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Sales and Technical information

Your GUIDE Book

Lens Field-of-View Chart for 1/3" Cameras

Below is a chart based on field of view for 1/3" cameras. This is intended to be used as a guideline only to help select the appropriate lens.

Wide Angle



Telephoto



Lens Focal Length	Distance from camera to object												
	5' away		10' away		15' away		25' away		50' away		100' away		
	H area	V area	H area	V area	H area	V area	H area	V area	H area	V area	H area	V area	
mm													
2.5	9.6'	7.2'	19.2'	14.4'	28.8'	21.6'	48'	36'	96'	72'	192'	144'	
2.9	8.3'	6.2'	16.5'	12.4'	24.8'	18.6'	41.3'	31'	82.7'	62'	165'	124'	
3	8'	6'	16'	12'	24'	18'	40'	30'	80'	60'	160'	120'	
3.8	6.3'	4.7'	12.6'	9.4'	18.9'	14.2'	31.5'	23.6'	63.2'	47.3'	126.3'	94.7'	
6	4'	3'	8'	6'	12'	9'	20'	15'	40'	30'	80'	60'	
8	3'	2.3'	6'	4.5'	9'	6.8'	15'	11.3'	30'	22.5'	60'	45'	
12	2'	1.5'	4'	3'	6'	4.5'	10'	7.5'	20'	15'	40'	30'	
16	1.5'	1.1'	3'	2.3'	4.5'	3.4'	7.5'	5.6'	15'	11.3'	30'	22.5'	
25	1'	.7'	1.9'	1.4'	2.9'	2.2'	4.8'	3.6'	9.6'	7.2'	19.2'	14.4'	
50	.5'	.4'	1'	.7'	1.4'	1.1'	2.4'	1.8'	4.8'	3.6'	9.6'	7.2'	

24 VAC WIRING DISTANCE CHART

Recommended distance for 24VAC wiring allowing for a 10% voltage drop

Distance listed below are in feet , numbers in (parentheses) is distance in meters

This chart may be used as a guideline for 24 VAC devices using 2 conductor wires such as: Cameras, Heaters, Blowers, IR's

- Total VA is Volt Amperes or Watts needed by the device. (i.e. Camera)
- AWG is thickness of the power cable or Gauge
- Table shows maximum distance that device should be installed away from Power Supply

Please consult your manufacturing specifications for proper VA or Watts necessary.

Example: An enclosure that requires 50 VA and is installed 120 feet away from the transformer would require a minimum wire gauge of 16AWG.

		Wire Gauge					
		20	18	16	14	12	10
Total vA consumed	10	283 (86)	451 (137)	716 (218)	1142 (348)	1811 (551)	2880 (877)
	20	141 (42)	225 (68)	358 (109)	571 (174)	905 (275)	1440 (438)
	30	94 (28)	150 (45)	238 (72)	380 (115)	603 (183)	960 (292)
	40	70 (21)	112 (34)	179 (54)	285 (86)	452 (137)	720 (219)
	50	56 (17)	90 (27)	143 (43)	228 (69)	362 (110)	576 (175)
	60	47 (14)	75 (22)	119 (36)	190 (57)	301 (91)	480 (146)
	70	40 (12)	64 (19)	102 (31)	163 (49)	258 (78)	411 (125)
	80	35 (10)	56 (17)	89 (27)	142 (43)	226 (68)	360 (109)
	90	31 (9)	50 (15)	79 (24)	126 (38)	201 (61)	320 (97)
	100	28 (8)	45 (13)	71 (21)	114 (34)	181 (55)	288 (87)
	110	25 (7)	41 (12)	65 (19)	103 (31)	164 (49)	261 (79)
	120	23 (7)	37 (11)	59 (17)	95 (28)	150 (45)	240 (73)
	130	21 (6)	34 (10)	55 (16)	87 (26)	139 (42)	221 (67)
	140	20 (6)	32 (9)	51 (15)	81 (24)	129 (39)	205 (62)
	150	18 (5)	30 (9)	47 (14)	76 (23)	120 (36)	192 (58)
	160	17 (5)	28 (8)	44 (13)	71 (21)	113 (34)	180 (54)
	170	16 (4)	26 (7)	42 (12)	67 (20)	106 (32)	169 (51)
	180	15 (4)	25 (7)	39 (11)	63 (19)	100 (30)	160 (48)
	190	14 (4)	23 (7)	37 (11)	60 (18)	95 (28)	151 (46)
	200	14 (4)	22 (6)	35 (10)	57 (17)	90 (27)	144 (43)

Maximum distance from transformer to load

Basic notes about Coaxial Cable:

It is best to use 75ohm rated cable. Reflection and excessive noise can occur if other than 75ohm rated cables and BNC components are used.

- 75 ohms impedance rating
- All copper center conductor
- Copper braided shield with 95% braid coverage

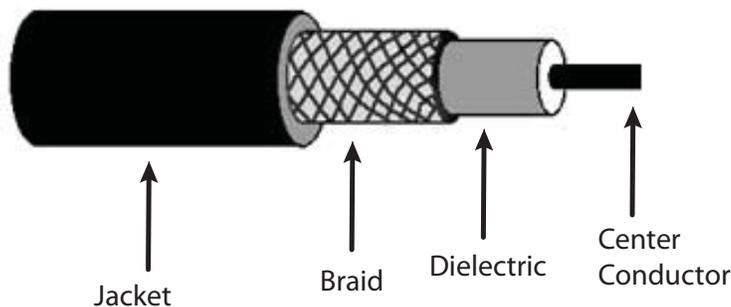
Use only high quality cable and always match the cable to the environment: whether indoor or outdoor. Solid core, bare-copper conductor is best suited for video applications, but be careful when flexing your cables. In locations where the cable must be continuously flexed (i.e., when used with scanners or pan & tilts), use cable intended for these movements. This cable will have a stranded wire core instead of the solid core recommended. Do not use cable with copper-plated steel stranding because it does not transmit effectively in the frequency range used in CCTV.

RG-59/U cable runs should not be longer than 750 feet or 228 meters between camera and recording or monitor device.

RG-6/U cable runs should not be longer than 1000 feet.

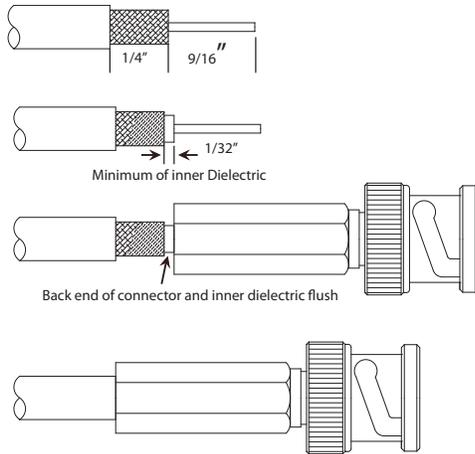
RG-11/U cable runs should not be longer than 1,500 feet.

Coax Cable Construction



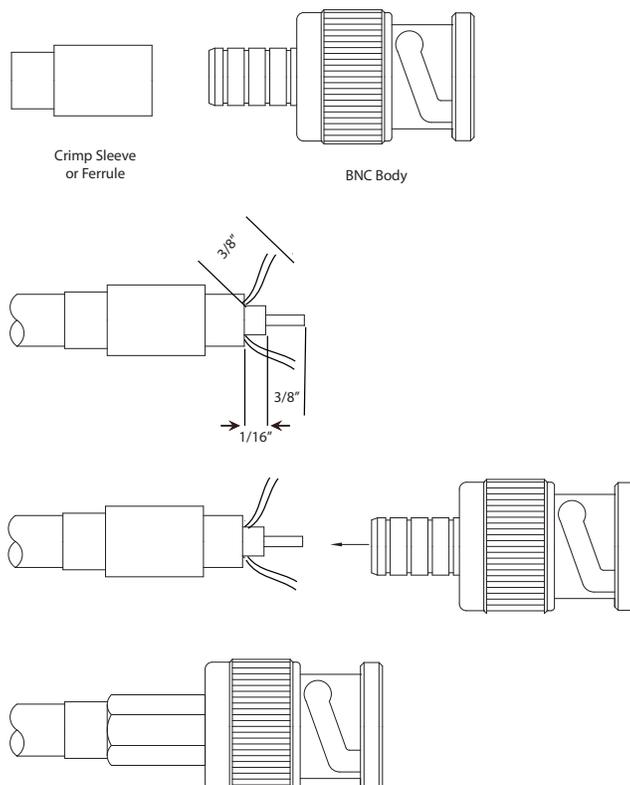
Note: An important note on coaxial cable is the gauge or diameter of the center conductor. A large diameter center conductor will have less signal loss for a given distance. Typical center conductor gauges available of RG-59/U cables are 20AWG, 22 AWG and 23AWG.

BNC Twist on Connector



- Step 1 Trim cable as shown. Take care not to nick center conductor or outer braid.
- Step 2 Twist outer braid in a clockwise direction so that at least 1/32" of cable dielectric is bared, and braid is left flat. (Stray or loose braid can cause shorts.)
- Step 3 Gently insert center conductor into back end of connector, "feeling" it into the guide hole. (If center conductor is NOT properly in place, about 1/8" of center conductor will show at the back end. Reinsert until cable dielectric reaches position shown in illustration.)
- Step 4 Push the cable firmly home (as far as possible). Then screw the connector onto the cable in a clockwise direction until it stops. Assembly is now complete.

2 Piece Crimp BNC



- Step 1 Run Crimp Sleeve down Cable
- Step 2 Trim Cable as shown. Taking care not to nick the center conductor or outer braid.
- Step 3 Flare out the braid slightly, Insert center conductor into guide hole in the rear of the connector and gently push on the connector. Make sure the braid is over the assembly.
- Step 4 Push the ferrule forward over the braid onto the connector body. Crimp Ferrule down.

Lens adjustments

Is your lens adjusted properly

Auto-iris

There are two types of auto-iris lenses available. "**Video**" type lenses contain an internal amplifier to compare the incoming video signal from the camera to adjust the iris to a level set by the user. "**DC**" type lenses contain no amplifier and are controlled by a circuit located within the camera to adjust the iris. Video Drive lenses have adjustment potentiometers on the lens where DC drive lens typically have no adjustment on the lens itself but have a level control adjustment located on the camera or within the OSD programming.

Level Control

Main iris control. An adjustment towards high will open the iris, towards low will close the iris.

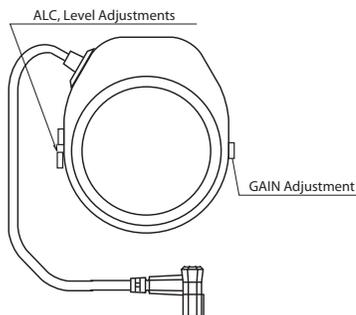
ALC

Iris sensitivity adjustment. This sets the iris reaction time fast or slow for changing light levels. Adjustment towards peak will increase sensitivity and reaction time, towards average will decrease both. Set to mid-range for most applications. You will not see a major change in the picture when adjusting the ALC.

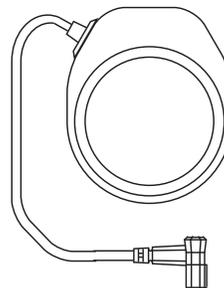
Gain

Some lenses are equipped with a gain adjustment to reduce iris oscillation (iris opens and closes rapidly in bright light) with certain cameras. If oscillation occurs, adjust until the iris reacts normally.

Video Drive Lens



DC Drive Lens



What is Flange Back Distance?

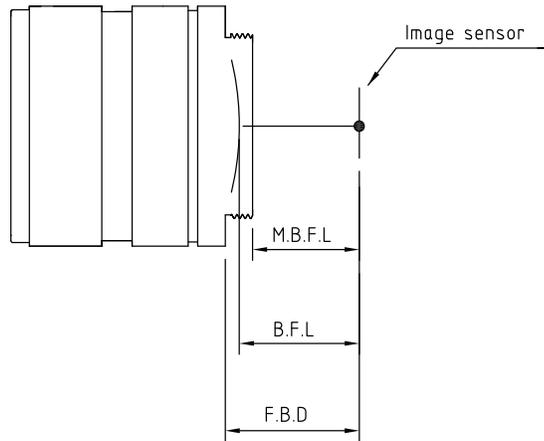
Flange back distance is the distance between the lens flange and the sensor focal plane

What is the Back Focal Length?

Back focal length is the distance between the vertex of the rear lens element and the sensor focal plane.

What is the Mechanical Focal Length?

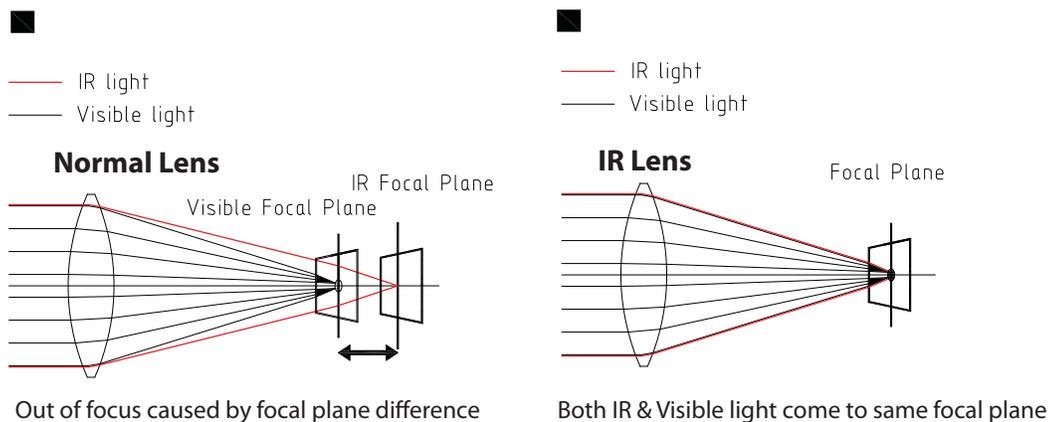
Mechanical back focal length is the distance between the surface of the lens frame and the sensor focal plane.



Non IR Lens vs. IR Lens

The wavelength of IR light is longer than those of the colors in visible light . This means each wavelength of light has a different focal point. When both visible and IR light enter a normal lens , they do not focus on the same focal plane. The IR focal point is shifted. This "Focus Shift" results in blurred images, reduced contrast and overall lower image quality.

Using a combination of Aspherical elements, special coatings and extraordinary low-dispersion glass (ED) Day/Night or IR corrected lenses achieve minimal axel aberration, keeping the light energy on the same focal plane. This means sharp in-focus images 24 hours a day.



Depth of Field

Depth of field (DOF) refers to the area within the field of view which is in focus. A large depth of field means that a large percentage of the field of view is in focus. A small depth of field means only a small section of the field of view is in focus.

Depth of field follows :

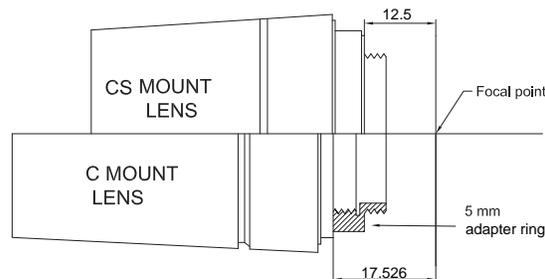
The larger the F. No. is the wider the depth of field becomes.

The shorter the focal length the wider the depth of field becomes

The longer the distance to the object is, the wider the depth of field becomes.

C and CS Mount

The CS mount lens has a flange back distance of 12.5mm. The C-Mount lens has a flange back distance of 17.5mm. This means a CS mount lens will only work on a CS mount camera, but the C mount lens will fit both a C or CS mount camera. In order for a C Mount lens to fit the CS mount camera and work properly you will need to use a 5mm spacer ring.



Back Focus Adjustment

The lens depth of field (focus) is shortest during nighttime viewing when the iris is wide open. If the lens and camera are not backfocused with the lens iris wide open, the nighttime picture can appear out of focus. Since most installations are performed during the day, the installer must drive the lens iris wide open and use a filter or turn the electronic iris on temporarily.

This procedure is best if using a neutral density filter or by using a No.6 or No.8 welder's glass in front of the lens mounted on the camera.

If you find that your focus is sharp when you are zoomed in but soft when zoomed out, your back focus needs adjusting. This normally only happens to cameras with detachable lenses

How to adjust the Camera Back Focus on Varifocal lens

1. Turn off AGC
2. Your iris should be wide open (If auto iris lens place welders glass or ND filter in front of lens)*
3. Set lens to required field of view.
- 4 Adjust lens focus for optimum clarity.
6. In step 4 if there is not enough adjustment in the lens , adjust the back focus ring to obtain maximum focus.
7. Turn AGC back on.
8. Remove filters.

How to adjust the Camera Back Focus for zoom lenses

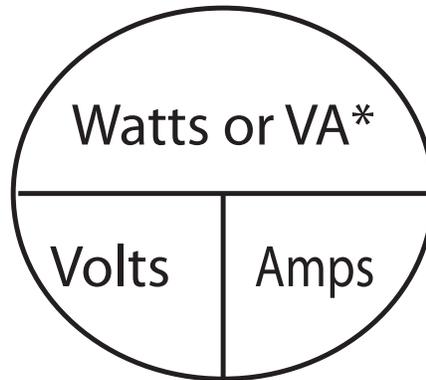
1. Turn off AGC
2. Your iris should be wide open (If auto iris lens place welders glass or ND filter in front of lens)*.
3. Set lens to widest field of view.
- 4 Set focus to infinity.
6. Point the camera at the furthest object required to view.
7. Adjust back focus for optimum clarity.
8. Zoom in and check that the lens focuses correctly.

Note: If you place your welders glass or ND filter in front of the lens and the image is too dark you will need to adjust the level control for the lens.

On a video drive lens this is found on the lens itself.

For a DC drive lens this control is normally found on the rear of the camera or in the OSD menu

The level control is used to set the auto-iris circuit to a video level desired by the user. After set-up, the circuit will adjust the iris to maintain this video level in changing lighting conditions. Turning the control towards High will open the iris, towards Low will close the iris.



To determine watts (using amps)

$$\text{volts} \times \text{amps} = \text{watts}$$

(e.g. $24 \times 2.6 = 62.4$ watts)

To determine volt amps (using amps)

$$\text{amps} \times \text{volts} = \text{volt amps}$$

(e.g. $1.8 \times 24 = 43.2\text{VA}$)

To determine amps (using watts)

$$\text{watts} \div \text{volts} = \text{amps}$$

($60 \div 24 = 2.5$ amps)

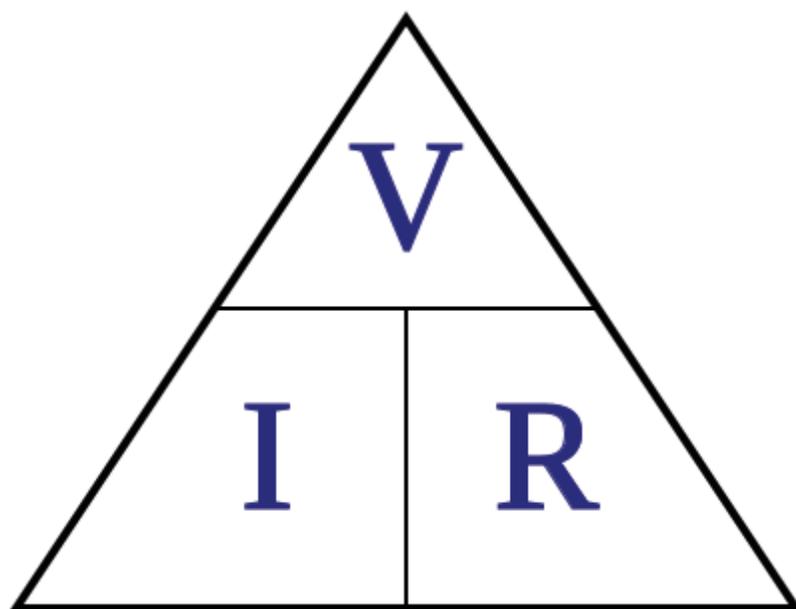
To determine amps (using volt amps)

$$\text{volt amps} \div \text{volts} = \text{amps}$$

($80 \div 24 = 3.33$ amps)

* Watts and VA are the same in a DC circuit, however they are different in an AC circuit. Volt Amps, which is higher than watts in an AC circuit, is used when calculating AC power requirements. The same formula may be used.

Ohms Law



$$V = I \times R$$

$$I = V / R$$

$$R = V / I$$

Ohm's law is a mathematical equation showing the relationship between Voltage, Current and Resistance within electrical circuits

V= Voltage

I= Current

R= Resistance

V= Voltage in Volts

I = Current in Amps

R= Resistance in Ohms

V= Voltage in Volts

I = Current in Milliamps mA

R= Resistance in Kiloohms

1mA=.001Amps

1Kilohm =1000 Ohms

Resistor Values

Resistor values are shown using colored bands.
Each color represents a number as shown below.

Band 1,2,3, Values

0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Grey
9	White
0.1	Gold
0.01	Silver

1K or 1000 Ohm Resistor



Brown = 1
 Black = 0
 Red = (2) 00
 Gold = $\pm 5\%$
 =1000 Ohms

Band 4 Tolerance Value

1%	Brown
2%	Red
5%	Gold
10%	Silver
20%	No Band

Four band resistors

The **first band** gives the **first digit** in the value of the resistor.
 The **second band** gives the **second digit** in the value of the resistor.
 The **third band** indicates the **number of zeros or multiplier**.
 The **fourth band** is used to show the **tolerance** of the resistor.

Tolerance of Resistors (fourth band)

Tolerance is the **precision** of the resistor given as a percentage. For example, a 1000 ohm resistor with a tolerance of $\pm 5\%$ will have a value within 5 percent of 1000 ohms , $1000 - 50 = 950$ ohms or $1000 + 50 = 1050$ ohms (50 is 5 percent of 1000 ohms). Value of resistor could be between 950-1050 Ohms.

Small Value Resistors (less than 10 ohm)

The standard color code cannot show values of less than 10 . To show these small values, two special colors are used for the third band: **gold which means $\times 0.1$ and silver which means $\times 0.01$** .

Example: Orange, Red, Gold bands = $32 \times 0.1 = 3.2$ ohms
 Orange, Red, Silver bands = $32 \times 0.01 = .32$ ohms

What is the difference between a patch or straight through cable, and a crossover cable?

Patch or Straight through cables are used to connect almost all networking components together and are the most common cable as a result.

Crossover cables are used in situations where two devices have the same interface, for example, connecting a hub to a hub, or a switch to a switch, or patching a hub or switch into a wall plate. The most common use is to connect two PCs directly to each other, without the use of any kind of router, hub, or switch. This is called a peer-to-peer network, and is a low-cost solution to allow file and Internet sharing between two computers.

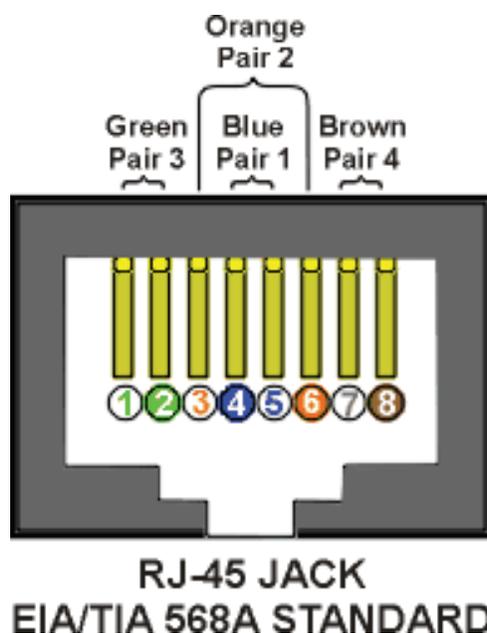
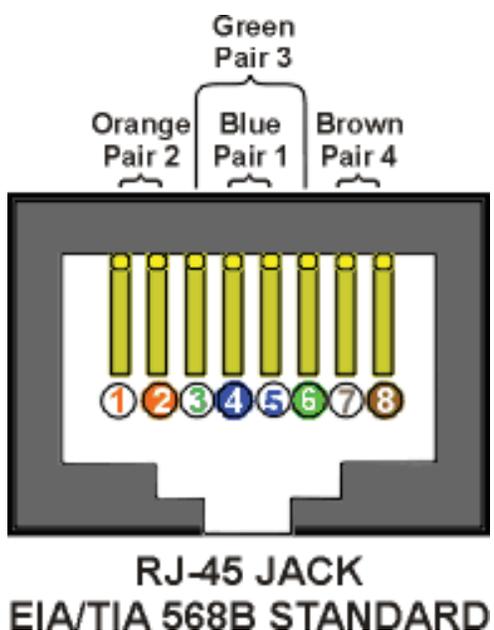
How to identifying which type of cable you have?

Patch Cable - Hold the cable with the copper contacts facing upward and the RJ45 plug pointed away from you. The first wire from left to right should be the white/orange wire followed by orange, white/green, blue, white/blue, green, white/brown, brown.

NOTE: Both ends of the cable will have this wiring configuration.

Crossover Cable - Hold the cable with the copper contacts facing upward and the RJ45 plug pointed away from you. Verify that one end of the cable has the wiring configuration listed above. If you have a crossover cable, one end will start with the white/green wire followed by green, white/orange, blue, white/blue, orange, white/brown, brown.

NOTE: On the crossover cable the ends will be different.



Crossover cable: The wiring of pins 1, 2, 3, and 6 are "crossed-over" to pins 3, 6, 1, and 2.

Start with the basics:

Don't trouble shoot your entire system, always break your system down to the simplest system (Camera, transmission means, monitor?)

Items you should know to help troubleshoot your system

Coax Related

1. Type of cable used
 - a. RG59
 - b. RG6
 - C. RG11
2. Construction of cable
 - a. Copper
 - b. Aluminum
 - c. Size of center conductor
3. Cable length
4. Termination point
 - a. Any splice points
 - B. Loop through device

Power Related

1. Type and gauge of cable used (Example 18/2 twisted)
2. Cable length
3. Power Supply
 - a. Type
 - b. Current of supply (Amp or VA Rating)
 - c. Output current per port if multi-port supply
 - d. Voltage at camera
 - e. Voltage at power supply

Lens Related

1. Type of Lens
 - a. Manual
 - b. Auto Iris
 - c. Vari Focal
 - d. Fixed
 - e. DC Drive
 - f. Video Drive
2. Brand of Lens
 - a. Model number
3. F-Stop of lens

Recording Device

1. Brand of device
 - a. Model Number
2. Does unit terminate or loop
 - a. Hi-z (Loop)
 - b. Terminate

UTP Related

1. Brand of UTP Adaptor
 - a. Model Number

2. Type
 - a. Passive
 - b. Active

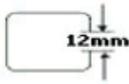
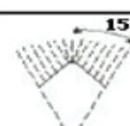
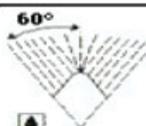
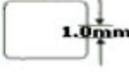
3. Cable
 - a. Type
 - b. Length
 - c. impedance

IP RATINGS EXPLAINED

What are IP Ratings?

IP is an acronym for "Ingress Protection" against objects that intrude into the enclosure of any type of equipment. The IP ratings are defined in the IEC standard 60529, which was developed by the International Electrotechnical Commission. Specifically, IEC 60529 defines an enclosure as, "a part providing protection of equipment against certain external influences and in any direction protection against direct contact."

The IP rating is formatted as "IP" followed by two digits. The first digit indicates a protection level against solids such as dust, and the second digit indicates a protection level against liquids.

1st Digit	Protection from solid objects	2nd Digit	Protection from moisture
0	Not protected	0	Not protected
1	 Protected against solid objects greater than 50mm	1	 Protected against dripping water
2	 Protected against solid objects greater than 12mm	2	 Protected against dripping water when tilted up to 15°
3	 Protected against solid objects greater than 2.5mmØ	3	 Protected against spraying water
4	 Protected against solid objects greater than 1.0mmØ	4	 Protected against splashing water
5	 Dust protected	5	 Protected against water jets
6	 Dust tight	6	 Protected against heavy seas water jets
Note: EN 60529 does not specify sealing effectiveness against the following : Mechanical damage of equipment, The risk of explosions, certain types of moisture conditions e.g those that are produced by condensation, corrosive vapours, fungus and vermin.		7	 Protected against the effects of immersion
		8	 Protected against submersion

CCTV Cameras process reflected light

Reflected light is that light that reflects or bounces off an object in the field of view. Light basically strikes an object and bounces off, this light passes through the lens of the camera, hits the image sensor in turn this creates a video image. Different types of material reflect light differently.

The amount of light or illumination available and the sensitivity of the camera should be taken into account when selecting a camera for your application.

Listed below in the table are reflectance factors of some common items:

Scene	Reflectance Factor
Asphalt	5%
Red Brick	25%
Trees, Grass	30%
Concrete Old	35%
Concrete New	40%
Glass Windows	75%
Snow	95%

Illimunination refers to the amount of light falling on a scene

Adequate illumination is essential for detection, recognition and identification

Listed below is a chart the summarizes light levels that occur under different conditions.

Lux/Foot candle Chart			
Condition	illumination		Details
	Foot candles (fc)	LUX	
Direct Sunlight	10,000	107,639	Daylight Range
Full Daylight	1000	10,763	
Overcast Day	100	1076	
General Office	40	430	
Dusk	10	107	
Twilight	1	10.76	
Deep Twilight	0.1	1.076	
Full Moon	0.01	0.107	Low Light Range
Quarter Moon	0.001	0.0107	
Starlight	0.0001	0.00107	
Overcast Night	0.00001	0.000107	

Bandwidth

Bandwidth can affect your connection not only for latency, but pictures per second, pixilation, and possibly intermittent video per channel. To find your bandwidth: there are many websites like: www.speedtest.net. Click on the arrow under Begin Test. Wait for Download and Upload Speed to complete:

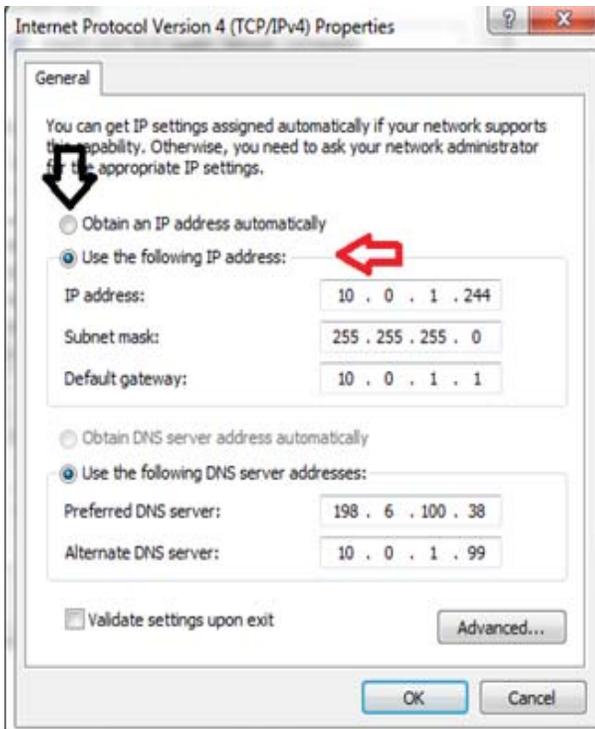


It's the transmission speed of your connection to the internet. Measuring bandwidth can be tricky. You must consider the lowest point of bandwidth from your computer to the site you are looking at determines the effective speed at that given moment. Speed tests can vary each time. What you are reviewing at the above site is the speed from your computer only. You will need to run this test at the site to find the speed there. Three factors outside of your computer that effect the speed:

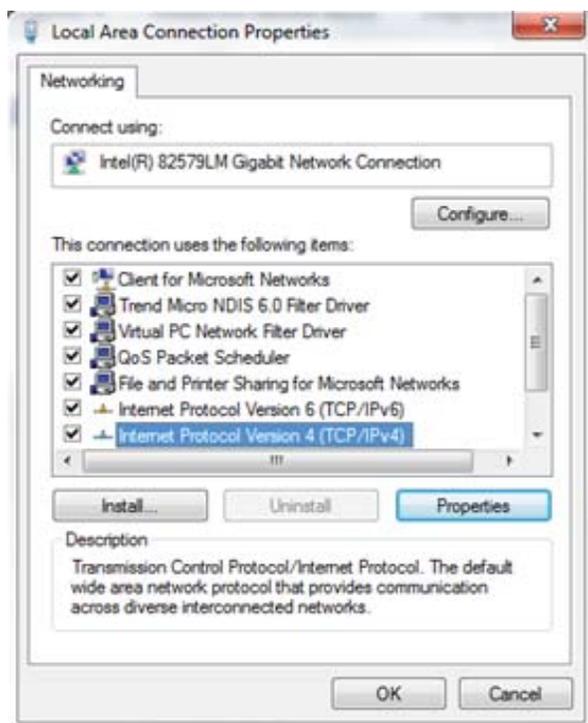
1. The bandwidth between your computer and the site you are connecting to
2. Round trip time between your computer and site being reviewed
3. Response time of the site you are viewing

DHCP versus Static Addressing

Static IP and DHCP are two different ways of obtaining an IP for your computer or IP security device. There are advantages and disadvantages of each which you can find threads of tech talk all over the web. It becomes a matter of personal preference and the way you would like to maintain the devices on your network. This could all vary by manufacturer recommendation as well. Many of your IP cameras today will be default in DHCP setting. This is done mainly for the VMS software to connect. That being said, most of your head end devices, server/DVR can be in Static addresses. A DHCP setting will allow your IP device to automatically obtain an IP address from the DHCP server. In most cases of homes and small business networks, this would be the router or cable modem/router. A Static IP in your IP device will have to be manually set. See figure below for an example of your PC set in Static, notice the red arrow for the PC to have an IP manually set:

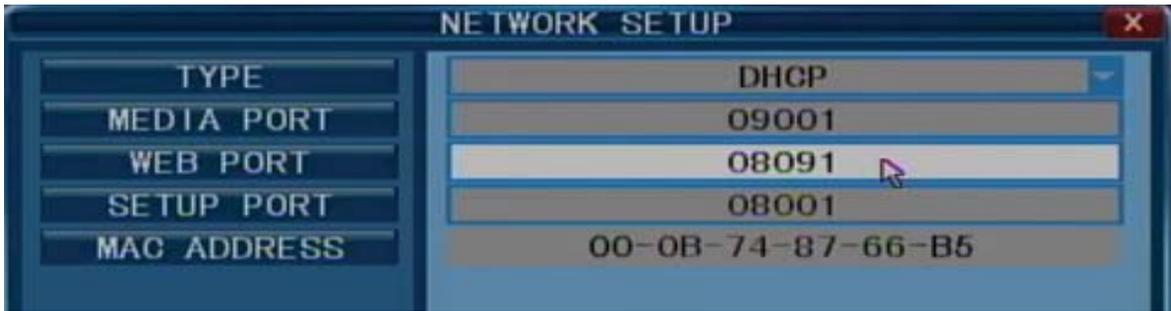


The black arrow is pointing the circle unmarked for DHCP or for the Computer to Obtain an IP address automatically from the DHCP server. *An easy way to get your DVR set on the network, is to put it in DHCP upon initial setup and let it acquire the address from the router. If you would like this IP address for Static; type in the IP address, Gateway and Subnet mask into the DVR that it found from the DHCP setting. If you prefer, you can also leave the IP address of the DVR in a DHCP setting. You can locate this setting in your PC in Local Area connection properties, via Control Panel and Network and Sharing Center. (Win7)



Ports, Routers and Switches

Most if not all your Security IP devices will need ports entered and forwarded to be connected on the internet. This is for security of your device. Please follow your manufacturer's guidelines for proper ports to forward to allow connection from Internet Explorer, Mobile Application, Remote Software, VMS etc. The following is an example of the Network Menu of the inDVR4000:



This DVR is set in DHCP. All three ports listed have to be forwarded in your router for proper connection to this unit: Media Port, Web Port and Setup Port. If you have multiple DVR's on the same network, each port listed above will need to be set differently and also forwarded. For example, the second DVR can have a Media Port of 09002, a Web Port of 08092 and a Setup Port of 08002. Usually, a separate port will need to be entered in the same manner and also forwarded for your mobile application.

The following is an example of a home or small business connected to an unmanaged switch. If you have a managed switch, please consult an IT Manager in charge or the manufacturer of the switch for proper configuration. For Security Devices such as a DVR, it will act as a normal PC in this configuration:



Using ICMP

Using ICMP will help find your own local PC IP address and network information and contact other devices on your network to insure a proper connection.

In Win7, move your cursor down and click on the Start command.



Click in the search box and type CMD

See more results



Click on the CMD program to start

Programs (1)

C:\cmd

To locate your PC's IP address, Gateway and Subnet Mask, type in "ipconfig"

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\mpecino>ipconfig
```

After you hit enter, your information will appear:

```
C:\Windows\system32\cmd.exe
Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix . . . :
Link-local IPv6 Address . . . . . : fe80::c57a:bc22:39cc:bb62%11
IPv4 Address. . . . . : 10.0.1.244
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.0.1.1
```

When your IP device is on the same network as this PC, the DVR will need to have the same address with exception of the IP address. You do not want two devices with the same local address. For example, the DVR in the above scenario would need to have IP address 10.0.1.245 to avoid a conflict.

To make sure you have contact with the IP device, after the device information has been saved within the Camera or DVR, using cmd, type in: "ping ipaddress". Please note, "ipaddress" would be the actual IP assigned to the DVR: Below the Red arrow indicates a space between ping and the Green arrow, IP address of the DVR.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.
C:\Users\1>ping 192.168.0.100
```

After you hit enter, your screen should show a proper communication screen like below 0% loss:

```

CA. Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\1>ping 192.168.0.100

Pinging 192.168.0.100 with 32 bytes of data:
Reply from 192.168.0.100: bytes=32 time=3ms TTL=64
Reply from 192.168.0.100: bytes=32 time=1ms TTL=64
Reply from 192.168.0.100: bytes=32 time=1ms TTL=64
Reply from 192.168.0.100: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms
    
```

For an improper connection, your screen will look like below, 100% loss and Request Timed

```

CA. C:\Windows\system32\cmd.exe
again.
C:\Users\mpecino>ping 192.168.0.101

Pinging 192.168.0.101 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.0.101:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\mpecino>ping 192.168.0.100

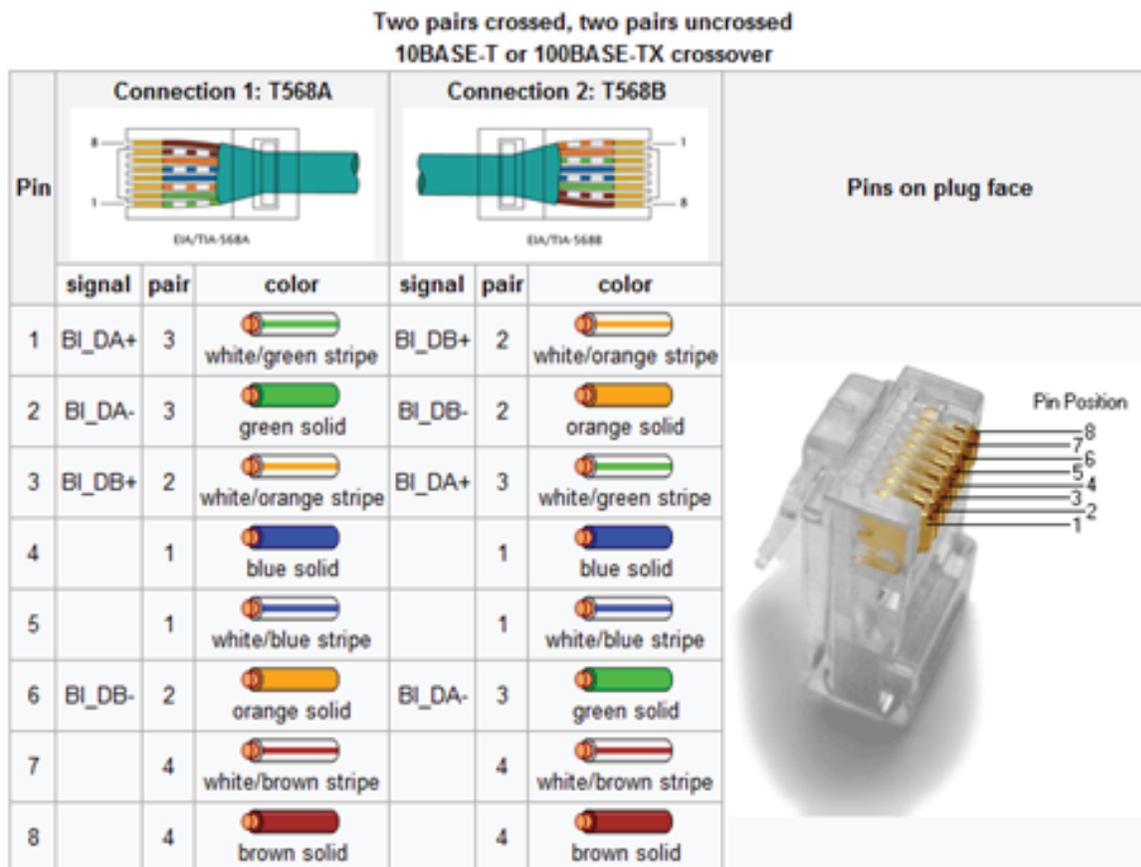
Pinging 192.168.0.100 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    
```

When you have 100% loss, there is a connection problem somewhere. Check your cables and replace. Make sure you have proper connection between all devices on the network. Double check your IP information

Direct Connection to Test

If you received a Request Timed Out from your ping test and you have checked your cabling, try a direct connection test. First, you will need a crossover cable. This is a cable that has colored pairs crossed for the connection, see figure below:



You will need a cable either purchased like this one above or made with these pairs crossed. A Direct connection is simply your PC/Laptop connected directly to the IP Security Device without any switch in between. This has to be done with a crossover cable. Both your PC and your DVR, in this example will be in Static address. Using section DHCP vs. Static Addressing place your PC/laptop in Static and use IP address 192.168.1.100, gateway 192.168.1.1 and subnet 255.255.255.0. Put your DVR in Static address and assign it 192.168.1.101, gateway 192.168.1.1 and subnet 255.255.255.0. You will now run your ping test. Please see section ICMP. If your IP device or DVR is properly operating and your cable is good, you should receive the proper ping communication 0% loss.

Other Troubleshooting Tools

Need to locate your external IP address? This is the address given to you by your Internet Service Provider. Go to: www.whatismyip.com your external IP address will display at the top.

Please note, websites mentioned in this tutorial are not affiliated with inMotion CCTV. Please contact inMotion Support Services if you need any further information.

inMotion CCTV

519 Bennett Lane
Suite 100
Lewisville, Texas 75057
Phone: 214-960-4640
Fax: 214-960-4641
Email: sales-US@inmotioncctv.com

inMotion Europe GmbH

Hohemarkstr. 20
61440 Oberursel
Frankfurt, Germany

+49-6171-2919393
Email: sales-EU@inmotioncctv.com