GARDASOFT
Machine Vision Control

TR-RC120/122
LED Lighting Controllers

Quick Start Guide

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Gardasoft TR-RC120/122 controllers

Your Gardasoft TR-RC120 or TR-RC122 LED Lighting Controller is designed to be quick and easy to use provided you set up the current of your light and connect the controller to an internal or external trigger.

This guide is provided to help you get 'up and running' quickly and easily. It covers connection to a power supply, a light, a PC, and to a trigger. It also gives a brief description of the product – in other words, all you need to know to get started.

Throughout this guide, the TR-RC120 and TR-RC122 are both referred to as TR-RC unless otherwise indicated.

Before you start

Before you use this product, make sure you are satisfied that you understand the section on Safety precautions and that you have checked that the TR-RC controller fulfils your requirements.

When you have done so, you are ready to connect and set up your TR-RC controller.

The full User Manual for the TR-RC controller and application notes about it can be found at www.gardasoft.com.

About your TR-RC

Your TR-RC is a single channel LED lighting controller that can be set up from its front panel or through its own web pages accessed from its Ethernet connection (see Section 5, "Ethernet operation").

You can connect a triniti® enabled light and use your TR-RC straight away, but you must first set the current rating for any other light you may want to use. See Section 6, "Setting the rating of your light". For other settings, refer to the User Manual.

1 Getting started with your TR-RC

This quick-start guide is designed to help you connect up and use your TR-RC LED Lighting Controller, easily and quickly.

When you are satisfied that you understand its basic operation, you are ready to download the full user's guide, as a PDF, from our website (at www.gardasoft.com/downloads/). That document will provide more information. For example, how to use the range of modes of operation that are available for each channel of your TR-RC, how to operate its timing controller, how to mount the unit, and how to configure it using different connections.

2 Default factory settings

The default factory setting for the TR-RC is that it is set to drive a triniti enabled light with a continuous output at 50% brightness. You can use the **CL** command on your TR-RC to return the controller to its default configuration.

To get your TR-RC unit working initially, you need to:

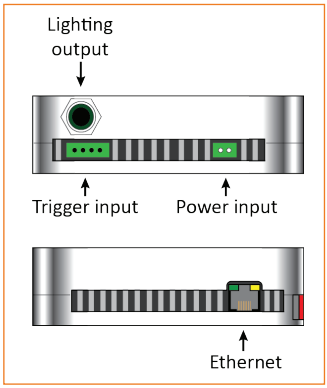
- Connect power
- Connect a light
- If your light *isn't* triniti enabled, set up its current rating on the TR-RC.
- Check that the LED illuminates correctly (***Note:*** refer to the safety information before doing so).
- And, if you intend to pulse the light, connect a trigger or set an internal trigger.

Then you need to read the User Manual, to find out how to mount the unit correctly, and how to change the controller's configuration.

3 Connecting your TR-RC

Your controller is designed to be mounted on a DIN rail. Make sure there is adequate ventilation.

The connector positions are shown opposite (a TR-RC120 is illustrated).

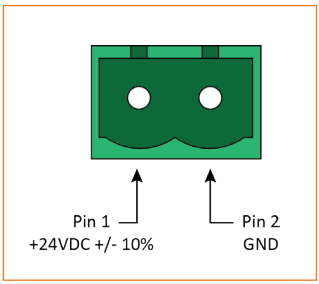


3.1 Connecting a power supply

The power supply connections are shown opposite.

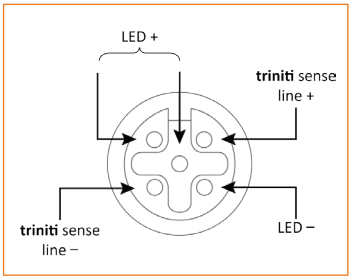
We recommend that any mains supply-derived power source to which you connect your TR-RC controller has a Safety Extra Low Voltage (SELV) output.

Route low voltage wiring to the TR-RC controller separately from mains wiring. If it is not possible to separate low voltage from mains wiring, ensure that the low voltage wiring has appropriately rated insulation or that you apply supplementary insulation.



3.2 Connecting a light

The lighting output socket includes the triniti sense lines. Use a straight through cable to connect your triniti enabled light. The pin functions of the connector as seen from the outside of the controller are shown opposite.



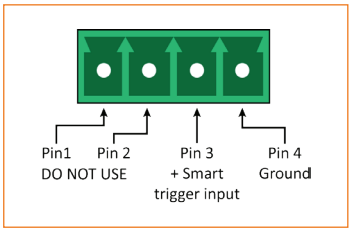
The lighting output connections must not be connected in common with any other controllers or grounded in any way.

Initially, your triniti enabled light is set to be on continuously at 50% brightness.

Before you connect a light to the output that is **not** triniti enabled, ensure that you have set the current or voltage setting of the light as described in Section 6, “Setting the rating of your light”.

3.3 Connecting a trigger source

The trigger input is a Smart input; it accepts a range of sources as trigger inputs which are explained in more detail in the User Manual at www.gardasoft.com. The connections are shown opposite.



Note that the Smart input is not isolated. It is ground-referenced to the power supply negative connection.

You can connect NPN, PNP, or TTL trigger sources to your TR-RC controller, or a voltage source where:

<0.9V = logic 0, and

3V to 24V = logic 1

4 Initial configuration

Three modes of operation are provided for the light output:

Continuous - the output is constant, but variable between 0% and 100% in increments of 0.1%.

Pulsed (Strobe) - the output is pulsed once per trigger. The delay from trigger to pulse, the pulse duration, and the brightness can all be set.

Switched - the trigger input can be used to switch the output current on and off.

Note: This Quick Start Guide is mainly concerned with pulse mode operation of your TR-RC controller. For more information on the other modes of operation, see the User Manual at www.gardasoft.com.

The set-up is non-volatile, so your TR-RC controller will resume the same operation after a power cycle.

4.1 Pulse and duty cycle limits

In both pulsed and switched modes, the pulse width and duty cycle are internally limited to prevent damage to the light. The brightness, pulse width, and duty cycle can all be set. For more information refer to the User Manual.

If necessary, your TR-RC controller limits the duty cycle by ignoring triggers that occur too soon after the previous trigger. If the internal temperature gets to high, the display shows ***FAt***.

4.2 Pulsed output

The output is off by default. When your TR-RC controller is triggered, it pulses after a delay.

The re-trigger delay is the minimum permitted time from one trigger to the next; this can be set in multiples of 100µs. Any triggers that occur too soon after the previous trigger are ignored.

You can configure the delay, pulse width, re-trigger delay, and pulse intensity. For more information, refer to the User Manual.

4.3 Internal trigger

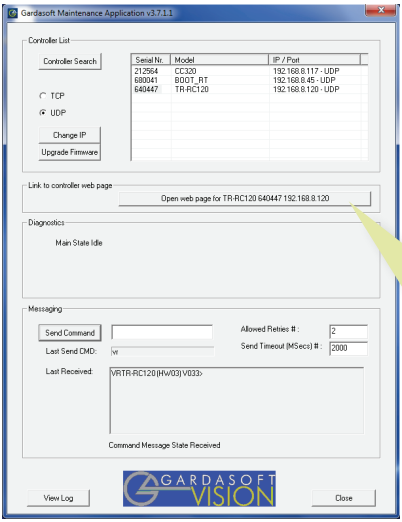
An internal trigger timer is available for continuous triggering in pulse mode. You can configure the period of this trigger's timer. For more information, refer to the User Manual.

5 Ethernet operation

An Ethernet connection is provided through the RJ45 socket. The connection is 10Base-T and operates at 10Mbits per second. Using the Ethernet connection enables you to communicate with your TR-RC using its web pages.

GardasoftMaint, available as a download from www.gardasoft.com, allows you to identify your TR-RC controller on your computer's network and to connect to it. For more information on the use of *GardasoftMaint* and connecting your TR-RC, refer to the User Manual at www.gardasoft.com. Application note APP923, *Troubleshooting Ethernet Problems* is also available from the Gardasoft website.

A screen shot of *GardasoftMaint* is shown below:



Select the appropriate controller from the list and click this button to open the TR-RC's web pages as shown overleaf.

5.1 GigE Vision™

Your TR-RC controller is a GiGE Vision server/device. This means that any GigE Vision clients can be used to configure and control your TR-RC controller.

GigE Vision clients include image processing packages such as Common Vision Box (CVB), Vision Pro, and LabVIEW among others. To connect your TR-RC controller, go to the window where you select your cameras, and your TR-RC controller appears as a device alongside any cameras.

5.2 triniti

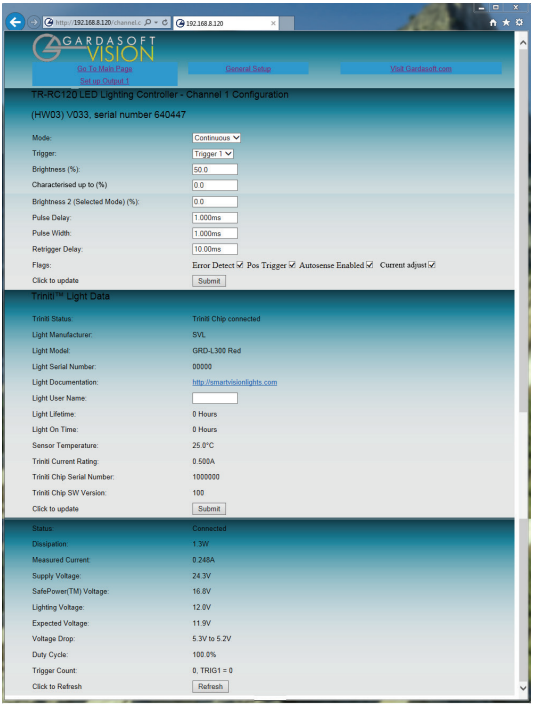
When your TR-RC controller detects a triniti enabled light, information about the light and its settings is sent back to the controller. Your TR-RC controller uses information about temperature and usage to ensure the performance of your lighting is maintained to the highest level.

For more information about triniti, refer to www.gardasoft.com where the User Manual and information about suppliers of other triniti enabled products can be found.

5.3 Using the TR-RC's web pages

Once you have established a network that includes your TR-RC controller, you can manage it and any other controllers on your network.

You can set your TR-RC controller up for continuous, switched, or pulsed operation. An example of your RC120's channel configuration page is shown overleaf:



6 Setting the rating of your light

If you are connecting a light which is not triniti enabled, you need to set the rating for the light before connecting it. You can do this by using the channel configuration web page of the TR-RC, or by using its front panel buttons as described below.

When you turn on your TR-RC controller, the display shows a series of messages (To find a list of their meanings, refer to the User Manual). Two segments of the display then flash alternately.

Press and hold the **SEL** button for one second, then follow the keystrokes below.

CH1 is displayed. Use the ▲ and ▼ buttons to scroll to **rAt**.

Press the **SEL** button.

Use the ▲ and ▼ buttons to select the method you require to set the rating of your light: **CUR** for current and **VOL** for voltage.

Use the ▲ and ▼ buttons to set the current in Amps or the voltage in Volts. Press the **SEL** button.

Your light's rating is set up.

7 Safety precautions

Read this before using the TR-RC. Always observe the following safety precautions. If in doubt, contact your distributor or Gardasoft Vision. The following symbols mean:

Warning: Read instructions to understand possible hazards

Warning: Surface may get hot.

Warning: Possible hazardous voltage.

7.1 Heat

Ensure the TR-RC is mounted correctly and that you do not exceed any of the ratings for the unit.

At its maximum ratings, the TR-RC's enclosure can exceed 65°C which is sufficient to cause a burn if touched. Place in a position where personnel cannot accidentally touch it and ensure there is a free flow of air around the unit.

7.2 Electrical

The TR-RC produces high energy pulses. Take care to connect the outputs correctly and protect the output wiring and load from any short circuits. When switched off, energy remains stored in the TR-RC for about 15 seconds.

- The TR-RC does not have complete electrical isolation of inputs (including triggering and communications ports) and outputs, therefore, please observe the following guidance:
- Computer equipment that is connected to the communication or trigger ports must be internally powered or separated from mains electricity by double insulation/reinforced isolation or be approved to IEC 60950-1 standard. All other equipment connected to the triggers or other ports must also have double insulation/reinforced isolation protection from the mains supply.
- The Power Supply Unit (PSU) used to energise the TR-RC must provide double insulation/reinforced isolation from mains electricity and protected against short circuits and overloads. We recommend using a PSU that limits its output current to the appropriate rating of the controller by design, by setting the current limit on the supply (if possible), or through over current protection. The PSU should be approved to either IEC 60950-1, IEC 60335-1, IEC 61010-1, IEC61558-1,-2,-16. The PSU may also be approved to equivalent or superior safety standards.
- Any energised conductors derived from mains electricity must also have Safety Extra Low Voltage (SELV) output.
- At maximum ratings the temperature of the enclosure can exceed 65°C.

Therefore, either all cabling must be rated to at least 100°C, or all cabling must be additionally insulated by an appropriately rated heat resistant sleeve.

- Power supply cabling to the controller must be rated to at least 6A.
- The cabling from the channel output to the load must be rated higher than the maximum channel output current.
- If the controller is setup incorrectly, or in the event of failure, the energy provided by the power supply to the controller may become directly connected to any or all output channels. You must consider this during installation, and if necessary, provide adequate protection.
- The DC power supply to controller must be externally fused to 3A using a slow blow fuse (T3AH, 50V).
- The installer must provide a clearly marked, nearby and easily accessible switch as part of the installation to allow the controller to be disconnected from its energy source on both power conductors.
- Transients caused by inductive loads must be suppressed externally to the TR-RC.

Warning: This is a Class A product. Its use in residential areas may cause radio interference, and such use should be avoided unless special measures are taken by the user to restrict emissions to a level that allows the reception of broadcast transmissions.

7.3 General

The TR-RC must not be used in an application where its failure could cause a danger to personal health or damage to other equipment.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

7.4 Installation guidance (disclaimer)

This information is for guidance only. Installers must perform their own risk assessment specific to each installation. While Gardasoft Vision Ltd has taken every care in the preparation of this advice, Gardasoft Vision Ltd accept no liability for damages of any kind except those required by

law. Deliberate acts of endangerment and vandalism are not covered by this document and must be considered by the installer.

8 Sicherheit

Bitte lesen Sie vor Verwendung des TR-RC diese Informationen. Beachten Sie immer die folgenden Sicherheitshinweise. Wenden Sie sich im Zweifelsfall an Ihren Händler oder Gardasoft.

Warnung: Lesen Sie die Hinweise um eine mögliche Gefahr zu verstehen.

Warnung: Oberfläche kann heiβ werden.

Warnung: Mögliche gefährliche Spannung.

8.1 Wärme

Stellen Sie sicher, dass der TR-RC korrekt montiert ist und dass Sie die Grenzwerte für das Gerät nicht überschreiten.

Bei den maximalen Grenzwerten kann das Gehäuse des TR-RC 65°C überschreiten, was ausreichend ist um bei einer Berührung zu Verbrennungen zu führen. Positionieren Sie das Gerät so, dass eine versehentliche Berührung durch das Personal ausgeschlossen ist und stellen Sie sicher, dass Luft frei um das Gerät zirkulieren kann.

8.2 Elektrik

Das TR-RC erzeugt Impulse mit hoher Energie. Achten Sie darauf, die Ausgänge korrekt anzuschließen und schützen Sie die Ausgangsverkabelung und Last gegen Kurzschlüsse. Beim Ausschalten bleibt Energie für etwa 15 Sekunden im TR-RC gespeichert.

Das TR-RC verfügt über keine vollständige Nachlaufisolierung der Eingänge (einschließlich Trigger- und Kommunikationsports) und Ausgänge. Beachten Sie daher unbedingt die folgenden Hinweise:

- Computergeräte, die an die Kommunikations- oder Trigger-Ports angeschlossen sind, müssen über eine interne Stromversorgung verfügen oder vom Stromnetz durch eine doppelte Isolierung/verstärkte Isolierung getrennt sein oder nach dem Standard IEC 60950-1 zugelassen sein. Alle anderen Geräte, die an die Trigger- oder andere Ports angeschlossen sind, müssen ebenfalls durch eine doppelte Isolierung/verstärkte Isolierung vom Stromnetz getrennt sein.
- Das Netzgerät, das zur Stromversorgung des TR-RC dient, muss durch eine doppelte Isolierung/verstärkte Isolierung von der Stromversorgung getrennt sein und gegen Kurzschlüsse und Überlastungen geschützt sein. Wir empfehlen die Verwendung eines Netzgeräts, das den Ausgangsstrom durch konstruktive Maßnahmen, durch Einstellen der Stromgrenze an der Versorgung (wenn möglich) oder durch einen Überstromschutz auf den geeigneten Nennstrom der Steuerung begrenzt. Das Netzgerät muss nach IEC 60950-1, IEC 60335-1, IEC 61010-1 oder IEC61558-1,-2,-16 zugelassen sein. Das Netzgerät kann auch nach gleichwertigen oder höheren Standards zugelassen sein.
- Alle stromführenden Leiter, die vom Stromnetz abgeleitet sind, müssen ebenfalls Sicherheitskleinspannung (SELV) am Ausgang erzeugen. Hinweise zu den zulässigen Spannungsgrenzwerten.
- Bei den maximalen Grenzwerten kann die Temperatur des Gehäuses 65°C überschreiten. Daher muss entweder die gesamte Verkabelung für mindestens 100°C bemessen sein oder die gesamte Verkabelung muss zusätzlich mit einer angemessen dimensionierten wärmebeständigen Tülle isoliert sein.
- Die Verkabelung der Stromversorgung zur Steuerung muss für mindestens 6A bemessen sein.
- Die Verkabelung vom Kanalausgang zur Last muss höher als der maximale Kanalausgangsstrom dimensioniert sein.
- Wenn die Steuerung falsch eingerichtet ist oder im Fall eines Fehlers, kann es vorkommen, dass die von der Stromversorgung an die Steuerung abgegebene Energie direkt mit einem oder allen Ausgangskanälen verbunden wird. Sie müssen dies bei der Installation berücksichtigen und gegebenenfalls für einen geeigneten Schutz sorgen.
- Die Gleichstromversorgung der Steuerung muss extern durch eine träge Sicherung (T3AH, 50V) bis 3A gesichert sein.

» Der Installationstechniker muss einen deutlich gekennzeichneten, leicht zugänglichen Schalter als Teil der Installation in der Nähe vorsehen, mit dem die Steuerung an beiden Stromleitern von ihrer Stromquelle getrennt werden kann.

» Durch induktive Lasten verursachte Einschaltstöße zum TR-RC müssen extern unterdrückt werden.

Warnung: Es handelt sich hierbei um ein Produkt der Klasse A. Die Verwendung in Wohngebieten kann zu Funkstörungen führen und eine solche Verwendung sollte vermieden werden, es sei denn besondere Maßnahmen werden vom Anwender ergriffen, um die Emissionen auf ein Niveau zu begrenzen, das den Empfang von Rundfunkübertragungen ermöglicht.

8.3 Allgemein

Das TR-RC darf nicht in Anwendungen eingesetzt werden, bei denen es durch einen Ausfall des Geräts zu einer Gefahr für die Gesundheit von Personen oder zur Beschädigung anderer Geräte kommen könnte.

Wenn das Gerät in einer anderen als der vom Hersteller vorgesehenen Weise verwendet wird, kann die Schutzvorrichtung des Geräts beeinträchtigt werden.

8.4 **Installationsanleitung** (Haftungsausschluss)

Diese Informationen dienen nur zur Orientierung. Installationstechniker müssen ihre eigene spezifische Risikobewertung für die jeweilige Installation durchführen. Auch wenn Gardasoft Vision Ltd diese Empfehlung mit größter Sorgfalt erstellt hat, übernehmen Gardasoft Vision Ltd keine Haftung für Schäden jeglicher Art, außer in dem gesetzlich erforderlichen Maße. Vorsätzliche Gefährdungs- oder Zerstörungshandlungen werden in diesem Dokument nicht behandelt und müssen vom Installationstechniker berücksichtigt werden.

9 Sécurité

Lisez ce document avant d'utiliser le TR-RC. Respectez les mesures de sécurité suivantes en toutes circonstances. En cas de doute, contactez

votre distributeur ou Gardasoft Vision. Les symboles ci-dessous auront la signification suivante:

Attention: Lisez les instructions pour comprendre quels sont les risques éventuels.

Attention: La surface peut devenir chaude.

Attention: Risque d'électrocution.

Lorsque ces symboles apparaissent dans le manuel, reportez-vous aux consignes pour connaître les précautions à prendre.

9.1 Chaleur

Veillez à ce que le TR-RC soit monté correctement et à ne dépasser aucune valeur nominale pour l'unité.

Lorsqu'il atteint ses valeurs nominales maximales, le boitier TR-RC peut dépasser les 65°C, ce qui est suffisant pour provoquer des brûlures en cas de contact. Placez l'appareil à un endroit où le personnel ne risque pas de le toucher par accident et veillez à ce que l'air circule librement autour de l'unité.

9.2 Électricité

Le TR-RC produit des impulsions d'énergie élevées. Veillez à bien raccorder les sorties et à ce que les câbles de sortie et la charge soient à l'abri de tout court-circuit. Lorsque le TR-RC est éteint, de l'énergie résiduelle reste dans l'appareil pendant environ 15 secondes.

Le TR-RC ne possède pas de système d'isolation complet des entrées (notamment des ports de déclenchement et de communication) et des sorties. Par conséquent, respectez les consignes suivantes:

» L'équipement informatique connecté aux ports de communication et de déclenchement doit être alimenté en interne ou séparé de l'alimentation secteur par une isolation double/renforcée, ou être approuvé selon

la norme CEI 60950-1. Tous les autres équipements branchés aux déclencheurs ou à d'autres ports doivent aussi posséder une isolation double/renforcée pour être protégés de l'alimentation secteur.

» Le boîtier d'alimentation utilisé pour mettre sous tension le TR-RC doit fournir une isolation double/renforcée pour isoler le TR-RC de l'alimentation secteur, et le protéger des courts-circuits et des surcharges. Nous recommandons d'utiliser un boîtier d'alimentation qui limite le courant de sortie de l'appareil à la valeur nominale appropriée du contrôleur, en réglant la limite de courant sur l'alimentation (si possible) ou via la protection contre les surcharges. Le boîtier d'alimentation doit être approuvé selon la norme CEI 60950-1, CEI 60335-1, CEI 61010-1 ou CEI61558-1,-2,-16. Le boîtier d'alimentation peut aussi être approuvé selon des normes de sécurité équivalentes ou supérieures.

» Tous les conducteurs sous tension dérivés depuis l'alimentation secteur doivent aussi posséder une sortie à tension de sécurité extra-basse.

» Lorsqu'il atteint ses valeurs nominales maximales, le boîtier du TR-RC peut dépasser les 65°C. Par conséquent, tout le câblage doit soit avoir une capacité minimale de 100°C, soit être en plus isolé par une gaine suffisamment résistante à la chaleur.

» Le câblage d'alimentation vers le contrôleur doit avoir une capacité minimale de 6A.

» Le câblage reliant la sortie de la chaîne à la charge doit avoir une capacité supérieure au courant de sortie maximal de la chaîne.

» Si le contrôleur est mal réglé ou en cas de panne, l'énergie fournie par l'alimentation au contrôleur peut devenir directement connectée à n'importe quelle chaîne de sortie ou à toutes les chaînes de sortie. Vous devez prendre en compte ce paramètre durant l'installation et si nécessaire, fournir une protection adéquate.

» L'alimentation en courant continu vers le contrôleur doit être protégée par un fusible 3A en externe, plus précisément un fusible à action retardée (T3AH, 50V).

» Dans le cadre de l'installation, l'installateur doit fournir un interrupteur clairement marqué, qui soit à proximité et facilement accessible, pour permettre au contrôleur d'être déconnecté de sa source d'énergie sur les conducteurs d'alimentation.

» Les coupures causées par des charges inductives doivent être supprimées de manière externe vers le TR-RC.

Attention: Il s'agit d'un produit de classe A. Son utilisation en zone résidentielle peut causer des interférences radio. Ce type d'utilisation doit être évité, sauf si des mesures particulières sont prises par l'utilisateur pour restreindre les émissions à un niveau qui permet la réception des transmissions diffusées.

9.3 Généralités

Le TR-RC ne doit pas être utilisé dans une application où la santé des personnes et l'intégrité des équipements seraient mises en danger s'il venait à tomber en panne.

Si l'équipement est utilisé autrement qu'aux fins prévues par le fabricant, la protection offerte par l'équipement pourrait en être altérée.

9.4 **Guide d'installation** (clause de non-responsabilité)

Ces informations sont seulement à titre indicatif. Les installateurs doivent effectuer leur propre évaluation des risques, pour chaque installation. Même si Gardasoft Vision Ltd a préparé minutieusement ces conseils, Gardasoft Vision Ltd décline toute responsabilité pour tout dommage, quel qu'il soit, à l'exception de ceux requis par la loi. La mise en péril volontaire ainsi que les actes de vandalisme ne sont pas couverts par le présent document et doivent être pris en compte par l'installateur.

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