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› DollaTek DC24V Programmable Logic Controller (PLC) FX3U-24MR User Manual

DollaTek FX3U-24MR

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1. INTRODUCTION

This manual provides essential information for the installation, operation, and maintenance of the DollaTek FX3U-24MR DC24V Programmable Logic Controller (PLC). The FX3U-24MR is an industrial-grade control board designed for various automation tasks, featuring a 32-bit microcontroller for robust performance and high-speed processing.

Key features include:

- Industrial-grade 32-bit microcontroller for strong anti-interference and fast operation.
- Supports Ladder Logic programming language.
- Compatible with GX-Developer and GX-work2 programming software.
- Supports Human Machine Interface (HMI) connection.
- Integrated programming port for program uploading, downloading, and monitoring.



Figure 1.1: DollaTek FX3U-24MR PLC with protective casing.

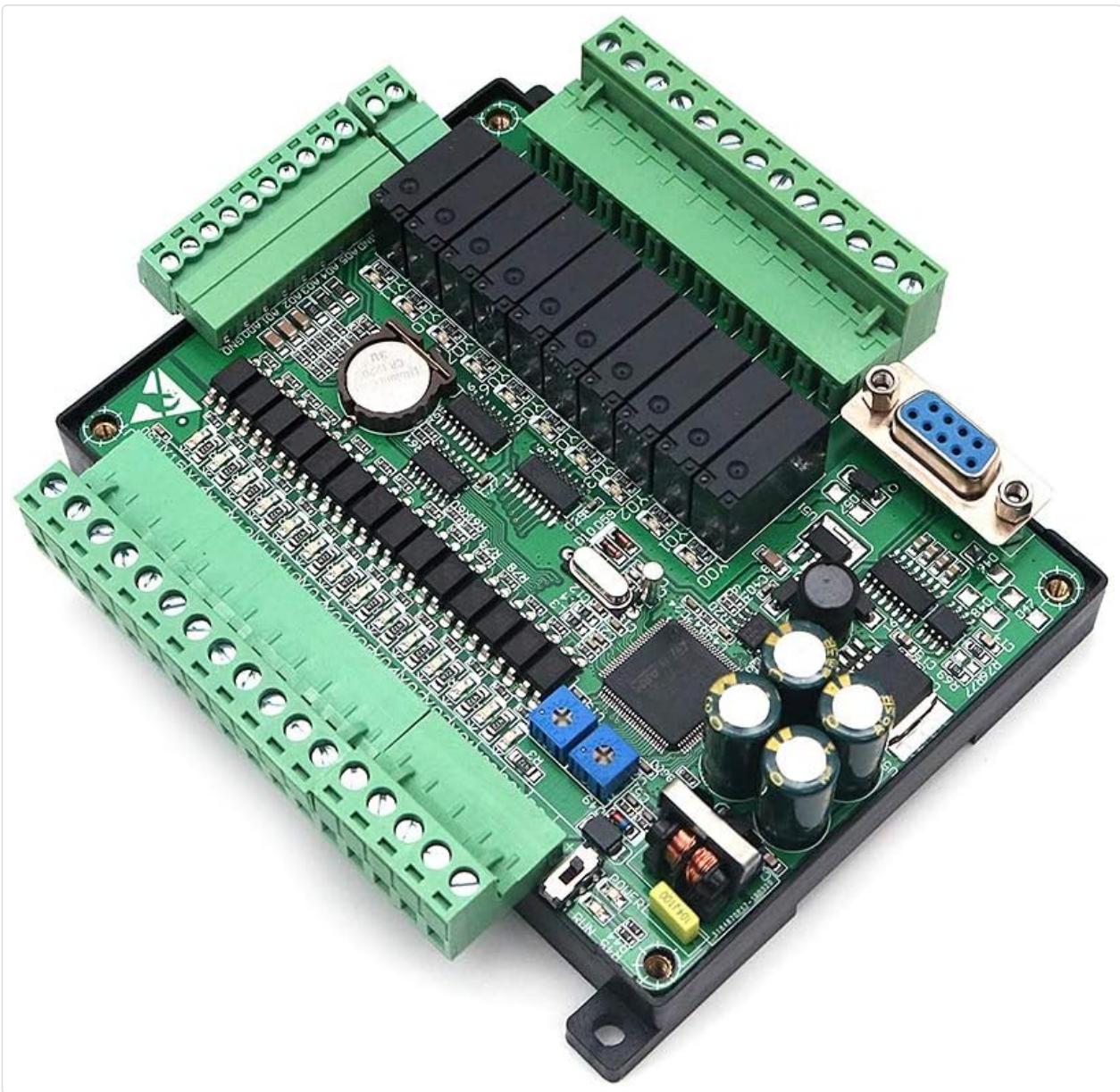


Figure 1.2: DollaTek FX3U-24MR PLC circuit board components.

2. SETUP AND WIRING

Proper setup and wiring are crucial for the safe and correct operation of the FX3U-24MR PLC. Ensure the power supply is disconnected before making any connections.

2.1 Power Supply Connection

The PLC requires a DC24V power supply. Connect the positive (+) terminal of the 24V power supply to the '24V' terminal on the PLC and the negative (-) terminal to the '0V' terminal.

2.2 Input and Output Wiring

The FX3U-24MR features 14 digital input points (X0-X15) and 10 relay output points (Y0-Y11). Inputs X0-X5 can function as high-speed counting inputs up to 12KHz. The relay outputs can control AC contactors, intermediate relays, and solenoid valves, with a maximum current of 5A per output.

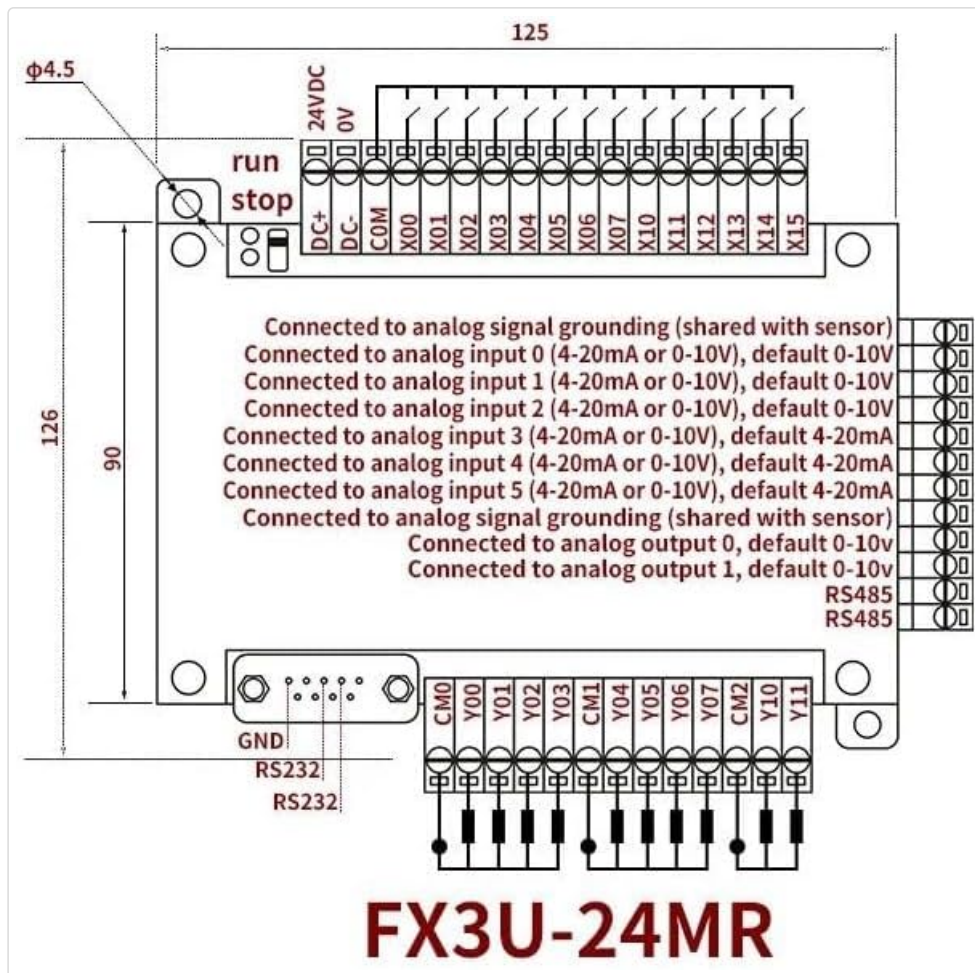


Figure 2.1: Detailed pinout and wiring diagram for the FX3U-24MR PLC.

Digital Inputs (X0-X15): These are low-level NPN inputs. Connect external sensors or switches to these terminals. Note that X point input is negative.

Relay Outputs (Y0-Y11): These are relay contacts. Connect the load to be controlled between the common terminal and the respective Y output terminal. Ensure the load's voltage and current ratings do not exceed the PLC's specifications (Max. 5A).

2.3 Analog Input/Output Wiring

The PLC includes 6 analog input channels (AD0-AD5) and 2 analog output channels (DA0-DA1).

- **Analog Inputs:** AD0-AD2 support 0-10V voltage input. AD3-AD5 support 0-20mA current input.
- **Analog Outputs:** DA0-DA1 provide 0-10V voltage output.

Refer to the wiring diagrams for correct connection of analog sensors and actuators.

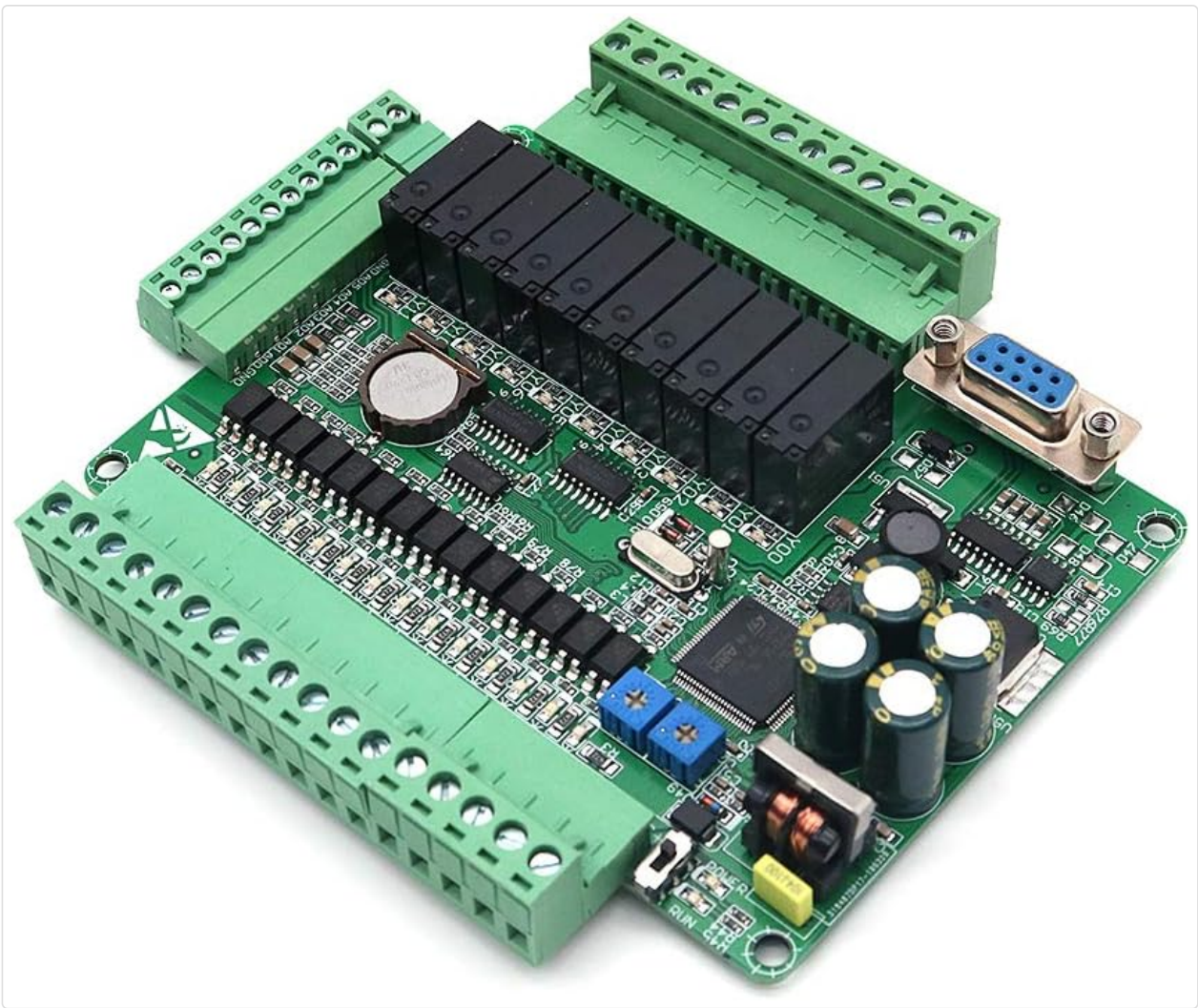


Figure 2.2: Example wiring diagram with loads and RS485 communication.

2.4 Communication Ports

The PLC is equipped with RS232 and RS485 communication interfaces. These ports are used for programming, HMI communication, and data exchange.

- **RS232:** Typically used for programming and debugging with a PC.
- **RS485:** Suitable for multi-device communication in industrial networks.

3. OPERATING INSTRUCTIONS

The FX3U-24MR PLC supports programming, uploading, debugging, and monitoring using Ladder Logic programming software such as GX-Developer or GX-work2.

3.1 Programming Mode

The PLC operates in a programming mode that allows for the creation, modification, and transfer of control programs. The programming port serves as the interface for these operations.

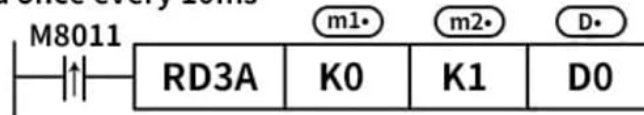
- **Programming:** Develop your control logic using Ladder Logic in GX-Developer or GX-work2.
- **Uploading/Downloading:** Transfer programs between the PC and the PLC.
- **Debugging/Monitoring:** Observe the PLC's real-time status and program execution for troubleshooting and verification.

3.2 Analog Input Reading

To read analog input values, use the **RD3A** instruction. This instruction reads the instantaneous value from the specified analog module and saves it to a data register.

Analog reading instruction

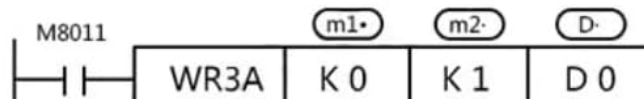
Read once every 10ms



Read instruction for analog input value of analog module

- m1•** : Module number, set the host to 0
- m2•** : Analog input channel number K0-K5 (corresponding to AI1- AI6)
- D•** : Read the instantaneous value of the data and save it to D0, and save the value read from the analog module

Analog output instruction



Read instruction for analog input value of analog module

- m1•** : Module number, set the host to 0
- m2•** : Analog input channel number K0-K1
- D•** : Write data, specify the value written to the analog module (0-4095)

Analog output instruction

The clock module explains: when setting the clock, the M8015 should be set and restores the M8015 reset. D8018 is for year, D8017 is month, D8016 is day, D8019 is week, D8015 is hour, D8014 is minute, D8013 is second. The clock data can be read by the clock data TRD to read the clock data to the general register, or to modify the clock with the clock writing instruction TWR, using this instruction without the position M8015.

Figure 3.1: Analog reading instruction (RD3A).

- **M1**: Module number (set to 0 for host).
- **M2**: Analog input channel number (e.g., K0-K5, corresponding to AD0-AD5).
- **D**: Data register to save the read value (e.g., D0).

3.3 Analog Output Control

To control analog output values, use the **WR3A** instruction. This instruction writes a specified data value to the analog output module.

High speed pulse output and pulse width modulation

Support 8-way pulse output Y0-3 frequency (100K) Y4-7 frequency (10K) (PLSY, PLSV, PLSR, DRVA, DRVI, ZRN, DSZR, DVIT) or 6-way pulse width frequency modulation Y0-3 (PWM), frequency 100K

pulse	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Number of output pulses	D8132	D8134	D8136	D8138	D8140	D8142	D8166	D8168
Output Tags	M8147	M8148	M8149	M8150	M8151	M8152	M8153	M8154
Pulse stop	M8141	M8142	M8143	M8144	M8145	M8146	M8155	M8156
Min output frequency	D8144	D8146	D8148	D8150	D8152	D8154	D8156	D8158
Acceleration and deceleration time	D8145	D8147	D8149	D8151	D8153	D8155	D8157	D8159
DSZR, DVIT direction	M8080	M8081	M8082	M8083	M8084	M8085	M8086	M8087
DVIT interrupt input X address 0-17	D8080	D8081	D8082	D8083	D8084	D8085	D8086	D8087
Origin regression velocity	D8220	D8221	D8222	D8223	D8224	D8225	D8226	D8227
Origin return crawling speed	D8090	D8091	D8092	D8093	D8094	D8095	D8096	D8097
Number of ZRN crawling pulses	D8072	D8073	D8074	D8075	D8076	D8077	D8078	D8079

Interrupt description

1. External interrupts support X0-X5, with the following interrupt numbers

	UP	DOWN	Interrupt Inhibit
X0	I0	I1	M8050
X1	I100	I101	M8051
X2	I200	I201	M8052
X3	I300	I301	M8053
X4	I400	I401	M8054
X5	I500	I501	M8055

2. Timer interrupt pointer is I600, interrupt inhibit is M8056
Interrupt time range I601 (1MS) - I699 (99MS)

3. Counter interrupt pointer

Pointer no.	Interrupt Inhibit
I0	M8059
I10	
I20	
I30	
I40	
I50	

Figure 3.2: Analog output instruction (WR3A).

- **M1:** Module number (set to 0 for host).
- **M2:** Analog input channel number (e.g., K0-K1).
- **D:** Data to write to the analog module (range 0-4095).

3.4 High-Speed Pulse Output and Pulse Width Modulation (PWM)

The FX3U-24MR supports high-speed pulse output and PWM functions, essential for controlling stepper motors, servo motors, and other precise motion control applications.

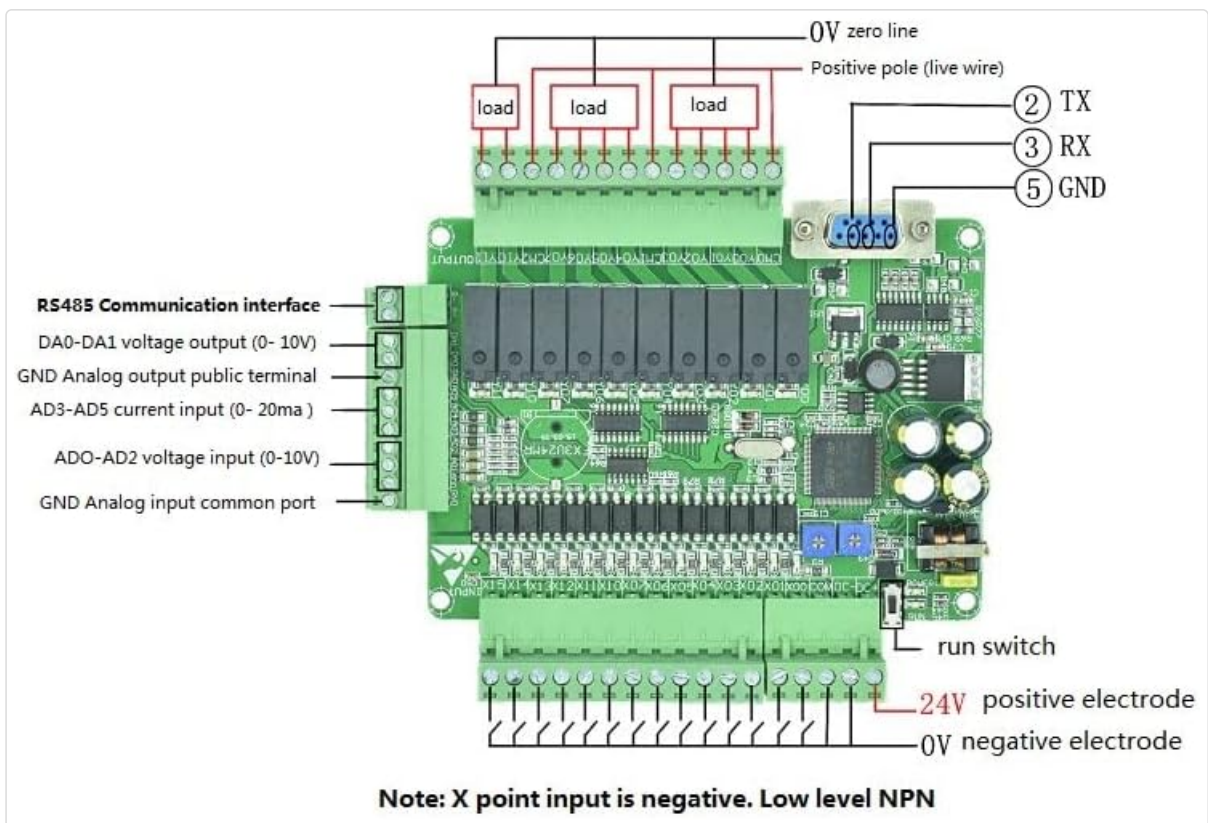


Figure 3.3: High-speed pulse output and PWM parameters.

The PLC supports 8-way pulse output (Y0-Y3 frequency 100K, Y4-Y7 frequency 10K) and 6-way pulse width modulation (PWM) output (Y0-Y3 frequency 100K).

3.5 Interrupt Description

The PLC supports various interrupt types for responsive control, including external interrupts, timer interrupts, and counter interrupts.

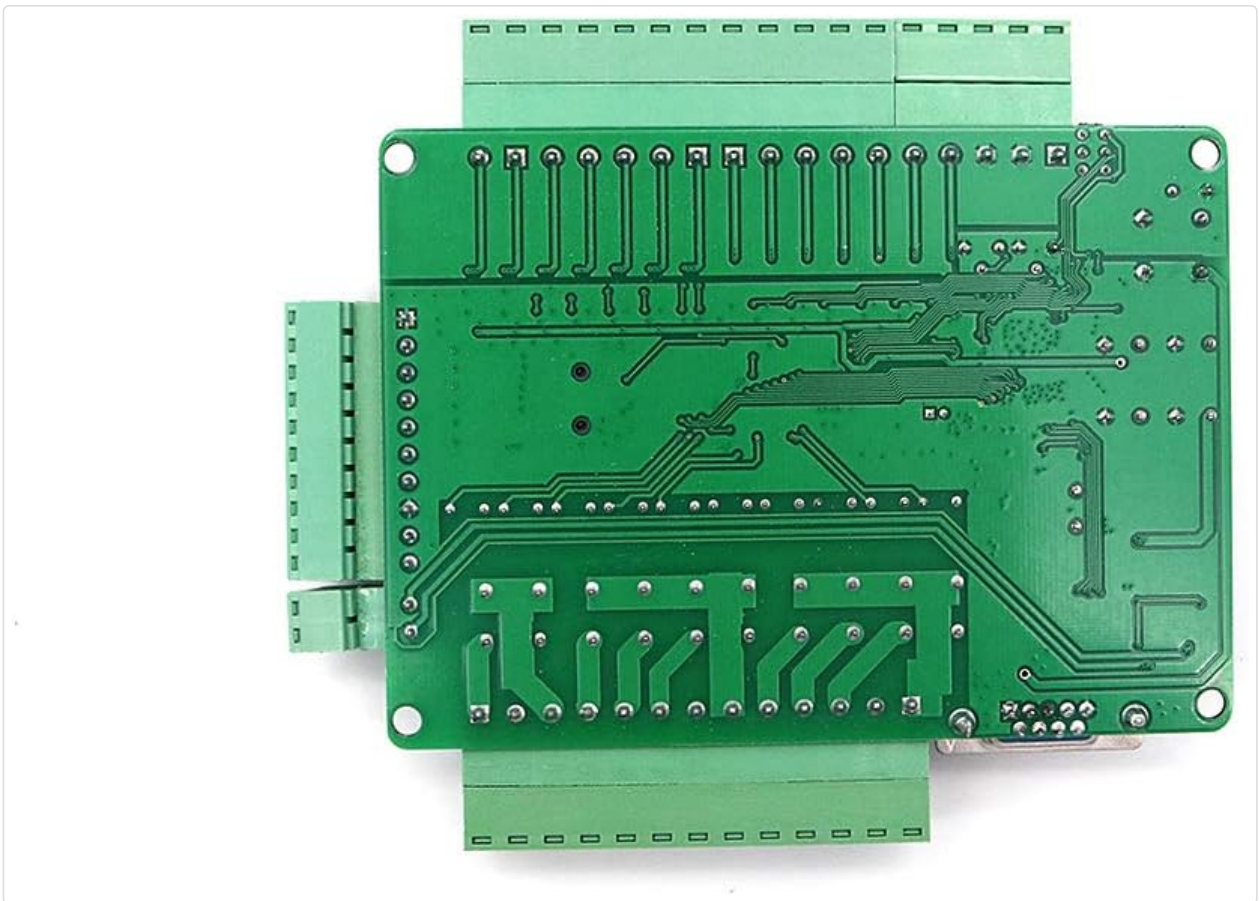


Figure 3.4: Interrupt description table.

- **External Interrupts:** Supported on inputs X0-X5 with specific interrupt numbers and inhibit bits.
- **Timer Interrupts:** Timer interrupt pointer is I600, with inhibit M8056. Interrupt time range I601 (1MS) - I699 (99MS).
- **Counter Interrupts:** Specific pointer numbers correspond to interrupt inhibit bits.

4. SPECIFICATIONS

Feature	Specification
Product Type	FX3U-24MR
Power Supply	DC24V
Digital Inputs	14 points (X0-X15), X0-X5 support 12KHz high-speed counting
Digital Outputs	10 relay points (Y0-Y11), Max. 5A per output
Analog Inputs	AD0-AD2 (0-10V), AD3-AD5 (0-20mA)
Analog Outputs	2 points (0-10V)
Memory Capacity	8000 steps
Upload Baud Rate	38.4 Kbps
Programming Software	GX-Developer, GX-work2
Dimensions (Board)	Approximately 125mm x 100mm
Maximum Operating Temperature	60°C

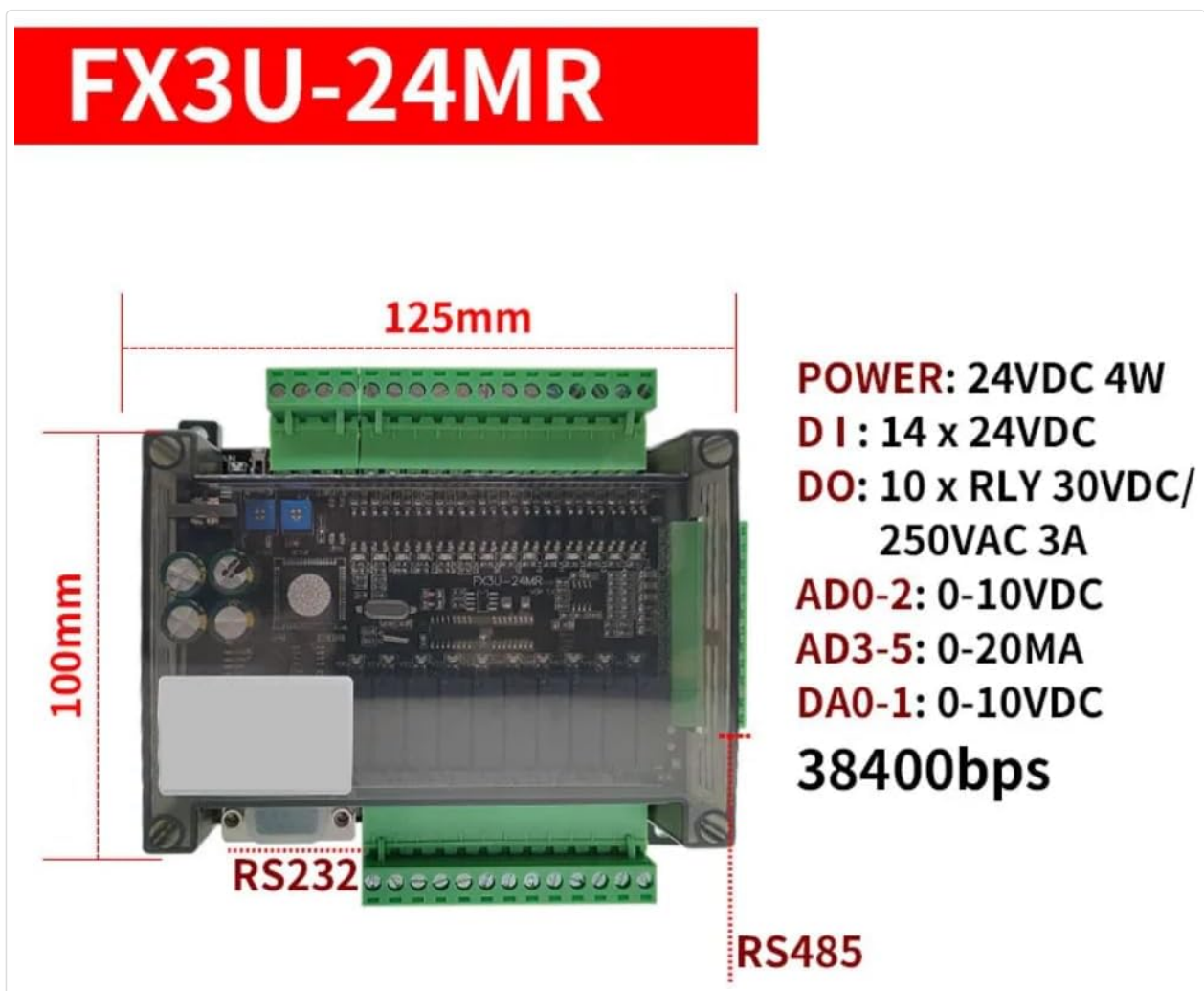


Figure 4.1: FX3U-24MR PLC dimensions.

5. MAINTENANCE

To ensure the longevity and reliable operation of your DollaTek FX3U-24MR PLC, follow these general maintenance guidelines:

- **Keep Clean:** Regularly clean the PLC and its surroundings to prevent dust and debris accumulation, which can affect performance and lead to overheating. Use a soft, dry cloth.
- **Environmental Control:** Operate the PLC within its specified temperature and humidity ranges. Avoid exposure to direct sunlight, excessive moisture, or corrosive environments.
- **Connection Integrity:** Periodically check all wiring connections for tightness and signs of corrosion. Loose connections can cause intermittent operation or damage.
- **Power Supply Stability:** Ensure a stable and clean DC24V power supply. Voltage fluctuations can impact PLC performance.

6. TROUBLESHOOTING

This section provides general guidance for common issues. For complex problems, consult the programming software documentation or contact technical support.

- **PLC Not Powering On:** Verify the DC24V power supply connections and ensure the power source is active and providing the correct voltage.
- **Program Upload/Download Failure:** Check the RS232/RS485 communication cable connection. Ensure the correct COM port is selected in the programming software and the baud rate matches the PLC's setting (38.4 Kbps). Verify that the correct drivers for your communication cable are installed.
- **Input Not Responding:** Check the wiring of the input device (sensor/switch) to the PLC's input terminal. Ensure the input device is functioning correctly and providing the expected signal (low-level NPN).
- **Output Not Activating:** Verify the wiring of the load to the PLC's output terminal. Check the load itself for functionality. In the programming software, monitor the output status to confirm the PLC is commanding the output to activate. Ensure the load's current draw does not exceed 5A.
- **Timing Function Issues:** If timing functions are not operating as expected, review your Ladder Logic program for correct timer instruction usage and parameter settings. Ensure the PLC's internal clock (if used) is correctly configured.

7. WARRANTY AND SUPPORT

For information regarding product warranty, technical support, or service, please refer to the documentation provided at the time of purchase or contact your vendor directly. DollaTek provides support for its products, and specific contact details can usually be found on their official website or through authorized distributors.