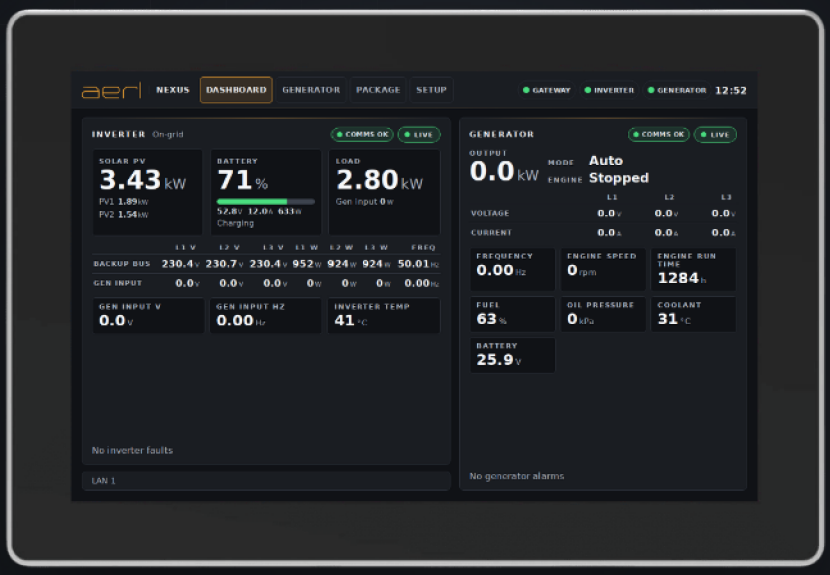
Industrial HMI

10.1" Sunlight-Readable Touch HMI



HMI-10 · NEXUS-HMI-10

Installation and Operation User Manual

REV 1.0.0, 8 NOV 2026

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Installers and site operators

Model
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About AERL

Australian Energy Research Laboratories (AERL) was founded in 1985 by Stuart Watkinson to commercialise the Power Optimizer, which he developed while studying at the University of Queensland. It became the AERL MAXIMIZER™, a universal maximum power point tracker (MPPT).

Today AERL designs, integrates and supports power conversion, lithium energy storage, monitoring and earth-fault detection products for commercial, industrial and off-grid energy systems, including oil and gas, mining and telecommunications sites.

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Important Safety Information

About this Manual, safety notes

01

This manual contains important safety information and installation and operating instructions for the AERL Industrial HMI (HMI-10). It uses the following symbols for important operating information and potentially dangerous conditions.

Important

Indicates information that must be followed to ensure proper installation or operation of the HMI-10.

Caution

Indicates a critical procedure for the safe installation or operation of the HMI-10 or the equipment it controls.

1.1 About This Manual

This manual covers installing the HMI-10, connecting it to the site's inverter and generator controller, and using its screens. Read all of its instructions and cautions before you start.

Only qualified electricians and technicians may install and commission the HMI-10. Site operators may use the Dashboard; the control and setup screens are protected by a PIN.

Do not disassemble or attempt to repair the HMI-10 unless you are a qualified technician and have authority in writing from AERL to do so.

AERL will not be held responsible in any way for the mishandling of this product or for installation of the product in a manner that does not follow the instructions in this manual or as advised by AERL.

1.2 Safety Notes

Caution

- The HMI-10's control screens start and stop real equipment. Before you send a command, make sure it is safe to do so: the screen states the consequence of each command and asks you to confirm it.
- Package control and its Emergency stop button are **not a safety function**. The site's hardwired emergency stop circuit remains the safety stop.
- Isolate the DC supply before you connect or disconnect the power input.
- Connect a 24 Vdc supply only through an in-line 12 V regulator (contact AERL).

Important

- Change the default PIN (0000) at commissioning (Setup > Security).
- The front of the HMI-10 is rated IP65. When it is rear-mounted behind a window in a switchboard door, the window and the door seal keep water out; the rest of the unit is not sealed.

Introduction

02

What the HMI-10 works with, screens at a glance

The AERL Industrial HMI (HMI-10) is a 10.1″ sunlight-readable touch panel with the AERL Nexus software built in. It gives operators a local view of the site's inverter and generator, and gives authorised staff local control of both.

The HMI-10 is the local control point of the system. It reads the inverter and the generator controller over Modbus (Ethernet, with RS-485 as an option), shows their values on its screens, sends start, stop and mode commands, and serves the same data to the site's SCADA system over Modbus TCP.

2.1 What the HMI-10 Works With

Equipment	How the HMI-10 connects
Solinteg M2HT inverter	Modbus TCP over Ethernet (default port 502), or Modbus RTU over RS-485
Deep Sea Electronics DSE74xx MKII generator controller	Modbus TCP over Ethernet (unit ID 10), or Modbus RTU over RS-485
Site SCADA	Modbus TCP server on the HMI-10 (read; package commands from allowed addresses only)

The HMI-10 is the only Modbus client of the inverter and the generator controller. Do not connect another Modbus master to them.

2.2 Screens at a Glance

Screen	Access	What it is for
Dashboard	Open	Live inverter and generator values, faults and alarms
Generator	PIN	Generator mode (Auto, Manual), Start, Stop, Reset alarms, telemetry start
Package	PIN	Inverter package Start, Stop, Emergency stop, Clear emergency stop
Setup	PIN	Device links, SCADA server, Network, Quiet hours, Security

Specifications

Display and touch, power, computing and interfaces

03

3.1 Display and Touch

Parameter	Value
Diagonal size	10.1 in
Resolution	1280 × 800 (WXGA)
Panel type	IPS · normally black, transmissive
Luminance	1000 cd/m²
Viewing direction	All
Touch panel	Capacitive · up to 10 touch points
Backlight	White LED · 30 000 h min. life

3.2 Power

Parameter	Value
Input voltage	12–24 Vdc (24 Vdc supplies need an in-line 12 V regulator; contact AERL)
Power consumption	9.6 W typ. (static desktop, default brightness)

3.3 Computing and Interfaces

Parameter	Value
Processor	Rockchip RK3568 · quad-core Cortex-A55, 2.0 GHz · Mali-G52 GPU
Memory	2 GB LPDDR4
Storage	32 GB eMMC · TF card slot
Operating system	Linux
Ethernet	2 × 10/100/1000
RS485 · CAN · RS232	2 × each (expansion IO header)
Wireless	Wi-Fi · Bluetooth · 4G LTE (nano SIM)
USB	2 × USB-A · 1 × USB-C (OTG)
Video out	HDMI 1.4

3.4 Mechanical and Environment

Parameter	Value
Dimensions (W × H × D)	260.4 × 177.4 × 37 mm
Weight	1.21 kg typ.
Enclosure	Full metal
Ingress protection	IP65 (front)
Operating temperature	−20 to 70 °C
Storage temperature	−30 to 80 °C
Mounting	Panel mount, or rear mount · 4 × M4 threaded holes, VESA 75 × 75 mm
Certifications	RoHS
Part number	NEXUS-HMI-10 (model HMI-10)
Warranty	2 years

Installation

04

Location, mounting, power, network and equipment connections

All installations must comply with national and local electrical standards and codes of practice.

4.1 Location

> **Important**
>
> - Mount the HMI-10 where operators can see and reach the screen, out of direct rain. The front is rated IP65; the rear is not sealed.
> - Keep the unit within its operating temperature range, −20 to 70 °C. In a switchboard, allow for the heat of the equipment around it.
> - Route cables downwards away from the unit, so that water on a cable cannot run back into it.

4.2 Mounting

The HMI-10 mounts one of two ways:

- **Panel mount**, through a cut-out in a panel or door.
- **Rear mount**, behind a window in the switchboard door, on the four M4 threaded holes in the back of the unit (VESA 75 × 75 mm pattern).

For a rear mount, seal the window in the door so that the front of the HMI-10 stays dry. Contact AERL for the panel cut-out dimensions.

4.3 Power

1. Isolate the DC supply.
2. Connect a 12 Vdc supply to the HMI-10's DC input, positive and negative as marked on the unit. From a 24 Vdc supply, fit the in-line 12 V regulator (contact AERL) between the supply and the HMI-10.
3. Restore the supply. The HMI-10 starts on its own: see Starting Up in the Getting Started chapter.

> **Caution**
> Check the polarity and the voltage at the HMI-10's input before you connect it. Applying more than the rated input voltage, or reversed polarity, may damage the unit and is not covered by the warranty.

4.4 Network and Equipment Connections

The HMI-10 has two Ethernet ports, **LAN 1** and **LAN 2**. One port is enough: the inverter, the generator controller and the SCADA system can all be on one switch connected to LAN 1. LAN 2 is optional.

1. Connect LAN 1 to the site switch with a Cat5e or Cat6 patch lead.
2. Connect the inverter and the generator controller to the same switch, and give each a fixed IP address on the site network.
3. If the site uses RS-485 instead of, or as well as, Ethernet, wire the device to an RS-485 channel on the HMI-10's expansion IO header: **channel 0 (A0, B0)** or **channel 1 (A1, B1)**. Terminate the RS-485 line at both ends as the device manufacturer says.
4. Set the links in Setup on the HMI-10 (Setup > Inverter and Setup > Generator; see the Setup chapter).

> **Important**
> Use shielded twisted-pair cable for RS-485 and keep data cables away from power cables.

Getting Started

Starting up, the screen header, touch and the keypad

05

5.1 Starting Up

When power is applied, the HMI-10 starts its software and then shows the Dashboard. Start-up can take up to about two minutes. The HMI-10 does not need an internet connection to start or to show the site's equipment.

5.2 The Screen Header

Every screen has the same header:

- The AERL logo and the title **Nexus**.
- The screen buttons **Dashboard**, **Generator**, **Package** and **Setup**.
- Three status chips, **Gateway**, **Inverter** and **Generator**, with a coloured dot: green when that part is working, amber when its data is old (stale) and red when it has no connection.
- The time, in 24-hour format.

5.3 Touch and the Keypad

The HMI-10 is used by touch only; there is no keyboard or mouse. Numbers, addresses and PINs are entered on an on-screen numeric keypad. Touch a field to open the keypad, enter the value and touch **OK**, or **Cancel** to leave the value as it was.

5.4 PIN and Locking

The Dashboard is open to everyone. The Generator, Package and Setup screens ask for the PIN ("Enter PIN for Generator control", "Enter PIN for Package control", "Enter PIN for Setup").

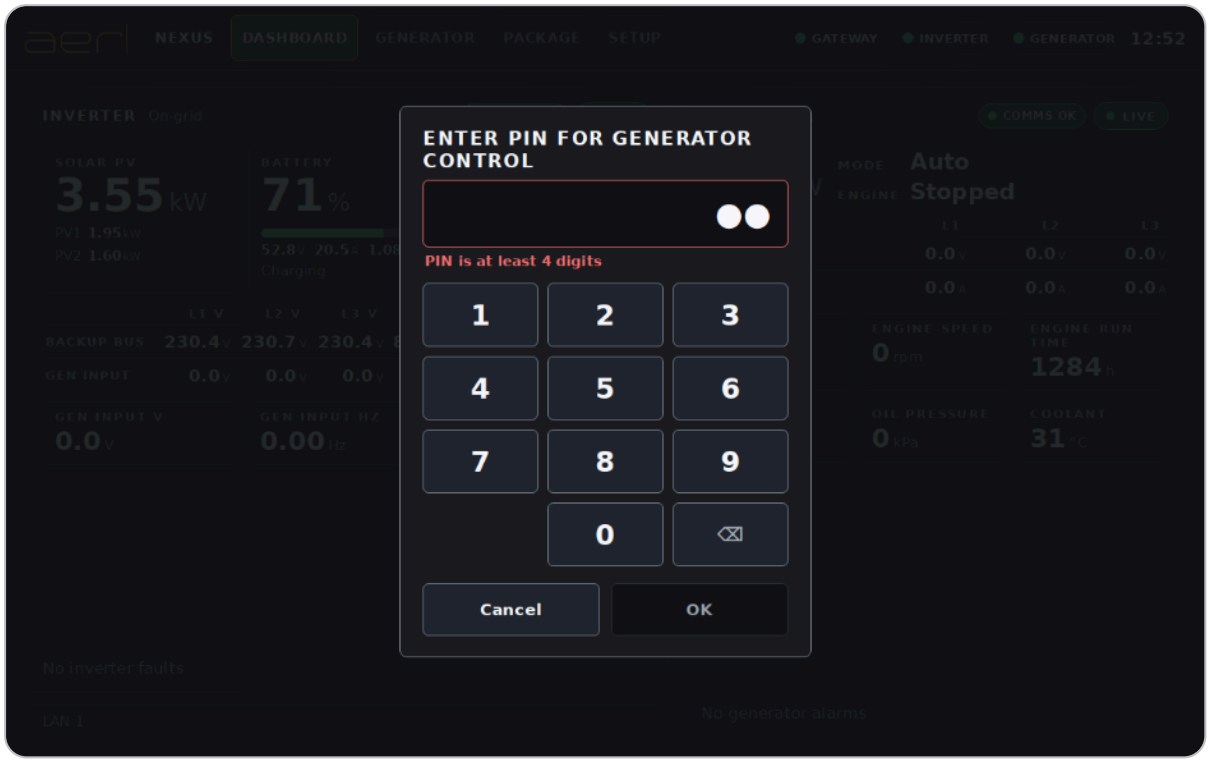


Figure 5.1 PIN prompt, opening the Generator screen

- The PIN is 4 to 8 digits. The default PIN is **0000**: change it at commissioning (Setup > Security).
- After five wrong PINs, PIN entry is locked for 60 seconds.
- A protected screen locks again after 2 minutes without a touch. Touch **Lock** (Generator, Package) or **Lock setup** (Setup) to lock it straight away.
- If the screen shows "Session expired. Enter PIN again.", enter the PIN again.

Dashboard

Inverter card, generator card, connection pills

06

The Dashboard shows the live state of the inverter and the generator. It needs no PIN.

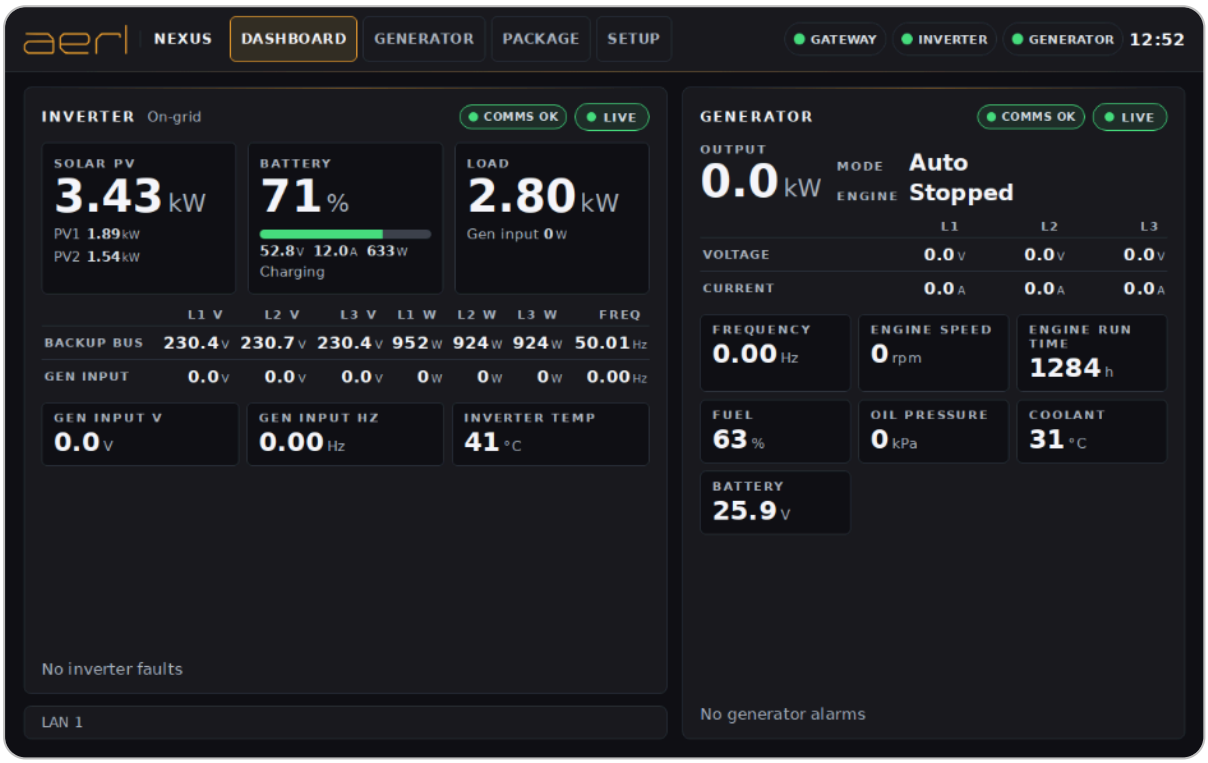


Figure 6.1 The Dashboard

6.1 Inverter Card

- The inverter's working status, next to the card title (for example On-grid).
- **Solar PV**: total PV power and each PV input (PV1, PV2).
- **Battery**: state of charge with a bar, battery voltage, current and power, and Charging, Discharging or Idle.
- **Load**: load power and the generator input power.
- A phase table: the **Backup bus** and **Gen input** voltage and power on L1, L2 and L3, and their frequency.
- **Gen input V**, **Gen input Hz** and **Inverter temp**.
- The inverter's active faults, or "No inverter faults".

6.2 Generator Card

- **Output** (kW), **Mode** (for example Auto) and **Engine** (for example Stopped or Running).
- Voltage and current on L1, L2 and L3.
- **Frequency**, **Engine speed**, **Engine run time**, **Fuel**, **Oil pressure**, **Coolant** and the generator's starter **Battery** voltage.
- The quiet hours line, when quiet hours are set (see the Setup chapter).
- The generator's active alarms, or "No generator alarms".

6.3 Connection Pills

Each card has two pills in its top corner. The comms pill shows the state of the link to the device, for example **Comms OK** or **Comms no reply**. The data pill shows whether the values are **Live** or **Stale**, or that the link is down or disabled. When a device is running on its RS-485 fallback link, the card says so.

6.4 Alarms and Faults

Alarms and faults are listed at the foot of each card, the most serious first: a solid red bar for a shutdown or an electrical trip, a yellow outline for a warning. When there are more than fit, the list says how many are active ("3 active, swipe to see all"): swipe the list to see the rest.

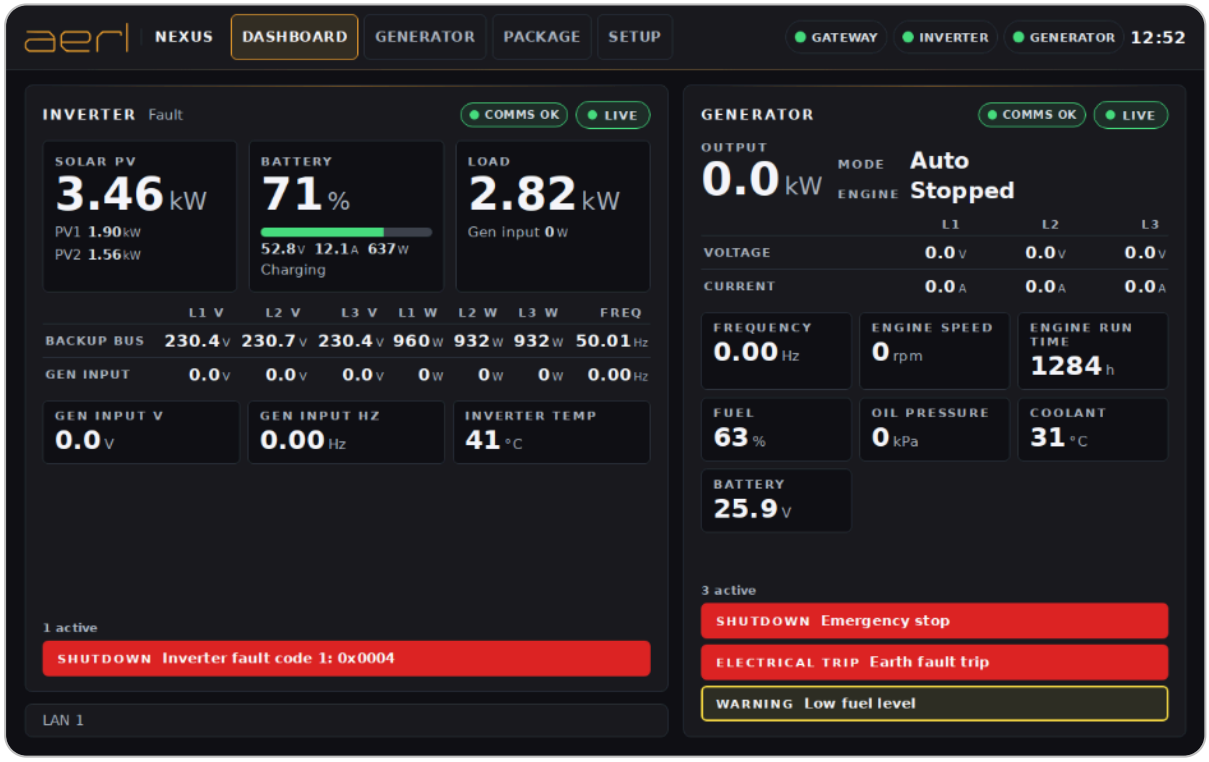


Figure 6.2 Dashboard with an inverter fault and generator alarms

6.5 Stale and Missing Values

When the HMI-10 has not had a good reading from a device for longer than its stale limit, that device's values are shown greyed as "--", with the time of the last good reading ("Last read 62 s ago"). The screen keeps trying and shows live values again as soon as the device answers.

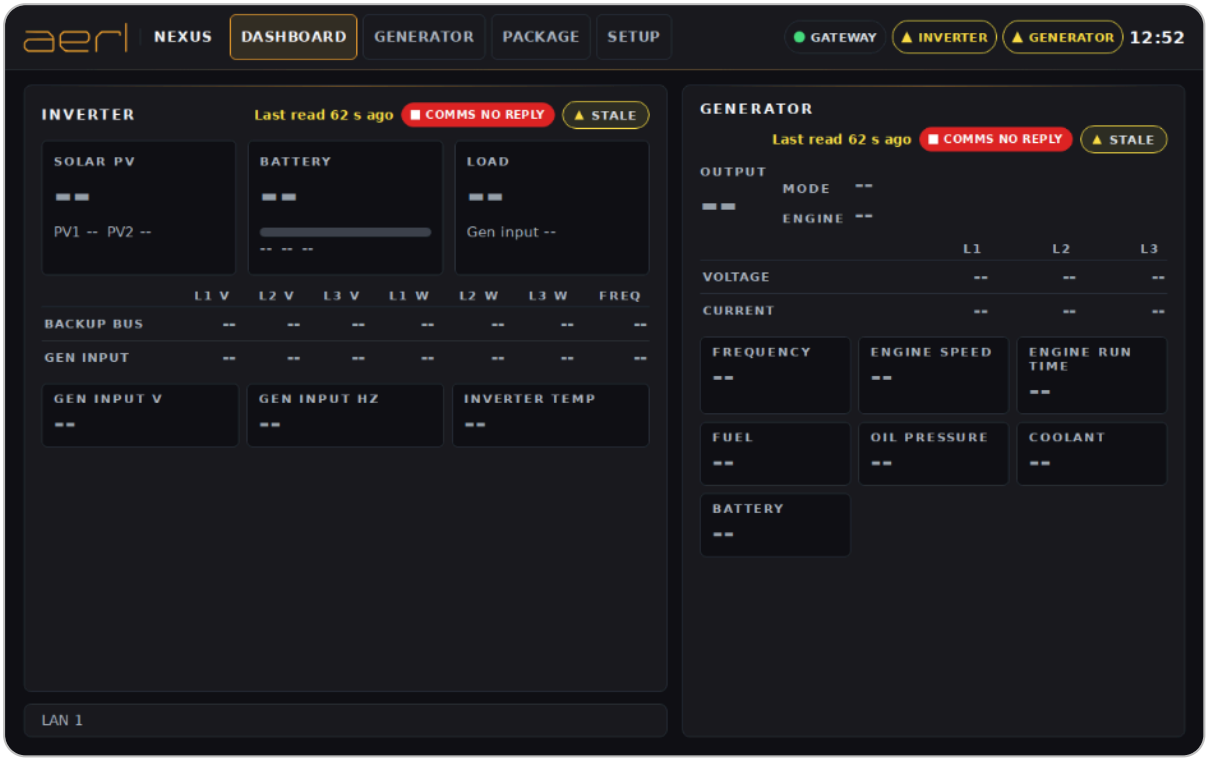


Figure 6.3 Dashboard with both devices not answering

Generator Control

07

Commands, when a button is greyed out, status panel, quiet hours

The Generator screen controls the generator through its controller. It needs the PIN.

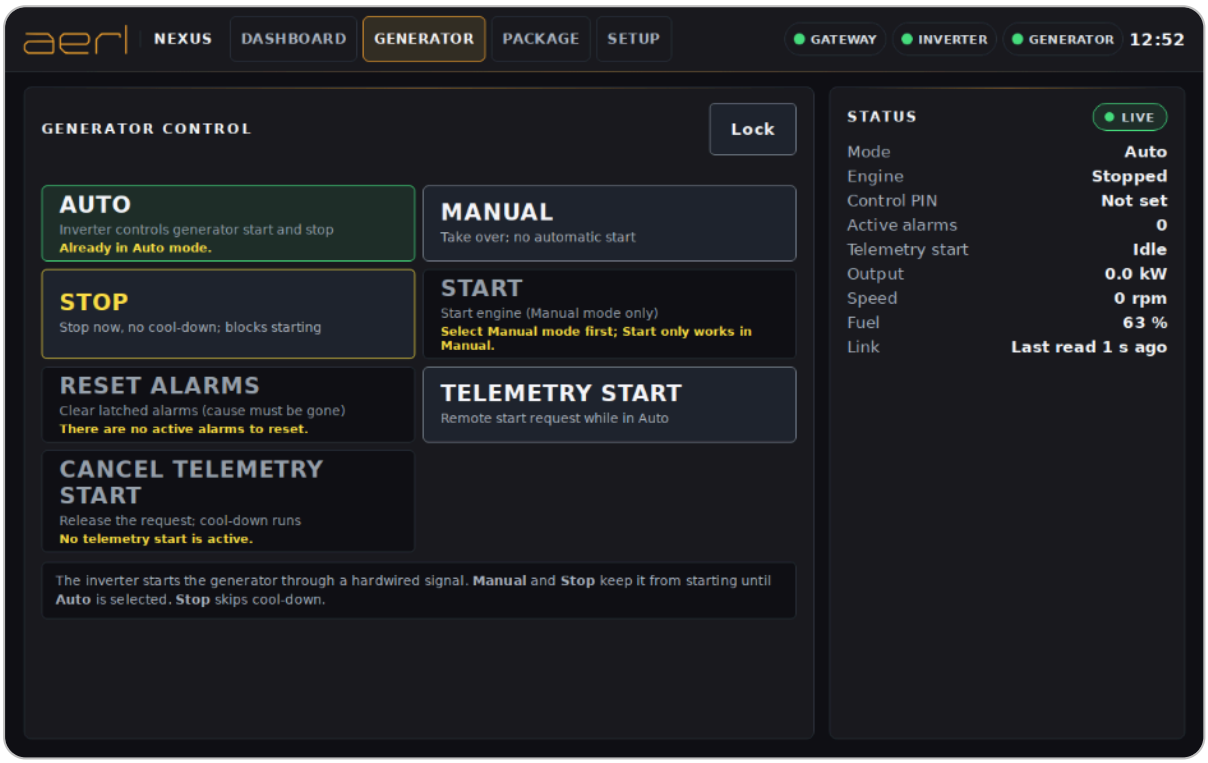


Figure 7.1 The Generator screen

7.1 Commands

Button	What it does
Auto	The inverter controls generator start and stop
Manual	Take over: no automatic start
Stop	Stop now, no cool-down; blocks starting
Start	Start engine (Manual mode only)
Reset alarms	Clear latched alarms (the cause must be gone)
Telemetry start	Remote start request while in Auto
Cancel telemetry start	Release the request; the cool-down runs

Every command opens a confirmation that states its consequence, for example "Make sure the area around the generator is clear." before a start, or "Only reset after the cause has been checked." before an alarm reset. Touch the confirm button to send it.

The inverter starts the generator through a hardwired signal. **Manual** and **Stop** keep it from starting until **Auto** is selected again.

7.2 When a Button Is Greyed Out

A command that cannot be sent is greyed, with the reason under it: for example "Already in Auto mode.", "Select Manual mode first; Start only works in Manual.", or "There are no active alarms to reset." Control is also unavailable while the generator's data is stale or disconnected, while generator panel control is switched off in Setup, or while the generator controller's control PIN is missing or has been rejected.

7.3 Status Panel

The panel beside the buttons shows the generator's **Mode**, **Engine** state, **Control PIN** state, **Active alarms**, **Telemetry start**, **Output**, **Speed**, **Fuel** and **Link**, and the result of the last command as the HMI-10 follows it (for example cranking, running up, running, or failed to start).

7.4 Quiet Hours

If a start is requested during quiet hours, the screen says "Quiet hours are active" and offers **Start anyway** or **Do not start**.

Package Control 08

The Package screen starts and stops the inverter package. It needs the PIN, and package control must be switched on in Setup > SCADA server.

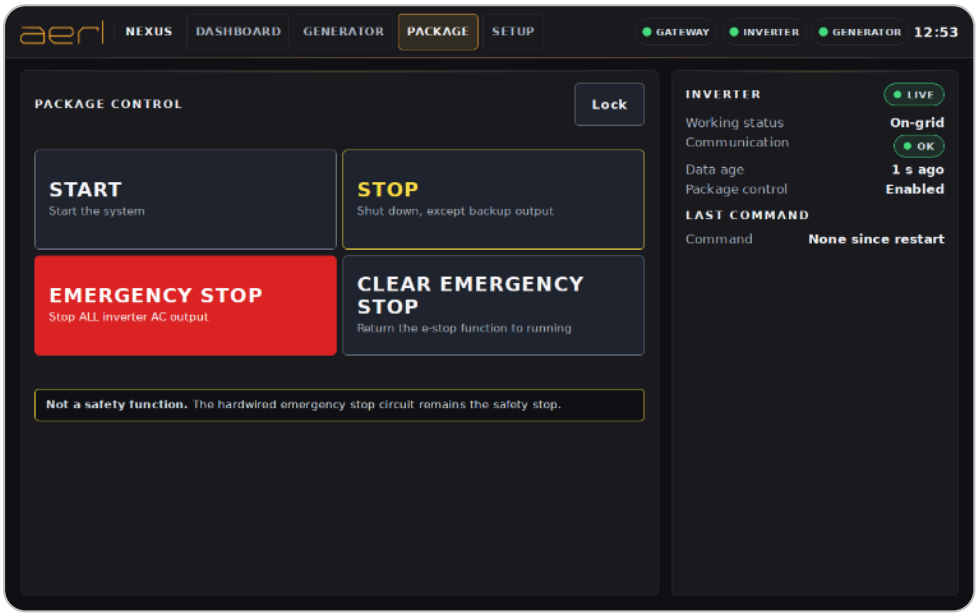


Figure 8.1 The Package screen

> **Caution**
> Package control is not a safety function. The hardwired emergency stop circuit remains the safety stop.

Button	What it does
Start	Start the system. Confirm only when it is safe to energise the system.
Stop	Shut down, except backup output. The site supply may be affected.
Emergency stop	Stop ALL inverter AC output. You are asked to confirm twice ("Yes, emergency stop").
Clear emergency stop	Return the e-stop function to running.

The panel beside the buttons shows the inverter's **Working status**, **Communication**, **Data age** and whether **Package control** is Enabled, and the last command: its **Counter**, **Command**, **Result** (Accepted, Rejected by inverter, or No reply from inverter) and **Source** (SCADA, or This touchscreen).

A command that has no reply may or may not have been applied: check the inverter's working status before you send it again. The HMI-10 never repeats a command by itself.

Setup

Making a change, inverter and generator, SCADA server, network

09

Setup holds the HMI-10's settings. It needs the PIN. The menu on the left opens **Inverter**, **Generator**, **SCADA server**, **Network**, **Quiet hours** and **Security**.

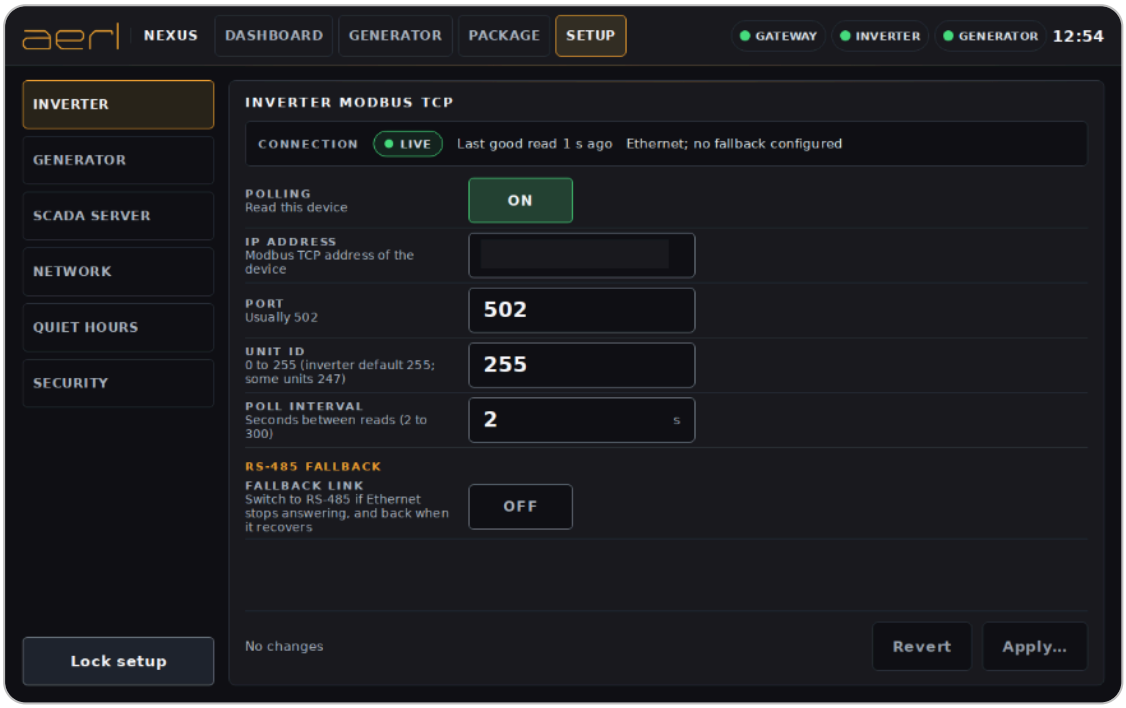


Figure 9.1 Setup: the inverter link

9.1 Making a Change

Changes you make form a draft ("Unsaved change"). Touch **Apply** to see the list of changes and confirm them, or **Revert** to discard them. The screen then shows "Settings applied", or "Not applied" if the change was not kept.

9.2 Inverter and Generator

Setting	Use
Polling	Read this device (On or Off)
Link	Ethernet, or RS-485 where the device offers it
IP address	The device's Modbus TCP address on the site network
Port	Usually 502
Unit ID	Inverter: 0 to 255 (the inverter's default is 255; some units use 247). Generator: fixed at 10 over Ethernet; set at the controller on RS-485

Setting	Use
Poll interval	Seconds between reads (2 to 300)
RS-485 fallback	On an Ethernet link: switch to RS-485 if Ethernet stops answering, and back when it recovers
RS-485 settings	Channel (0: A0, B0; 1: A1, B1), baud rate and unit ID; 8 data bits, no parity, 1 stop bit

The generator page also has:

- **Generator controller PIN**: the controller's own control PIN, entered once and never shown. The controller locks out after three wrong PINs (for 1 minute, doubling each time up to 64 minutes), so the HMI-10 never retries a rejected PIN: enter the correct one.
- **Panel control**: allow Auto, Manual, Stop and Start from this screen. When it is off, the Generator screen shows the values but its buttons are greyed.

9.3 SCADA Server

The HMI-10 serves the inverter, generator and HMI-10 status to the site SCADA system as a Modbus TCP server.

- **Package control**: off by default. It is needed for both SCADA and this touchscreen to start or stop the inverter.
- **SCADA writers**: the IP addresses allowed to send package commands (at most 16).
- **Bind address**, **Port** (usually 502) and **Allowed clients**: who may read the data. An empty list allows local-network clients only.
- **Served units**: unit 1 (inverter), unit 10 (generator controller) and unit 100 (HMI-10 status and the package control result), each with a stale limit. With no reply from a device for longer than its stale limit, SCADA reads of that unit return a Modbus exception.

Contact AERL for the SCADA register map.

9.4 Network

Set the address of each port, **LAN 1** or **LAN 2**: **DHCP** (the default) or **Static** with an IP address, netmask, gateway and up to two DNS servers. The gateway is needed for remote support.

A network change is on trial: after you apply it, the HMI-10 checks the new setting and undoes it by itself after 2 minutes unless you touch **Keep**. Touch **Undo** to go back straight away. This keeps a wrong address from cutting the HMI-10 off its network.

9.5 Quiet Hours

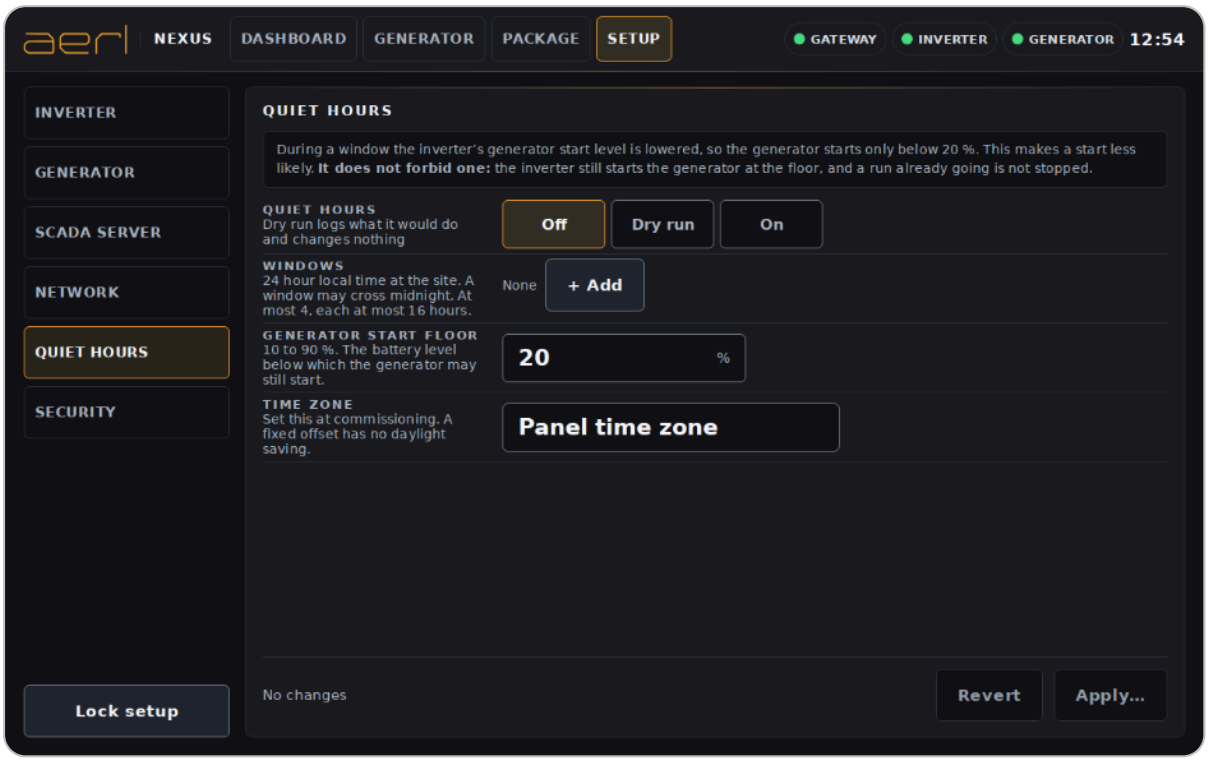


Figure 9.2 Setup: quiet hours

During a quiet-hours window the inverter's generator start level is lowered, so the generator starts only below the generator start floor. This makes a start less likely. It does not forbid one: the inverter still starts the generator at the floor, and a run already going is not stopped.

- **Quiet hours**: Off, Dry run (logs what it would do and changes nothing) or On.
- **Windows**: in 24-hour local time at the site. A window may cross midnight. At most 4, each at most 16 hours.
- **Generator start floor**: 10 to 90%. The battery level below which the generator may still start.
- **Time zone**: set this at commissioning. A fixed offset has no daylight saving.

9.6 Security

Change the Setup PIN here: enter the current PIN, then the new PIN twice. Until the default PIN is changed, the page shows "The default PIN is still in use. Change it now." The **About** line shows the software version (for example "Nexus software 0.2.0"): quote it when you contact AERL.

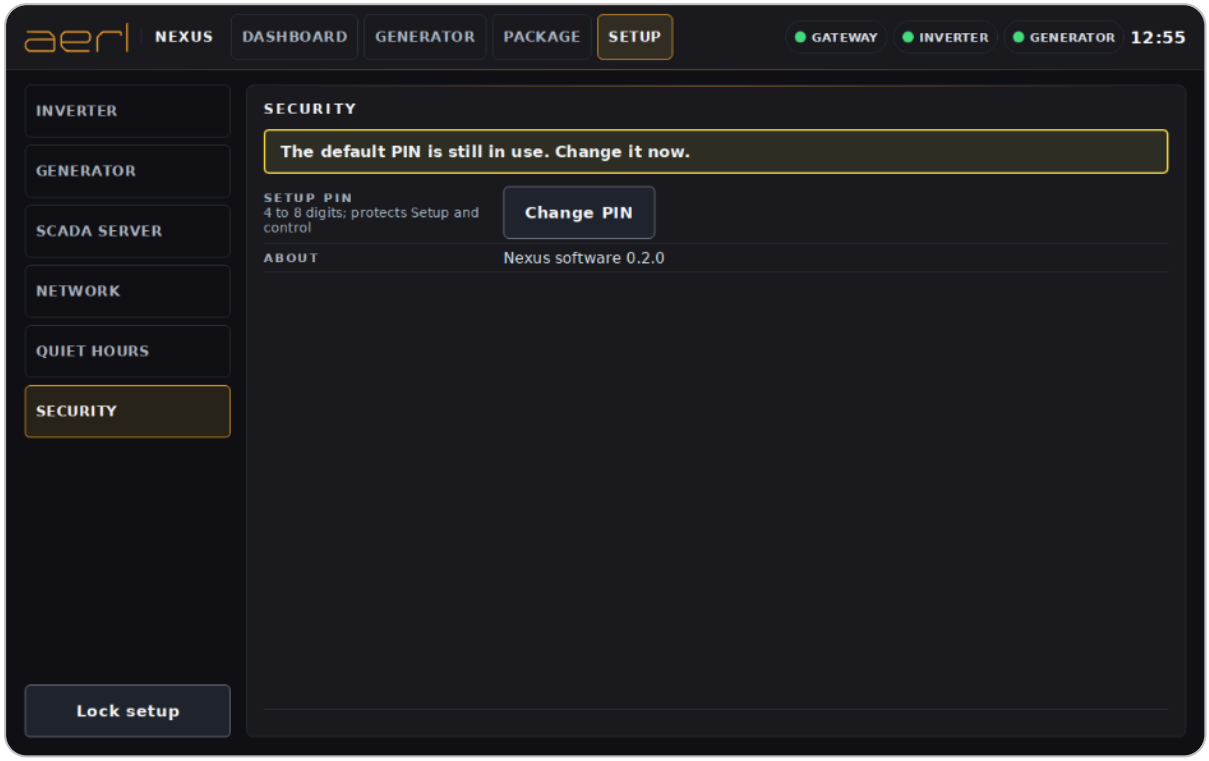


Figure 9.3 Setup: security

Troubleshooting 10

The HMI-10 shows a banner across the top of the screen when something is wrong. It keeps trying in the background and recovers by itself when the cause is fixed.

What the screen shows	What to do
"The screen has lost contact with the Nexus. Retrying... Values below are not live."	The HMI-10's own software is restarting. Wait a minute. If it stays, switch the HMI-10 off and on again.
"The gateway is not responding. Waiting for it to come back..."	As above. If it stays after a restart, contact AERL support.
"Settings cannot be read from the gateway."	Wait a minute and open Setup again. If it stays, contact AERL support.
"Inverter: Ethernet and RS-485 links are both down." (or Generator)	Check the device has power, the Ethernet cable and switch, the RS-485 wiring, and the device's IP address, port and unit ID in Setup.
Values greyed as "--", "Last read ... ago", Stale pill	The device is not answering. Check its power, cabling and the link settings in Setup.
Comms no reply pill	Check the IP address, port and unit ID in Setup against the device's own settings.
Generator buttons greyed	Read the reason under each button. Check that panel control is on (Setup > Generator), that the Control PIN is Accepted, and that the generator's data is live.
Control PIN Rejected or Locked out	Enter the correct generator controller PIN in Setup > Generator. After a lock-out, wait for it to clear before you try again.
Package buttons greyed	Switch on package control (Setup > SCADA server), and check that the inverter's data is live.
"Package control is not available." or "This Nexus does not offer package control yet. A software update is needed."	Generator and package control are enabled by AERL when the site is commissioned, and some sites need a Nexus software update first. Contact AERL support.
"Session expired. Enter PIN again."	Enter the PIN again.
Lost network access after a network change	Touch **Undo**, or wait 2 minutes: the previous setting is restored by itself unless you touched **Keep**.

If your situation is not covered here, contact AERL support on 1800 950 865 or at support@aerl.com.au. Have the HMI-10's serial number, the software version (Setup > Security) and a photo of the screen ready.

Warranty

Change log

11

The HMI-10 has a **2-year warranty**. It starts 30 days after AERL dispatches the HMI-10, or on the day it first connects to AERL Cloud if that is sooner.

Register your HMI-10 at **aerl.com.au/warranty-registration**. Registration does not change the 2-year warranty.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

The full terms and the claim procedure are in the AERL Industrial HMI (HMI-10) Warranty Statement, at aerl.com.au.

11.1 Change Log

Revision	Date	Change
1.0.0	11 / 2026	First issue.

Thank You for Choosing AERL

If you have any questions or need support, contact AERL.

Sincerely,

The AERL Team

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