

The PSM system monitor is the first step into digital communication on board. It enables the monitoring and controlling of all connected philippi PBUS compatible components, and is the central indicating and operating interface of the EM-box. The PSM monitors, controls and manages the electrical installation. The CAN-bus system design enables to connect more than one system monitor side by side to obtain information about tanks, batteries, energy management and AC-power simultaneously. Alternatively several PSM system monitors may be installed on board at different locations to obtain the required information independently of each other.

As the PSM system monitor operates as a central monitor, the system can easily be enhanced incrementally from the smallest stage of expansion for instance with only a shunt SHC as a battery monitor up to a multi system

monitor or a control panel in a digital switched CAN-bus system.

The combination of the system monitor PSM with a digital shunt SHC 300 as battery monitor for the main battery including voltage measurement for a starter battery can be the first step for this new system. By fitting additional shunts SHC 300 for further batteries its easy to extend the system to your desire.

When a battery charger ALC is connected to the PBUS the system monitor has automatically access to the battery charger functions. Or you install an AC-interface ACW and get the informations about your AC - system. All further connections of compatible PBUS components expand the system monitor PSM to a multi function monitor.

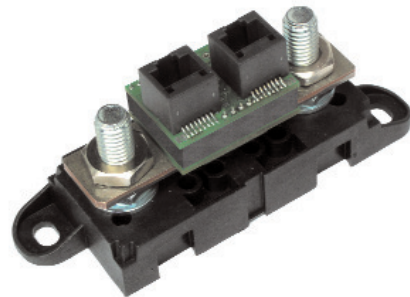
► ACTIVE SHUNT SHC



* PSM Order-No.: 0 7100 2000

The PSM system monitor is operated by a coloured TFT touch screen graphic display, with adjustable brightness, connected to PBUS via a standard RJ45 cable.

Operation voltage	8-60 V
Consumption	30 mA, Stand-by: 1 mA
Dimensions	L 105 x B 105 x H 35 mm
Cut out	88 x 88 mm



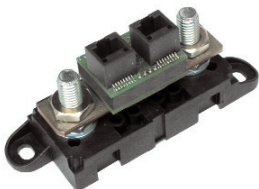
* SHC 300 Order-No.: 0 7100 0300

Active shunt connected via PBUS provides precise information of current, voltage and capacity of the connected battery and a terminal for voltage measurement of an additional (starter) battery.

The electrically isolated PBUS interface also allows measurement of galvanic isolated battery systems. Power supply via measuring cable. The SHC 300 shunt has to be placed in the negative line of the battery. Connection bolts M 10.

Rated current	300 A, 600 A 1 min, 1500 A 0,5 s
Nominal voltage	12 V, 24 V, 36 V, 48 V
Consumption	10 mA, Stand-by 2mA
Operation voltage	8-60 V
Current range	10 mA - 1500 A
Dimensions	L 118 x W 40 x H 52 mm

The following components can be connected to the PBUS. Connection of the individual components



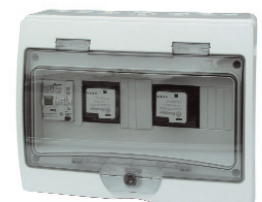
Digital shunt



Tank interface



Switch interface



Shore Power unit

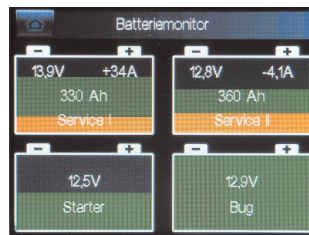
When the corresponding components are connected to the PBUS the system monitor has the following functions. All components are automatically accessible (plug&play). When the components are connected the first time

the system monitor allows the naming of the individual components for easier handling.



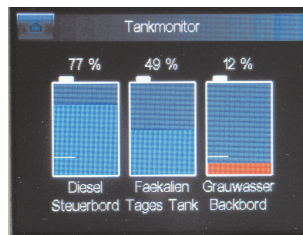
MAIN MENU

The main menu shows all available information pages. The touch screen monitor allows easy access to functions and information.



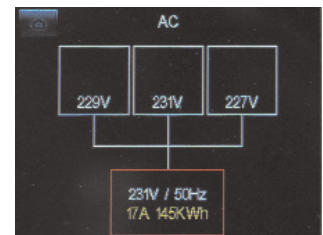
BATTERY MONITOR

When one or more SHC shunts or energy management boxes are connected to the PBUS all available information such as voltage, current, state of charge (V/A/Ah) are displayed. Up to 15 battery banks can be monitored.



TANK MONITOR

Connecting tank sensors via a CMT interface to the PBUS shows the levels of each tank on the display. Up to 4 tank sensors can be connected to each CMT interface. The system monitor can handle a maximum of 15 tanks.



AC MONITOR

When an LAU switch over unit and/or an ACW interface is connected to the PBUS, the monitor displays all available AC system information.



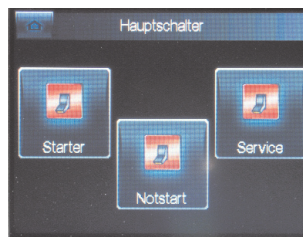
SETUP

All configurations of all connected components except the PowerPlex system (which has its own configuration software) can be accessed by the system monitor. Access is protected by a PIN code.



ENERGY MONITOR

By connecting the EM-box to an ALC series battery charger or an AL battery charger via a CMC interface, the monitor shows a clear overview of the energy flow in the DC system. If an EM-box is connected more detailed information is available.



MAIN SWITCH MONITOR

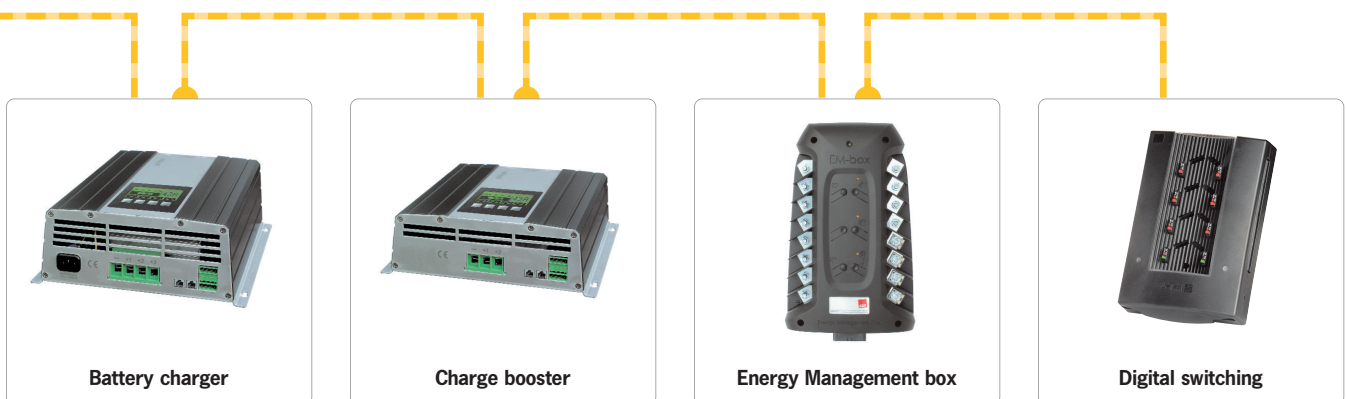
When the EM-box is connected to the PBUS, the monitor accesses the main switches. The access can be protected by a PIN code



DIGITAL SWITCHING

In combination with a PowerPlex digital switching system or a interface CMR 4, the monitor can control the consumers or scenarios via the touchscreen. The monitor shows the actual state of the configured consumer.

by using standard 8-pole computer network cable with RJ45 connectors



ENERGY MANAGEMENT BOX

The EM-Box is an innovative power management marine product which optimises efficiency in a boat's power creation and storage capacities. The product is a single solution to a number of different power management challenges and is energy, environmentally and economically efficient.

Different batteries have different charging needs. The EM-Box detects what these needs are and delivers what is required. This prolongs the batteries' lives, minimising environmental impacts and regular replacement expense for the boat owner.

Boat electrical systems have multiple points of failure, with many connec-

tions, fittings and wirings which are responsible for 80% of electrical system failures. The EM-Box simplifies the installation and reduces potential failures. The circuit boards and connections are localised in a single watertight box, which is the size of a shoe box. This makes installation and fault finding extremely flexible and easy.

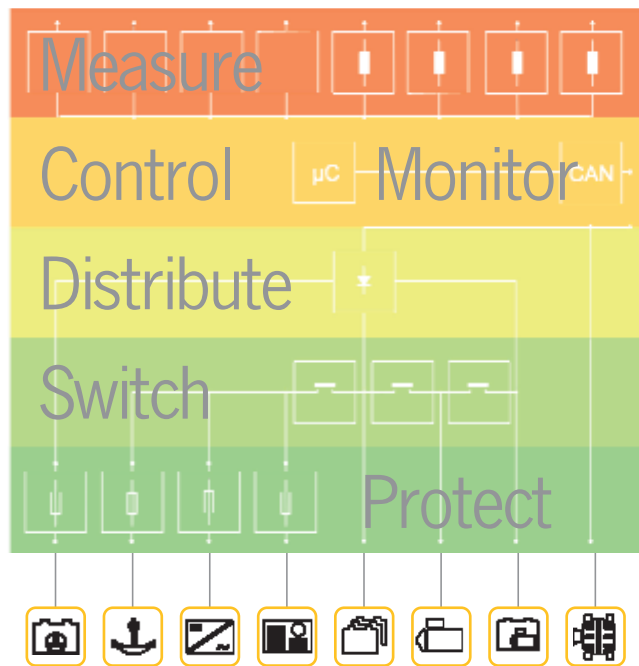
The EM-Box optimises a boat's power generation, including power from generators and alternators as well as solar and wind. This gives greater flexibility to power creation methods, will benefit the environment and will cause reduced running costs to the user.

All parameters will be collected to ensure a fast and properly charge of all batteries connected to the EM-box.

The microcontroller computes a specific charge characteristic for each battery bank. All datas are available on the CAN-Bus

The intelligent charge distributor splits the current from any source to an individual charge matching to each battery bank

The remote battery switches can be controlled by the system monitor PSM, separate connected control switches or direct at the EM-box. So the main switch can be accessed from any place and also in emergency situations.



3 high current outputs are equipped with bolt fuses. The bolt fuses are available also in an ignition proof version. If no bow battery is connected, the terminal can be used a further power outlet.

ACCESSORIES



* **TEMP AL** Order-No.: **0 5900 3001**

Temperature sensor für battery temperature.
Cable lenght 2,8 m



- * **SHB 50 A** Order-No.: **6 0892 5501**
- * **SHB 75 A** Order-No.: **6 0892 5751**
- * **SHB 125 A** Order-No.: **6 0892 6121**
- * **SHB 250 A** Order-No.: **6 0892 6251**

Bolt fuse M8. Rated voltage 58 V

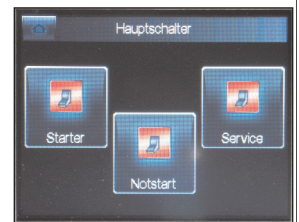
A system monitor PSM connected to the EM-box gives the opportunity to get the access to all informations of the electrical system. All charging parameters can be programmed by the system monitor PSM. Also the remote battery switches and the emergency cross over switch can be controlled by touch screen (menu can be protected by a PIN code).



For all connected battery banks voltage, charge- and discharge current and state of charge will be displayed.



Display of the energy flow. Which energy source delivers and how much current and where it is gone.



Status and control of the battery disconnect switch and emergency cross over switch. The access can be protected by a PIN code.

ENERGY MANAGEMENT BOX

All alternators regulators having a separate sensing line (Volvo-Penta, Nanni, ...) the EM-box upgrades the alternator to a 3 step charging characteristic energy source. For alternators without this possibility we recommend our additional DC charge booster LMB (see page 31).

The design of the EM-box ensures a clear and logical connection of batteries, charging sources and consumers. The strict division of the + and - terminals ensures high safety.

Manual override of the battery disconnect switch (emergency stop)

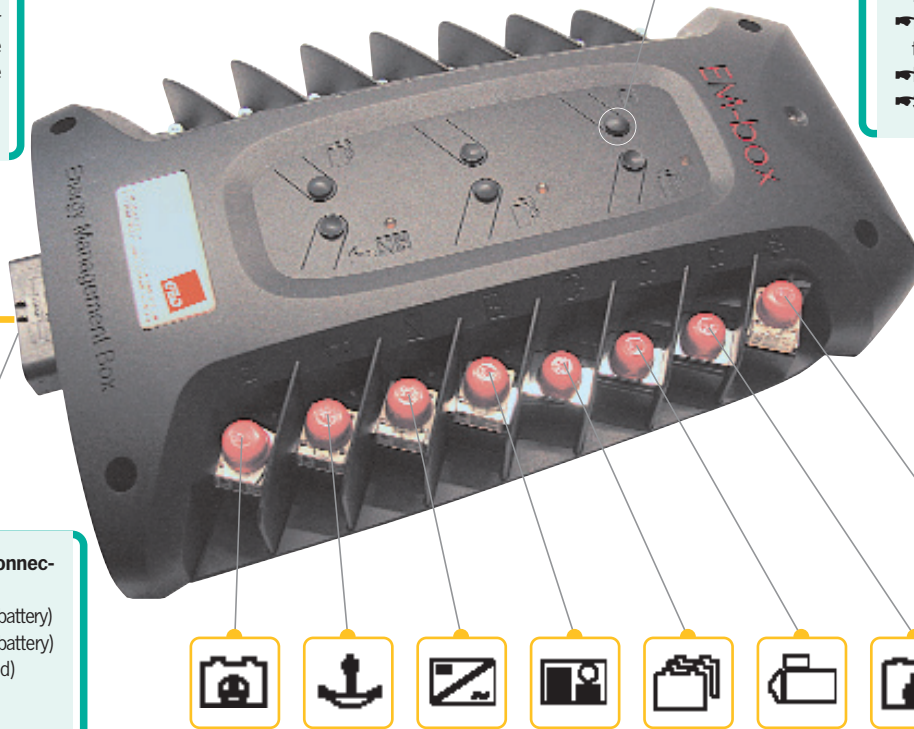
All in one box!

The EM-box unites all the individual electrical devices.

The EM-box replaces:

- ☛ Battery main switch
- ☛ Charge distributor
- ☛ Main fuse
- ☛ Negative bus bar
- ☛ Deep discharge protection
- ☛ Battery controller
- ☛ Smart regulator

CAN-Bus



Internal protected connections for:

- Unswitched plus (starter battery)
- Unswitched plus (house battery)
- Charge input (solar/wind)

Remote input for

- Main switch
- Battery voltage/-temperature
- CAN-bus

Remote output for

- Alternator regulator
- Wind generator stopp



Main connection for:

- ☛ Starter battery
- ☛ House battery
- ☛ Bow battery

- ☛ Alternator
- ☛ Starter
- ☛ 3 main consumers like panel, inverter, Anchor winch

Instead of a third battery bank (bow battery) a fourth main consumer can be connected to the EM-box

* EM-box

Order-No.: 0 7100 1000

Battery disconnect switch		Rated voltage	
Bistable relay with save manual override. No corrosion by water-tight housing. No current consumption after switching.	Rated current 260 A @ 23 °C	Rated voltage 12 / 24 V	
	Overload 190A @ 85°C (1500A 0,5s)	Terminals M8	
	Voltage drop >40 mV @ 100 A	Weight 2 kg	
Alternator regulator, charge distribution		Dimensions HxWxD 330 x 250 x 75 mm	
3 step IUoU charging characteristic for each connected battery bank (starter/house/bow) individual adjustable. All connected battery banks will be supervised by current and voltage and protected against overcharge independent of the charging source.	Characteristic max. current IUoU adjustable	Temperature range -15°C - 50 °C	
	recommended alternator 35 -150 A	Protection IP 67	
		Power terminals IP21	
Current measuring, state of charge		Bolt fuses are not included. Please order separately	
Individual measurement of current, voltage and temperature for each battery bank (external sensor). For all consumers and connections individual current measurement.	Rated current 260 A		
	Overload 1500 A 0,5 s		
	Resolution 10 mA		
	Error 0,5 %		
Consumer outlets			
external fusing via bolt fuses M8	Circuits 3 (4) max 250 A		

If the EM-box is used without the system monitor PSM, the battery disconnect switches can be controlled with standard toggle switches 0-1 from any desired location.

The charging characteristic are pre defined to temperature compensated IUoU-characteristic to 14,4 V/13,8 V @ 20°C.

With a decentralized digital CAN BUS system, the consumers can be switched and controlled by a digital command. The classical wiring of controls and/or protective switches, to respective consumer, does not exist any more, so all consumers are supplied by only one efficient power line. The classic connection between consumer and switch is replaced by the digital control and then a consumer can be switched from several places and vice-versa with no additional lines. Also the allocation of consumer switches can be changed at any time. This offers an easy adding of new comfort functions like alarm functions, or the remote controlled switching from consumers. Each output is able to switch the assigned load, accomplish timer functions,

recognize functional-load, over-current and a broken wire. Each channel can be individually adjusted by software. The configuration software runs on each PC. Communication to the E-T-A Power Plex system is made by a USB-CAN adapter. The individual configuration is stored in non-volatile memory on each power bus node. In case a node has to be replaced, only that one has to be exchanged, and the reprogramming takes over themselves automatically from the other Power Plex nodes in the system, so that the system is operational immediately again.

* E-T-A POWER MODUL

Order-No.: 1 0010 2400

CAN-BUS power node with 12 power outlets:

Outputs:

4x 1 A
6x 8 A and 2x 25 A, additionally fused by frontside circuit breakers with emergency function.

Inputs:

8 digital inputs for control switches/-push buttons.
8 digital outputs for checkback signals.
4 analog measuring inputs 0-10 V.
All functions adjustable by PC-software.

Dimensions

L 300 x W 230 x H 70 mm



* E-T-A PANEL MODUL

Order-No.: 1 0010 2500

CAN-BUS panel node with 32 digital controlling inputs:

Inputs:

32 digital inputs for control switches/-push buttons.
32 digital outputs for checkback signals.
4 analog measuring inputs 0-10 V.

Outputs:

4x 1 A,
2x 8 A, additionally fused by frontside circuit breakers with emergency function.
All functions adjustable by PC-software.

Dimensions

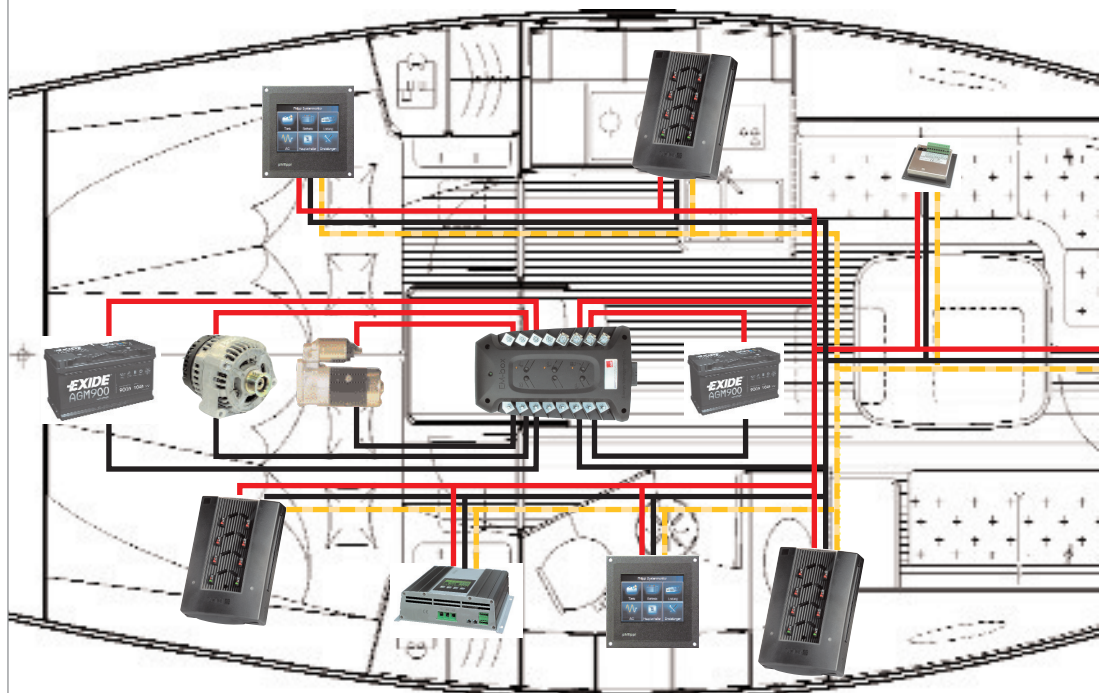
L 300 x W 230 x H 70 mm



The configuration of all switching functions of the CAN-bus system is made by the Power-Plex software on a PC. This configuration will be saved and stored on each bus node. After the programming the node system is running apart of the necessity of a PC. On your kind demand we or your PowerPlex system partner will overtake the programming of the system.

Which advantages you will get from a CAN-Bus system?

▶ Easy expanding by installing additional CAN-bus components into the existing system without extensive new wiring.





Emergency function by plugging the circuit breaker into the socket.



A maximum of 32 nodes can be together in one system



Quick connection by spring pressure terminals

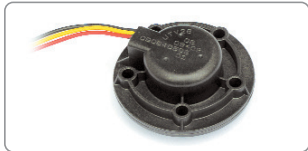


8 outputs are dimmable

Possible connections to the Power-Plex-Box:

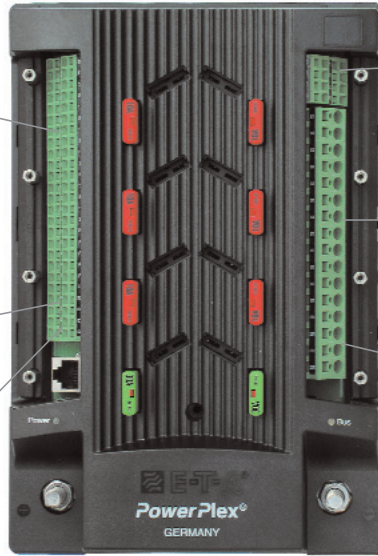


8 digital inputs for control switches/-push buttons. With outputs for LED-controlling, dimmable.



4 analog measuring inputs 0-10 V.

CAN-Bus wire



OUTPUTS:

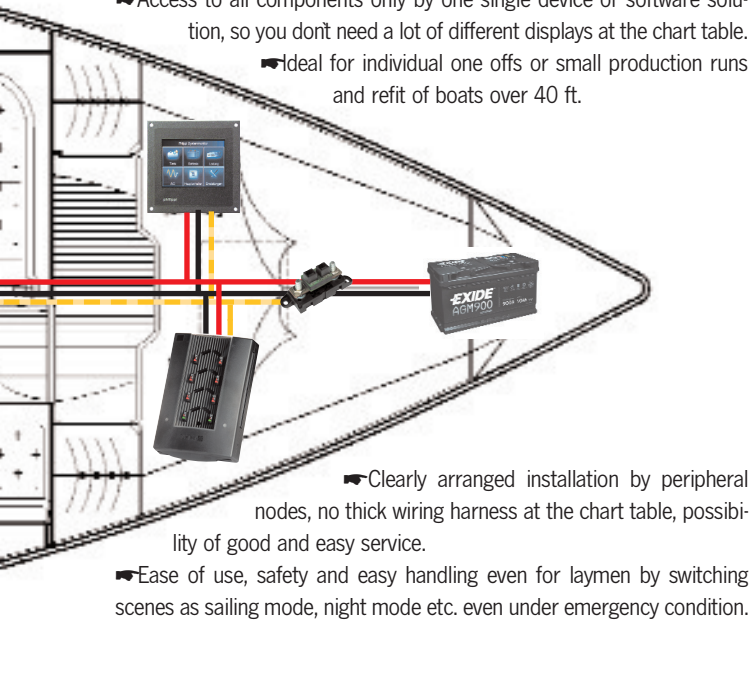
4x 1 A, electronically fused

6x 8 A, fused electronically and by frontside circuit breakers with emergency function. Dimmable

2x 25 A, fused electronically and by frontside circuit breakers with emergency function. Dimmable

If more power is needed, two outputs can be switched together (parallel).

- High flexibility in configuration and easy changing of adjustments and the possibility of expanding your system at any time.
- Guaranteed future for enlargements (by software update).
- Access to all components only by one single device or software solution, so you don't need a lot of different displays at the chart table.
- Ideal for individual one offs or small production runs and refit of boats over 40 ft.



- Clearly arranged installation by peripheral nodes, no thick wiring harness at the chart table, possibility of good and easy service.
- Ease of use, safety and easy handling even for laymen by switching scenes as sailing mode, night mode etc. even under emergency condition.



Controlling a bus-system

Individual switch boards including switches, push-buttons and system monitors PSM



Variable switch boards, single switches and the system monitor PSM



Customised software solutions for a touchscreen-PC.

COMPONENTS FOR THE PBUS

To get the level information of your tank sensors into the PBUS network you need the interface CMT. It receives all the information, supplies the sensors and provides this informations to the system network. All adjustments needed as type of sensor, capacity of the tank, alarm thresholds etc. will be done by the system monitor PSM. You can connect up to four tanks (with different characteristics) to the CMT:

- tank sensor, characteristic: resistance 10-180 Ohm
- tank sensor, characteristic: resistance 240-33 Ohm
- tank sensor, characteristic: resistance free range 0-300 Ohm
- tank sensor, characteristic: current measurement 4-20 mA
- tank sensor, characteristic: voltage 0,5-2,5V
- flow sensors DFS.

The interface CMC enables the integration into the PBUS Network of:

- Battery charger via RS 485 interface (series ALC)
- Active shunt via RS 485 interface (series SHA)
- AC-interface ACW via RS 485 (modbus protocol)



* CMT

Order-No.: **0 7100 0400**

Interface for the PBUS for the measurement of up to 4 tank sensors. Connection by plug-in screw terminals. Connection to the PBUS by 8 pole RJ45 network socket and Y-adapter with 8 pole computer-networkcable CAT 5 or higher.

Dimensions L 105 x W 105 x H 40 mm

* CMC

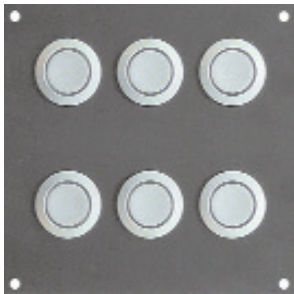
Order-No.: **0 7100 0485**

Interface for the PBUS for the integration of a shunt SHA or charger AL. Connection by plug-in screw-terminals

Dimensions L 105 x W 105 x H 40 mm

For easy application of CAN-bus systems also in smaller boats the switch board STC 6 can be used in connection with the output module CMR 4. Programming of switch functions has to be done by the system monitor

PSM. Only easy functions as switching without complexe combinations are possible. The components can be integrated into the E-T-A PowerPlex system.



* STC 6

Order-No.: **0 7100 0206**

Control panel for integration into the PBUS or a PowerPlex CAN bus system. 6 Button with integrated LEDs.

Dimensions L 105 x W 105 x D 50 mm



* CMR 4

Order-No.: **0 7100 0040**

Power outlet module for four consumers 8 A max each.

ACCESSORIES



- * PBUS-cable 0,5 m Order-No.: **5 3000 0050**
- * PBUS-Cable 1 m Order-No.: **5 3000 0100**
- * PBUS-Cable 2 m Order-No.: **5 3000 0200**
- * PBUS-Cable 5 m Order-No.: **5 3000 0500**
- * PBUS-Cable 10 m Order-No.: **5 3000 1000**

Network cable for the connection of PBUS-components (RJ 45).



* PBUS Terminator (terminator resistor)

Order-No.: **5 3000 0012**

Terminator resistor for the PBUS. Necessary for the end device in the PBUS.