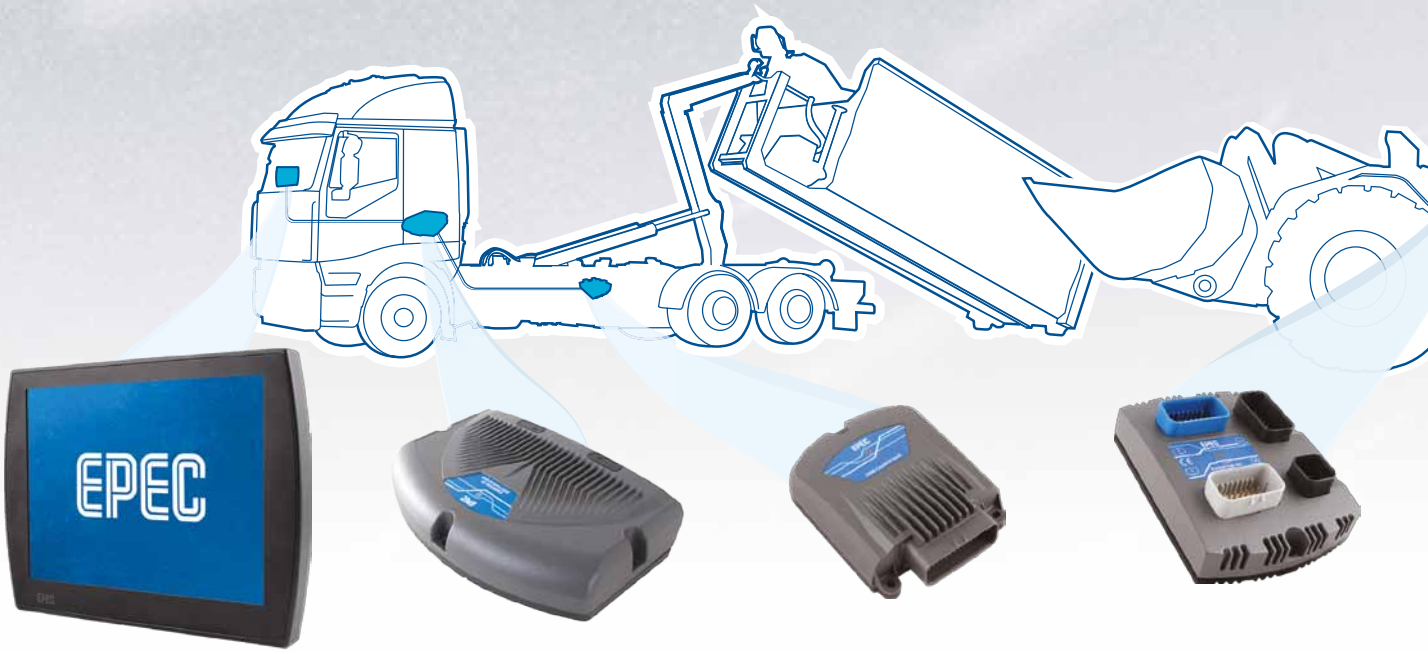
EPEC

PRODUCT CATALOGUE

EPEC - COMMITMENT TO YOUR CONTINUOUS SUCCESS



Machines and vehicles today must offer advantages through productivity, performance, and dependability. They should be efficient and cost effective in order to achieve full machine potential.

Embedded control systems and vehicle computers help define expected machine standards. They increase machine efficiency and productivity by optimizing, and constantly monitoring and diagnosing loads, pressures, temperatures, and other functions around the machine, engine, etc.

Optimum performance and high output capability can be expected from machines with these intelligent systems, contributing to machine's full potential, and supporting the overall process performance for effectively carrying out work.

EPEC SOLUTION

Epec is a solution provider specializing in intelligent control systems, vehicle computers, and information systems for mobile machines. Epec helps its customers and partners to design and manufacture efficient, safe, and environmentally friendly mobile working machines and special vehicles.

FOR CHALLENGING CONDITIONS

All Epec mobile control units can be used in rough terrain and challenging conditions. They have a wide operating temperature range, and high endurance against difficult and demanding environmental conditions. Epec control units, embedded displays, and vehicle computers can be found from the range of products listed in the following pages.

MADE IN FINLAND

Extreme conditions? Bring it on!

Extensive experience and know-how of mobile machines and special vehicles creates the foundation for Epec's ability to help machine manufacturers and partners develop efficient, safe, and environmentally friendly mobile machines and utility vehicles. This enables end users to maximize their productivity.

Epec Oy is a solution provider specializing in embedded control systems, vehicle computers, and information logistics systems for mobile machines and utility vehicles.

In addition to our line of quality-manufactured products, services such as training and customer support are all available along with our technical expertise.

We are fully committed to the goals and continuous success of our customers and partners. We will work together to improve machine efficiency and find the right solution to suit their needs.

Our client base is both local and international, with our business unit including manufacturing located in Finland. Local support and quality services can also be found from our growing international network of partners, conveniently serving their local markets.

Products comply with machinery standards for EMC and environmental conditions. Products are also certified for automotive use according to E17.

OPEN AND COMPATIBLE

Embedded control systems are based on PLCopen and CANopen®, which make them easily scalable to meet requirements for both small and large machines. Electronic control units have open I/O and communication interface, thus making it possible to connect devices from other manufacturers to optimize the whole machine environment, both technically and ergonomically. In addition to CANopen® communication protocol, SAE J1939 and ISOBUS are also available.

High-performance Control and Display Units

Embedded Control Units and Displays are the foundation of machine control systems. Each unit can act as an independent control unit in smaller systems or as a part in a total control system. They are compact multifunction units, and have open I/O interfaces which make it easy to connect commonly used devices such as sensors, actuators and joysticks.

The design and unique shape of the unit housing works to protect the electronics inside against mechanical wear. All control units are used in very difficult environmental conditions, thus it easily endures cold, heat, vibration, moisture, and impacts. Units can handle impacts up to 100G, and are water and dust proof according to IP67. This, along with the functional design of the unit housing, makes the installing easy as the unit seldom requires any extra protection.

The type of each input is determined by the PLCopen application software, allowing for flexible use of the unit. The units are PLCopen programmable which makes the programming easy and convenient, shortening development time for new systems. CODESYS programming tool provides an easy graphic environment for developers to work with.

Epec uses gold plated, heavy duty, AMPSEAL connectors, which are convenient to install into the machine, both in the factory and in the field. Each connector is color coded and mechanically keyed to fit only to the correct, corresponding place. The connector type is specially designed for wire harness use in volume production.

Up to four CAN bus interfaces increase the possibilities of connecting other CAN devices with the unit. They also provide a communication solution for the control system's internal communication. With several CAN bus interfaces, these units are also capable of working as a gateway between different CAN buses. CANopen® communication protocol provides easy communication with other CANopen® devices. With SAE J1939 communication protocol all the communication with modern diesel engines and transmissions, etc. is also easy.

Epec 6000 Series Display Unit
NEW PRODUCT

Epec 6107 Display Unit

Epec 6107 is a high-performance, rugged, reliable and easily configurable 7" display specially designed for mobile machinery. Combining modern computing, software and display technology, Epec 6107 Display is an ideal solution for the most demanding heavy duty applications like mining machines, excavators, forest machines, wheel loaders, etc. Freely programmable graphical user interface provides an opportunity to maximize machine usability and efficiency, while still keeping the interaction simple and user friendly.

The display supports both panel and pedestal mounting as well as portrait and landscape assembly. Fully enclosed aluminum housing provides water and dust proof operation according to IP66. Epec 6107 is a widescreen display with a resistive touch screen. Wide viewing angles and high brightness offer good readability also in direct sunlight.

CANopen | USB | ETHERNET | SAE J1939 | E17 | 50G | CODESYS | CE

Robust display unit for Mobile Machinery

6107 Display is CODESYS 3.5 programmable to fulfill all the needs required of a central operator interface for mobile machines. CODESYS 3.5 is a develpoment environment that can be used to design display gauge meters, icons, buttons, texts, etc. Typically the display application may have several windows, and is used to adjust and store system parameters, application back up copies, system event logs, etc. In addition to CODESYS 3.5, a range of powerful software tools to enable efficient implementation of your application are also available.

The 6107 Display is equipped with versatile interfaces. These interfaces allow the machine to be connected to higher level information systems, such as databases for monitoring production. Also, to further enhance the user experience, it is possible to connect an external button panel, user wheel, a standard USB mouse or keyboard to the display.

PRODUCT ORDER CODE **E30D6107-01**

KEY CHARACTERISTICS:

- High CPU performance
- Open software application platform with CODESYS 3.5 visualization
- 2 x CAN / 2 x Ethernet / 2 x USB
- Support of CANopen and SAE J1939
- Connectors for external display
- Speaker
- Two analog camera inputs
- Resistive touch screen
- Wide viewing angles and bright display panel (800 nits) with excellent sunlight readability
- Aspect ratio 16:9
- High colors
- High-end graphics
- Automatic display backlight control

OPTIONS ON REQUEST:

- Flash 4, 8, 16 or 32 GByte
- RAM 256, 512 or 1024 MByte
- Non-volatile memory 512 or 2048 kbyte
- Ability to view documents and videos

Different memory sizes are available as options on request. MiniPCIe card place enables additional options such as wireless communication interfaces (3G/GRPS/GPS, Wi-Fi and Bluetooth).

6107 DISPLAY UNIT					
RESOLUTION	WVGA 800 X 480 PIXELS	TOUCH SCREEN	RESISTIVE	PROCESSOR	ARM CORTEX A9 DUAL CORE
OPERATING SYSTEM	LINUX	PROGRAMMING	CODESYS 3.5	MEMORY (FLASH/RAM/NVRAM)	4 Gbyte/1024 Mbyte/512 kbyte
SIZE	185 X 128 X 49,5 mm	WEIGHT	1,1 kg	PROTECTION CLASS	IP66
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	8,4 ... 36 VDC	OVERVOLTAGE PROTECTION	70 VDC
OPERATING TEMPERATURE	-30 ... +70°C	CONNECTORS	1 X AMP23	5 X M12	
I/O INTERFACE, CONFIGURATION EXAMPLE	2 X DI/PI	2 X DO/DI	1 X AI	I/O PINS TOTAL	5
COMMUNICATIONS	2 X USB 2.0	2 X ETHERNET 10/100	1 X RS232	2 X CAN	

Epec 6000 Series Display Unit
NEW PRODUCT

Epec 6112 Display Unit

Epec 6112 is a rugged 12" display unit for mobile machines. Equipped with the same modern computing, software and display technology as Epec 6000 series, Epec 6112 Display is an ideal solution for the most demanding heavy duty applications where a bigger display is needed. Freely programmable graphical user interface provides an opportunity to maximize machine usability and efficiency, while still keeping the interaction simple and user friendly.

Fully enclosed aluminum housing provides water and dust proof operation according to IP66. Epec 6112 is equipped with a resistive touch screen. Wide viewing angles, LED backlighting and high brightness offer good readability also in direct sunlight.

The 6112 Display is CODESYS 3.5 programmable to fulfill all the needs required of a central operator interface for mobile machines. In addition to CODESYS 3.5, a range of powerful software tools to enable efficient implementation of your application are also available.

The 6112 Display is equipped with the same versatile interfaces as Epec 6107 Display Unit. These interfaces allow the machine to be connected to higher level information systems, such as databases for monitoring production. Also, to further enhance the user experience, it is possible to connect an external button panel, user wheel, a standard USB mouse or keyboard to the display.

PRODUCT ORDER CODE **E30D6112-01**

KEY CHARACTERISTICS:

- High CPU performance
- Open software application platform with CODESYS 3.5 visualization
- 2 x CAN / 2 x Ethernet / 2 x USB
- Support of CANopen and SAE J1939
- Connectors for external display
- Two analog camera inputs
- Wide viewing angles and bright display panel (500 nits) with excellent sunlight readability
- Resistive touch screen
- 4:3 Aspect ratio

OPTIONS ON REQUEST:

- Ability to view documents and videos

CANopen | USB | ETHERNET | SAE J1939 | E17 | 50G | CODESYS | CE

EPEC 6112 DISPLAY UNIT					
RESOLUTION	WVGA 1024 X 768 PIXELS	TOUCH SCREEN	RESISTIVE	PROCESSOR	ARM CORTEX A9 DUAL CORE
OPERATING SYSTEM	LINUX	PROGRAMMING	CODESYS 3.5	MEMORY (FLASH/RAM/NVRAM)	4 Gbyte/1024 Mbyte/512 kbyte
SIZE	310 X 290 X 82 mm	WEIGHT	4,0 kg	PROTECTION CLASS	IP66
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	9,2 ... 36 VDC	OVERVOLTAGE PROTECTION	70 VDC
OPERATING TEMPERATURE	-30 ... +70°C	CONNECTORS	1 X AMP23	5 X M12	
I/O INTERFACE, CONFIGURATION EXAMPLE	2 X DI	2 X DO/DI	1 X AI	I/O PINS TOTAL	5
COMMUNICATIONS	2 X USB 2.0	2 X ETHERNET 10/100	1 X RS232	2 X CAN	

Epec EPC-i14 Mobile PC
NEW PRODUCT

EPC-i14 Mobile PC with touchscreen

Conditions for mobile working machines, such as underground mining machines or forest harvesters are very demanding, which requires more than normal office PC technology. EPC-i14 is a modern and powerful vehicle computer specially designed for demanding professional use in machines and vehicles.

Extreme conditions, where vibration, wide temperature changes and moisture are encountered every day, were the criteria for the i14 design and component selections. A pre-heater for low temperatures, robust aluminum housing and a toughened glass TFT screen with LED backlight, together with the dust and splash protection (IP54) form a base for reliable operation.

The unit has basic I/O interface, and a wide range of different communication interfaces such as CAN and Ethernet and a possibility for wireless communications as an option.

The standard operating system allows usage of commercial software. Machine specific HMI application can be written, for instance, with CODESYS 3.5 Visualization. EPC-i14 offers an excellent platform for creating reliable, efficient and user-friendly HMI for the control system.

CODESYS 3.5 VISUALIZATION FOR EPC-I14

CODESYS 3.5 offers a user friendly programming interface for EPC-i14. CODESYS 3.5 is available for EPC-i14 as an option.

KEY CHARACTERISTICS:

- WLAN+GPRS+GPS+BT
- 4 Gbyte RAM, 32 Gbyte SATA SSD
- 2 x CAN / Ethernet / 4 x USB
- Support of CANopen and SAE J1939
- 3 x Camera input
- 12.1 inch touch screen
- Wide viewing angles and bright display panel (500 nits) with excellent sunlight readability
- 4:3 Aspect ratio

PRODUCT ORDER CODE **E3003061-10**

CANopen | SAE J1939 | USB | ETHERNET | E17 | CODESYS | CE

EPEC EPC-I14 MOBILE PC					
RESOLUTION	WVGA 1024 X 768 PIXELS	TOUCH SCREEN	RESISTIVE	PROCESSOR	CELERON 1,4 GHz
OPERATING SYSTEM	WINDOWS 7	PROGRAMMING	CODESYS 3.5	MEMORY (SSD/RAM)	32 Gbyte/4 Gbyte
SIZE	310 X 290 X 82 mm	WEIGHT	3,9 kg	PROTECTION CLASS	IP54
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	11 ... 30 VDC		
OPERATING TEMPERATURE	-40 ... +55°C				
I/O INTERFACE, CONFIGURATION EXAMPLE	5 X DI	2 X DO	I/O PINS TOTAL	7	
COMMUNICATIONS	4 X USB 2.0	1 X ETHERNET 10/100	1 X RS232	2 X CAN	3 X CAMERA INPUT	1 X AUDIO INPUT	1 X MICROPHONE INPUT

Epec 5050 Control Unit

Epec 5050 Control Unit is an extremely compact, powerful and robust multifunction controller. Epec 5050 Control Unit is ideal for applications that require plenty of I/O and enhanced algorithms. 3 x 35 pin heavy-duty AMPSEAL connectors provide an I/O interface that includes, for example, 28 PWM outputs, four CAN interfaces and versatile connectivity for sensors. Along with the efficient 32-bit microcontroller and up to 3 Mbyte application size, the product fits perfectly in different control system architectures.

Non-volatile RAM is a perfect solution for fast and continuous saving of information that needs to be retained over long power outages. Epec 5050 is equipped with a huge, ultra-fast 512 kbyte NVRAM that is very easy to use for storing machine parameters or log files.

The compact Epec 5050 Control Unit has an optimized number of both input and output pins to be used for numerous roles in the control system. The total number of I/O pins is 65, including digital inputs and outputs, analog inputs, pulse inputs and proportional (PWM) outputs. All I/O pins are equipped with a short-circuit protection. Pulse inputs have threshold voltage selection and some of the inputs have pull up/pull down selection by application.

NEW: CODESYS 3.5 VERSION OF EPEC 5050 CONTROL UNIT ALSO AVAILABLE

CODESYS 2.3 VERSIONS

EPEC PRODUCT CODE FOR 1 Mbyte/4 Mbyte RAM VERSION

E30B5050-01

EPEC PRODUCT CODE FOR 3 Mbyte/8 Mbyte RAM VERSION

E30B5050-81

CODESYS 3.5 VERSIONS

EPEC PRODUCT CODE FOR 1 Mbyte/4 Mbyte RAM VERSION

E30D5050-01

EPEC PRODUCT CODE FOR 3 Mbyte/8 Mbyte RAM VERSION

E30D5050-81

CODESYS 3.5 version Control Unit
NEW PRODUCT

CANopen | SAE J1939 | ISOBUS | E17 | 100G | CODESYS | CE | ETHERNET

5050 CONTROL UNIT											
PROCESSOR	32-BIT CPU, 128 MHz	APPLICATION SIZE	1 OR 3 Mbyte	PROGRAMMING	CODESYS 2.3 OR 3.5	SIZE	224,8 X 148,5 X 50 mm	WEIGHT	0,9 kg		
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	8,3 ... 36 VDC	REF VOLTAGE OUTPUTS (CONTROLLABLE)	5 V, 10 V						
OVERVOLTAGE PROTECTION	70 VDC	OPERATION TEMPERATURE RANGE	-40 ... +85°C	CONNECTORS	3 X AMP35						
I/O INTERFACE											
5050	20 X PWM/DO/DI (SOURCING) (HIGH SIDE CURRENT MEASURE)	8 X PWM/DO/DI (SOURCING)	11 X AI/DI	4 X DO/DI (SINKING)	22 X DI/PI						
I/O PINS TOTAL	65										
MEMORY	Flash 8 Mbyte, RAM 4/8 Mbyte, NVRAM 512 kbyte										
COMMUNICATIONS	4 X CAN	PROGRAMMING INTERFACE	ETHERNET, CAN								
PROTECTION CLASS	IP67										

Epec 4602 Control Unit

Epec 4602 Control Unit is a new multifunction controller for system distribution and stand-alone applications.

Epec 4602 Control Unit is equipped with the advanced processor technology of Epec 3000 series and is capable of controlling 10 hydraulic blocks simultaneously by using 20 PWM outputs and 10 feedback pins. The control unit can also simultaneously read multiple joysticks and analog signals. These features make it possible to control a whole machine by using only one control unit.

Based on the same housing as Epec 5050 Control Unit, Epec 4602 Control Unit provides a wide range of programmable I/Os for different implementations. As all Epec control units, the 4602 Control Unit was designed to be used in harsh operating environments, to withstand high mechanical shocks and vibration, heat, cold and different chemicals. In addition, the control unit has a high level of electro-magnetic compatibility including a type approval according to the automotive EMC directive. The design of the robust unit also carries plenty of features such as signal LED for control unit diagnostics.

One CAN is equipped with double pins, which makes cabling easier since there is no need for branches in the wire harness. Non-volatile RAM is a perfect solution for fast and continuous saving of information that needs to be retained over long power outages. NVRAM is very easy to use for storing machine parameters or log files.

KEY CHARACTERISTICS:

- 16/32 bit powerful microcontroller
- Flash memory: 1,6 Mbyte
- 8 kbyte Non volatile memory (FRAM) for application parameters (unlimited write cycles)
- RAM memory for application variables 112 kbyte
- PLCopen application size up to 768 kbyte
- Temperature range up to +85°C
- High current sourcing capability (total 30A)
- Competitive pricing per I/O pin
- Two color diagnostic LED for quick status check and fault detection

PRODUCT ORDER CODE **E30B4602-01**

CANopen | SAE J1939 | ISOBUS | E17 100G | CODESYS | CE

4602 CONTROL UNIT									
PROCESSOR	16/32 BIT CPU, 100 MHz	APPLICATION SIZE	768 kbyte	PROGRAMMING	CODESYS 2.3	SIZE	224,8 X 148,5 X 50 mm	WEIGHT	0,9 kg
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	8,5 ... 33 VDC	REF VOLTAGE OUTPUTS (CONTROLLABLE)	5 V				
OVERVOLTAGE PROTECTION	70 VDC	OPERATION TEMPERATURE RANGE	-40 ... +85°C	CONNECTORS	3 X AMP35				
I/O INTERFACE, CONFIGURATION EXAMPLE	10 X AI/FB	20 X PWM/DO/DI (SOURCING)	20 X AI/DI	14 X DI/PI	4 X DI/DO (SINKING)				
I/O PINS TOTAL	68								
COMMUNICATIONS	2 X CAN								
PROTECTION CLASS	IP67								

Epec 3724 Control Unit

The new Epec 3724 Control Unit is a compact multifunction controller which I/O solution is based on the same proven in use combination as in the Epec 2024 Control Unit. It has an optimized number of both input and output pins to be used for numerous roles in the control system. The total number of I/O pins is 52, including digital inputs and outputs, analog inputs, pulse inputs, proportional (PWM) outputs, and current feedback inputs.
Epec control system products are designed and manufactured according to strict standards of the mobile machinery industry.

Epec 3724 Control Unit provides the benefits of the efficient 16/32-bit microcontroller and the optimal I/O interface that is proven in several applications over the years. This makes the product a real multipurpose controller for distributed control systems.

KEY CHARACTERISTICS:

- 16/32 bit powerful microcontroller
- Flash memory: 1,6 Mbyte
- RAM memory: 1024 kbyte
- Non-volatile memory: 8 kbyte
- PLCopen application size up to 768 kbyte
- Temperature range up to +85°C

PRODUCT ORDER CODE FOR FB 1 A VERSION **E30B3724-01**
(ANALOG INPUTS ARE PULLED UP AND DOWN)

PRODUCT ORDER CODE FOR FB 2 A VERSION **E30B3724-21**
(ANALOG INPUTS ARE PULLED UP AND DOWN)

Epec 3720 Control Unit
NEW PRODUCT

Epec 3720 Control Unit

A compact and rugged control unit for embedded control systems. The I/O interface of the control unit is specially optimized for hydraulic controlling as it has a vast number of proportional (PWM) outputs to connect hydraulic devices from other manufacturers. To further increase the accuracy of hydraulic control, the control unit has current feedback inputs for feedback signals, e.g. hydraulic valves.

PRODUCT ORDER CODE **E30B3720-01**

CANopen | SAE J1939 | ISOBUS | E17 | 100G | CODESYS | CE

3724 CONTROL UNIT, 3720 CONTROL UNIT											
PROCESSOR	16/32 BIT CPU, 100 MHz	APPLICATION SIZE	768 kbyte	PROGRAMMING	CODESYS 2.3	PROTECTION CLASS	IP67	SIZE	147 X 113 X 46 mm		
WEIGHT	0,7 kg	NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	8,5 ... 33 VDC						
OVERVOLTAGE PROTECTION	70 VDC	OPERATING TEMPERATURE	-40 ... +85°C	CONNECTORS	3 X AMP23	1 X AMP8					
I/O INTERFACE, CONFIGURATION EXAMPLE	3724	4 X DI	4 X AI/FB	24 X PWM/DO/DI (SOURCING)	8 X AI/DI	4 X DI/DO (SINKING)	8 X DI/PI				
I/O INTERFACE, CONFIGURATION EXAMPLE	3720	1 X DI	2 X 10X AI/FB	24 X PWM/DO/DI (SOURCING)	6 X AI/DI	8 X DI/PI					
I/O PINS TOTAL	3724	52	3720	59							
COMMUNICATIONS	2 X CAN										

Epec 3606 Control Unit

Epec 3606 Control Unit is a new multifunction controller for system distribution and stand-alone applications. This compact controller processor includes 8 PWM outputs and a high performance processor making the product a long-term solution. The robust, leak proof zink/plastic housing has been widely tested against different environmental conditions. Also, the unique shape of the casing works to protect the electronics inside against mechanical wear. Three point fixing confirms firm mounting also on irregular surfaces.

The unit has an optimized number of both input and output pins to be used for numerous roles in the control system. The total number of I/O pins is 21, including digital inputs and outputs, analog inputs, pulse inputs, proportional (PWM) outputs, and current feedback inputs. The totally new design of the robust unit carries plenty of new features such as signal LED for control unit diagnostics. One CAN is equipped with double pins, which makes cabling easier since there is no need for branches in the wire harness. A second CAN is also available as an option.

PRODUCT ORDER CODE FOR 1 X CAN/FB 1 A VERSION **E30B3606-01**
PRODUCT ORDER CODE FOR 2 X CAN/FB 1 A VERSION **E30B3606-02**
PRODUCT ORDER CODE FOR 1 X CAN/FB 2 A VERSION **E30B3606-31**
PRODUCT ORDER CODE FOR 2 X CAN/FB 2 A VERSION **E30B3606-22**

KEY CHARACTERISTICS:

- 16/32 bit powerful microcontroller
- Flash memory: 1,6 Mbyte
- RAM memory for application variables 112 kbyte
- PLCopen application size up to 768 kbyte
- Temperature range up to +85°C
- Non-volatile memory: 2 kbyte

CANopen | SAE J1939 | ISOBUS | E17 | 100G | CODESYS | CE

3606 CONTROL UNIT							
PROCESSOR	16/32 BIT CPU, 100 MHz	APPLICATION SIZE	768 kbyte	RAM FOR APPLICATION VARIABLES	112 kbyte	SIZE	138 X 108 X 44 mm
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	8,5 ... 33 VDC	PROGRAMMING	CODESYS 2.3	PROTECTION CLASS	IP67
OVERVOLTAGE PROTECTION	70 VDC	OPERATING TEMPERATURE	-40 ... +85°C	CONNECTORS	1 X AMP35		
I/O INTERFACE, CONFIGURATION EXAMPLE	4X AI/FB	8 X PWM/DO/DI (SOURCING)		4 X AI/DI	5 X DI/PI		
I/O PINS TOTAL	21						
COMMUNICATIONS	1 X CAN	2ND CAN AS AN OPTION					

Epec 2024 Control Unit

A compact multifunction controller with an optimized number of both input and output pins to be used for numerous roles in the control system. The total number of I/O pins is 52, including digital inputs and outputs, analog inputs, pulse inputs, proportional (PWM) outputs, and current feedback inputs.

PRODUCT ORDER CODE **E30B2024-10**

Epec 2023 Control Unit

The I/O interface is optimized for cabin use, thus it has inputs suitable to connect two, 3-axis joysticks and several digital inputs to accommodate switches, keys, etc. typical in a cabin environment. In addition, it has the ability to connect keyboard matrices to it. In addition to the vast number of inputs, the control unit has a number of digital outputs and proportional (PWM) outputs for direct connections to surrounding devices.

PRODUCT ORDER CODE **E30B2023-10**

Epec 2024 Control Unit GL approval

All Epec control system products are designed and manufactured according to strict standards, and are certified for automotive use according to e17. In addition, Epec 2024 Control Unit GL has also GL approval (Germanischer Lloyd), which allows the control unit to be used on ships and vessels.

PRODUCT ORDER CODE **E30B2024-10GL**

Epec 2020 Control Unit

A compact and rugged control unit for embedded control systems. The I/O interface of the control unit is specially optimized for hydraulic controlling as it has a vast number of proportional (PWM) outputs to connect hydraulic devices from other manufacturers. To further increase the accuracy of hydraulic control, the control unit has current feedback inputs for feedback signals, e.g. hydraulic valves.

PRODUCT ORDER CODE **E30B2020-10**

PLEASE NOTE THAT PRODUCTS PRESENTED ON THIS PAGE ARE NOT MEANT FOR NEW DESIGN APPLICATIONS. PLEASE CHECK AVAILABILITY.

CANopen | SAE J1939 | e17 | 100G | CODESYS | CE

CONTROL UNIT 2024 , CONTROL UNIT 2024 GL APPROVAL, CONTROL UNIT 2023, CONTROL UNIT 2020													
PROCESSOR	C167 40 MHz	APPLICATION SIZE	256 kbyte	PROGRAMMING	CODESYS 2.3	PROTECTION CLASS	IP67	SIZE	147 X 113 X 46 mm				
WEIGHT	0,7 kg	NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	10 ... 30 VDC								
OVERVOLTAGE PROTECTION	70 VDC	OPERATION TEMPERATURE	-40 ... +70°C	CONNECTORS	3 X AMP23	1 X AMP8							
I/O INTERFACE, CONFIGURATION EXAMPLE													
2024	2024 GL APPROVAL	4 X DI	4 X AI/FB	24 X PWM/DO/DI (SOURCING)	8 X A I/DI	4 X DI/DO (SINKING)	8 X DI/PI						
2023	16 X DI/PI	16 X AI/DI	4 X DI/DO (SINKING)	8 X PWM/DO/DI (SOURCING)	8 X PWM/DO/DI (SINKING)								
2020	2 X 10 X AI/FB	24 X PWM/DO/DI (SOURCING)	8 X DI/PI	6 X AI/DI	1 X DI								
I/O PINS TOTAL	2024 & 2023	52	2020	59									
COMMUNICATIONS	2 X CAN												

Epec 2038 Control Unit

The smallest control unit with 20 I/O pins for embedded control systems. The control unit is used independently in smaller machines or with other control units in larger systems. With the help of the Epec 2038 Control Unit it is possible to even further deepen the distribution of intelligence around the machine by locating the control unit next to connectable sensors, actuators, and other devices spread around the machine.

There are two variations of this control unit. One variation of this control unit has two CAN bus interfaces. The other variation has CAN bus and RS232 serial interfaces.

PRODUCT ORDER CODE FOR CAN+RS232 VERSION **E30B2038-10**
PRODUCT ORDER CODE FOR CAN+CAN VERSION **E30B2038-20**

CANopen SAE J1939 e17 100G CODESYS CE

CONTROL UNIT 2038					
PROCESSOR	C167 40MHZ	APPLICATION SIZE	256 kbyte	PROGRAMMING	CODESYS 2.3
PROTECTION CLASS	IP67	SIZE	147 X 63 X 53 mm	WEIGHT	0,5 kg
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	9 ... 30 VDC	OVERVOLTAGE PROTECTION	34 VDC
OPERATING TEMPERATURE	-40 ... +70°C	CONNECTORS	1 X AMP23	1 X AMP8	
I/O INTERFACE, CONFIGURATION EXAMPLE	4 X DI/PI	3 X AI/FB/DI	2 X PWM/DO/DI (SOURCING)	6 X AI/DI	1 X DI/DO (SINKING)	4 X DI/DO/PWM/PI (SOURCING)
I/O PINS TOTAL	20	COMMUNICATIONS	2 X CAN OR 1 X CAN + 1 X RS232		

Epec 2021 Hub Unit

A compact and robust communication and control unit for mobile machines. Small outside dimensions and robust construction with IP67 classification makes installing easy. Star topology in CAN bus is not often seen in embedded control systems, but with the 2021 Hub Unit it is used to further increase the safety and reliability of the embedded control system. With the help of the hub unit, system designing and installing is easy as the hub distributes both CAN bus and the power supply for the whole control system. This enables extra safety features to be built into the system as the hub unit is able to monitor the condition of the communication and power supply wiring, as well as the power consumption of the whole system. When the system power is distributed via the hub unit, it is able to protect more sensitive devices connected to it from e.g. overvoltage peaks.

PRODUCT ORDER CODE **E30B2021-10**

CANopen SAE J1939 e17 100G CODESYS CE

Epec 38 CANopen® Slave M1

Epec 38 CANopen® Slave M1 is a versatile control unit for a CAN based control system with a very small footprint and highly flexible configuration capabilities. The 38 Slave Unit is one of the smallest control units available for embedded control systems, yet offers a considerable amount (20 pc.) of controllable I/Os. The 38 Slave Units are easy blocks for creating embedded control systems or to expand the I/Os of an active control unit.

PRODUCT ORDER CODE **E30S2038**

CANopen e17 100G CE

PLEASE NOTE THAT PRODUCTS PRESENTED ON THIS PAGE ARE NOT MEANT FOR NEW DESIGN APPLICATIONS. PLEASE CHECK AVAILABILITY.

Epec 2040 Color Display

Simple interaction and usage of a machine are key elements in any machine application. Freely programmable graphical user interface provides an opportunity to maximize machine usability and efficiency. With a 5,7" TFT display size, the 2040 Color Display is an ideal solution for heavy duty applications like mining machines, excavators, forest machines, wheel loaders, etc. Fully enclosed aluminum housing provides water and dust proof operation according to IP66. The temperature ranges from -20 °C to +60 °C.

The 2040 Color Display is equipped with two CAN bus interfaces, a hardware configurable serial interface (RS232/422/485), Ethernet and USB interface via AMPSEAL connectors, thus allowing the display to be connected as an integral part of the embedded machine control system. The display has five integrated push buttons for operating, and when using C programmed applications it is also possible to connect an external user wheel or a standard USB mouse to further enhance the user experience.

Ethernet can be used to connect the machine to higher level information systems, such as databases for monitoring production, enterprise resource planning (ERP), etc.

The 2040 Color Display is a fully programmable display unit and CODESYS Visualization makes programming very easy. This graphical windows tool can be used to design display gauge meters, icons, buttons, texts, etc. Typically the display application may have several windows, and is used to adjust and store system parameters, application back up copies, system event logs, etc. The display also supports a feature where two separate displays are installed in the same machine. For C-programmable displays, licenses for Remote access library and Modbus/TCP Slave communication are available as an option.

EPEC PRODUCT CODE FOR C-PROGRAMMABLE DISPLAY WITH RS232 **E3002040-50**

EPEC PRODUCT CODE FOR C-PROGRAMMABLE DISPLAY WITH RS485/422 **E3002040-60**

EPEC PRODUCT CODE FOR CODESYS VISUALIZATION PROGRAMMABLE DISPLAY WITH RS232 **E30B2040-10**

EPEC PRODUCT CODE FOR CODESYS VISUALIZATION PROGRAMMABLE DISPLAY WITH RS485/422 **E30B2040-20**

PLEASE NOTE THAT PRODUCTS PRESENTED ON THIS PAGE ARE NOT MEANT FOR NEW DESIGN APPLICATIONS. PLEASE CHECK AVAILABILITY.

CANopen USB ETHERNET E17 5OG CODESYS CE

COLOR DISPLAY 2040							
RESOLUTION	320 X 240 PIXELS	PROCESSOR	ARM9 180 MHz	MEMORY (FLASH/RAM/NVRAM)	64 Mbyte/64 Mbyte/512 kbyte		
OPERATING SYSTEM	LINUX	PROGRAMMING	CODESYS 2.3 / C	PROTECTION CLASS	IP66		
SIZE	181 X 120 X 53 mm	WEIGHT	1,0 kg				
NOMINAL OPERATING VOLTAGE	12/24 VDC	FULL OPERATING RANGE	11 ... 30 VDC	OVERVOLTAGE PROTECTION	70 VDC		
OPERATING TEMPERATURE	-20 ... +60°C	CONNECTORS	1 X AMP8	1 X AMP23			
I/O INTERFACE, CONFIGURATION EXAMPLE	2 X DI/DO	3 X DI	I/O PINS TOTAL	5			
COMMUNICATIONS	2 X USB 1.1	1 X ETHERNET 10/100	1 X RS232/RS422/RS485	CAN1	CAN2 (OPTICALLY ISOLATED)		

EPEC SOFTWARE PRODUCTS

From the engineering viewpoint of a control system, it is not enough to only have the sufficient hardware for the physical implementation of a system, in modern control systems software plays a key role. Epec provides software tools and an extensive set of application libraries in order to help developers improve their overall productivity. Epec software tools help system engineers in programming, configuring, adjusting and diagnosing the control system and its application.

CANmoon configuration and diagnostics tool

CANmoon is a powerful CANopen based software tool. It can be used to configure, monitor and diagnose nodes on CAN bus. It can also be used for downloading applications to Epec control units, and updating their firmware.

With CANmoon, CAN messages can be logged and saved to files for offline diagnostics, for example, when it is not possible to go onsite personally. Log file format is commonly used and compatible with third party analysing tools to enable flexible interoperability between different tools. With CANmoon it is also possible to play the saved CAN log data back to CAN bus. This playback feature, together with the possibility to define and send CAN messages to the bus and the possibility to use Python scripting makes CANmoon a powerful simulation and testing tool. It is possible to, for example, create automatic test sequences or simulate CAN devices like sensors or remote controllers without the actual hardware present.

Support for CAN databases, makes it convenient to monitor and debug control system specific CAN messages. Instead of complex hexadecimal format, the data is automatically interpreted and shown in decimal values together with meaningful variable names. CAN database can be generated, for example, from Epec MultiTool.

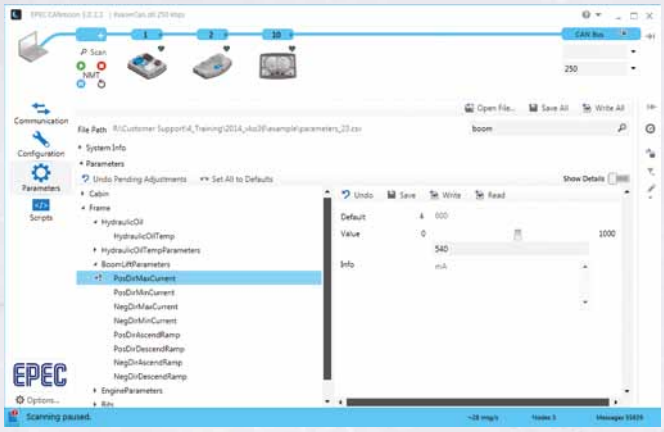
CANmoon also includes an interpreter for CANopen messages such as NMT, SDO and PDO. The CANopen messages are interpreted from hexadecimal format to descriptive texts and/or decimal values according to CANopen standard.

CANmoon works seamlessly with Epec MultiTool to maximize the productivity in control system project development. For example, control system parameters can be exported from MultiTool to a file which can then be imported to CANmoon. Based on this file, CANmoon generates an easy to use graphical interface for adjusting machine parameters, such as calibration values, alarm limits, etc.

It is possible to customize CANmoon for any use. By a simple, yet versatile Python scripting language, it is possible to expand CANmoon functionality and even change the whole user interface of CANmoon. Creating a customized software download tool or service tool for a PC has never been easier!

CANmoon is easy to use with just basic computer skills, and it works with any computer running Microsoft Windows 7 or 8 operating systems. It supports the most commonly used CAN adapters in the market.

CANmoon is available to our customers free of charge from Epec extranet.



MultiTool helps developers concentrate on functionality

Epec MultiTool is a system design and configuration tool that helps developers concentrate on functionality while hiding the inherent complexity of programmable devices.

Configurations made with MultiTool's intuitive user interface are generated into a code template. The otherwise slow and error prone steps, such as CAN protocol initializations, are automatically done by MultiTool. In addition, MultiTool speeds up the start of making the actual customer application with machine functionalities. The customer application is implemented on top of the code template using CODESYS IEC 61131-3 programming languages.

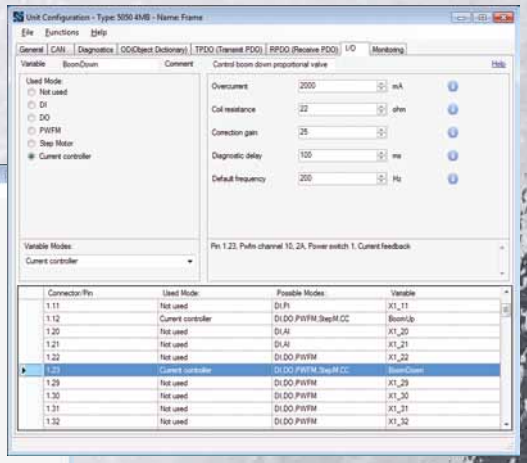
Epec MultiTool provides easy-to-use interfaces to select preferred programmable control units to the system and create CANopen object dictionaries (ODs) as well as I/O configurations for these devices. Furthermore, third party CANopen devices, such as sensors, are easily added to the control system by importing EDS (Electronic Data Sheet) or DCF (Device Configuration File) files from the device manufacturer to the MultiTool project.

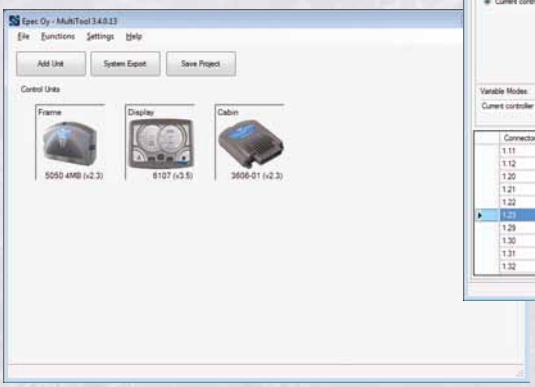
In order to enable system developers to select the most suitable tools for testing and analysing the control system, MultiTool generates CAN databases to export CAN data structures for diagnostics/analyzing tools such as Epec CANmoon. File format is commonly used in the market, which makes it possible to utilize the feature also with third party analysing tools. This makes it easy to test, verify and optimize the control system's performance.

MultiTool supports CODESYS versions 2.3 and/or 3.5 depending on the control units used in the system.

SOME OF THE KEY FEATURES OF MULTITOOL:

- Manage the whole control system in one project
- Fast configuration of CANopen communication with easy to use graphical user interface
- Automated SAE J1939 communication using standard predefined PGNs
- Simple to use configuration of I/O interface
- Many diagnostic features built-in and automatically included in the code template
- Library Manager ensures that you have the correct libraries in your project
- Create Your CODESYS project with full CAN communication, I/O and diagnostic features already built in the code template – All with just one click of your mouse!





Libraries to make the job easier

Epec provides an extensive selection of CODESYS libraries. With these libraries, software development time is decreased significantly.

All Epec libraries have been built to work seamlessly together. The libraries have also been built from smaller building blocks, so developers can use the same building blocks to make their own functionality.

Epec libraries include ready to use blocks for commonly used sensors and actuators, such as voltage, current and resistive sensors, encoders, joysticks, proportional valves, etc., connected to either control unit I/O or CAN interface. These library blocks include built in diagnostics for commonly encountered faults in electronic control systems, such as broken wires, short circuits, broken sensors and actuators.

Epec also provides library implementations of different CAN protocols. Epec CANopen and J1939 libraries are both known for their high performance level, reliability and flexibility. Both protocols can handle high busloads with little or no effect on program cycle time.

EPEC LIBRARIES PROVIDE, FOR EXAMPLE, SOLUTIONS TO THE FOLLOWING FUNCTIONALITIES:

- Communication protocols, CANopen & SAE J1939
- Diagnostics for digital outputs
- CANopen network management
- Controlling and diagnostics for proportional valves
- Diagnostics and calibration for most commonly used sensor types
- Diagnostics and calibration for different types of joysticks and pedals
- Different kinds of filtering and conversion functions
- Event/Error handling and logging
- Solutions for updating applications and adjusting parameters with CODESYS programmable HMI.

All Epec libraries have passed our thorough testing and have been used in various applications over the years. Epec Programming and Libraries Manual provides useful information for developers, including programming examples. The manual is easily accessible from CODESYS help, while programming Epec units. Epec Libraries and Programming Manual is also available from Epec extranet.

Epec is committed to further develop software tools and libraries based on customer needs. All Epec libraries are available for CODESYS versions 2.3 and 3.5. Libraries and MultiTool tool are available to our customers free of charge from Epec extranet as an installation package called Epec SDK.

Epec SDK for easy installation and configuration management

Epec releases and distributes its tools, libraries and manuals needed for programming as a release and installation package called Epec SDK (Software Development Kit). SDK is an easy to use installer that installs all needed components ready for use. It includes Epec MultiTool, Epec application libraries, Programming and Libraries Manual, CAN adapter drivers and target/device description files for all Epec units. This way we can ensure that the customer always has the correct tools and library set installed, which are compatible with each other.

For further information about Epec software tools and libraries, please contact techsupport@epec.fi

ACCESSORIES FOR CONTROL UNITS AND DISPLAYS

USER WHEEL

Display applications can be operated with an external User Wheel which is connected to the display I/O pins with an AMP23 connector. This User Wheel makes display operation very fast and easy. With a 360 degree rotating wheel, one is able to scroll through buttons and parameter values. Two selection buttons make the user interface buttons and fields easy to operate.

PRODUCT ORDER CODE **E40001505**

SHOCK COVER FOR EPEC 3700 AND 2000 SERIES CONTROL UNITS

All Epec control units are designed to endure very difficult environmental conditions. When the control unit is mounted in such a place where it might get impacts from dropping items, someone stepping on it, or where it is exposed to possible water spray, a special shock cover is used to protect connectors and wire attachment points. The shock cover is mounted on the control unit by using two special M6 bolts. The cover does not increase IP classification, etc. of the product, but prevents any direct hits on connectors. A special wire bracket is typically mounted under the control unit. Bolts are tightened to attach the bracket and the control unit to their places and the shock cover is mounted on top of them for extra protection.

PRODUCT ORDER CODE FOR SHOCK COVER **E30C02192**
(INCLUDING WIRE MOUNTING BRACKET AND MOUNTING BOLTS)

Accessories for Epec display products

PANEL MOUNTING KIT FOR EPEC 6107 DISPLAY UNIT
PRODUCT ORDER CODE **E30802471**

SMALL MOUNTING PEDESTAL FOR 6107 DISPLAY UNIT
PRODUCT ORDER CODE **E30802473**

ETHERNET Y-SPLITTER CABLE 0,8 M
PRODUCT ORDER CODE **KW0179**

ETHERNET CABLE 3 M
PRODUCT ORDER CODE **KW0184**

USB CABLE (M12 USB MINI-B - USB A MALE) 2 M
PRODUCT ORDER CODE **KW0186**

M12 PLUG COVER FOR MALE CONNECTOR
PRODUCT ORDER CODE **KX0423**

M12 PLUG COVER FOR FEMALE CONNECTOR
PRODUCT ORDER CODE **X0058261**

GENERAL ACCESSORIES FOR CONTROL UNITS AND DISPLAYS

Epec uses sealed, heavy duty connectors with all embedded control units and displays. These connectors ensure the highest possible protection against moisture and dust. They are also very suitable for using wire harnesses. Each connector part is gold plated to ensure endurance against corrosive environment.

AMP CONNECTORS FOR EPEC PRODUCTS

Epec uses TE Connectivity connectors. Connectors are used as I/O, power supply and communication connectors. Connectors are fully sealed against water and dust (IP67). Plugs are mechanically keyed to fit only into the equivalent color connector of the Epec control unit.

AMP 23-PIN PLUG ASSEMBLY, GREY
AMP PRODUCT CODE **770680-4**
EPEC PRODUCT ORDER CODE **KX0007**

AMP 23-PIN PLUG ASSEMBLY, BLACK
AMP PRODUCT CODE **770680-1**
EPEC PRODUCT ORDER CODE **KX0008**

AMP 23-PIN PLUG ASSEMBLY, BLUE
AMP PRODUCT CODE **770680-5**
EPEC PRODUCT ORDER CODE **KX0009**

AMP 8-PIN PLUG ASSEMBLY, BLACK
AMP PRODUCT CODE **776286-1**
EPEC PRODUCT ORDER CODE **KX0187**

AMP 35-PIN PLUG ASSEMBLY, GREY
AMP PRODUCT CODE **776164-4**
EPEC PRODUCT ORDER CODE **KX0351**

AMP 35-PIN PLUG ASSEMBLY, BLUE
AMP PRODUCT CODE **776164-5**
EPEC PRODUCT ORDER CODE **KX0352**

AMP 35-PIN PLUG ASSEMBLY, BLACK
AMP PRODUCT CODE **776164-1**
EPEC PRODUCT ORDER CODE **KX0353**

AMP 35-PIN WIRE RELIEF
AMP PRODUCT CODE **776463-1**
EPEC PRODUCT ORDER CODE **KX0354**

FLYING LEADS
Each connector is also sold together with ready made flying leads with lenght of 2 m.

AMP 23-PIN PLUG ASSEMBLY, GREY WITH 2 M LEADS
EPEC PRODUCT ORDER CODE **E30901310**

AMP 23-PIN PLUG ASSEMBLY, BLACK WITH 2 M LEADS
EPEC PRODUCT ORDER CODE **E30901311**

AMP 23-PIN PLUG ASSEMBLY, BLUE WITH 2 M LEADS
EPEC PRODUCT ORDER CODE **E30901312**

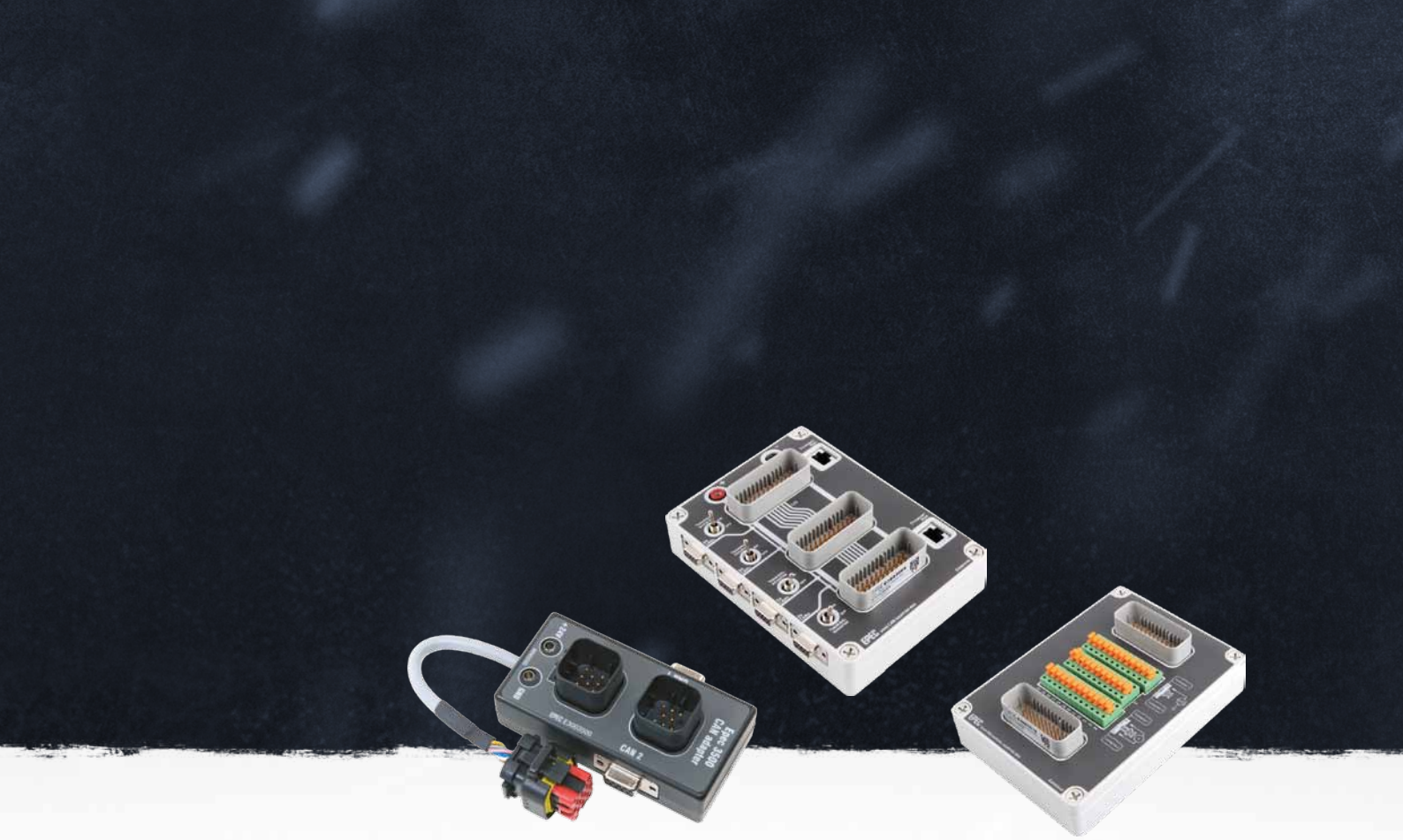
AMP 8-PIN PLUG ASSEMBLY, BLACK WITH 2 M LEADS
EPEC PRODUCT ORDER CODE **E30901313**

AMP 35-PIN PLUG, GREY WITH 2M LEADS
EPEC PRODUCT ORDER CODE **E30902451**

AMP 35-PIN PLUG, BLACK WITH 2M LEADS
EPEC PRODUCT ORDER CODE **E30902452**

OTHER AMP RELATED ACCESSORIES:

CRIMPING TOOL
EPEC PRODUCT ORDER CODE **TT0018**



AMP GOLD PLATED CONNECTOR PINS

AMP connector pins, manufactured by TE Connectivity, are used in AMP plugs connected with Epec control unit connectors. Each connector pin can be used with currents up to 17 amperes. An AMP hand crimping tool is used to crimp connectors with wires (AMP Procrimper 58529-1). Connector pins are available separately or in manufacturer's packages with 1000 pcs/package.

AMP PRODUCT CODE **770854-3**

EPEC PRODUCT ORDER CODE **KX0010**

3500 CAN ADAPTER BOX

This easy to use connector cable is for system developers. It provides a connection for both CAN1 and CAN2 via AMP8 and Dsub9 connectors. 3500 CAN Adapter box is used to connect power supply to control units and displays, and to connect a CAN bus adapter from a PC to a CAN network.

Plugs of a power supply and Dsub9 connector of a CAN card are connected with the adapter, and the AMP8 is connected with a control unit's or display's AMP8 connector.

EPEC PRODUCT ORDER CODE **E3003500**

3509 CAN ADAPTER BOX

This easy to use connector adapter is meant for system developers. It provides a connection for CAN1, CAN2, CAN3 and CAN4 via AMP35 and Dsub9 connectors. 3509 CAN Adapter box is used for connecting the power supply to control units, and to connect a PC's CAN bus adapter to a CAN network or vice versa. RJ45 connectors enable connecting to the system via Ethernet. There is also a switch for each CAN, to connect or disconnect the terminal resistor.

PRODUCT ORDER CODE **E3003509**

3510 MEASURING ADAPTER FOR AMP 35 PIN CONNECTOR

The measuring Adapter can be used for testing the cabling and measuring the signals between the control unit and the machine, for example, to locate a malfunction in the system.

PRODUCT ORDER CODE **E3003510**

MEASURING ADAPTER FOR AMP 23 PIN CONNECTOR

PRODUCT ORDER CODE **E3002014**

EPEC PARTNERS ALL AROUND THE WORLD

Epec has a strong position as a designer and manufacturer of control systems for mobile machines, as well as electronics and software for challenging conditions. Epec´s main customers include global machine and utility vehicle manufacturers. In addition to a strong share in the domestic market, Epec products are widely exported to Europe, the Far East, Russia, USA and Canada.

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.

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

Epec is actively expanding its partner network. Today, Epec's retailer network covers European, Asian, American and Australian markets.

Increased market coverage and operations in different market segments and areas will continue to be one of Epec's main targets in the coming years.

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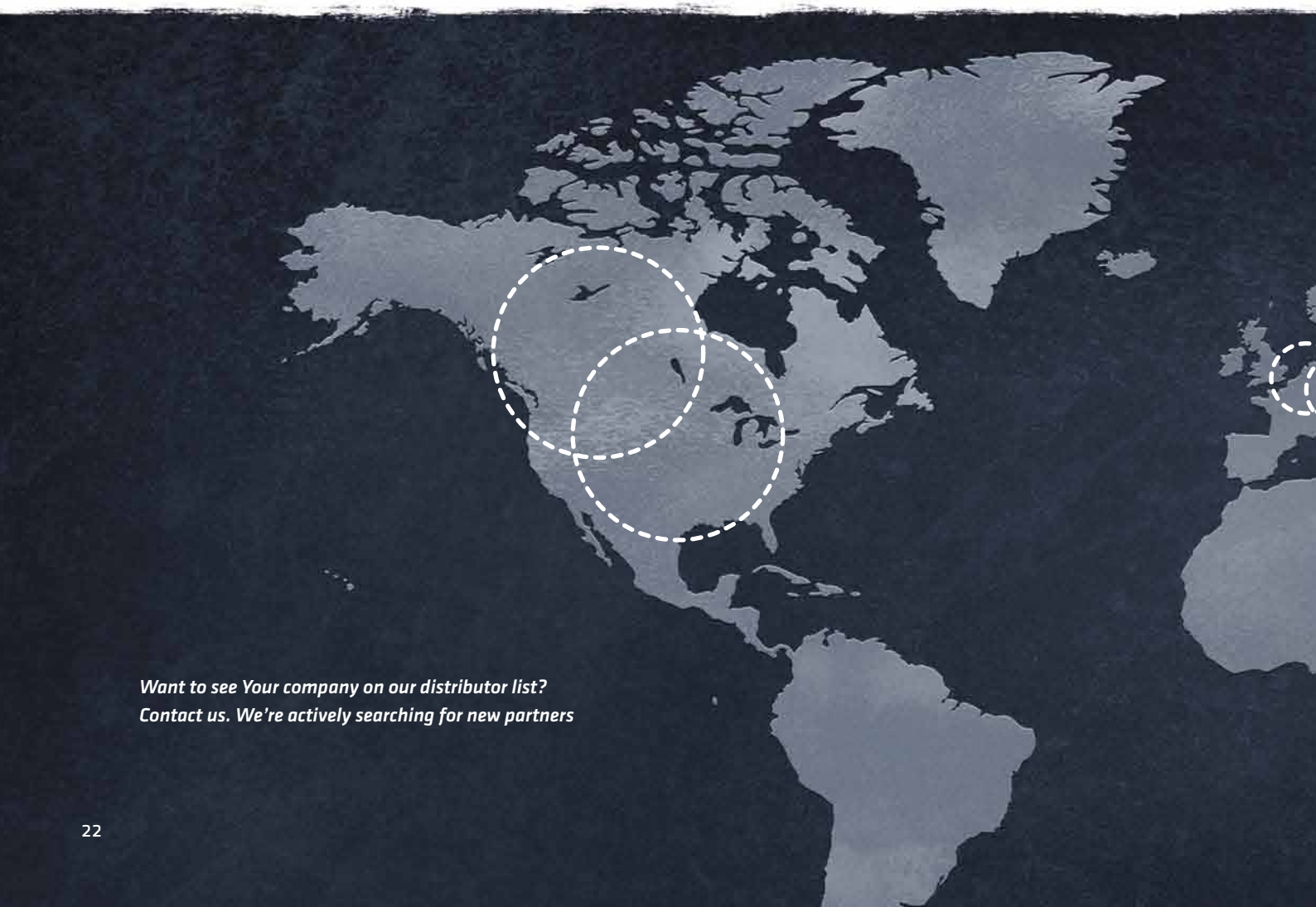

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