer: Mitsubishi Electric

FX1N-60MT-001

The arithmetic and control system : Stored program repeat operation method, there interrupt instruction

Input and output control method : Batch processing method (END when the instruction is executed), input and output refresh command, Pulse catch function

Programming language : Relay symbol system + step ladder system (SFC representation Allowed)

Program memory : The maximum memory capacity : 8000 step comment, up to 8000 steps, including the file register

Built-in memory capacity and format : 8000 step EEPROM (memory backup required)

Memory cassette (memory board) : FX1N-EEPROM-8L (8000 step EEPROM)

RUN during the write function : Yes (can change programs during the sequencer RUN)

Protective function : There is password protection function (by keyword function)

Real-time clock : Clock function : Built from 1980 to 2079 years (with leap year correction) The year 2-digit / 4-digit switch, monthly deviation ± 45 seconds (25) * Notes on the clock function the current time a large-capacity capacitor of the clock that is built-in (built-in) in has been backed up. Large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. In addition, it can also be held in the battery when you use the optional battery.

Type of instruction : Basic instruction : Sequence Instruction: 27 -step ladder instructions: two

Application Instructions : Application Instructions: 89 species

Arithmetic processing speed : Basic instruction : 0.55 ~ 0.7 s / instruction

Application Instructions : 3.7 to the number of 100 s / instruction

Input and output points : Number of inputs : 128 points or less (at the time of expansion combination) However, the following 128 points in the input and output total

Number of outputs : 128 points or less (at the time of expansion combination) However, the following 128 points in the input and output total

Remote I / O points (CC-Link) : The actual I / O, including below 128 points

Total score : 128 points or less (at the time of expansion in combination)

device : Input and output relay : Input relay : X000 ~ X177 128 points (octal number) extension when used with

Output relay : Y000 ~ Y177 128 points (octal number) extension when used with

Auxiliary relay : For general use : M0 ~ M383 384 points

For Keep (EEPROM keep) : M384 ~ M511 128 points * Notes on the keep area keep area and non-keep-area is fixed. (Change is not allowed in the parameter) in order to reliably keep the EEPROM is required energizing time of the sequencer is more than five consecutive minutes.

For Keep (capacitor keep) : M512 ~ M1535 1024 points * Notes on the keep area keep area and non-keep-area is fixed. (Parameter change is not allowed) large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

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For special : M8000 ~ M8255 256 points

State : Initial state (EEPROM keep) : S0 ~ S9 10 points * Notes on the keep area keep area and non-keep-area is fixed. (Change is not allowed in the parameter) in order to reliably keep the EEPROM is required energizing time of the sequencer is more than five consecutive minutes.

For Keep (EEPROM keep) : S10 ~ S127 118 points * Notes on the keep area keep area and non-keep-area is fixed. (Change is not allowed in the parameter) in order to reliably keep the EEPROM is required energizing time of the sequencer is more than five consecutive minutes.

For Keep (capacitor keep) : S128 ~ S999 872 points * Notes on the keep area keep area and non-keep-area is fixed. (Parameter change is not allowed) large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

Timer (on-delay) : 100ms : T0 ~ T199 200 points (0.1 to 3,276.7 seconds)

10ms : T200 ~ T245 46-point (0.01 to 327.67 seconds)

1ms integration type (capacitor keep) : T246 ~ T249 4 points (0.001 to 32.767 seconds) * Notes on the keep area is keep the area and non-keep-area is fixed. (Parameter change is not allowed) large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

100ms integration type (capacitor keep) : T250 ~ T255 6 points (0.1 to 3,276.7 seconds) * Notes on the keep area is keep the area and non-keep-area is fixed. (Parameter change is not allowed) large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

Other : You can use the built-in analog volume two points as an analog timer VR1: D8030, VR2: D8031 2 points (0 to 255)

counter : 16-bit up : C0 ~ C15 16 points (0 to 32,767 counts)

16-bit up (EEPROM keep) : C16 ~ C31 16 points (0 to 32,767 counts) * Notes on the keep area keep area and non-keep-area is fixed. (Change is not allowed in the parameter) in order to reliably keep the EEPROM is required energizing time of the sequencer is more than five consecutive minutes.

16-bit up (capacitor keep) : C32 ~ C199 168 points (0 to 32,767 counts) * Notes on the keep area keep area and non-keep-area is fixed. (Parameter change is not allowed)

large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

32-bit up / down : C200 ~ C219 20 points (-2,147,483,648 ~ + 2,147,483,647 count)

32-bit up / down (capacitor keep) : C220 ~ C234 15 points (-2,147,483,648 ~ + 2,147,483,647 count) * Notes on the keep area is keep the area and non-keep-area is fixed. (Parameter change is not allowed) large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

High-speed counter : [32-bit high-speed up / down (EEPROM keep)] C235 C255 1 phase: 60KHz, 10KHz 2 phase: 30kHz, 5kHz There is a limit to the number and input frequency that can be used by the conditions used. * Notes on the keep area keep area and non-keep-area is fixed. (Change is not allowed in the parameter) in order to reliably keep the EEPROM is required energizing time of the sequencer is more than five consecutive minutes.

Data register (32-bit in the pair used) : 16-bit general purpose : D0 ~ D127 128 points

16 bit for Keep (EEPROM keep) : D128 ~ D255 128 points * Notes on the keep area keep area and non-keep-area is fixed. (Change is not allowed in the parameter) in order to reliably keep the EEPROM is required energizing time of the sequencer is more than five consecutive minutes.

16 bit for Keep (capacitor keep) : D256 ~ D7999 7744 points * Notes on the keep area keep area and non-keep-area is fixed. (Parameter change is not allowed) large-capacity capacitor (built-in) becomes a full charge in the current time of 30 minutes, and holds the current value of 10 days. When the voltage of the large-capacity capacitor is reduced there is that the state of the capacitor keep the device can not be properly maintained. Or when used for the first time after purchasing the FX1N Series PLC, when you want to use after the state that does not put a long time power supply, please initialize the capacitor keep the device. Also, before you resume operation, please do the setting of the device and the current time necessary for the operation.

File register (keep) : D1000 ~ D7999 maximum 7000 points (the program area in the 500-point units from the D1000 by the parameter as a file register (set to EEPROM) Allowed)

16 bit for special : D8000 ~ D8255 256 points

For 16-bit index : V0 ~ V7, Z0 ~ Z7 16 points

Pointer : JUMP, for CALL branch : P0 ~ P127 128 points (CJ instruction, for the CALL instruction, for the END jump P63)

Input interrupt : I00 ~ I50 6 points

nesting : [Master control] N0 N7 8 points (for MC instruction)

constant : Decimal number (K) : 16-bit: -32,768 + 32,767 32-bit: -2,147,483,648 ~ + 2,147,483,647

Hexadecimal (H) : 16-bit: 0 FFFF 32 bit: 0 ~ FFFFFFFF

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Power Specifications :

Rated voltage : AC100 ~ 240V

Allowable voltage range : AC85 ~ 264V

Rated frequency : 50 / 60Hz

Allowable momentary power failure time : 10ms will continue to operate for the momentary power failure follows.

Power Fuse : 250V 3.15A

Inrush current : Maximum 30A 5ms or less / AC100V, maximum 50A 5ms or less / AC200V

Power consumption : 35W includes input current worth of (per point 7mA or 5mA,).

DC24V service power : 400mA is unrelated to the expansion block of connection.

Input Specifications :

Number of inputs : 36 points (40) in () is the number of occupied, the difference between the effective number is empty number.

Input connection shape : Removable terminal block (M3 screws)

Input format : sink

Input signal voltage : DC24V ± 10%

Input impedance : X000 ~ X007 : 3.3k

X010 or later : 4.3k

Input signal current : X000 ~ X007 : 7mA / DC24V

X010 or later : 5mA / DC24V

Input ON sensitivity current : X000 ~ X007 : More than 4.5mA

X010 or later : More than 3.5mA

Input OFF sensitivity current : 1.5mA or less

Input response time : About 10Ms X000 X007 has a built-in digital filter, can be changed in 1ms unit to 0 ~ 15ms by the D8020. If 0 is specified, X000, X001 is 10 s, X002 ~ X007 will be 50 s.

Input signal format : No-voltage contact input NPN open collector transistor

Input circuit insulation : Photocoupler

Input Operation Display : Input ON when the LED lights up

Input circuit configuration :

Output Specifications :

Number of outputs : 24 points

Output connection shape : Terminal block (M3 screws)

Output type / format : Transistor / sink output

External power supply : DC5 ~ 30V

Peak load : Resistance load : 0.5A or less / output per point 0.8A or less / COM terminal per one

Inductive load : 12W / DC24V

Minimum load : -

Open circuit leakage current : 0.1mA / DC30V

ON voltage : 1.5V

Response time : OFF ON : Y000, Y001: 5 s following Y002 later: 0.2ms or less

ON OFF : Y000, Y001: 5 s following Y002 later: 0.2ms or less

Circuit insulation : Photocoupler

Output operation display : Photocoupler drive when LED lighting

Output circuit configuration :

Built-in high-speed counter function :

1 phase 1 count input : [C235, C236] Up To Two Points: The Best 60KHz High Speed Compared To SET / RESET When Using: 30KHz [C237 C245] Up To 4 Points: Up To 10KHz High Speed Compared To SET / RESET When Using: 10KHz Sequencer Is Processed By The High-Speed Counter And Pulse Density Instruction The Sum Of The Frequency (The Two-Phase Counter Summing Up The 2 Times The Input Frequency) Is A 60KHz Maximum. During The High-Speed Comparison SET / RESET Use, The Sum Of the frequency at which the sequencer is treated with high-speed counter and pulse density instruction (the two-phase counter summing up the 2 times the input frequency) is the maximum 30kHz is.

1-phase 2-count input : [C246] Up To One Point: The Best 60KHz High Speed Compared To SET / RESET When Using: 30KHz [C247 C250] Up To Two Points: The Best 10KHz High Speed Compared To SET / RESET When Using: 10KHz Frequency At Which The Sequencer Is Treated With High-Speed Counter And Pulse Density Instruction (The Two-Phase Counter Summing Up The 2 Times The Input Frequency) Of The Total Is 60KHz Maximum. During The High-Speed Comparison SET / RESET Use, The Sum Of The Frequency at which the sequencer is treated with high -speed counter and pulse density instruction (the two-phase counter summing up the 2 times the input frequency) is the maximum 30kHz is.

2-phase 2-count input : [C251] Up To One Point: The Best 30KHz High Speed Compared To SET / RESET When Using: 15KHz [C252 C255] Up To Two Points: The Best 5KHz High Speed Compared To SET / RESET When Using: 5KHz High-Speed Counter And Pulse Density Instruction Frequency On Which The Sequencer Process In (The Two-Phase Counter Summing Up The 2 Times The Input Frequency) Of The Total Is 60KHz Maximum. During The High-Speed Comparison SET / RESET Use, The Sum Of The Frequency At which the sequencer is treated with high- speed counter and pulse density instruction (the two-phase counter summing up the 2 times the input frequency) is the maximum 30kHz is.

Built-in pulse output and positioning function :

Number of controlled axes : Independent 2-axis

Maximum frequency : 100kHz

Programming language : Sequence program

Corresponding basic unit : Transistor output type basic unit

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Pulse output instruction : Output Pulse (PLSY) , Acceleration And Pulse Output With Speed (PLSR) Pulse Output Format: Pulse Train (The Direction Is Controlled By The Sequence)

Positioning instruction : ABS Current Value · Read ([D] ABS) · Homing [ZRN] (Without DOG Search Function) Near Point DOG: To Slow Down In The ON, The Near Point DOG:. Stops At OFF (Homing Operation Of Counting The Zero- Signal And Different Point From) , Variable-Speed Pulse Output [PLSV] , Relative Positioning [DRVI] - Absolute Positioning [DRVA]

Pulse Output Format: Pulse Train Tasu Direction

Ambient temperature : 0 ~ 55 ····· operation, -20 ~ 70 ····· during storage

Relative humidity : 35 ~ 85% RH (non-condensing) ..... operation

Vibration resistance : When the DIN rail mounting : Frequency: 10 ~ 57Hz : Amplitude Half: 0.035Mm X, Y, Z Each Direction 10 Times (For A Total Of Each 80 Minutes) Criteria, According To IEC61131-2

Frequency: 57 ~ 150Hz : Acceleration: 4.9M / S 2 X, Y, Z Each Direction 10 Times (For A Total Of Each 80 Minutes) Criteria, According To IEC61131-2

Direct mounting at the time : Frequency: 10 ~ 57Hz : Amplitude Half: 0.075 mm X, Y, Z Each Direction 10 Times (For A Total Of Each 80 Minutes) Criteria, According To IEC61131-2

Frequency: 57 ~ 150Hz : Acceleration: 9.8M / S 2 X, Y, Z Each Direction 10 Times (For A Total Of Each 80 Minutes) Criteria, According To IEC61131-2

Impact : 147M / S 2, Action Time 11Ms, X At Half-Sine Pulse, Y, Z 3 Times Each Direction Criterion, According To IEC61131-2

Anti-noise : Noise voltage 1,000Vp-p, noise width 1 s, due to rising 1ns, cycle 30 ~ 100Hz of noise simulator

Withstand voltage : . When Performing A Withstand Voltage Test, Please Go Between The Ground Terminal Of Each Terminal And The Basic Unit At A Voltage Of Below Power Supply Terminal (AC Power) And Between The Ground Terminal: AC1.5KV 1 Minute DC24V Service Power Supply, And Input Terminal The (DC24V) And Between The Ground Terminal: AC500V 1 Minute Output Terminal (Transistor) And Between The Ground Terminal: AC500V 1 Minute

Insulation resistance : . When Performing The Insulation Resistance Test, Please Go Between The Ground Terminal Of Each Terminal And The Basic Unit At A Voltage Of Below Power Supply Terminal (AC Power) And Between The Ground Terminal: DC500V 5Emuomega More In Insulation Resistance Tester DC24V Service Power Supply , And The Input Terminal (DC24V) And Between The Ground Terminal: DC500V 5Emuomega More In Insulation Resistance Tester And The Output Terminal (Transistor) Ground Terminal Between: DC500V 5Emuomega More In Insulation Resistance Tester

ground : D Grounding Class (Ground Resistance: 100Omu Or Less) Ground, Please Dedicated Ground Or Shared Ground.

Use atmosphere : Corrosive, there is no flammable gas, conductive dust (dust) that is not terribly

Advanced use : Or Less 2,000M Can Not Be Used Under The Pressurized Environment To More Than Atmospheric Pressure. There Is A Possibility Of Failure.

Shipping Weight : 1.8 Kg