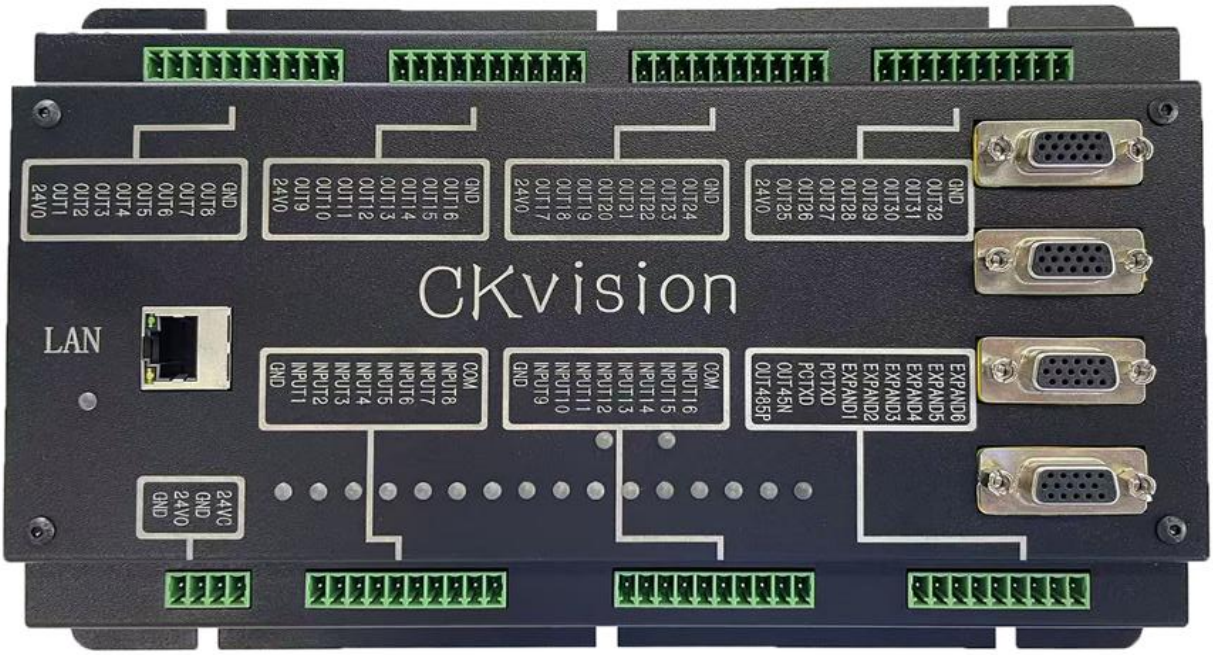
Optical Screening Machine Controller

CK3PMCV1.2



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1. Product Overview

The CK3PMCV1.2 optical screening machine controller, based on high - speed position comparison technology, is specifically developed for scenarios such as optical sorting machines, separators, and assembly line visual inspection. It has built - in functions including high - speed automatic camera triggering, incoming material screening, counting statistics, general I/O control, and timeout alarm. By seamlessly cooperating with CKVisionBuilder, it can effectively simplify the system design process of optical sorting machines and help users improve the efficiency of visual inspection.

2. Product Features

- 100Mbps adaptive Ethernet communication, featuring high transmission rate and strong anti - interference capability
- Supports dual - system operation; a single system can support up to 6 cameras and 2 air blowing ports
- Adopts a high - speed optocoupler design, ensuring stability, reliability, and strong anti - interference performance
- Camera triggering and air blowing accuracy as low as 10μs
- Equipped with overload, short - circuit, and reverse connection protection functions
- Cooperates with CKVisionBuilder to provide a complete set of machine vision and motion control solutions

3. Specification Parameters

Parameter	Specification
Power Supply Mode	DC24V
Communication Mode	Ethernet
Sorting Speed	≥1500pcs/min
Incoming Material Level	High/Low Level
Working Mode	Single/Dual Channel
Number of Motor Controls	4
Motor Control Mode	Pulse Control

Motor Control Interface	DB15
Inputs	16
Outputs	32
Single - Channel Camera Triggers	6
Single - Channel Air Blowing Ports	2
Camera Trigger and Air Blowing Accuracy	≤10μs
Operating Environment	Temperature: 0～40℃, Humidity: 20～85%RH (Non-condensing)
Storage Environment	Temperature: -20～60℃, Humidity: 20～85%RH (Non-condensing)
Overall Dimensions	228*143.5*33.8 (L*W*H, Unit: cm)

4. Communication Protocol

4.1. Communication Settings

- Motion Controller Working Mode: TCP Server
- IP Address: 192.168.1.254
- Port : 7
- Supports simultaneous communication with up to 4 clients

4.2. Communication Commands

4.2.1. Motor Control

1. Driver Enable
   - Turntable 1 - SORON1
   - Turntable 2 - SORON2
2. Driver Disable
   - Turntable 1 - SOROFF1
   - Turntable 2 - SOROFF2

3. Motor Operation

- Moter 1- RUNA1/RUNB1 = Speed, Number of Pulses
- Moter 2- RUNA2/RUNB2 = Speed, Number of Pulses

A represents forward direction; B represents reverse direction.

Speed: The number of pulses per second at which the turntable motor operates

Number of Pulses: The number of pulses for the turntable movement in this command. A pulse count of 0 indicates continuous movement.

Examples

- RUNA1 = 5000, 1000. The motor of Turntable 1 runs forward at a speed of 5000 pulses per second and stops after moving 1000 pulses.
- RUNB2 = 4000, 0. The motor of Turntable 2 runs in reverse at a speed of 4000 pulses per second and operates continuously.

4. Pulse Clear

- Turntable 1 - ZEROA
- Turntable 2 - ZEROB

5. Motor Stop

- Turntable 1 - STOP1
- Turntable 2 - STOP2

Notes:

a. The pulse clear command is only valid in the enabled state and is used when setting the positions of cameras and air blowing ports.

b. Under normal circumstances, one revolution of the turntable is 100000 pulses according to the default settings of the driver. Changing the driver settings will cause a mismatch between the set value and the actual rotation speed of the turntable.

4.2.2. Result Processing

1. Data Clear

- CLEAR1: Clear data for Turntable 1
- CLEAR2: Clear data for Turntable 2

Note:

a. CLEAR1 is used by default for a single turntable. After data clearing, the counts of all working positions are reset to zero.

2. OK Result

- OK1: Result of Turntable 1 is OK

- OK2: Result of Turntable 2 is OK

3. NG Result

- NG1: Result of Turntable 1 is NG
- NG2: Result of Turntable 2 is NG

Notes:

a. If the material has reached the first air blowing port but the result from the upper computer has not been sent to the board, the result of this material will be blocked. No OK/NG air blowing operation will be performed, and the material will be sent to the re - inspection port.

b. Data results must be output within the interval of one material; otherwise, data confusion will occur.

4.2.3. Position Setting

1. Set Output Position

- Turntable 1: P0SAx = yyyy, z
- Turntable 2: P0SBx = yyyy, z

x: Output point position (1 - 6 for cameras; 7 for OK air blowing port; 8 for NG air blowing port)

y: Number of pulses from the output point to the input optical fiber.

z: 1 corresponds to camera output point; 2 corresponds to OK air blowing port output point; 3 corresponds to NG air blowing port output point.

Examples

- POSA1 = 6000, 1: Output 1 of Turntable 1 is a camera, and the number of pulses from the optical fiber is 6000.
- POSB2 = 18000, 1: Output 2 of Turntable 2 is a camera, and the number of pulses from the optical fiber is 18000.
- POSA7 = 34100, 2: Output 7 of Turntable 1 is the OK air blowing port, and the number of pulses from the optical fiber is 34100.
- POSB8 = 38000, 3: Output 8 of Turntable 2 is the NG air blowing port, and the number of pulses from the optical fiber is 38000.

2. Integrated Sending of Position Settings

Example

- POSA1 = 7000, 1 POSA2 = 17000, 1 POSA3 = 27000, 1 POSA4 = 37000, 1 POSA7 = 47100, 2 POSA8 = 57000, 3

3. Save Settings

- SAVE1: Save settings for Turntable 1
- SAVE2: Save settings for Turntable 2

- SAVE: Save all settings

Note:

a. After setting positions, it is necessary to save the setting data. Using SAVE is recommended.

4. Obtain Output Position

- Turntable 1: GETPOSAx
- Turntable 2: GETPOSBx

x: Output point (1 - 6 for cameras; 7 for OK air blowing port; 8 for NG air blowing port)

Examples:

- GETPOSA1: Read the pulse position of Camera 1 on Turntable 1.
- GETPOSB7: Read the pulse position of the OK air blowing port on Turntable 2.

5. Read All Output Positions

- Turntable 1: GETDATAA
- Turntable 2: GETDATAB

6. Set Incoming Material Pulse Interval

- Turntable 1: INPDIS1 = x
- Turntable 2: INPDIS2 = x

Note:

a. If the incoming material pulse interval is less than the set value x, the second incoming material will be ignored, and no camera triggering or air blowing operations will be performed.

7. Set Air Blowing Duration

- Turntable 1: BLOWTIME1 = x
- Turntable 2: BLOWTIME2 = x

x: The recommended value is an integer between 10 and 100, adjusted according to the type of material. Unit: millisecond.

Example

- BLOWTIME2 = 20. The air blowing duration of the air blowing port on Turntable 2 is set to 20ms.

8. Set Custom Output Port

- OUTPUT = x, y

x: Output port position

y: Switch state (0 = off; 1 = on)

Examples

- OUTPUT = 1, 1: After sending this command, Output 1 will output continuously.
- OUTPUT = 2, 0: After sending this command, Output 2 will be turned off.

9. Obtain Trigger Times of Each Point

- Turntable 1: GETRECORDA
- Turntable 2: GETRECORDB

Notes:

a. The commands for setting and reading the output point pulses of Turntable 2 are not related to the OUTPUT wiring points. For example: If the OK air blowing port of Turntable 2 is connected to OUTPUT23 during wiring, POSB7 = yyyy, 2 and GETPOSB7 are still used for position setting and pulse reading.

b. Fixed output port definitions for Turntable 1 and Turntable 2: 1 - 6 for cameras; 7 for OK air blowing port; 8 for NG air blowing port. This definition cannot be modified.

4.2.4. No - Material Protection Time

If the optical fiber sensor fails to detect incoming materials within a certain period, the equipment will trigger an alarm, and the vibration plate will stop working. After another period, the turntable will stop working.

- Command: STOPTIMEx = yy, zz

x: Turntable number (default: left = 1; right = 2)

yy: If no material is detected by the optical fiber within yy seconds, the vibration plate stops.

zz: If no material is detected by the optical fiber within zz seconds, the turntable stops.

Example

- STOPTIME2 = 5, 10. If the optical fiber of Turntable 2 does not detect incoming materials within 5 seconds, the vibration plate stops. The turntable stops 10 seconds after the optical fiber sensor first fails to detect incoming materials.

Note:

a. zz must be greater than yy. If zz ≤ yy, the turntable and the vibration plate will stop simultaneously.

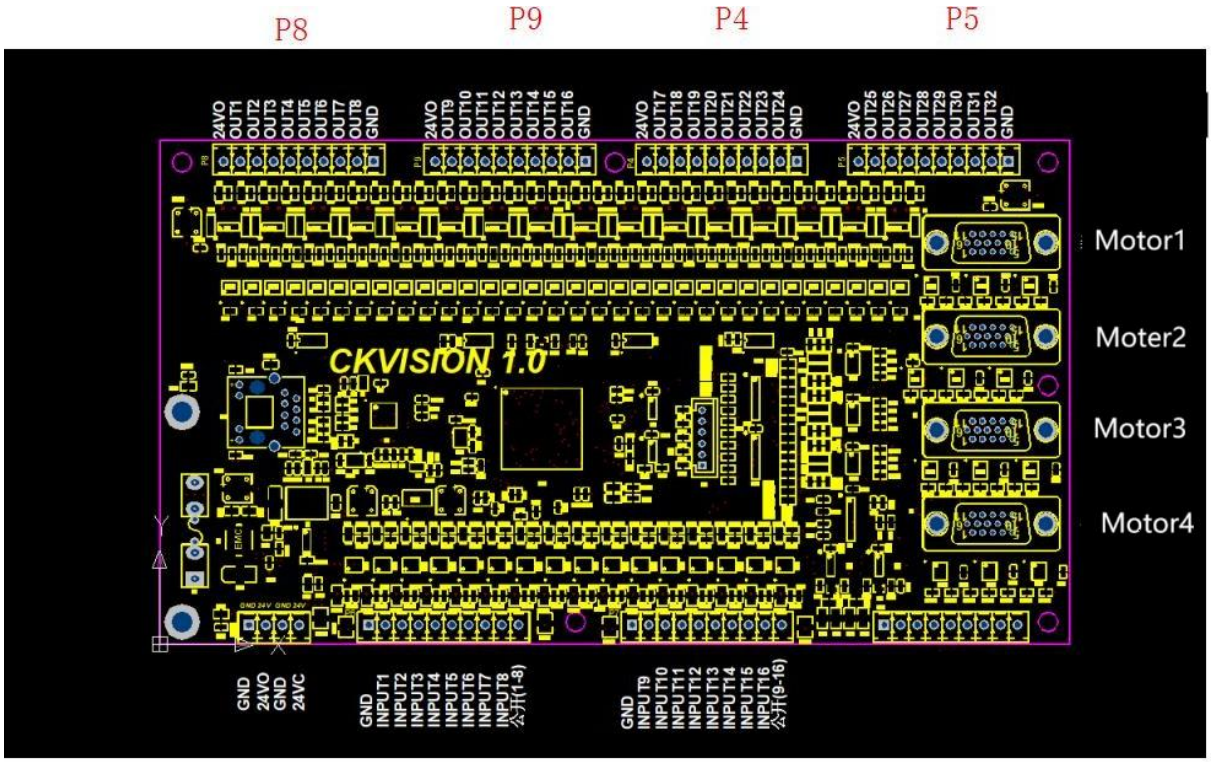
4.2.5. Query Input Status

- Command: INPUT=?

The return value is composed of hexadecimal characters, which can be decomposed to infer the input state of each bit of INPUT.

5. Wiring Definition

5.1.Power Supply & IO Wiring Definition

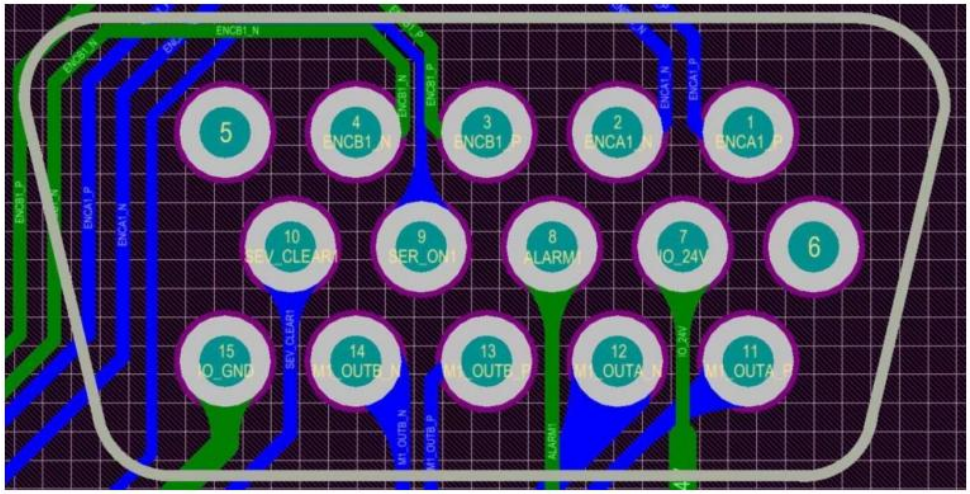


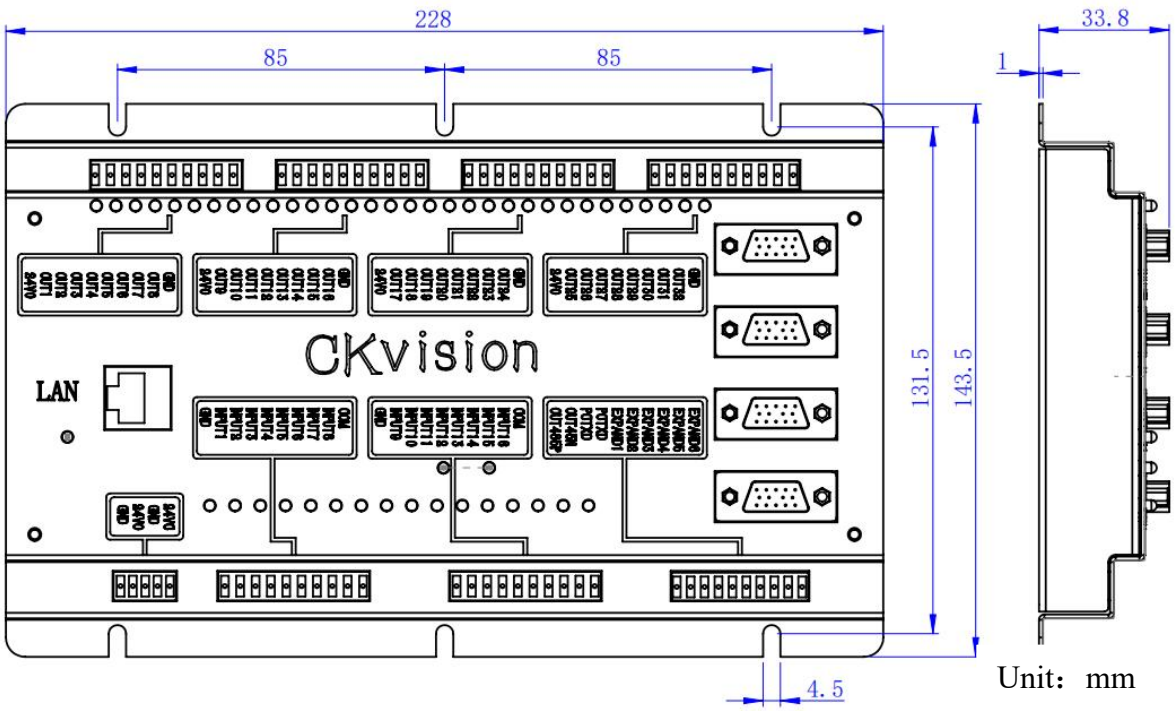
POWER		1	P	GND
		2	P	DC 24V
		3	P	GND
		4	P	DC 24V
INPUT	P6	GND	P	GND
		INPUT1	I	Turntable 1 Fiber Optic Sensor
		INPUT2	I	Turntable 2 Fiber Optic Sensor
		INPUT3	I	
		INPUT4	I	
		INPUT5	I	
		INPUT6	I	
		INPUT7	I	Barometric Pressure
		INPUT8	I	Emergency Stop
		Common	P	NPN— DC24V，PNP—GND

		Terminal (1 - 8)		
	P7	GND	P	GND
		INPUT9	I	
		INPUT10	I	
		INPUT11	I	
		INPUT12	I	
		INPUT13	I	
		INPUT14	I	
		INPUT15	I	
		INPUT16	I	
		Common Terminal(9-16)	P	NPN— DC24V，PNP—GND
OUTPUT	P8	24V	P	OUTPUT DC24V
		OUTPUT1	O	Turntable 1 Camera 1
		OUTPUT2	O	Turntable 1 Camera 2
		OUTPUT3	O	Turntable 1 Camera 3
		OUTPUT4	O	Turntable 1 Camera 4
		OUTPUT5	O	Turntable 1 Camera 5
		OUTPUT6	O	Turntable 1 Camera 6
		OUTPUT7	O	Turntable 1 OK Air blowing port
		OUTPUT8	O	Turntable 1 NG Air blowing port
		GND	P	Power Ground Wire
	P9	24V	P	OUTPUT DC24V
		OUTPUT9	O	
		OUTPUT10	O	Turntable 1 Vibration Disk
		OUTPUT11	O	
		OUTPUT12	O	
		OUTPUT13	O	
		OUTPUT14	O	Turntable 1 Green Lamp
		OUTPUT15	O	Turntable 1 Red Lamp
		OUTPUT16	O	Buzzer
		GND	P	Power Ground Wire
	P4	24V	P	OUTPUT DC24V
		OUTPUT17	O	Turntable 1 Camera 1
		OUTPUT18	O	Turntable 1 Camera 2

		OUTPUT19	O	Turntable 1 Camera 3
		OUTPUT20	O	Turntable 1 Camera 4
		OUTPUT21	O	Turntable 1 Camera 5
		OUTPUT22	O	Turntable 1 Camera 6
		OUTPUT23	O	Turntable 2 OK Air blowing port
		OUTPUT24	O	Turntable 2 NG Air blowing port
		GND	P	Power Ground Wire
	P5	24V	P	OUTPUT DC24V
		OUTPUT25	O	
		OUTPUT26	O	Turntable 2 Vibration Disk
		OUTPUT27	O	
		OUTPUT28	O	
		OUTPUT29	O	
		OUTPUT30	O	Turntable 2 Green Lamp
		OUTPUT31	O	Turntable 2 Red Lamp
		OUTPUT32	O	Buzzer
		GND	P	Power Ground Wire

5.2. Wiring Definition between Controller and Driver



Pin	Function	Type
1	Encoder A+	I
2	Encoder A-	I
3	Encoder B+	I
4	Encoder B-	I
5	NC	-
6	NC	-
7	24V	P
8	Servo Alarm	I
9	Enable	O
10	Alarm Clear	O
11	Pulse +	O
12	Pulse -	O
13	Direction +	O
14	Direction -	O
15	Power Ground Wire	P

6. Dimensions