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VBC-210
User's Manual

with Microsoft® Windows® 7
with Microsoft® Windows® 10
with Microsoft® Windows® 11
with Ubuntu

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Chapter 1. About this Manual

1.1Manual version revision record

Date	Version Number	Revise Content	Modified By
2023/07/14	V1.0.	Prepare the manual for the first time	LWT
2023/10/31	V1.1	Add GPIO definition description	LWT
2024/09/26	V1.2	Redefine DIO	LWT

1.2Copyright Statement

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You clearly understand and agree that, in addition to the law, breach, its subsidiaries, agents, partners, relationships, managers, employees and authorized person need not be responsible for you any direct, indirect, special, derivative, incidental, punitive damage (including but not limited to the goodwill, profit, use data damage or other intangible loss).

With an extremely rigorous and scientific attitude, the manual is compiled, but the technology is constantly developing, and the speed of product upgrading is far beyond the speed of the preparation, so we reserve the right to modify it at any time without notification.

1.4Trademark

The ownership of the trademark involved in this manual, Darveen Technology Limited , is owned by the holder of Darveen Technology Limited No one shall use it without their permission.

1.5Warranty terms

The default product warranty period is 1 year. In case of special circumstances, the contract signed by both parties shall prevail
Safety guidance for installed and use

1. Please read carefully and keep this manual properly before use.
2. Keep the plate card dry and packed intact before installation, ensuring that the equipment is placed in a stable plane, and an accidental fall or flip may cause equipment failure or damage.
3. In order to avoid unnecessary damage caused by frequent turning to the product, wait at least 30 seconds before shutdown of the machine. If the equipment is not used for a long time, disconnect the power cord to avoid the equipment being damaged by instantaneous voltage.
4. The opening slot of the chassis is used for ventilation to avoid overheating of the parts in the chassis. Do not mask or block such openings.
5. Before connecting the product to the power supply, confirm the supply voltage and adjust the voltage to 220V.
6. Protect the power cord from trampling or other accidents that may cause sudden power failure, and do not stack anything on the power cord.
7. Unplug the power cord before unplugging any expansion card or module.
8. Note to all the notes and warnings mentioned in the manual.
9. Do not make any changes or modifications to this product. If there is any abnormal use of the equipment, please find a professional personnel for safety reasons.
10. Please do not place or store the product at an ambient temperature above 60℃ (140F) as it will cause harm to the product.
11. If the battery is not replaced properly, it can cause a danger. Be sure to use the same model or equivalent battery as recommended by the manufacturer.

Chapter 2. Product Overview

Chapter 2. Product Overview

Industrial control machine (Industrial Personal Computer, IPC) is the industrial control computer, is a use of bus structure, the production process and electromechanical equipment, process equipment for detection and control of the tool general name.

Industrial control machine has important computer attributes and characteristics, such as computer CPU, hard disk, memory, peripherals and interfaces, and operating system, control network and protocols, computing power, friendly man-machine interface.

The industrial control machine often operates in a harsh environment, and the safety requirements for data are higher. Therefore, the industrial control machine is usually reinforced, dust proof, moisture proof, corrosion proof, radiation prevention and other special designs.

2.1Overview of the VBC-210 function

The VBC-210 is a modular industrial computer with 10th/11th Gen Intel® Core™ i3/i5/i7/i9, Pentium®, and Celeron® processors. It offers extensive connectivity options, expansion capabilities, control interfaces, and flexible display configurations, making it a versatile and reliable choice for industrial applications.

* Table 2.1-1 VBC-210 Functional Overview table

Product Keywords	Machine Vision Computer with Intel® LGA1151 6/7/8/9th Core™ I3/I5/I7 CPU, 6x Intel® LAN(4POE), 16x Opto-isolated DIO
Product Features	▪ Intel B365 Chipset ▪ 6 x Intel LAN(4 x POE), 16 x Opto-isolated DIO ▪ 8 x USB 3.0, 6 x COM ▪ 1 x VGA, 1 x HDMI

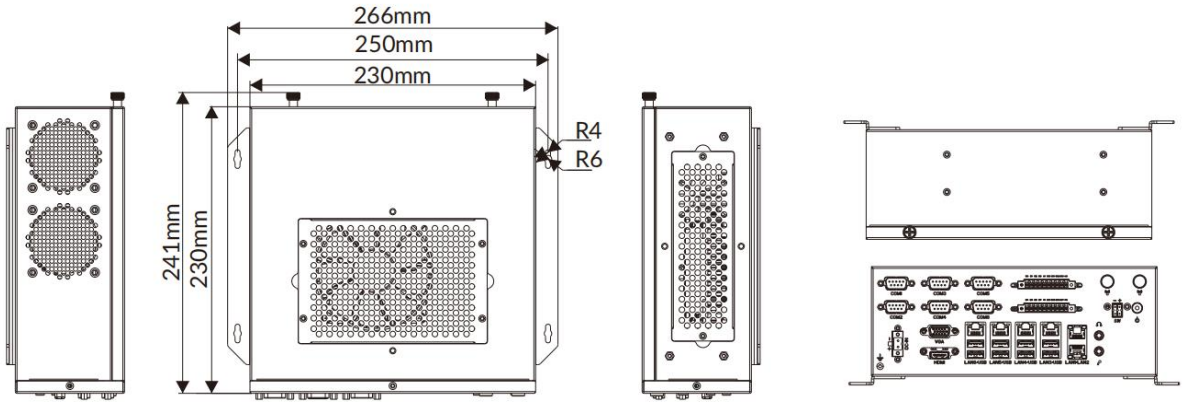
Chapter 3. Product Presentation

Chapter 3. Product Presentation

3.1Product Appearance

* Figure 3.1-1 front view of VBC-210

3.2Appearance size diagram



* Figure 3.2-1 VBC-210 dimensional drawing

3.3Product specification introduction

* Table 3.3-1 VBC-210 product specification

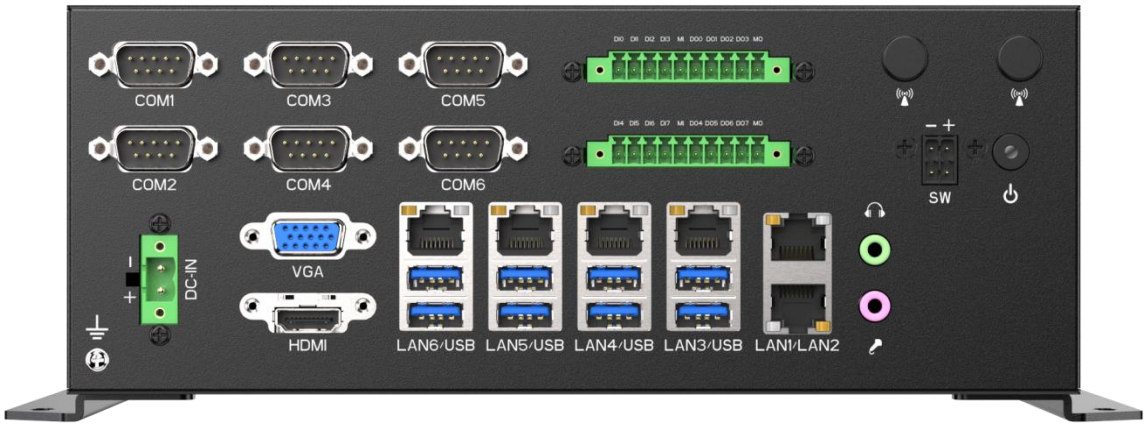
Model No.	VBC-210
Short Description	Intel® LGA1151 6/7/8/9th Core I3/I5/I7 CPU, 6 x Intel LAN(4POE), 16 x Opto-isolated DIO
Features	Intel B365 Chipset
	6 x Intel LAN(4 x POE), 16 x Opto-isolated DIO
	8 x USB 3.0, 2 x USB 2.0, 6 x COM
	1 x VGA, 1 x HDMI
Model No.	VBC-210
CPU	Intel® LGA1151 6/7/8/9th Core I3/I5/I7 CPU
Chipset	Intel B365
Memory	2 x DDR4-2133/2666 MHz DIMM up to 64GB
Storage	1 x 2.5" HDD 1 x mSATA
Graphics	By CPU
BIOS	TPM2.0(Options)
TPM	TPM2.0(Options)
I/O Ports	
USB Port	8 x USB3.0
Serial Port	6 x RS232(2 x RS232/RS485)
Ethernet	6 x Intel LAN for GbE(4 x POE Options)
Display Port	1 x VGA, 1 x HDMI
SIM Card Slot	1 x SIM
DIO	16 x Opto-isolated DIO(Options)
Antenna Hole	2 x SMA-type
Expansion Slot	
Mini-PCIe	1 x full-size mini PCIe
RF Communication	

Wi-Fi	Mini-PCIe Expansion (Optional)
Cellular	Mini-PCIe Expansion (Optional)
Bluetooth	Mini-PCIe Expansion (Optional)
GNSS	Mini-PCIe Expansion (Optional)
Audio	
Audio	Line Out,Mic
Power	
Button	Power button
Remote Power On/Off	4-Pin Remote&LED
DC Input	9~28V DC-IN
Input Type	1x2pin Terminal Block Connector
Operating System	
Windows	Windows 7/10/11
Linux	Ubuntu
Mounting Mode	
Dimensions (W x D x H)	230x230x88mm
Weight (N.W.)	2KG（4.41lb）
Mounting	Wall-mount
Material	Sheet Metal
Environment	
Operating Temperature	-0 ~ 60℃(with SSD Airflow 0.7m / s)
Storage Temperature	-20 ~ 85℃
Relative Humidity	10 ~ 85% (Non-condensing)
Certification	
EMC	CE, FCC Class A

Chapter 4. IO Panel description

Chapter 4. IO Panel Description

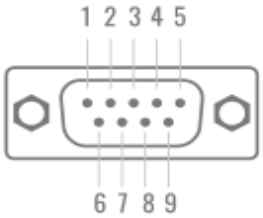
4.1VBC-210 panel is shown below



* Figure 4.1-1 VBC-210 panel diagram

4.2Serial communication port (simply "serial port")

Equipped with 6 DP9 serial ports, COM3/COM4/COM5/COM6/COM7/COM8 is RS232, COM1/COM2 can be switched to RS485, RS232.

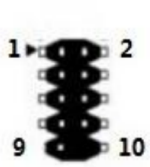


* Figure 4.2-1 serial port diagram of DP 9

* Table 4.2-1 Explanation of serial definition for DP 9

PIN	Signal name	PIN	Signal name
1	DCD/RS485-	2	RXD/RS485+
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	NC

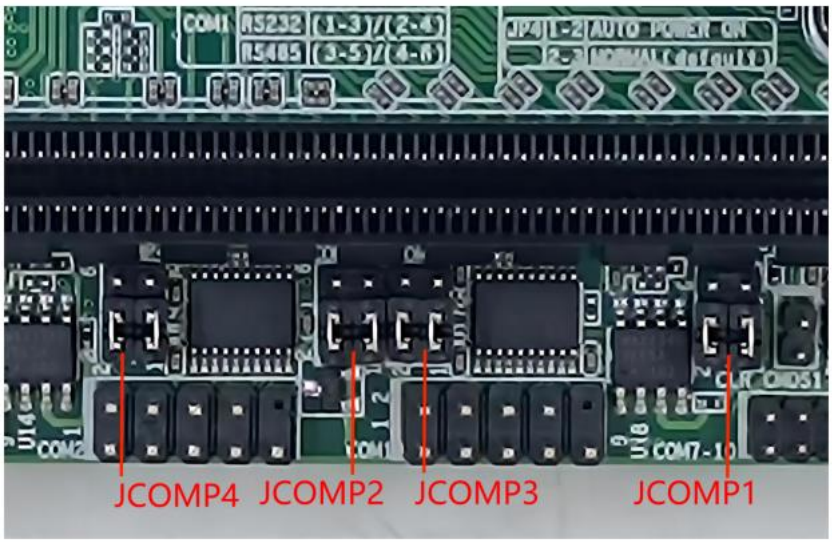
4.2.1. COM1/2/3/4/5/6 Pin Headers



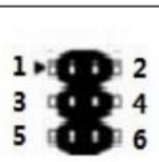
PIN	Define	PIN	Define
1	-NDCD	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N/A

* Figure 4.2-2 COM1/2/3/4/5/6 Pin Headers

4.2.2. J_COM1/2 support RS232 by default, RS485 is selectable by"COM1/2 RS232/RS485 Select Jumper"

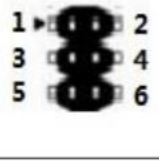


JCOMP1/JCOMP3-COM1



STATUS	Setting
1-3/2-4	RS232
3-5/4-6	RS485

JCOMP2/JCOMP4-COM2

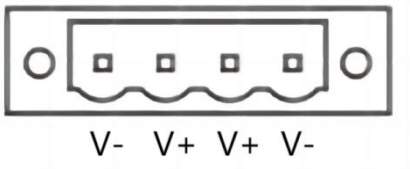


STATUS	Setting
1-3/2-4	RS232
3-5/4-6	RS485

* Figure 4.2-3 RS485 is selectable

4.3DC port

Equipped with Input 9~28V, 1x 4-pin terminal block connector as shown in Fig.

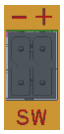


* Figure 4.3-1 DC port diagram

Note: Use the adapter or switch power supply supporting the equipment. Do not connect more than 36V power supply, otherwise it will cause the motherboard over voltage to burn!!!

4.4Remote

Equipped with 1 set of remote switches, you can achieve power on/off. as shown in the figure.



* Figure 4.4-1 Remote

* Table 4.4-1 Definitions table

Pin		Signal	Description
1	SW	PBTN	Power on or Power off
2		GND	
3	+	LED	Power LED
4	-	GND	

4.5DIO

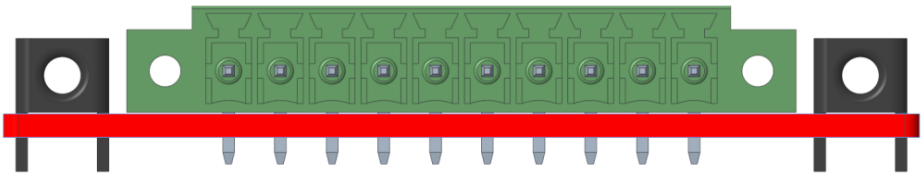


Diagram G01

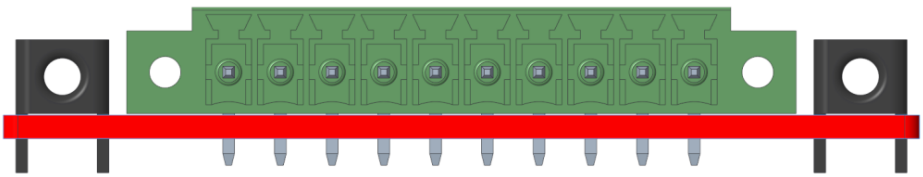


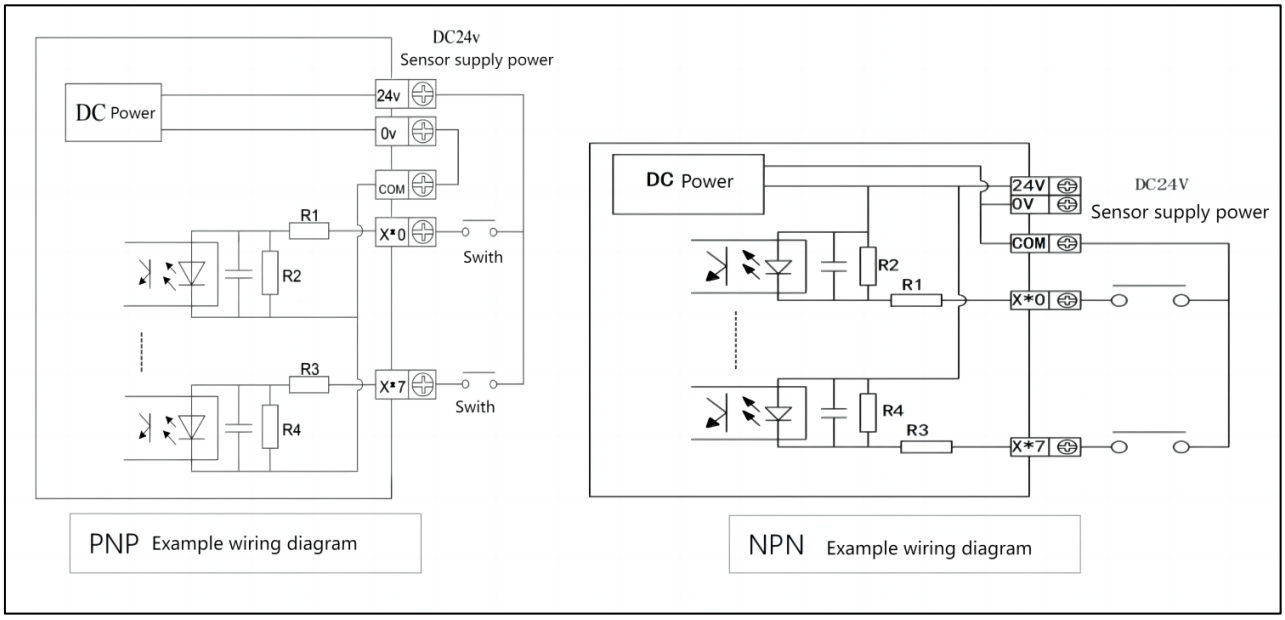
Diagram G02

* Figure 4.5-1 Definition diagram of the GPIO communication interface

4.5.1. DI Specification

Item	Description
8 DI	Type: NPN/PNP Input signal voltage: DC24V ± 10% Input ON current: above 4.5mA Input OFF current: below 1.5mA Input response time: 0.1ms (device specification) Input signal form: bidirectional opto-coupler Circuit insulation: opto-electronic coupling insulation Input action display: When inputting ON, the software reads 1

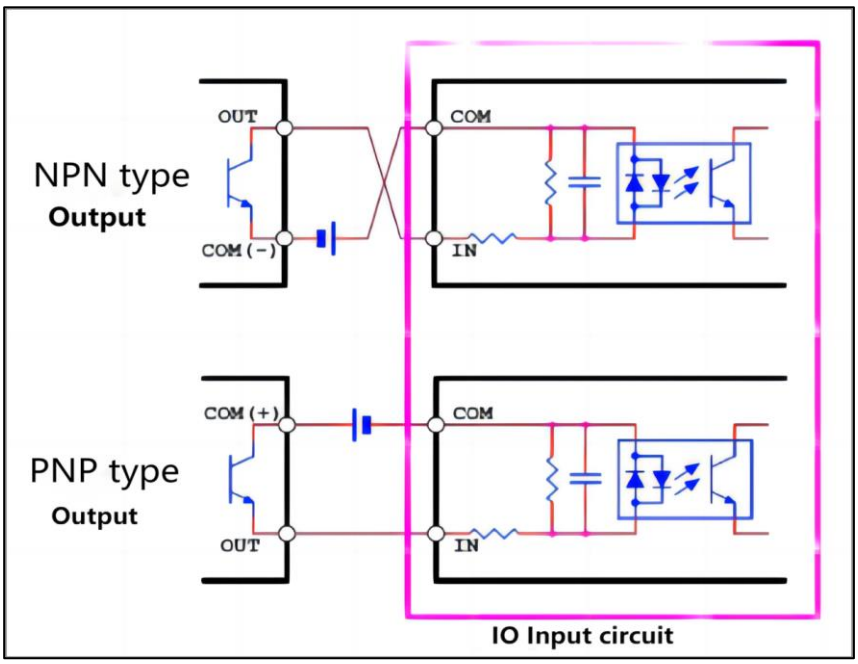
4.5.2. DI design schematic diagram



Diagram

4.5.3. DI Example diagram

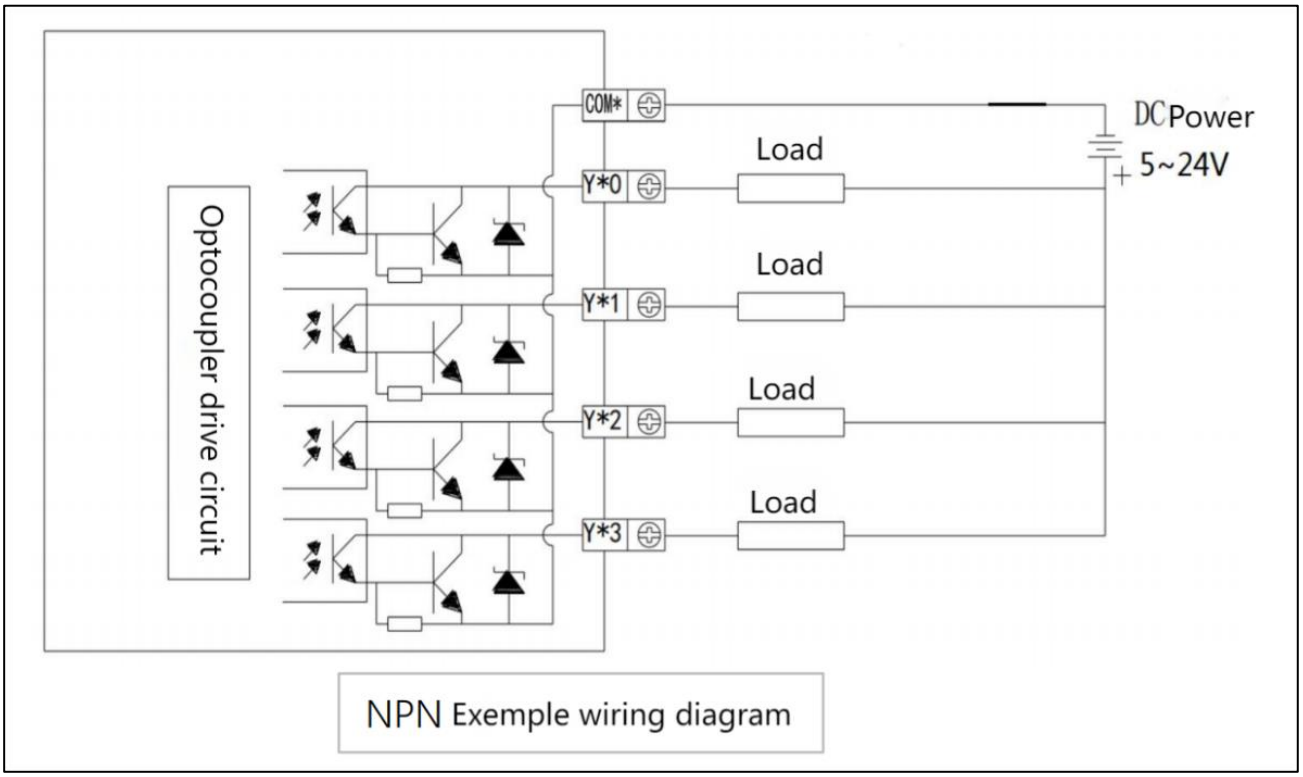
Diagram



4.5.4. DO Specification

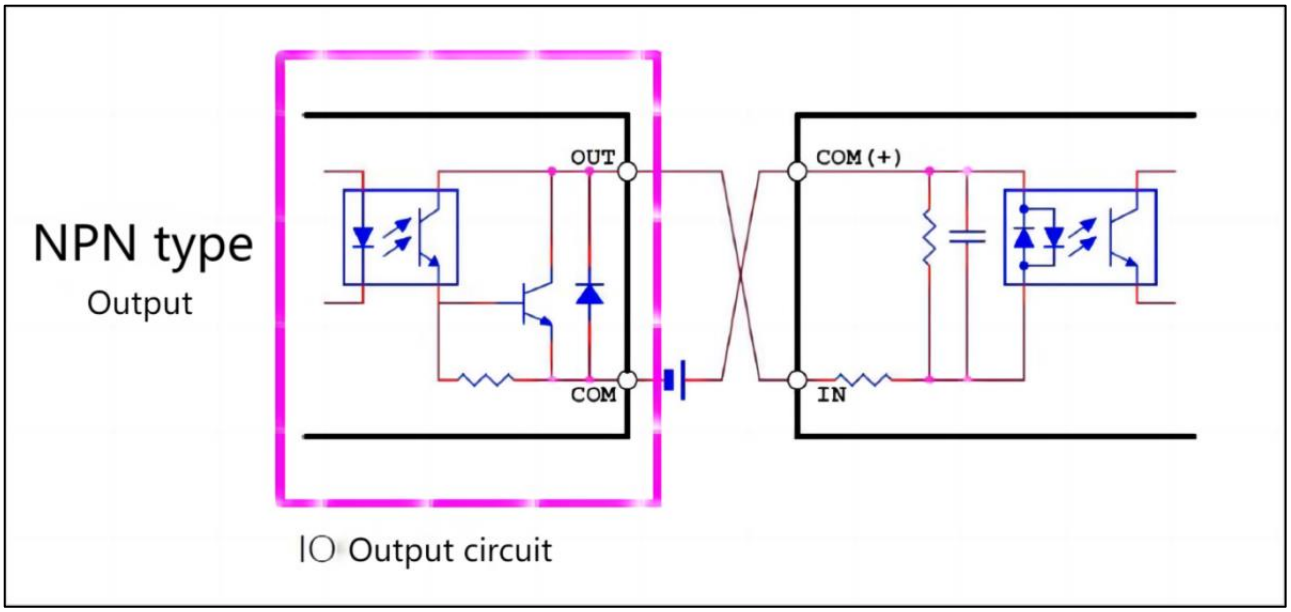
Item	Description
8 DO	Type: NPN Output load voltage: DC24V ± 10% Load current: Max 100mA/DC24V Short circuit protection current: 200mA Output response time: 0.2ms (device specification) Output signal form: NPN open collector electrode Circuit insulation: opto-electronic coupling insulation Output action display: When software is set to 1, conduction occurs

4.5.5. DO design schematic diagram



Diagram

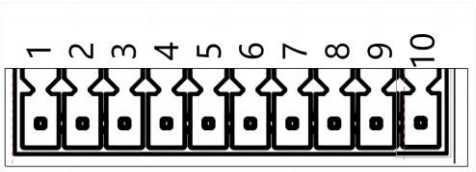
4.5.6. DO Example diagram



Diagram

4.5.7. Interface definition

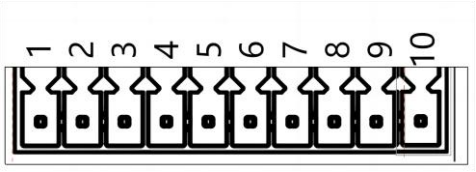
G01 Communication interface definition



Diagram

Pin	Signal	Description
1	DI0	Isolated Inputs0
2	DI1	Isolated Inputs1
3	DI2	Isolated Inputs2
4	DI3	Isolated Inputs3
5	DI_COM_L0	Input common terminal0
6	DO0	Isolated Outputs0
7	DO1	Isolated Outputs1
8	DO2	Isolated Outputs2
9	DO3	Isolated Outputs3
10	DO_COM_L0	Output common terminal0

G02 Communication interface definition

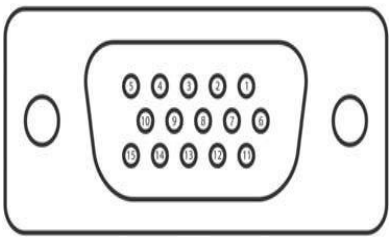


Diagram

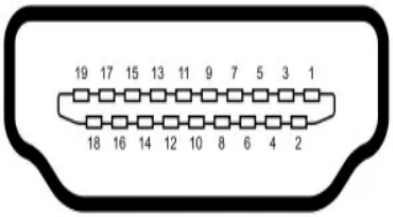
Pin	Signal	Description
1	DI4	Isolated Inputs4
2	DI5	Isolated Inputs5
3	DI6	Isolated Inputs6
4	DI7	Isolated Inputs7
5	DI_COM_L1	Input common terminal1
6	DO4	Isolated Outputs4
7	DO5	Isolated Outputs5
8	DO6	Isolated Outputs6
9	DO7	Isolated Outputs7
10	DO_COM_L1	Output common terminal1

4.6Display Output (VGA//DP)

Equipped with 1 HDMI, 1 DP, and 1 VGA display interface.



* Figure 4.6-1 VGA Interface



* Figure 4.6-2 HDMI Interface

4.6.1. VGA Definition

The VGA interface is shown in the figure, and the pin definitions are as follows:
Provides a high-resolution D-sub 15 pin VGA interface that supports VGA interface displays with a maximum resolution of 1920x1200 @ 60Hz.

* Table 4.6-1 VGA definitions table

Pin	Definition	Pin	Definition
1	RED	9	KEY
2	GREEN	10	GND
3	BLUE	11	IDO
4	ID2	12	ID1
5	GND	13	H SYNC
6	RGND	14	V SYNC
7	GGND	15	ID3
8	BGND		

4.6.2. HDMI Definition

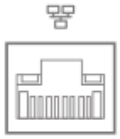
Equipped with an HDMI interface, supporting HDMI display screens with a maximum resolution of up to 4096X2160@30HZ , defined as follows

* Table 4.6-2 HDMI definitions table

PIN	signal	PIN	signal
1	TMDS Data2+	11	TMDs clock shield
2	TMDS Data2 shield	12	TMDs clock-
3	TMDS Data2-	13	CEC
4	TMDS Data1+	14	Reserved (N.c.on device)
5	TMDS Data l shield	15	SCL(I2c serial clock for D DC)
6	TMDS Data1-	16	SDA(12c serial data for D DC)
7	TMDS Data0+	17	D DC/CEC Ground)
8	TMDS Data0 shield	18	+5v power
9	TMDS Data0-	19	Hot plug Detect
10	TMDs clock+		

4.7Ethernet Interface (LAN)

With 4 Ethernet interfaces, 6xWGI211AT LAN as shown in the figure, and supports 10 / 100 / 1000Mbps. The port uses the standard RJ-45 jack with LED indicators indicating the connection and transmission status. See the chart below for the indicator light representation and the machine status.



* Figure 4.7-1 Ethernet interface diagram

* Table 4.7-1 LED indicator light definitions table

LED pilot lamp			
Left side LED			offside LED
close	orange	green	green
10Link	100Link	1000Link	transfer

PIN	signal	Description
1	TR DOP	Trance ive Data+
2	TR DON	Trance ive Data-
3	TR D1P	Received Data+
4	TR D2P	Bi-directional Data+
5	TR D2N	Bi-directional Data-
6	TRDIN	Received Data-
7	TR D3P	Bi-directional Data+
8	TR D3N	Bi-directional Data-

4.8USB Interface

Equipped with 8 USB 2.0 interfaces, the USB interface supports the plug and play function, allowing

the user to connect or disconnect the device at any time, as shown in the chart.

* Figure 4.8-1 USB interface diagram

* Table 4.8-1 USB interface definition table

PIN	signal	PIN	signal
1	vbus	6	std A_SSR X+
2	D-	7	G ND_DR IAN
3	D+	8	stdA_SSTX-
4	GND	9	std A_SST X+
5	stdA_SSRX-		

4.9Audio Interface (Line-out, Mic-in)

With 23.5 stereo audio interfaces, which support line output and line input. The audio chip controller is ALC662, and the interface is shown in the chart

* Figure 4.9-1 Audio interface diagram

* Table 4.9-1 Audio interface definition table

icon	description
	Line-out
	Mic-in

4.10 Explanation of indicator lights

* Table 4.10-1 Machine indicator table

icon	pigment	State instructions	description
	Green	mains switch	DC power supply off: off / DC power supply on: always on

Chapter 5. Direction for Use

Chapter 5. Direction for Use

This section provides a simple operation description for the normal use of VBC-210 series products, introducing the working environment, installation steps and the basic operation of the system protection functions of industrial computers.

5.1OOBA

Before opening the package, please check whether the product model indicated on the outer package is consistent with the product model ordered. After opening the package, carefully check whether the accessories are complete according to the packing list or the order contract. If the surface of the industrial computer is damaged, or the product content is not consistent, please do not use it, and contact the dealer immediately.

Note:
In order to prevent electrostatic damage to industrial computers, please touch the effective grounded metal object to release the electrostatic charge carried by the body, and wear anti-static gloves.

5.2Note the following points when unpacking the equipment:

1. It is recommended that you do not discard the original packaging materials. Please keep the original packaging materials for use when transporting the equipment again.
2. Check the delivered equipment for any obvious damage caused during transit.
3. Confirm whether the received goods include complete equipment and accessories. refer to the packing list. If there is any discrepancy or transportation damage, please contact the relevant business or customer service personnel.

Table 5.2-1 Machine packing list table

List of binning		
order number	type	quantity
1	The VBC-210 series of industrial computers	A set
2	Adapter, power supply cord	A set
3	Wall hanging kit	A set
4	Install wall screw	A set
5	IO terminal (with antenna rod if configured with antenna)	A set

5.3Work environment

1. Industrial computers need to be far away from the high-power and strong electromagnetic interference of electrical appliances and the environment;
2. The working environment temperature should be between 0 degrees and 55 degrees Celsius;
3. The power supply voltage shall be kept between 200 V and 240 V.

5.3 Dead Work

Before installation, please prepare the relevant items, such as:
1. VBC-210 series of industrial computers, and related power supply and cables;
2. Display, and the display cable between the display and the industrial controller;
3.USB mouse and keyboard;
4. PLC, camera and corresponding connecting lines;
5. Power supply.

5.4Installation Steps

Hardware connection:
1.Connect the equipped display to the industrial computer display interface;
2.Connect keyboard, mouse and other to industrial computer USB interface;
3.Connect other hardware, such as PLC and camera, according to the corresponding interface;
4.Power adapter access 220V voltage, power on.

5.5Gigabit Network Card Camera Configuration

1. Confirm that the camera is connected to the power supply and that the camera is connected to the industrial computer.
2. Close the firewall, control panel-> Windows Defender-> Set-> Implement protection-> Remove hook and administrator-> Enable Windows Defender-> Remove hook.
3. Turn on camera software.

Chapter 6. Troubleshooting Guide

Chapter 6. Troubleshooting Guide

6.1Boot Abnormal Q&A

Q1: After pressing the power button to start on, the power indicator is not on
1. Answer A: Check whether the industrial computer is connected correctly, and whether the power socket is charged;
2. Answer B: Check the industrial computer power adapter, plug and unplug the power cord, display data cable and keyboard mouse cable, confirm that the display and host connection is correct;
3. Answer C: Check whether the positive and negative electrodes of the power plug are reversed.
4.

Q2: The power indicator is on and the display is not displayed
1. Answer A: Check the display power supply and switch;
2. Answer B: Check whether the display data line is in bad contact;
3. Answer C: If using Display Port or VGA converter, replace other brand converters;
4. Answer D: Observe the keyboard and mouse indicator, if the keyboard indicator, mouse indicator is on, replace the monitor screen.

Q3: After the boot of the motherboard can not self-check success
1. Answer: Press [Del], key to reset CMOS, or clear CMOS.

Q4: The mouse and keyboard cannot be used after the boot
1. Answer A: To see whether the keyboard lock is locked, remove the keyboard lock;
2. Answer B: If not, check whether the connection with the main board and the keyboard and mouse are connected correctly;
3. Answer C: Check whether there is a keyboard mouse one two turn joint, if there is the keyboard, mouse reverse use;
4. Answer D: Replace one joint and two joints;
5. Answer E. Replace the mouse and keyboard.

Q5: Unable cannot boot the system from the hard drive after boot
1. Answer A: Press the "Del" key to enter the CMOS hard disk parameter setting and boot order are correct;
2. Answer B: After using the optical drive or floppy drive boot, check whether the hard disk has a boot system or the hard disk is normal partition and has activated the boot partition;
3. Answer C: Press F8 at startup and select the last correct configuration to start the operating system;
4. Answer D: Replace the new hard drive and reinstall the system.

Q6: The system dies or has a blue screen during operation
1. Answer A: Check whether the industrial computer temperature is too high;
2. Answer B: Check whether the incorrect or expired drivers are installed;
3. Answer C: Check whether the system is infected with the virus;
4. Answer D: Whether the system file or application and disk are damaged.

Q7: Unable to install the device driver correctly
1. Answer A: Check whether the driver is correct and the latest;
2. Answer B: Whether the driver needs the patch support of the operating system;
3. Answer C: Whether the resources occupied by other equipment are in conflict with the resources occupied by the equipment that need to be driven;
4. Answer D: If the peripheral equipment, change a slot and reinstall the drive;
5. Answer E: Replace the equipment and reinstall the driver program.

Q8: BIOS Upgrade method
1. Prepare a UEFI start U disk, if not, you need to make one;
2. Please copy the required refresh BIOS file and batch to the U disk root directory;
3. Press F7, select the made UEFI U disk, return, and enter the Shell;
4. Enter FS0: return (if no other storage devices, fs0:);
5. Run the flash. The nsh, brush BIOS, the middle of no power off;
6. After brushing the BIOS, power off, then power on, restart the industrial computer, enter the BIOS setting, F3 load the BIOS optimization value (Load optimized defaults return car selection Y).

Q9: Precautions The following conditions may lead to a refresh failure and no boot up.
1. Power interruption during the refresh process;
2. Virus exists in the U disk;
3. BIOS files;
4. Non-UEFI system.

If it cannot be started after refresh, you can empty the BIOS and try it. If the situation is still the same, please return to the factory for repair.

Chapter 7. After-Sale Service

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Please visit the official website of Darveen (www.darveen.com), Get the latest information on the product.

If users need technical support, please contact the local distributor, seller or the customer service department. Before the technical consultation, please collect the following information:
1. Product model and production serial number (normally, bar code on the body)
2. Software used (operating system, version, application software, etc.)
3. Additional equipment situation of product docking (such as power supply situation, resistance and other basic information)
4. Complete description of the problem (video and photo)
5. Full content of each error message (video recording and photo taking)

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