

Vantage Connect – Sensor Module

VC-SM

User Guide

TVL No. 379

Issue No. 1

Date: June 2026



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1. Introduction

1.1. Scope

This manual covers all main options of the VC-SM monitoring unit and key ancillaries supplied with the system.

1.2. Purpose

It is important that you familiarise yourself with the manual and any site drawings before commencing any work with the Vantage Connect – Sensor Module (VC-SM). This manual is to be used as a guide to aid installation, commissioning and servicing of a Vantage Connect – Sensor Module. The document is intended to be read by qualified elevator installers, testers and service engineers.

The unit is to be wired as per the relevant drawings. Ensure that all interface wires are connected properly and that the supply voltage is correct before turning on the unit.

TVC accepts no liability for any damage resulting from incorrect or inappropriate installation or adjustment of optional parameters of the equipment.

TVC reserves the right to change the specification of the product, its performance or the contents of the manual without notice.

1.3. Acronyms and Definitions

CAN	Controller Area Network
MPU	Micro Processor Unit
TVC	Thames Valley Controls
VC-SM	Vantage Connect – Sensor Monitoring
VC-EX	Vantage Connect – Ethernet Extension

1.4. Safety Warnings / Precautions



Be aware that the elevator panel will contain equipment that is supplied with potentially lethal voltages. Please make sure the panel is isolated before carrying out any installation work or modifications.



Observe normal precautions for handling electronic devices; avoid static electricity, dampness and extreme temperatures. Please consult drawings for contract specific wiring and setup.



Installation and servicing of this control equipment must be carried out by suitably qualified and trained personnel. A thorough risk assessment must be performed before carrying out any work on this equipment.

1.5. Contacts

If you have a question concerning safety, please do not hesitate to contact TVC:

Address:

Thames Valley Controls Ltd.
Manor Farm Industrial Estate,
Flint,
Flintshire.
CH6 5UY.
UK.

Customer Service:

Telephone: +44(0) 1352 793222
Email: customersatisfaction@tvcl.co.uk

Sales:

Telephone: +44(0) 1352 793222
Email: info@tvcl.co.uk
Website: <http://www.tvcl.co.uk>

1.6. Standards

The VC-SM meets the following standards / specifications:

BS EN 81-20:2020. Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts.

BS EN 81-50:2020. Safety rules for the construction and installation of lifts. Examinations and tests. Design rules, calculations, examinations and tests of lift components.

BS EN 12015:2020. Electromagnetic compatibility. Product family standard for lifts, escalators and moving walks. Emission.

BS EN 12016:2013. Electromagnetic compatibility. Product family standard for lifts, escalators and moving walks. Immunity.

ETL Control Number _____

Conforms to ASME Std A17.5
Certified to CSA Std B44.1

MODEL:	VC-SM
PART NUMBER:	700.008177.XX
VOLTS:	100-240Vac
FREQ:	50/60Hz
WATTS:	115W
CONFORMS TO:	CSA B44.1/ASME A17.5, EN81-20.
CONTAINS	FCC ID: 2AJYU-8PYA007 FCC ID: 2ABCB-RPICM4

Bluetooth SIG Number Q382277

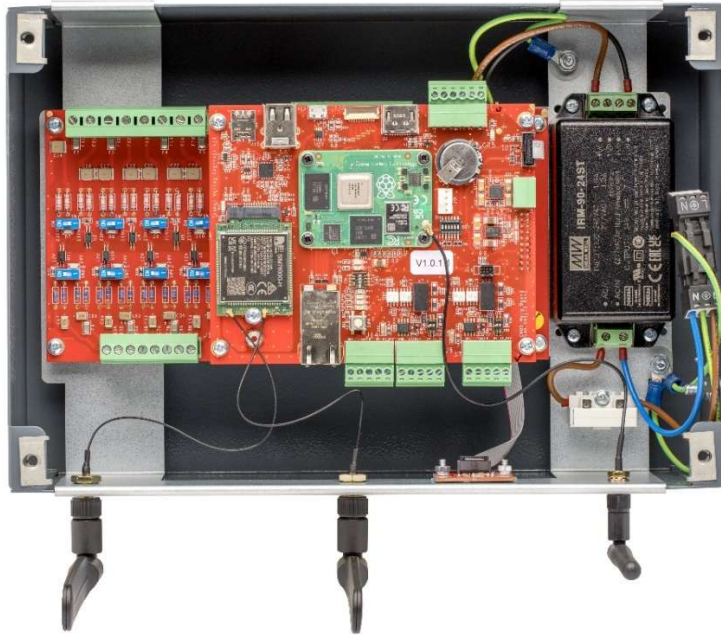


1.7. Certificates

Certificates for EMC compliance and Safety compliance can be supplied when requested - see TVC.

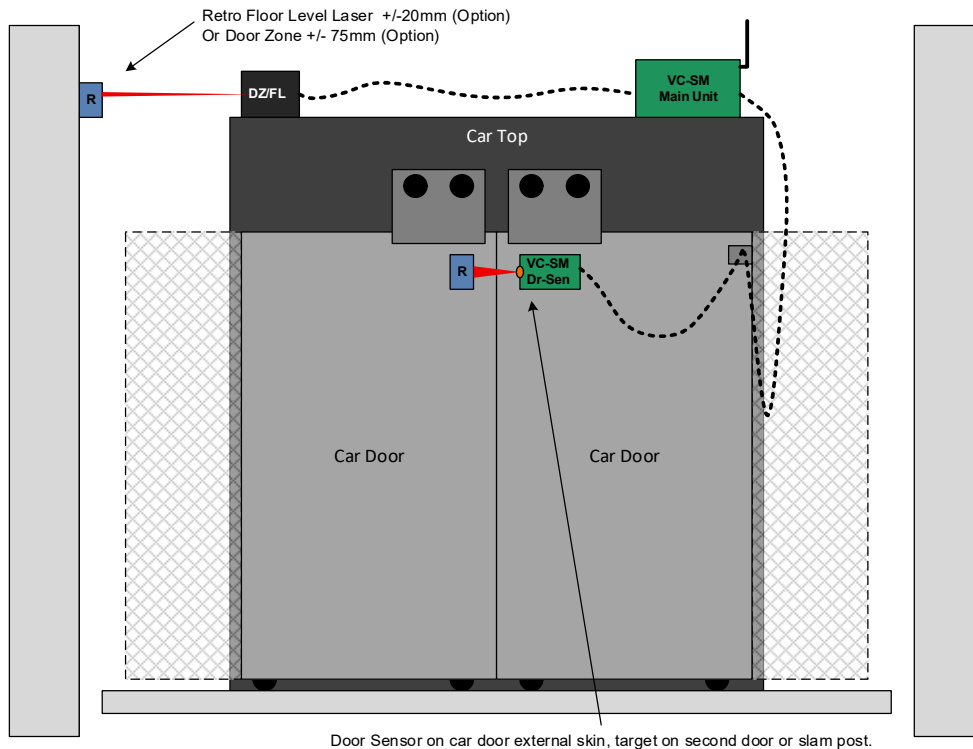
2. System Description

2.1. System Overview



The TVC VC-SM provides remote elevator monitoring. The unit is used with various options to go from a minimal installation, that uses built in sensors, to a more complex install monitoring various critical points on the elevator control system. The combination of sensors and optional signals are used to determine whether the elevator is out of service and whether passengers are trapped. It offers extensive metrics for remote monitoring including availability, journey counts, floor levelling accuracy, ride profiling, door monitoring etc.

The basic setup is seen below: This comprises the main VC-SM unit that mounts on the car top and a Door Sensor that mounts on the elevator car door. Shown additionally is an optional floor level sensor that can be mounted on the car top, this give accurate trip hazard warnings if the elevator is stopping out of level.



2.2. VC-SM Specification

Supply Voltage:	230V a.c. +10% -15% 50 Hz. Note: Other voltages available - consult TVC	
Unit Operating Current:	0.5 – Fused (2A A/S)	
Backup Battery:	2 x 3.6V – Lithium Ion (INR18650/25P)	
24V d.c.Wetting Supply:	1A - Max load	
Low Voltage Inputs:	Min - 10V to Max - 48V a.c./d.c.	
High Voltage Inputs:	Min - 95V to Max - 230V a.c./d.c.	
Outputs Min:	Min - 100mV @ 100uA d.c	
Outputs Max:	Max - 110V a.c. @ 5A / 30V d.c. @ 5A (Resistive)	
Communications:	Gigabit Ethernet / 4G GSM / Bluetooth.	
Dimensions: (including connector)	300 x 200 x 100mm	
Fixings:	4 x M6 at 212 x 116mm	
Other Features:	2 CAN Ports 1 RS485 Ports USB	1 RS232 Ports Ethernet 10/100/1000M HDMI

2.3. Environment

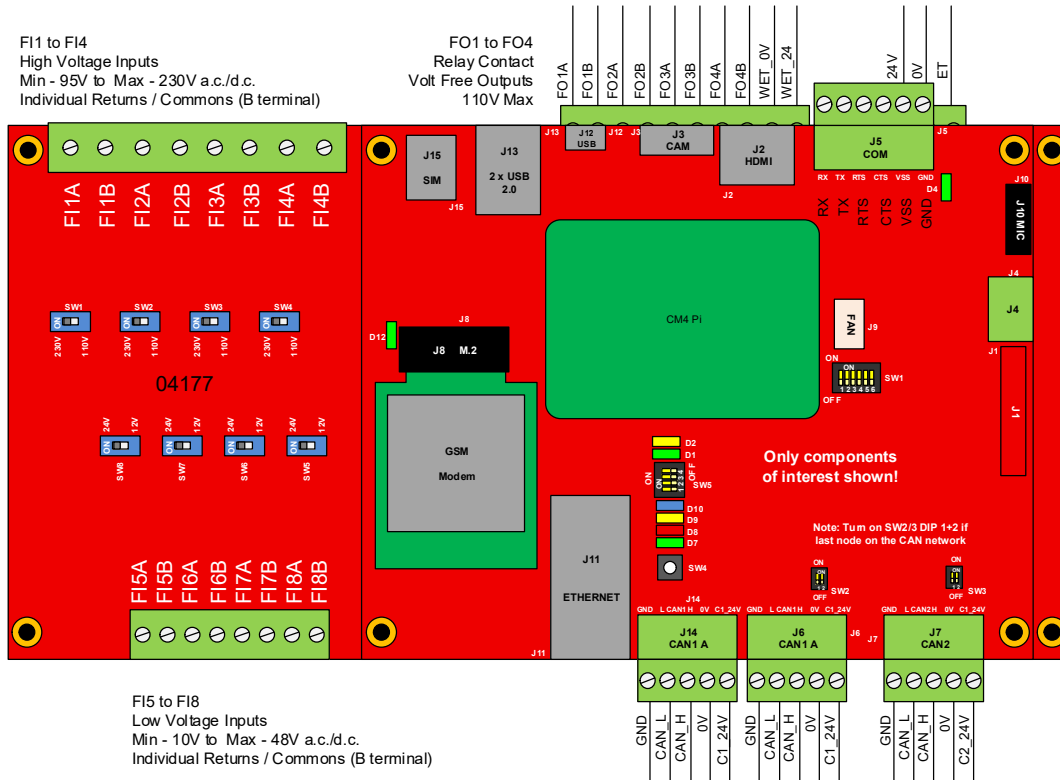
Storage Temperature:	-10 °C to +60 °C	
Operating Temperature:	0 °C to +40 °C Note: The ambient temperature surrounding the unit must be between 0 °C and 40 °C.	
Humidity Operating Range:	5 - 90% relative humidity (non-condensing)	
IP Rating	IP2X	Protect against dust, moisture and water ingress.

2.4. EMC Guidelines

It is extremely important that the following guidelines are adhered to: All cable runs must be kept away from motor wiring, a separation of at least 300mm. Keep sensor wiring away from mains. If wiring has to cross any high voltage cable this must be done at right angles. Sensors must be mounted away from any high voltage equipment e.g. motors, door gear etc. CAN networks must be correctly terminated, terminate CAN with DIP's on both ends (last modules / sensors) of any network. Limit stub connection length on the CAN bus. Any screens in the trailing cables must be earthed at both ends.

2.5. VC-SM Hardware – Main Board



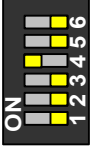
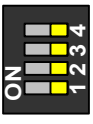
Main PCB Internal Layout



LED Descriptions

LED	Location	Description
D1 / Green	Main CPU	CPU Running - 2 flashes every 1 Second.
D2 / Yellow	Main CPU	Boot errors (see CM4 manual).
D4 / Green	Main CPU	3.3V Power OK.
D7 / Green	Main CPU	1 flash every 1 Second – Main program is running OK.
D8 / Red	Main CPU	Fault in main program.
D9 / Yellow	Main CPU	RX from Door Sensors, 1 flash = 1 door sensor active / 2 flashes for 2 sensors.
D10 / Blue	Main CPU	Bluetooth active, strobes in pairing mode, solid in connected mode.
D12 / Green	Main CPU	Modem: Always ON: Searching Network / Call Connect. 200ms ON - 200ms OFF: Data Transmit / 4G registered. 800ms ON - 800ms OFF: 3G registered network. OFF: Power off / Sleep.
D1 / Green	Mic Board	Follows D7 on main CPU - Main program is running OK.
D1 / Red	Mic Board	Follows D8 on main CPU - Fault in main program.
D6 / Red	Charger/IO	Li-Ion Charger Fault
D7-8 / Green/Red	Charger/IO	HV Input 1 to 4 (lights when on)
D23-26 / Grn/Red	Charger/IO	LV Input 5 to 8 (lights when on)

DIP / Switch Settings

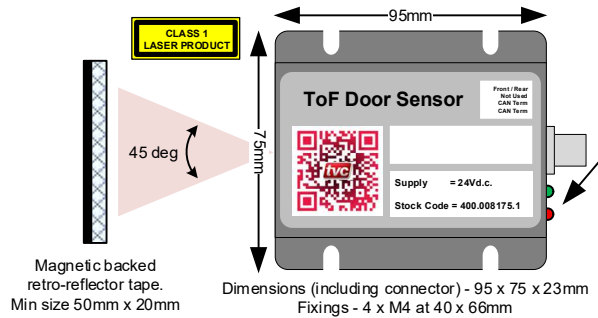
	Switch	Description	Normal Position
	SW2 – DIP1	Door Sensor Network – CAN1 Termination	ON (Front Doors) OFF (Front + Rear)
	SW2 – DIP2	Door Sensor Network – CAN1 Termination	ON (Front Doors) OFF (Front + Rear)
	SW3 – DIP1	ABS Position Network – CAN2 Termination	ON
	SW3 – DIP2	ABS Position Network – CAN2 Termination	ON
	SW1 – DIP1	RUN_PG	Factory Use - Default OFF
	SW1 – DIP2	GLOBAL_EN	Factory Use - Default OFF
	SW1 – DIP3	USB_BOOT	Factory Use - Default OFF
	SW1 – DIP4	WIFI_DISABLE	Factory Use - Default ON
	SW1 – DIP5	BLUE_DISABLE	Factory Use - Default OFF
	SW1 – DIP6	EEPROM_WP	Factory Use - Default OFF
	SW5 – DIP1	PCB_TEST	Factory Use - Default OFF
	SW5 – DIP2	FACT_DPS	Factory Use - Default OFF
	SW5 – DIP3	Spare 3	Factory Use - Default OFF
	SW5 – DIP4	WATCHDOG_DISABLE	Factory Use - Default OFF

2.6. Door Sensor

Installation

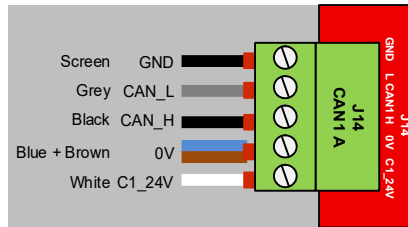
The Door Sensor reports position of the doors and monitors door vibration.

Installation - Position the sensor on the elevator door so it has a clear view of the reflector in the fully open and fully closed position. The reflector needs to be mounted on a static part of the car or the second door if centre opening. If mounting on the door is not possible the sensor can be mounted on the car and reflector mounted on the door. This will still provide door position but limit door vibration reporting.



Wiring

Run the cable parallel with any safety edge cable fitted, back to the car top mounted VC-SM. Wire Door Sensor CAN and supply to VC-SM as per colours shown on the left. If installing



DIP / Switch Settings

Switch	Description	Normal Position
SW1 – DIP4	Door Side	OFF = Front, ON = Rear
SW1 – DIP3	Spare 3	Factory Use - Default OFF
SW1 – DIP2	Door Sensor Network – CAN Termination	ON
SW1 – DIP1	Door Sensor Network – CAN Termination	ON

DIPs 1 and 2 on for CAN termination. These should be set on the last node in the network. (default ON)

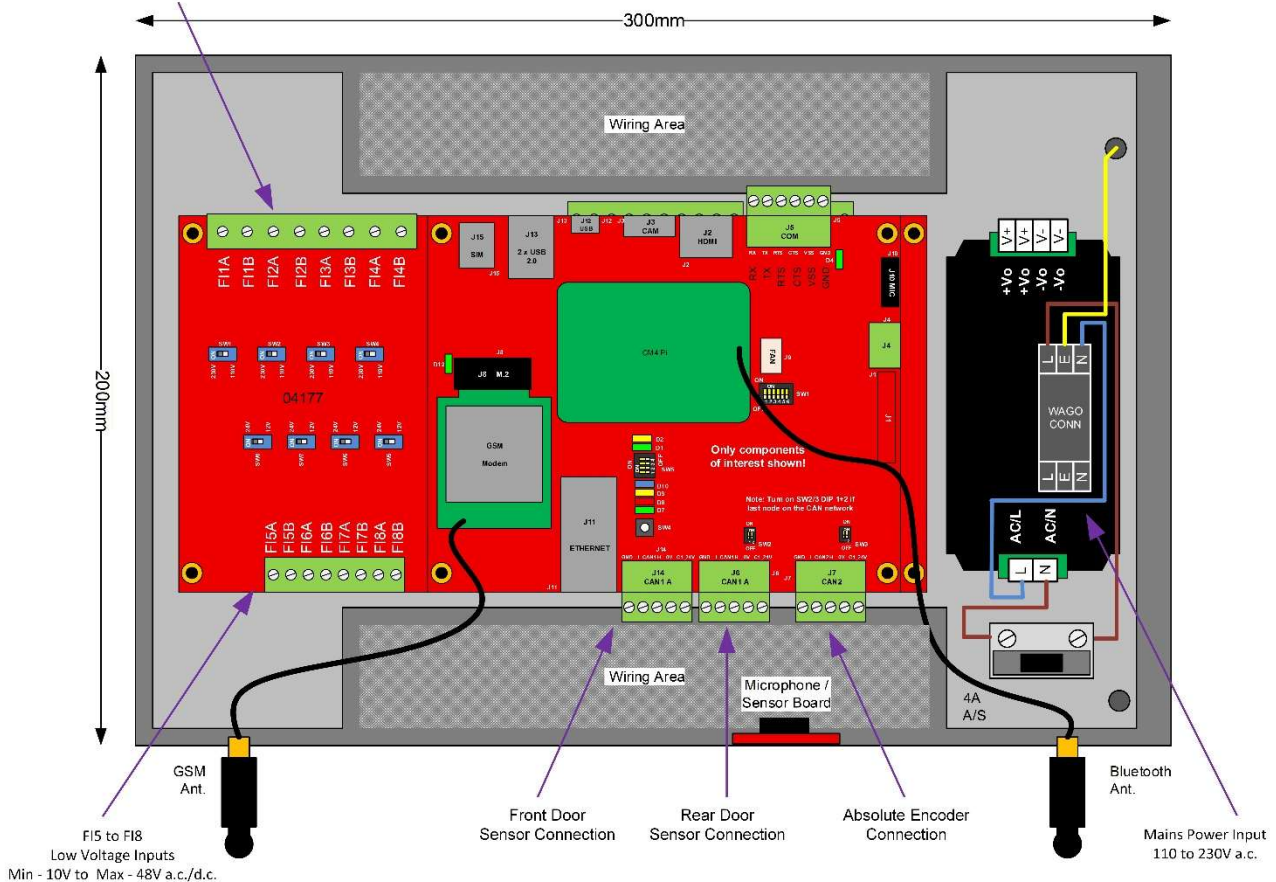
LED Descriptions

LED	Location	Description
Green / D3	Door Sensor	The Green LED will light to signify power to node and that the node is running. Flashing green signifies that the sensor can see a reflector, solid green means the reflector can't be seen at distance or the reflector is closer than 100mm.
Red / D4	Door Sensor	The Red LED will light continuously for 4 seconds when the node is first powered up. After this point the red LED signifies various fault codes. The LED will do a quick flash every 4 seconds if the node has a fault. 1 flash every 4 secs = Node not communicating with VC-SM. 2 flashes every 4secs = Node is experiencing data bus faults. 3 flashes every 4 secs = Node has stopped transmitting due to bus faults. 4 flashes every 4 secs = Node has stopped transmitting or receiving from the data bus

3. Sequence of Install

VC-SM External Wiring

F11 to F14 - High Low Voltage Inputs
Min - 95V to Max - 230V a.c./d.c.



1) Confirm the elevator is electrically isolated and safe to work on.

2) The main unit is mounted on the car top, the door sensor mounted on the doors or door gear. Additional equipment may be supplied, consult further sections for instructions.

3) Remove the inner frame, with the electronics on, from the VC-SM enclosure. This allows cable entries to be drilled and the enclosure to be mounted. Temporarily remove the backup batteries from the base board if pre-fitted.



4) Do not power up the unit without the batteries fitted, failure to do this may cause corruption on a power down.

5) Mount the VC-SM in a suitable area on the car top. Make sure the unit isn't a trip hazard and is placed on a solid surface, preferably the crown beam or car roof, not the handrail. Make sure the antennae do not have any metal work close to them (within 150mm), try and place the unit on the edge of the car with antennae facing outwards into free space.

6) Place the inner frame back into the VC-SM enclosure, be careful not to disturb the antennae leads.

7) Wire the unit to a mains power supply on the car top, usually the car lighting supply if available. The unit can be powered from 120 to 230V a.c.

8) Wire in additional signals, if required, to the feature inputs (F11-8). These are in 2 banks: High voltage (F11 to F14) and Low voltage (F15 to F18). Each input is isolated and has its' own return. The high voltage inputs can monitor

signals from 90V to 230V a.c. or d.c. The low voltage inputs are rated at 10 to 48V a.c or d.c. Below is a list of inputs that can be assigned in the commissioning phone app.

Optional Inputs		Typ.V	Usage / VC-Events
ALMP	Alarm push pressed	12V	Used to determine trapping if alarm buzzer not available.
CG	Car gate	110V	Used to detect car gate fault on closed position
EOSI	Elevator out of service indicator	24V	Elevator Indicated Lost / Regained Service
FDZ	Front door zone	24V	Confirms if stopped out of door zone, also used for floor position
FFL	Front floor level	24V	Detects trip hazard on front door
FIRE	Fire service	24V	On / Off Fire Control / Fire Recall
FRPAS	Fire recall pass	24V	Remote Fire Recall Test pass input
GFRP	Ground floor reset position	24V	Used to reset sensor derived position, if needed
GL	Landing locks	110V	Used to detect landing gate fault on closed position
IND	Independent service	24V	On / Off Independent Control / Special Service
MRI	Motor room intruder	24V	Detects motor-room intruder
PRLCK	Landing pre-lock	110V	Used to detect pre-lock fault on closed position
PSC	Safety circuit / controller supply	110V	Used to signal lost / regained controller supply
RDZ	Rear door zone	24V	Confirms if stopped out of door zone, also used for floor position
RFL	Rear floor level	24V	Detects trip hazard on rear door
RPSTR	Rope stretch	24V	Detects rope stretch switch
TEST	Test control	110V	On / Off Test Control / Inspection Control
Optional Outputs			
BFC	Bottom floor call	24V	Used to confirm trapping / elevator not moved
FRREQ	Fire recall request	24V	Remote Fire Recall Test initiation
ISOREQ	Isolation request	24V	Equipment Isolated / Restored
TFC	Top floor call	24V	Used to confirm trapping / elevator not moved

Depending on the voltage applied to each input select the correct position for the voltage selection DIP's (SW1-SW8) On the high voltage inputs F11 to F14 turn on the DIPs if the voltage applied is 200V or over. On the low voltage inputs Fi5 to Fi8 turn on the DIP's if the applied voltage is over 20V.

9) The wiring for the inputs needs to be routed under the cradle if cable inputs are not used on the same side. This allows the cradle to be removed for maintenance without disturbing the wiring.

10) Mount the door sensor and reflector as detailed in the previous section. Run the supplied cable back to the VC-SM. Wire into J14 for the front sensor and J6 for the rear sensor, if required.

11) Fit the backup batteries back into the base board, **make sure the battery polarity is correct**. Connect Ethernet to J11 if not using the on-board GSM modem. The GSM modem LED (D12) will flash once communication is started.

12) Power up the unit. The unit will boot up and green LEDs D1 and D7 will start to flash.



13) If the unit needs to be powered down: Turn off the mains input and wait for 5 minutes for the unit to do a safe shutdown. Once all LEDs on the top board are off, it's safe to power the unit backup. Failure to wait for the full shutdown may cause the unit to not power back up correctly.

14) Follow mobile app commissioning guide to finalise the install. Press SW4 push button to put the unit in Bluetooth pairing mode first.

4. Commissioning – Quick Start

The VC-SM needs to be commissioned once installed. This is to give the unit details of the elevator it's installed on. Information collected by the commissioning process includes I/O setup, door information, floor legends / floor heights etc.

Commissioning is done via a phone app connected via the unit's on-board Bluetooth connection.

The app can be downloaded via the links below:



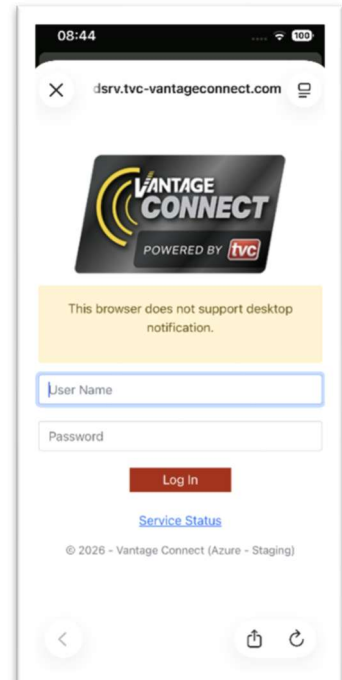
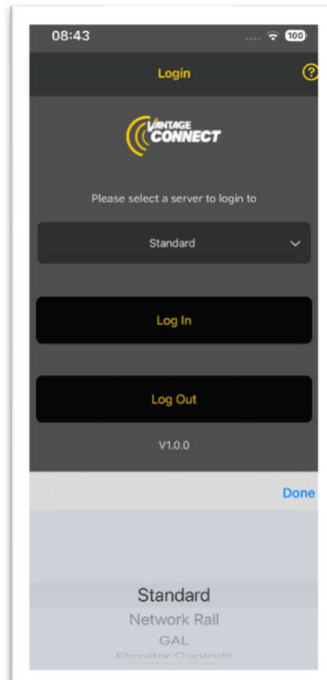
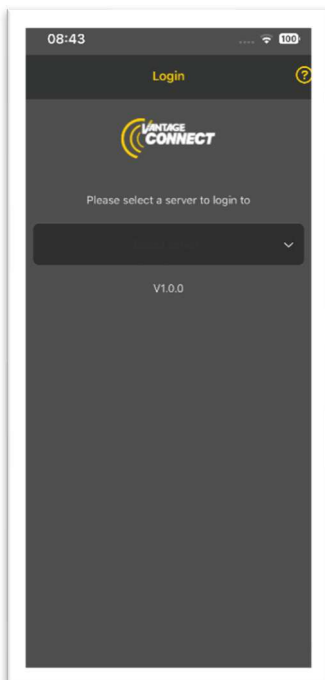
Once the app is downloaded and you are logged in, press SW4 push button on the VC-SM top board to put the unit in Bluetooth pairing mode. Scan for the correct VC-SM and connect.

Consult TVC to setup a user account once the app is downloaded.

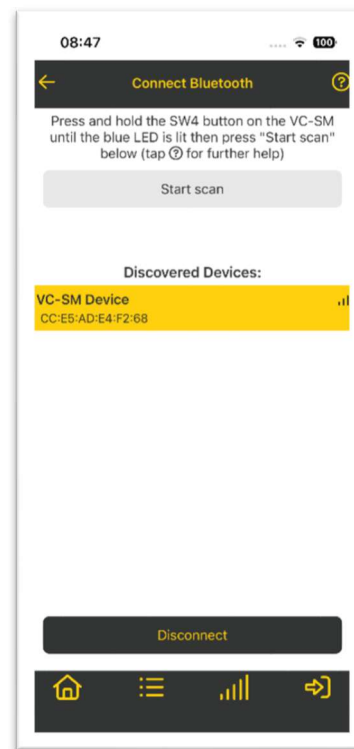
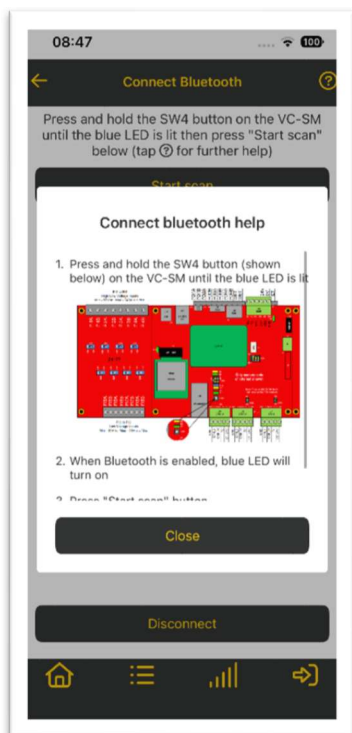
Follow the sequence below to login, choose site reference and commission the VC-SM:

Open the commissioning app:

Select server and logon:

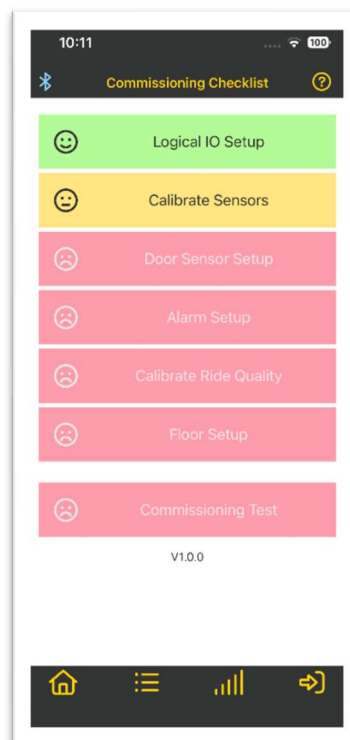
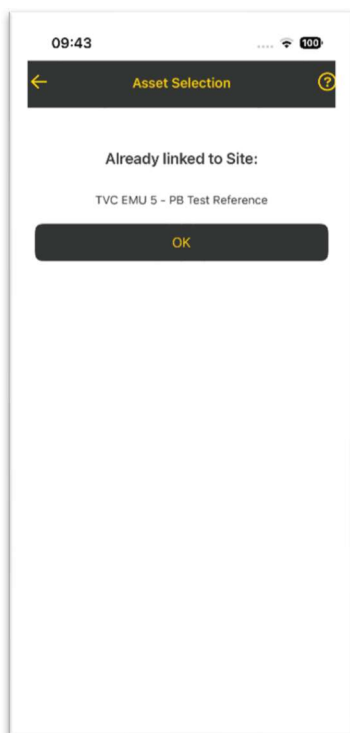


**Press SW4 push button on the VC-SM to put the unit in Bluetooth pairing mode.
Scan for the correct VC-SM and connect.**

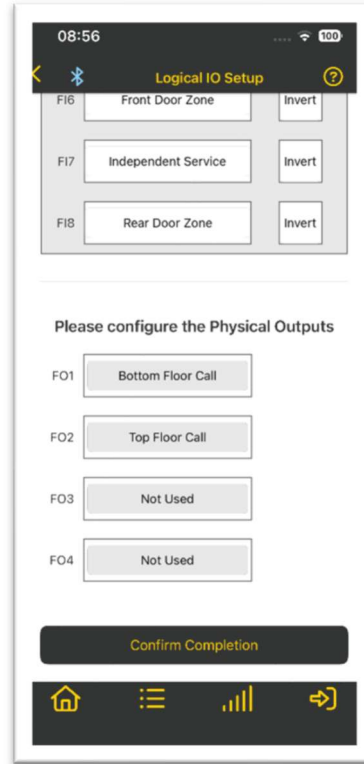
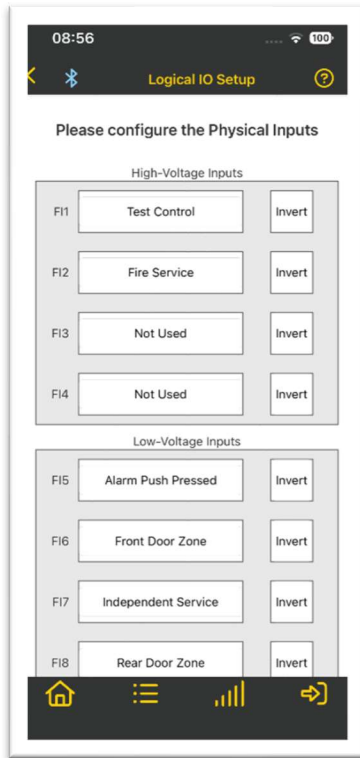


Select Site, Group and Contractor:

**Launch the commissioning app main menu:
Work through the sections to fully setup the VC-SM**



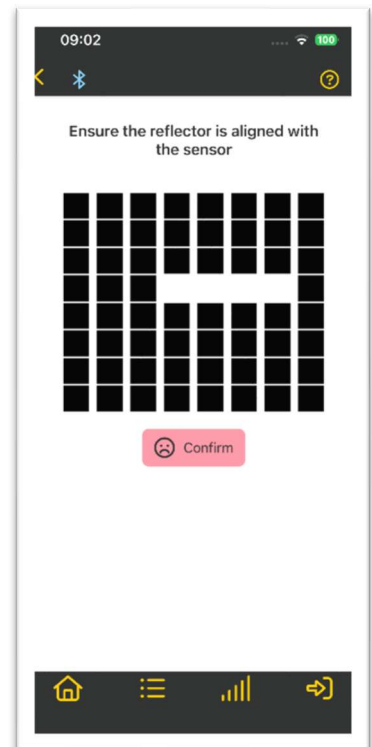
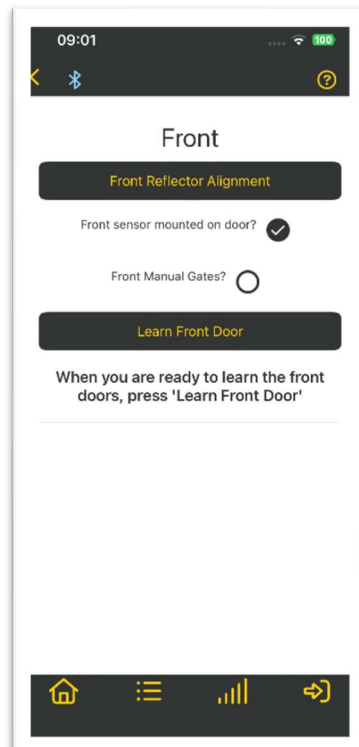
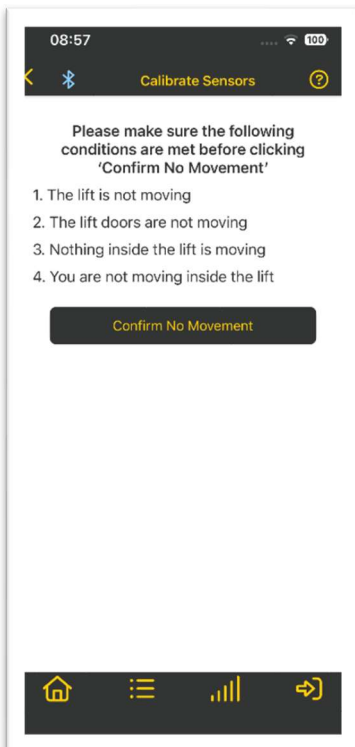
Setup IO if required: There are 4 high voltage inputs, 4 low voltage inputs and 4 outputs that can be assigned to various options to allow additional event reporting.



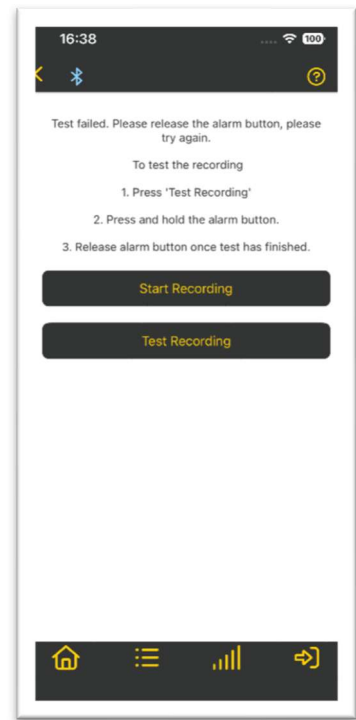
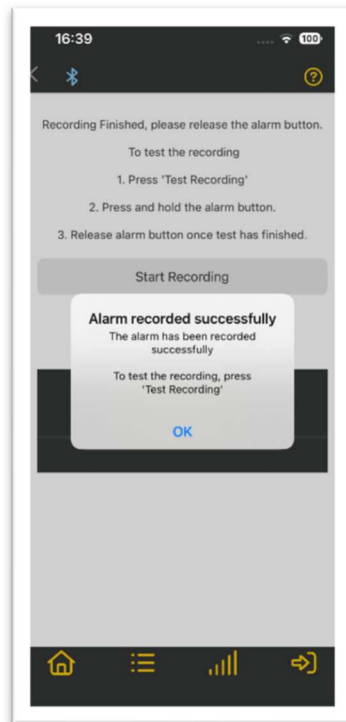
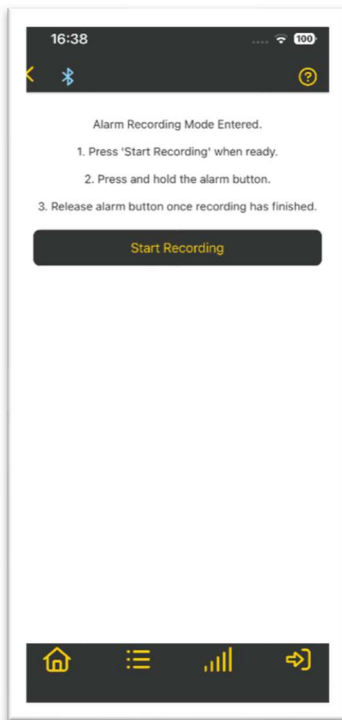
Calibrate sensors:

Setup door sensor(s):

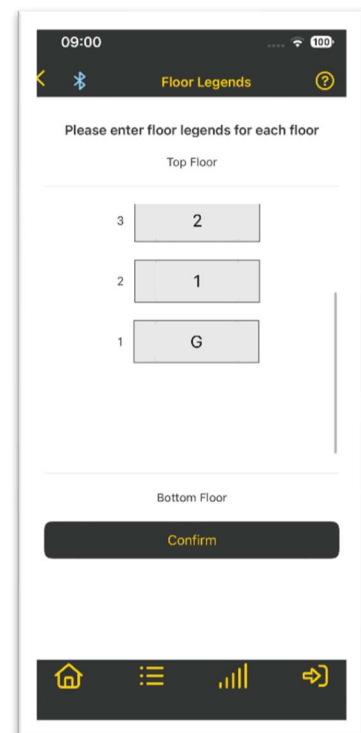
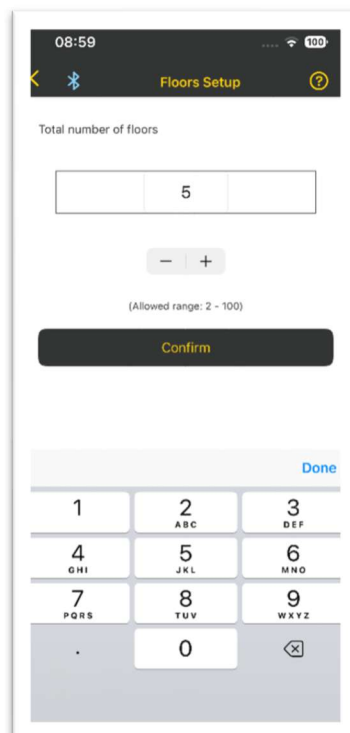
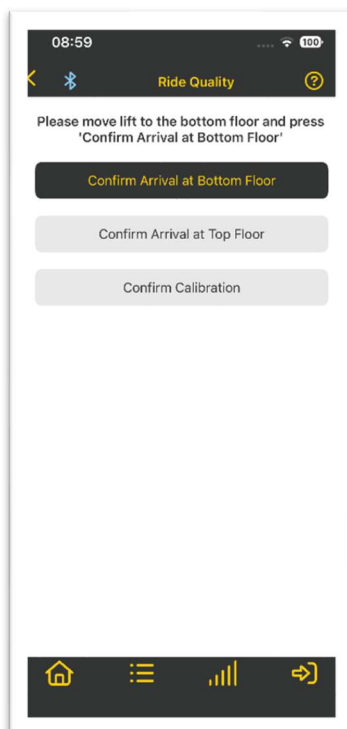
Check door sensor alignment.



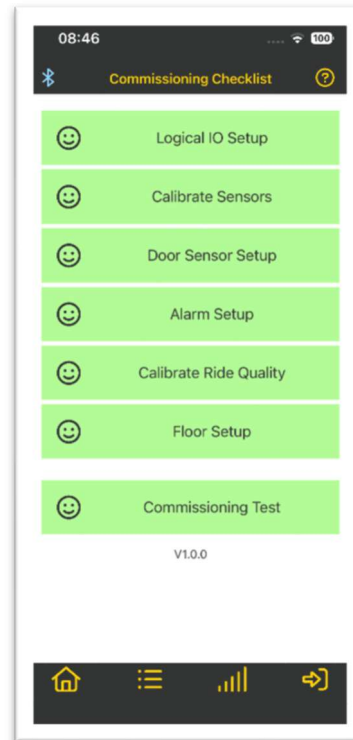
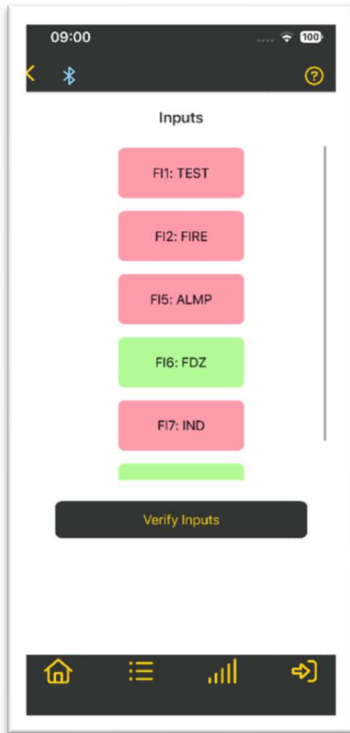
Setup the audible alarm detection if fitted: Follow the prompts to record then test the alarm.



Run the ride quality calibration, the lift will need from its top floor to the bottom floor and back again. Once complete the floor levels are then learnt:



The floor setup is the last thing to commission, once complete the IO and movement detection are tested in the commissioning test screen.



5.1. Floor Level / Door Zone Sensor.

CAUTION

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

tvc Thames Valley Controls

We reserve the right to alter, without giving prior notice, technical data, dimensions and weights described in this manual.
Thames Valley Controls Ltd, Minor Farm Industrial Estate, Flint, Flintshire CH6 5UY
(T): +44 (0) 1352 793222 (F): +44 (0) 1352 793255

Sensor Head Unit Mounting Instructions

Safety

The Lasers within the Laser-Door Zone Unit are classified as Laser Class 2 devices. These are visible lasers. This class is safe for accidental viewing under all operating conditions. However, it may not be safe for a person who deliberately stares into the laser beam for longer than 0.25 s, by overcoming their natural aversion response to the very bright light.

Warning:- Do not stare directly into the beam; avert your eyes immediately!

This unit is not suitable for Fire-Fighting Lifts to EN61-72

Specification

Sensor Specification:-

- Temperature Range -10 to +50c
- Laser Class Class 2 (650nm red)
- Number of Lasers 2
- Beam Distance 450mm (6 3000mm)
- Supply Voltage 10 to 30 V d.c.
- Max Operating Current 100mA
- Photo Protection Yes
- Short Circuit Protection Yes
- Laser IP Rating IP67
- Dimensions 200 x 140 x 70mm

Internal Laser Cable Colours:-

- Brown +24V
- Blue 0V
- White Connected
- Black DZF or DZR

Side View

Front View

The laser unit can be mounted on either the car or the sling. When mounted on the car, levelling may be effected by uneven car loading and compression of the car isolation mountings. If this is anticipated, we recommend the laser unit is mounted on the front of the car where it will more accurately represent the car sill position.

Alternatively the unit can be mounted on the crosshead or sling. When mounting on the sling, check that any excess movement of the sling in the guides (due to wear or adjustment) does not cause the laser beam to miss the target.

- 1) Mount the enclosure horizontally on a fixed secure bed at a 90° Degree vertical and horizontal angle from the Laser Door Zone Reflector. Ensure the beam is perpendicular to the reflector surface.
- 2) Ensure the enclosure is securely fixed and does not shake or move during travel.
- 3) Ensure the Laser Door Zone Unit is not within 150mm of the Door Zone Reflectors, and does not exceed 300 mm in distance.
- 4) Connect the signal cables as per controller schematic drawing.
- 5) If multiple lifts share the same shaft:- Make sure the lifts laser beam only lines up with its own set of reflectors.

Maintenance

Ensure all reflectors and sensors are free from dust or marks, this may affect operation if dirty. If they need to be cleaned use a cloth, moistened with isopropyl alcohol or similar to remove grease or dust from reflectors or sensor windows.

TVC Spare Parts: 063 000230
Laser Sensors:- 600 340173.1
Full Unit:- 200 340051.2
Reflector Assembly:-

Reflector Mounting Instructions

The Laser Door Zone Reflectors can be fitted many different ways depending on your application.

The reflectors comprise of a retro-reflective tape mounted on a magnetic strip, which can be attached directly to architrave or the laser door zone bracket provided. After final adjustment, the reflectors can be permanently secured using super glue.

With the laser door zone unit fitted and lasers active, the mounting options are as follows:-

Using the magnetic reflector strip only:- Architrave or Guide Rail
Using reflector strip with mounting bracket:- Wall Mounted or Uni-Strut Mounted.

Wall Fixing Method.

- 1) Move the car to floor level, the laser should be illuminating the wall.
- 2) Place the Laser Door Zone Bracket against the wall with the laser dot shining centrally on the Laser Door Zone Bracket. Mark the fixings, remove, drill and fix bracket to wall using standard Rawlplugs and self-tapping fixing screws.
- 3) Place reflective strip onto bracket and align.

Uni-Strut Fixing Method

- 1) Fit the uni-strut to the shaft guides in the usual way, within door zone.
- 2) Move the car to floor level, the laser should be illuminating the uni-strut so that the laser dot is shining centrally on the Laser Door Zone Bracket.
- 3) Fix the bracket to the uni-strut using usual guide clips, which can retain 3mm thick brackets. Place the Reflective tape back onto the bracket.
- 4) Align the Retro-Reflective tape so that the laser dot shines directly on the vertical and horizontal centres of the tape.

Front / Rear Zones

Sensor Adjustment

The cross head potentiometer on the sensors can be adjusted for sensitivity. Position the beam on the sensor at the required distance, turn the sensitivity potentiometer to its maximum position (clockwise) this will give the optimum sensitivity for a distance of 150 mm.

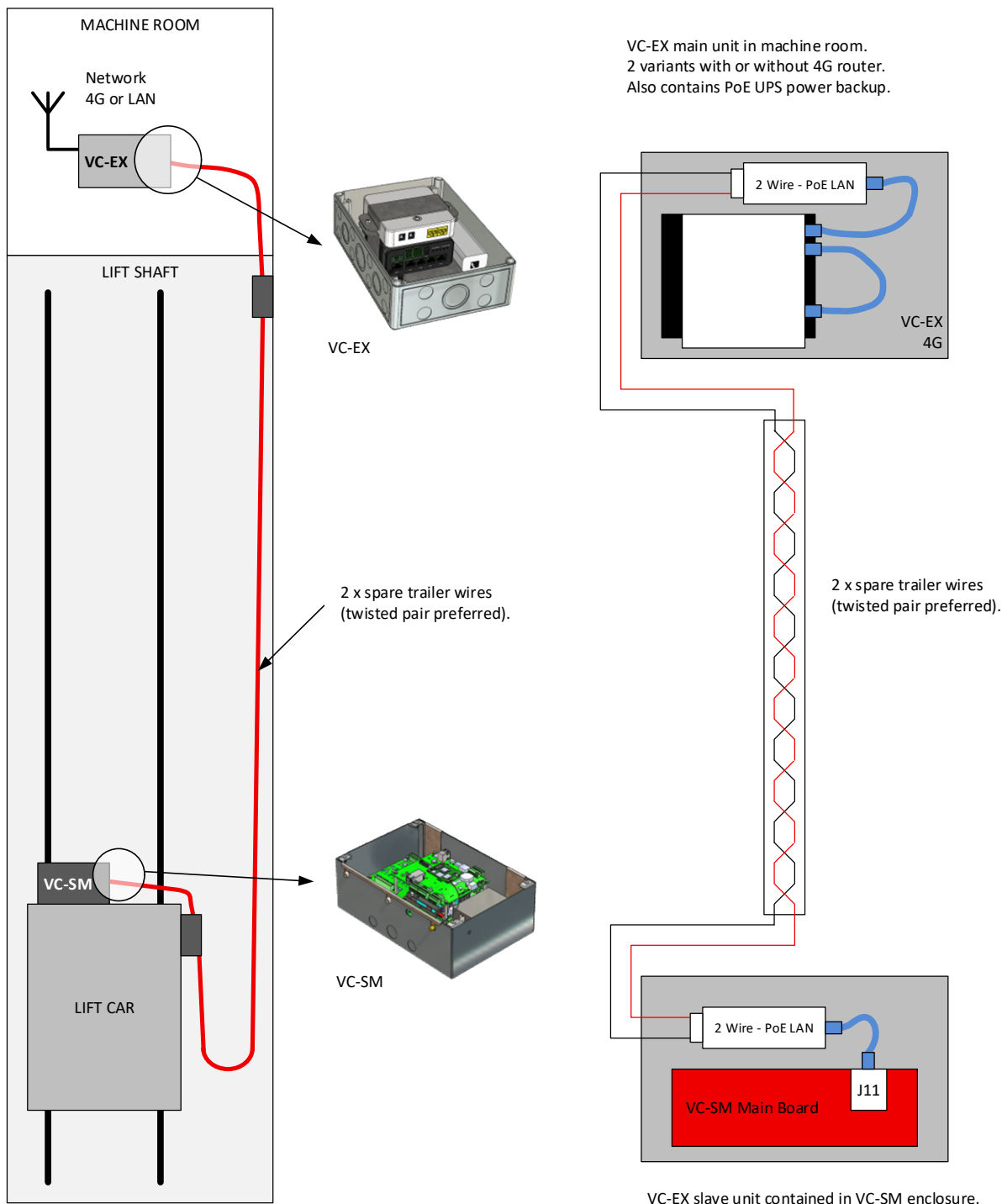
Note the green LED is a power indication and the yellow LED will switch on when the sensor is on target.

5.2. VC-EX - Ethernet 2-wire extenders with router.

If the site has a poor GSM signal the unit can be hardwired back to the building's network or a machine room mounted GSM router. The TVC VC-EX unit comes in 2 parts, an Ethernet to 2-wire converter that is mounted within the VC-SM and the paired 2-wire to ethernet converter and router unit.

Installation:

- 1) Mount the first converter (marked as PoE OUT) within the VC-SM enclosure. Plug this unit into J11 on the VC-SM.
- 2) Mount the main VC-EX unit in the machine-room. Position the antennae in a suitable location.
- 3) Wire the 2 units together via 2 adjacent spare trailers, preferable a twisted pair.
- 4) Wire power to the main unit and switch on.



Document Change Log

Issue	Date	Section / Page	Software Version
1.0	10/06/2026	All - First Issue	VC-SM-V1.0



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