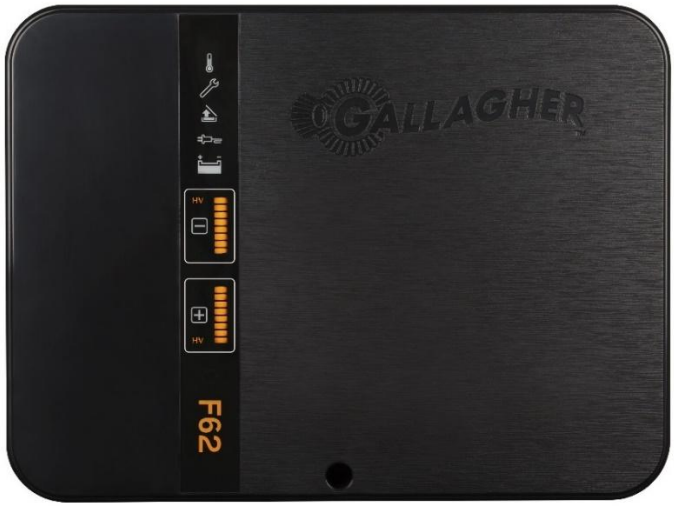
Gallagher

F5/F6 Fence Controller

Installation Note

Gallagher F51 Fence Controller:	G21923
Gallagher F52 Fence Controller:	G21943
Gallagher F61 Fence Controller:	G21933
Gallagher F62 Fence Controller:	G21953
Gallagher F61 Fence Controller - EN:	G21935
Gallagher F62 Fence Controller - EN:	G21955



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ATTENTION: This equipment contains components that can be damaged by electrostatic discharge. Ensure both you and the equipment are earthed before beginning any servicing.

IMPORTANT: Gallagher Fence Controllers are for Commercial Use Only

1 Authorised Use Only

- A Security energizer fence system must be configured and installed by, or under the responsibility of an authorised installer.
- A Security energizer fence system shall be serviced and maintained by, or under the responsibility of an authorised installer.
- After installation, a label shall be attached to each energizer in a security energizer group that provides the authorised installer's name, contact details and the installation date.
- After servicing, a label shall be attached to each energizer in a security energizer group that provides the authorised installer's name, contact details and the installation date.
- An authorised installer is a person suitably trained by Gallagher to be able to safely configure, install and maintain a security energizer fence system on the basis of professional training, knowledge, experience and familiarity of then relevant equipment.

2 Introduction

The Gallagher F5/F6 Fence Controller is a high voltage perimeter security fence energizer.

Regulated electrical pulses are sent along each Fence Channel. Each pulse will deliver a short, but safe shock. The end of the Fence Channel is connected back to the Fence Controller where it measures the returning pulse. Any attempt to cut or short-out the fence results in the appropriate alarm being generated.

Inputs and outputs on the Fence Controller can be used with an external alarm system, siren, flood lighting, gate switch, or other devices of this nature.

The Fence Controller can operate in Standalone mode (configuration is controlled via the SW1 dipswitches), or in HBUS mode (configuration is received from Gallagher Command Centre).

The differences between the Fence Controllers are shown below.

	F5x Fence Controller		**F6x Fence Controller**	
	F51	**F52**	**F61**	**F62**
Fence Channels	**Single Zone**	**Dual Zone**	**Single Zone**	**Dual Zone**
Dual Pulse	✗	✓	✗	✓
High Voltage Mode (HV)	✓	✓	✓	✓
Low Voltage Mode (LV)	✓	✓	✓	✓
HVplus	✗	✗	✓ *	✓ *
Safety Extra Low Voltage (SELV) Ready	✗	✗	✓ **	✓ **
Smart Sync	✓	✓	✓	✓

* HVplus is excluded from EN variants due to EN and BSEN Standards limitations.

** Safety Extra Low Voltage (SELV) is intended as a post release software update.

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2.1 HVplus mode

HVplus is only supported on F6 Fence Controllers.

When an attack is detected on a fence, the Fence Controller will automatically transition to HVplus mode. HVplus mode increases the deterrent to around 10 kV for a period of 20 minutes. Only fences armed in High Voltage mode can transition to HVplus mode.

Notes:

- HVplus escalates both fences circuits on the F62 Fence Controller to 10 kV, except if a fence zone is disarmed or in Low Feel mode, in which case no change occurs for that fence only.
- To exit HVplus mode, the fence must be disarmed or changed to Low Feel mode.
- The 20-minute duration is maintained regardless of whether the original load on the fence that triggered the transition to HVplus mode remains in place or is removed, or whether any events occur on the other fence during that time.
- To re-enter HVplus mode, the voltage must have returned to normal and then a new attack occur.

Synchronization

HVplus mode is not persisted across synchronized Fence Controllers.

Temperature management

If the temperature measured within the Fence Controller unit is greater than 72 °C (162 °F) the Fence Controller will not transition to HVplus mode when an attack occurs. If an HVplus escalation is currently in progress, it is allowed to complete normally.

When powered by the battery

- If an attack occurs while the Fence Controller is running on the battery (mains failure has occurred) the Fence Controller will still enter HVplus mode.
- If the Fence Controller enters Stop mode from HVplus mode, the HVplus escalation is cancelled. Once pulsing resumes, it is in High Voltage mode (assuming the unit has remained armed in High Voltage mode throughout).

Service mode

- If the Fence Controller is in Service mode it will still transition to HVplus mode when an attack occurs.
- If the Fence Controller is in HVplus mode and Service mode is entered or exited, the Fence Controller will exit HVplus mode.

2.2 To get the best from your Fence Controller

To gain maximum performance from your Fence Controller it is recommended you use Gallagher accessories. Using Gallagher accessories will help you achieve a very reliable, high performance security system. Performance of the monitored pulse fence system may be impacted if using non-Gallagher fence hardware in conjunction with the F5/F6 Fence Controllers.

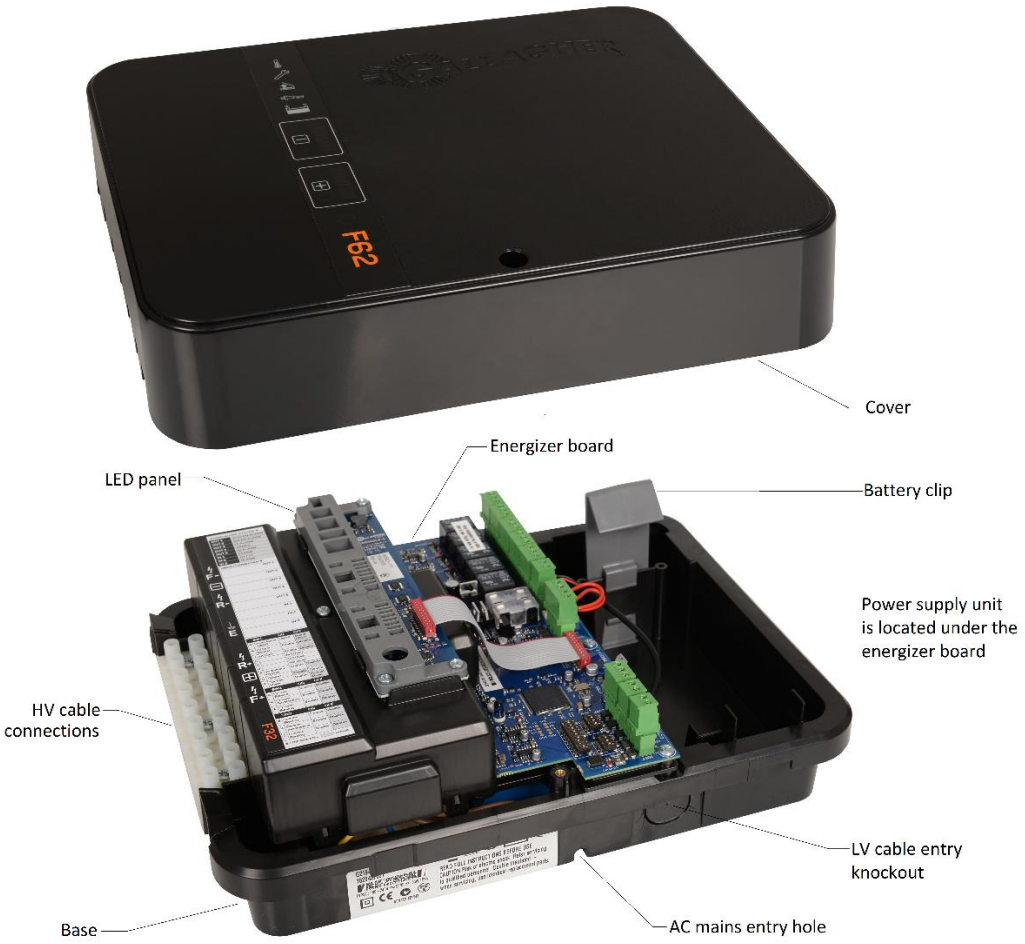
2.3 Carton Contents

Check the carton contains the following items:

- 1 x Fence Controller cover
- 1 x Fence Controller base assembly with fitted power supply unit (G21964)
- 1 x Bag of small components (4 wall plugs, 4 base screws, 1 battery lead, and 1 magnetic key)

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2.4 Fence Controller components



3 Important information

IMPORTANT: For full safety instructions refer to the printed leaflet ***3E6060 F5/F6 Fence Controller Safety Information***, packaged with the Fence Controller.

WARNING: This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

- DO NOT use non-rechargeable batteries while the fence controller is powered by mains.
- During charging, vented rechargeable batteries shall be placed in a well-ventilated area.
- WARNING: User only a detachable power supply unit that is listed as an accessory made available by Gallagher.

Authorised Use

- Installation must be performed by an authorised installer trained by Gallagher.
- This product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, unless they have been given supervision or instruction by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the fence energizer.
- After installation, a label with the installer's details and installation date must be attached to each energizer.

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Important Note

By default, a new Fence Controller is configured with dipswitch settings:

- **Switch 9 = OFF** (Standalone mode)
- **Switch 8 = OFF** (Secondary mode)

In Standalone mode, a newly installed Secondary Fence Controller that has not yet received an LV Sync bus ID from a Primary so will not pulse when the Fence Zones are armed. Once connected to a Primary via LV Sync, the Secondary will begin pulsing as expected when the Fence Zones are armed.

Similarly, in Command Centre configurations, if a new Fence Controller is set as a Secondary (dipswitch 9 = ON and Command Centre settings reflect Secondary mode), it will also not pulse until it receives an LV Sync bus ID from a Primary Fence Controller.

4 Installation

4.1 Introduction

Please read the safety warnings before you install this product.

SAFETY WARNINGS:

- This product must be installed in accordance with the 'Important Safety Information' provided with the Fence Controller or digital version: F5/F6 Fence Controller Safety Information.
- This product must be installed in accordance to the safety guidelines detailed in the document *"3E0654 Gallagher International Code of Practice - Perimeter Systems"*. This document can be downloaded from here: https://security-support.gallagher.com
- Ensure the product is fully assembled and all wiring has been completed, before turning the power on.
- This appliance is not intended for use by young children or infirm persons without supervision.
- Young children should be supervised to ensure that they do not play with the appliance.
- This energizer is fitted with polyvinyl chloride sheathed cords and should not be handled when the ambient temperature is below +5 °C (41 °F).
- Do not touch the HV connections (HV terminal block) when the AC mains power or battery is connected. Handle the Fence Controller using the long edge of the unit only.
- If it is required to temporarily disconnect power to the energizer, disarm the energizer before doing so. This will discharge the energy storage capacitors. Power can be reconnected at anytime.
  If power is removed from the energizer and the energy storage capacitors have not been discharged wait at least 45 seconds before reconnecting power. Re-connection of power at times less than 45 seconds may cause the energizer Fast Fire Protection to operate. If Fast Fire Protection operates this will prevent the energizer from producing pulses for up to 10 seconds and fence alarms will be produced.

4.2 Equipment you will need

Installation tools required are:

- 3.5 mm (1/8 in) drill bit
- 8 mm (5/16 in) drill bit (if using wall plugs/masonry)
- Power drill (hammer drill if mounting onto concrete)
- Phillips (cross head) screwdriver
- 0.8 mm (flat) screwdriver (for LV connections)
- Wire stripper (G20210) and wire cutters (G20211)

Additional components that are required to complete the installation are:

- Gallagher CAT 5e 4 twisted pair 24 AWG (0.2 mm^2) network cable (G10600) or HBUS cable
- Ducting and ducting end terminations
- System components such as leadout cable, earth stakes and fence components

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4.3 Procedure

Complete the following procedure to install the Fence Controller:

1. Choose a location

Choose a location to mount the Fence Controller. Considerations are:

- Mains power availability.
- The mains power wall socket switch must be accessible to authorised users.
- Should be mounted in a shelter that is both hidden from casual observers but allows frequent access.
- Weather and extreme temperature protection.
- During charging, the rechargeable battery requires a well-ventilated area.
- Sufficient space to accommodate the Fence Controller and Cable Manager(s) if used.
- Should be mounted as close as is practical to the fences it is connected to in order to minimise HV cabling requirements.
- The HBUS network length should not exceed 500 m (1640 ft) from the Gallagher Controller 6000.
- The LV sync network length should not exceed 1.2 km (3937 ft).

2. Consider temperature

This product generates heat. Careful consideration must be given to temperature increases, and the installation enclosure chosen for this product. Refer to section *"9. Temperature management"* later.

3. Remove one LV cable entry knockout

There are 3 circular LV cable entry knockouts located on the base. Carefully consider where the low voltage cabling will be entering the unit. Using a drill, remove the appropriate LV cable entry knockout.

Note: The Gallagher Cable Manager (G21965) can be used to expand the low voltage cable area. The Cable Manager can also be used to house Gallagher I/O Expansion products.

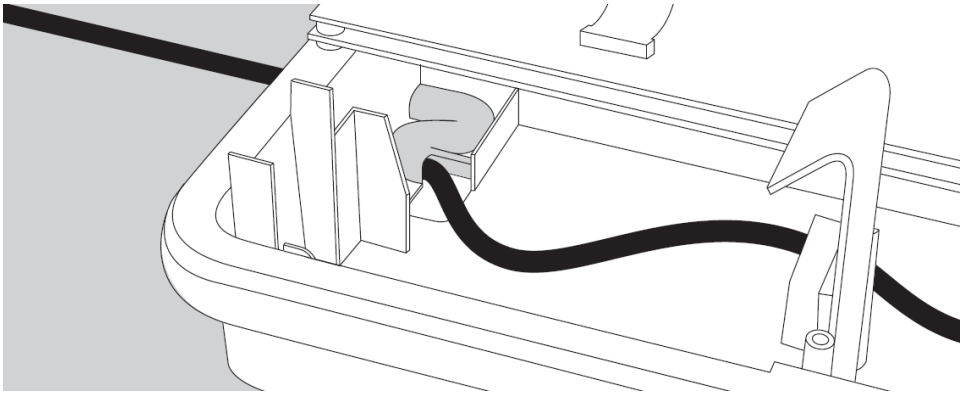
4. Mark the wall

Using the installation template on the back of the carton as a guide, drill all four mounting holes using a 3.5 mm (1/8 in) drill bit.

If mounting the base on a concrete or brick wall use an 8 mm (5/16 in) drill bit, a hammer drill, and the masonry plugs provided.

5. Insert the mains power cord

Insert the mains power cord (supplied by your approved Gallagher distributor) into the mains entry hole and "S Bend" strain relief.

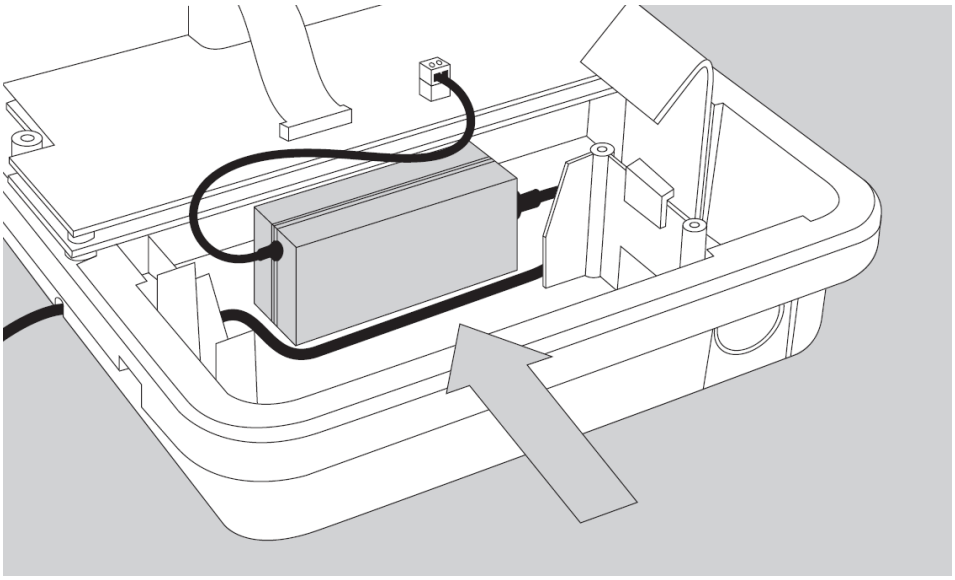


6. Connect the power supply unit

Pull out the power supply unit (G21964), located under the energizer board and plug the power cord into the figure 8 socket. Return the power supply unit to its original position.

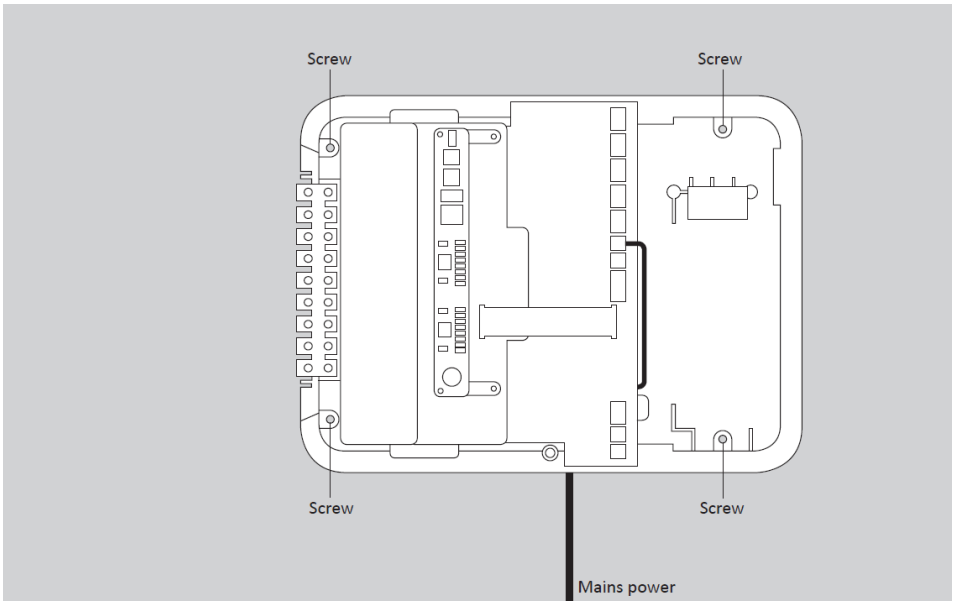
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DO NOT plug into the mains power. DO NOT turn on the mains power.



7. Mount the Fence Controller

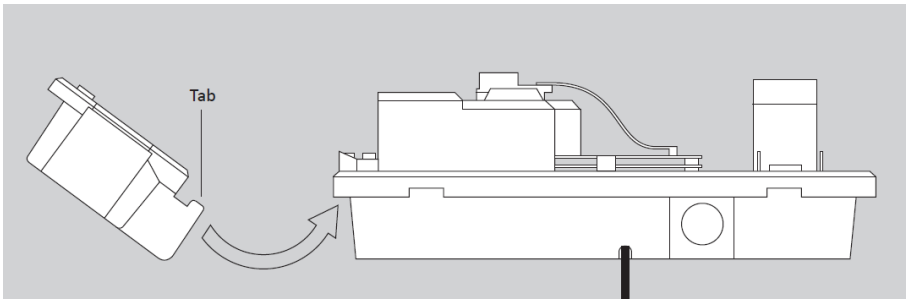
Using the four screws provided, mount the Fence Controller to the mounting surface. Ensure the unit is flush with and tight against the mounting surface.



8. Mount the Cable Manager

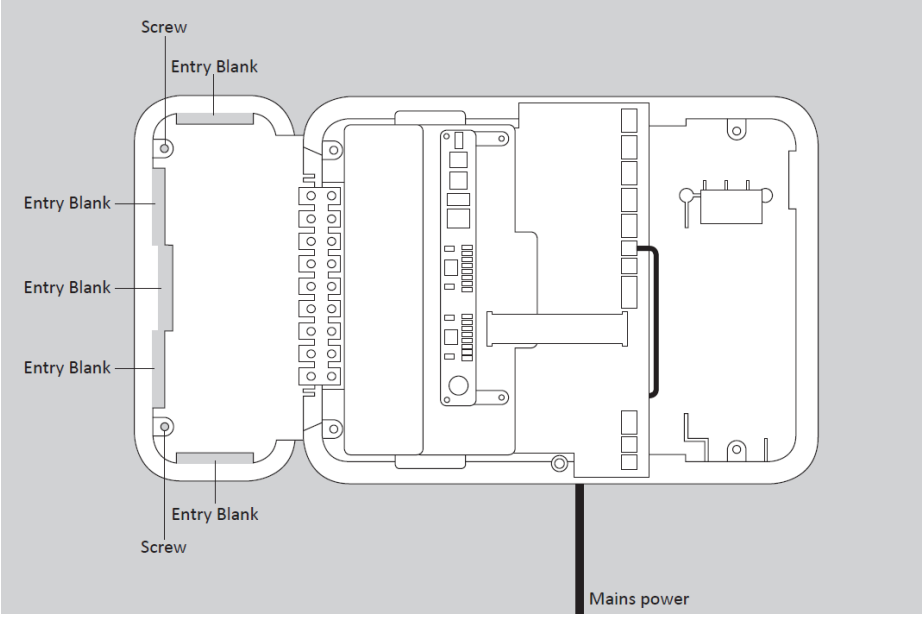
If using the Gallagher Cable Manager (G21965), attach the Cable Manager to the Fence Controller.

1. Angle the Cable Manager so that the tabs enter below the Fence Controller lip.



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2. Push the Cable Manager down, so that it is flush and tight against the mounting surface. Secure the Cable Manager to the mounting surface, using the two screws provided.



3. Remove the appropriate Entry Blank, enabling wires to enter the Cable Manager. These blanks can accept up to 38 mm (1½ in) conduit and have drill start points to assist with fitting.
   Note: The Cable Manager can be fitted to either end of the Fence Controller and used to route cables or house Gallagher ¼ or ½ footprint PCB modules.

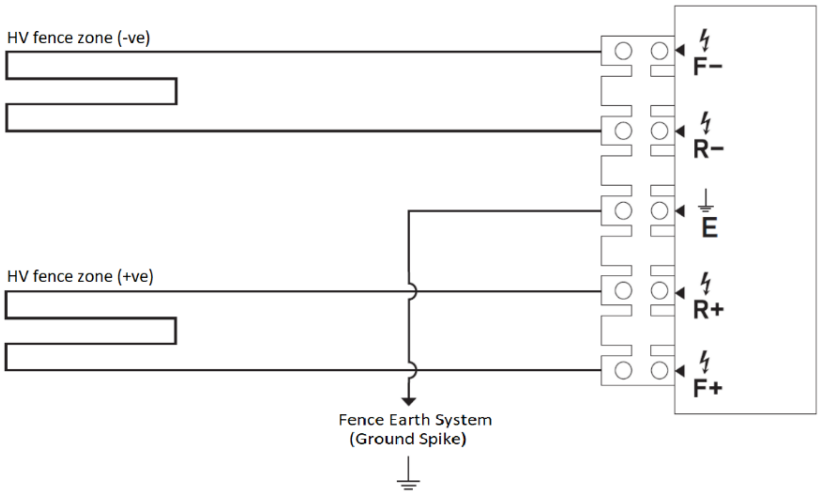
9. Connect the HV cables

Strip 25 mm (1 in) of sheathing off the end of each cable. Connect the HV cables to the terminal block. The terminal block has two screws per input/output. Screw down **both screws** to firmly secure the HV cable.

Construct the fence as detailed in document *"3E0901 - Technical Reference Manual - Perimeter Systems"*. This document can be downloaded from here: https://security-support.gallagher.com

Notes:

- Connect the earths of multiple Fence Controllers together.
- HV fence cables should be kept separate from all other cable types. The HV cable entry can accommodate up to 38 mm (1½ in) round conduit.



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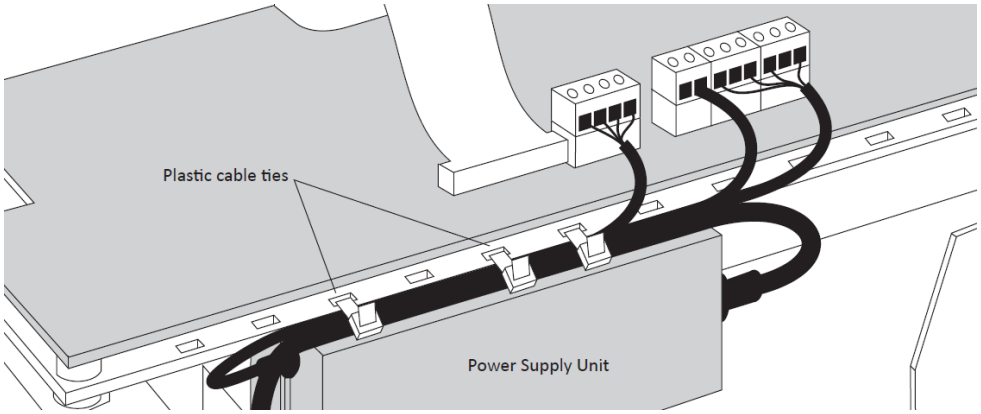
10. Connect the LV cables

Insert the low voltage cables through the LV cable entry knockout and connect to the appropriate connections.

Use plastic cable ties to secure the low voltage cables to the PCB shield (located directly below the PCB). Slots have been provided within the PCB shield.

Notes:

- If synchronising the pulse rate for multiple Fence Controllers, connect the LV sync network cable.
- The number of Inputs and Outputs available is determined by the Fence Controller type.



11. Set the SW1 dipswitches

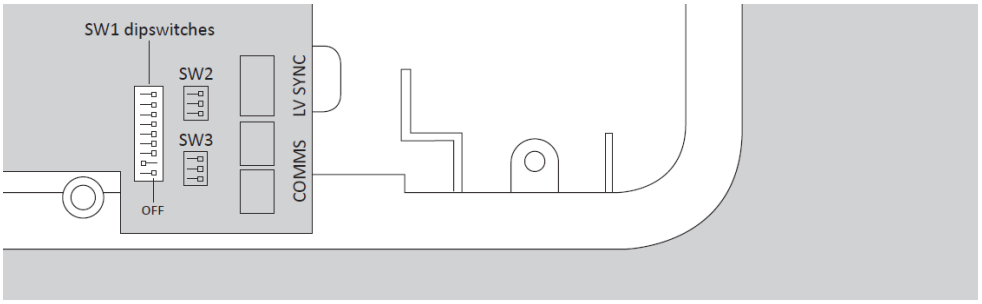
To operate in Standalone mode, ensure SW1 dipswitch 9 is set to OFF (this is the default). Configuration will be controlled using the SW1 dipswitches.

Note: When in Standalone mode the Comms LED will be off at all times.

To operate in HBUS mode, set SW1 dipswitch 9 to ON, power cycle the Fence Controller and ensure the HBUS network cable is connected. Configuration will be controlled from Command Centre.

Refer to section *"6. DIP Switch Settings"* later in this installation note for more information.

SW1 dipswitch location



12. Termination and bias

LV Synchronization network

The LV sync network is used to synchronize the pulse rate for multiple Fence Controllers. If using the LV sync network, it is very important to correctly terminate the RS-485 bus by using the DIP switch (SW2) to engage the termination resistor on the appropriate energizer. Incorrect termination is likely to cause failure in the synchronization signals and require the energizers to reduce their pulse power. Refer to section *"12.1 LV Synchronization"* later in this installation note for additional information.

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HBUS network

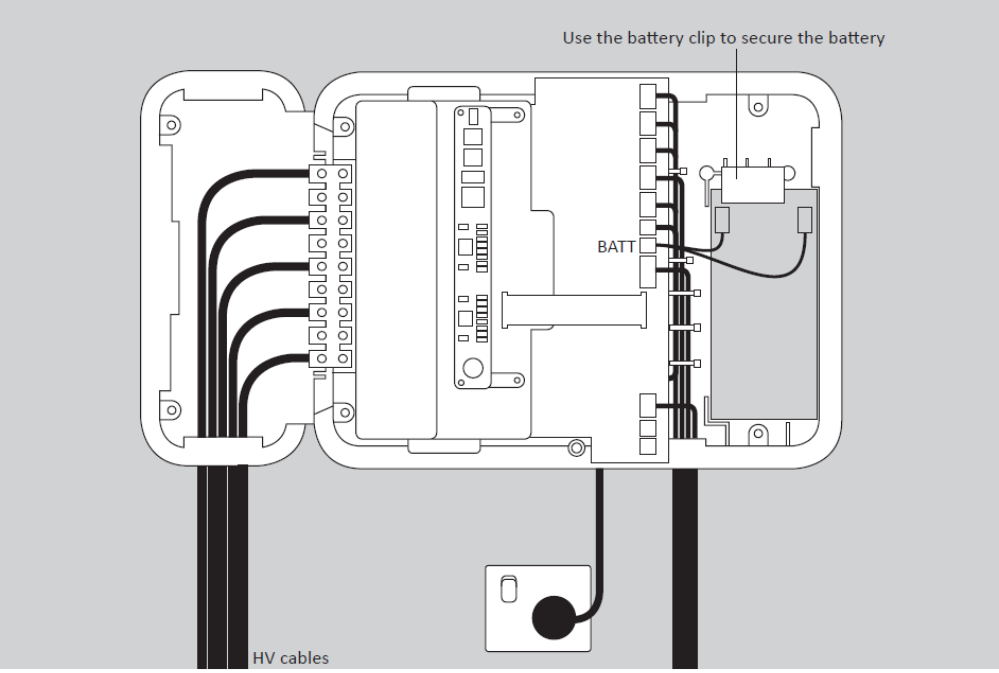
If operated in HBUS mode (the Fence Controller is connected to a Gallagher Controller 7000), terminate the end devices on the HBUS network. Refer to section *"11.3 HBUS termination"* later in this installation note. The Controller 7000 and HBUS Module has built in bias.

13. Power on

Place the battery (12V 7Ah valve regulated lead acid battery) provided by your approved Gallagher distributor into the base.

Connect the battery lead provided. Connect the black wire to the battery negative terminal. Connect the red wire to the battery positive terminal.

Plug the battery lead connector into the BATT connection located on the energizer board. Plug the mains power cord into the wall socket and switch on.





SAFETY WARNING: The Fence Controller is on when it receives power from the mains power supply, internal battery, or an external power source.

Anytime the Fence Controller is on, the deterrent will be present, (i.e. anyone touching the fence or HV wires will receive a short, sharp, but safe shock).

14. If operated in HBUS mode, configure in Command Centre

Configure the Fence Controller in Command Centre. Refer to *"Configuring an F3x/F4x/F5x/F6x Fence Controller"* in the Command Centre Configuration Client Online Help.

Note: The F5/F6 Fence Controller can only be used with Gallagher Command Centre vEL9.40 software (or later). Earlier versions of Command Centre do not support this product.

15. Tamper calibration

Calibration of the on-board tamper detector will occur when one of the following conditions is met:

Note: Once the countdown timer for tamper re-calibration has started, if any SW1 dipswitch subsequently changes during the countdown period, the timer is restarted.

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Standalone mode

Dipswitch	Action
Dipswitch 2 ON	60 seconds after dipswitch1 has been changed from ON to OFF.
Dipswitch 2 ON	10 seconds after power up.
Dipswitch 1 OFF	60 seconds after dipswitch 2 has been changed from OFF to ON.

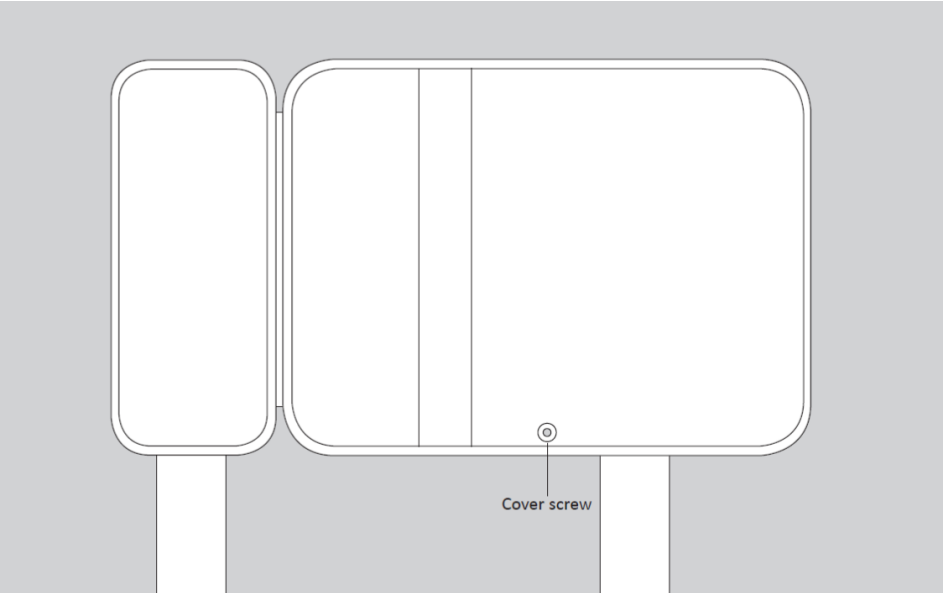
Note: When in Standalone mode the Comms LED will be off at all times so that it doesn't affect tamper calibration.

HBUS mode

When the Disable Tamper checkbox in Command Centre…	the tamper will be re-calibrated…
remains unchecked	either: • 60 seconds after dipswitch 1 has been changed from ON to OFF when the **Allow use of Service Mode for local control** checkbox is checked in Command Centre. • 10 seconds after power up. • 10 seconds after a **Reset** override has been performed on the Fence Controller in Command Centre.
is unchecked	10 seconds after.

16. Mount the cover

Mount the cover by clicking it into place. Secure the cover using the screw provided. If using the Cable Manager, mount the Cable Manager cover.



17. Test the fence

Test the fence by creating a connection between the pulse and earth wire. An alarm will occur within 4 seconds of this connection.

Note: This is a temporary connection and can be created by hanging a bent piece of wire between the pulse and ground wire. During this process the fence should NOT be touched, as it will provide a short, sharp but safe shock.

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To reset:

1. Turn the energizer off (mains power and battery power).
2. Remove the piece of wire.
3. Turn the energizer back on and ensure that the LEDs are flashing in time with the pulse.

18. Reset inactive alarms

To reset inactive (historic) alarms, perform one of the following actions:

Note: Inactive alarms will automatically reset 5 days after alarm restoral, (i.e. returned to normal).

- Present the magnetic key to either fence zone icon "-" or "+".
- Power cycle the Fence Controller (disconnect both mains power and battery).
- Perform a **Reset** override on the Fence Controller in Command Centre.

19. Remove the clear overlay

Remove the clear overlay, located above the icons on the Fence Controller cover.

5 Cover icons

Icons are used to indicate the system and fence zone status. The icon will flash red (1 flash/second) when an active alarm is present. The icon remains solid red when an inactive (historic) alarm exists.

Icon	LED State	Diagnostic Indication
	1 Flash (Red)	Over-temperature alarm. The internal temperature is greater than 75 °C (167 °F). Once the internal temperature drops to below 65 °C (149 °F) the over-temperature alarm restores.
	1 Flash (Red)	Service alarm (internal module failure has occurred or the Service Mode SW1 dipswitch 1 has been set to ON).
	1 Flash (Red) Fast Flash (Red)	Tamper alarm (indicates cover has been removed). The tamper re-calibration countdown is in progress.
	1 Flash (Red)	Mains power supply failure alarm.
	1 Flash (Red)	Battery test failed or battery missing alarm.
HV	On (Orange)	Fence zone is in High Voltage mode.
LF	On (Orange)	Fence zone is in Low Feel mode.
	1 Flash (Red)	Fence zone alarm (-ve).
	1 Flash (Red)	Fence zone alarm (+ve).
	Pulsed (Orange)	Provides an indication of the measured return voltage delivered from the previous pulse. If all the LEDs are lit, then the return voltage is at or near its designed maximum. Even in an alarm situation one LED will be lit if pulses are being delivered to the fence.

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Icon	LED State	Diagnostic Indication
	Off	**No synchronization signal is present.** Unit is configured as an LV Sync Primary with HV Sync disabled. • This is **normal operation if** the fence system contains only one energizer. • This is **incorrect operation if** the unit is connected to Secondaries, (i.e. Secondaries are not being detected).
	Long Green (3925ms Green/ 75ms off)	**Correct operation.** All expected synchronization mechanisms are being received. • As an LV Sync Primary, all known Secondaries are responding. • As an LV Sync Secondary, it is receiving synchronization from the Primary. • If HV Sync is enabled (whether internal or external, Primary or Secondary), the HV source is being received.
	Green for (500ms) after each pulse is received. Otherwise, off. Red LED should reflect any alarm state	**HV Sync Pulse Received.** • If HV Sync is enabled (whether internal or external, Primary or Secondary), the HV source is being received. • For **Internal** HV Sync - If sync is not received for too long, it goes to **Active Sync-Lost Alarm**.
	Moderate Flashing Green 1.6Hz (400ms Green/ 200ms off)	**Acceptable operation.** • **External** HV Sync enabled but not present.
	Moderate Alternating 1.6Hz (200ms Green/ 400ms Red)	**Waiting for LV Sync Initialization.** • Primary is discovering Secondaries. • Secondary waiting to receive an LV Sync BusID. • Bus Map is being erased or refreshed.
	Moderate Flashing Red 1.6Hz (400ms Red/ 200ms off)	**Active Sync-Lost Alarm.** • **Internal** HV Sync enabled but not present (Primary or Secondary) • Is an LV Sync Secondary but sync signal is not present. • Is an LV Sync Primary but response from one or more Secondaries is no longer being received.
	Fast Flashing Red 3.3Hz (100ms Red/ 200ms Off)	**Pulse Power Limited - Due to own lost sync.** • Unit has entered Restricted Energy Mode and pulse output power is restricted. • Any reason for Sync-Lost Alarm has persisted beyond the configured wait period.
	Fast Alternating 3.3Hz (200ms Green/ 100ms Red)	**Pulse Power Limited - Commanded by LV Sync.** • Unit has entered Restricted Energy Mode and pulse output power is restricted. • LV Sync Primary is sending synchronization signal that specifies using restricted pulse power.
	Long Red (1925ms Red/75ms off)	**Historical Alarm.** • Alarm condition has resolved, but the alarm notification has not been cleared. • Sync-Lost Alarm occurred but sync has been restored.

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6 DIP Switch Settings

#	SW1	ON	OFF
9	Comms Mode	The Fence Controller will operate in HBUS mode. Configuration is received from Command Centre. Dipswitches 2-8 are ignored. After setting this dipswitch power cycle the Fence Controller.	**Default:** The Fence Controller will operate in Standalone mode. Configuration is controlled using dipswitches 1-8.
8	LV Sync Primary	The Fence Controller is the LV synchronization primary.	**Default:** The Fence Controller is an LV synchronization secondary.
7	HV Sync	Positive channel used for HV synchro-nization input. Applies to Primary and Secondary Fence Controllers. Refer to section *"12.6 HV Synchronization"* later for additional information.	**Default:** The HV synchronization input is not being used. The positive channel is available for pulse output.
6	Future Use	Unused (available for custom firmware)	**Default:** Unused.
5	HVplus	**Default:** HVplus mode enabled.	HVplus mode disabled.
4	Future Use	Unused (available for custom firmware)	**Default:** Normal operation.
3	Int Battery Bypass	Using an external battery. Battery monitoring is supported.	**Default:** Using an internal battery. Battery charging, testing and monitoring is supported.
2	Tamper	**Default:** Optical tamper is enabled.	The optical tamper is disabled.
1	Service Mode	The Fence Controller is in Service Mode. Both fence zones are initially disarmed. The Fence Controller no longer responds to input state changes or Command Centre to arm or disarm the fence zones.	**Default:** The Fence Controller is in normal operating mode. The fence zones immediately follow the status set by the inputs or Command Centre.

7 F5/F6 Comms LED

When in HBUS Mode, (i.e. Command Centre connected):

LED Flash Patterns	F5/F6 Status
1 Flash 1Hz: 500ms on, 500ms off	Configured to a Controller and Normal working state
2 Flash 50ms on, 400ms off with a 1.2s gap between sequences	Comms established, not configured
3 Flash 50ms on, 400ms off with a 1.2s gap between sequences	No comms connection to the F5/F6 Controller
4 Flash 50ms on, 400ms off with a 1.2s gap between sequences	Fault Detected - Unit Replacement Required. The Functional Microcontroller is not communicating with the Safety Microcontroller. Please contact Gallagher Support for further assistance.

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When in Standalone Mode:

LED Flash Patterns	F5/F6 Status
1 Flash 1Hz: 500ms on, 500ms off	Normal working state
4 Flash 50ms on, 400ms off with a 1.2s gap between sequences	Fault Detected - Unit Replacement Required The Functional Microcontroller is not communicating with the Safety Microcontroller. Please contact Gallagher Support for further assistance.

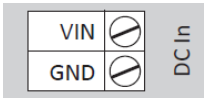
8 Power and battery management

8.1 Int Battery Bypass SW1 dipswitch 3

Dipswitch 3 controls how power and battery management is handled by the Fence Controller.

	Dipswitch 3 ON	**Dipswitch 3 OFF**
	Select if using an external battery. The Fence Controller expects a DC In and BATT voltage range between 12-15.75 V.	Select if using an internal 12 V 7Ah battery. The Fence Controller expects a DC voltage range between 12-15.75 V.
Battery charging	✘	✓
Battery testing	✘	✓
Battery monitoring	✓	✓

8.2 Connections

Power Supply		Ensure the power supply is connected to the **DC In** connection. This connection has a 5 A fuse that will blow if there is a fault on the energizer board.
Battery		Connect the battery cable to the **BATT** connection. This connection has a 5 A fuse that will blow if the battery terminals are reversed, or if there is a fault with the battery or energizer board.

8.3 Power Save mode

The Fence Controller will enter Power Save mode when one of the following conditions is met:

	Dipswitch 9	**Dipswitch 3**	**Power Supply**	**Result**
Condition 1	OFF	ON	DC In and BATT ≤ 11.5 V for 7-10 seconds	Go Slow mode is entered (the Fence Controller will skip every alternative pulse). A power failure alarm is raised and active.
Condition 2	OFF	OFF	DC In failed and BATT ≤ 11.5 V for 7-10 seconds	
Condition 3	ON	ON or OFF	DC In failed for ≥ 30 seconds	Power Save mode is entered. In Command Centre Power Save mode can be configured for either Go Slow mode (skip every alternative pulse) or Low Feel mode.
Condition 4	ON	ON or OFF	DC In and BATT ≤ 11.5 V for 7-10 seconds	

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Note: Power Save mode is enforced even if the Fence Controller is part of a synchronized system. If the primary Fence Controller enters Power Save mode, the secondary Fence Controllers will pulse synchronized by the primary at the normal pulse rate and voltage.

8.4 Stop mode

The Fence Controller will enter Stop mode when one of the following conditions is met:

	Dipswitch 9	Dipswitch 3	Power Supply	Result
Condition 1	OFF	ON	DC In and BATT ≤ 11 V for 7-10 seconds	Stop mode is entered (pulsing is stopped). If a fence zone is armed, a fence zone alarm is raised and active.
Condition 2	OFF	OFF	DC In failed and BATT ≤ 11 V for 7-10 seconds	
Condition 3	ON	ON or OFF	DC In and BATT ≤ 11 V* for 7-10 seconds	Stop mode is entered (pulsing is stopped).

* This value is configurable in Command Centre.

8.5 Battery selection

The Fence Controller is designed to house a 12 V 7Ah valve regulated lead acid battery.
The internal battery dimensions are:

- 151 mm (6 in) long,
- 65 mm (2.6 in) wide, and
- 97.5 mm (3.85 in) high (including the terminals)
  Terminals to be Faston tab 250, 6.35 mm (0.25 in) wide.

Warnings:

- Non-rechargeable batteries should not be used while the Fence Controller is powered by the mains.
- A battery larger than 7 Ah must not be used with the internal charging functionality of the Fence Controller.

8.6 Battery replacement

Remove power from the Fence Controller (disconnect the mains power supply) before removing the old battery. Dispose of the old battery in a safe manner, refer to *"Battery disposal"* next.

Power cycling the Fence Controller after a battery replacement will clear the active battery alarm and schedule the next battery test to occur in approximately 24 hours. If you do not power cycle the Fence Controller the battery alarm will remain active until the next successful battery test. This may take up to 14 days.

Note: You should ensure the replacement internal battery is fully charged to avoid site security being compromised from a mains failure occurring before the replacement battery has had time to charge.

8.7 Battery disposal

- Leaking batteries should be removed. Avoid contact with any leaked material.
- Contact your local battery agent for advice and assistance in the safe disposal of your battery.
- The battery must be removed from the Fence Controller before it is scrapped.

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8.8 Battery charging

The Fence Controller includes an internal battery charger. There are three modes of operation:

1. *Trickle Charge*
   This is initiated if the battery voltage is less than or equal to 10 V.
2. *Bulk Charge*
   This is initiated if the battery voltage is greater than 10 V.
3. *Float Charge*
   Float charge occurs when the bulk charge has raised the battery voltage to the fully charged condition. This float voltage varies with temperature to match the temperature versus voltage characteristics of the lead acid battery.

A battery discharged to 11.25 V will take approximately 19 hours to fully charge.

8.9 Battery test alarm level

The battery test alarm level used in Standalone mode defaults to 11.5V. In Standalone mode if the battery voltage drops below the configured Test Level (Default = 11.5 V) during the battery test, the System alarm relay is triggered.

The battery test alarm level in Standalone mode can be changed as follows:

1. Turn dipswitch 9 ON and power cycle the Fence Controller.
2. Connect to a Controller 7000 using HBUS, and configure the Fence Controller in Command Centre.
3. Under the Fence Controller item's **Alerts** tab adjust the "Test Level (Volts)" number to around 11.7 or 11.8V and **Apply** the changes.
4. Disconnect the Fence Controller from the Controller 7000.
5. Turn dipswitch 9 back OFF again and power cycle the Fence Controller again.

8.10 Automated battery testing

The Fence Controller will automatically test the internal battery. When a battery test is due the Fence Controller stops charging the battery and switches to being powered from the battery. The battery voltage is then measured over a 30 minute test period.

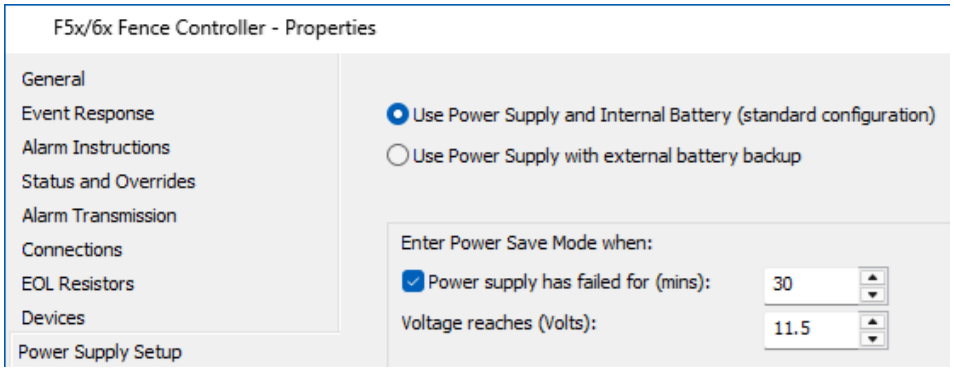
The battery test is initiated 24 hours after the Fence Controller has started (power up) and then approximately every 14 days there-after. To initiate the test, at least one fence zone must be armed and the battery present (if not, will retry in 2 hours).

8.11 Manual Battery Test Override

A Battery Test can be manually initiated for Fence Controllers configured in Command Centre only.

The Fence Controller must be configured in Command Centre with the "Use Power Supply and Internal Battery (standard configuration)" option on the Fence Controller's **Power Supply Setup** tab:

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To initiate a manual Battery Test:

1. Arm the Fence Zone(s) – battery tests can only be initiated if at least one Fence Zone is pulsing.
2. In Command Centre, open the Fence Controller's **Status and Overrides** tab.
3. From the 'Override' drop down menu, select the 'Initiate Battery Test' option.
4. Click the **Override Now** button.
5. Wait for the battery test to complete (approximately 30 minutes).
6. When the test has completed successfully, a 'Battery Test Succeeded' event is generated.

8.12 Battery and temperature

The ambient temperature surrounding the battery is approximately 13 °C (55 °F) (landscape orientation) higher than the ambient temperature surrounding the Fence Controller unit.

The ambient temperature surrounding the battery must be taken into account when selecting the battery for inclusion in the Fence Controller. For example, if the Fence Controller unit is operating in an ambient temperature of 50 °C (122 °F) the battery selected must be capable of operation at 60 °C (140 °F).

Note: Higher temperatures severely shorten battery life. For example, if the expected battery life of a battery is 2 years at 20 °C (68 °F) then this is reduced to 3 months at 60 °C (140 °F).

8.13 Battery venting

There is ventilation with a free area equal to 1.3 cm^2 within the Fence Controller enclosure.

There is no equipment which generates flames, sparks, arcing or glowing devices (max surface temp 300 °C) within 61 mm of the battery vents on the 7Ah battery. This measurement has been taken from the battery to the centre of the 5 A glass fuse. A vertical divider can be placed between the battery and the fuse to increase this distance, if required.

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9 Temperature management

The Fence Controller is equipped with an on-board temperature sensor. This sensor is located near the microcontroller and measures the internal temperature within the Fence Controller unit.

The ambient temperature operating range without loss of performance is:

Landscape orientation	Portrait orientation
-20 to +50 °C (-4 to +122 °F)	-20 to +40 °C (-4 to +104 °F)

The following table shows how the internal temperature of the Fence Controller responds to ambient temperature increases.

Internal measured temperature	Approximate ambient temperature per unit orientation	Comment
40 °C (104 °F)	16 °C (61 °F)	
60 °C (140 °F)	Landscape 37 °C (99 °F) Portrait 26 °C (79 °F)	**High temperature** status value. This value is applicable for Command Centre only. This value is configurable in Command Centre. When this value is exceeded, the Fence Controller can be configured to automatically trigger a relay to activate a fan or other cooling method. When the temperature has dropped by 10 °C (50 °F) below this value, the relay switches off.
75 °C (167 °F)	Landscape 52 °C (126 °F) Portrait 41 °C (106 °F)	**Very high temperature** status value. An over-temperature alarm is raised (temperature icon flashes red) and an alarm is generated in Command Centre. The Fence Controller will skip every alternative pulse (Go Slow mode). **Note:** In Command Centre Power Save mode can be configured for either Go Slow mode (skip every alternative pulse) or Low Feel mode. Once the internal measured temperature drops to below 65 °C (149 °F) the Fence Controller exits Power Save mode, the over-temperature alarm restores, and the system alarm relay returns to its normal state (assuming no other system alarm conditions are active).
85 °C (185 °F)	Landscape 62 °C (144 °F) Portrait 51 °C (124 °F)	**Critical temperature** status value. An alarm is generated in Command Centre. The Fence Controller enters Stop mode (cease producing pulses).

The following conditions apply to the above tables:

- All Fence Channels are functioning at maximum output with a pulse period of 1.1 seconds.
- The internal battery is being charged at the maximum current.
- The power supply unit is fitted within the Fence Controller unit.
- All relay coils are powered.
- 0.7 A is drawn from the COMMS +ve connection.

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10 Inputs

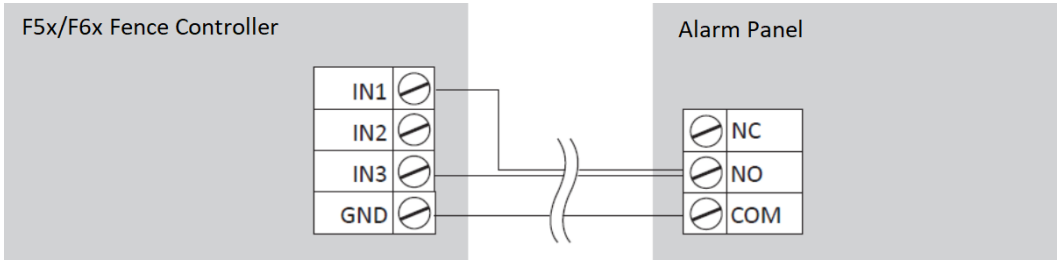
When in HBUS mode the input connections are configured in Command Centre. When in Standalone mode the input connections control the fence zone as follows:

Input	Input open (default)	Input closed
IN1	Fence zone (-ve) disarmed	Fence zone (-ve) armed
IN2	HV mode (both zones)	Low Feel mode (both zones)
IN3	Fence zone (+ve) disarmed	Fence zone (+ve) armed

Cabling should be a minimum size of 24 AWG (0.2 mm^2) for all input connections.

10.1 Using common control inputs

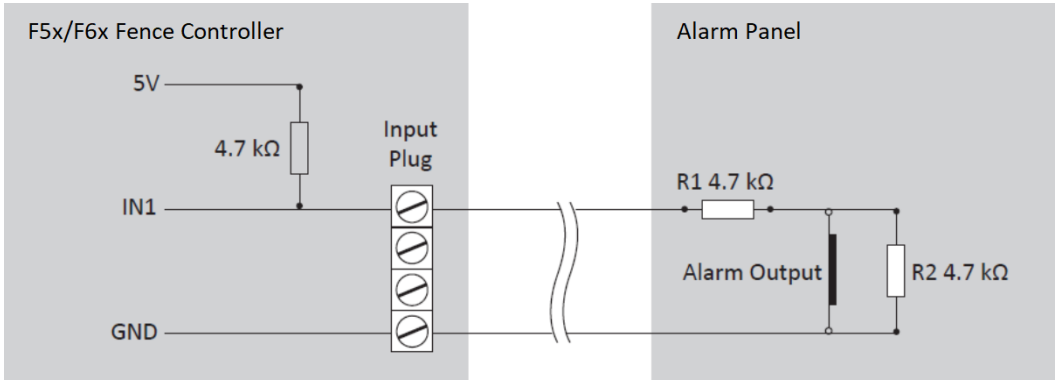
You may choose to common the zone control inputs on the Fence Controller, so that one relay on the alarm panel can be used to control (arm/disarm) both fence zones simultaneously.



10.2 Using balanced input (EOL resistors): HBUS mode only

To ensure correct tamper detection (short or open circuit), balanced inputs require 4.7 kΩ resistors to be connected as close as possible to the device being monitored.

When the monitored device incorporates a normally-closed (N/C) tamper switch, it can be wired in series with resistor R1.



If the Fence Controller is connected to a Gallagher Controller 6000, configure the resistor values using the Command Centre software (via the EOL Resistors property page). Refer to *"Configuring EOL Resistors for devices"* in the Command Centre Configuration Client Online Help.

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10.3 Relays

When in HBUS mode the output connections are configured in Command Centre. When in Standalone mode the output connections are used to indicate the system status as follows:

Output	System status
OUT 1	System alarm (battery missing, battery test failure, tamper, over-temperature, LV sync secondary-signal loss, conflicting sync primaries, Service Mode enabled, or safety microcontroller (SMCU) fault). **Note:** Fence alarms are not raised by output 1. Entering Power Save mode does not raise a system alarm.
OUT 2	Power supply failure alarm.
OUT 3	Fence zone alarm (-ve).
OUT 4	Armed indication: on if either zone -ve or zone +ve is armed. Otherwise off.
OUT 5	Fence zone alarm (+ve).

10.4 Relay operation

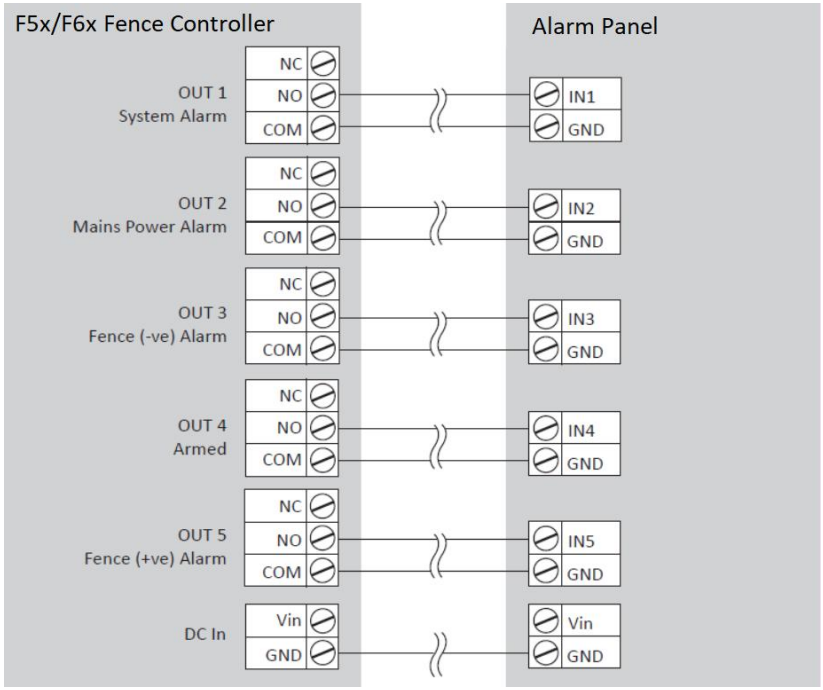
The relays 1, 2, 3 and 5 operate in "mimic" mode, (i.e. follow the alarm condition). These relays are connected as shown in the following table.

Alarm state	Relay power	Connection
No alarm	ON	N/O (normally open) is connected to C (common) when the relay is on
Alarm	OFF	N/C (normally closed) is connected to C (common) when the relay is off

Note: Relays 1, 2, 3 and 5 are powered when in the "No alarm" state so that if the Fence Controller loses power altogether (mains failure followed by battery failure), the outputs will indicate this as an alarm condition.

10.5 Using separate alarm panel inputs

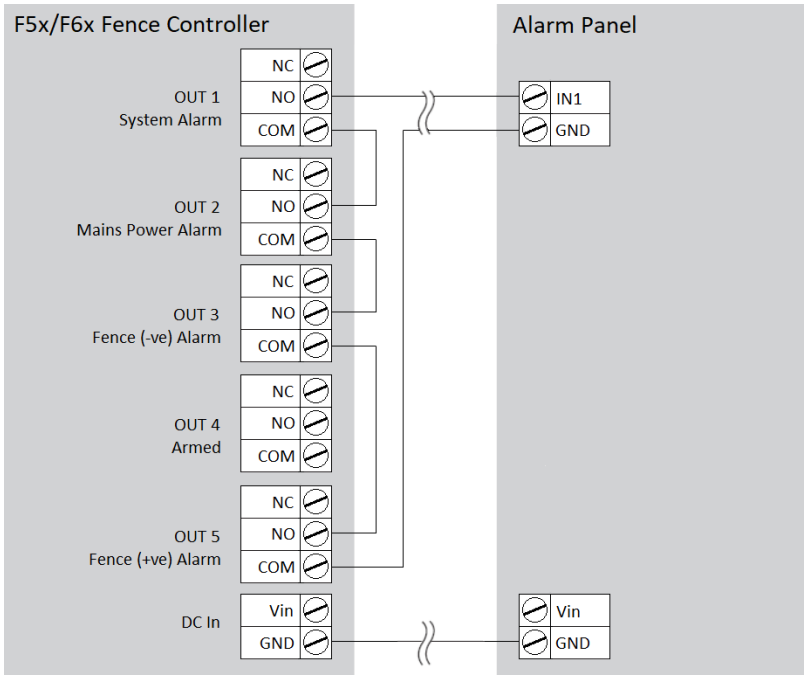
Each alarm panel input is triggered by a separate relay output.



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10.6 Using a single common alarm panel input

The single alarm panel input is triggered by any relay output.



11 Comms

The Fence Controller can be operated in HBUS mode, by connecting it to a Gallagher Controller 7000. The Fence Controller uses the encrypted HBUS communications protocol to communicate with the Controller 7000. The HBUS communications protocol is based on the RS485 standard and allows the Fence Controller to communicate over a distance of up to 500 m (1640 ft) from the Controller 7000.

Note: If the Fence Controller has been powered on in Standalone mode (SW1 dipswitch 1 is OFF), then switched to HBUS mode (SW1 dipswitch 1 is set to ON) you will need to power cycle the Fence Controller in order to connect to Command Centre.

11.1 HBUS cable

The recommended cable type for optimal HBUS performance is CAT 5e 4 twisted pair 24 AWG (0.2 mm^2) network cable. Two data wires (HBUS A and HBUS B) and a third common ground wire (-ve).

11.2 HBUS network topology

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).

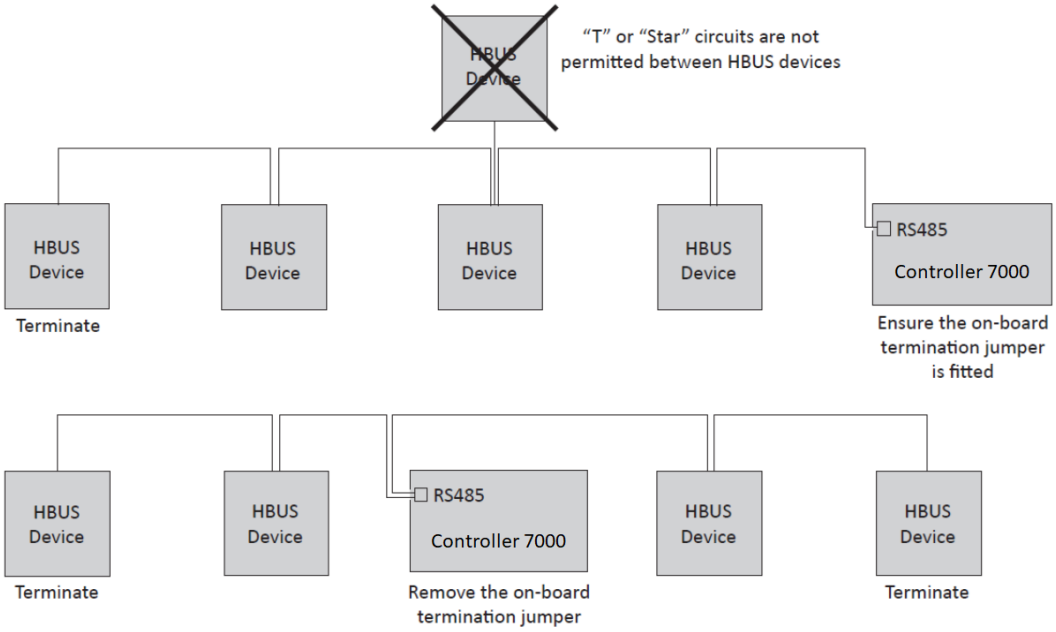
11.3 HBUS termination

The end devices on the HBUS network should be terminated using 120 Ω resistance.

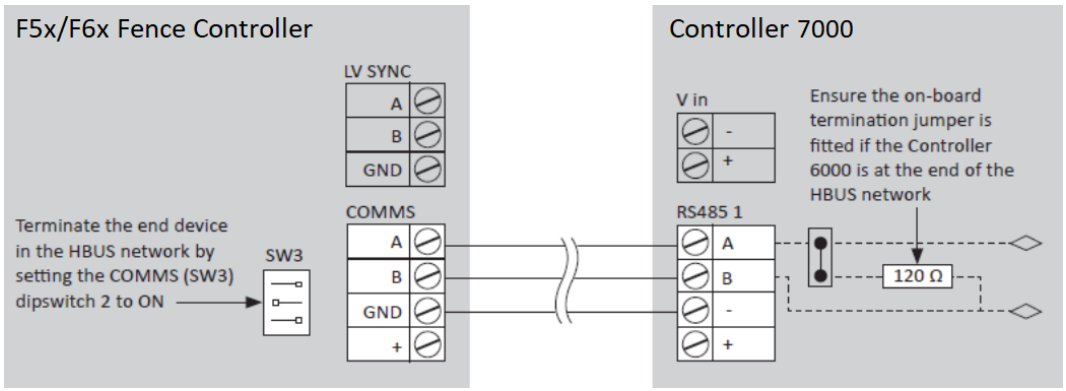
To terminate the Fence Controller set the COMMS SW3 dipswitch 2 to ON. To terminate at the Gallagher Controller 7000, ensure the on-board termination jumper is fitted for the appropriate

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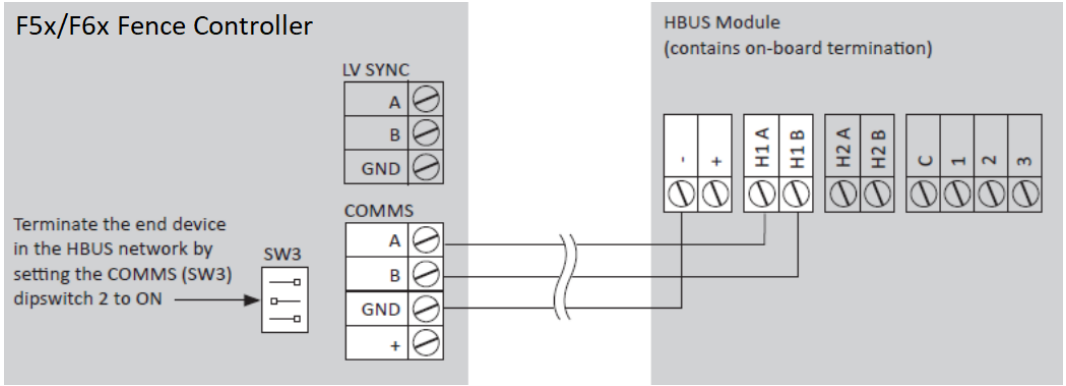
RS485 port. Termination is already included at the HBUS Module, (i.e. each HBUS port is permanently terminated at the module).



11.4 Connecting to the Controller 7000



11.5 Connecting to the HBUS Module (attached to the Controller 7000)



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12 Synchronization

Synchronization ensures that any electric fences that can be touched at the same time, in the entire fence system, pulse at exactly the same time. This complies with safety requirements intended to prevent causing cardiac fibrillation and allows a person to release their grip on the fence before the next pulse arrives.

If, for any reason, synchronization cannot be guaranteed, energizers are required to enter "Restricted Energy Mode" by reducing their output power to 1.2 Joules per second until synchronization is re-established.

There are There are two types of synchronization: LV (Low-Voltage) and HV (High-Voltage).

Notes:

- The 'Primary' is the fence controller providing the synchronization signal to all Secondary fence controllers connected.
- The 'Primary' with external HV' is the primary synchronization fence controller, providing the synchronization signal only when an external High voltage signal is not present.
- The 'Secondary' fence controller receives the sync signal to time its pulse against.
- "HV Primary" means an LV Sync Primary that synchronizes itself and the Secondaries to the pulses received on its HV input.

12.1 LV synchronization

Low Voltage Synchronization (LV Sync) uses RS-485 communication (via copper or fiber-optic) to synchronize one or more fence controllers. The primary Fence Controller transmits a small data packet to the Secondary Fence Controllers and the Secondary Fence Controllers reply with acknowledgment packets to the Primary.

If synchronization is lost between two or more fence controllers, all controllers within the LV Sync network will automatically enter "Restricted Energy Mode" (1.2J).

Note: LV synchronization can be used to synchronize F31, F32, F41, F42, F51, F52, F61 and F62 fence controllers together within one system when installed according to a 'Permitted Configuration'.

Where an F5 or F6 series fence controller is to be used in an existing installation, the installer must refer to section *"13. Permitted Installation Scenarios"*, and comply with one of the allowed connection methods. Failure to comply with the Permitted Installation Scenarios may cause the fence system to not comply with regulations.

In a mixed system using LV Sync, an F5/F6 fence controller must be set as the primary. Existing F3 and F4 series fence controllers must have their firmware updated to be compatible with F5/F6 and be set as secondary fence controllers in the LV sync network.

12.2 Large Sites

A maximum of 250 fence controllers can be connected on a single LV Sync bus. For sites requiring more than 250 fence controllers or multiple LVSync buses, HV Synchronization can be used to "bridge" to another LV Sync bus.

This is achieved by enabling HVSync on the last "Secondary" fence controller in one LV Sync bus with the Primary controller on the next LV Sync bus, and cross connecting their outputs to the others' HV input. Please contact a Gallagher representative if your installation exceeds more than 250 energizers.

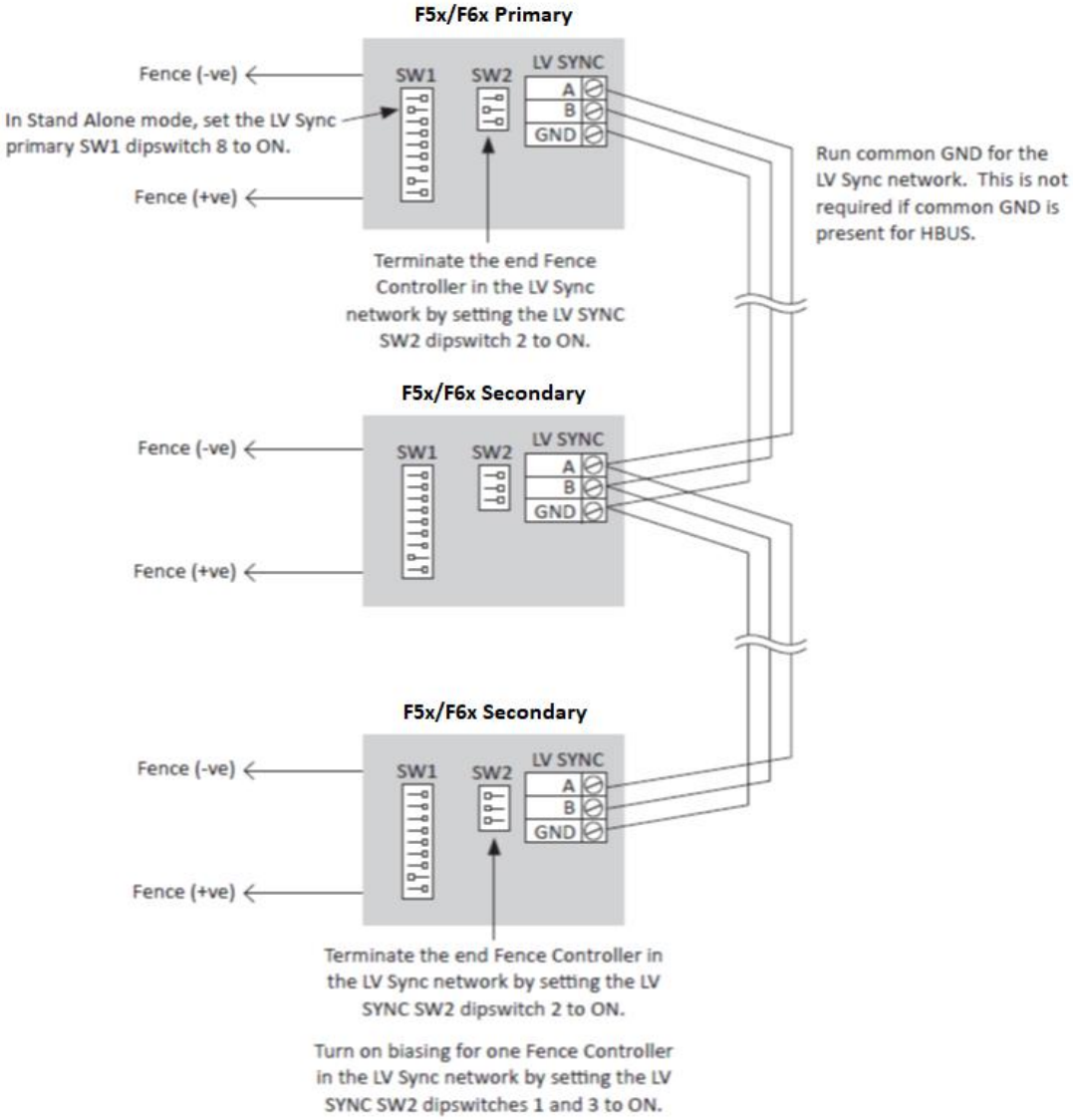
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12.3 Recommended group sizing

Gallagher's recommended limit is 100 energisers per LV Sync group (including operational buffer). Each physical fence controller counts as one unit.

For sites exceeding 100 energisers, additional groups are chained using Internal HV Sync. The primary of each subsequent group is configured as "Primary with HV input" - it listens to the HV sync signal from the previous group's fence wire, and its own secondaries LV sync to it normally. An F52 or F62 must be used as this primary, as F51 and F61 do not support HV Sync. Further groups are added by repeating this pattern. This is a larger and more complex site, so a Gallagher engineering review is recommended. Refer to the *3E0901 Technical Reference Manual* for more detailed instructions.

12.4 LV Sync Bus Termination



It is very important to correctly terminate the RS-485 bus by using the DIP switch (SW2) to engage the termination resistor on the appropriate energizer. Incorrect termination is likely to cause failure in the synchronization signals and require the energizers to reduce their pulse power. Bias one device on the LV sync network (it is recommended you bias the Secondary energizer farthest from the Primary).

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Notes:

- Use CAT 5e 4 twisted pair 24 AWG (0.2 mm^2) cable for the LV sync network. The LV sync network length should not exceed 1.2 km (3937 ft).
- In Standalone mode, set the LV Sync Primary SW1 dipswitch 8 to ON for the LV Sync Primary in the LV Sync network.
- Terminate the end Fence Controllers in the LV Sync network.
- Bias only one Fence Controller in the LV Sync network (typically the start or end device).
- By default, a 'Medium Priority Alarm' will be raised in Command Centre as soon as synchronization has been lost. After 2.5 minutes, a 'High Priority Alarm' will be generated when a primary or secondary fence controller has reduced its pulse to Restricted Energy Mode.
- In the event where synchronization is lost for an extended period of time, the fence controller(s) will continue to operate in Restricted Energy Mode (reduced energy), alarm thresholds will automatically be adjusted to ensure alarm detections is maintained.

12.5 Removing an Energizer from the LV Synchronization BUS

When an energizer is removed or replaced, the Primary unit will continue expecting pulse acknowledgements from the previous Secondary. This causes the system to enter a sync-lost state, preventing normal operation.

How to Restore Normal Operation

To resolve this, the Primary must be informed that the removed Secondary no longer exists. The simplest way to do this is to clear the Primary's memory of connected Secondaries, allowing it to re-detect all remaining devices on the LV Sync bus.

Networked Installation (using Command Centre)

1. Open Command Centre.
2. Navigate to the Primary unit.
3. Go to Status and Overrides.
4. Click **Reset LVSync Secondaries**.

This will remove any non-responsive Secondaries from the Primary's list and re-sync with active ones.

Standalone Installation (without Command Centre)

If Command Centre is not available, you can manually reset the Primary's memory using the DIP switch:

1. Locate the LVSync Role DIP switch (DIP8) on the Primary unit.
2. Change DIP8 from ON (LV-Primary mode) to OFF (LV-Secondary mode).
3. Wait 3 seconds.
4. Change DIP8 back to ON (LV-Primary mode).

This will cause the Primary to erase its list of Secondaries and re-detect only those currently active on the LV Sync bus.

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12.6 LV Sync Network Troubleshooting

RS-485 Diagnostics
The F5x and F6x provide diagnostic information about the RS-485 network from the perspective of each energizer. This information can help determine if the LV Sync cable is disconnected, damaged, or incorrectly terminated. Contact your Gallagher Group representative for assistance.

12.7 HV synchronization

High Voltage Synchronization allows the fence controller to synchronize the firing of its own pulse with pulses being received from another electric fence. HV synchronization can be provided by any pulse fence energizer, including non-Gallagher devices, provided the pulse voltage is within the acceptable range of 1.6 kV to 9 kV.

An energizer using HV Sync can be configured as a "Primary", meaning it will also perform the duties of an LV Sync Primary device by sending Pulse Now commands synchronized to the HV input pulses. This is sometimes referred to as an "HV Primary" device but should not be confused with thinking it provides an HV timing signal; on the contrary, it receives the HV timing signal. The preferred terminology is "Primary with Internal HV" or "Primary with External HV", or more generally "Primary with HV input".

If a Primary Fence Controller is configured as "Internal HV Sync", meaning the HV source is "inside" or "part of" the same fence system, the absence of an input pulse will cause a sync-lost alarm and it will enter Restricted Energy Mode behaviour. However, if it is configured as "External HV Sync", meaning the input pulse comes from an external fence system, such as a neighbouring property, then no sync-lost alarm will be generated, and Restricted Energy Mode will not be entered.

If an F52 or F62 Primary loses its HV Sync input, it will continue to pulse at its configured rate and continue to operate as LV Sync Primary.

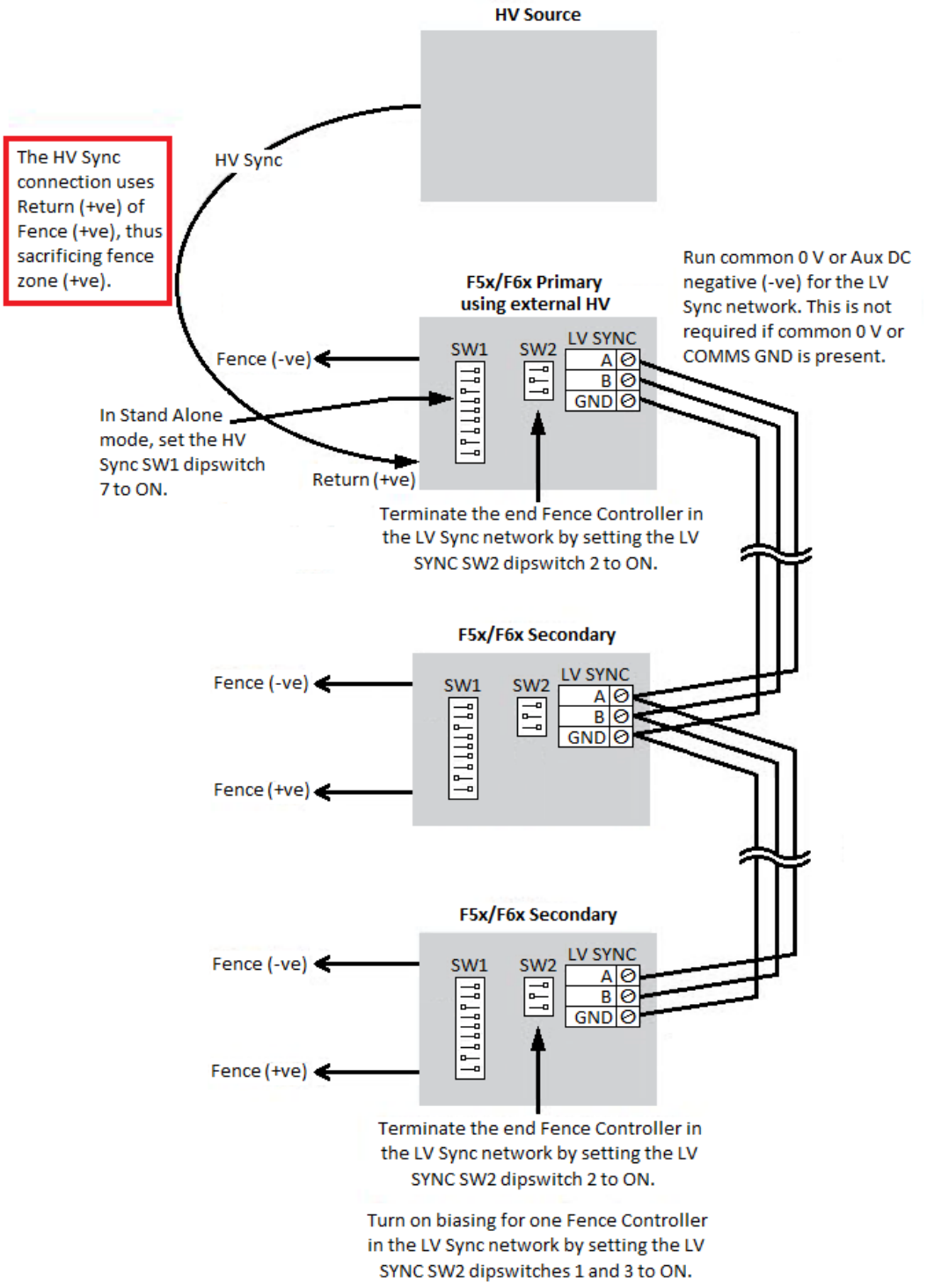
The "Primary with HV input" configuration can be used as a bridge to synchronize fence controllers with LV Sync capability to an energizer that does not have that capability. It can also be used to bridge two separate LV Sync buses.

An energizer using HVSync can alternatively be configured as a "Secondary", meaning it will perform the duties of an LV Sync Secondary device where its pulse acknowledgement will report the presence or absence of a synchronized HV pulse on its HV input channel. This allows bridging two F5/F6 LV Sync buses together. Secondaries only use "Internal HV", meaning it cannot ignore the loss of HV input, because this setting only applies to fence controllers in the same fence system.

Notes:

- F51 and F61 (single channel) Fence Controllers cannot use HV Sync because they do not contain the required input hardware (channel 2).
- The time delay between detecting loss of synchronization and starting "Restricted Energy Mode" behaviour is user configurable.
- Some settings for a Standalone fence system cannot be configured by DIP switches alone and must be configured through a temporary connection to Command Centre.

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13 Permitted Installation Scenarios

With recent updates to IEC60335-2-76, including the introduction of Permitted Installation Scenarios, there are now stricter requirements for how fence controllers are tested to meet international safety standards for new installations. The following are best practises for upgrading or extending existing sites. These guidelines ensure that F5 and F6 fence controllers continue to operate in full compliance when integrated into legacy systems.

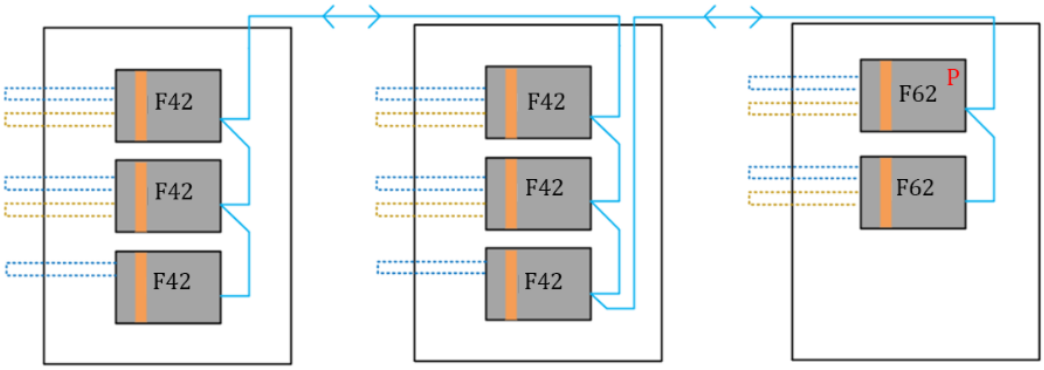
13.1 Sites with F3 or F4 Fence Controllers

For sites currently operating with F3 or F4 series fence controllers and planning to upgrade or expand with F5 or F6 controllers, it is essential to update the firmware on F3/F4 units to Gallagher's new synchronization protocol, Smart Sync. This ensures all controllers operate in a compliant and fully integrated manner.

To enable this functionality on your F3 or F4 controllers:

1. Ensure our energizers are running a version of Command Centre that supports Smart Sync (version 9.40 MR or later).
2. Set the primary sync source to the newly installed F5 or F6 fence controller.

This process applies to sites using an F3 or F4 in either Standalone mode or Command Centre-connect.



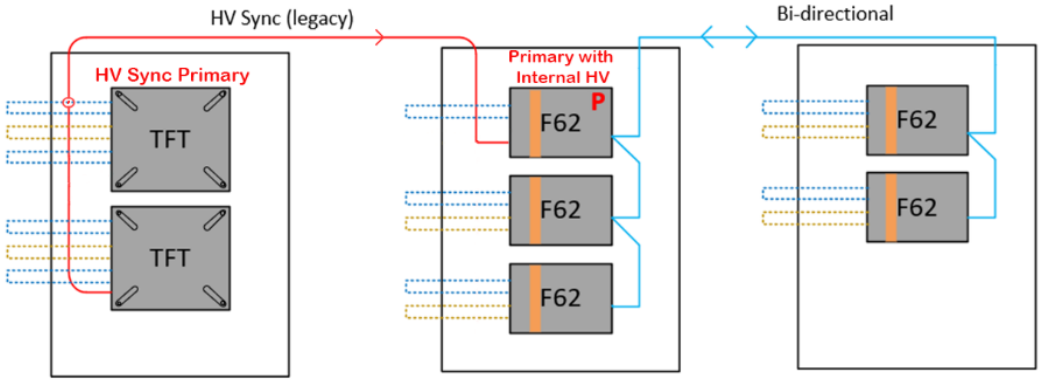
13.2 Sites with Trophy FT and F22 Fence Controllers

For sites using Trophy FT or F22 Fence Controllers that require expansion, Gallagher recommends a full upgrade to the latest generation of fence controllers and Command Centre software. This approach is referred to as a Staggered Upgrade and ensures the system meets current safety and performance standards.

To maximise safety during a staggered upgrade, any fence zones powered by Trophy or F22 controllers that are adjacent to zones powered by F5 or F6 Fence Controllers should be configured to operate at reduced energy levels. This allows the newer controllers to apply "safe limits" effectively, enhancing overall site safety in line with the latest IEC standards.

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Trophy FT Fence Controllers Installation Scenario:

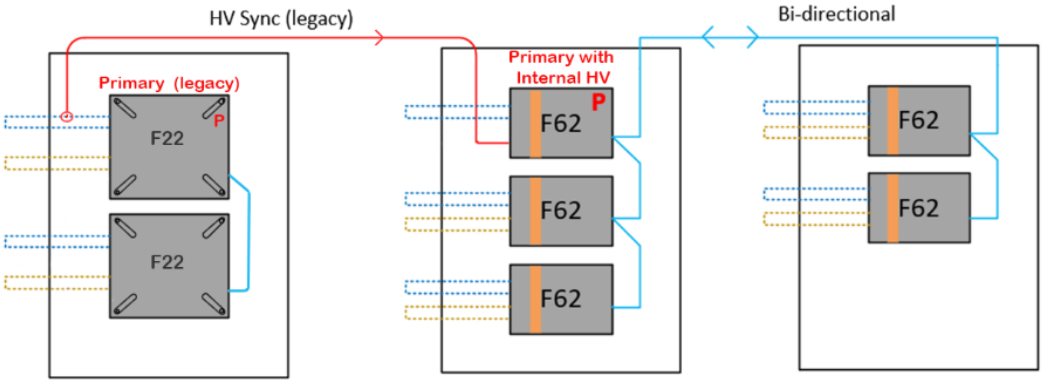


To ensure safe and compliant operation when extending a site that includes Trophy FT fence controllers, the following configuration steps are recommended:

- The neighbouring F5 or F6 fence controller must be set as the **Primary Sync Source** using **Internal High Voltage (HV)**. This allows the F5/F6 unit to respond appropriately if synchronization with the Trophy FT is lost.
  The adjacent Trophy FT controller should be configured as the **HV Sync Primary**.
- Any Trophy FT-powered fence zones that are adjacent to zones powered by F5 or F6 controllers must be set to operate at **reduced power levels**. This ensures the newer controllers can apply “safe limits” effectively, in line with compliance requirements.
- Reduced power levels should be applied as outlined in **Table 1.0** below.

Important Note: *A fence zone of the F62 is used when accepting external or internal HV pulse for synchronization*.

F22 Fence Controller Installation Scenario:



When upgrading sites that include F22 fence controllers, it’s important to note that the F22 supports legacy Low Voltage (LV) synchronization and does not natively support High Voltage (HV) sync. As a result, these sites will operate with two separate sync circuits (legacy LV sync for the F22 units and Smart Sync for F5 or F6 controllers).

To ensure safe and compliant operation:

- The F5 or F6 fence controller adjacent to an F22-powered zone must be configured as the Primary Sync Source using Internal HV. This allows it to respond appropriately if synchronization with the F22 is lost.
- The F22 controller powering the zone used for HV synchronization should be set as the Primary LV Sync for the associated F22 units.

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- Important: Do not connect F5 or F6 controllers to the F22's LV sync ring. These newer controllers are not compatible with legacy LV sync protocols.
- Any fence zones powered by F22 controllers that are adjacent to F5 or F6 zones must operate at reduced power levels to allow the newer controllers to apply 'safe limits' as required for compliance.
- Reduced power levels should be applied as defined in **Table 1.0** below.

Important Note: *A fence zone of the F62 is used when accepting external or internal HV pulse for synchronization*.

TABLE 1.0: Recommended maximum energy levels of legacy energisers during a staggered upgrade:

Maximum recommended pulse energy for Legacy Energizers			
Compliance Region	Medal & Trophy +	Trophy FT	F22
BSEN 60335-2.76	Not Supported	40%	50%
ASNZ 60335-2-76	Not Supported	50%	60%

Important Notes:

- Wherever possible, **staggered upgrades** should be completed on a **cabinet-by-cabinet basis**. This means avoiding configurations where F5 and F22 fence controllers operate within the same cabinet.
- **Standalone sites** using legacy fence controllers (such as **Trophy +** and **Medel**) are **not supported** for integration with F5 or F6 controllers. These sites should be carefully managed during an upgrade process to ensure safety and compatibility.
- Pulse fencing systems that rely on an **external HV sync source**, such as neighbouring fences powered by other controllers, fall **outside the scope of this document**. While Gallagher cannot control these external systems, all **best practical efforts** should be made to synchronize with neighbouring fences to maintain site safety.

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14 Service Mode

A service technician can use the magnetic key to arm or disarm a fence zone when servicing the Fence Controller. The magnetic key can also be used to reset all inactive (historic) system or fence zone alarms.



Note: The magnetic key can be used on any F51/F52/F61/F62 Fence Controller, it is not specific to an individual Fence Controller.



IMPORTANT: The Gallagher magnetic key contains a magnet that may be harmful if you have a pacemaker or other similar implanted device. Do not use the magnetic key if you have a pacemaker.

14.1 When in Standalone mode

To enter Service Mode, set the Service Mode SW1 dipswitch 1 to ON.

When Service Mode is entered:

- An active Service Mode alarm is raised (the Service icon on the Fence Controller is lit, red andflashing while the Fence Controller is in Service Mode). The alarm remains active and cannot be reset until you exit Service Mode.
- All system and fence alarms continue to be raised while in Service Mode. The alarms are visible via the Fence Controller icons.
- The fence zones are initially disarmed.
- The Fence Controller no longer responds to input state changes from the alarm panel to arm or disarm the fence zones. Relay 4 will continue to show the status as set by the inputs. This enables you to view what the fence zone status will be when Service Mode is exited.
- The Fence Controller continues to follow the set HV/LF mode and responds to any changes made to the HV/LF mode.
- The fence zone control via the magnetic key operates on a toggle; arming the fence zone if it is currently disarmed; disarming the fence zone if it is currently armed. Each fence zone operates independently by presenting the magnetic key to each fence zone icon "-" or "+".
- Presenting the magnetic key at either fence zone icon will reset all inactive alarms displayed on the Fence Controller.

When Service Mode is exited:

- The system alarm relay restores to its non-alarm state (assuming no other active system alarm conditions exist).
- The Service Mode alarm changes to inactive and can be reset.
- The fence zones immediately follow the status as set by the inputs.
- Presenting the magnetic key no longer arms or disarms the fence zones but will reset all inactive alarm conditions.

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14.2 When in HBUS mode

1. To enable Service Mode, check the **Allow use of Service Mode for local control** checkbox on the **Advanced** tab in the appropriate Fence Controller's properties.
2. To enter Service Mode, set the Service Mode SW1 dipswitch 1 to ON.

When Service Mode is entered:

- An active Service Mode alarm is raised (the Service icon on the Fence Controller is lit, red and flashing while the Fence Controller is in Service Mode). The alarm remains active and cannot be processed until you exit Service Mode.
- All system and fence alarms continue to be raised while in Service mode. The alarms are visible via the Fence Controller icons, in Command Centre and at a terminal.
- Inactive alarms reset at the Fence Controller will remain visible in Command Centre and at a terminal. Inactive alarms processed in Command Centre but not reset at the Fence Controller, remain visible at the Fence Controller.
- The fence zones are initially disarmed.
- The Fence Controller no longer responds to terminal or Command Centre state changes to arm or disarm the fence zones.
- The Fence Controller continues to follow the set HV/LF mode and responds to any changes made to the HV/LF mode.
- The fence zone control via the magnetic key operates on a toggle; arming the fence zone if it is currently disarmed; disarming the fence zone if it is currently armed. Each fence zone operates independently by presenting the magnetic key to each fence zone icon "-" or "+".
- Presenting the magnetic key to the Fence Controller will reset all inactive alarms displayed on the Fence Controller.
- Inactive alarms reset at the Fence Controller will remain visible in Command Centre and at a terminal. Inactive alarms processed in Command Centre but not reset at the Fence Controller, remain visible at the Fence Controller.

When Service Mode is exited:

- The Service icon on the Fence Controller is restored (solid red).
- The Service Mode alarm changes to inactive and can be processed.
- The fence zones immediately follow the status as set by Command Centre.
- Presenting the magnetic key no longer arms or disarms the fence zones but will reset all inactive alarm conditions.

Notes:

- If a fence zone is placed in Lockout mode from a terminal, no indication of Lockout mode is visible on the Fence Controller. When subsequently placed in Service Mode, the magnetic key cannot be used to arm/disarm fence zones that are in Lockout. The magnetic key will clear all inactive alarms.
- Placing the Fence Controller in Service Mode when the Fence Controller is offline or shunted has no effect on behaviour, (i.e. fence zones cannot be controlled via the magnetic key), even if Service Mode was enabled prior to the Fence Controller going offline or being shunted.
- If the Fence Controller is in HBUS mode and not connected to Command Centre, Service Mode cannot be entered.

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15 Appendix

15.1 Security Energizer Groups

A security energizer group consists of one or two security energizers, powering a total of two fence circuits that supply adjacent electric security fences. This configuration allows both fence circuits to be activated simultaneously.

The IEC60335-2-76 ED3.0 standard refer to Type R and Type S Energizer Groups.

A **Type R Energizer** is an energizer with an energy limit of 2.5J per output channel.

The include:

- F51 Fence Controller (G21923)
- F52 Fence Controller (G21943)
- F61 Fence Controller - EN (G21935)
- F62 Fence Controller - EN (G21955)

A **Type S Energizer** is an energizer with a maximum pulse current of no more than 15.7A into a 500-ohm load, with the pulse duration not exceeding 0.1ms.

These include:

- F61 Fence Controller (G21933)
- F62 Fence Controller (G21953)

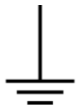
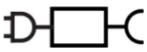
Important Notes:

- Only type R security energizers or type S security energizers can be used in security energizer groups.
- A type S security energizer shall not be used in a type R security energizer group.
- A type R security energizer may be used in a type S security energizer group
- An electric security fence shall not be supplied from two separate energizers unless they are type R security fences or type S security energizers configured and connected to operate in a type R security energizer group or type S energizer group.

The permitted configurations and connections of security energizers that may be used are detailed in section *"13. Permitted Installation Scenarios"* earlier.

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16 Symbol Definitions

	[symbol IEC 60417-5036 (2002-10)]	Dangerous voltage
	[symbol IEC 60417-5017 (2006-08)]	Earth: ground
	[symbol IEC 60417-6406 (2018-02)]	Time synchronized type R security energizer
	[symbol IEC 60417-6407 (2018-02)]	Time synchronized type S security energizer
	Symbol IEC 60417-5005 (2002-10)	Plus; positive polarity
	Symbol IEC 60417-5006 (2002-10)	Minus; negative polarity
	[symbol IEC 60417-6181 (2013-03)]	Detachable supply unit

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17 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: Changes or modifications not expressly approved by Gallagher Limited could void the user's authority to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

G21964

This symbol indicates that the separate power supply unit (G21964) was used to power the Fence Controller during testing. This symbol is located on the out-side of the Fence Controller near the mains power entry inlet. Using a different power supply unit may void the approvals and standards met by this Fence Controller.

UK CA CE

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This product is compliant with the following safety standards when mounted vertical on a flat surface in a cabinet, and where the ambient temperature surrounding the product never exceeds 50 °C (122 °F). Methods for achieving this could be ventilation, forced ventilation or refrigeration.

IEC 60335-2-76 Edition 3.0 2018-06
AS/NZS 60335.2.76:2019 Edition 3.0
BS EN 60335-2-76:2021 + A11:2021
SANS 60335-2-76:2024 Edition 3.0
SANS 60335-1:2016 Edition 5.2

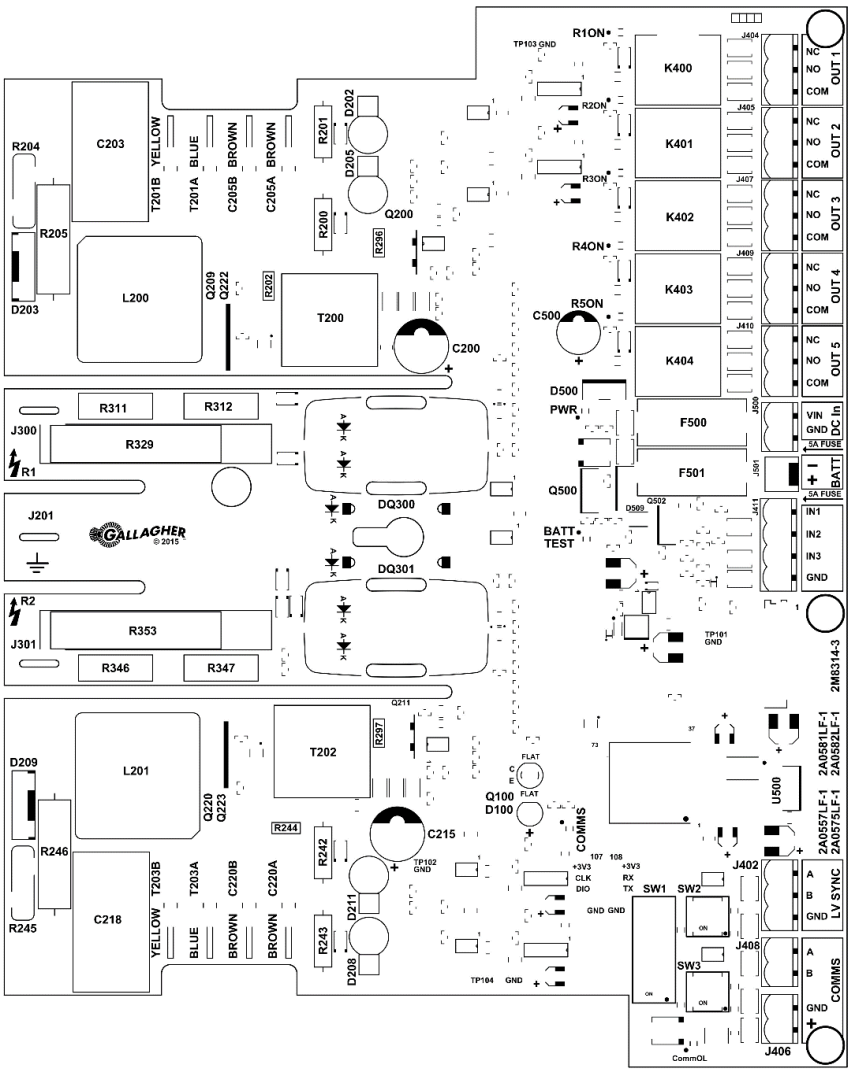
Part 2-76: Particular requirements for electric fence energizers.

Mains power supply cord

The mains power supply cord is not supplied with this product. The power cord will require an IEC C7 connector on one end, to plug into the Fence Controller power supply unit. The power cord should be no lighter than:

- ordinary polyvinyl chloride sheathed cord (code 60227 IEC 53);
- ordinary polychloroprene sheathed cord (code 60245 IEC 57).

The power cord should be rated at 105 °C (221 °F) for installations exposed to ambient temperatures greater than 40 °C (104 °F).



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18 Technical Specifications

Specification	F51 Fence Controller F61 Fence Controller - EN	F52 Fence Controller F62 Fence Controller - EN	F61 Fence Controller	F62 Fence Controller
Power supply:	100-240 Vac 50/60 Hz			
Max power consumption (mains):	13 W	17 W	16 W (HVplus mode)	22 W (HVplus mode)
Average power consumption (mains):	8 W	12 W	11 W (HVplus mode)	17 W (HVplus mode)
Power supply unit:	G21964 (SMPS 15 V 4 A)			
Battery backup:	One 12 V 7Ah valve regulated lead acid battery (not included)			
Battery backup time in HV mode:	14 hours at a pulse rate of 1.5 seconds with no current taken from the Aux. DC output (COMMS +ve) 6 hours at a pulse rate of 1.5 seconds with 0.7 A taken from Aux. DC output (COMMS +ve)	10 hours at a pulse rate of 1.5 seconds with no current taken from the Aux. DC output (COMMS +ve) 5 hours at a pulse rate of 1.5 seconds with 0.7 A taken from Aux. DC output (COMMS +ve)	14 hours at a pulse rate of 1.5 seconds with no current taken from the Aux. DC output (COMMS +ve) 6 hours at a pulse rate of 1.5 seconds with 0.7 A taken from Aux. DC output (COMMS +ve)	10 hours at a pulse rate of 1.5 seconds with no current taken from the Aux. DC output (COMMS +ve) 5 hours at a pulse rate of 1.5 seconds with 0.7 A taken from Aux. DC output (COMMS +ve)
SW1 dipswitch 3 is OFF (default):	The expected internal battery voltage range is 15-15.75 V			
SW1 dipswitch 3 is ON:	The expected external battery voltage range is 12-15.75 V			
Aux. DC output (COMMS +ve):	11-15 Vdc, 0.7 A (resettable fuse)			
Fuse ratings (F500, F501):	5 A			
EOL resistors (for inputs):	4.7 kΩ			
Inputs per Fence Controller:	2	3	2	3
Outputs per Fence Controller:	4	5	4	5
Relay contact:	The power switched through a relay must not exceed 20 Vdc or 20 Vrms. 1 A DRY contact.			
Channels per Fence Controller:	1 (-ve zone)	2 (-ve zone, +ve zone)	1 (-ve zone)	2 (-ve zone, +ve zone)
HV (per channel):	8 kV [1] (without load)			
Low Feel (per channel):	0.9 kV [1] (without load)			
Pulse rate:	1 pulse every 1.5 seconds [1]			
HV alarm threshold to enter HVplus:	Less than 2.0 kV [1]			

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Specification	F51 Fence Controller F61 Fence Controller - EN	F52 Fence Controller F62 Fence Controller - EN	F61 Fence Controller	F62 Fence Controller
HV alarm threshold:	Less than 2.0 kV [1] or greater than 15.0 kV [1]			
Low Feel alarm threshold:	Less than 0.3 kV [1] or greater than 10.0 kV [1]			
Unit weight:	2.95 kg (6.5 lb) (includes packaging - excludes battery)	3.7 kg (8.2 lb) (includes packaging - excludes battery)	2.95 kg (6.5 lb) (includes packaging - excludes battery)	3.7 kg (8.2 lb) (includes packaging - excludes battery)
Unit dimensions:	Fence Controller: 255 mm x 340 mm x 120 mm (10 in x 13.4 in x 4.7 in)	Fence Controller with one Cable Manager connected: 255 mm x 452 mm x 120 mm (10 in x 17.8 in x 4.7 in)	Fence Controller: 255 mm x 340 mm x 120 mm (10 in x 13.4 in x 4.7 in)	Fence Controller with one Cable Manager connected: 255 mm x 452 mm x 120 mm (10 in x 17.8 in x 4.7 in)
Ambient temperature range without loss of performance:	Landscape orientation -20 to +50 °C (-4 to +122 °F)	Portrait orientation -20 to +40 °C (-4 to +104 °F)	Landscape orientation -20 to +50 °C (-4 to +122 °F)	Portrait orientation -20 to +40 °C (-4 to +104 °F)
Environmental protection:	IPX4			
Max output energy (per channel):	2.3 J per pulse (into 200 Ω load) HV mode		2.3 J per pulse (into 200 Ω load) HV mode 3.6 J per pulse (into 200 Ω load) HVplus mode	
Max energy between interleave dual pulse connected zones:	4.5 J per pulse (into 400 Ω load) HV mode		4.5 J per pulse (into 400 Ω load) HV mode 7.2 J per pulse (into 400 Ω load) HVplus mode	
Max voltage between interleave dual pulse connected zones:	16 kV HV mode		16 kV HV mode 20 kV HVplus mode	
Max number of Fence Controllers on one HBUS cable:	24			

[1] This value is configurable in Command Centre.

The above values are typical when using a standard installation and default settings

Specification	HBUS network	LV sync network
Recommended cable type:	CAT 5e 4 twisted pair 24 AWG (0.2 mm^2) network cable	
Maximum distance:	500 m (1640 ft) for the HBUS network	1.2 km (3937 ft) for the LV sync network
Speed:	RS485 1 Mbits/s	RS485 19.2 kbits/s

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