2.3 MD38PGMD Multi-function Encoder Card

2.3.1 Product Introduction

MD38PGMD is a multi-function PG card based on MD38PG1, MD38PG5 and MD38PG6D. It is compatible with differential input, open-collector input, push-pull input, differential output and open-collector output for regular encoders and A/B phase input of the host controller. MD38PGM card with CPLD also has 0 to 63 multi-frequency output, adaptive filtering, automatic interlocking function and encoder disconnection detection function.

2.3.2 Appearance and Dimensions

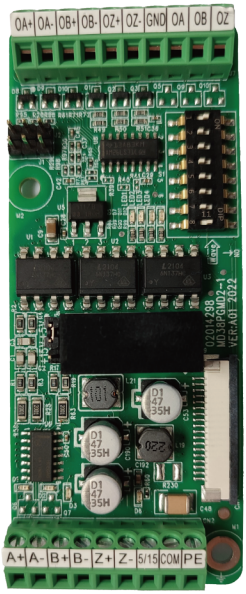

Figure 2-7 Appearance of MD38PGMD expansion card

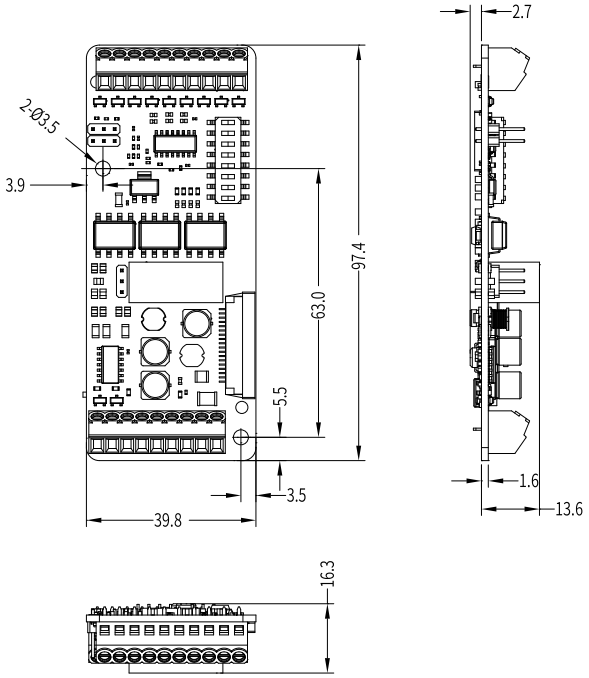

Figure 2-8 Dimensions of MD38PGMD expansion card

2.3.3 Interface Layout and Description

Interface Layout

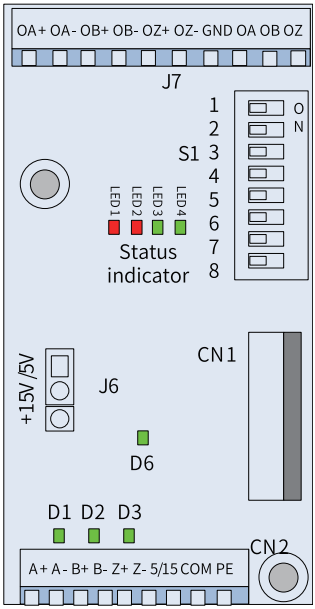

Figure 2-9 Interface layout of MD38PGMD expansion card

Name	Description	Note
CN1	Interface connecting the PG card and the control board of the AC drive	-
CN2	Encoder signal input terminal, supporting differential and collector input;	Refer to “Pin definition of CN2 encoder signal input terminal”
S1	DIP switch used to set the frequency division coefficient and the filtering function.	Only available for MD38PGMD expansion card.
J6	Jumper used to select the encoder power supply (5 V or 15 V output)	Set to 5V by default
J7	Frequency-division terminal: supporting differential and collector frequency-division output	-
LED1/LED2/LED3/ LED4	Status indicator	See the table below for specific meanings. Only available for MD38PGMD expansion card.

Name	Description	Note
D6	Power indicator	-
D1/D2/D3	Encoder input signal indicators: The indicators flash or remain steady on when the encoder has an input signal.	D1 corresponds to A +/A-, D2 corresponds to B +/B-, and D3 corresponds to Z +/Z-.

Interface description

Table 2–6 Pin definition of CN2 encoder signal input terminal

Pin No.	Terminal	Description
1	A+	Encoder output A signal (positive)
2	A-	Encoder output A signal (negative)
3	B+	Encoder output signal B positive
4	B-	Encoder output signal B negative
5	Z+	Encoder output signal Z positive
6	Z-	Encoder output signal Z negative
7	5V/15V	Encoder 5V/15V power supply
8	COM	Encoder power ground
9	PE	Shield connecting terminal

Table 2–7 Pin definition of J7 frequency-division output signal terminal

Pin No.	Terminal	Description
1	OA+	Differential frequency dividing output signal A positive
2	OA-	Differential frequency-division output signal A negative
3	OB+	Differential frequency-division output signal B positive
4	OB-	Differential frequency-division output signal B negative
5	OZ+	Differential frequency-division output signal Z positive
6	OZ-	Encoder output signal Z negative
7	GND	Frequency dividing output reference ground
8	OA	Open-collector frequency dividing output signal A

Pin No.	Terminal	Description
9	OB	Collector frequency-division output signal B
10	OZ	Collector frequency-division output signal Z

DIP switch S1

The DIP switch S1 is used to set the frequency division coefficient and select the filtering function. The code is 1 when the DIP switch is ON. Otherwise the code is 0. For details, refer to the following table.

Frequency-division coefficient	DIP switch								Filtering function
	Switch for setting frequency-division coefficient						Switch for setting filter function		
	1	2	3	4	5	6	7	8	
No output	0	0	0	0	0	0	0	0	Non-adaptive filter
1 frequency-division output	1	0	0	0	0	0			
2 frequency-division output	0	1	0	0	0	0	1	0	Adaptive filter
3 frequency division output	1	1	0	0	0	0			
-	-	-	-	-	-	-	0	1	Fixed interlock
-	-	-	-	-	-	-			

Frequency-division coefficient	DIP switch								Filtering function
	Switch for setting frequency-division coefficient						Switch for setting filter function		
	1	2	3	4	5	6	7	8	
-	-	-	-	-	-	-	1	1	Automatic interlock
63 frequency division output	1	1	1	1	1	1			

Filtering function description:

- Non-adaptive filter: The filter coefficient of the PG card is fixed and small. The PG card is applicable to scenarios with low or no interference, or high-speed applications.
- Adaptive filter: The filter coefficient of the PG card can be adjusted automatically. This filter mode has a strong interference-resistant capability, especially when the encoder feedback frequency is lower than 100 kHz. This mode is suitable for scenarios with high interference. It is the default mode.
- Fixed interlock: On the basis of adaptive filter function, the fixed interlock mode has a new function that can eliminate the jitter of the encoder feedback signal edge. This mode adds the capability to eliminate encoder feedback signal edge jitter on the basis of adaptive filter. It is applicable to scenarios where encoder feedback signals have jitter at the edge.
- Automatic interlock: Besides the function supported in fixed interlock mode, the automatic interlock mode also supports switchover between adaptive filtering and fixed interlock to adapt to zero-speed and non-zero-speed working conditions. This helps ensure no signals are taken as edge jitter and get eliminated in zero-speed condition.

Status indicator

No.	Type	State	Function
LED1	Encoder input signal quality indicator (red when flashing or on)	OFF	The input signal is normal, with stable speed and no interference.
		Steady ON	The input signal is slightly unstable when the motor accelerates or decelerates or when the encoder input signal is slightly interfered with.
		Slow flashing [Note]	The input signal is moderately unstable when the motor accelerates or decelerates or when the encoder input signal is moderately interfered with.
		Flashing quickly	The input signal is seriously unstable when the motor accelerates or decelerates rapidly or when the encoder input signal is seriously interfered with.
LED2	Signal processing quality indicator of PG card (red when flashing or on)	OFF	The PG card signal is normal, with stable speed and no interference.
		Steady ON	The PG card signal is slightly unstable when the motor accelerates or decelerates or when a small amount of interference in the encoder input signal is not filtered out by the PG card (less than 10 interference pulses are not filtered out per unit time).
		Slow blinking	The PG card signal is moderately unstable when the motor accelerates or decelerates or when a certain amount of interference in the encoder input signal is not filtered out by the PG card (less than 30 interference pulses are not filtered out per unit time).
		Flashing quickly	The PG card signal is severely unstable when the motor accelerates or decelerates or when a certain amount of interference in the encoder input signal is not filtered out by the PG card (more than 30 interference pulses are not filtered out per unit time).
LED3	Interlock status indicator (green when flashing or on)	ON	Inter-lock enabled
		OFF	Inter-lock disabled
LED4	System indicator (green when flashing or on)	Steady ON	Normal
		Flashing	The encoder cable breaks.

Note

Slow flash frequency: 2 Hz; Flash frequency: 10 Hz.