



# Bolin Installation & Optimization

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## Installing the Bolin SD 520

First – Some Important Items!



**Important:** *The Bolin SD 520 enforces a complex password when being accessed over a public IP Address – even when the public address forwards to a private address. Before deploying your camera be sure to set the administrator password to a sufficiently complex password that is at least 12 characters long with both upper and lower case letters and at least one number (e.g. wxyzMyBolinCamera7).*



**Important:** *We strongly recommend using a local (wired only) router with at least 4 ports when installing in a remote location*



*using the public Internet. Sometimes these are integrated with the cable/DSL modem. Use this to create a small ad-hoc local network and use port-forwarding to connect to the camera*

*from the public address provided by your ISP. We recommend setting the local subnet to 192.168.0.X and keep the cameras default IP Address of 192.168.0.13. This enhances security and makes future maintenance of the camera significantly easier. We strongly recommend you never set the cameras IP Address to the public IP Address assigned by your ISP!*



**Important:** *When using port-forwarding we recommend keeping the default http and rtsp ports on the camera, but forward from non-default port numbers from the public side (e.g. 42080(http) from the public side to 80 on the camera IP, 42554(rtsp) from the public side to 554 on the camera IP). This enhances security and makes future maintenance of the camera significantly easier.*

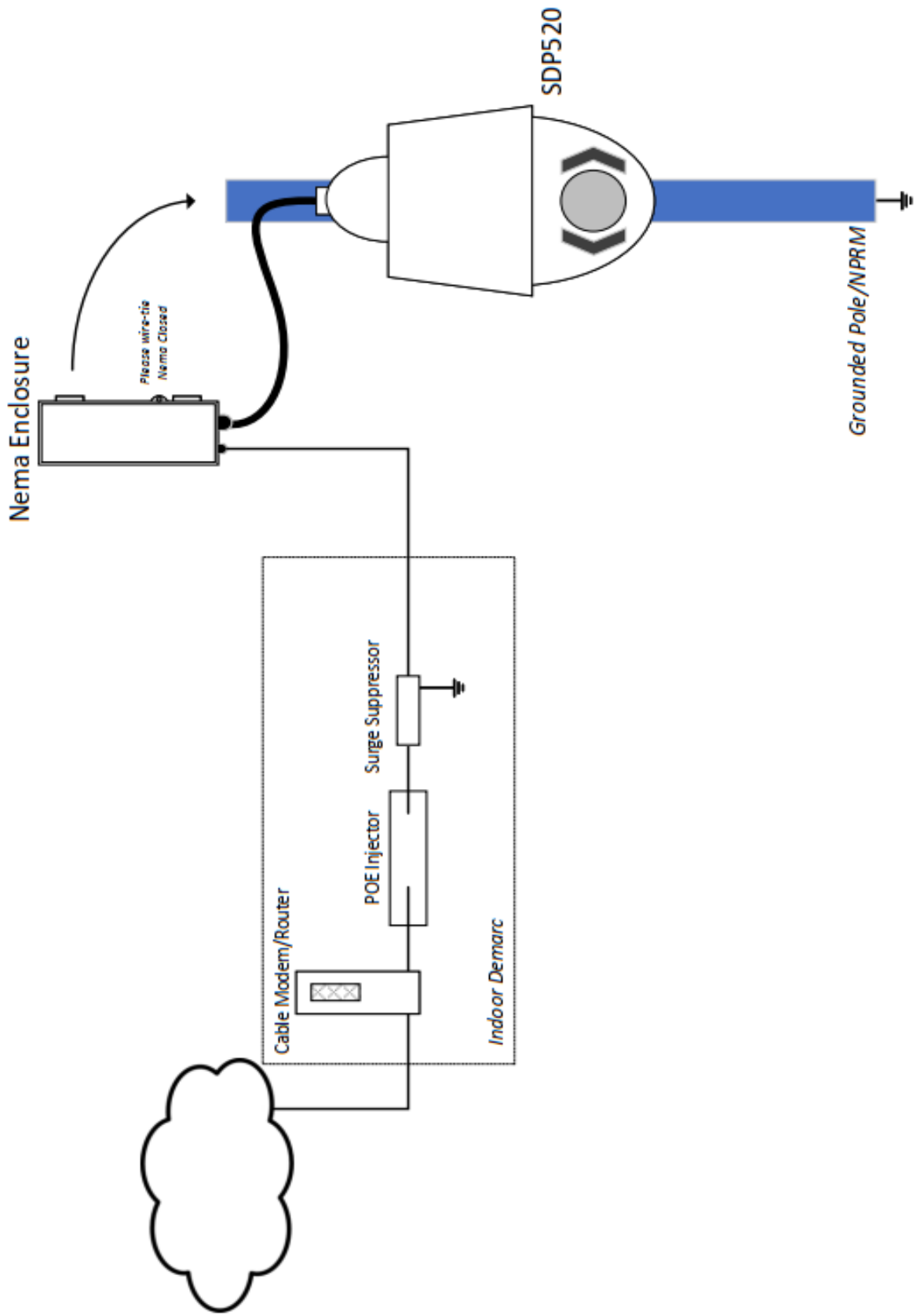


**The Bolin SD520 'Starlight' PTZ Camera**

### Physical Installation

When installing the Bolin SD 520 we recommend a sturdy Non-Penetrating Roof Mount (NPRM) or a permanently attached pole (see illustration on next page). The pole should be fully grounded. An ungrounded pole will only have the camera and the demarc installation as a path to ground. It is best to avoid this.

The Bolin Broadcast Kit from Videstra comes with an IP66 External NEMA enclosure with a pole mount. This is intended to shield the camera umbilical cable from the elements. Cable glands of appropriate sizes are pre-installed to accommodate an Ethernet cable as well as the umbilical from the SD 520.



## Bolin Starlight IP66 NEMA enclosure by Videstra

Your Bolin SDP Cameras each come with a specially created outdoor IP66 rated NEMA enclosure with pole mounts suitable for towers or non-penetrating roof mount poles to host the cameras umbilical cable. There are several connectors on this umbilical cable, however only the RJ45 connector will be used in a typical Videstra® managed Micro Local camera installation where video is accessed through IP.

## POE

The RJ45 connector on the umbilical also acts as the power connection for this camera through a POE (Power Over Ethernet) connection. The power is provided by the BL-PP97 High Power (97W) POE Injector.



The POE injector and power supply is a class 2 device and must remain indoors.

More information regarding this injector can be found directly on the Bolin web site at: <https://bolintechnology.com/high-power-97w-poe-injector/>

## Umbilical Details

There are several connections on the Bolin umbilical cable. Only the RJ45 connection will be used. However, the cable must always be protected within an IP66 environment. Videstra has provided an IP66 NEMA enclosure with two IP66 cable glands and pole mounting hardware to host the umbilical cable safely and securely.





Insertion of the Bolin umbilical should be done carefully. To properly pass the umbilical through the cable gland always start with the large connectors first – the RJ45 being the largest one, you should start with it. Followed by the remaining larger connectors one at a time. The small wires will pass easily once all the larger connectors are inside the NEMA enclosure.

A network cable *without a protective cover* will fit easily through the second cable gland. If your cable has a protective cover you may either remove it or use a heat gun to loosen it and pass it through the gland separately.

Once the umbilical and Ethernet cable are safely inside, you may close the cable gland. Be sure to leave an appropriate service loop for the Ethernet cable. You may need to put some electrical tape on the portion of the cable that will be directly sealed by the gland if it will not close sufficiently.



The application of a small amount of silicone grease will further insure against moisture and water ingress.

A small, black, UV resistant wire-tie should be used to seal the NEMA enclosure after mounting. We recommend leaving a spare wire-tie inside the enclosure for future access.

**Note:** *The NEMA enclosure is small, and no average wind-load has been calculated for it as it is assumed to be negligible.*

## Optimizing the Bolin SD 520 Camera for On-Air



The Bolin SD 520 outdoor camera is an IP66 rated PTZ Capable camera with a superior imaging block for outstanding video – especially in low-light situations. In a side-by-side “shootout” with other popular outdoor PTZ cameras in the same price category the Bolin presented cleaner colors, lower noise and superior contrast across the board. The Bolin SD 520 is an excellent choice for deployment in any situation, however where low-light performance is important it is a clear winner.

Out of the box the Bolin camera is NOT set to perform optimally in a *broadcast television* environment. Designed initially as a high-resolution, powerful *security* camera, the Bolin SD 520 will require some changes from the default settings to optimize it for use as an on-air camera. With the default settings it will not be immediately obvious until the scene becomes darker, or darkest.

This document will outline the changes necessary to optimize your Bolin SD 520 for Broadcast Television when using it as a Micro Local Camera.

**Note:** *Sometimes it may become necessary to return the camera to factory defaults. When this happens you will need to use this guide to return the settings recommended herein to optimize the camera for use on-air.*

### Flip the image 180°

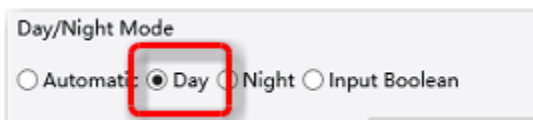


When you first power up the Bolin SD 520 after mounting it you may notice the image is upside down. To flip it navigate to **Image → Image → Image Enhancement** and set Image rotation to **180°**

All other settings under Image Enhancement can be left at defaults.

### IR Filter – Set the IR Filter to Day mode

The IR Filter on the Bolin camera is, by default, set to *disengage* in low light. This is a physical filter that is mechanically moved. Removing the filter allows the sensor to “see better in the dark.” While this may seem like a good thing, it is, in fact, not good for broadcast. The IR filter on any camera *also* allows the camera to see

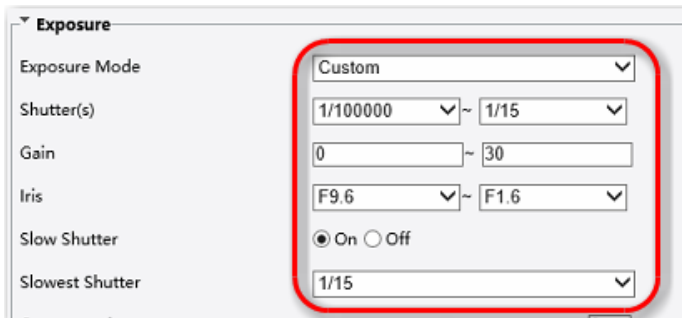


accurate colors in normal light. Without the IR filter a camera must be switched to black & white, or the colors become skewed. Without the IR Filter the Bolin SD 520 will automatically switch to Black & White when the sun sets. The sensor in the Bolin SD 520 is a very high-quality, low light sensitive device and leaving the IR filter in place will still result in very good imagery when it is dark out. In a security setting where extreme detail is often required, black & white images are fine, but are not good for broadcast. Setting the IR filter to Day will keep the IR filter in place both day and night and allows the camera to present in color. To set the IR Filter permanently to Day mode navigate to:

**Image → Image → Exposure → Day/Night Mode**

### Gain – Switch exposure settings to “Custom” to limit noisy gain

By default, the camera’s automatic exposure setting allows the camera to increase the gain substantially at night, or in dark settings. While high gain may be useful in a security environment, it is sub optimal for broadcast. Unfortunately gain increases image noise considerably. At Videstra we believe that “Dark is Better Than Noise” when it comes to live video from Micro Local Cameras. To reduce the gain, the camera is permitted to use set under **Image → Image → Exposure → Exposure Mode to Custom**



When the Exposure mode is set to Automatic the camera will use the full range of gain available. Numerically this is in db. By default, the camera will crank the gain up to 100 db in the dark – which will introduce a great deal of noise into the image stream. Setting the Exposure Mode to Custom still allows the camera to make its own exposure decisions, but lets you set the limits for

shutter speed, gain, iris and also determine if you want to allow super-slow shutter speeds. The above settings represent our recommendations – which are to allow the full range of shutter speeds and iris, but limit the gain to a maximum of 30 db.

We also recommend allowing a slowest shutter speed of 1/15<sup>th</sup> of a second. But note that in the darkest settings the camera will use this *and* reduce the output to 15 fps. This may make faster motion look slightly jerky and blurry (usually not). If the smoothest motion is always desired, you can limit the slow shutter speed to 1/30<sup>th</sup> of a second and the camera will always deliver 30 fps (when permitted by bandwidth and other network restrictions).

### WDR – (also known as HDR) Settings

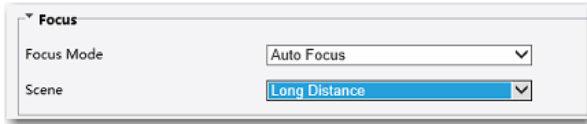
The maximum setting for WDR should be 3. With some Bolin firmware a setting higher than 3 only



produces flashing, or pulsing video. To change this setting, you must first turn on WDR, then set WDR Level to 3. Leave all other settings as defaulted.

## Auto Focus – Allow the camera to always autofocus for Long Distance

By default, the camera is set to use one-touch focus – which assumes you are using the cameras web page to focus. This will not always be the case and your camera should be set to always auto focus. The recommended settings are available in **Image → Image → Focus**. The Long Distance setting prevents the camera from focusing on raindrops/mist that may gather on the front window. While you can always use the wiper on the camera to remove water, it may not always be convenient to do so just before you use it on-air.



## PTZ Timeout

On the PTZ→Basic Settings tab there is a setting called PTZ Timeout. You should turn this on with a nominal setting of 10 (seconds). This will cause the camera to stop any PTZ activity 10 seconds after initiation of any Pan, Tilt or Zoom.

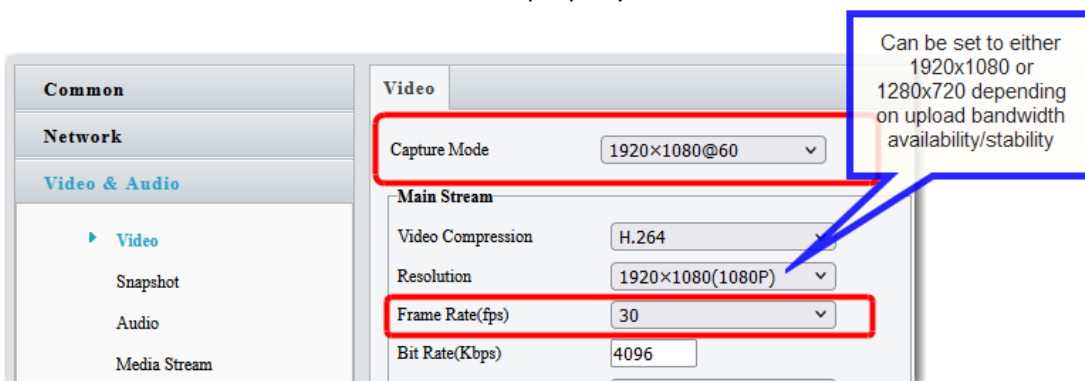
Sometimes bandwidth constrains cause significant video latency which can make panning, tilting or zooming difficult to judge. Setting this to a low value like 3 (seconds) can often help by forcing the user to re-apply their action with another mouse-click while panning, tilting or zooming. This is pretty much in the try-it-and-see category.

## Other Important Camera Settings

The Bolin SD 520 can make up to 3 separate stream profiles available. These are represented on the Video & Audio → Video tab in the cameras web page. Here you will find the ability to configure the Capture Mode and up to three stream profiles: Main, Sub Stream and Third Stream.

### Capture Mode

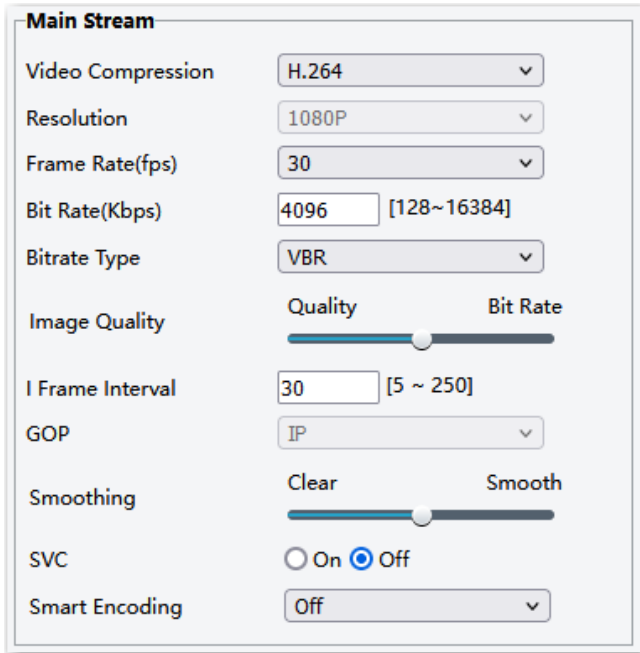
Set this to **1920x1080@60**. Although it might make sense to set this to the @30 setting – this is non-standard and the Videstra PTZ control will not be able to connect. Set this to the @60 mode, then set the main channel to 30 FPS. This results in a standard stream that both the Videstra V-Streamer and the Videstra Native Bolin control will work with properly.



These settings are important for overall compatibility with the Videstra system

## Main

This will be the stream you use on-air and should be set for the highest quality available. Either h.264 or h.265 are acceptable here. Unless bandwidth is restricted (e.g. < 5 Mb) you should set the Frame Rate (fps) to 30.



The screenshot shows the 'Main Stream' configuration panel with the following settings:

- Video Compression: H.264
- Resolution: 1080P
- Frame Rate(fps): 30
- Bit Rate(Kbps): 4096 [128~16384]
- Bitrate Type: VBR
- Image Quality: Slider between Quality and Bit Rate, positioned in the middle.
- I Frame Interval: 30 [5 ~ 250]
- GOP: IP
- Smoothing: Slider between Clear and Smooth, positioned in the middle.
- SVC:  On  Off
- Smart Encoding: Off

- **Video Compression:** H.264 or H.265
- **Bit Rate:** set to no more than 75% of your available *upload* bandwidth available to the camera
- **Bitrate Type:** set be VBR\*
- **Image Quality:** set to the middle
- **I Frame Interval:** set to 30
- **Smoothing:** set to the middle
- **SVC:** should be OFF
- **Smart Encoding:** should be OFF

Note: Sometimes setting the **Bitrate Type** to **CBR** can help if video tends to freeze a lot. This is often due to optimizations in routers along your devices path (traceroute) that may optimize traffic by lowering the priority of any stream whose bandwidth is inconsistent. Setting to CBR may also reduce latency which is helpful for PTZ functionality which will use the Sub Stream (see below).

CBR, however, can significantly increase the bandwidth usage of the camera and should, generally, be avoided.

## Sub Stream

This stream will be used by the Videstra Native Bolin PTZ Control your users will use to move the camera. We want to reduce the amount of bandwidth used for this functionality so we don't "steal" bandwidth (or much) from the main stream.

- **Video Compression:** H.264
- **Resolution:** 720P
- **Frame Rate:** 15
- **Bit Rate:** 1024
- **Bitrate Type:** VBR\*
- **Image Quality:** Slide a bit more toward Bit Rate
- **I Frame Interval:** 30
- **Smoothing:** In the middle
- **SVC:** Off
- **Smart Encoding:** Off

Note: See **Bitrate Type** note regarding VBR and CBR in the section above.

## Disable the Third Stream

A Third Stream is available on the Bolin, but should not be enabled at this time.

## Resetting the SD 520



**Note:** *Do not forget the administrative password. Recovery can be difficult as the Bolin SD 520 does not have a hardware reset option. There is a software reset option, however it is a one-time option.*

If you have forgotten the password for the Bolin SD 520 you can use the Bolin IP Finder to reset it, but **only over a local connection**. If the camera is remotely deployed in a location accessible via a public Internet address, you will need to go on-site with a laptop in order to reset the cameras administrative password.

You can download the Bolin IP Finder from Videstra using the following link:

<https://www.videstra.com/bolinsupport/IPC-Search-Tool.zip>

To reset you will need to send the camera serial number (available from the IP Finder) to Videstra for a one-time code to reset the password. Videstra cannot generate the password, but will work directly with Bolin to get this. You may alternately contact Bolin support directly at: **(626) 333-6288**

The manual for the IP Finder is available here:

<https://www.videstra.com/bolinsupport/Camera-IP-Search-Tool-User-Guide-IPF-UN-02202021.pdf>