

## ATS Controller Diagram

In this ATS controller diagram, the changeover switch is made by using two power contactors fitted with auxiliary contacts and mechanical interlock. The contactors KG and KM are rated 300 Amp AC1.

### When it is about contactors

The configuration of two contactors is a safe and reliable solution. It is mandatory to use, as safety precaution, a mechanical interlock. This prevent the KG and KM to be simultaneously closed.

This is theoretically impossible because we already use auxiliary contacts. But adding a mechanical interlock will add a superior level of protection.

The expected life of the coil of the contactor is about 20 to 30 years. But you have to maintain the operating temperature as lower as possible. Ambient temperature inside the panel over 50 degrees Celsius may reduce the life of the coil. For this reason we recommend that you store inside the panel a spare coil.

In case of failure you can replace the coil in a few minutes. We always recommend 230V coils instead of 400V coils.

Never make mechanical work on the panel when contactors are inside. Iron filings are the most dangerous enemy of the contactors. A really small amount of it can create big issue in the movement of the contacts. In case of contamination you are required to accurately disassemble the contactors.

To guarantee long life of the panel, take into account the number of the operation of the contactors. In normal condition a standby generator will work 2-3 times a week.

You can dimension the size of the contactors based on class AC1. But in case you supply high inductive loads or a higher number of weekly operations, we recommend dimensioning the contactors based on the AC3 class.

### General Description

When the utility power is not available the ATS controller transfers the load to the generator. It will transfer the load back once utility power will be restored. The ATS controller that governs the system ensures that all this is done smoothly and with a short downtime.

The automatic changeover switch for generator comes with a so called ATS controller, which monitors the parameters of utility power and detects when there are electrical parameters out of the preset limits. The ATS controller will then automatically start the engine via the BE242RB interface board.

The contact of the relays will instruct the engine to start. Once the generator provides the correct frequency and voltage, the automatic changeover switch transfers the load from the utility power to the generator.

This happens after a mains failure programmed delay (seconds, minutes or hours). When the engine is cold, the ATS CONTROLLER provides a programmable warm up time to run the engine off load.

Once utility power has been restored, the **Automatic changeover** switch will connect the load to the power utility automatically. After a time delay, the engine is then stopped.

## HOW IT WORKS in details

### GENERATOR-LOAD

The generator is electrically connected to the LOAD via the KG (contactor of the generator). This is possible only when both contacts, **KM-AUX** and **KG-PILOT** are closed.

The KM-AUX are the auxiliary contacts fitted on the body of the Mains contactor (so called KM). When the KM is open, the **KM-AUX** contacts enable the KG. Once the ATS controller decides to close the contactor, it will energize the relay **KG-PILOT**.

In this case, the coil of the KG will be supplied by the N and L3 of the generator via a protection. The Be242 continuously monitors the electrical parameters: voltage-frequency and current.

Should a parameter exit from the allowed range, the ATS controller triggers a warning and a shut down if is the case. This is the typical behavior of the automatic transfer switch: BREAK-BEFORE-MAKE.

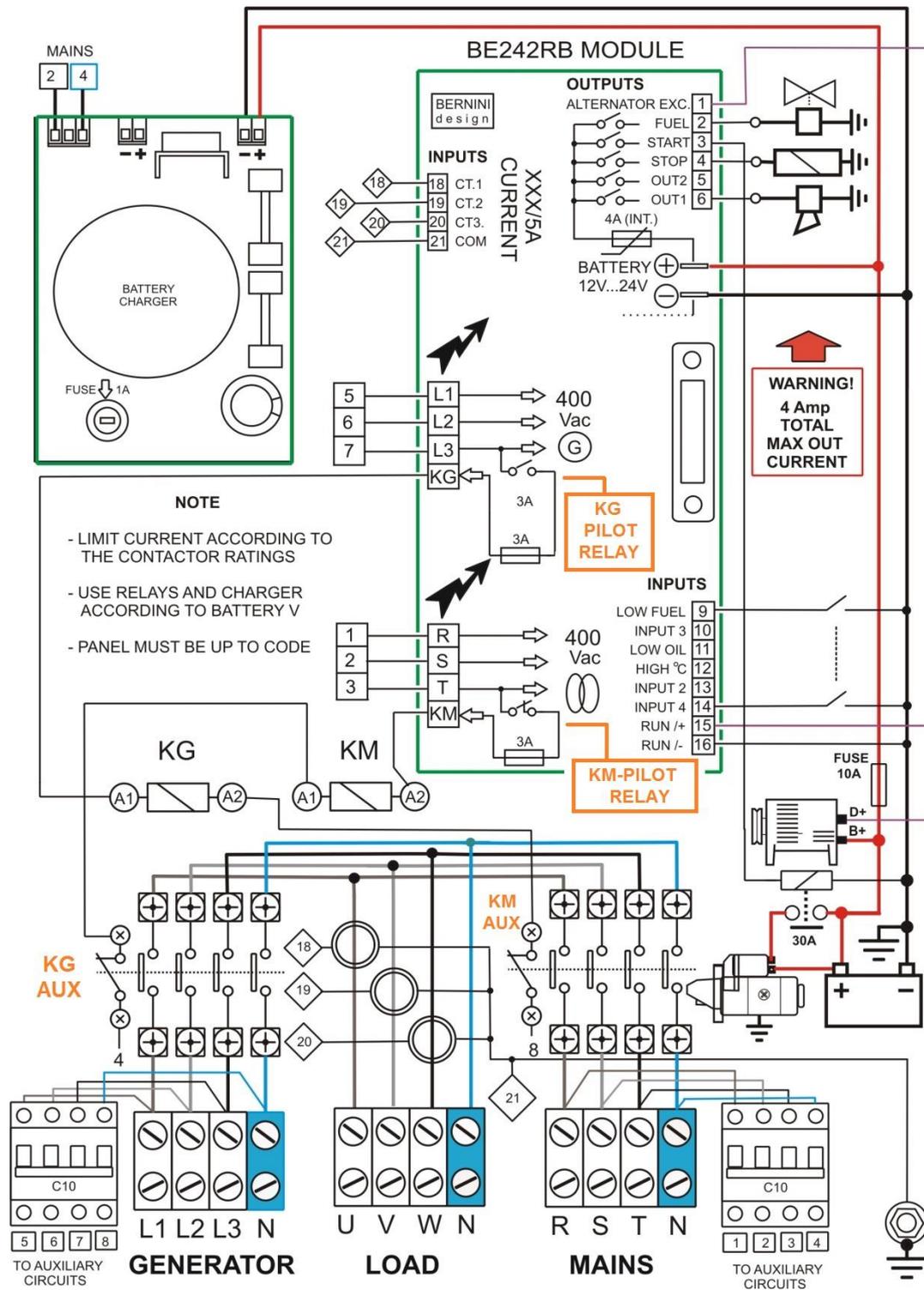
### UTILITY POWER-LOAD

The utility power is connected to the LOAD via the KM contactor. The coil of the KM is energized by the closed contacts **KG-AUX** and **KM-PILOT**. **KG-AUX** are the auxiliary contacts mechanically fitted on the body of the KG (contactor of the generator). Being the contactor of the generator open, the auxiliary contacts are closed. The **KM-PILOT** is the UTILITY POWER control relay.

This relay is OFF when the utility power (or MAINS if you will) is within the settings. In this case the COIL of the KM is supplied by the N and L3 of the MAINS via a protection fuse. It is really important to note why we use the normally closed contacts of the **KM-PILOT**.

By using the normally closed contacts, we are sure to provide priority to UTILITY POWER in case the ATS controller is damaged or without supply. If we use the normally open contacts, all the time we remove the DC supply of we remove the battery of the engine, we disable the contactor of the mains. The user will get an unexpected power failure in the building even if the UTILITY POWER is healthy.

This is why we use the normally closed contacts. In case of real power failure, the ATS controller energizes the **KM-PILOT**. The **KM-PILOT** contacts will open and the KM will open as well. This prevents the panel to supply the LOAD with improper electrical parameters. Once the KM is open, the auxiliary contacts **KM-AUX** will close. This is one of the mandatory condition to close the KG (the KM must be open in the first place).



The auxiliary circuits for utility power and generator are protected via 10Amp. circuit breakers. We always recommend to insert a 16.25Amp fuse on the battery. This will avoid burning the DC cables in case of a direct short circuit of the battery plus and battery minus on the panel side. Limit the maximum current to 300 Amp.

<b>DESCRIPTION</b> <b>173kVA ATS BE242</b>	<b>PANEL</b> <b>DETAILS</b>
MANUFACTURER	<b>BERNINI DESIGN SRL - 10 IAN 2022</b>
MODEL	<b>173KVA - BE242 (Serial no. ATS1038EN)</b>
CABINET	<b>STEEL 2mm COATED RAL 7032</b>
DIMENSIONS / WEIGHT	<b>1400 X800 X300 / 78 KG</b>
NOMINAL POWER kVA (kW)	<b>173kVA (150kW)</b>
NOMINAL VOLTAGE / RANGE	<b>400Vac / 360-440Vac</b>
INSULATION	<b>1000 Vac</b>
MAX. CURRENT AC1	<b>300 Amp</b>
CONTINUOUS CURRENT TAMB 25 DEG, CELSIUS	<b>0-250Amp</b>
CONTINUOUS CURRENT TAMB 40 DEG, CELSIUS	<b>0-200Amp</b>
CONTINUOUS CURRENT TAMB 50 DEG, CELSIUS	<b>0-100Amp</b>
CURRENT TRANSFORMER	<b>3 X 300/5A</b>
SHORT CIRCUIT CURRENT	<b>100KA</b>
FREQUENCY / RANGE	<b>50Hz / 45-55Hz</b>
CONTACTORS	<b>2 X 4 poles 3PH+Neutral GHISALBA GH15PN</b>
ELECTRICAL PROTECTIONS	<b>Min-Max Voltage / Frequency Generator Overload</b>
CONTACTOR COILS	<b>230V/50Hz GHISALBA GH15SN</b>
STANDARDS	<b>IEC 61439-1-2-34-5-6-7 IEC 60529</b>
INTERNAL PROTECTIONS	<b>Fuses 5x20 1A / 2XCIRCUIT BREAKERS.10A</b>
HUMIDITY CLASS	<b>5-85 %</b>
OPERATING TEMPERATURE	<b>-15/+50 Degree Celsius</b>
TERMINAL BLOCKS	<b>M10 BOLTS</b>
BATTERY CHARGER	<b>24V 5 AMP.</b>
STANDBY POWER (internal circuits)	<b>20VA</b>

DECLARATION OF CONFORMITY

THIS PANEL MEETS AND EXCEEDS **IEC 61439-1-2-34-5-6-7 IEC 60529.**

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