Gallagher
Z10 Tension Sensor

Installation Note

Gallagher Z10 Tension Sensor Standard: G13110
Gallagher Z10 Tension Sensor High Spec: G13115



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1 Introduction

IMPORTANT: The Gallagher Z10 Tension Sensor can only be used with Gallagher Command Centre vEL7.10.1306 software (or later). Earlier versions of Command Centre do not support this device.

This device contains sensitive electronic components - handle with care.

The Gallagher Z10 Tension Sensor is an intelligent intrusion detection device that measures wire tension. Normal operating range for wire tension is 7 - 60 kgf (15 - 132 lbf).

The sensor signals an alarm when the wire tension surpasses the predetermined attack threshold, or when the wire tension surpasses the predetermined maintenance thresholds.

Onboard algorithms distinguish between deliberate intrusion events and unwanted events, such as environmental interaction.

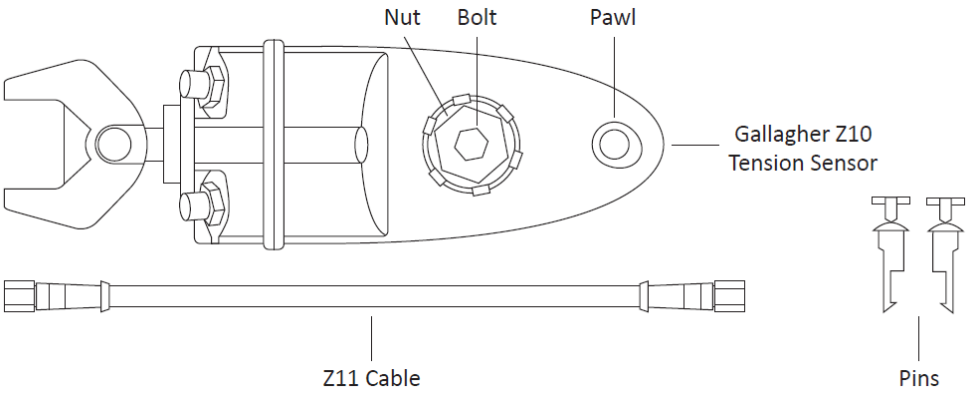
When installed, the sensors are connected to the Gallagher Controller 6000 or the Gallagher HBUS Module (attached to the Controller 6000). The Controller 6000 is capable of monitoring up to 80 sensors. A maximum of 80 sensors can be connected to a single HBUS run.

Sensors are grouped by fence, (e.g. North Fence Upper Sensor Group) in Gallagher Command Centre. Command Centre allows for sensor diagnostic reporting and event alarm management.

2 Carton contents

Check the carton contains the following items:

- Gallagher Z10 Tension Sensor
- Z11 Cable
- Pins



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3 Installation

3.1 Introduction

The following procedure describes how to install the Gallagher Z10 Tension Sensor and additional components.

3.2 Equipment you will need

Tools required to install the Z10 Tension Sensor are:

- 8 mm (5/16") socket and power drill
- 8 mm (5/16") socket and ratchet, or 8 mm (5/16") ring spanner
- Centre punch
- 5 mm (3/16") drill bit and power drill
- #2 Pozi or #2 Phillips screwdriver
- Sheath removal tool (G20210) and wire cutters (G20211)

Additional components that are required to complete the installation are:

- Gallagher K20 Pivot Mount Brackets (G20874 or G20884)
- Gallagher Z11 End of line (G13126)
- Gallagher Z12 Cable Adapter (G13125)
- Gallagher CAT 5e 4 twisted pair 24 AWG (0.2 mm_2) network cable (G10600)
- Gallagher Cable Ties (G10806)
- Gallagher Z40 Voltage Booster (G13310)
- Gallagher Controller 6000 (C300100)
- Gallagher Power Supply (C200440)
- Gallagher K20 Interlocking Pins - spare part (G20645)

3.3 Procedure

Complete the following procedure to install the Gallagher Z10 Tension Sensor.
Note: This list can be used as a checklist to ensure you have completed all the necessary steps.

1. System design

Use the Z10 Fence Designer to determine the tension span, bay widths, wire types and spring types required for the fence. The Z10 Fence Designer can be located here: http://security-support.gallagher.com
System design considerations are:

- A maximum of 55 sensors can be assigned to a sensor group in Command Centre. Sensors must be grouped by fence, (e.g. North Fence Upper Sensor Group). Multiple groups can belong to one fence.
- The sensors belonging to a sensor group cannot span multiple Controllers.
- A maximum of 80 sensors can be connected to a Controller 6000.
- The maximum configurable tension span is 300 m (984 ft). Tension span (zone length) should be determined based on security and risk evaluation.
- Consideration must be taken with regards to the HBUS network requirements. Refer to the topic "*Network Configuration*" later in this installation note.
- A maximum of 80 sensors can be connected to a single HBUS run.

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2. Power Supply

It is mandatory for all installations of the sensors to use the Gallagher Z40 Voltage Booster (G13310). Power should not be supplied from any other source.

Use the Voltage Calculator on the Z10 Fence Designer to determine if the sensors will receive the required voltage. The Z10 Fence Designer can be located here: http://security-support.gallagher.com

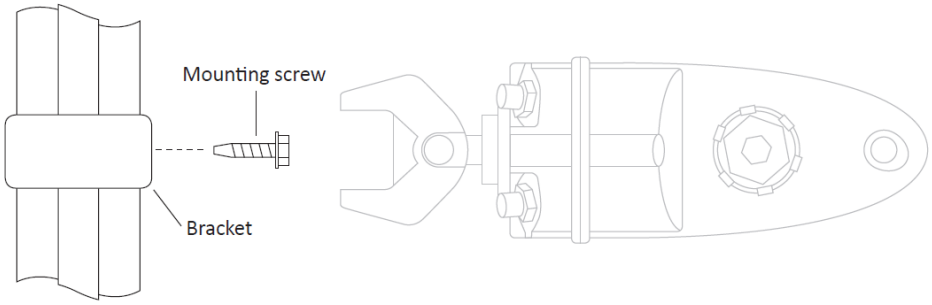
3. Construct the fence

The fence structure must meet the requirements as detailed in the document *"Perimeter Security Electric Fencing Installer Reference Guide (3E0901)"*. This document can be downloaded from here: http://security-support.gallagher.com. The sensors must be mounted to a Gallagher Security Post (G203XX).

4. Mount the bracket

Using the screws provided with the brackets, mount all brackets (G20874 or G20884) to the Gallagher Security Post (G203XX) before attaching the sensors.
Ensure all sensors are spaced appropriately, such that the sensors can be connected together, using the Z11 Cables. The sensors are compatible with 91 mm (3.6") and 60 mm (2.4") pitch wires.

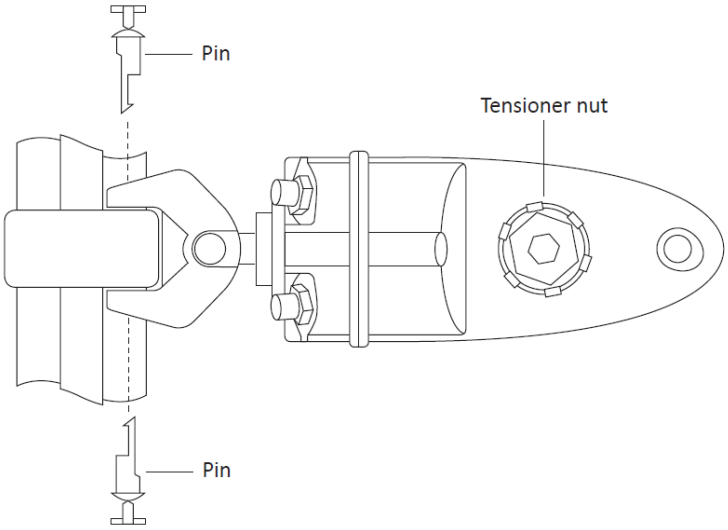
Hint: For a more secure installation, orientate the bracket so that the mounting screw enters behind the sensor.



5. Attach the sensor

Using the pins provided, attach the sensor to the bracket. Remove the breakoff tabs from the pins once installed. Ensure the sensor orientation is such, that the tensioner nut is accessible. Ensure all sensors are orientated the same way.

Note: Once the pins have been clipped together, they are difficult to remove.

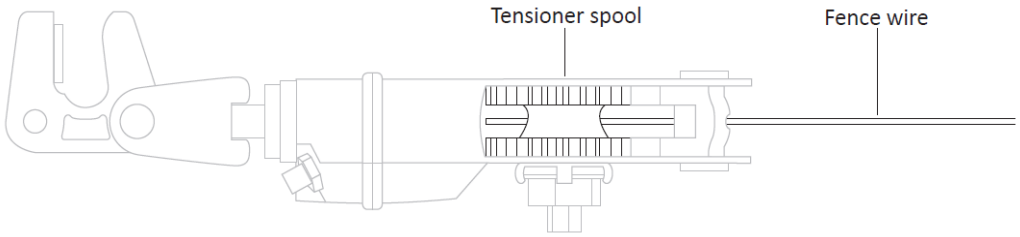


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6. Attach the fence wire

Before you attach the wire, ensure the length of the wire does not exceed the rear (toothed edge) of the tensioner spool. Insert the wire through the tensioner pawl then the spool. Using an 8 mm (5/16") socket and ratchet, or an 8 mm (5/16") ring spanner, tension the wire.

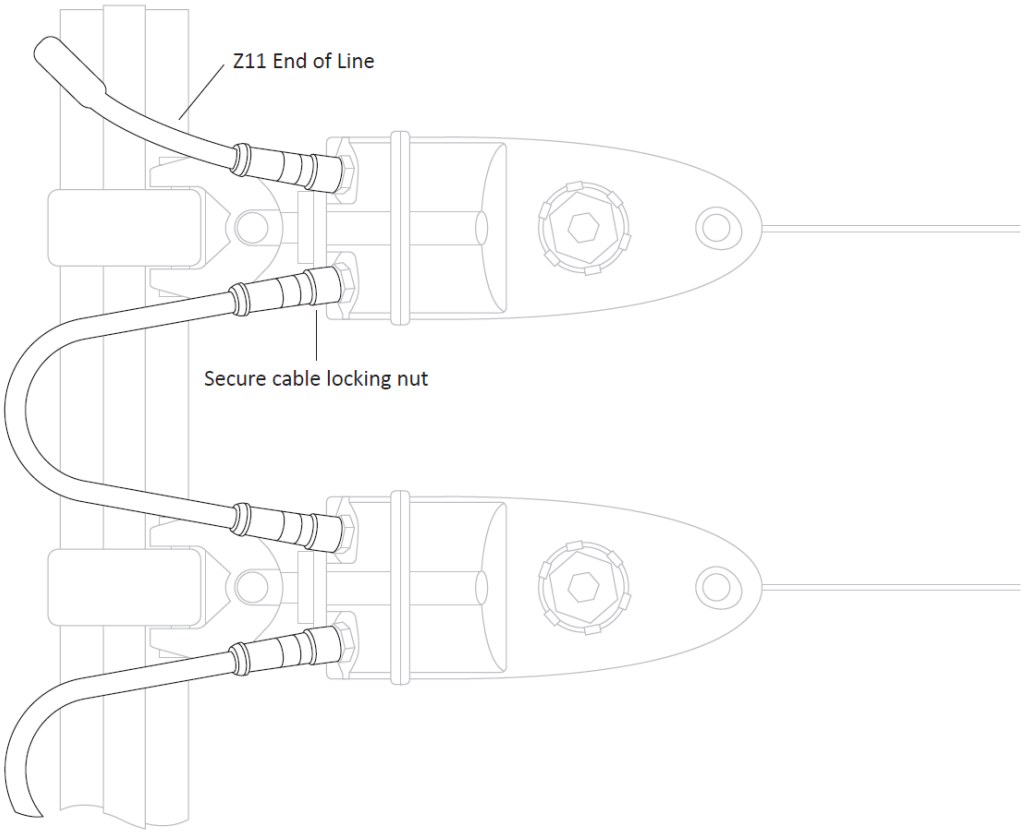
Hint: For ease of wire attachment, ensure the curl of the wire faces down when inserting the wire through the tensioner pawl and spool.



7. Connect the Z11 Cables

Connect the Z11 Cable provided to the sensor. Secure the cable locking nut.
Connect all sensors together using the Z11 Cables. Terminate the **last** sensor, using the Z11 End of line (G13126).

Hint: The Z11 Cable plugs are 'keyed' and will only fit in one orientation.



8. Mount the Z12 Cable Adpater

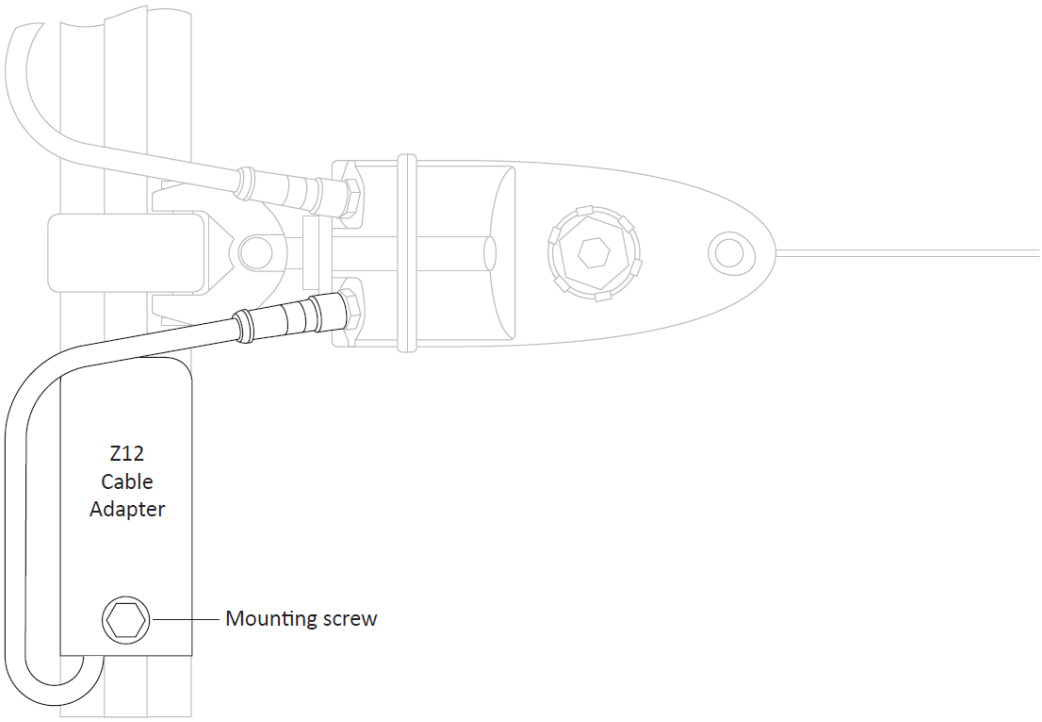
Connect the Z12 Cable Adapter (G13125) cable and plug to the **first** sensor.
Orientate the Z12 Cable Adapter, so that the mounting screw is located at the bottom of the unit.

Using a centre punch, define the start position for the mounting screw hole.
Using a 5 mm (3/16") drill bit and power drill, drill the mounting screw hole.

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Using the mounting screw provided with the Z12 Cable Adapter and an 8 mm (5/16") socket and power drill, mount the Z12 Cable Adapter to the post. Use the plastic stand-off provided when mounting to a Gallagher Security Post (G203XX). Do not tighten the mounting screw at this point. Slide up and remove the cover in preparation for the next step.

Hint: The Z12 Cable Adapter must be installed vertically as shown below, with the mounting screw at the lowest point to reduce the risk of water ingress.



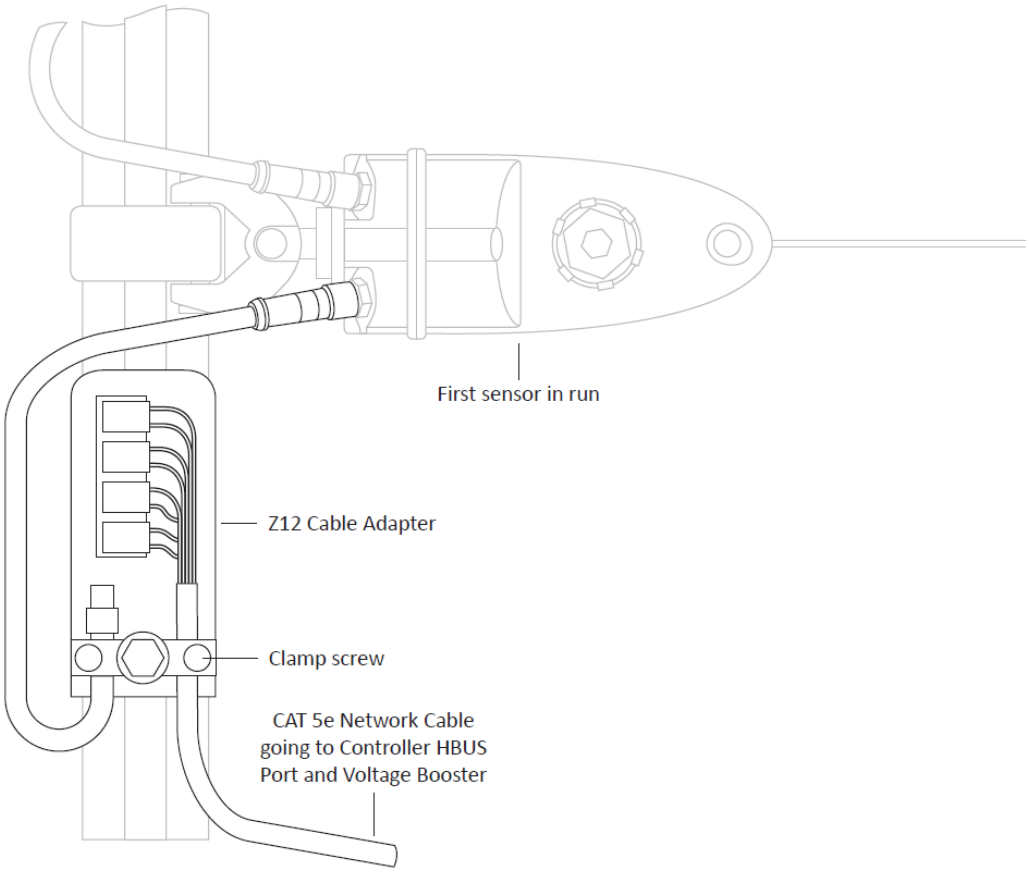
9. Connect the network cable to the Z12 Cable Adapter

Using a #2 Pozi or #2 Phillips screwdriver, remove both clamp screws located at the bottom of the Z12 Cable Adapter. Insert the Gallagher CAT 5e 4 twisted pair 24 AWG (0.2 mm_2) network cable (G10600).

Using the sheath removal tool (G20210), remove the outer sheath from the end of the network cable and insert the individual wires into the appropriate insulation-displacement connectors, as indicated by the colour coded label, then close the connector.

Note: Do not strip the individual wires, simply insert the wires, then close the connector. Ensure each wire is fully inserted into the insulation-displacement connector. The end of the wire should make contact with the end of the connector when inserted.

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Use the table below and the colour coded label, located inside the Z12 Cable Adapter to ensure the correct connections are made.

CAT 5e wire colour	Z10 connection function	Colour coded label
Orange	+Vin	Orange
Orange/White	+Vin	Orange/White
Brown	-Vin	Brown
Brown/White	-Vin	Brown/White
Blue	RS485 A	Blue
Blue/White	RS485 B	Blue/White
Green	RS485 GND	Green
Green/White	RS485 GND	Green/White

Once all wires are connected, replace both clamp screws located at the bottom of the Z12 Cable Adapter. Replace the Z12 Cable Adapter cover.
Tighten the Z12 Cable Adapter mounting screw.

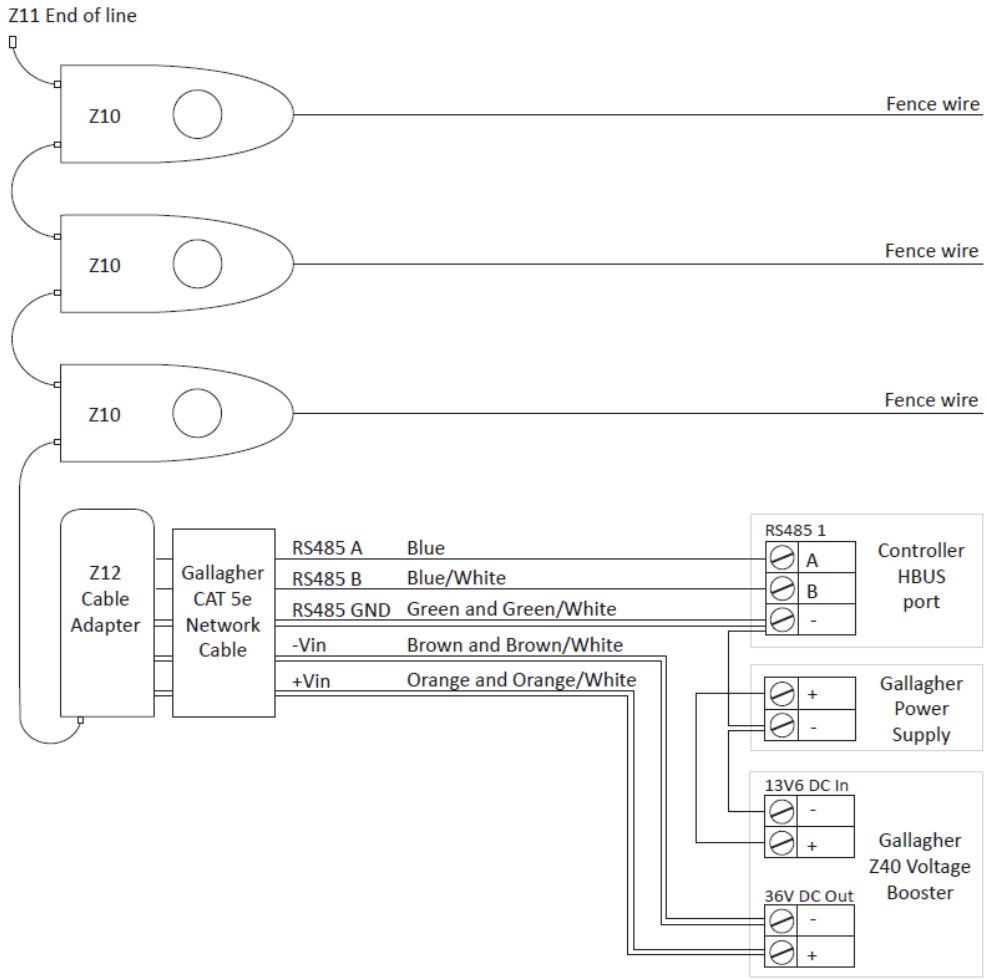
10. Connect the network cable to the Z40 Voltage Booster and HBUS port

Connect the other end of the Gallagher CAT 5e 4 twisted pair 24 AWG (0.2 mm_2) network cable (G10600) to the Z40 Voltage Booster and Controller HBUS port. Make the connections as shown in the table next:

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CAT 5e wire colour	Z10 connection function	Connect to…
Orange	+Vin	Z40 DC Out +
Orange/White	+Vin	Z40 DC Out +
Brown	-Vin	Z40 DC Out -
Brown/White	-Vin	Z40 DC Out -
Blue	RS485 A	HBUS port RS485 A
Blue/White	RS485 B	HBUS port RS485 B
Green	RS485 GND	HBUS port RS485 GND
Green/White	RS485 GND	HBUS port RS485 GND

Hint: For further detail regarding the HBUS connections, refer to the topic *"Network Configuration - HBUS connections"* later in the installation note.



11. Power on the sensors

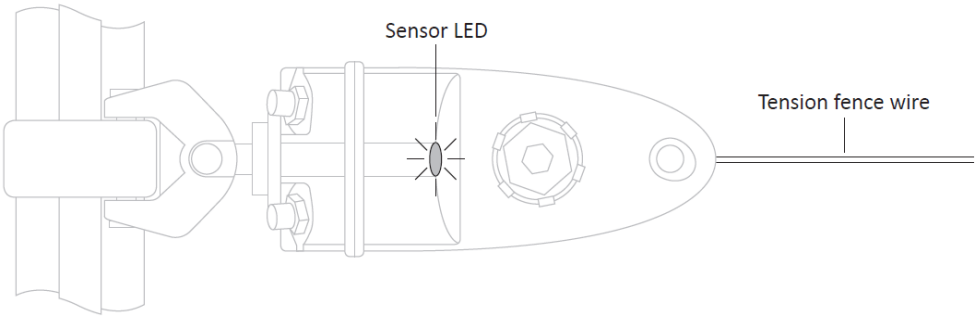
12. Configure the sensors in Command Centre

Configure the sensors using the Command Centre software vEL7.10.1306 (or later). Refer to the topic *"Configuring a Z10 Tension Sensor Group"* in the Command Centre Help.

Note: The use of Z10 Tension Sensors with Command Centre is a licensable feature. The total number of sensors in a system is governed by your Command Centre license file.

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13. Complete the final tensioning



Note: Tensioning is best done in low sunlight conditions.

Once configured a Maintenance Mode override will be in effect. When in Maintenance Mode only, the sensor's LED will display one of the following flash patterns:

LED	Wire Tension Status
1 Flash per second (Green)	The wire is tensioned within target tension range.
1 Flash per second (Red)	The wire is over tensioned (too tight).
1 Flash per second (Blue)	The wire is under tensioned (too loose).

LED	Diagnostic Status
3 Flash per second (Red)	No communications with the Controller.
2 Flash per second (Red)	Communications with the Controller, but sensor is not configured.
1 Flash per second (Green, Red or Blue)	Fully configured and functioning normally. The sensor's LED displays the current wire tension status.

LED	Tension Overload Status
3 Flash for 3 seconds (Green), then 3 Flash for 3 seconds (Red, Blue then Green)	The wire tension is within target tension range. The sensor has reported a tension overload event, (i.e. more than 200 kgs 441 lbs).
3 Flash for 3 seconds (Red), then 3 Flash for 3 seconds (Red, Blue then Green)	The wire is over tensioned. The sensor has reported a tension overload event, (i.e. more than 200 kgs 441 lbs).
3 Flash for 3 seconds (Blue), then 3 Flash for 3 seconds (Red, Blue then Green)	The wire is under tensioned. The sensor has reported a tension overload event, (i.e. more than 200 kgs 441 lbs).

Note: If the sensor has reported a tension overload event, the sensor may be permanently damaged and should be replaced.

Complete the final tensioning then cancel the Maintenance Mode override. The sensor group will then be functioning normally. The LED will flash once then switch off.

14. Verify reliable operation

All sensors should be verified to ensure they provide the appropriate response to an attack. Simulate an attack on the wire, by deflecting the wire a fixed distance. Generate an Activity Report detailing all alarms raised.

Hint: Alternatively, use the Walk Test Mode functionality. Refer to the topic *"Performing a Walk Test Mode Override"* in the Command Centre Help. In Walk Test Mode, when an alarm condition is detected, the sensor's LED will change to red, and remain red until the alarm condition is removed.

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4 Network Configuration

4.1 Introduction

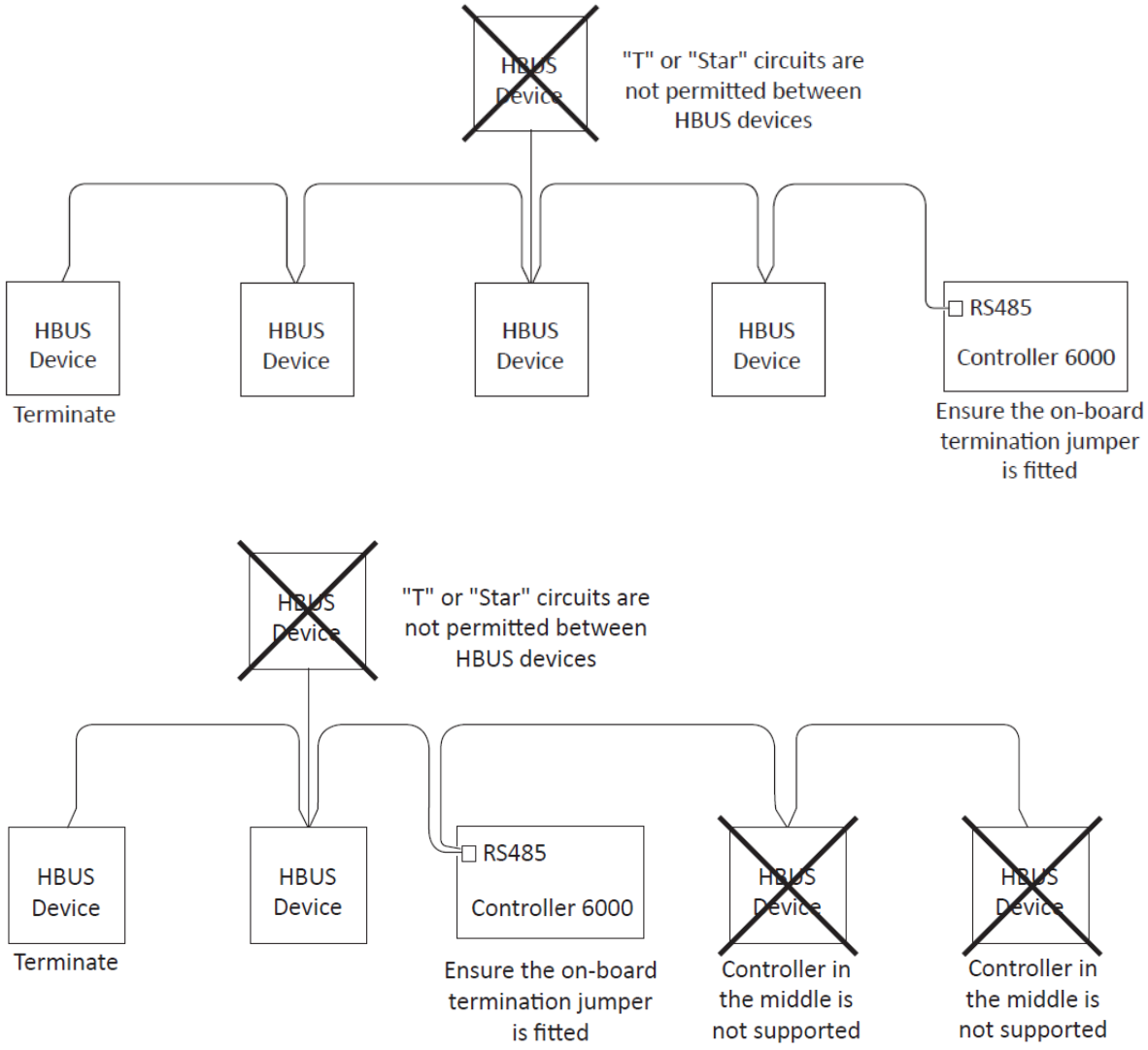
The sensor uses the encrypted HBUS communications protocol to communicate with the Gallagher Controller 6000 or the Gallagher HBUS Module (attached to the Controller 6000).

The HBUS communications protocol is based on the RS485 standard and allows HBUS devices to communicate over a distance of up to 500 m (1640 ft) from the Controller.

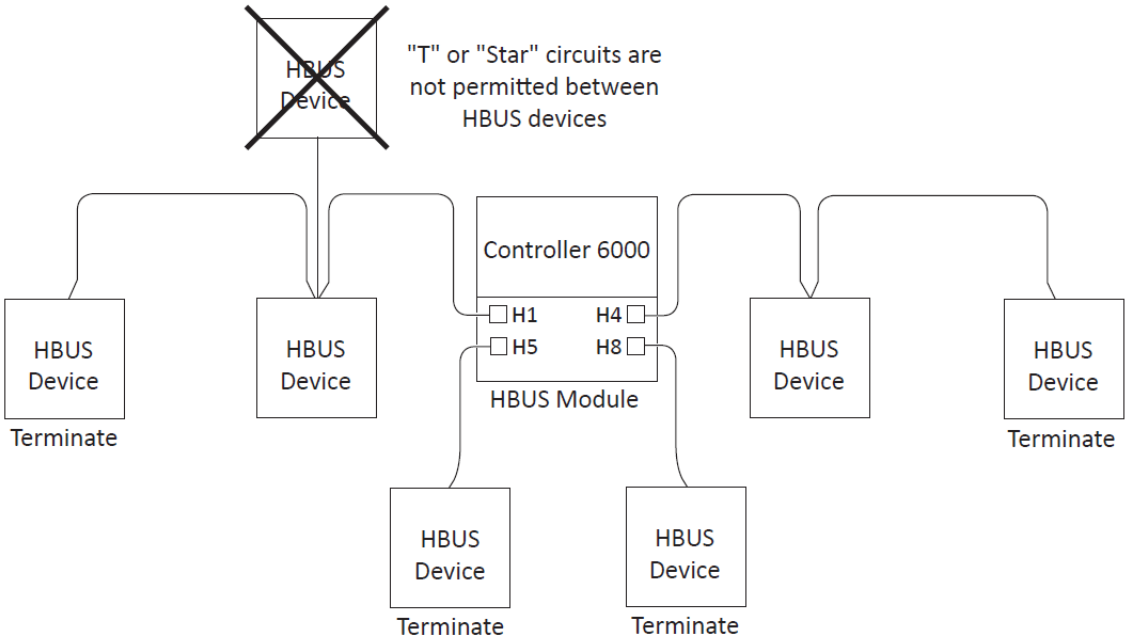
4.2 Network topology and termination

The cabling between HBUS devices should be done in a "daisy chain" topology, (i.e. a "T" or "Star" topology should not be used between HBUS devices).

To terminate at the Gallagher Controller 6000, ensure the on-board termination jumper is fitted for the appropriate RS485 port. Termination is already included at the HBUS Module, (i.e. each HBUS port is permanently terminated at the module). To terminate at the Z10 Tension Sensor, connect the Z11 End of line (G13126) termination.

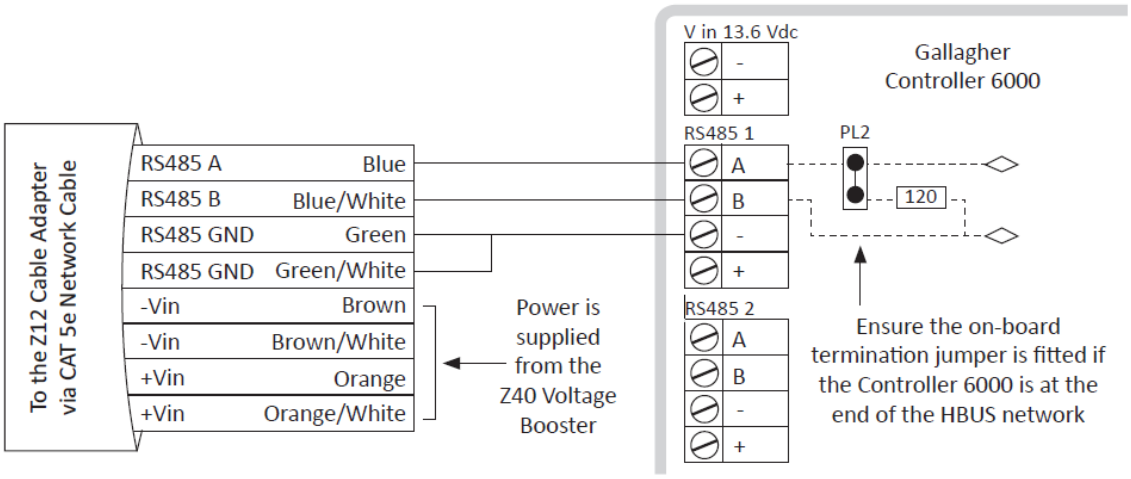


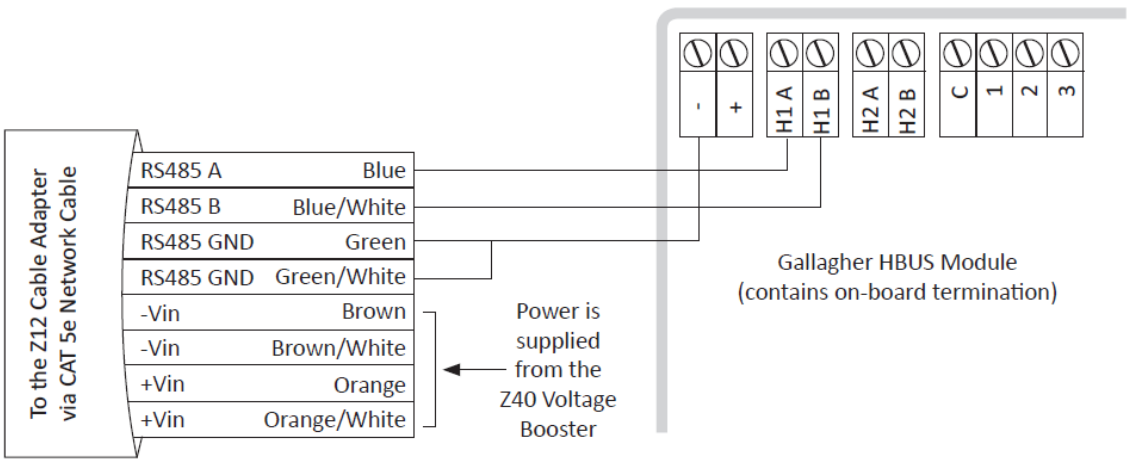
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4.3 HBUS connections

Connect the sensor to either the Controller 6000 or HBUS Module, as shown.



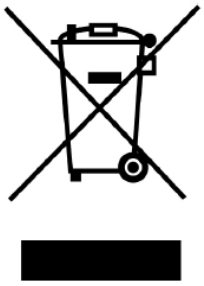


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5 Technical Specifications

Minimum operating tension:	5 kgf (11lbf)
Maximum continuous operating tension:	60 kgf (132 lbf)
Safe maximum instantaneous load:	200 kgf (441 lbf) (STP)
Temperature:	-40 °C to +60 °C (-40 °F to +140 °F)
Maximum number of Z10 Tension Sensors per Controller 6000:	80
Humidity:	100% non-condensing
Environmental protection:	IP68
Impact rating:	IK07 (STP)
Shipment weight:	0.2 kg (0.4 lb) includes packaging
Dimensions: (includes the attached bracket but excludes the Z11 Cable)	Length: 176 mm (6.9 inches) Width: 50 mm (1.9 inches) Height: 56 mm (2.2 inches)

6 Approvals and Compliance Standards



This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city recycling office or the dealer from whom you purchased the product.

RoHS COMPLIANT

This product complies with the environmental regulations for the Restriction of Hazardous Substances in electrical and electronic equipment (RoHS). The RoHS directive prohibits the use of electronic equipment containing certain hazardous substances in the European Union.

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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