ToughEye-3100™

User Manual, *V8.0*

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For more information, please contact info@excelsensetechnologies.com or 1-800-914-3193

Overview

Patented ClearSight™ technology actively and automatically clears the field of view of the camera without any regular maintenance. The technology is effective against oil, grease, mud, and various other industrial contaminants. ClearSight™ enables cameras to self-clean — in most cases, for several years — eliminating the need for access and regular maintenance.

Your ToughEye-3100™ is equipped with ClearSight™ technology. The system requires nothing more than conventional electrical connections; its rugged, self-contained design eliminates the need for fluid tanks, hoses, compressors, and pumps.

Important Safety Instructions

⚠️ Warning

1. This is an ITE class A device. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
2. All electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations. Electrical power is not to be applied to conductors at any point during this process.
3. Connecting the ToughEye-3100™ cable incorrectly poses a risk of injury due to electric shock to the user, and can damage the device.
4. Damaged or faulty cable connections may leave electrical conductors bare and/or short-circuited. Extra care must be taken during cable installation in order to avoid this scenario. In such a circumstance, do not attempt to handle conductors before removing power.
5. The ToughEye-3100™ lens is made with hardened glass, but the user should take necessary precautions when handling the system if the lens is deployed. If excessive force is induced, the glass may break, causing system failure and potential injury to the user.
6. The ToughEye-3100™ lens deploys with forces up to 200 lbs. Care must be taken to ensure there is sufficient clearance around the lens. Refer to the *Dimensions* section of this document for spacing details.
7. When adjusting the position of the ToughEye-3100™ mounting bracket (for example, from *Configuration 1* to *Configuration 2* — see *Dimensions* section), care should be taken not to pinch fingers in the areas between the side brackets and the ToughEye-3100™ shell.

⚠ Caution

1. Alterations or modifications carried out without appropriate authorization may invalidate the user's right to operate the equipment.

2. A Class 2 24VDC 4A power supply is recommended to ensure the best picture quality and stable operation. With its internal protection and regulation, ToughEye-3100™ can be operated with an unregulated 24VDC power supply. In this scenario, voltage fluctuation limits will be dependent on setup. Refer to the *Electrical Specifications* section on ToughEye-3100™ operational limits.

3. Only use fully-compatible cabling, as recommended by ExcelSense representatives, to connect ToughEye-3100™ cameras in your application. Failure to do this may cause unintended behaviour and permanent damage.

4. It is recommended that ToughEye-3100™ be used with the ExcelSense Analog Monitor when analog view is required. However, ToughEye-3100™ may be used with any analog monitor that has a CCTV quality 75 video impedance level.

5. Do not attempt to disassemble ToughEye-3100™ in order to access internal components. Consult ExcelSense for technical support as required.

6. Never face the ToughEye-3100™ directly towards the sun or any bright or reflective light, which may cause smear on the picture and possible damage to the CCD.

7. Do not remove the ToughEye-3100™ label containing P/N and S/N information for warranty service.

8. Never expose ToughEye-3100™ to conditions outside those specified in the *Specifications* section. Doing this can cause permanent damage to the device.

9. Keep the ToughEye-3100™ lens fully retracted in its shell at all times when unpowered or camera view is not required in order to minimize risks of damage to the lens.

10. Damaged ToughEye-3100™ equipment must be replaced through an ExcelSense representative. Failure to do this may cause incompatibilities and permanent damage to the system.

11. Always clean the ToughEye-3100™ lens by performing cleaning cycles (see *Triggering the ToughEye-3100™* section for details). Do not clean lens manually. ToughEye-3100™ may also be pressure washed while the lens is retracted.

Specifications

CAMERA

Image Sensor	2.34 MP
Resolution (HxV)	2000 x 1241
Min Illumination	0.1Lux/F2.0 (No illumination required for IR version)
Illumination Distance	Infrared option: 15m [50'] est | Visible option: 5m [16'] est
Horizontal FoV	Approx. 80°, 120° (customization available)
Video (IP)	H.264 (1920x1080) | MJPEG (1280x720)
Video (Analog)	720x486 (NTSC), 720x576 (PAL)
Network	RTSP, RTP, UDP, RTCP, IGMP, HTTPS
ONVIF	Profile S
Recording	32GB Storage - Continuous, Motion, Pre/Post Alarm

GENERAL

Dimensions	297mm x 170mm x 130mm [11.7in x 6.7in x 5.1in] (Extended)
	241mm x 170mm x 130mm [9.5in x 6.7in x 5.1in] (Retracted)
Weight	ToughEye-3100™: 5.9kg [13lbs] | Standard bracket: 2.3kg [5lbs]
Clean Cycle	Configurable Timer Based, Electrical Trigger (up to V_{IN})
	Extension Time 3sec (typ). Full Cycle Time 10sec (max).
	Rated cycles: 60000 or 90000 (see ordering options)
Temp Range	-40°C to 50°C (Extended Temp Model)
	5°C to 50°C (Standard Temp Model)
IP Rating	IP68
Vibration	Tested to 11g

ELECTRICAL

Parameter	Min	Typ	Max
Input DC Voltage, V_{IN}	22V	24V	30V
Power Consumption, P_{IN}	10W (Idle)	55W (Deploying)	96W[2] (Max heating)
Input Protection			
Clamping Voltage, V_C			85V (IEC 61000-4-5)
Undervoltage Lockout[3], V_{UVLO}			18V
Overcurrent Threshold, I_{OVC}			6A (internal fuse)
Reverse-Polarity, V_{RVP}			$-V_{IN}$
Max Cable Length[4], L_{MAX}			40m [130ft]
Trigger Input, V_{TRIG}	0V / Open	0V (default pulled low)	V_{IN}

1. Min and Typ values measured at 25°C ambient, Max value measured at -40°C ambient.
2. Extended Temp Model only, taken at -40°C ambient temperature
3. If the input voltage drops below the UVLO threshold, lens actuation and thermal regulation will be disabled
4. Recommended maximum cable length, assuming negligible losses between power source and cable junction

For more information, please contact info@excelsensetechnologies.com or 1-800-914-3193

Ordering Options
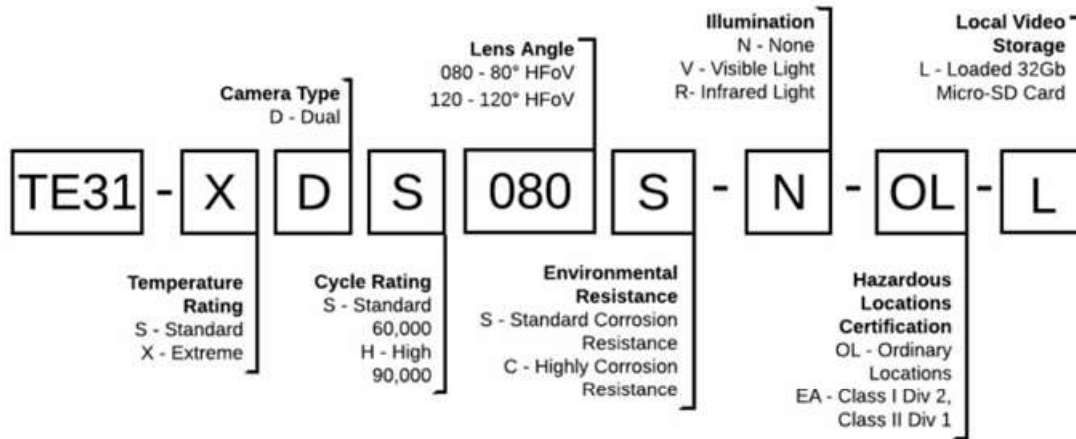
TE31 - ToughEye-3100™ camera

Lens Angle
080 - Approx. 80° Horizontal FOV
120 - Approx. 120° Horizontal FOV

Temperature Rating
S - Standard: 5 °C to 50 °C
X - Extreme: -40°C to 50°C

Environmental Resistance
S - Standard Corrosion Resistant
C - Highly Corrosion Resistant

Camera Type
D - Dual: IP / Analog Camera

Illumination
N - None: No illumination
V - Visible Light LED array
R - Infrared Light LED array

Cycle Rating
S - Standard: Rated for 60,000 cycles
H - High: Rated for 90,000 cycles

Hazardous Locations Certification
OL - Ordinary locations
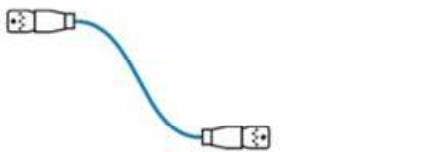**EA** - Class I Div 2, Class II Div 1 Certified

Local Video Storage
L - Loaded 32Gb Micro-SD Card

Accessories

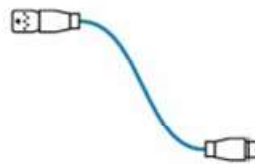The following lists standard accessories available for ToughEye-3100™ installations.

MAIN CABLE

| MC | - | DC | - | 10M | - | X | - | DU |

Length
XXM - XX meter

Main cable used in all ToughEye installations.
Available in: **3m, 5m, 10m, 15m, 20m, 22m, 25m, 30m** lengths

EXTENSION CABLE

| EC | - | DC | - | 03M | - | X | - | DU |

Length
XXM - XX meter

Extension cables can be used to increase the length of existing cables. Available in: **3m, 10m** lengths

BREAKOUT CABLE

24 VDC
GND
IP (MALE RJ45)
TRIGGER
MALE BNC

| BC | - | DU | - | 01M |
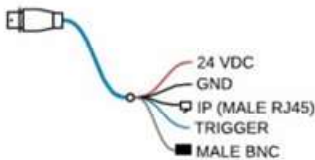
Breakout cable providing access to the internal connections of the ToughEye. Typically terminated through a cable gland into an existing electrical cabinet. Comes standard with **1m** length.

POWER CABLE

24 VDC
GND
TRIGGER

| PC | - | SC | - | 03M |
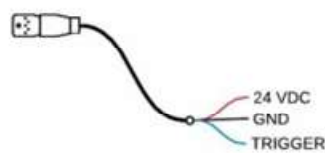
The power cable is used to power the dual output junction box (PN JB-DU-AM-1C). Typically terminated through a cable gland into an existing electrical cabinet. Comes standard with **3m** length.

SEALED RJ45 KIT

| RJ | - | IP |

For use with the dual output junction box (PN JB-DU-AM-1C). Allows for an IP rated network connection. CAT 5e or better cable required

**DUAL OUTPUT
JUNCTION BOX**

| JB | - | DU | - | AM | - | 1C |

Standard dual output junction box. Suitable for outdoor installation. Provides connections for ToughEye, Input Power, Network and compatible with ExcelSense standard 7" Monitor (PN AM-3C-7IN-MB)

**7" MONITOR WITH
MOUNT**

| AM | - | 3C | - | 7IN | - | MB |

7" Monitor with included adjustable mount. Can be connected directly to the dual output junction box (PN JB-DU-AM-1C)

**MIL-SPEC
MOBILE NVR**

| NVR | - | MIL | - | 4C |

Network video recorder intended for harsh mobile applications. When combined with one or more ToughEye cameras it allows for extended storage capacity and remote triggering capability

**WELDING ADAPTER
BRACKET**
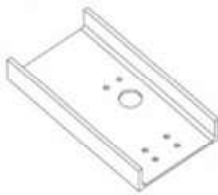
| MB | - | TE | - | WE |

Suitable for welding to existing horizontal or vertical surfaces when bolting is not an option

**PROGRAMMING
CABLE**
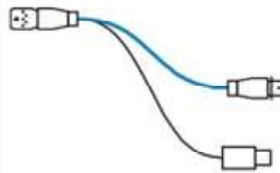
| PA | - | TE | - | USB | - | A |

Programming cable is used to modify timing of automatic cleaning cycles, retrieving cleaning cycle data and for updating internal microcontroller firmware. Suitable for inline connection to ToughEye

System Installation

Configuration Selection

The ToughEye-3100™ supports analog and network video streams, including simultaneous analog and network video streams. Selection of the appropriate stream is an important consideration.

The network stream provides simpler connections, higher resolution video, and accessibility to the stream from any device connected to the same network. We **recommend** using the **network** stream in the following scenarios:

1. The stream must be viewed remotely | See***Configuration A***
2. The stream must be viewed on the equipment and an on-equipment display exists which is powered by a computer (ie. Panel PC or Dispatch system) | See***Configuration A***

It is important to note that IP video has inherent latency due to video compression. The ToughEye-3100™ latency is rated at approximately 100ms[1], so only in applications where this latency can be tolerated is the network stream of ToughEye-3100™ recommended.

The analog streams are lower resolution and more prone to noise, however, they can be connected to almost any new or existing analog monitor or DVR. We **recommend** using the **analog** stream in the following scenarios:

1. The stream must be viewed on the equipment and no existing display is installed | See ***Configuration B***
2. The stream must be viewed on the equipment and an existing analog display with open channels exists | See***Configuration C***

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1. Latency is 100ms, however depending on the network environment, bit rate, server specification, and viewing software, this value may change

Configuration A

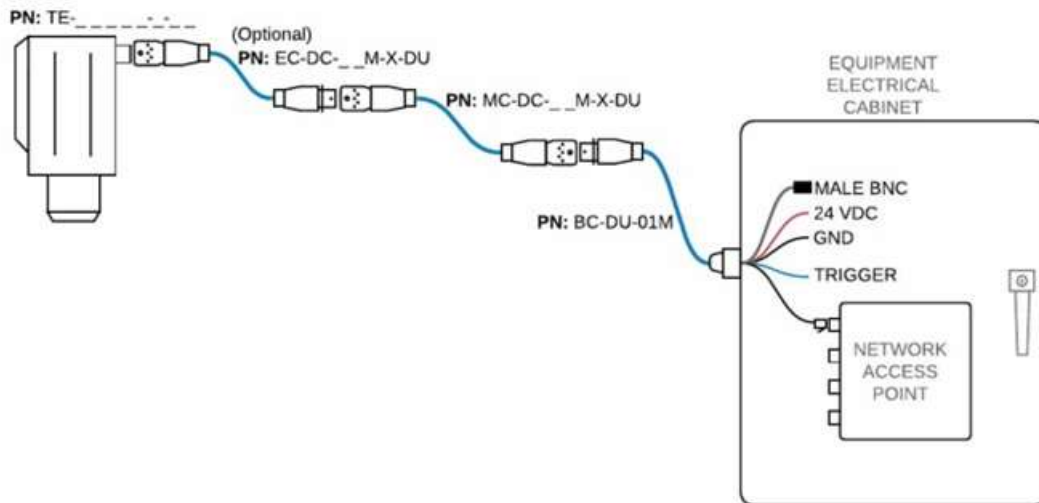Network Stream with Breakout Cable

Figure 1 - System Diagram using Breakout Cable

This configuration is relatively simple to install and configure:

1. Route the dual-output Breakout Cable (BC-DU-01M).
   Note:It is highly recommended that the cable be installed into an electrical cabinet via an appropriately sized cable gland. The cable jacket is 17.3mm (0.68") in diameter
2. Connect the ToughEye-3100™ power and ground according to the *Powering the ToughEye-3100™*section
3. Connect the Trigger according to your application requirements as defined in the *Triggering the ToughEye-3100™*section
4. Connect the RJ45 connector to a router, access-point or other network capable device.
   *Note:The cable may be extended using a female-male CAT cable or a female-female adapter and a standard CAT cable. Ensure all**extensions**are made using**CAT-5E**or better cabling*
5. If the analog video stream will not be used, ensure that the Male BNC cap remains installed and that the cable is secured such that it will not wear or become damaged over time
6. Route the main cable (MC-DC-xxM-X-DU) and any required extension cables (EC-DC-xxM-X-DU) from the ToughEye-3100™ to the inline connector on the breakout cable. *Note:Care should be taken to properly secure the main cable. Use of conduit, cable clamps or appropriately rated cable ties is recommended*

Configuration B

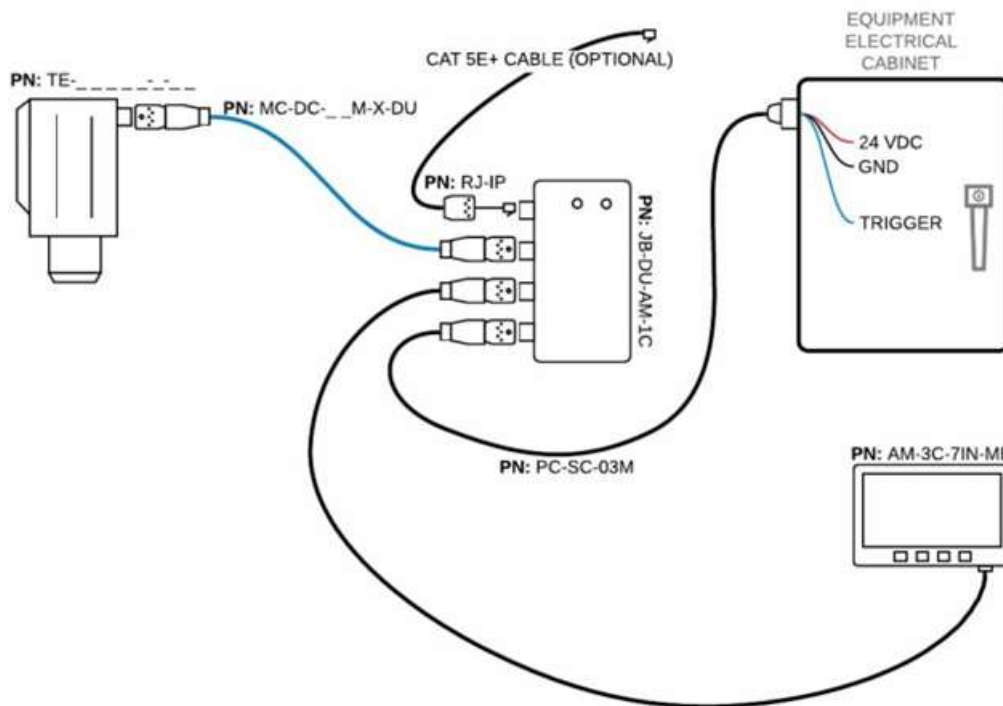ExcelSense Standard 7" Monitor

Figure 2 - System Diagram using Junction Box and ExcelSense 7" Monitor

This configuration allows simple setup of an on-equipment monitor for use by equipment operators:

1. Select an appropriate installation location for the junction box. It is important to consider the positioning of the junction box such that both the monitor cable and the power cable can reach the junction box

2. Mount the junction box using 4 appropriately sized self-tapping or threaded fasteners
(M4 or #8). Refer to the *Single Channel Junction Box section* for mounting pattern
   Note: *If using standard machine screws, an anti-vibration measure should be used (loctite, nylock nuts or spring washers)*

3. Connect the circular connector of the power cable (PC-SC-03M) to the Power port on the
junction box (See *Figure 4*). Connect the power and ground wires according to the *Powering the ToughEye-3100™* section
   Note: *It is highly recommended that the cable be installed into an electrical cabinet via an appropriately sized cable gland.*

4. Connect the Trigger wire (found in PC-SC-03M cable) according to your application requirements as defined in the *Triggering the ToughEye-3100™* section

5. Connect the monitor via its built-in cable to the Monitor port on the junction box (See *Figure 4*)

6. Route the main cable (MC-DC-xxM-X-DU) and any required extension cables (EC-DC-xxM-X-DU) from the ToughEye-3100™ to the Camera port on the junction box (See *Figure 4*)
   Note: Care should be taken to properly secure the main cable. Use of conduit, cable clamps or appropriately rated cable ties is recommended

7. **Optional:** If the network stream is to be used, connect an RJ45 terminated CAT-5E or better cable to the Camera IP port (See *Figure 4*)
   Note: If the junction box is installed in a location where fluid or dust ingress is a concern the RJ45 connection should be installed using our sealed RJ45 kit (RJ-IP). See the *RJ-IP Kit* section for details on using this kit.

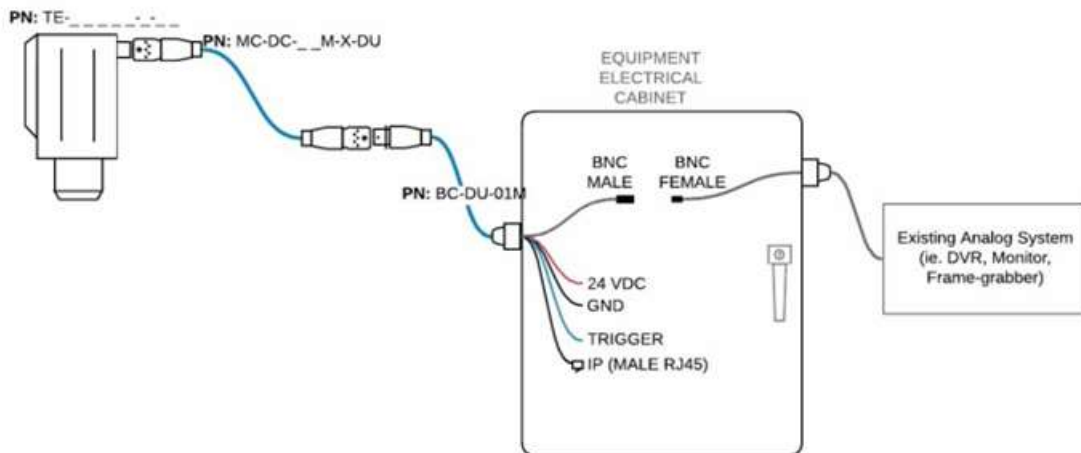# Configuration C

Existing Analog Monitor or Frame-Grabber

Figure 3 - System Diagram using breakout cable for connection to existing analog system

This configuration enables the connection of ToughEye-3100™ to existing analog hardware such as a DVR, monitor or frame-grabber.

1. Route the dual-output Breakout Cable (BC-DU-01M).
   Note:It is highly recommended that the cable be installed into an electrical cabinet via an appropriately sized cable gland. The cable jacket is 17.3mm (0.68") in diameter
2. Connect the ToughEye-3100™ power and ground according to the *Powering the ToughEye-3100™* section
3. Connect the Trigger according to your application requirements as defined in the *Triggering the ToughEye-3100™* section
4. Connect the Male BNC connector from the breakout cable to the analog system. If the analog system is near the power connection, this may be done directly. If the system is further away the analog signal may be extended using a **75Ω** impedance **coaxial** cable.
5. **Optional:** If network connectivity is required, connect the RJ45 connector to a router, access-point or other network capable device. ***Note:****The cable may be extended using a female-male CAT cable or a female-female adapter and a standard CAT cable. Ensure all***extensions***are made using***CAT-5E***or better cabling*
6. Route the main cable (MC-DC-xxM-X-DU) and any required extension cables (EC-DC-xxM-X-DU) from the ToughEye-3100™ to the inline connector on the breakout cable. ***Note:****Care should be taken to properly secure the main cable. Use of conduit, cable clamps or appropriately rated cable ties is recommended*

Accessory Technical Information

The following sections outline the specifications, sizes, and other relevant information for critical accessories.

Single Channel Junction Box - JB-DU-AM-1C

The ExcelSense Standard Junction Box is fully compatible with ToughEye-3100™ analog and IP video streams. It receives 24 VDC from the power cable (PC-SC-03M) at the Power port, and distributes it to the Camera and Monitor ports through two 5x20mm fast-blow fuses. The camera fuse is rated at 5A and the monitor fuse at 3A. The fuseholder secures the fuse using a spring-loaded locking mechanism, providing an anti-tease feature that is vibration-resistant. In the case that a fuse has blown, it can be easily replaced via the screwdriver slot on the fuseholder. Ensure the fuse is properly secured before locking it into the fuseholder.
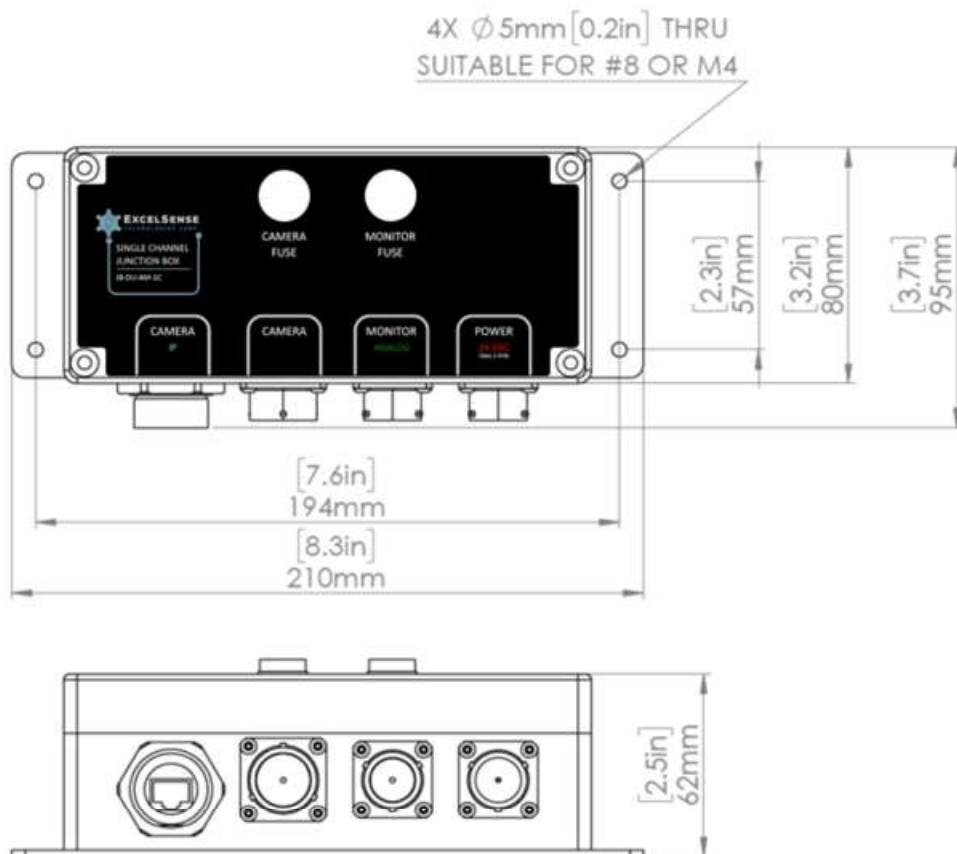
Mechanical Drawing

Figure 4 - JB-DU-AM-1C Dimensions, Mounting Pattern and Connector Layout

7" Analog Monitor

The waterproof and dustproof ExcelSense 7" Analog Monitor features on-screen brightness adjustment control, automatic screen dimming, and a screen-lockout functionality. Paired with the ToughEye-3100™ analog stream, the monitor produces sharp images in virtually all lighting conditions. The monitor comes attached with a rugged cable to allow plug-and-play functionality with the compatible junction box (JB-DU-AM-xC). Included in the monitor package is a custom ExcelSense mounting bracket built to last in high vibration environments.

Specifications

LCD Size	7" (16:9)
Input Voltage	10VDC ~ 32VDC
Power Consumption	6W
Video Formats	AUTO / PAL / NTSC
Channels	3
Features	Screen lock-out[1], automatic low-light mode with backlit buttons, automatic scanning camera triggers (x3), optional sun shield
Resolution	800x480 (RGB)
Contrast	500:1
Brightness	400cd/m2
Temperature	-40°C to 80°C
Ingress Protection	Dustproof, waterproof

Order Guide

Description	Part Number
7" Analog Monitor	AM-3C-7IN
Mounting Bracket	MB-AM-7IN
7" Analog Monitor and Mounting Bracket Kit	AM-3C-7IN-MB

1. Hold MENU button for 20 seconds to lock and unlock all buttons except brightness adjustment and power buttons

Mechanical Drawing
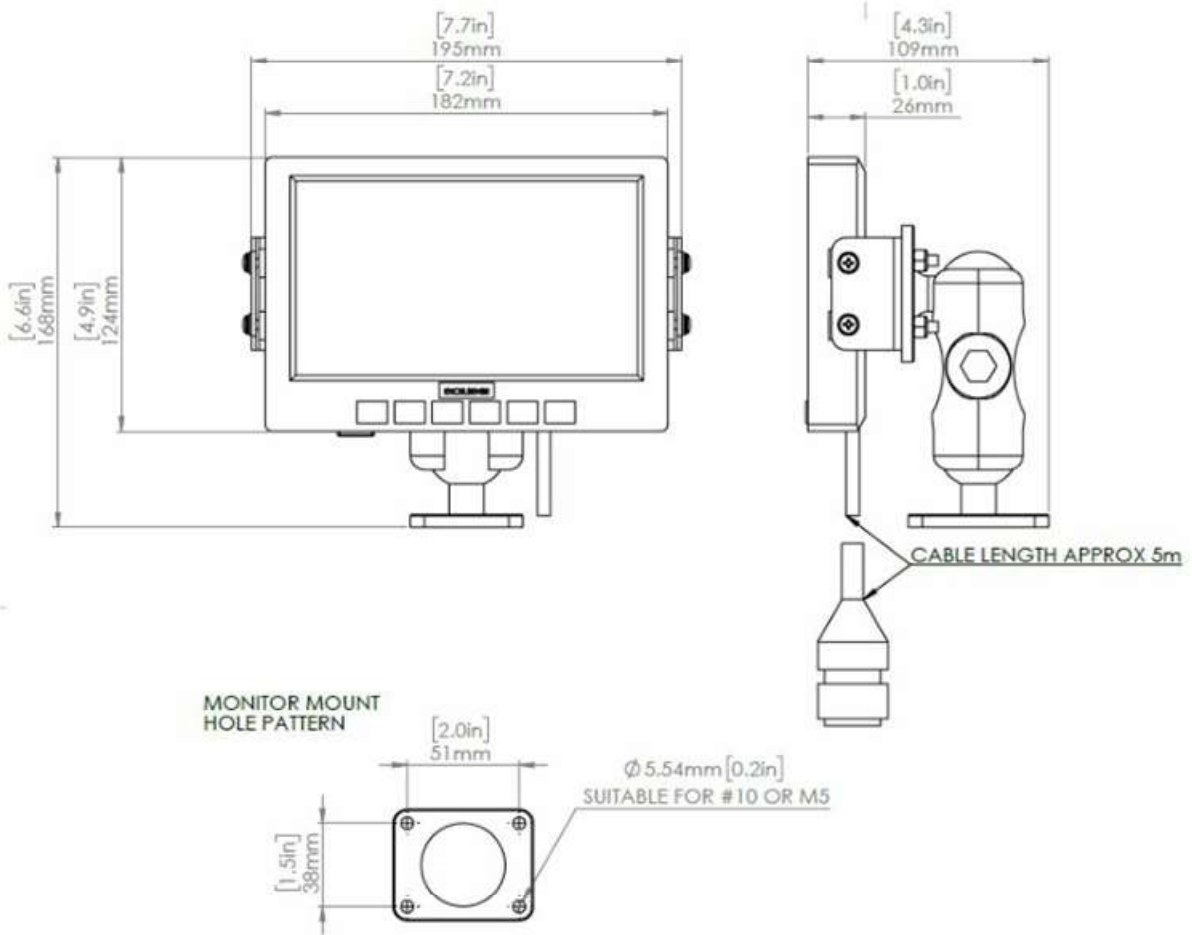
Figure 4 - 7" Analog Monitor + Bracket Mechanical Dimensions

RJ-IP Kit

The RJ-IP Kit is intended for network video stream applications using a junction box where a sealed IP67 network cable connection is required. Using the RJ-IP Kit, the wires at the junction box end of the CAT-5E cable are terminated into an RJ-45 plug using an appropriate crimping tool.
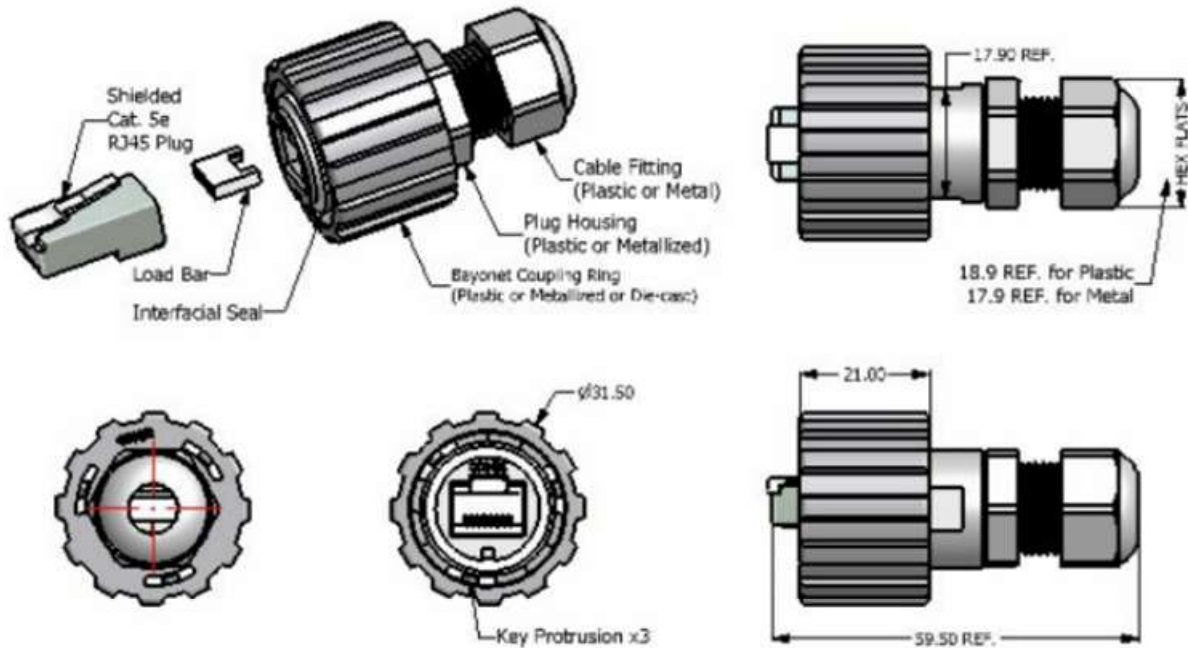
Figure 5 - RJ-IP Kit Mechanical Drawing

Order Guide

Description	Part Number
Sealed RJ-45 Plug Kit	RJ-IP

Powering the ToughEye-3100™

Important Note: As per rule 2-024(2) of the Canadian Electrical Code Part I, ToughEye-3100™ does not require approval in order to be installed. However, it must be connected to a Class 2 output, as permitted by the Canadian Electrical Code Part I. (See rule 16-222 and relevant appendices)

Installation Wiring

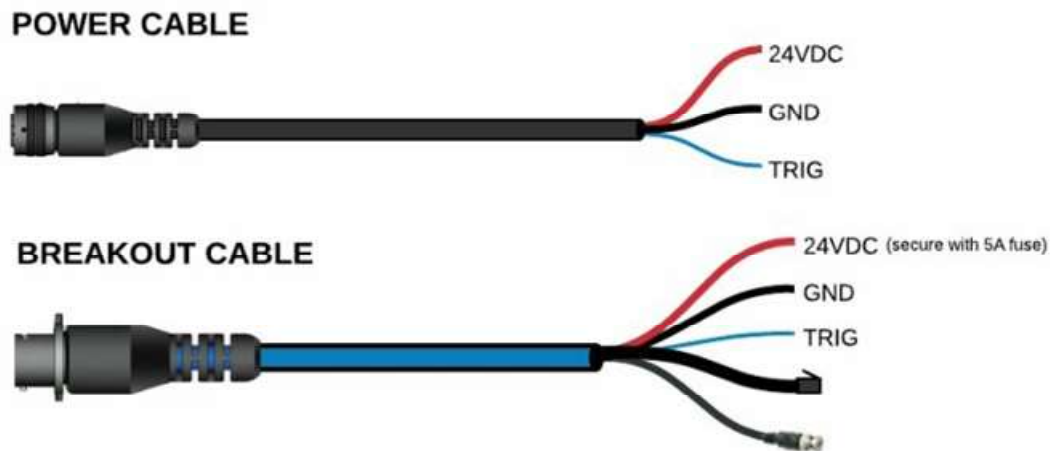| Label / Colour	Function	Vehicle Connection
24VDC (Red wire)	Plus (+) DC power supply	Plus (+) DC voltage of the vehicle, 22VDC ~ 30VDC (5A fuse required for Breakout Cable installation only)
GND (Black wire)	Minus (-) DC power supply	Minus (-) of the vehicle
TRIG (Blue wire)	Self-cleaning trigger	See *Triggering the ToughEye-3100™* section

Figure 6 - Power Cable and Breakout Cable Wiring Details

Triggering the ToughEye-3100™

The ToughEye-3100™ performs cleaning cycles in response to a trigger input. The triggering method is an important consideration at the time of specifying your ToughEye-3100™ system topology. The decision is based on many factors, including availability of a digital switch, remote triggering requirements, and the general nature of the application. Below are the recommended options for triggering the ToughEye-3100™:

Manual Trigger

This trigger method is based on an external digital input (see *Electrical Specifications* for acceptable input voltage range). The ToughEye-3100™ responds to the trigger signal when it is at a known state - either fully retracted or fully deployed - following the logic table below:

Trigger Voltage	ToughEye-3100™ Response
5VDC ~ V_{IN}	Deploy lens
0VDC / Open	Retract lens

As a result, the following pulse sequence can be utilized to initiate a ToughEye-3100™ cleaning cycle[1]. It is important to emphasize that only after the ToughEye-3100™ has reached a fully deployed or retracted state will it respond to inputs via the trigger wire.
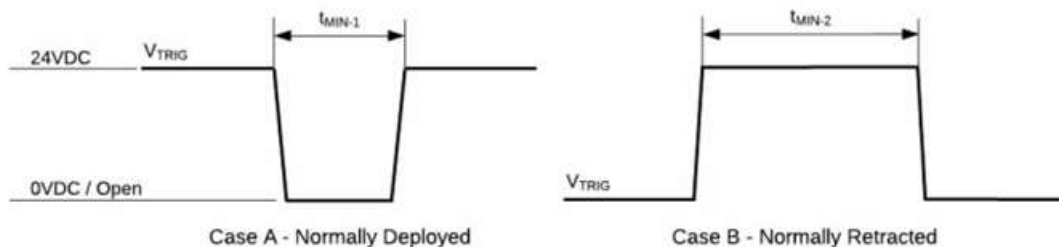
Figure 7 - Trigger Pulse Diagrams

n the pulse sequence diagram for case A (shown above on the left), the trigger signal must be held low (or open) for a minimum of 100 ms (t_{MIN-1}) in order for the ToughEye-3100™ to register the state change. Similarly, for case B the trigger must be held high until the camera view is no longer needed. The typical deployment time of approximately 3 seconds must also be taken into account here. Using this control, you can configure the ToughEye-3100™ for common use cases as seen below.

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1. Cleaning cycle refers to the action sequence of an initially deployed ToughEye-3100™ performing a full retraction followed by a full deployment

Manual Trigger Wiring with External Button

In manual trigger applications where on-demand vision is required, the trigger can be simply wired to a switch as shown below.

Figure 8 - External Button Wiring

Manual Trigger with Vehicle Reverse Gear Signal

In applications such as vehicle rear camera installations, the trigger can be wired to seamlessly provide consistent clear rear vision when reversing. This is done by simply connecting the trigger wire to the reverse gear signal of the vehicle, as shown in the figure below. In this wiring configuration, the ToughEye-3100™ will normally keep its lens retracted safely inside its rugged outer shell, and only deploy to allow clear view when the operator engages the reverse gear of the vehicle.
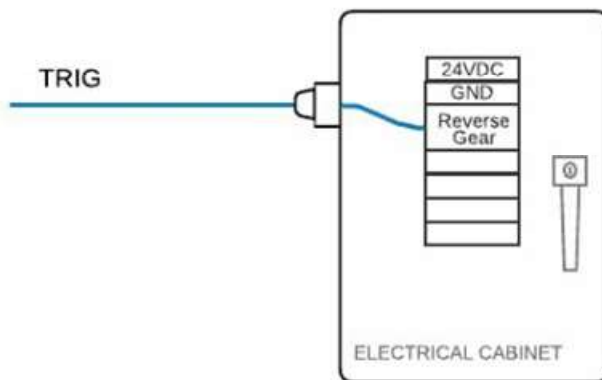

Figure 9 - Reverse Gear Wiring

Manual Remote Triggering via Network

In applications such as autonomous haulage or tele-operated machines where remote triggering is required, the mobile NVR can be used to access the existing network and output a digital signal to the ToughEye-3100™. The configuration and wiring details are shown in the figures below.
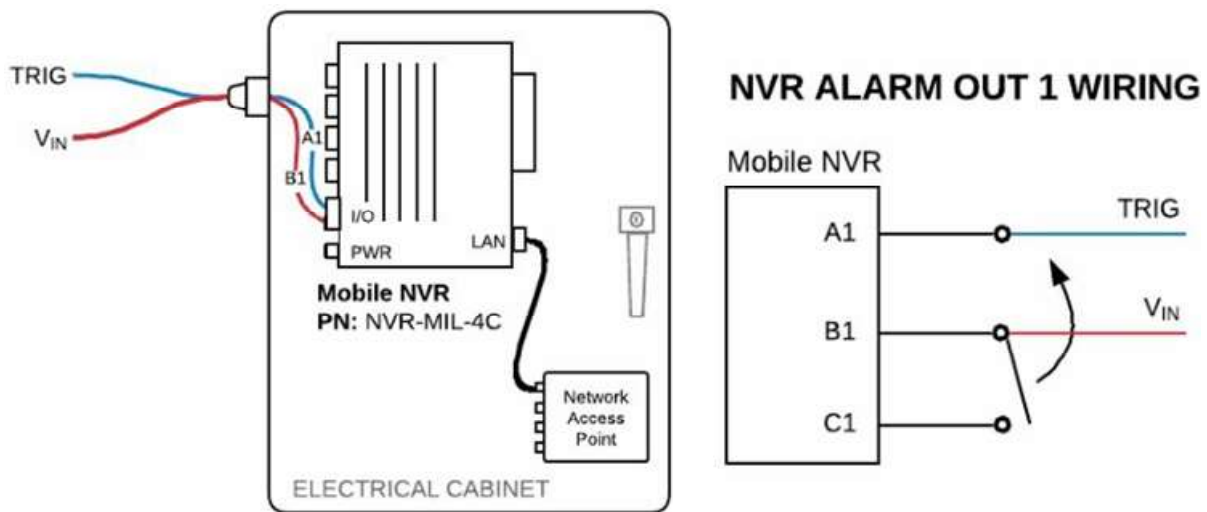
Figure 10 - Remote Trigger Wiring using Mobile NVR

Timer-Based Automatic Trigger

This trigger method is based on the ToughEye-3100™'s internal timer initiating cleaning cycles at a constant modifiable interval. In this mode, the default wiring configuration is achieved by tying the trigger wire to the Plus (+) input voltage supply (V_{IN}). As a result, the ToughEye-3100™ lens is normally deployed, and will only perform cleaning cycles in the following situations:

a) ToughEye-3100™ internal timer event is triggered (based on predefined cleaning interval)
b) Trigger wire is momentarily[1] pulled low or open

Both events will trigger an automatic cleaning cycle to be performed by ToughEye-3100™. The advantage of this trigger method is that no added external hardware, such as buttons, NVRs, and their respective cabling is required.

Modifying the ToughEye-3100™ Trigger Settings

In order to access and modify the ToughEye-3100™ trigger settings, a programming adapter (PA-TE-USB-A) is required. The cable is connected in-line between the main cable and the ToughEye-3100™ and breaks out a USB connection that allows communication with a client PC (see *Programming the ToughEye-3100™* for further details).

The *ToughEye-3100™ User Control* windows application can be used to access and modify the trigger settings on the unit. Refer to the *User Control Application Instructions* for documentation or contact your ExcelSense representative.

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1.   It is always recommended to hold the trigger signal at a known state for a minimum of 100ms.

Programming the ToughEye-3100™

The ToughEye-3100™ utilizes serial communication to allow users to upload internal microcontroller firmware and gain access to key parameters such as trigger settings and cleaning cycle data. The programming adapter (PA-TE-USB-A) is used in the configuration shown below to do this. The adapter, which is connected in-line between the main cable and the ToughEye-3100™, breaks out a USB connection that allows communication with a client PC.

Figure 11 - ToughEye-3100™ Programming Cabling

Custom ExcelSense light-weight windows applications can be used on the client-side PC to

achieve communication with the ToughEye-3100™, including the *Firmware Uploader* and the *User Control* apps. Refer to their respective documentation for more information or contact your ExcelSense representative.

Thermal Regulation (Extreme Temperature Models Only)

The *Extreme Temperature* models of ToughEye-3100™ come equipped with a thermal regulation subsystem to allow for operation at temperatures as low as -40 °C. This subsystem maintains the ToughEye-3100™ internal temperature at or above 15 °C.

On start-up, the initial system response and actuation of the camera will be determined by its current actuation state and the particular model of ToughEye-3100™:

1) ***Start-up when Extended Out***- The system ignores cleaning triggers and self-regulates until the internal temperature is high enough to ensure the lens is ice-free prior to retraction. Once the temperature passes this threshold the system starts as usual in

    High-Thrust Retraction mode.
2) ***Start-up when Fully Retracted***- The system ignores cleaning triggers and self-regulates until the internal temperature is within the operating temperature of the

    optical circuit (see *Extension Prevention Threshold* in table below), at which point the lens extends in *Normal Extension* mode. Once the ToughEye-3100™ is fully extended it once again ignores trigger signals and self-regulates until the internal temperature is high enough to ensure the lens is ice-free prior to retraction.

Once the lens actuates, it will continue to self-regulate to a temperature well above the actuation temperature while still accepting trigger signals. If the system is unable to sustain this temperature and drops below a lower hysteresis threshold, it will then prevent the system from actuating again until the internal temperature is above the ice-free lens threshold.

Note: It is good practice to retract the lens before cutting power to the ToughEye-3100™ camera. This step will shorten the start-up time of ToughEye-3100™ in a cold environment.

Temperature Thresholds

Parameter	Temperature
Ice-Free Lens Threshold	7 °C
Retraction Prevention Threshold	5 °C
Extension Prevention Threshold[1]	-10 °C ~ 0 °C

1.   See Camera Operating Temperature
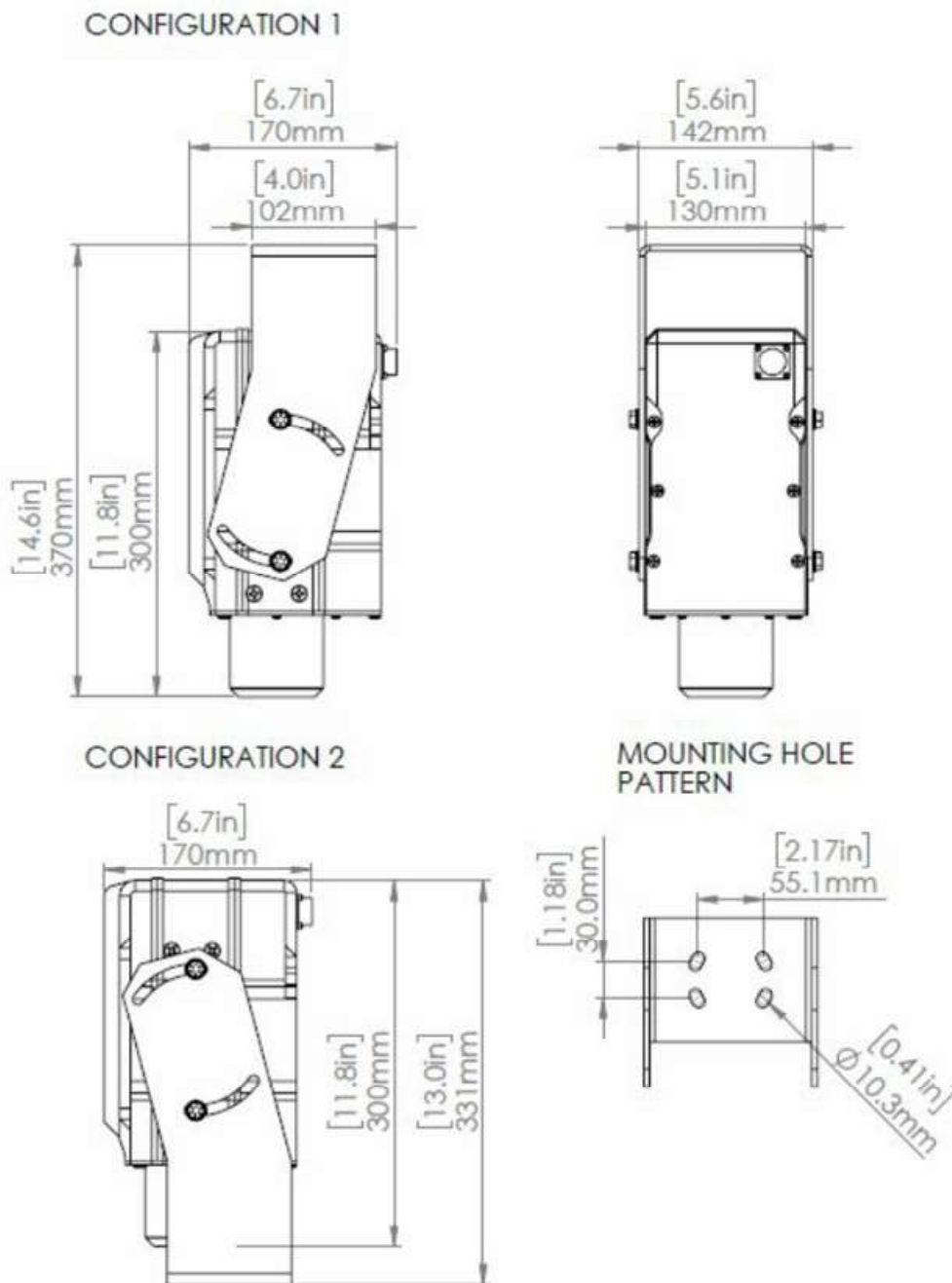
ToughEye-3100™ Dimensions

Figure 12 - ToughEye-3100™ Mechanical Dimensions

IP Camera Functionality

Finding the Network Camera

Once ToughEye-3100™ is powered, the camera module takes approximately 30 seconds to boot up.

This camera has the default IP address **192.168.0.123**. To access the network camera for the first time, it is recommended to use the IP Installer app "NetCamIPInstaller.exe". This light-weight app automatically searches for and displays network devices on your network. The application can also be used to manually assign a static IP address.

Note that the computer running the IP Installer must be on the same network segment (physical subnet) as the network camera. This camera complies with ONVIF Profile S, making it fully compatible with common IP Camera software.
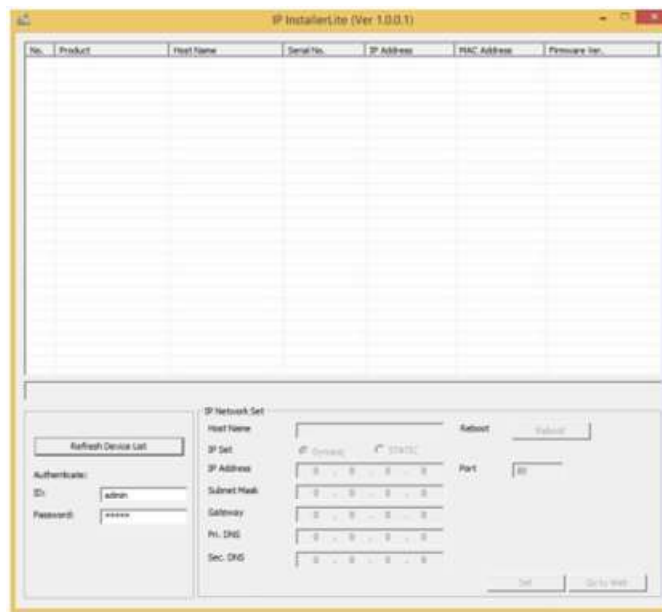

Figure 13 - IP Installer User Interface

After it has successfully booted up, the camera should be visible once the "*Refresh Device List*" button is clicked. Double-clicking on the line corresponding to the camera enables the "*Go to Web*" button if the camera credentials are entered correctly. To enable the live camera feed, proceed to the *First Time Access* section below.

First Time Access

Below are the steps to follow in order to achieve the live feed for the first time. You only have to go through these steps once.

(1) Open Internet Explorer or Microsoft Edge **as Administrator** and type the following url: **http://192.168.0.123** (ensure that your computer is on the same subnet as the camera).
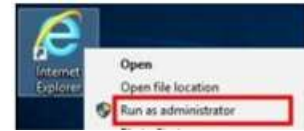
(2) If you have not already done so, you will receive a prompt to install ***Web View ActiveX Control***. This is a plugin that is required on IE to enable streaming, access the camera settings, and activate features

(3) Upon successful installation of ***ActiveX Control,*** a Login page will be displayed. Login with the following credentials:

> **User ID:** admin
> **Password:** admin

(4) You should now be able to view the live stream with the camera's factory settings configured.

Live View Page

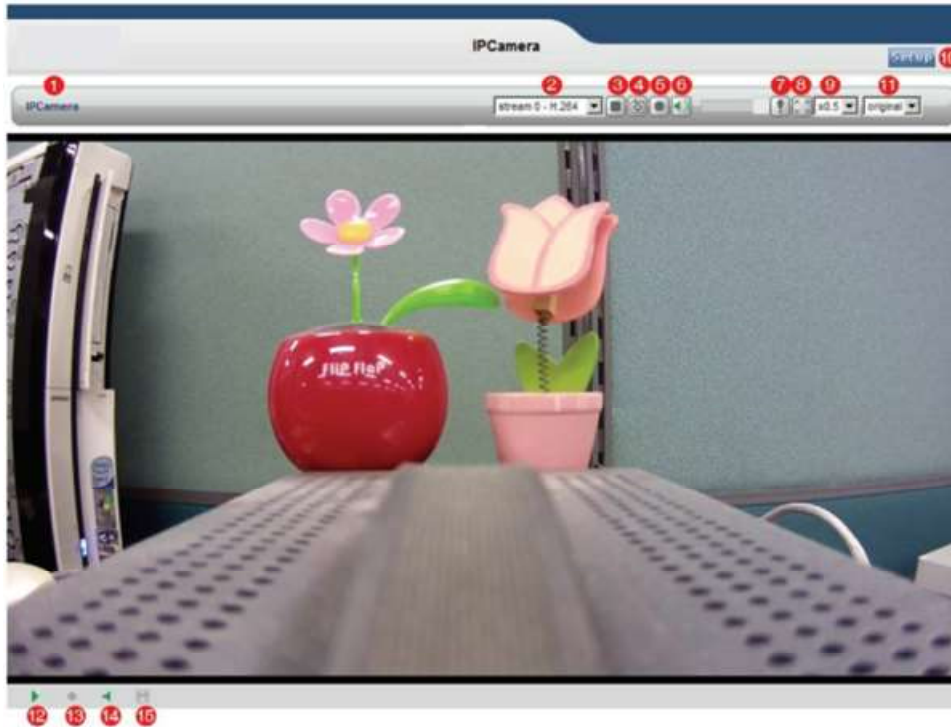This is the main page for accessing live video streams on your browser.

Figure 14 - IP Camera Live View Page

No.	Name	Description
1	Host Name	Displays the host name.
2	Video Format	Allows for selection of different video formats on live stream.
3	Play / Stop	Starts and stops the media stream.
4	Snapshot	Performs a snapshot and saves on local hard drive[1].
5	Record	Records current video stream and saves on local hard drive[1].
6	Speaker On / Off	Not compatible with ToughEye-3100™.
7	Manual Trigger	Not compatible with ToughEye-3100™.
8	Full Screen	Maximizes display size.
9	Viewer Magnification	Amplifies or shrinks video screen in live view mode.
10	Setup	Navigates to setup page.
11	Ratio	Resizes aspect ratio to 16:9 or 4:3 (H.264 stream only)
12	Video Indicator	Indicates whether the stream is live or not.
13	Record Indicator	Indicates whether recording is in progress or not.
14	Audio Indicator	Not compatible with ToughEye-3100™.
15	Motion Indicator	Indicates whether motion was detected or not.

1. Destination folder location is Documents > KTNC

Hard Reset

In the unlikely event where a hard reset of the camera is required, please inquire with ExcelSense technical support about receiving a step-by-step instructional video. In this case, the ToughEye-3100™ device will have to be partially opened in a safe manner within a clean environment. Please refrain from attempting to open the unit without first contacting technical support and receiving clear instructions.

Basic Configuration

Network

This section details the network settings and SMTP notification. If the SMTP notification feature is enabled, the user can receive an IP change notification by email when the IP address is changed by the DHCP server.

Network Services

Static: Assigns a static IP address manually.
DHCP: Assigns a dynamic IP address automatically from the DHCP server on your network.

Important: DHCP should be enabled only if you are using the SMTP notification for the IP address change, or if your DHCP server can update a DNS server, which allows you to access the Network Camera by the host name. If DHCP is enabled and you cannot access the unit, then you may have to reset the unit to the factory default and redo the installation again.

Network Configuration

IP Address: Specify a unique IP address for your Network Camera.
Subnet Mask: Specify the mask of the Network Camera located subnet.
Default gateway: Specify the IP address of the default gateway (router) used for connecting devices to the network.
Test: Test if the IP address that was entered is already occupied or not.

Users

This section describes the administrator and user account settings. Each user can be configured to different authority levels.

Admin Account

Admin ID: Enter the administrator ID.
Admin Password: Enter the administrator password.

User Account

Add User: Add a user account. Enter the user ID and Password. Each user can be configured to a different level of authority for Speaker, Stop / Snapshot / Rec. Trigger.

User List: Displays list of authorized users for the network camera. Click the modify button to modify the authority. Click the remove button to erase the user account.

Free Pass

Free Pass means that anybody on the network can access the Network Camera stream (but not the settings) from the browser without logging in. To enable the feature, check the box to *Enable Free Pass* and click *Save* to confirm settings.

Important: If this feature is enabled, all users can access the Live View page without a login process. If the Network Camera is installed in an area needing privacy, this feature must be disabled.

Video

Video Stream

Type: Select the video stream type to use for the H.264 and MJPEG image.
Resolution: Select the resolution to use for the H.264 and MJPEG image.

Encode FPS: This feature is used to limit the frame rate. The frame rate can be set by selecting values from the drop down list.

I-frame interval: I-frame interval of each GOP (Group of Pictures)
Bitrate Control:
- **Variable bit rate (VBR):** Set the Network Camera to produce the variable bit rate H.263 video.
- **Constant bit rate (CBR):** Set the Network Camera to produce the constant bit rate H.264 video.

Average Bitrate: The average amount of data transferred per second.
Note: Valid value ranges 256 Kbps – 4000 Kbps for 320x240 resolution, 1000 Kbps – 8000 Kbps will be allowed on bigger resolution.

Quality: Changing the image quality affects the amount of bandwidth required. High value improves image quality, but uses more bandwidth.

Video

Mirror: Provides 4 mode (Normal, ROTATE 90, ROTATE 270, Hor/Ver of image)
Maximum video stream time: This feature is used to limit the length of time that the streaming is displayed. Set unlimited or set the maximum time in seconds, minutes, or hours. When the set time has expired, a new stream can be started by refreshing the page in the browser.
Maximum Frame rate: This feature is used to limit the frame rate. The frame rate can be set by selecting values from the drop down list. *Note: The maximum video stream time does not apply to clients connected via CMS (Central Monitoring System) software.*

OSD

Include date: Includes the date and time in the video image as configured.
Include test: Enter your own text in the field to overlay text in the video image.
Place text/date/time at: Select top or bottom position to display test, date, time.

Date & Time

Current Server Time

Date: Displays the current date of Network Camera.

Time: Displays the current time of Network Camera.

New Server Time

Set manually: Using this option allows you to enter the time and date manually.

Synchronize with NTP server: The Network Camera will sync the time with an NTP server. The NTP server's IP address or host name is specified in: Setup>Advanced Network>NTP Setting.

Synchronize with PC: Sync the time with a local computer.

Daylight Saving Time

Enable this feature to adjust automatically to the daylight savings time. Set the start and end date.

Date & Time Format

This format will be used when displaying the date and time as overlay in the video image.

Advanced Configuration

Motion Settings

Motion Detection Area

This screen displays the live video image. Users can configure the motion detection field as desired on the screen.

Motion Detection Settings

Motion Detection Setup: Creates Motion Detection field. Enter the name of the Motion Detection field, threshold, sensitivity, and idle time. Click the Add button to create the new field.

Motion Detection List: Display all of the Motion Detection fields. Click the Modify button to modify setting values. Click the Remove button to erase the Motion Detection field.

Note:A total of 5 motion fields can be configured.

Configuration of Motion Detection

(1) Enter a descriptive name.
(2) Select the Threshold Value.
- a. Higher Level: Only very large objects trigger motion detection.
- b. Lower Level: Even small objects trigger motion detection.
- c. Default values: 20%
(3) Select Sensitivity.
- a. Higher Level: Higher sensitivity for object movement.
- b. Lower level: Lower sensitivity for object movement.
- c. Default values: 50%
(4) Select Idle Time.
- a. Set the idle time to avoid continued event triggering by motion detection. Event will not be triggered again during this period of time.
(5) Click the Add button to create a new Motion Detection window.
(6) Display the name of the Motion Detection window.
(7) Click the center of the window and drag to the desired position.
(8) Drag the bottom right-hand corner to adjust the window size.

(9) Click the save button to save configuration.

Examples:

A) Avoid triggering on small objects in the video image by setting the Object Size level to high.
B) To reduce the number of triggers when there are a lot of movements during a short period of time, select a high Idle Time level.
C) To only detect flashing light, low Sensitivity should be selected. In other cases, a high Sensitivity level is recommended.

SD Card

This section describes how to manage SD cards and search for recorded files.

Information

Capacity: Shows total capacity of the SD card.
Usage: Shows the usage percentage of the SD card.

Command

Format: Click the Format button to initialize the SD card.
Unmount: Click the Unmount button before removing the SD card from the Network Camera.

Setting

Overwrite: In the event of reaching memory capacity, recorded files will be erased chronically in order to record new events.
FTP Upload: Recorded files in the SD card feeds via FTP.

Search Recording Files

You can search through the recorded files.
Also, the recorded files can be downloaded or deleted.
Note: We recommend VLC Media Player for playing recorded files.

Further Advanced Configuration

For all other advanced camera configuration options, including image adjustment, exposure settings, event servers, event actions, and troubleshooting guide please refer to the *IP Camera Settings Manual*.

Maintenance

Initialize & Upgrade

This section describes how to reset the Network Camera and upgrade the firmware.

Initialize

Reboot: Reboot the Network Camera.

Restore: If it is necessary to restore the camera to a previously backed up settings, click the Browse button to locate the saved backup file, and then click the Restore button.

Factory Default: Resets all parameters to the original factory settings.

Backup, Restore

Backup: Save all parameters to a backup file on your local drive.

Upgrade

Upgrade: To upgrade the firmware for the Network Camera, click the Browse button to find the firmware file, and then click the Upgrade button.

Logs

This section describes the system logs.

System Logs

The Network Camera records when a particular event occurs in the log record.
First Page: Go to the first page of the log record.

Previous Page: Go to the previous page of the log record.

Next Page: Go to the next page of the log record.

Remove Logs: Remove all of the log record.

Support

System

System Information

Displays the system information of the Network Camera.

Help

Guide for Troubleshooting

If you suspect a problem is being caused by incorrect configuration or some other minor problem, consult the troubleshooting guide.

Server Information for Repair

This report will be helpful when you contact your support channel.