

6 Inch Medium Speed Dome

User Manual

V2.0.0

Thank you for purchasing our product. If there is any question or request, please do not hesitate to contact dealer.

This manual is applicable to **6 Inch Medium Speed Dome**.



This manual may contain several technically incorrect places or printing errors, and the content is subject to change without notice. The updates will be added into the new version of this manual. We will readily improve or update the products or procedures described in the manual.

Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss. The precaution measure is divided into “Warnings” and “Cautions”:

Warnings: Neglecting any of the warnings may cause serious injury or death.

Cautions: Neglecting any of the cautions may cause injury or equipment damage.

	
Warnings Follow these safeguards to prevent serious injury or death.	Cautions Follow these precautions to prevent potential injury or material damage.



Warnings

1. In the use of the product, you must be strict compliance with the electrical safety regulations of the nation and region.
2. Please use the power adapter, which is provided by normal company. The standard of the power adapter is AC24V/3A.
3. Do not connect several devices to one power adapter as adapter overload may cause over-heat or fire hazard.
4. Please make sure that the plug is firmly connected on the power socket.
5. When the product is installed on wall or ceiling, the device shall be firmly fixed.
6. If smoke, odors or noise rise from the device, turn off the power at once and unplug the power cable, and then please contact the service center.
7. If the product does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the camera yourself. (We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.)



Warnings

1. Do not drop the dome or subject it to physical shock, and do not expose it to high electromagnetism radiation. Avoid the equipment installation on vibrations surface or places subject to shock (ignorance can cause equipment damage).
2. Do not place the dome in extremely hot, cold (the operating temperature shall be $-30^{\circ}\text{C} \sim +65^{\circ}\text{C}$), dusty or damp locations, or fire or electrical shock will occur otherwise.
3. The dome cover for indoor use shall be kept from rain and moisture.
4. Exposing the equipment to direct sun light, low ventilation or heat source such as heater or radiator is forbidden (ignorance can cause fire danger).
5. Do not aim the camera at the sun or extra bright places. A blooming or smear may occur otherwise (which is not a malfunction however), and affecting the endurance of CCD at the same time.
6. Please use the provided glove when open up the dome cover, avoid direct contact with the dome cover, because the acidic sweat of the fingers may erode the surface coating of the dome cover.
7. Please use a soft and dry cloth when clean inside and outside surfaces of the dome cover, not to use alkaline detergents.

Table of Contents

Table of Contents.....	3
Chapter 1 Brief Introduction.....	4
1.1 Description.....	4
1.2 Outline	4
1.3 Functions	4
Chapter 2 Operation Instructions.....	6
2.1 Power-up Action	6
2.2 Basic Operations.....	6
2.3 Presets with Special Functions	7
Appendix 1 Lightning & Surge Protection.....	10
Appendix 2 RS485 Bus Connection	11
Appendix 3 24VAC Wire Gauge & Transmission Distance	14
Appendix 4 Table of Wire Gauge Standards.....	15

Chapter 1 Brief Introduction

1.1 Description

Adopting the high-performance integral dome drive with auto iris, auto white balance and other capabilities, the medium speed dome is integrated with the built-in pan/tilt unit and the digital receiver. The dome provides Manchester code and wiring failure diagnosis; with precise drive, it features high reaction sensitivity and reliable running, ensuring superior image stability.

The medium speed dome can be widely applied to various monitoring scenes such as the river, forest, road, railway, airport, harbor, oil field, sentry, plaza, park, scenic spot, street, station, stadium, etc.

1.2 Outline



6 Inch Medium Speed Dome

1.3 Functions

- **Self-adaptive to Multiple Protocols**

The dome is compatible with PELCO-D, PELCO-P and HIK-Code protocol, etc., and is capable of being self-adaptive to these protocols without need of selecting protocol by DIP switch settings.

- **Keyboard Control**

The pan/tilt movement and zoom actions of dome can be controlled by the control keyboard, DVR, matrix, etc.

- **Limit Stops**

The dome can be programmed to move within the limit stops (left/right, up/down) which are configurable by the control keyboard, DVR or client application software.

- **Presets**

Each of the user-definable presets can be programmed to use pan, tilt, camera settings and other settings. When preset is called, the dome will automatically move to the defined position. User is allowed to add, modify, delete and call each preset.

- **3D Intelligent Positioning**

The speed dome can be controlled with the 2 buttons and scroll of mouse can be used under HIK-Code protocols with devices and

client software. Click on a certain area and the device will move to the scene with corresponding point as the center. When a rectangular area is selected by left-clicking the mouse, device will move to its center and enlarge it. With right-clicking, the lens will zoom in, and the scroll can easily make the lens zooming, and mouse operation automatically incorporates zooming effect.

- **Auto Focus**

The auto focus enables the camera to focus automatically to maintain clear video images.

- **IR Cut Filter**

The IR cut filter can be set to Auto, Day and Night. In auto mode, the camera is capable of automatically switching Black & White mode (Night) and Color mode (Day) with regard to environment lightening conditions. In manual switch mode, user can increase sensitivity in low light conditions by switching to Black & White mode, while the Color mode is preferred in normal lighting conditions.

- **Low Light Electronic Shutter**

The shutter speed will automatically slow down in low illumination conditions to maintain clear video images by extending the exposure time. The feature can be enabled/disabled by the menu.

- **White Balance (WB)**

This feature automatically processes the viewed image to retain color balance over a color temperature range. The default setting for auto white balance is ON.

- **Patrol**

The speed dome provides up to 3 patrols. In each patrol, user is allowed to specify the scanning track by a group of user-defined presets, with the scanning speed between two presets and the dwell time at the preset separately programmable. Each patrol support 16 presets. Patrol 1 is presets 1 to preset 16, patrol 2 is preset 17 to preset 32, patrol 3 is preset 33 to preset 48.

- **Pattern**

A pattern is a memorized, repeating series of pan, tilt, zoom, and preset functions that can be recalled with a command from a controller or automatically by a configured function (park, time task, or power-up). By default the focus and iris are in auto status during the preset is being memorized.

- **Power-off Memory**

This feature allows the dome to resume its previous position or status after power is restored. By default setting, the dome supports the power-off memory capability with the dwell time of 3 minutes.

Chapter 2 Operation Instructions

2.1 Power-up Action

After the power is applied, the speed dome will perform self-test action that begins with lens actions and then pan and tilt movement. After completion of power-up self-test actions, the interface as shown in Figure 2.1 will be displayed on screen for 120 seconds.

The System Information displayed on the screen includes the Dome Address, Protocol, Version and other information. The COMMUNICATION refers to the baud rate, parity, data bit and stop bit of the dome, e.g., “2400, N, 8, 1” indicates the dome is configured with the baud rate of 2400, no parity, 8 data bits and 1 stop bit. Please refer to Section 3.3.1 for detailed information.

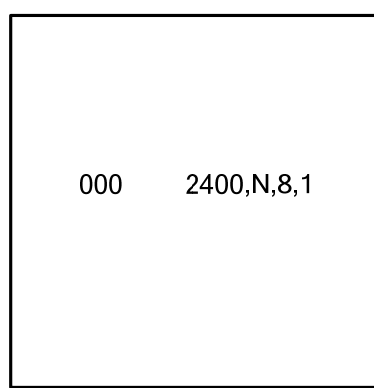


Figure 2.1

2.2 Basic Operations

The following operation shall be done with the use of control device or client software. The control devices include control keyboard and DVR, etc. And the client refers to the client application software. Examples are given here for common operation provided that the current control system supports following operation. Please refer to Client Software User Manual for detail operation guide.

Pan and tilt movement: Move the joystick to the desired direction, or press the Up/Down/Left/Right buttons.

Zoom operation: Press ZOOM+/TELE button to make the lens closer and magnify the scene. Press ZOOM-/WIDE button to make the lens farther and minify the scene.

Focus operation: After FOCUS+/FAR button is pressed, the object far away will become clearer while the object in vicinity will be ambiguous. After FOCUS-/NEAR button is pressed, the object in vicinity will become clearer while the object far away will become ambiguous.

In auto focus mode, camera will focus automatically to maintain clear image. This feature can also be achieved by manually as well. However, after other operation of device, camera will resume auto focus.

Iris operation: press IRIS+/OPEN to enlarge the iris and increase the image brightness. And by pressing IRIS-/CLOSE, the iris will gradually shrink that decreases image brightness. In auto iris mode, the IRIS+/OPEN and IRIS-/CLOSE buttons are still operable. However, after finishing other operation by dome, camera will resume auto iris action.

Preset operation:

Preset can be programmed or called through keyboard or menu. The dome provides 256 presets. Press the SHOT button and then the

numeric keys to call the programmed preset. E.g., the callup of preset 08 can be achieved by pressing PRESET button and then the numeral 08. Please refer to *Section 3.3.4* for the configuration of presets.

Note: The callup of presets, including the presets with special functions, will be restricted by the limit stops if defined. Callup of presets programmed out of the limit stops will be invalid.

2.3 Presets with Special Functions

The following presets are predefined with special functions:

- Using HIKVISION, PELCO-D, PELCO-P protocols, the preset and corresponding function are as below:

Presets Operation	Call the preset	Set the preset
1 to 50	Call functions	Set functions
51(No.1 auto scan path)	Start auto scan(high speed)	Set auto scan starting position
52	Start auto scan(medium speed)	Set auto scan end position
53	Start auto scan(low speed)	---
54	Reboot	Restore to factory settings
55	Close camera auto restore	Open camera auto restore
56(No.1 patrol)	Start patrol (high speed)	Set the patrol to stop for 10 seconds
57	Start patrol (medium speed)	Set the patrol to stop for 30 seconds
58	Start patrol (low speed)	Set the patrol to stop for 60 seconds
59	Start Sens Up(for SONY camera)	Close Sens Up(for SONY camera)
60	Auto focus	Half-auto focus
61	Open park action	Auto park action 10s
62	Close park action	Auto park action 30s
63	Preset 1	Auto park action 60s
64	Preset 2	Auto park action 300s
65	Preset 3	Zoom Trigger focus
66	No.1 patrol	Manual focus
67	No.1 Auto scan	Open zoom display
68	No.1 Pattern (customized)	Close zoom display
69	---	Night mode
70	---	Day mode
71	Start Pattern(customized)	D/N auto switch
72	Pattern remember start(customized)	Indoor
73	Pattern remember end(customized)	Outdoor
74	Auto Trace White Balance	Auto White Balance
75	Auto IRIS	Manual IRIS
76	Open proportional pan/tilt	Open BLC
77	Close proportional pan/tilt	Close BLC
78	Open scan limit	Open digital zoom
79	Close scan limit	Close digital zoom
80(Auto scan path 2)	Open speed level controlling	Open camera power
81	Close speed level controlling	Close camera power

82	Open camera configuration	Open parity and Verification
83(Auto scan path 3)	Close camera configuration	Close parity and Verification
84	---	Clear all presets information
85	---	---
86(Auto scan path 4)	---	---
87	---	---
88	---	---
89(Auto scan path 5)	---	---
90	---	---
91(No.2 auto scan)	Start auto scan path (high speed)	Set scan start position
92	Start auto scan path (medium speed)	Set scan end position
93	Start auto scan path (low speed)	---
94	---	---
95	---	---
96(No.2 patrol)	Start patrol(high speed)	Set the patrol to stop for 10 seconds
97	Start patrol (medium speed)	Set the patrol to stop for 30 seconds
98	Start patrol (low speed)	Set the patrol to stop for 60 seconds
99(No.3 auto scan)	Start auto scan path (high speed)	Set scan start position
100	Start auto scan path (medium speed)	Set scan end position
101	Start auto scan path (low speed)	---
102(No.3 patrol)	Start auto scan path (high speed)	Set the patrol to stop for 10 seconds
103	Start auto scan path (medium speed)	Set the patrol to stop for 30 seconds
104	Start auto scan path (low speed)	Set the patrol to stop for 60 seconds

2. Using Manchester code protocols(turn the 4th, 5th, 6th of SW2 on), the preset and corresponding function are as below:

Presets Operation	Call the preset	Set the preset
1 to 35	Call functions	Set functions
36(No.1 auto scan path)	Start auto scan(high speed)	Set auto scan starting position
37	Start auto scan(medium speed)	Set auto scan end position
38	Start auto scan(low speed)	---
39	Reboot	Restore to factory settings
40	Close camera auto restore	Open camera auto restore
41(No.1 patrol)	Start patrol (high speed)	Set the patrol to stop for 10 seconds
42	Start patrol (medium speed)	Set the patrol to stop for 30 seconds
43	Start patrol (low speed)	Set the patrol to stop for 60 seconds
44	Start Sensor Up(for SONY camera)	Close Sensor Up(for SONY camera)
45	Auto focus	Half-auto focus
46	Open park action	Auto park action 10s
47	Close park action	Auto park action 30s
48	Preset 1	Auto park action 60s
49	Preset 2	Auto park action 300s
50	Preset 3	Zoom Trigger focus
51	No.1 patrol	Manual focus
52	No.1 Auto scan	Open zoom display

53	No.1 Pattern (customized)	Close zoom display
54	---	Night mode
55	---	Day mode
56	Start Pattern(customized)	D/N auto switch
57	Pattern remember start(customized)	Indoor
58	Pattern remember end(customized)	Outdoor
59	Auto Trace White Balance	Auto White Balance
60	Auto IRIS	Manual IRIS
61	Open proportional pan/tilt	Open BLC
62	Close proportional pan/tilt	Close BLC
63	Open scan limit	Open digital zoom
64	Close scan limit	Close digital zoom
65	Open speed level controlling	Open camera power
66	Close speed level controlling	Close camera power
67	Open camera configuration	Open parity and Verification
68	Close camera configuration	Close parity and Verification
69	---	Clear all presets information
70	---	---

Explanation:

Take using Pelco-P/D, HIKVISION protocols for example, integrated analog speed dome supports 3 patrols, each of which support 16 presets(patrol 1 supports preset 1 to present 16, patrol 2 supports preset 17 to present 32, patrol 3 supports preset 33 to present 48), the stay time and speed can be set. The dome also support 2 auto scan path with movement limitation, the speed is adjustable. If don't set the movement limitation, it moves continuously. It support park action as well, and park action time is optional from 10s to 300s. There are 6 modes can be chosen from (preset 1 to preset 3, auto scan 1 and patrol 1 and pattern 1).

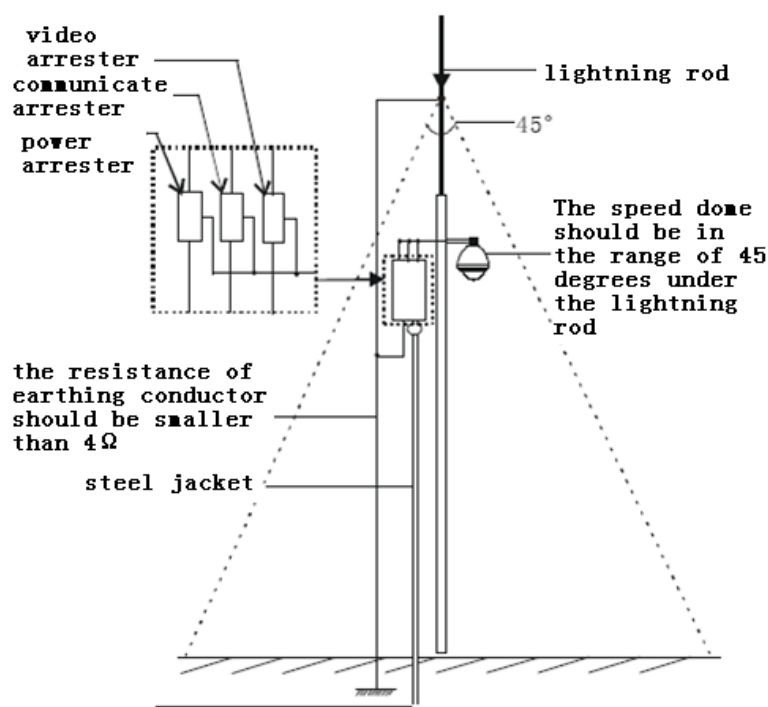
Detailed operation is described as below:

Call 56th preset to call patrol 1. Select the video in the DVR, press "PTZ" and "Rec", and input 056 to start patrol 1, and the dome will continuously scan among pre-set 16 presets. User can realize other function through the same meaning.

Appendix 1 Lightning & Surge Protection

This product adopts TVS plate lightning protection technology to avoid damage caused by pulse signal that is below 3000W, like instantaneous lightning, surging, etc. According to the actual situation outdoors, necessary protection measures must be taken to secure the electrical safety.

1. The distance between signal transmission line and High-voltage equipment or high-voltage cable is at least 50m.
2. Outdoor wiring should better be along the eaves as much as possible.
3. In the open field, wiring should be buried underground in sealed steel pipe, and the steel-pipe should be one-point grounding. Overhead routing method is forbidden.
4. In strong thunderstorm area or high induction voltage areas (such as high-voltage transformer substation), high power lightning protection apparatus and lightning conductor are necessary to be appended.
5. The design for installation and wiring with lightning protection and grounding in mind should be combined with the lightning protection consideration of the building, and conform to the related national standards and industry standards.
6. The system should be equipotentially grounded, and the grounding equipment must satisfy double-request of system anti-jamming and electric safety, and it must not appear short circuit and open circuit with the zero conductor of strong grid. When the system is grounding individual, the resistance should be no more than 4Ω , the section al area of the grounding cable should be no less than 25mm^2 . For grounding instructions, please refer to the *Installation Manual of Speed Dome*.



Appendix 2 RS485 Bus Connection

1. General Property of RS485 Bus

According to RS485 industry bus standard, RS485 is a half-duplex communication bus which has 120Ω characteristic impedance, the maximum load ability is 32 payloads (including controller device and controlled device).

2. RS485 Bus Transmission Distance

When using 0.56mm (24AWG) twisted-pair line, according to different baud rate, the max transmission distance theory table is shown as below:

Baud Rate	Max Distance
2400BPS	1800m
4800BPS	1200m
9600BPS	800m

The transmission distance will be decreased if we use the thinner cable, or use this product under the strong electromagnetic interference situation, or there are lots of devices are added to the bus; on the contrary, the transmission distance will be increased.

3. Connection Method and Terminal Resistance

- RS485 industry bus standard require daisy-chain connection method between any devices, both sides have to connect a 120Ω terminal resistance (show as Diagram 1), the simplified connection method is shown as diagram 2, but the distance of "D" should not be too long.

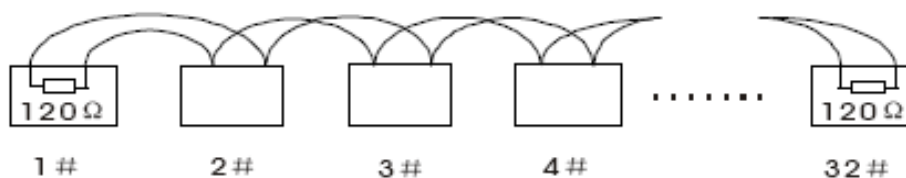


Diagram 1

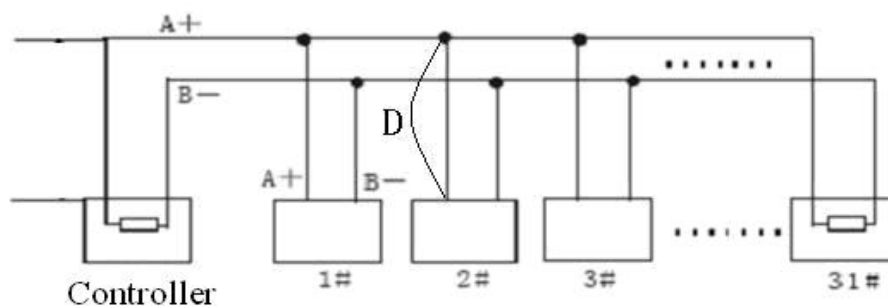


Diagram 2

2) Connection of 120Ω terminal resistor

The 120Ω terminal resistor can be connected through the DIP switch on the communications board, as shown in Figure3. For a new dome, the 120Ω matching resistor is defaulted as unconnected, switch on the eighth bit of SW2, it will be connected. Conversely, switch off the eighth bit of SW2, it will be unconnected.

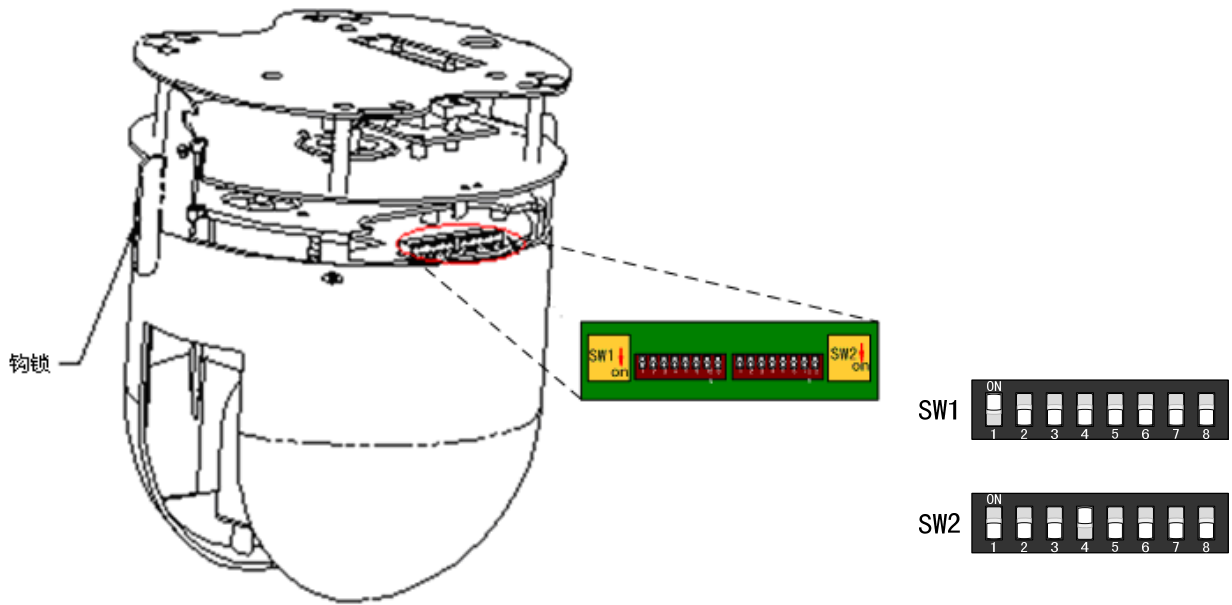


Figure 3

4. Problems in the Practical Application

Normally, users adopt star-shape connection method in construction, under this situation, the terminal resistors must be connected between two farthest devices (as Figure 4, 1# and 15#), but this connection method is not satisfy the requirement of the RS485 industry standard so that it will lead to some problems such as signal reflection, anti-jamming ability decline when the devices are faraway. At this time, the dome will be uncontrollable, or self-running, etc.

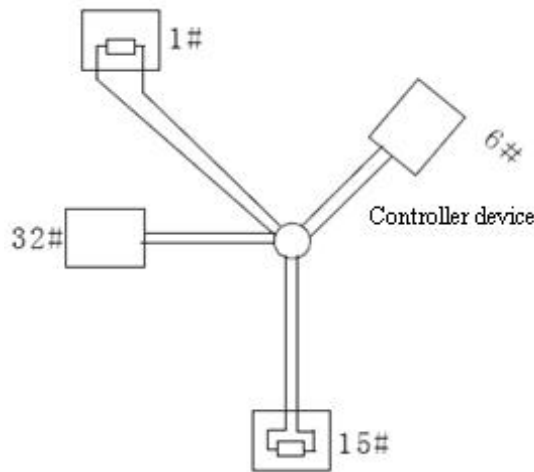


Figure 4

For such case, the best way is adding a RS485 distributor. This product can effectively change the star-shape connection to which satisfies the requirement of RS485 industry standard, in order to avoid those problems and improve the communication reliability. Show as figure 5.

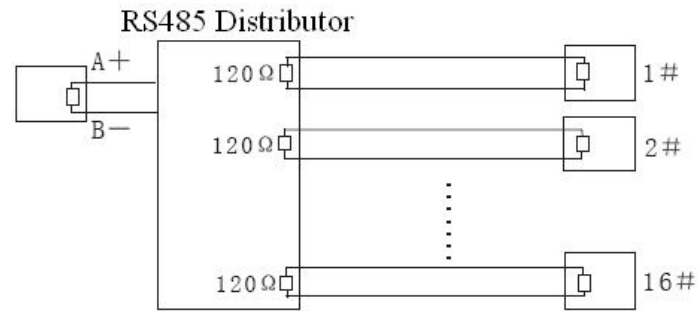


Figure 5

1. FAQ of RS485 Bus

Fault Phenomenon [↵]	Probable Cause [↵]	Solutions [↵]
The speed dome do the self-check but can not be controlled. [↵]	1. The address or Baud Rate is not matched between Host and the Speed Dome. [↵]	1. Adjust the address or Baud Rate of Host or Speed Dome to make a match. [↵]
	2. RS485+,- are connected incorrectly. [↵]	2. Change the RS485+ and RS485- wires. [↵]
	3. Wiring drops, [↵]	3. fastening the wire [↵]
	4. RS485 wire broke; [↵]	4. Change RS485 wire. [↵]
The speed dome can be controlled but not smoothly [↵]	1. loose contact of RS485 [↵]	1. fastening RS485 wire; [↵]
	2. one RS485 wire broke; [↵]	2. Change RS485 wire. [↵]
	3. Host and speed dome are too far away [↵]	3. Add terminal matched resistance [↵]
	4. Too many speed domes are connected [↵]	4. Add RS485 distributor [↵]

Appendix 3 24VAC Wire Gauge & Transmission Distance

The following table has described the recommended max. distance adopted for the certain wire gauge when the 24VAC voltage loss rate is less than 10%. For the AC driven device, the maximum voltage loss rate allowable is 10%. For example, for a device with the rating power of 80VA which is installed at a distance of 35 feet (10m) away from the transformer, then the minimum wire gauge required is 0.8000mm.

Distance feet(m)	Wire Gauge mm			
	0.8000	1.000	1.250	2.000
10	283 (86)	451 (137)	716 (218)	1811 (551)
20	141 (42)	225 (68)	358 (109)	905 (275)
30	94 (28)	150 (45)	238 (72)	603 (183)
40	70 (21)	112 (34)	179 (54)	452 (137)
50	56 (17)	90 (27)	143 (43)	362 (110)
60	47 (14)	75 (22)	119 (36)	301 (91)
70	40 (12)	64 (19)	102 (31)	258 (78)
80	35 (10)	56 (17)	89 (27)	226 (68)
90	31 (9)	50 (15)	79 (24)	201 (61)
100	28 (8)	45 (13)	71 (21)	181 (55)
110	25 (7)	41 (12)	65 (19)	164 (49)
120	23 (7)	37 (11)	59 (17)	150 (45)
130	21 (6)	34 (10)	55 (16)	139 (42)
140	20 (6)	32 (9)	51 (15)	129 (39)
150	18 (5)	30 (9)	47 (14)	120 (36)
160	17 (5)	28 (8)	44 (13)	113 (34)
170	16 (4)	26 (7)	42 (12)	106 (32)
180	15 (4)	25 (7)	39 (11)	100 (30)
190	14 (4)	23 (7)	37 (11)	95 (28)
200	14 (4)	22 (6)	35 (10)	90 (27)

Appendix 4 Table of Wire Gauge Standards

Bare Wire Gauge (mm)	American Wire Gage AWG	(British) Standard Wire Gauge SWG	Cross-sectional Area of Bare Wire mm ²
0.050	43	47	0.00196
0.060	42	46	0.00283
0.070	41	45	0.00385
0.080	40	44	0.00503
0.090	39	43	0.00636
0.100	38	42	0.00785
0.110	37	41	0.00950
0.130	36	39	0.01327
0.140	35		0.01539
0.160	34	37	0.02011
0.180	33		0.02545
0.200	32	35	0.03142
0.230	31		0.04115
0.250	30	33	0.04909
0.290	29	31	0.06605
0.330	28	30	0.08553
0.350	27	29	0.09621
0.400	26	28	0.1257
0.450	25		0.1602
0.560	24	24	0.2463
0.600	23	23	0.2827
0.710	22	22	0.3958
0.750	21		0.4417
0.800	20	21	0.5027
0.900	19	20	0.6362
1.000	18	19	0.7854
1.250	16	18	1.2266
1.500	15		1.7663
2.000	12	14	3.1420
2.500			4.9080.
3.00			7.0683