YOUR CHALLENGE, OUR INSPIRATION.
WHAT WE OFFER

With 40 years of experience and motivated people eager to help you with any control system challenge, here is what we offer.

PRODUCTS

Control system products
We have control system products for every need:

- Functional Safety Products
- Programmable and CANopen slave units to support different architectures
- IoT gateways
- HMI units
- ISOBUS certified products
- I/O pin amounts up to 82
- We also offer OEM customized products

Application development environment
We provide you with the whole toolchain making the control system programming quick, easy and fun - and free of charge! Read more from page 17.

IoT solutions
- Epec GlobE - Customizable IoT platform
- Epec GatE - Secure access solution
- Epec Connectivity - Global cellular connectivity as a service
- CODESYS WebVisu - Wireless remote HMI for mobile machines
- More information on pages 6-7

ISOBUS solutions
- We provide you with all the needed HW and SW for ISOBUS implementations
- More information on page 16

Functional safety solutions
- We provide you with all the needed HW and SW, along with pre-certified safety libraries
- More information on pages 4-5

Support & training
Epec Customer Support consist of professionals who are experienced in all the required aspects for creating modern control systems and ready to help you with day-to-day challenges:

- Training services for getting started with Epec HW and SW
- Customized training for your needs
- Technical help-desk for your tough questions
- Safety specialists for guiding you under required regulations
- Consultation for inspiring new solutions
- A fast lane to access all of our 40 years of experience
SYSTEMS

Epec Systems can provide you with a comprehensive machine system solution including:

• Customized OEM products
• Electromobility & autonomous machine systems
• Simulation driven system engineering
• Joint development projects with OEMs
• More information on page 13

ENGINEERING SERVICES

Do you have challenges with your application, have a hard time defining the winning system architecture or perhaps you are struggling with functional safety? Bring it on! Let our motivated and experienced professionals help you along the way. Just contact us and let us offer a tailored solution according to your specific needs.

• Control system architecture design
• Functional safety
• IoT design and implementations
• Creating simulation models for complex features enabling agile verification without a physical prototype (model-based design)
• User interface and UX design and implementation
Why?

The EU Machine Directive 2006/42/EC sets requirements which machine manufacturers must comply to with their products. Also, new revisions of C-type standards have been published to refine application-specific requirements for functional safety and state-of-the-art technology.

For these demands, Epec has developed the S Series Functional Safety Platform including a software toolchain to meet all the technical requirements as well as business targets. Our objective is to provide machine manufacturers with a complete solution to achieve the shortest time-to-market.

How?

Epec’s application development toolchain streamlines the making of functional safety application, in 3 simple steps:

1. Make all the needed configurations with Epec MultiTool (all functional safety-related items are highlighted with yellow), MultiTool then generates a code template.

2. Continue the programming with CODESYS using Epec’s pre-certified functional safety libraries. CODESYS also provides tools for application verification.

3. Once the application is completed, use Epec CANmoon to download the software into the safety unit according to functional safety regulations.

IN A NUTSHELL

Developing safety-related functionalities is expensive and time consuming and that’s why we have prepared an efficient toolchain to make the safety development process fluent:

- Epec provides all the needed HW and SW for functional safety.
- Software consists of pre-certified safety libraries and the toolchain for creating an application.
Epec S Series Functional Safety Platform

Epec S Series has been developed using state-of-the-art technology optimized for safety-related systems in mobile machinery.

The S series platform consists of HW, SW, pre-certified PLCopen application libraries and a development toolchain for software-based safety function implementation. Certified Epec SC52 safety control unit is based on the S Series platform and Epec also has the capability to develop OEM customized functional safety control units based on the S Series technology.

**EPEC S SERIES SAFETY PLATFORM KEY CHARACTERISTICS:**
- Up to SIL2 (IEC 61508:2010 and IEC 62061:2005) and PLe/Cat. 3 (ISO 13849-1:2015), as a stand-alone controller
- Support for Cat. 2 architecture when using intelligent safety certified sensors
- Processor: 32 bit multicore CPU with lock-step execution and memory protection
- Supported CAN protocols: CANopen, CANopen Safety, SAE J1939
- CANopen Safety protocol for functional safety related communication according to EN50325-5
- Extensive set of pre-certified PLCopen libraries for safety related applications

**EPEC SC52 SAFETY CONTROL UNIT KEY CHARACTERISTICS:**
- 22 I/O pins (14 inputs + 8 outputs)
- Three-colored diagnostic LED for quick status check and fault detection

Epec’s TÜV certified functional safety professionals will be happy to help you with any functional safety challenges.

For turn-key functional safety projects, see pages 14-15.
Epec’s digitalization solutions provide seamless integration between the machine control system and the chosen remote management solution, optimizing your machine’s time-to-market.

**Epec GatE - secure access solution**

Epec GatE provides a secure access to machine control system for OEMs’ R&D and service personnel for remote maintenance over the Internet. OEMs can manage licenses and user privileges easily from the GatE web portal.

Together with Epec 6000 series units, GatE enables various activities, such as:

- Remote desktop access for local HMI with CODESYS WebVisu* or VNC.
- SW Updates and file exchange with FTP.
- CODESYS on-line debugging remotely to any ECU in CAN or Ethernet sub networks.
- Access local service portal made with CODESYS WebVisu*

(*additional license needed for WebVisu).

**CODESYS 3.5 WebVisu**

CODESYS WebVisu enables you to create a local service portal. The portal and the machine’s local HMI can be operated remotely with any device with a web browser.

CODESYS WebVisu can be used with all Epec 6000 series units provided with a WebVisu license.

Together with an Epec 6000 series unit, WebVisu can be used as a wireless service and diagnostics solution.

- A service technician can easily perform, for example, needed diagnostics and calibration activities. This can be done using the machine HMI or dedicated service portal views wirelessly with a tablet or smartphone.
- R&D engineers or techsupport can access the WebVisu service portal or the local HMI remotely from the factory using Epec GatE.
IOT SOLUTIONS

IOT REFERENCE CASE: NT LIFTEC

“NT Liftec chose Epec as IoT solution provider, because we have good experiences of their products and they are easy to work with”, says Raimo Ukkonen, Development Manager at NT Liftec. “NT Liftec is a market leader in the cost-efficient transportation systems for ports, terminals and a wide range of industries.

**IOT Gateways and Connectivity as a service**

Epec 6000 series units can be used as an IoT gateway to access the Internet using cellular, WLAN or Ethernet interface.

To streamline OEM machine manufacturer’s delivery process, Epec is also able to provide global cellular connectivity as a service, meaning 6000 series units with pre-installed global M2M SIM cards and data subscriptions. This makes it easy for OEMs to roll-out new machines and to be in control of the connectivity offering they provide to their customers.

Epec Connectivity service supports both Epec GlobE and Epec GatE services and scales automatically with changing data amount needs always optimizing the operating costs for the customer.

**Epec GlobE - IoT platform as a service**

Epec GlobE® is an IoT platform provided as a service for OEM machine manufacturers to enable them to develop customized IoT solutions.

GlobE enables data-driven decisions for the customers in their daily operations, for example, optimizing the use of resources on site or continuous condition monitoring of machinery. These are just few examples of the possibilities that GlobE enables. Each customer case is unique, often all the needs are not recognized at the beginning, therefore, it’s important that the technology is flexible and scales with your business. GlobE enables customers to develop fully customized dashboard views, reports an application logic with the easy to use built-in editors provided by the platform.

Equally important is the time-to-market, which is why using IoT platforms are required nowadays. Epec GlobE has unique seamless integration with Epec machine control systems. Features like remote parametrization, SW updates and event logging often require some integration project, but in GlobE they are supported by default for Epec control systems. An IoT and control system solution from Epec, offers optimized time-to-market for the customer and ensures reliable operation.

Flexibility and fast time-to-market together with our business model also enables smaller manufacturers to benefit from IoT without huge initial investments and resources. GlobE is the easiest, fastest and most cost efficient IoT platform to take in to use. Epec GlobE® is a registered trademark of Epec Oy.

**LIFTEC USES:**

- Epec GlobE (to log and analyse machine data, for example, for improving the work process efficiency)
- Epec Connectivity (to have global SIM cards pre-installed in displays and a web portal to check data usage)
- Epec 6107 display unit (provides IoT connectivity and an interface for the machine)
- Epec 4602 control unit (contains a high number of pins which provide enough I/O to meet Liftec’s requirements)
### Technical data table

<table>
<thead>
<tr>
<th></th>
<th>Epec x56c Central Unit</th>
<th>Epec 6200 Remote Access Unit</th>
<th>Epec 6107 Display Unit</th>
<th>EPEC 6112 Display Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAN</strong></td>
<td>6</td>
<td>up to 6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Display size &amp; type</strong></td>
<td></td>
<td>-</td>
<td>7” TFT IPS color LCD Resistive CFP</td>
<td>12.1” TFT color LCD Capacitive PCAP</td>
</tr>
<tr>
<td><strong>Touch type</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>-</td>
<td>-</td>
<td>WVGA 800 × 480 (5:3)</td>
<td>XGA 1024 × 768 (4:3)</td>
</tr>
<tr>
<td><strong>Remote management</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Other communication</strong></td>
<td>2 × Ethernet 1 × USB 1 × RS-232</td>
<td>2 × Ethernet 1 × USB 1 × RS-232</td>
<td>2 × Ethernet 2 × USB 1 × RS-232 2 × Camera</td>
<td></td>
</tr>
<tr>
<td><strong>Wireless interfaces</strong></td>
<td>-</td>
<td>2G / 3G / 4G / LTE WLAN GPS / GNSS</td>
<td>2G / 3G GPS / GNSS or WLAN</td>
<td>Radio interfaces are options</td>
</tr>
<tr>
<td><strong>I/O pins (inputs + outputs)</strong></td>
<td>5 (3 + 2 or 5 + 0)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>IP class</strong></td>
<td>IP67</td>
<td>IP67</td>
<td>IP65</td>
<td>IP66</td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>-30… +60 °C -22… +140 °F</td>
<td>-30… +60 °C -22… +140 °F</td>
<td>-30… +70 °C -22… +158 °F With GSM/GPS option: -30… +55 °C -22… +131 °F</td>
<td>-30… +70 °C -22… +158 °F</td>
</tr>
<tr>
<td><strong>Connectors</strong></td>
<td>1 × AMP23 2-4 × M12</td>
<td>1 × AMP23 2-4 × M12 1-4 × SMA</td>
<td>1 × AMP23 2-5 × M12 1-3 × SMA</td>
<td>1 × AMP23 1-3 × M12</td>
</tr>
<tr>
<td><strong>CODESYS Version</strong></td>
<td>3.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
IOT & DISPLAY PRODUCTS

EPEC 6200 REMOTE ACCESS UNIT:
- Versatile interfaces for wired and wireless communication
- Wrapped in rugged full aluminium housing optimized for mobile machinery
- Memory options internal flash 4 GB/32 GB
- Dual/quad core CPU with integrated GPU
- Three 3-colored diagnostic LEDs offer you quick status information
- In case there is an occasional need for a graphical interface, with CODESYS WebVisu you can use any device with a browser as a temporary HMI

EPEC 6107 DISPLAY UNIT:
- 7” display with resistive touch screen
- 800 x 480 resolution
- Display brightness 800 cd/m²
- Pedestal and panel mounting possibilities
- Wide range of remote connectivity possibilities

EPEC 6112 DISPLAY UNIT:
- Top of the notch 12,1” display with capacitive touch screen
- 1024 x 768 resolution
- Display brightness 600 cd/m²
- Pedestal and panel mounting possibilities
- Wide range of remote connectivity possibilities

EPEC 6107 DISPLAY UNIT:
NEW PRODUCTS FOR VARIOUS MACHINE ARCHITECTURES

EPEC GL84 SLAVE UNIT:
- CANopen standard device according to CiA 301 v4.2
- Very fast cycle time - feels like the I/O is actually connected to the master/central unit
- 2 CAN buses
- CAN1 also routed to M12 connectors for easy wiring
- Three power supply groups – Safety cut-off feature in a group of 10 PWM/DO outputs
- 34 outputs and 35 inputs
- 5 A POWER_DO outputs
- Total current up to 60 A
- 1 status LED
- New generation housing and connector solution enabling more I/O in a compact housing
- Several GND pins for sensors and actuators

NEW GENERATION HOUSING AND CONNECTOR SOLUTION:
- Enables plenty of I/O in a compact housing
- Protected against high pressure washing (IP69k)
- Single Wire Seal (SWS) system ensures safe & robust sealing for wires
- Integrated strain relief in LEAVYSEAL connectors
- Connectors with lever locking designed for high vibration environments

EPEC EC44 CONTROL UNIT:
- High processing power
- 2 CAN buses
- 16 outputs, 16 inputs
- Plenty of I/O in a compact housing
- 1 status LED
- CODESYS 3.5 programming
NEW PRODUCTS FOR VARIOUS MACHINE ARCHITECTURES

EPEC GL84 SLAVE UNIT:
• CANopen standard device according to CiA 301 v4.2
• Very fast cycle time – feels like the I/O is actually connected to the master/central unit
• 2 CAN buses
• CAN1 also routed to M12 connectors for easy wiring
• Three power supply groups – Safety cut-off feature in a group of 10 PWM/DO outputs
• 34 outputs and 35 inputs
• 5 A POWER_DO outputs
• Total current up to 60 A
• 1 status LED
• New generation housing and connector solution enabling more I/O in a compact housing
• Several GND pins for sensors and actuators

EPEC XS6C CENTRAL UNIT:
• Targeted for master unit in centralized intelligence systems
• High processing power and memory capacity
• Up to 6 CAN buses
• 2 Ethernet 100-base TX
• USB 2.0
• Three status LEDs
• CODESYS 3.5 programming

Note that we also make customized products!
**CONTROL UNIT PRODUCTS**

**Designed, tested and produced in Finland**

Epec control unit products are made 100% in Finland. We are a control system expert, specialized in intelligent control systems and information systems for even the most demanding conditions. Epec control units are robust and reliable, they are designed and manufactured to withstand harsh conditions: high mechanical shocks and vibration, heat, cold and different chemicals.

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**Control unit technical data table**

<table>
<thead>
<tr>
<th></th>
<th>EPEC 3606/3610</th>
<th>EPEC EC44</th>
<th>EPEC 3720/3724</th>
<th>EPEC 4602</th>
<th>EPEC 5050</th>
<th>EPEC SC52 SAFETY CONTROL UNIT</th>
<th>EPEC GL84 CANopen SLAVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAN</strong></td>
<td>1 or 2</td>
<td></td>
<td>1 or 2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Safety Functions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safety cut-off</td>
<td></td>
</tr>
<tr>
<td><strong>ISOBUS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other communication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accelerometer</strong></td>
<td>optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I/O Pins</strong> (inputs + outputs)</td>
<td>21 or 22</td>
<td>32 (16+16)</td>
<td>59 (35+24) / 52 (24+28)</td>
<td>68 (44+24)</td>
<td>65 (33+32)</td>
<td>22 (14+8)</td>
<td>69 (34+35)</td>
</tr>
<tr>
<td><strong>PLCopen Application Size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IP Class</strong></td>
<td>IP67</td>
<td></td>
<td>IP67</td>
<td>IP67</td>
<td>IP67</td>
<td>IP67</td>
<td>IP69</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>-40 ... +85 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Connectors</strong></td>
<td>1 x AMP35</td>
<td>1 x LEAVYSEAL46</td>
<td>3 x AMP23 / 1 x AMP8</td>
<td>3 x AMP35</td>
<td>3 x AMP35</td>
<td>1 x AMP35</td>
<td>2 x LEAVYSEAL46 / LEAVYSEAL21</td>
</tr>
<tr>
<td><strong>CODESYS Version</strong></td>
<td>2.3</td>
<td>3.5</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3 or 3.5</td>
<td>3.5 SP10</td>
<td></td>
</tr>
</tbody>
</table>
EPEC SYSTEMS

Epec Systems provides comprehensive solutions for future off-highway vehicle generations.

**Electromobility & autonomous machine systems**

Epec is an experienced partner for OEMs working with future vehicles with electric or hybrid powertrains and autonomous functions. Our offering includes machine sub-system development, testing and manufacturing considering the latest functional safety requirements.

**Joint development projects with OEMs**

Epec Systems projects are done with seamless integration with OEM and key suppliers’ project teams.

**Customized OEM products**

When there is a need for custom control unit hardware development, Epec is able to offer customized products for OEMs.
Our experienced control system superheroes can help you to convey the latest trends to your mobile machine. Contact us with any needs for creating a modern control system!

Control system projects

Want some help designing and implementing your control system, taking into account relevant functional safety requirements? Choose Epec as your technology partner - we can help you in a way that suits you best - from the requirements and development to the commissioning. Epec’s development process is efficient and quick!

You’ll get Epec’s cost efficient application development and a ready and tested application. We also provide all the support and training you need in case you want to maintain the application development yourself.

Concept engineering

Having control system challenges that you’d like to brainstorm with Epec’s experts? Want to take advantage of Epec’s know-how and resources for designing the next generation machine control system according to latest trends and requirements? Let’s team up and co-create the optimum control system solution with Epec’s systematic concept design process!

We’ll be digging into your control system challenges according to your specifics needs. You’ll get clear plans and a head start for the control system topics you have chosen - reducing the development costs and time!

BENEFITS

- Fast time-to-market for your machine - Epec’s development process is efficient and quick!
- Clear action plans
- Minimizing risks
- Taking future needs into account
- Getting full advantage of Epec’s control system know-how
Functional safety

Confused with the machine directive and functional safety standards, SIL/PL levels and so on? Developing safety-related functionalities is expensive and time consuming so let us help you. Epec can provide all the needed HW and SW for functional safety. We’ll design and implement a functional safety solution for your machine and Epec’s TÜV certified functional safety professionals can also assist you with any questions concerning functional safety!

For more information about functional safety, see pages 4-5.

Model-based design

Highly automated functions are often needed in modern machines. Model-based design makes implementation and verification of functions cost-efficient without a physical prototype.

Epec experts can create a MATLAB/Simulink model that can be used for simulating and testing the control algorithm saving tons of time. You’ll get an accurate machine application that is tested and implemented - the simulation model reduces the costs and improves your time-to-market.
ISOBUS SOLUTIONS

ISOBUS compliance enables ‘plug and play’ interoperability between agriculture equipment coming from different manufacturers.

Epec ISOBUS control units (Epec 3606, Epec 3610 and Epec 3724) are available as ISOBUS compliant versions, which have passed AEF’s hardware conformance tests. All of them can also be used as gateway units, turning a non-ISOBUS implement cost effectively into an ISOBUS implement.

Epec’s ISOBUS solution supports:

• ISOBUS VT client (VT version 2-3)
• ISOBUS TC client (TC version 3)
• ISOBUS Tractor-ECU (TECU class 1-2) interface
• ISOBUS Diagnostics

**How?**

Epec provides all the necessary hardware and software for ISOBUS implement development. Set-up is quick and easy with Epec MultiTool and ISOBUS client libraries.

Epec has joined the Agricultural Industry Electronics Foundations – AEF – to participate in the on-going research and standardization of ISOBUS systems.

---

EPEC 3724 CONTROL UNIT:

• 2 CAN bus
• 52 I/O pins

EPEC 3606 CONTROL UNIT:

• 2 CAN bus
• 21 I/O pins

EPEC 3610 CONTROL UNIT:

• Accelerometer
• High-side current measurement
• 2 CAN bus
• 22 I/O pins

For more detailed hardware information, see page 12 and www.epec.fi/products

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JUNKKARI USES:

• Epec ISOBUS libraries and toolchain to enable interoperability with ISOBUS tractors
• Epec 3724 ISOBUS control unit for controlling the seeder machine functions accurately.

“Everything went as planned, the project was ready on schedule and we will continue our co-operation with Epec”, says Tarmo Kukkola, R&D manager at Junkkari.
We want to make control system application development easy, fast and even fun for ourselves and for our customers.

That’s why we have a set of helpful software development tools (PLCopen libraries, MultiTool, CANmoon and comprehensive programming manuals) that are available for customers free of charge as an installation package called Epec SDK.

**1ST STEP: EPEC MULTITOOL**

Everything starts with Epec MultiTool:
- A configuration tool that makes programming fast and error-proof
- Configure I/O interfaces, CAN settings and diagnostics limits, initialize communication protocols, define control system parameters, events and CAN messages between the control units in the system. You can even configure the IoT solution interface
- MultiTool generates a CODESYS application that can be used as a template for application development with CODESYS

**2ND STEP: CODESYS LIBRARIES**

Continue application development with CODESYS on top of the MultiTool generated template:
- Epec has an extensive set PLCopen libraries to help you with application development. Our libraries are tested and documented software blocks for commonly needed features and functions in control system applications, for example, to calibrate and diagnose commonly used sensors or to control typical actuators
- Using our libraries enables you to shorten the application development time while improving the application quality and performance

**3RD STEP: EPEC CANMOON**

Once your application is implemented, you can use Epec CANmoon during the verification process and as a service/diagnostics tool for field service technicians.
- Log and diagnose CAN communication.
- Download application and firmware to Epec control units and adjust their communication parameters
- Simulate CAN devices, such as sensors
  - Adjust, copy, backup and restore control system parameters
- CANmoon works seamlessly with Epec MultiTool to maximize the productivity in control system project development

Programming instructions for all Epec products can be found from Epec Programming and Libraries manual.

Detailed hardware and cabling information can be found from product specific technical manuals.
For more than 40 years, Epec Oy has been powered by a passion to help our customers design safe, efficient and environmental friendly mobile working machines and special vehicles. We are a control system expert, specializing in intelligent control systems and information systems for even the most demanding conditions.

Our ambition is to free up our customers resources for their own core business and create control systems in cooperation with our clients. Our diverse experience is based on long term cooperation with leading international machine manufacturers in different sectors. Our strength is the combination of innovative products and services, a good technical department and extensive project service and application experience for different types of machines and operating environments.

For Epec, the factory and the production are a competitive advantage. Our employees are motivated and self-managed, and we are constantly improving the functions of our production according to Lean. With the help of modern manufacturing technology, a high and still increasing level of automation, and above all, our skilled staff, we make sure that our factory is the best in the world when it comes to manufacturing control systems for heavy machinery.
Our partners in different countries operate as Epec product distributors and are specialized in offering total control system solutions for machine manufacturers in their home markets.
Epec offices are located in Seinäjoki (HQ, Finland), Tampere (Finland) and Shanghai (China). Contact details can be found from the backcover.

Want to see your company on our distributor list? Contact us. We're actively searching for new partners.

**AUSTRALIA**
Tele Radio Australia Pty Ltd
phone: +61(0)8 6253 4000
www.teleradio.com.au

**CANADA**
Certified Power Inc.
phone: +1 847 573 3800
www.certifiedpower.com

**FINLAND**
HEVTEC Oy
phone: +358 40 548 5341
www.hevtec.fi
Qvistec Oy
phone: +358 44 0690045
www.qvistec.fi

**ITALY**
Tritecnica S.p.A.
phone: +39 02 54194 52
www.tritecnica.it

**NETHERLANDS**
Bram Engineers B.V.
phone: +31 10 283 9747
www.bram-engineers.nl

**SWEDEN**
Electrum Automation AB
phone: +46 90 184550
www.electrumab.se

**SOUTH KOREA**
DAS Co., Ltd.
phone: +82 31 356 3541
www.das-co.com

**USA**
Certified Power Inc.
phone: +1 847 573 3800
www.certifiedpower.com