OPERATION MANUAL

AUTOMATIC SHORE GENERATOR (INVERTER)-SWITCH OVER UNIT FOR 2 SOURCES LAU 216 (F)

INTRODUCTION

If an AC generator or inverter is installed on board a yacht or vehicle, it is necessary to switch between the shore connection and the generator/ inverter 2-pole. The AC changeover unit LAU 216 (F) is used for automatic switching between 2 AC sources with max. 16A.

PLEASE NOTE:
Please note that when installing a generator according to EN ISO 13297, a voltmeter for the 230V/50 Hz on-board power supply voltage must be available!

The system monitor PSM is provided for this purpose. This also provides information on the operational readiness of the individual sources and the status of the on-board power supply system.
On the on-board power supply side, an FI/LS circuit breaker (RCBo) must be installed to protect against residual currents. This switch is already installed in the LAU 216 F models!
The inputs of the switching unit must be protected by external miniature circuit breakers (MCB) directly at the energy sources (generator, inverter, shore connection) to match the laid conductor cross-section and the load capacity of the switching unit!

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1. General Information

1.1 Content

- AC changeover unit LAU 216 (F)
- This instruction manual (The document is available for download in colour on our website. www.philippi-online.de

1.2 Warranty

philippi elektrische systeme gmbh grants a two year limited and non-transferable warranty for the delivered devices. Defects resulting from material or manufacturing defects will be repaired free of charge if:

- The device is sent to the manufacturer free of charge.
- The proof of purchase is enclosed
- The device has been treated and used as intended.
- No external parts have been installed or interventions have been carried out.

The warranty does not cover damage caused:

- by overvoltage at the inputs, or polarity reversal
- by liquids which entered the device
- from lightning strike

The warranty does not cover consequential costs and natural wear and tear. A detailed description of the defect is essential when asserting claims under warranty. Detailed notes facilitate and speed up the processing. Please understand that we cannot accept shipments which are not sent to us free of charge.

1.3 Exclusion of liability

Both the observance of the operating instructions as well as the conditions and methods for the installation, operation, use and maintenance of the shunt SHC cannot be monitored by *philippi elektrische systeme gmbh.* Therefore, we assume no responsibility and liability for losses, damages or costs resulting from faulty installation and improper operation.

1.4 Quality Management

During production and assembly, the devices undergo several checks and tests. Manufacturing, controls and tests are carried out according to established protocols. Each LAU has its own serial number. Do not remove the label. The assembly and testing of all LAU units are carried out completely at our company in Remseck am Neckar.

2. Safety References

- unauthorized changes to the equipment will invalidate the CE sign
- the installation of the LAU may be made only by electrical specialists.

The assembly and operating instruction is a component of the LAU package. It must be kept (for reference). Importantly: - for later maintenance work - and for the use of subsequent owners of the equipment.

3. Operating Principle

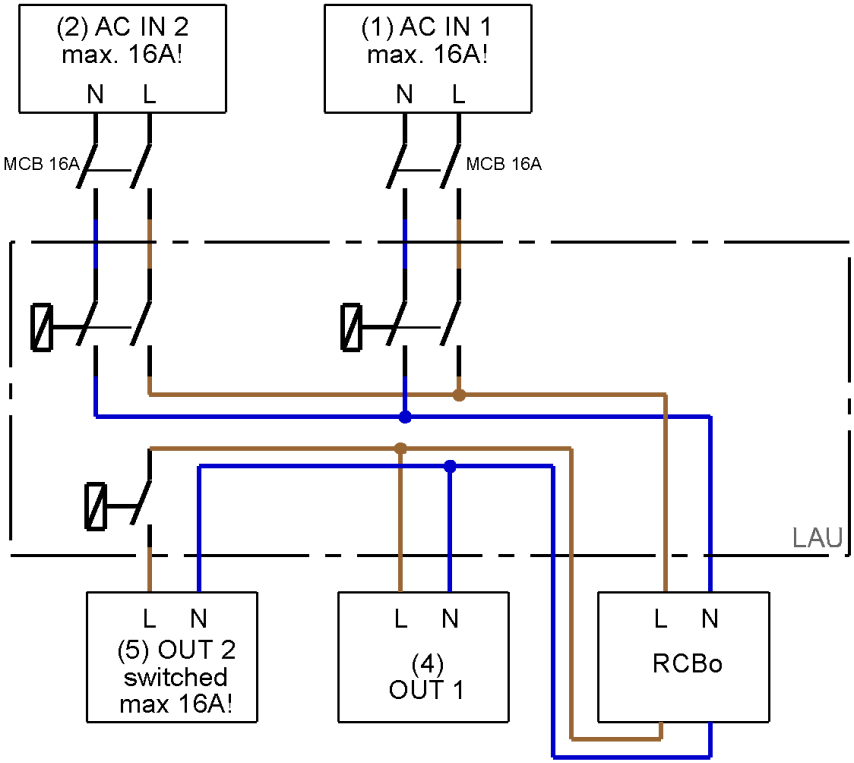
The switch over unit LAU 216 (F) automatically switches between two AC sources after a fixed priority. Therefore the AC voltage must be within a valid range (factory setting 180-250 V AC) so that the AC voltage can be switched to the respective AC source. The priority is set ex works: Input 2 has priority over input 1. This can be changed at any time via the system monitor PSM. The switching time between the individual AC sources is set ex works to 3 seconds and can be changed at any time via the system monitor PSM.
There are 2 outputs available. Output 1 is the general output and is active for all AC sources. Output 2 is only active for certain AC input sources. For example, a charger is connected to output 2 in order to prevent the charger from operating when the inverter is active, or to allow the air conditioning system to be operated only when the generator is active. Ex works the output 2 is only active at source 2 .This can be adapted at any time via the system monitor PSM.

The switch-over unit LAU is intended for connection to a PBUS network. The system monitor PSM shows the current AC voltages of the individual inputs and the frequency of the currently active AC sources. If an ACW 3 transducer is connected, additional data such as the AC current (A) and kilowatt hours (kWh) of the board net are displayed. All settings can be adapted in the corresponding setup. Refer to chapter 6 of this manual and manual of the system monitor PSM.

We recommend the following assignment of the inputs:

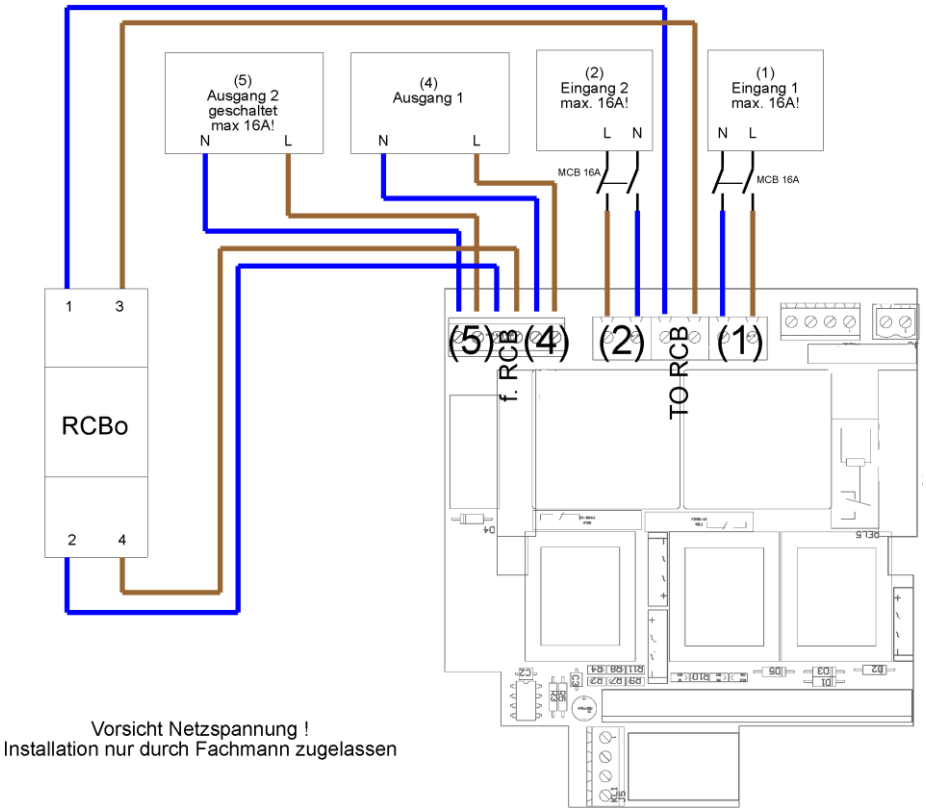
LAU 216: (2) Generator (max 3.6 kW) (1) Shore (max. 16 A)
Or (2) Shore (max.16 A) (1) Inverter (max.3.6 kW)

Schematic circuit diagram:



If the model is used without an integrated RCBo (LAU 216 without F), the installer must provide the necessary protection for the system by means of an externally connected/grinded RCBo!

4. Connection of the LAU

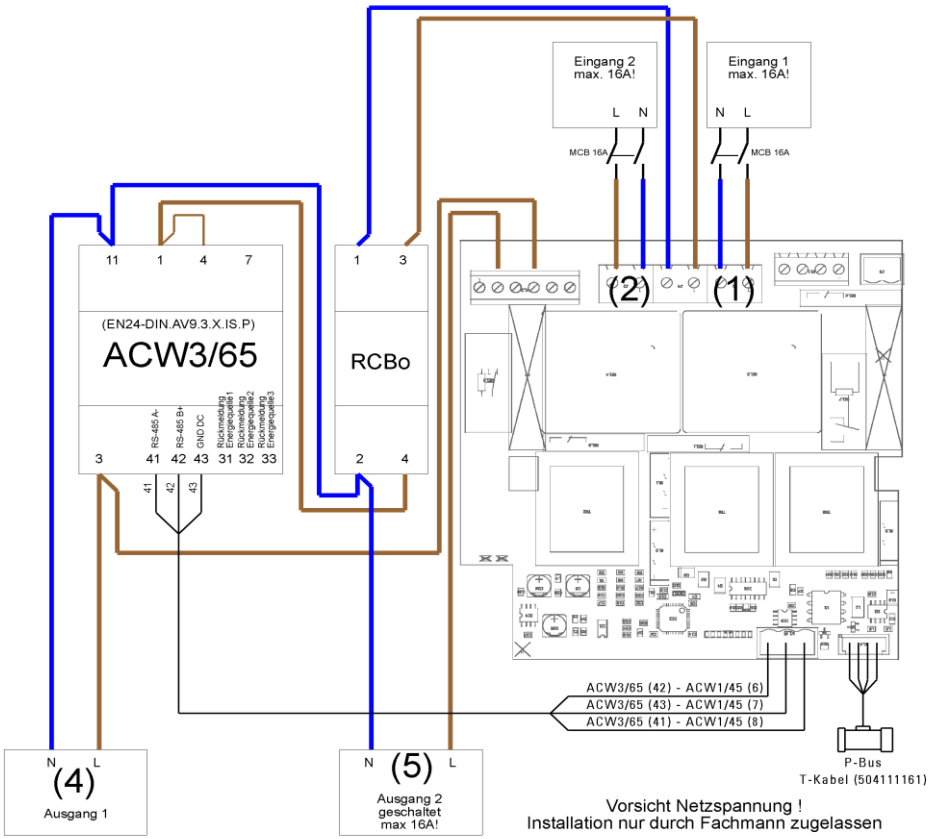


The circuit diagram shows the connection of the switching unit to 2 AC sources. The inputs of the switching unit LAU 216 must be fused with external MCB 16A circuit breakers. If the input sources are already fused with FI / LS (RCBo) switches, the switching unit LAU 216 can be connected without any modifications. If an existing FI / LS (RCBo) switch has to be grind in, the internal jumpers between terminals TO RCB and F.RCB must be removed and the external FI / LS (RCBo) switch grind in this particular space, please refer to the diagram below. In the model LAU 216 F this RCBo is in the housing and is pre-wired.

Wiring:

Terminal 1: Input 1 Terminal 4: Output 1
Terminal 2: Input 2 Terminal 5: Output 2 (switched)

5. Connection LAU 216 F including ACW



The circuit diagram shows the connection of the switching unit to 2 AC sources. The inputs of the switching unit LAU must be fused with external MCB 16A circuit breakers. The FI/LS-switch RCBo is located in the housing and is pre-wired. The consumers, which are always active, are connected at the output 1; at the output 2 those consumers are attached which can only be active with a specific source.

Terminal assignment:

Terminal 1:	Input 1
Terminal 2:	Input 2
Terminal 4:	Output 1
Terminal 5:	Output 2 (switched)

6. Adjustment Options via the System Monitor PSM

6.1 Setup AC

If the LAU changeover unit is connected to the PSM, the display and operating parameters can be set.

6.1.1 Identification

The hardware type (e. g. LAU3xx), its software version (V001) and the serial number of the device are displayed.

6.1.2 Priorities

The sequence of automatic source switching can be adapted to the system. Priority 1,2,3 means that source 1 has priority over source 2 and 3 and is switched on with priority in the valid range when the mains voltage is applied.

6.1.3 Switching thresholds

The thresholds for undervoltage and overvoltage and delay time for automatic source switching can be set individually for each source. If the mains voltage of the source is higher than the undervoltage and lower than the overvoltage, the source is switched on with the appropriate priority.

6.1.4 Exclusion

Loads that are not to be supplied from every source can be connected to the additional output XX of the LAU. The activation of this output depending on the source is defined here. This output is only active for the set active sources.

6.1.5 Hysteresis

A hysteresis can be defined for the shutdown due to undervoltage, which defines the shutdown threshold xx volts lower than the switch-on threshold. This prevents unwanted toggling (switching on and off) when the source is switched on when consumers are switched on.

6.1.6 Designation

For each AC source, the designation is displayed symbolically and is used for easier assignment.

7. Technical Specifications

Nominal voltage	AC 230Volt / 50 Hz
AC input 1 & 2	16A
AC Output 1 & 2	16A
Dimensions (WxHxD)	160 x 200 x 115 mm (LAU 216) 195 x 200 x 115 mm (LAU 216F)
PBU S interface	RJ45

8. Declaration of Conformity

This device complies with the requirements of EU directives
2004/108/EC "Electromagnetic compatibility"
2006/95/EC "Electrical equipment designed for use within certain voltage limits"
A declaration of conformity can be sent on request.

9. Disposal

Please take care of your local directives on waste electrical and electronic equipment.
Please use collection points for waste electrical and electronic equipment.