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Plug into *The Current Future*

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# Freedom Lite to Inverter Interfacing Guide

Freedom Won produces various ranges of the popular eTower and Freedom Won LiTE battery to suit all applications. The respective battery ranges available are as follows:

1. eTower
2. LiTE Home and Business
3. LiTE HV Home and Business
4. LiTE Marine (13V, 26V and 52V)
5. LiTE Mobility (golf carts, forklifts etc)
6. LiTE Commercial (including Lite Commercial HV and HV+)
7. LiTE Industrial

For the Freedom Won general purpose 12 V LiFEPO4 batteries not covered here please refer to the 12V battery specification sheet for more information.

The focus of this guide is to summarize the inverter and allied equipment brands that are certified to be compatible with eTower and Freedom LiTE batteries. The interface option covered relates only to the CAN bus or RS485 communication option. For interfacing with analogue and relay drivers in the Marine range please refer to the Lite Marine installation manual.

The CAN bus or RS485 interface is not the only consideration when determining the marriage suitability of an eTower of LiTE and an inverter – the operating voltage and power capabilities must also be matched.

All CAN or RS485 networks must contain two 120 Ohm termination resistors; every LiTE is supplied with one resistor to fit into the second RJ45 CAN Bus socket on the battery, some inverter systems require the addition of another resistor and some have one built in. The eTower master module that the inverter CAN Bus or RS485 will be connected to has a built in termination resistor on the CAN Bus and RS485.

Some systems require a specially made RJ45 cable to accommodate varying pin configurations when connecting to the inverter – these can be purchased from Freedom Won or made by yourself by referring to the LiTE manual for the pin configuration. The

eTower batteries are all shipped with a selection of cables that provides a solution for most inverters on the market and therefore purchasing separate cables is not necessary.

Some inverter systems require a special profile on the eTower or LiTE. If you require this, please contact Freedom Won for assistance.

Refer to the respective eTower or LiTE installation manual for further information on CAN bus communication.

The natural classification for laying out this guide is to split the eTower and LiTE ranges into the following categories based on their nominal operating voltage:

I. 52V and below (this means 13V, 26V and 52V)
II. 150 to 300V
III. 300 to 600V
IV. 600V to 800V

Table 1 provides the inverter and interfacing information for all inverters certified by Freedom Won in each of the above four categories.

Inverter brands not included in Table 1 have not been certified by Freedom Won for the CAN bus or RS485 interface. Should you have another brand of CAN bus or RS485 compatible inverter that you would like to connect to an eTower or LiTE please contact Freedom Won, we would be glad to assist.

There are also a few inverter brands that are not CAN Bus or RS485 enabled and hence have no way to communicate with the eTower or LiTE. These inverters will also work in a system with the eTower or LiTE, but some functionality will be lost because of the lack of information and commands available from the battery. For example, the true SoC of the battery will not be available on the inverter, and the battery will also not be able to stop charge or discharge should it be necessary. The battery will trip to protect itself if this occurs, so there is no safety concern, only a matter of inconvenience. For new installations Freedom Won recommends selecting a CAN Bus or RS485 lithium battery compatible inverter. For retrofits where an inverter without CAN bus or RS485 already exists, the eTower or LiTE can be used, provided that the inverter voltage setpoints are set up correctly – contact Freedom Won for assistance if the eTower or LiTE manual does not provide you with enough information.

The Freedom Won eTower comes with the following inverter cables included:

- CAN Bus Comms cable for Victron inverters
- CAN Bus Comms cable for Type 1 inverters (eg. Sunsynk, Solis, Goodwe, Growatt, Revo)
- RS485 Comms cable for Voltronic/Axpert inverters

Refer to the respective inverter's installation manual to confirm connector type required.

Table 1: Inverter Interfacing Guide Categorized according to Voltage Range Categories

| **Category** | **eTower & Freedom LiTE Models** | **Equipment/ Battery Inverter Brand** | **Equipment Models** | **Installation Notes** |
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| I. (13V,26V,52V) | eTower (52V)<br><br>Freedom LiTE Home and Business (52V)<br><br>Freedom LiTE Commercial (52V)<br><br>Freedom LiTE Marine (13V, 26V, 52V) | Axpert/Kodak | King, Max, VMIII<br><br>48V models to suite 52V LiTE and eTower | For LiTE models a CAN Bus to RS485 Converter accessory is required, available from Freedom Won or certain distributors. Refer to Freedom Won CAN to RS485 Converter installation guide for complete setup information for this inverter.<br>Standard LiTE Profile.<br>Standard Ethernet Cables.<br>No additional resistor.<br>Select "Lib" (for Lithium Battery) in inverter menu under battery type.<br>For eTower models simply plug the inverter RS485 to the correct eTower RS485 plug using the cable supplied with the eTower. |
| | | Goodwe | ES<br><br>48V models to suite 52V LiTE and eTower | "LiTE to Type 1" RJ45 cable required for connecting CAN bus from LiTE to Goodwe – available from Freedom Won.<br>Standard LiTE Profile.<br>No additional resistor.<br>Select Default Lithium 100Ah in the Goodwe app (or Freedom Won if available).<br>For eTower connect CAN Bus using "Type 1" cable supplied with the eTower. |
| | | Growatt/Sunforce | 5kW<br><br>48V model to suite 52V LiTE and eTower | "LiTE To Type 1" RJ45 cable required for connecting CAN bus from LiTE to inverter – available from Freedom Won.<br>Standard LiTE Profile.<br>No additional resistor.<br>For eTower connect CAN Bus using "Type 1" cable supplied with the eTower. |
| | | Imeon | 3.6, 9.12<br><br>48V models to suite 52V LiTE and eTower | "Type Imeon" RJ45 cable required for connecting CAN bus from LiTE to Imeon inverter – available from Freedom Won<br>Non-Standard "Imeon Profile" required on LiTE<br>For eTower connect CAN Bus using "Type 1" cable supplied with the eTower. |

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| | | Ingeteam | Ingecon Sun Storage 1Play 3TL and 6TL<br><br>Semi Compatible with 52V LiTE | Note: operating these inverters on 52V is possible but the battery current is limited by the inverter to 50A and therefore the maximum battery power available from the inverter is about 2.5kW.<br>Standard Ethernet cable can be used for the CAN bus – the inverter end has no plug, only wire terminals (see Lite manual for the cable configuration)<br>Non-Standard "Ingeteam Profile" required on LiTE<br>No additional resistor required<br>Note: The Lite cables will not fit into the terminals directly on the Ingeteam Inverter as the terminals are too small.<br>Note: These inverters cannot be connected in parallel or 3-phase owing to limitations to the Ingeteam firmware.<br>eTower is not compatible. |
| | | Koyoe | 3kVA Hybrid<br><br>48V models to suite 52V LiTE and eTower | Contact Freedom Won if you need to connect one of these inverters to a LiTE |
| | | MLT | PowerStar10<br>Oasis<br>Nomad MPPT<br><br>48V models to suite 52V LiTE and eTower | The MLT range of products offers complete CAN bus interfacing from the 2019 models onwards.<br>PowerStar10 – Use a "LiTE to Type 1" RJ45 Ethernet Cable available from Freedom Won. The inverter includes a 2 pin jumper header to enable the termination resistor if it is the last in the CAN bus line.<br>Oasis – same as PowerStar<br>Nomad – A CAN terminal plug is provided on the PC board of the Nomad with a resistor that can be enables with a bridge (see Nomad manual)<br>Standard Lite Profile<br>For eTower connect CAN Bus using "Type 1" cable supplied with the eTower. |
| | | Revo | 5kVA<br><br>48V models to suite 52V | Requires "Type 1" CAN Bus cable available from Freedom Won.<br>Standard Lite Profile<br>No additional resistor required |

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| | | | LiTE and eTower | For eTower connect CAN Bus using “Type 1” cable supplied with the eTower. |
| | | SMA | Sunny Island<br><br>48V model to suite 52V LiTE and eTower | “Type SMA” RJ45 cable required<br>Standard Lite Profile<br>Additional resistor supplied with inverter<br>For eTower connect CAN Bus using “eTower to Type SMA” cable available from Freedom Won. |
| | | Sofar Solar | 3kW<br>48V models to suite 52V LiTE and eTower | Please contact Freedom Won if you have a Sofar Solar 48V inverter to connect to a LiTE |
| | | Solax | Various<br><br>48V models to suite 52V LiTE and eTower | Please contact Freedom Won if you have a Solax to connect to a LiTE |
| | | Solis/Kodak | 3 to 6kW models<br><br>48V models to suite 52V LiTE and ETower | “LiTE to Type 1” RJ45 cable required for connecting CAN bus from LiTE to inverter – available from Freedom Won.<br>Special “Solis” LiTE Profile required from Freedom Won.<br>No additional resistor.<br>For eTower connect CAN Bus using “Type 1” cable supplied with the eTower. |
| | | Studer | Variotrack and Xtender models<br><br>48V models to suite 52V LiTE and eTower | System must include an XCom CAN module and RC3 module. Connect Lite CAN to XCom CAN module and set the XCOM CAN dip switches according to the pin configuration required (see Lite Manual for Lite CAN pin configuration)<br>Standard Lite Profile<br>Termination resistor dip switch available on XCOM CAN device.<br>For eTower connect CAN Bus using “Type 1” cable supplied with the eTower. |
| | | Sunsynk/Daye | 5kW and 8kW Hybrid<br><br>48V models to suite 52V LiTE and eTower | “Type 1” CAN RJ45 cable required. No additional resistor required. Select Battery Type 00 on the Sunsynk/Daye<br>Standard Lite Profile required<br>For eTower connect CAN Bus using “Type 1” cable supplied with the eTower. |

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| | | Victron | Quattro, MultiPlus<br><br>Models available in 12V, 24V and 48V to suite the LiTE Marine 13V, 26V and 52V models respectively<br><br>48V Victron models suite the LiTE 52V and eTower models | All Victron systems must include a Venus device i.e. Venus GX, Color Control GX, Cerbo, Octo GX, Maxi GX. This is required to interface the LiTE with the inverter over CAN Bus. Use a standard ethernet cable to connect the Lite CAN bus to the Venus Ve.CAN.<br>Standard LiTE Profile<br>Termination resistors supplied with Venus device<br>See Freedom Won Compatibility Guide on the Victron Energy website for further information.<br>For eTower connect CAN Bus using "Victron" cable supplied with the eTower. |
| II.<br>(150V to 300V) | Freedom Lite Home and Business HV | Ingeteam | Ingecon Sun Storage 1Play 3TL and 6TL | The original Freedom Lite Home and Business HV range was specifically designed for the Ingeteam inverters. The Ingeteam inverters are very efficient and compact covering high performance for a residential solution – full power is available from the inverter when operating on battery owing to the higher DC voltage.<br>Standard Ethernet cable can be used for the CAN bus – the inverter end has no plug, only wire terminals (see Lite manual for the cable configuration)<br>Non-Standard "Ingeteam Profile" required on Lite<br>No additional resistor required<br>The Lite Home HV cables will fit into the terminals on the Ingeteam Inverter as the terminals HV cables are much smaller owing to lower current.<br>*Note: These inverters cannot be connected in parallel or 3 phase owing to limitations to the Ingeteam firmware.* |
| III.<br>(300V to 600V) | Lite Home and Business HV+ (Note only HV+ models not HV models) | ATESS<br><br>ATESS inverters Available from Freedom Won | Hybrid battery inverters 30kW to 150kW: | Note: Only 40/32HV+ upwards is compatible with these inverters i.e. not the 30/24HV+<br>Standard ethernet cable for CAN Bus (connects to terminals in the inverter)<br>"ATESS Lite Profile" required |

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| | Lite Commercial HV | with Lite HV battery purchase | HPS30, 50, 100 and 150 | No additional termination resistor required.<br>Inverters available from Freedom Won along with design, installation, and commissioning assistance. |
| | | Sofar Solar Inverters available from Freedom Won | 20kVA 3 Phase | Note: 30/24HV+ is compatible with slight power derating owing to lower than ideal voltage. All other Lite Home and Business **HV+** models offer full performance.<br>Standard ethernet cable for CAN Bus (connects to a terminal multipin plug on the inverter)<br>"Sofar Solar Lite Profile" required<br>No additional termination resistor required |
| IV.<br>(600V to 800V) | Lite Commercial HV+<br>Lite Industrial | ATESS<br><br>ATESS inverters Available from Freedom Won with Lite HV+ battery purchase | Battery Inverters 50kW to 630W PCS50, 100, 250, 500, 630 | This is a pure battery inverter range designed to couple with DC solar charge controllers (PBD250 and 350). Freedom Lite must be an HV+ model. Lite requires "ATESS Lite" profile. Standard ethernet cable required. No additional resistor required. Inverters available from Freedom Won along with design, installation, and commissioning assistance. |
| | | Socomec | Various models available – typical range 100kW to 500kW | Contact Freedom Won for assistance with interfacing with this brand |
| | | Elpower | Various Models available – typical range 100kW to 500kW | Contact Freedom Won for assistance with interfacing with this brand |
| | | ABB | MGS100 – various sizes | Contact Freedom Won for assistance with interfacing with this brand |
| | | Delta | PCS2000 range | Contact Freedom Won for assistance with interfacing with this brand |
| | | Kehua | Various models – 100kW to 1,5MW | Contact Freedom Won for assistance with interfacing with this brand |

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Freedom Won Technical Contact Details

Please use the following contact details to make enquiries on technical matters or for actual technical support with design and/or commissioning:

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Please contact the Freedom Won office for urgent assistance if the mobile number is temporarily engaged or unavailable (see www.freedomwon.co.za for contact details).