



User Manual

1 Introduction

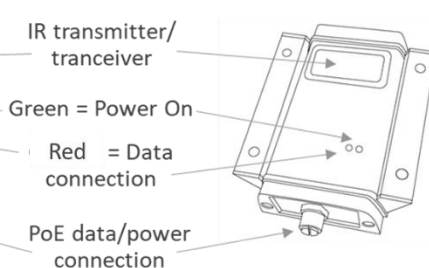
The Trulifi 6014 series of transceivers provide a wireless LiFi connection between two points with data rates up to 845 Mbit/s and a maximum operating distance up to 20 meters, depending on the variant. The device is equipped with a M12 8-pin X-coded Female connector port to connect to the network. The device is powered using the same Ethernet port using PoE and is compliant with PoE standard IEEE 802.3af. The device can be connected directly to a PoE enabled Ethernet switch or using a PoE injector. For a functioning system, a 6014 Access Points needs to connect to a 6014 End Point. Devices are pre-configured as Access Point and End Point in production and this configuration cannot be changed.

The 6014 series is available in different variants:

Product Type number	Max datarate / distance (optimal alignment)	Max distance	Mounts	Access Point / End Point
6014.01 APMB	520 Mbps @ 2m	20m	Standard mount	Access Point
6014.01 EPMB	520 Mbps @ 2m	20m	Standard mount	End Point
6014.02 APMV	830 Mbps @ 1m	12m	Reverse mount	Access Point
6014.02 EPMV	830 Mbps @ 1m	12m	Reverse mount	End Point

The Access Point and End Point type can be identified via the product label and via the Web UI.

6014.01

6014.02


2 Photobiological safety

The Trulifi 6014 used Infrared light which complies with IEC/EN62471 for photobiological safety Class 0 exempt group.

3 Application notice

The Trulifi 6014 is designed to offer a (temporary) data connection between machines, devices and/or network systems at a maximum distance of up to 20 meters. The product complies to the IP65/IP66 and IP67 IP rating (IP rating has been tested, pending certification). The Trulifi 6014 is not designed for safety critical applications. Line of sight between two devices is necessary, therefore blocking the line of sight will limit or disconnect connectivity.

Environmental elements, such as rain, mist, dust, snow, direct sunlight may limit the performance of the Trulifi 6014. Special precaution should be observed in aligning the devices for optimum line of sight.

- Ambient temperature -25°C to +55°C (6014.01)
- Ambient temperature -25°C to +70°C (6014.02)
- For Canada only: Innovation, Science, and Economic Development Canada ICES -003 Compliance label: CAN ICES-3 (B)/NMB-3(B)

A full list of compliances and supported standards can be found in the product specification sheet, which can be downloaded from:

<https://www.signify.com/global/innovation/trulifi/downloads>

4 Getting started

It is advisable to configure the required parameters before mounting/installing the Trulifi 6014 units to their final position.

Make sure the Trulifi 6014 units and your client PC/device are connected to the same network switch and powered using a PoE connection. When the Access Point is powered, the green control light is ON.

For the first-time setup, you will have to use the web configuration system of the Trulifi 6014.

4.1 Default IP configuration

Out of the box the Trulifi 6014 Access Points and End Points are pre-configured with DHCP enabled. With DHCP enabled, the 6014 unit will automatically receive an IP address and subnet mask. In addition to this automatically assigned IP address, the 6014 also has a *static* IP address, even when DHCP is enabled. This can be helpful in case you are unable to retrieve what address has been assigned to the 6014 by the DHCP server. The default static IP address is:

- 192.168.1.10 (6014 Access Points)
- 192.168.1.20 (6014 End Points)

The corresponding default subnet mask is:

- 255.255.255.0

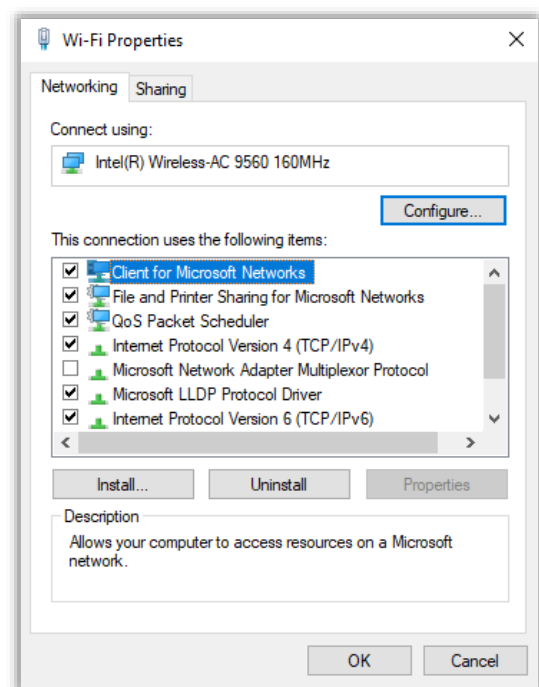
4.2 Accessing the web configuration system

It is important that your computer is configured to be in the same subnet as your Trulifi 6014.

Check your DHCP server's address allocation table for the IP address of your laptop and the 6014 unit to confirm that both are in the same subnet.

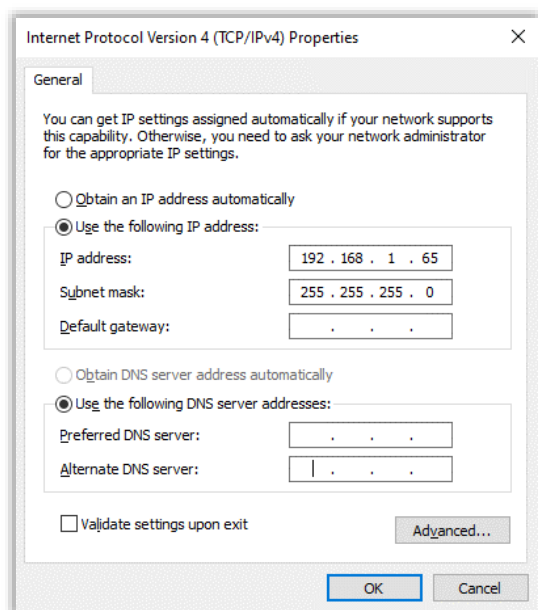
If this is not the case, then you may use the 6014's default static IP address to reach the web configuration system. In order to do this, you will have to bring your laptop temporarily in the same subnet as the 6014. Once you have completed the configuration steps, you can assign your laptop back to its original subnet. On Windows 10 systems, the procedure is as follows:

1. Select correct Ethernet or Wi-Fi adaptor and select Properties using the right mouse button.



2. Select the Internet Protocol 4 (TCP/IPv4) and select Properties.
3. Assign an IP address to your computer and make sure that it is within the correct network subnet that the Trulifi 6014 is also connected to (default: see section 4.1). Check that the IP address

of your computer is different from that of the Trulifi 6014.



4. Close the window and save the configuration by clicking the OK tab.

5 Web Configuration system

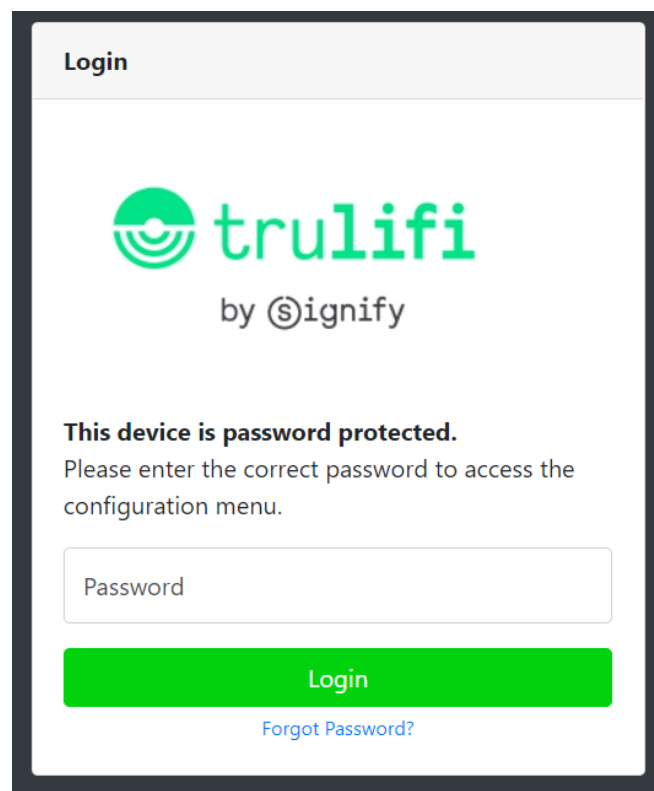
You can use the Trulifi 6014 web configuration system to configure specific operating parameters. To access the web configuration system, open a standard web browser and enter the IP address into the navigation tab (assigned by DHCP or use the static IP address).

Device type	Default IP address	Default password
Access Point	192.168.1.10	[Serial number of Device]
End Point	192.168.1.20	[Serial number of Device]

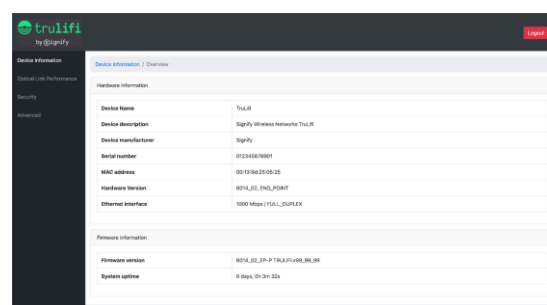
The default password is the serial number of the device, found at the back side of the device. In the Authentication tab, enter the Configuration/Security password and click **[ok]**.

When selecting a password, the password length should be between 8 and 20 characters.

After entering the password, the main configuration window opens. On the left side of this window, there are several menu



tabs to view and change system configuration parameters.



5.1 Device Information menu

This screen displays the following information of the device:

- Device name
- Device description
- Device manufacturer
- Serial number
- MAC address

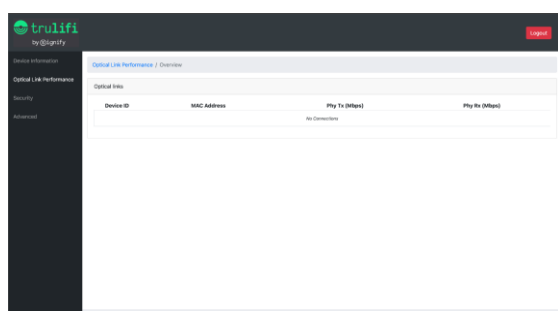
- Hardware version, including if device is configured as Access Point or End Point
- Ethernet interface; this displays the type of ethernet interface the device is connected to
- Firmware version
- System uptime; time passed since last reboot.

The information in this page cannot be edited.

5.2 Optical Link Performance

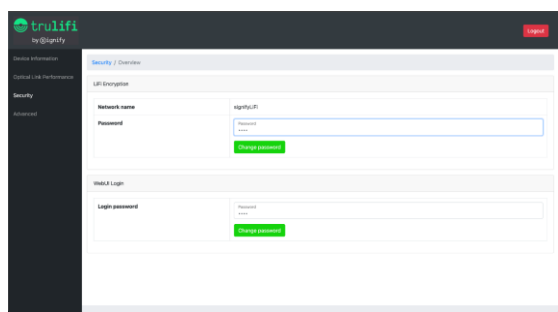
This page only shows data when an End Point and Access Point are connected and have established an Optical Link. In case no connection is available, please use the page refresh option of your web-browser. When connected the Link Performance menu reports connection status information and corresponding transmit and receive throughput values.

Information on this page can not be edited.



5.3 Security

This page enables entering the device security settings. There are two security settings for the 6014.



Network Name

The password for the “Network name” enables the encryption of the data transmitted via the optical link. Devices are pre-programmed/auto-assigned as either Access Point or End Point. **NOTE** : Only Access Points and End Points can establish an optical link, and only when they make use of the identical encryption passwords.

The default LiFi encryption password for every 6014 Access Point, or End Point is: **trulifi**.

Login password

The “login password” is the password the web user interface. The default password is the serial number of the device, found at the back of the device. It is strongly recommended to change the password to a strong password. The password should be between 8 and 20 characters.

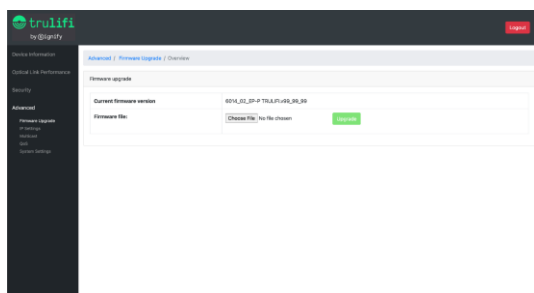
In case the password is forgotten, upon login to the web user interface there is the option to reset password (restore factory settings). When this option is selected all settings return to factory default.

5.4 Advanced menu

The advanced menu is recommended for IT-manager and system administrators having access to and knowledge of the system network requirements of the solution.

The “Advanced” menu contains the following sub-menus:

- Firmware upgrade
- IP Settings
- Multicast
- Quality of Service (QoS)
- System settings



5.4.1 Firmware upgrade

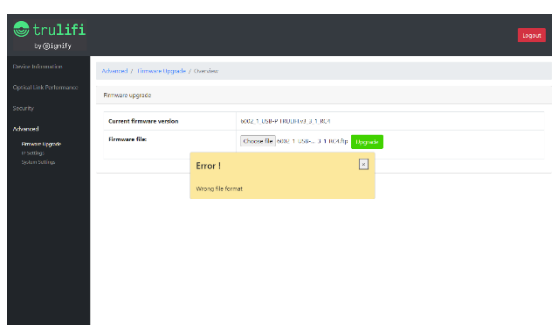
This screen displays the current firmware version and offers the opportunity to update the firmware to a newer version. The latest firmware version can be downloaded from:

<https://www.signify.com/global/innovation/trulifi/downloads>

After downloading the latest firmware store the file on a convenient location; e.g. Desktop.

Select [**Choose File**] and browse to the location where the new firmware version is saved. Select [**Upgrade**]

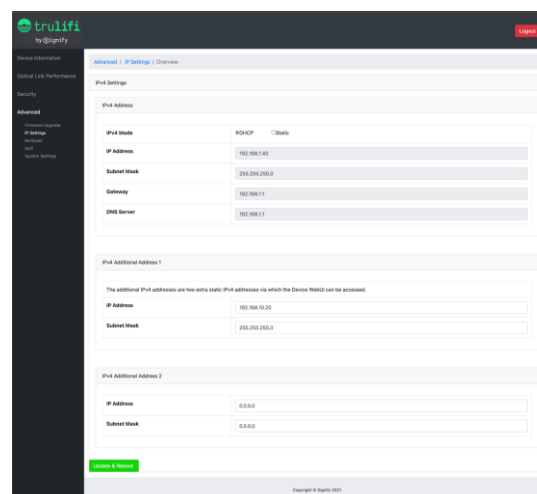
In case a non-valid file is selected to upload, the following error message will be displayed.



5.4.2 IP Settings

This screen displays the IP settings of the device. Either static IP addresses can be configured, or the device can be configured in DHCP mode. Additional static IP

addresses can be configured in case the device needs to be accessed from a different subnet.

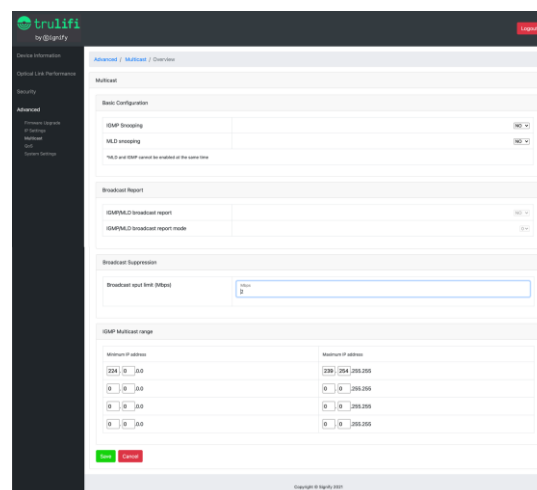


To disable the [**IPv4 Additional Address 1**], please enter [**0.0.0.0**] in the field [**IP Address**].

Select [**Update & Reboot**] after completing the configuration.

5.4.3 Multicast menu

The Multicast menu allows for configuring Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) snooping parameters.



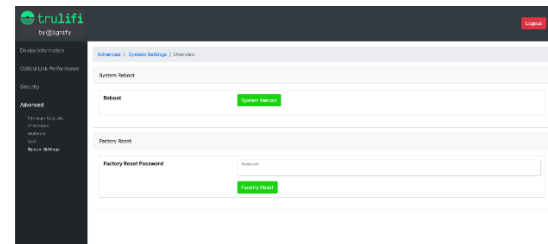
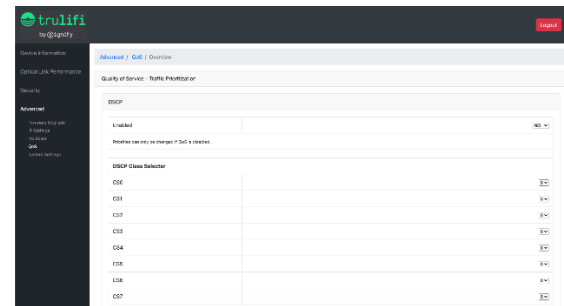
5.4.4 QoS menu

In the screen QoS menu you can change the following Trulifi 6014 parameters:

- QoS Criteria: 802.1p or custom
- Frame Type: Ethernet frame, 802.1q, 802.1ad
- Packet Detection Method: IPv4 or custom
- Packet Classification/Type-of-Service ToS)

5.4.5 System Settings

The “system settings” page has provisions to perform a System reboot and a Factory Reset and restore the initial factory setting at time of shipment. When using the factory reset option, all system configuration settings will be lost.



The factory reset password is: **trulifi%2019**

WARNING: All settings (IP-settings, LiFi encryption password, UI access, and other settings) will be returned to the factory default value.

6 Installation

After the configuration of the Trulifi 6014 units is completed, the system is ready to be installed. Note that the optimum performance of the LiFi link can only be achieved when the Access Points and End Points are perfectly aligned. To support this alignment, there are various mounts as well as a laser pointer available as options which are sold separately.

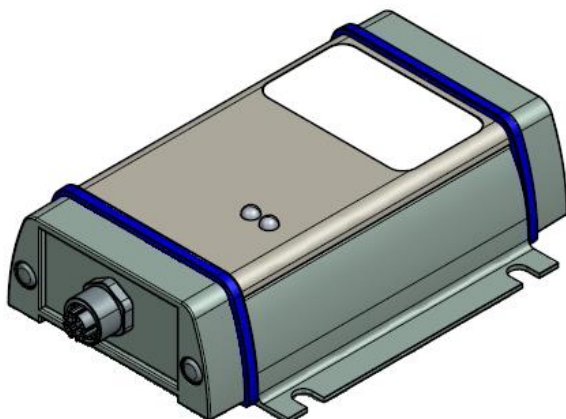
It is recommended to first check the correct operation/data communication between devices before installing the devices into their final position.

The 6014 devices may be mounted at heights exceeding 2 meters. The maximum mounting distance between the Access

Point and the End Point shall not exceed 20 meters (6014.01) or 12 meters (6014.02) to guarantee operation.

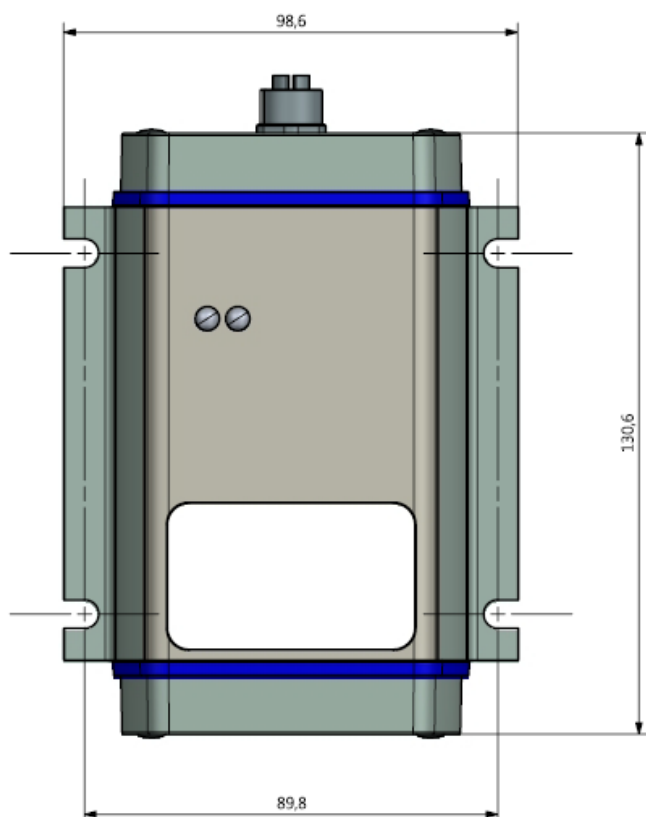
The 6014 unit emits a cone of infrared light. The radius r of this cone depends on the operating distance between the Access Point and an End Point. The radius r is specified in the Trulifi 6014 Technical Specification. In case multiple pairs of 6014 units are used in the same space, the cones of one pair of 6014s shall not intersect with the cones of the adjacent 6014 pair, to avoid malfunctioning of the system. A minimum distance of $2.5 \times r$ shall be maintained between each pair of 6014s.

In case the 6014 device is mounted directly at a wall/ceiling, 6 mm diameter screws with



appropriate mounting wall plugs shall be used.

The 6014.02 devices should be mounted with 4x M6 bolts (minimum tensile strength of 500N/mm²) and self-locking nuts and/or spring washer for mounting the 6014 to the surface bracket, to comply to EN50155 regulations.



6.1 Installation prerequisites

- For a working installation (depending on the use case) mounts and brackets may be required (see next section)
- To connect the 6014 to the standard IT infrastructure, an adapter cable (8-pin M12 X-Coded Male to RJ45) may be required (not included)
- PoE injector or PoE powered switch (IEEE 802.3af) is not included

The Trulifi 6014 is available with 2 different types of mounting brackets.

6.2 6014.01 mounting instruction

The 6014.01 comes with standard forward mounting brackets which can be mounted on to a wall, ceiling, or other surface. Use M6 bolts and nuts or screws and wall plugs for installation (not included).

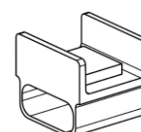
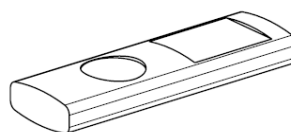
6.2.1 Laser Pointer

In case a very accurate alignment over longer distance is required, a laser pointer is optionally available. The laser pointer and the bracket can be ordered under the following order number:

Ordering Information:

9125 001 04197

Trulifi 6014 POINTER



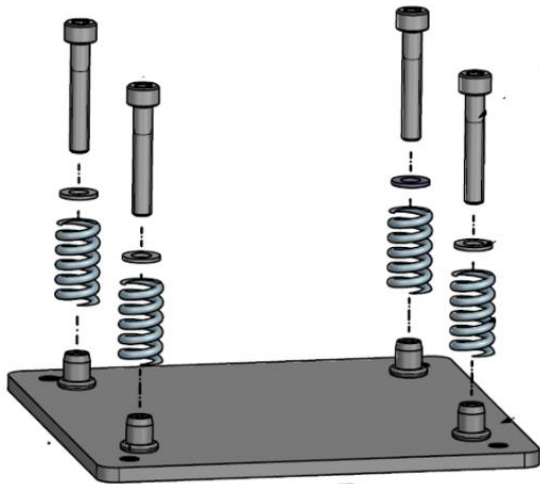
For convenience of alignment, it is recommended to use two (2) Laser pointers (one at each end) however alignment is possible using only one laser pointer and use/change them between the two units.

6.2.2 Fine adjustment bracket

In case alignment over a longer distance is required, an optional fine adjuster bracket is recommended.

Ordering information:

9125 001 04197 Trulifi 6014 MOUNT



After mounting the 6014.01 on the fine adjustment bracket, the units can be perfectly aligned using the laser pointer and the 4 mounting screws fitted with spring coils. These mounting screws double as fine adjustment screws. The fine adjustment bracket can be mounted to a flat surface (wall, ceiling, etc.) or to a coarse adjustment wall mount from RAM.

6.2.3 Coarse adjustment

For wall/ceiling mounting including coarse adjustment, Signify recommends RAM mounts. These are 3rd party product from RAM Mount and consists of 3 parts.

1. [Ball Plate Adapter RAM-246U](#)

The 100x100mm VESA ball plate adapter connects to the fine-adjuster.



2. [Socket Arm RAM-201U-B](#) C-size

The socket arm connects the ball plate adapter to the drill down base.



3. [Drill down base RAM-202U](#) C-size,

This connects to the wall/mounting surface.

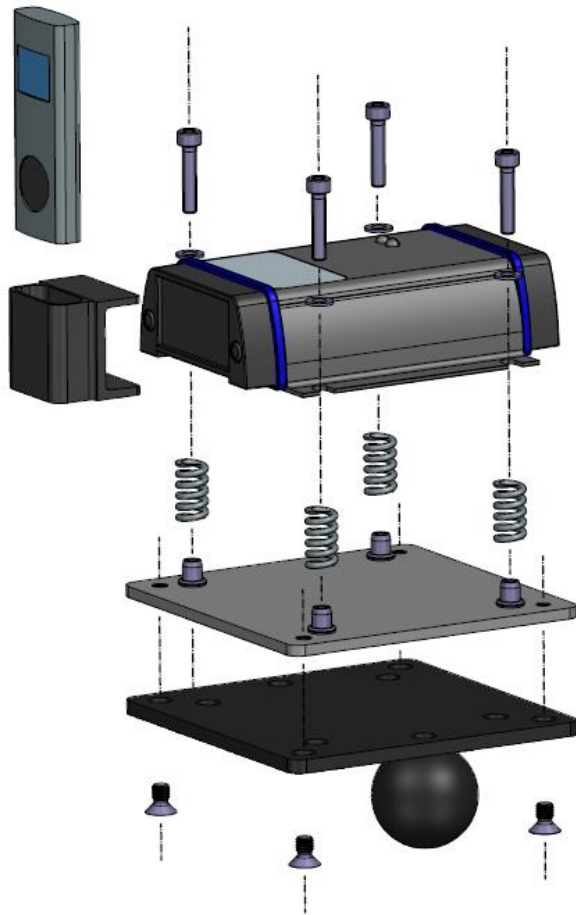


For more information on compatible mounts please visit: www.ram-mount.co.uk

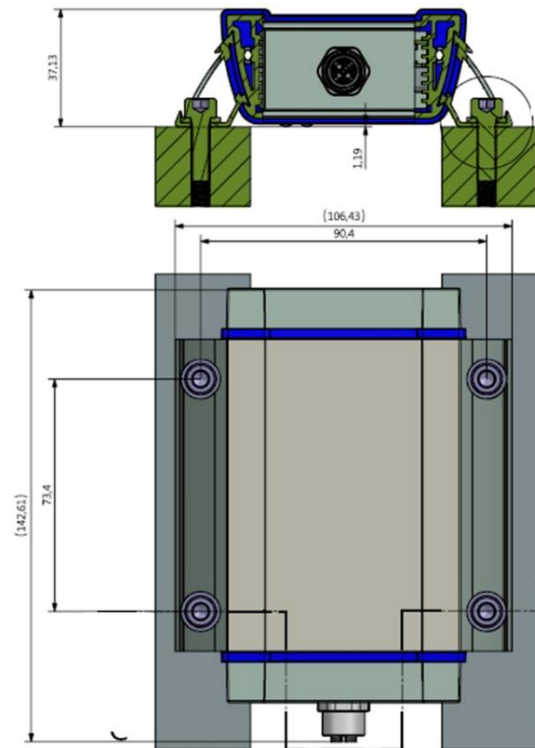
For installation instruction of the RAM mount, please refer to the instruction delivered with your variant of RAM-mount.

6.2.4 Assembly

The exploded view below depicts how to assemble the 6014.01 using the various mounts and laser pointer.



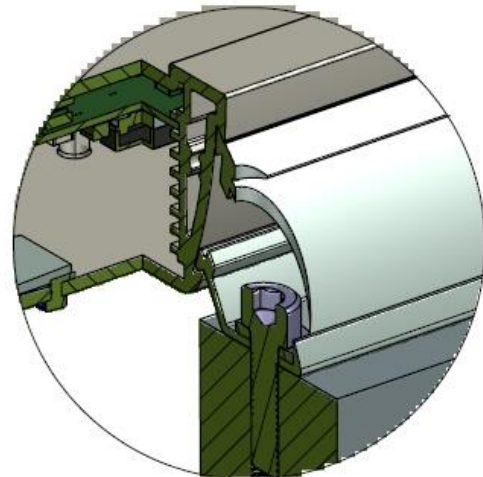
below, where caution should be observed that the optical window is not obstructed by the mounting surface.



The aiming and alignment can be done by attaching the optional laser pointer and bracket to the 6014.01, to help the aiming of the device.

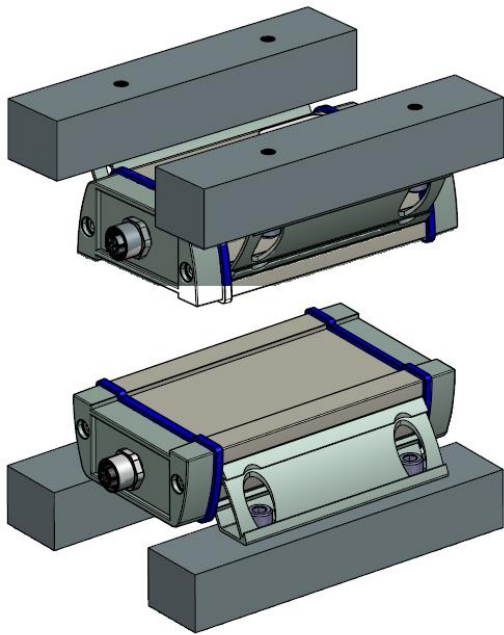
Fine adjustment can be done by turning any of the 4 bolts until a perfect alignment is achieved. For a detailed operation of the laser pointer please carefully read the instructions provided with the laser pointer.

Caution: Never look directly into the laser beam.



6.3 6014.02 mounting instruction

The reverse mounting bracket included with the 6014.02 should be mounted as depicted



6.4 Connecting and using the device

After attaching the 6014 unit to the ceiling/wall/object, connect the network cable to the 6014 via a PoE-enabled 100/1000-Base-TX network switch port or use a PoE injector. When the device is powered, the green power LED on the front panel is lit.

Repeat this step for the other 6014 unit. Once both units are aligned correctly, the LINK ACTIVITY LED will indicate communication activity between the units.

The system is now ready to be used.