DEIF

-power in control

CE

MULTI-LINE
APPLICATION NOTES



Automatic Genset Controller, AGC

- Single generator set
- Automatic mains failure
- Parallel with mains (grid)
- Load sharing, multiple gensets
- Sensors

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SW version: 3.3x.x or later

1. General information

1.1 Warnings, legal information and safety

1.1.1 Warnings and notes

Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings

Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

Notes

Notes provide general information, which will be helpful for the reader to bear in mind.

1.1.2 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator controlled by the Multi-line 2 unit, the company responsible for the installation or the operation of the set must be contacted.

The Multi-line 2 unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

1.1.3 Safety issues

Installing and operating the Multi-line 2 unit may imply work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

1.1.4 Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

1.1.5 Factory settings

The Multi-line 2 unit is delivered from factory with certain factory settings. These are based on average values and are not necessarily the correct settings for matching the engine/generator set in question. Precautions must be taken to check the settings before running the engine/generator set.

1.2 About the Application Notes

1.2.1 General purpose

This document includes application notes for DEIF's Multi-line 2 unit. It mainly includes examples of different applications suitable for the unit.

For functional descriptions, the procedure for parameter setup, parameter lists etc., please see the Designer's Reference Handbook.

The general purpose of the application notes is to offer the designer information about suitable applications for the Multi-line 2 unit.

Please make sure to read this document before starting to work with the Multi-line 2 unit and the gen-set to be controlled. Failure to do this could result in human injury or damage to the equipment.

1.2.2 Intended users

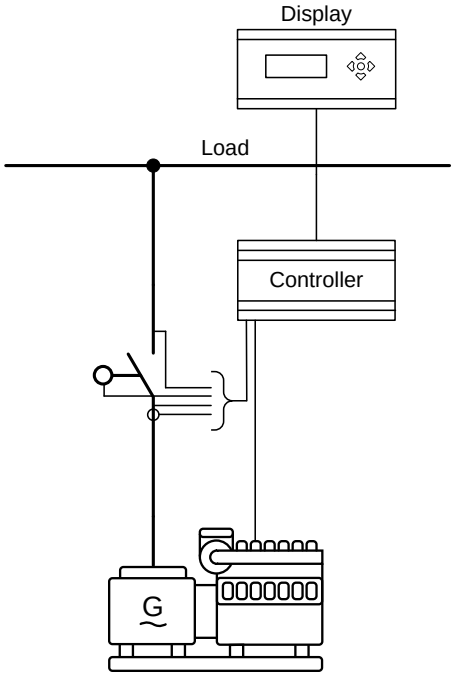
The Application Notes are mainly intended for the person responsible for designing Multi-line 2 systems. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this document.

1.2.3 Contents and overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

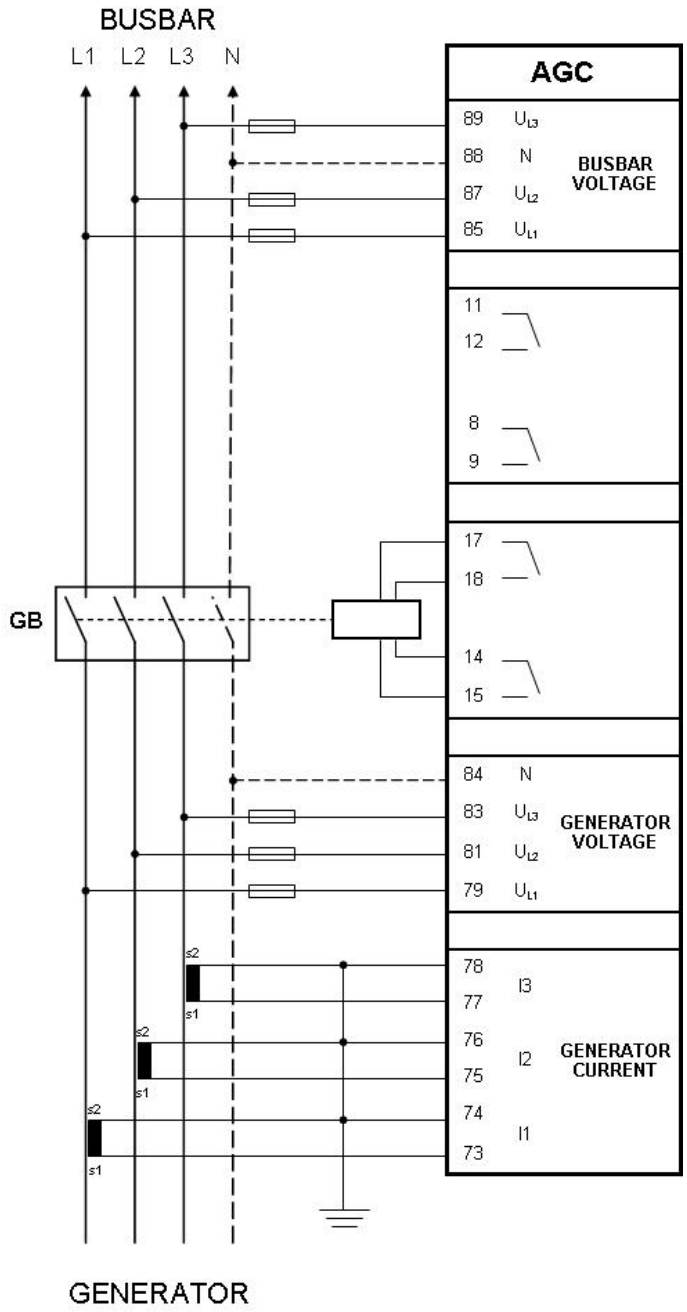
2. Single generator set

2.1 System single-line diagram



Diesel generator set

2.2 AC connections

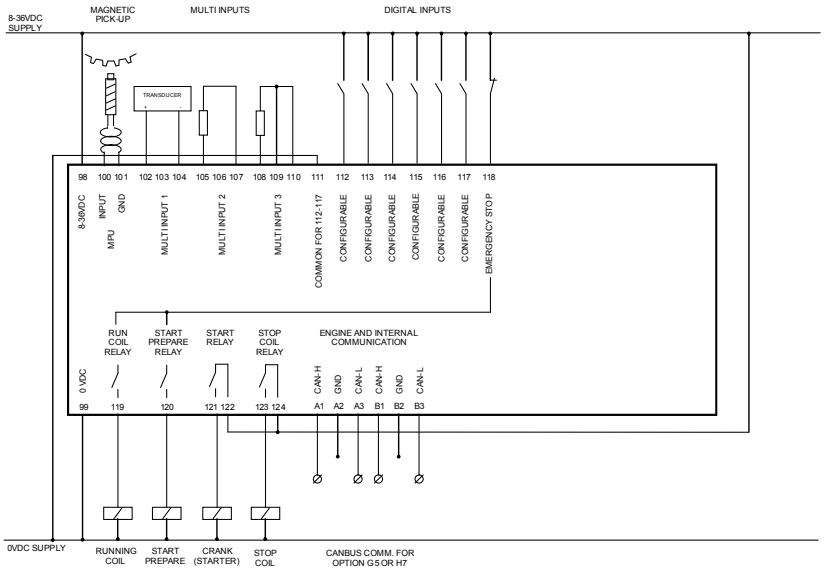


A neutral connection is a possibility but not a necessity. AC voltages max. 690V AC phase-phase.

Regarding single-phase and split-phase (2-phase) systems, please refer to the installation instructions.

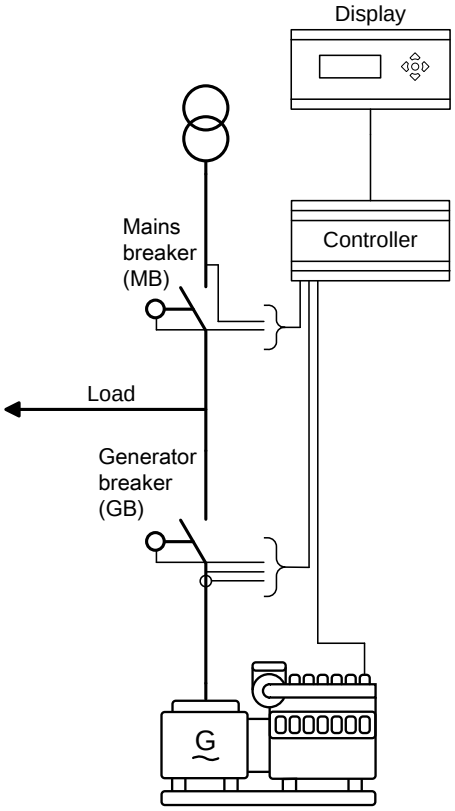
2.3 DC connections

2.3.1 Engine interface PCB

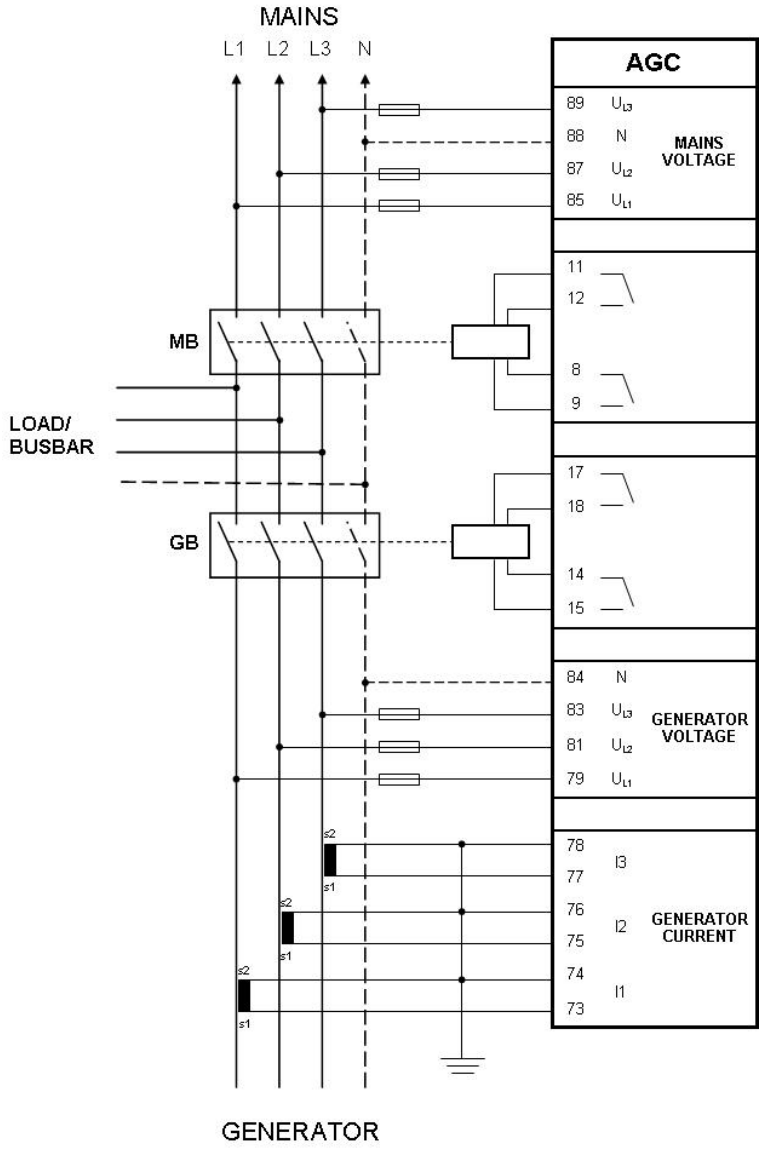


3. Automatic mains failure

3.1 System single-line diagram



3.2 AC connections

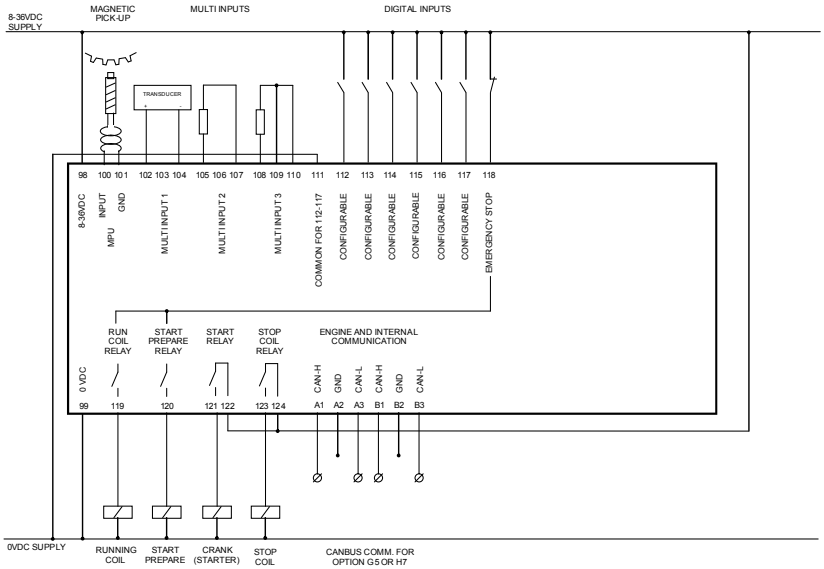


A neutral connection is a possibility but not a necessity. AC voltages max. 690V AC phase-phase.

Regarding single-phase and split-phase (2-phase) systems, please refer to the installation instructions.

3.3 DC connections

3.3.1 Engine interface PCB

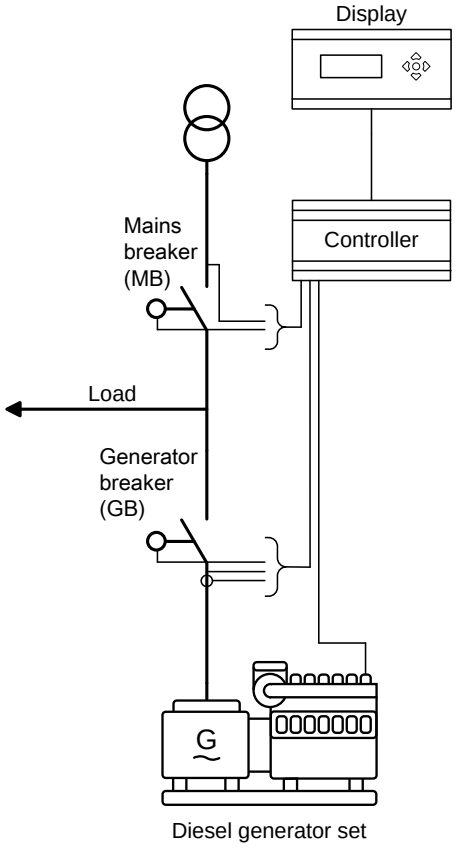


4. Parallel with mains (grid)

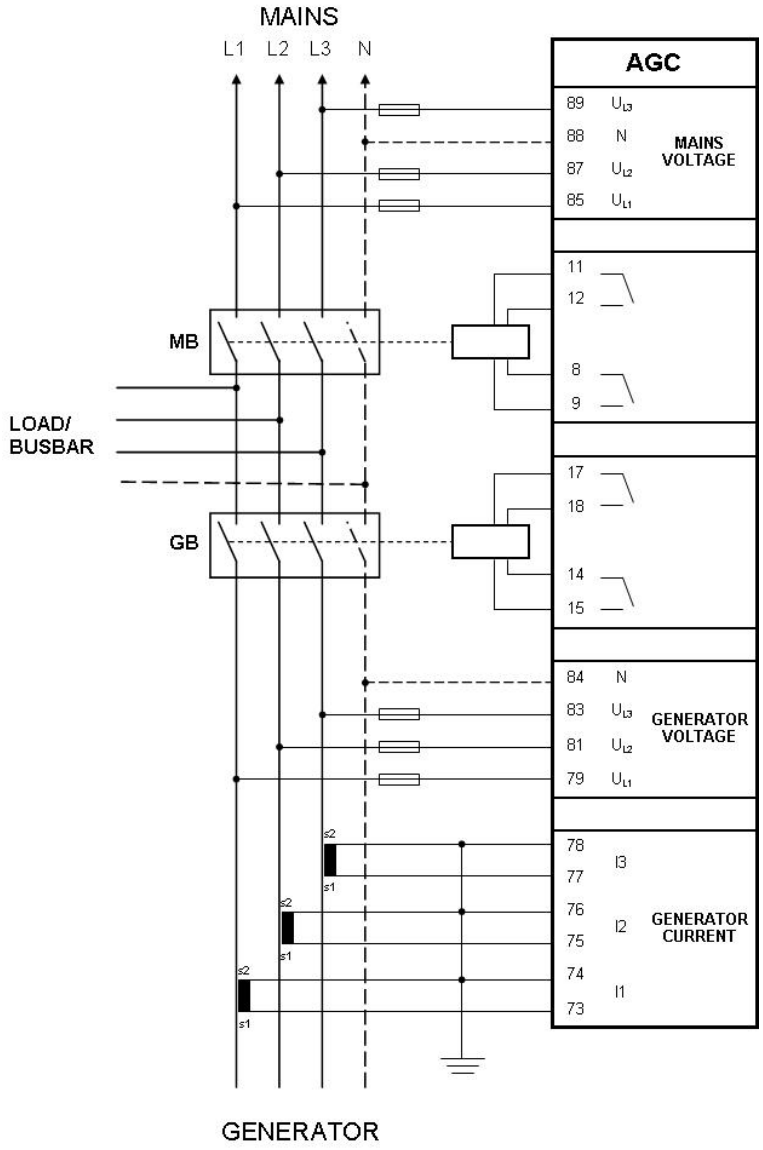
4.1 Parallel with mains (grid)

This application covers the genset modes peak shaving, fixed power, mains power export and load take over. The application can be combined with the stand-by AMF (Automatic Mains Failure) application by enabling the mode shift setting. In this case, the unit will automatically run the generator as a stand-by AMF generator in case of mains failure.

4.2 System single-line diagram



4.3 AC connections

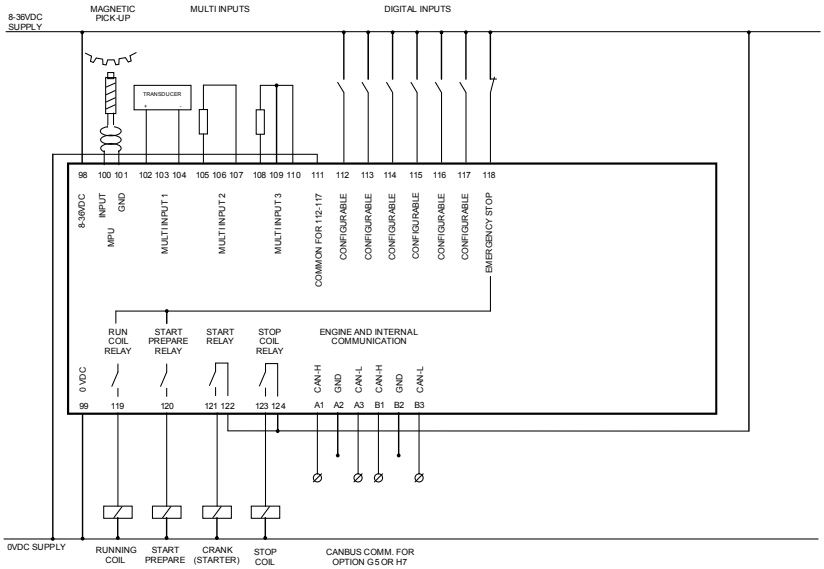


A neutral connection is a possibility but not a necessity. AC voltages max. 690V AC phase-phase.

Regarding single-phase and split-phase (2-phase) systems, please refer to the installation instructions.

4.4 DC connections

4.4.1 Engine interface PCB

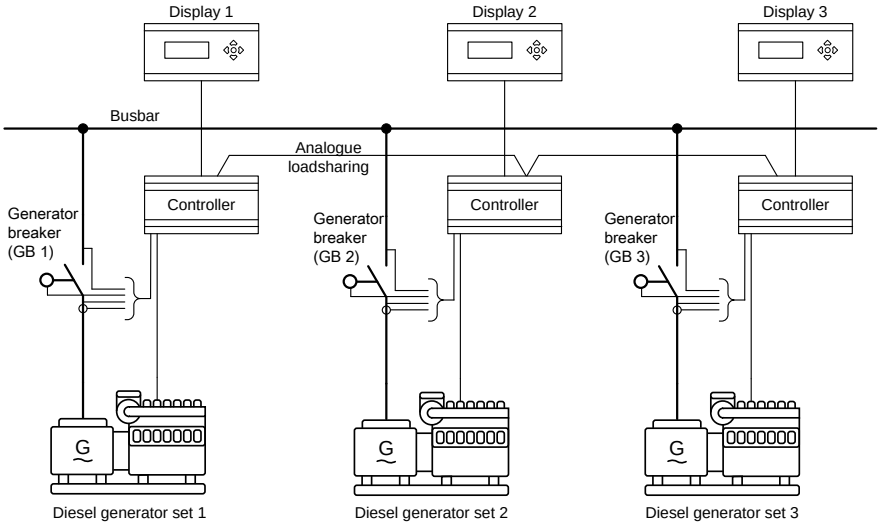


In peak shaving, mains power export and load take over, it is necessary to connect a 4-20 mA signal from a power transducer to multi-input 1 as the mains power measurement.

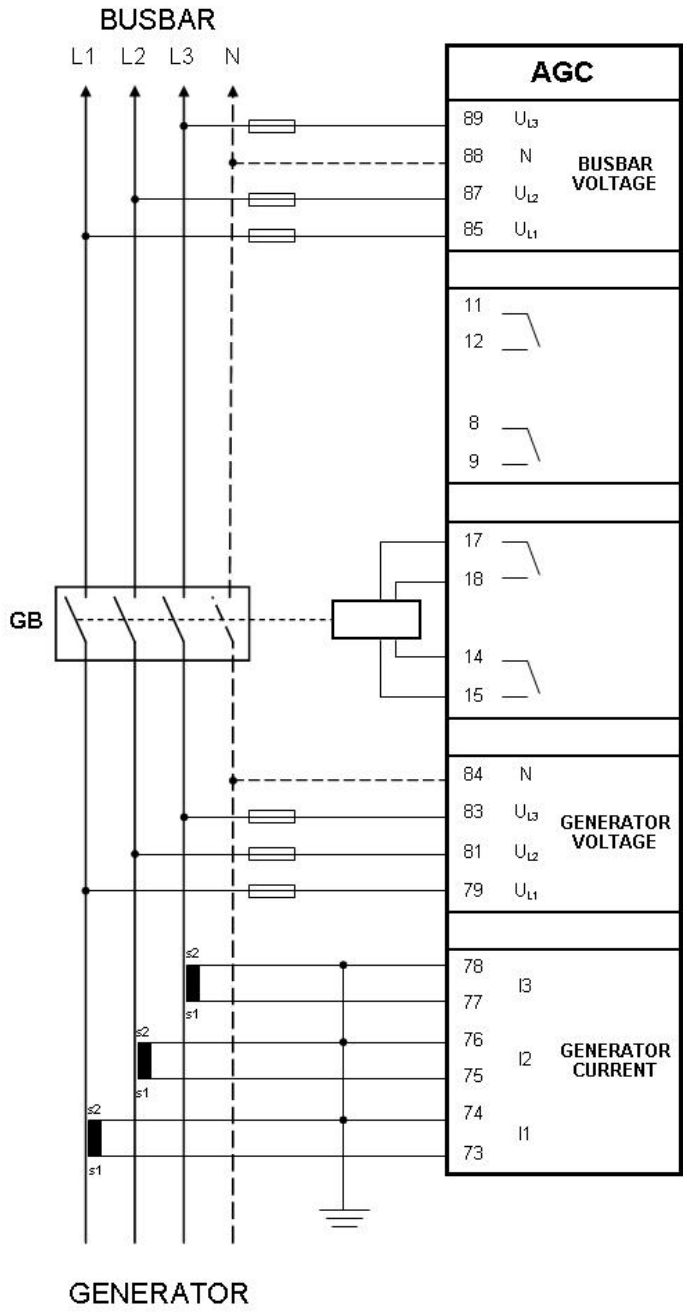
5. Load sharing

5.1 System single-line diagram

5.1.1 System single-line diagram



5.2 AC connections

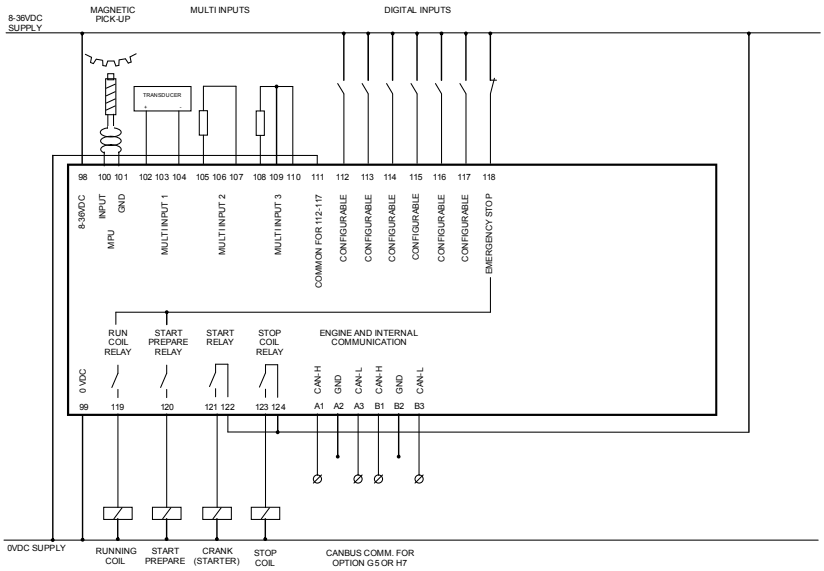


A neutral connection is a possibility but not a necessity. AC voltages max. 690V AC phase-phase.

Regarding single-phase and split-phase (2-phase) systems, please refer to the installation instructions.

5.3 DC connections

5.3.1 Engine interface PCB

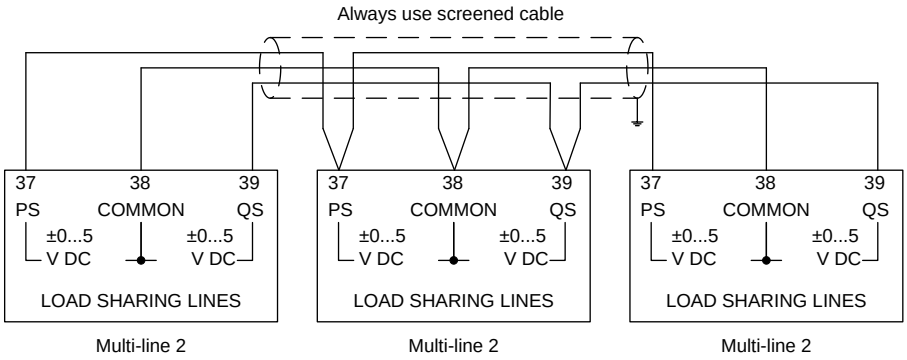


5.4 Additional DC connections

5.4.1 Load sharing connections

In theory, the load sharing lines have no maximum distance. The impedance of the input of the load sharing line is 22 kΩ. As a consequence, the resistance of the selected cable is insignificant.

A load sharing line of up to 300 metres is commonly used, but 300 metres is not the limit.



Use screened cable only.

Load sharing requires option G3.

6. Pt100/Pt1000 sensors

6.1 Introduction

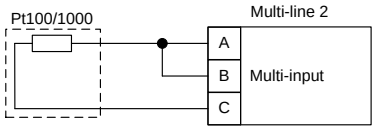
The Pt100 and Pt1000 inputs are available on the multi-inputs in slot #7.

Pt100 and Pt1000 sensors are also known as RTD sensors (Resistance Temperature Detector).

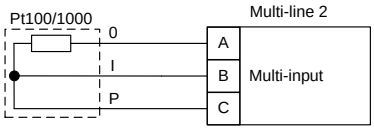
6.2 Connections

The input is designed for the 3-wire sensor, but the 2-wire sensor can also be used. The unit will also measure the resistance of the leads and cables. The 3-wire sensor compensates for the resistance of the leads and cables and gives a more accurate measurement than the 2-wire sensor.

2-wire connections



3-wire connections



7. VDO sensors

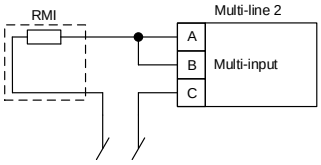
7.1 Introduction

The VDO inputs are available on the multi-inputs in slot #7.

7.2 Connections

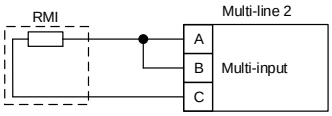
7.2.1 1-wire sensors

This diagram shows how the 1-wire VDO sensors must be connected.



7.2.2 2-wire sensors

This diagram shows how the 2-wire VDO sensors must be connected.



The measurement is only a resistance measurement. It is not necessary to connect an auxiliary supply to the sender.

8. 4-20mA inputs

8.1 Introduction

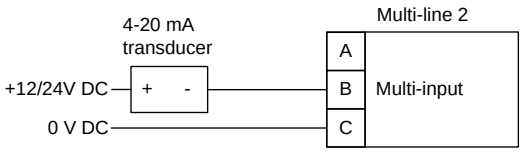
The 4-20 mA inputs are available on the multi-inputs in slot #7 and in slot #6, if option M15 is selected.

8.2 Connections

8.2.1 Multi-inputs

Passive transducers

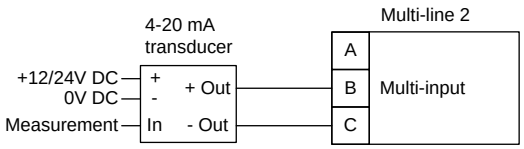
If the passive 4-20 mA transducers are used, the following connection must be used.



If the passive sensor has its own battery supply, the voltage may not exceed 30V DC.

Active transducers

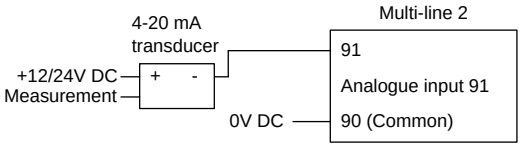
Active transducers are connected like this:



8.2.2 Analogue inputs (option M15)

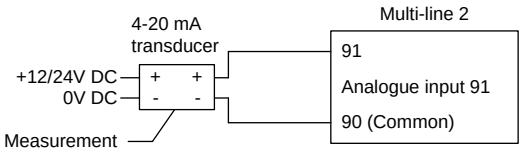
The following drawings only show the wiring for analogue input 91, but apply to all analogue inputs (91 to 97) included in option M15.

Passive transducers
If the passive 4-20 mA transducers are used, then the following connection must be used.

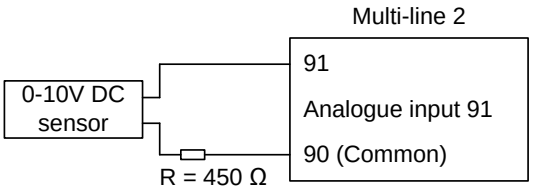


If the passive sensor has its own battery supply, the voltage may not exceed 30V DC.

Active transducers
Active transducers are connected like this:



0-10V DC
Under certain circumstances, the 4-20mA input can be used to measure a 0-10V DC signal.



The unit will measure 0-20 mA, but it will only use the 4-20 mA range for protection purposes.

9. Digital inputs

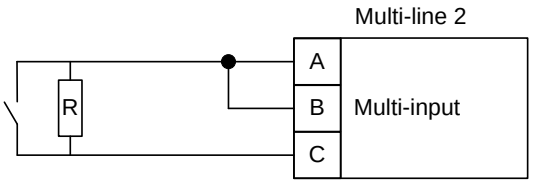
9.1 Introduction

The digital inputs can be used as protection inputs or as function/control inputs. The protection inputs can be used as normally open or normally closed. When used as function/control inputs, they depend on the specific function and how the function is activated.

See a complete list of the digital inputs and input functions in the Designer's Reference Handbook.

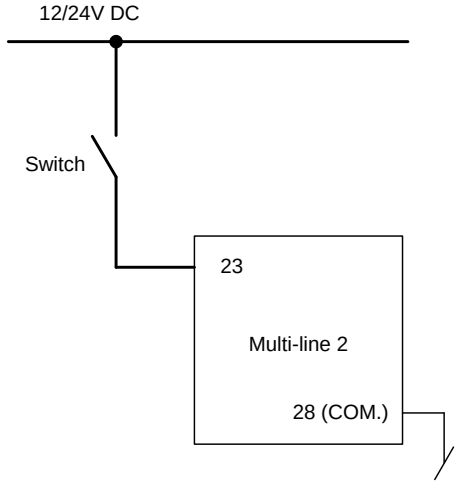
9.2 Connection

9.2.1 Multi-inputs



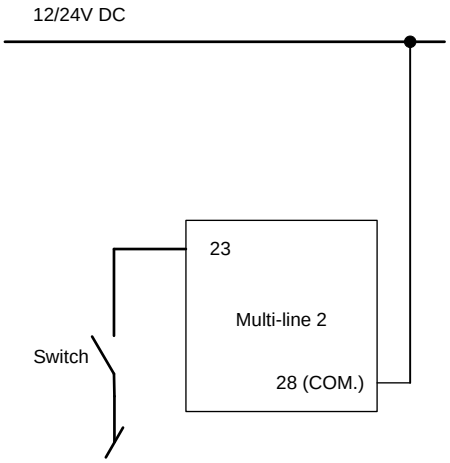
The resistor is only mounted if wire fail supervision is required. The value of the resistor should be 270 Ω +/-10%.

9.2.2 Battery positive to input



9.2.3 Battery negative to input

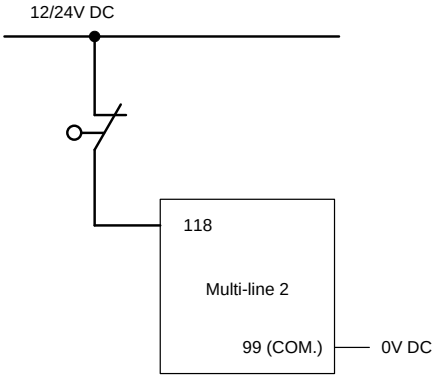
It may be practical to connect the battery positive to the unit common. The clear advantage is that digital sensors can be used, e.g. for water temperature or oil pressure that has the sensor body connected to earth.



The digital inputs are bi-directional.

9.2.4 Emergency stop

Since the start prepare relay and run coil are supplied through terminal 118, this terminal should only be used for the emergency stop.



It is not possible to connect the emergency stop input to battery negative.

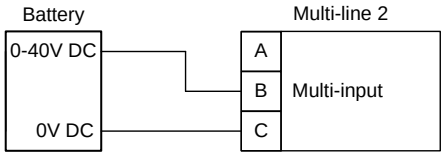
10. 0-40V DC

10.1 Introduction

The 0-40V DC inputs can be used for battery charger alarms, battery asymmetry or protections. The inputs are only available on the multi-inputs in slot #7.

10.2 Connection

10.2.1 Multi-input

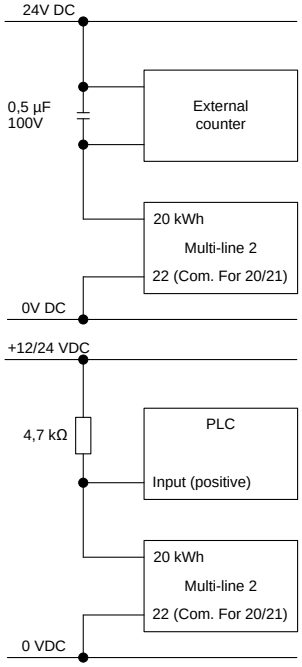


11. Other inputs/outputs

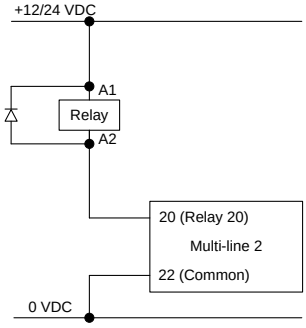
11.1 Optocoupler outputs

When the transistor outputs are configured to "Relay", it is possible to use the transistor outputs as relay outputs. As these outputs are open collector outputs, the wiring should be done as shown below.

External counter:



Relay output:

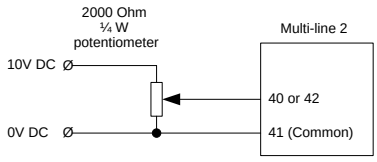


Remember to mount the free wheel diode.

Maximum load on the optocoupler outputs is 10 mA at 24V DC.

11.1.1 External setpoint inputs (option G3)

0-10V DC input using potentiometer



+/-10V DC input using potentiometer