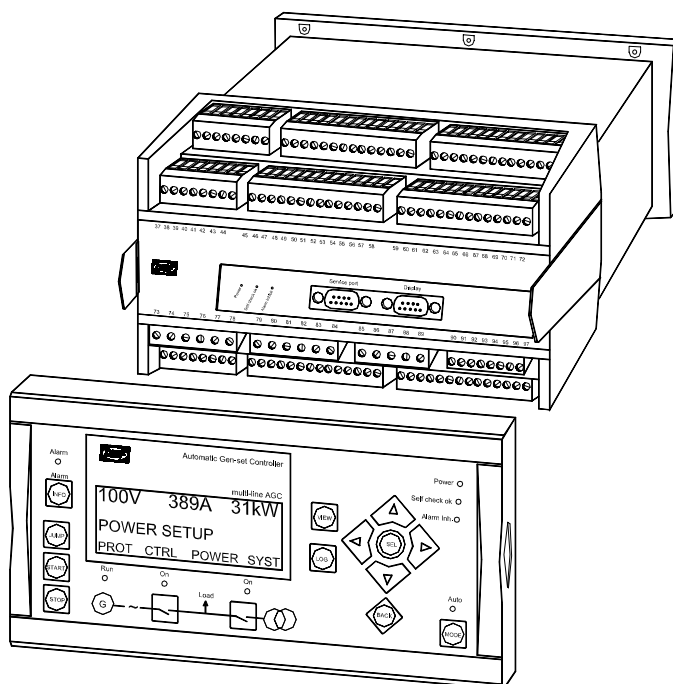


Application Notes

Automatic Gen-set Controller

4189340368B

SW version 2.3X.X



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



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1. About this document

General purpose

This document includes application notes for DEIF's Automatic Gen-set Controller, the AGC. It mainly includes examples of different applications suitable for the unit.



For functional descriptions, the procedure for parameter setup, complete standard 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 AGC.



Please make sure to read this handbook before working with the multi-line 2 controller and the gen-set to be controlled. Failure to do this could result in damage to the equipment or human injury.

Intended users

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

Contents/overall structure

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

2. Warnings and legal information

Legal information and responsibility

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

The units are not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

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.

Safety issues

Installing the unit implies 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.

Definitions

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

Notes



The notes provide general information which will be helpful for the reader to bear in mind.

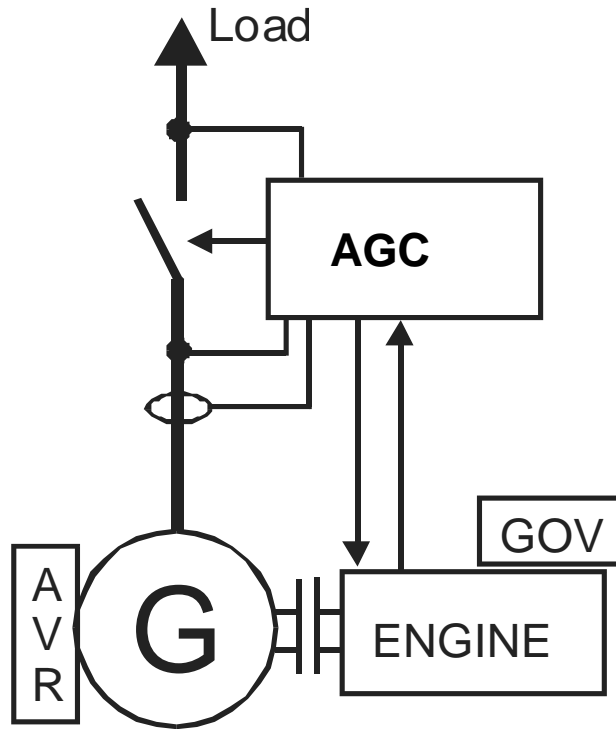
Warning



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

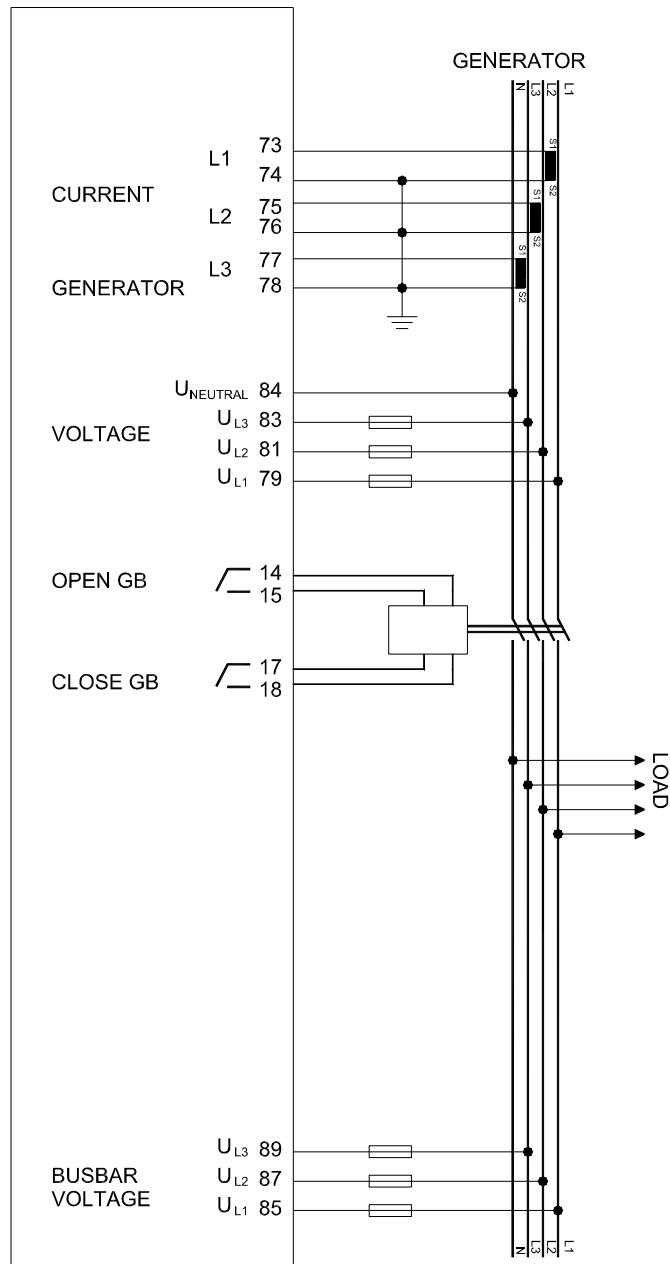
3. Single generator set

System single-line diagram



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

AC connections

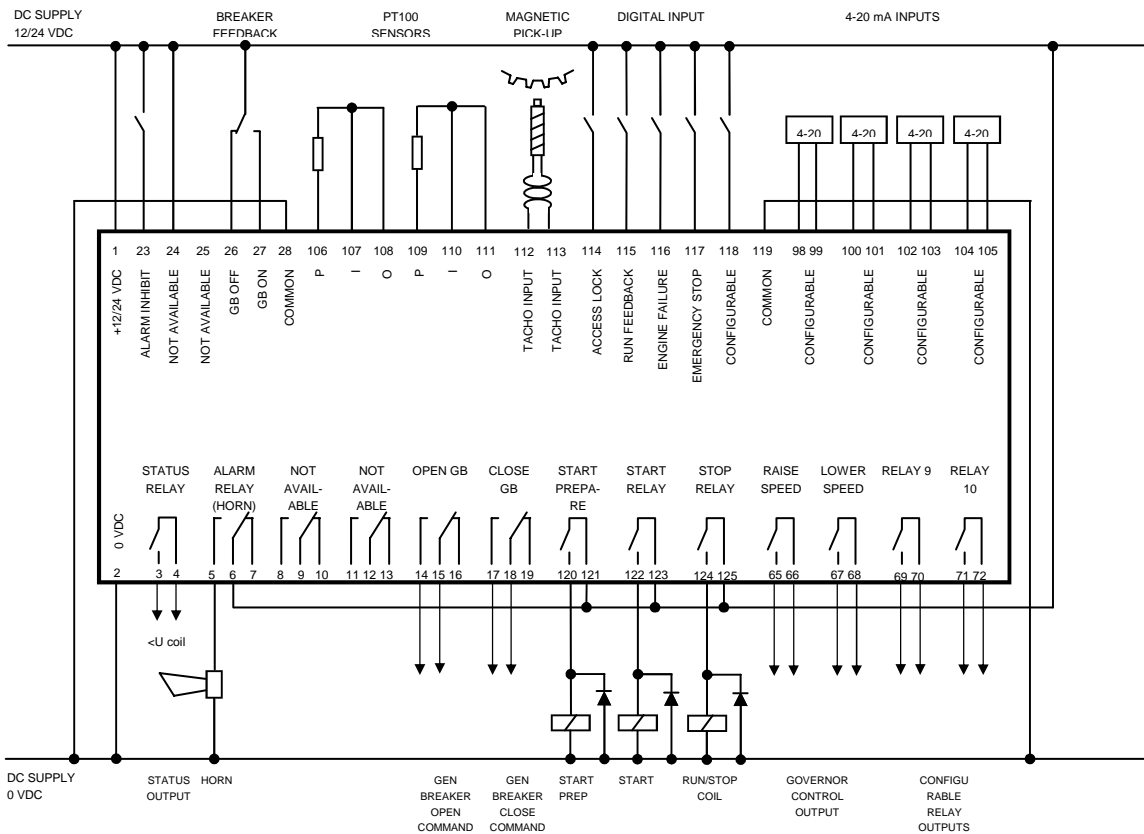


DC connections

PT100 engine interface PCB



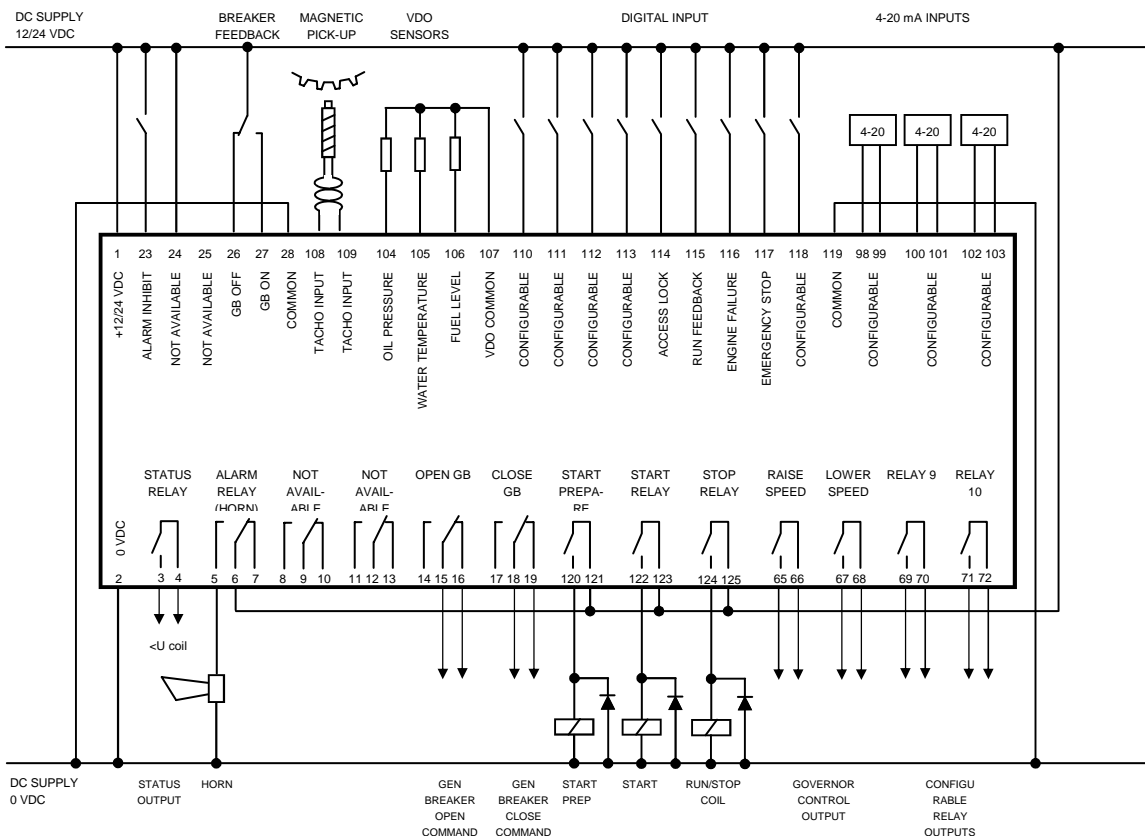
A connection is needed from the 12/24 volts power supply to terminal 24.



VDO engine interface PCB

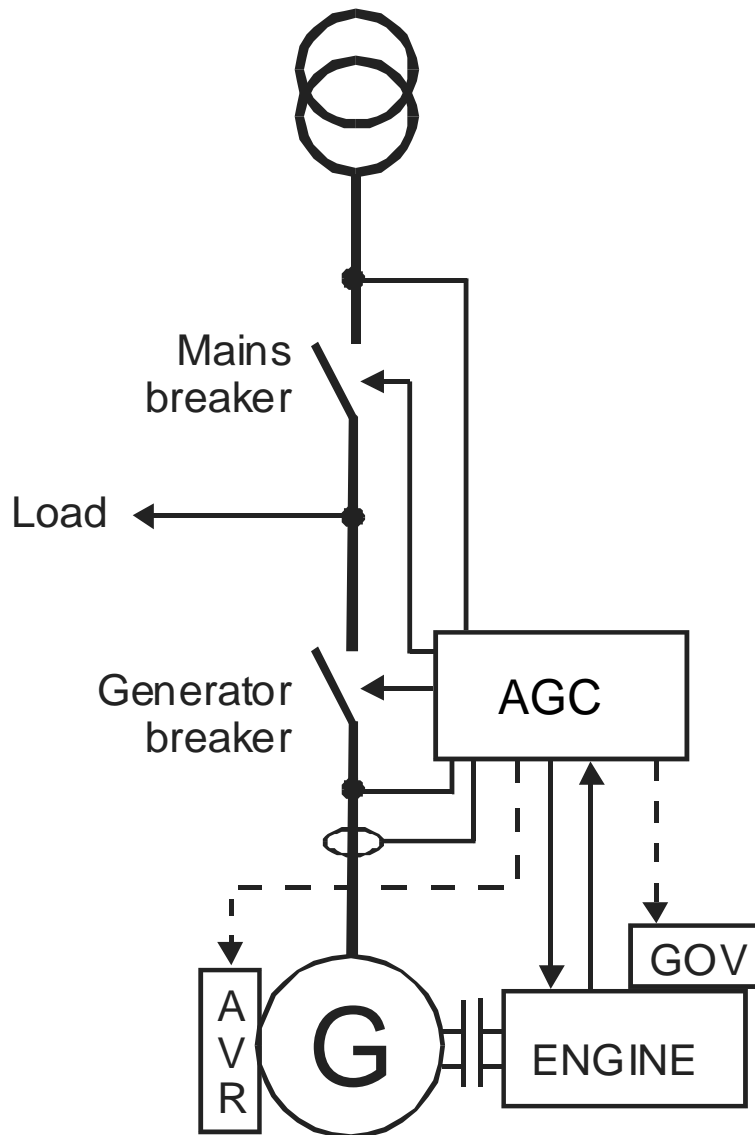


A connection is needed from the 12/24 volts power supply to terminal 24.

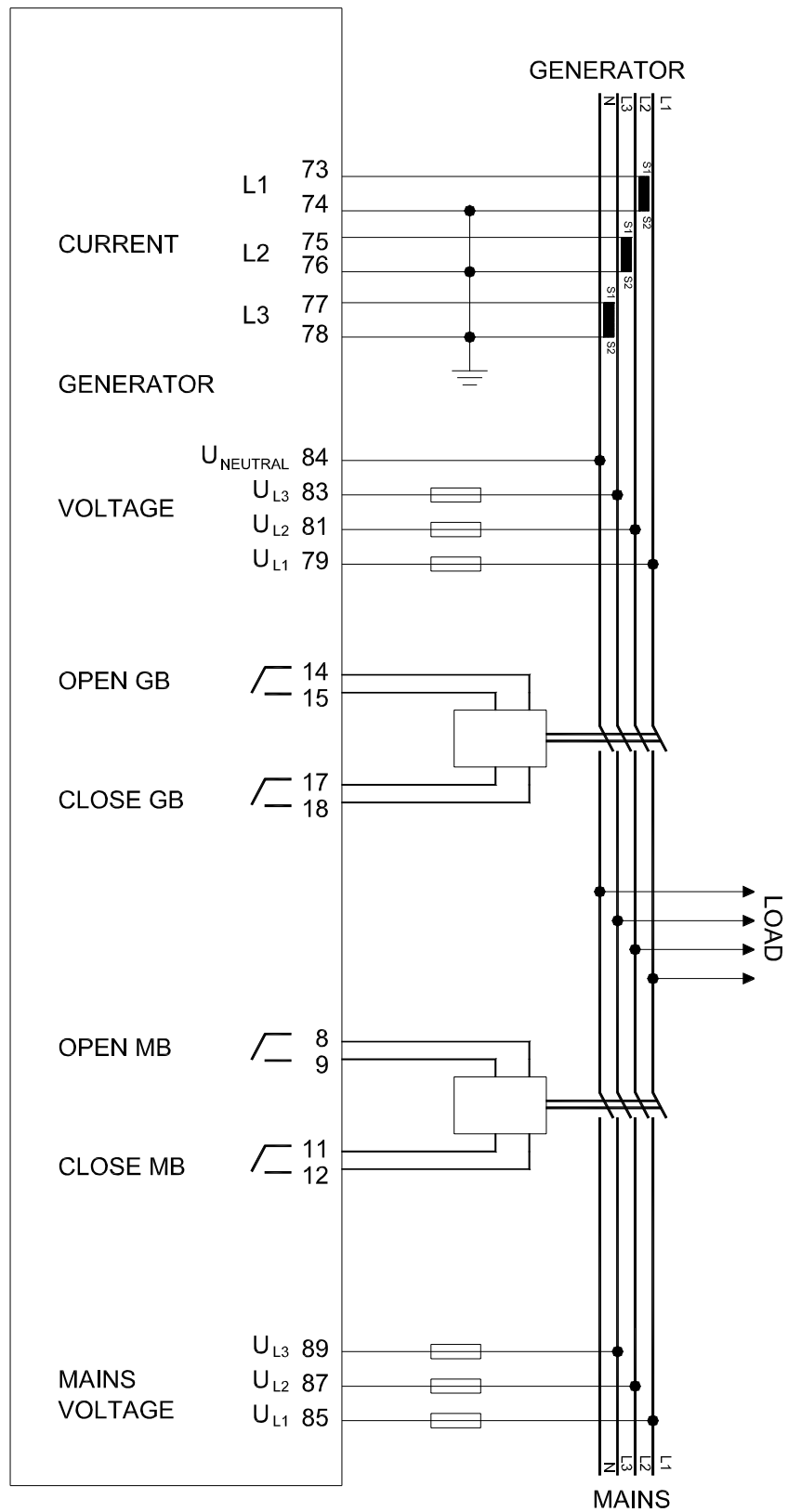


4. Automatic mains failure

System single-line diagram

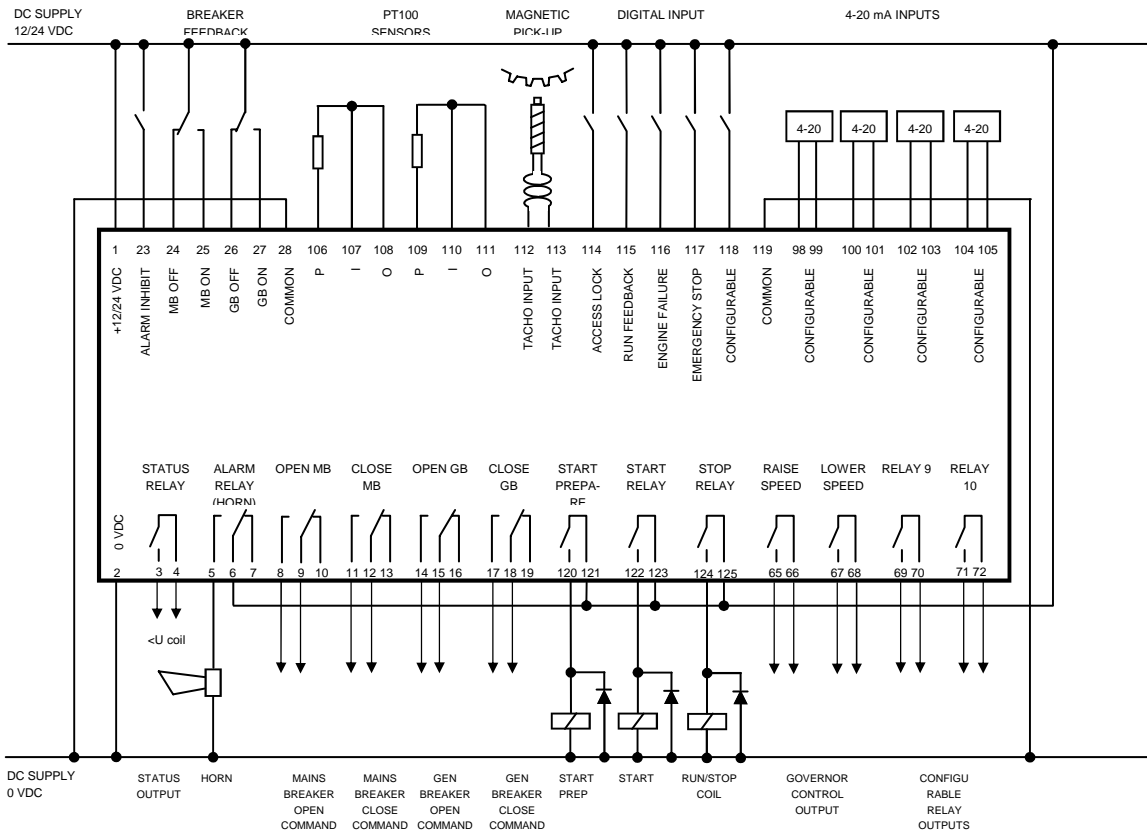


AC connections

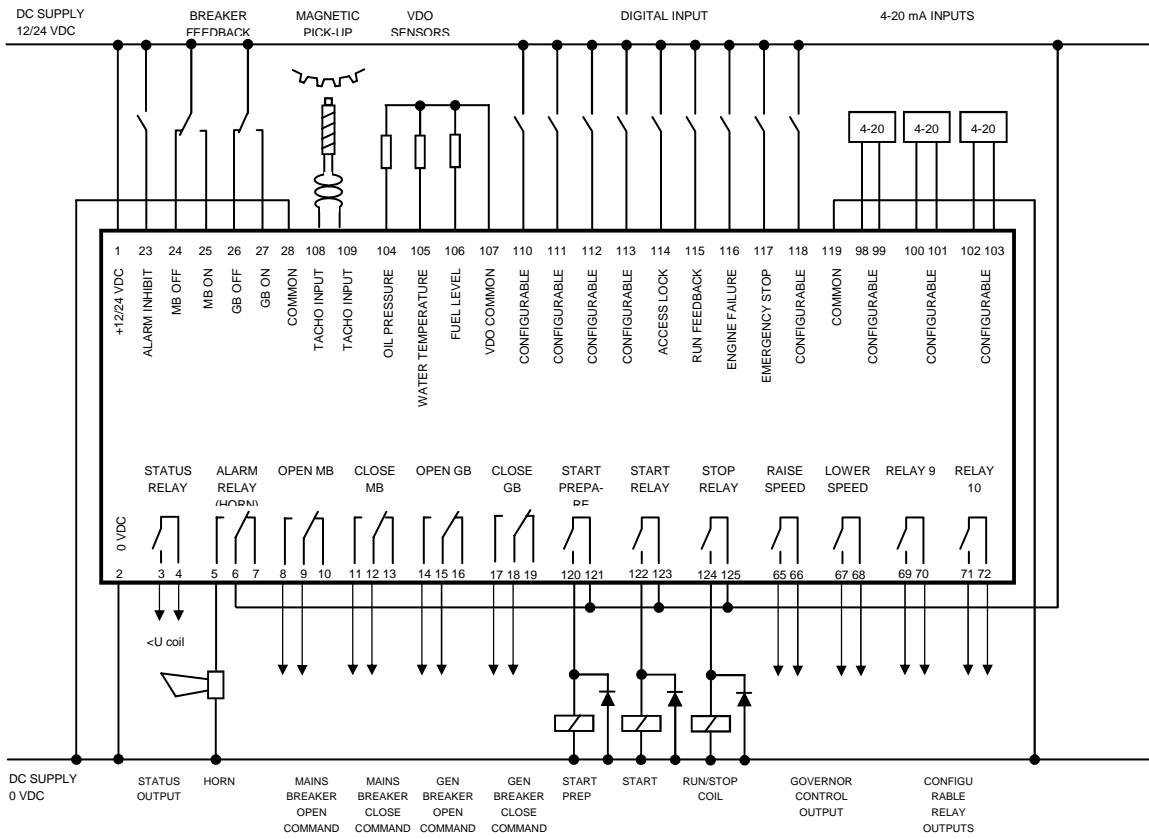


DC connections

PT100 engine interface PCB



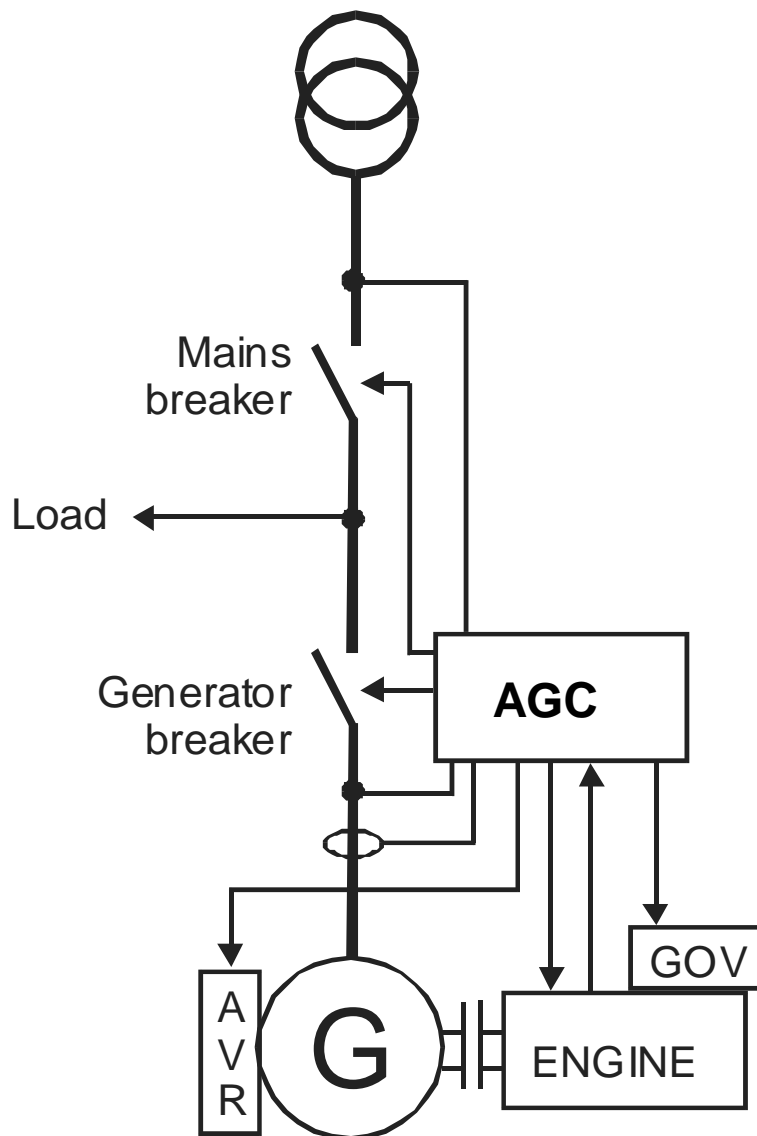
VDO engine interface PCB



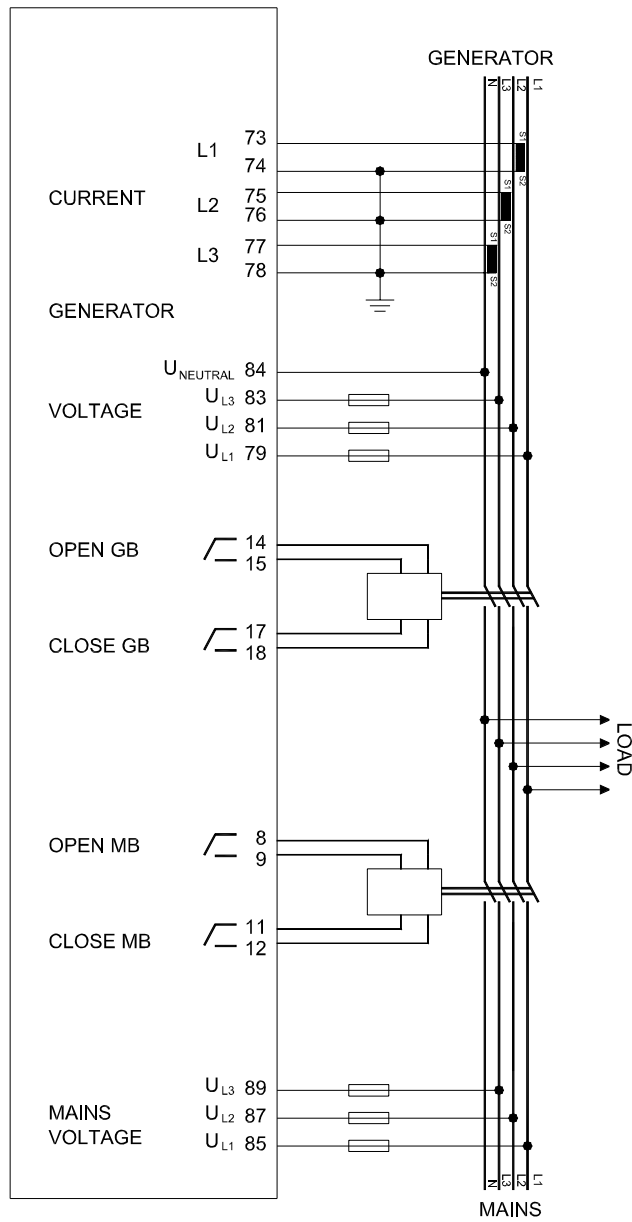
5. Parallel with mains (grid)

This application can be combined with the stand-by AMF (Automatic Mains Failure) application by setting the mode shift (setting 4441 under MB control) to Mode – AMF – Mode. In this case, the unit will automatically run the generator as a stand-by AMF generator in case of mains failure.

System single-line diagram

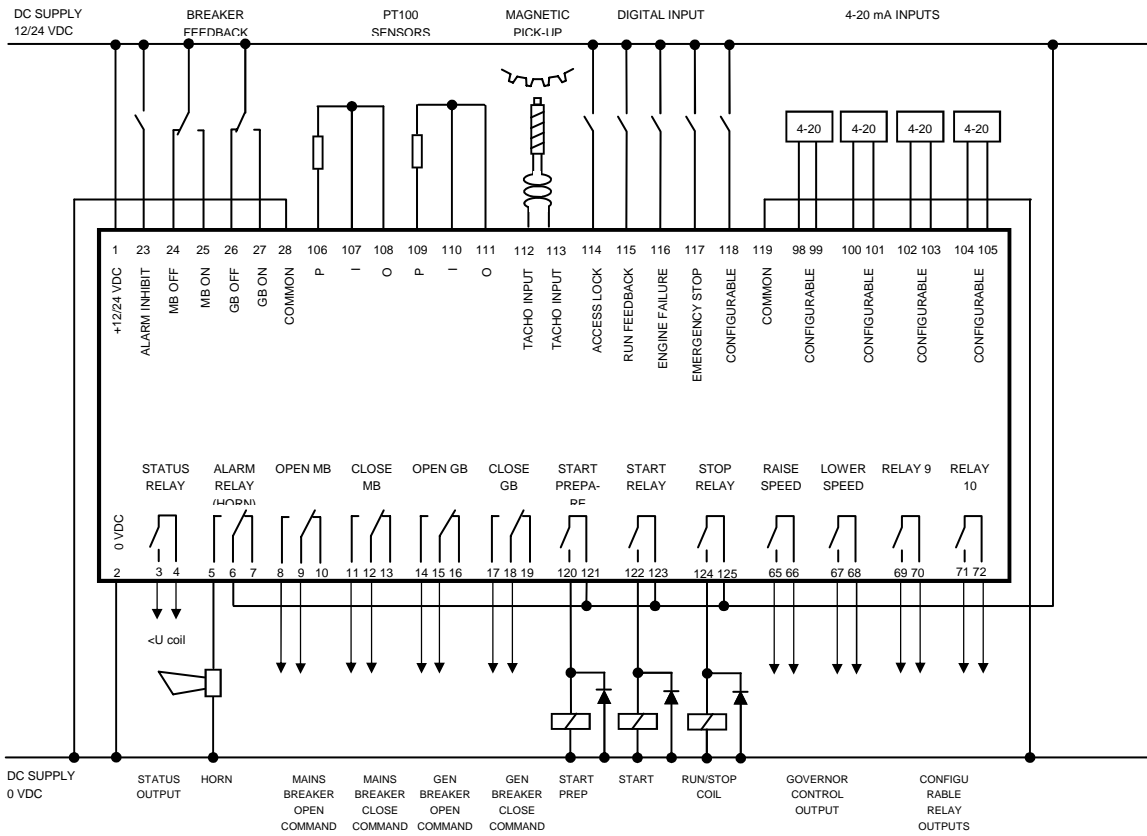


AC connections

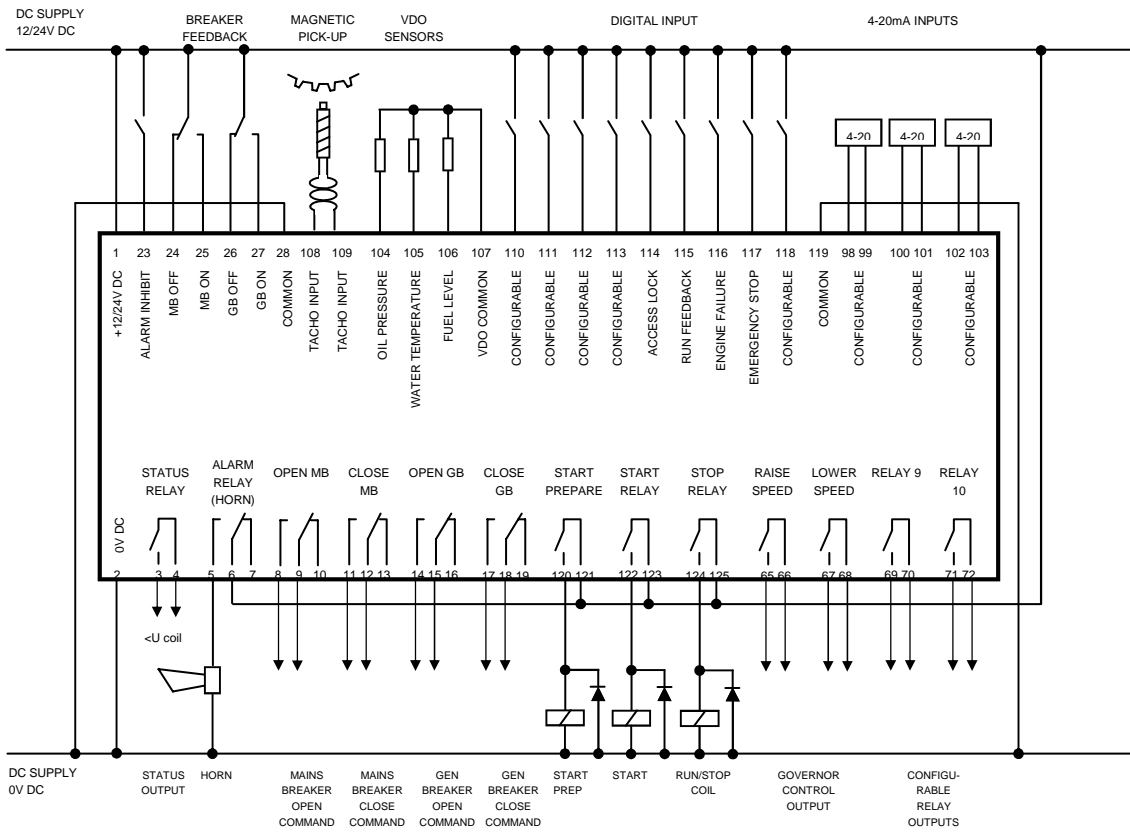


DC connections

PT100 engine interface PCB

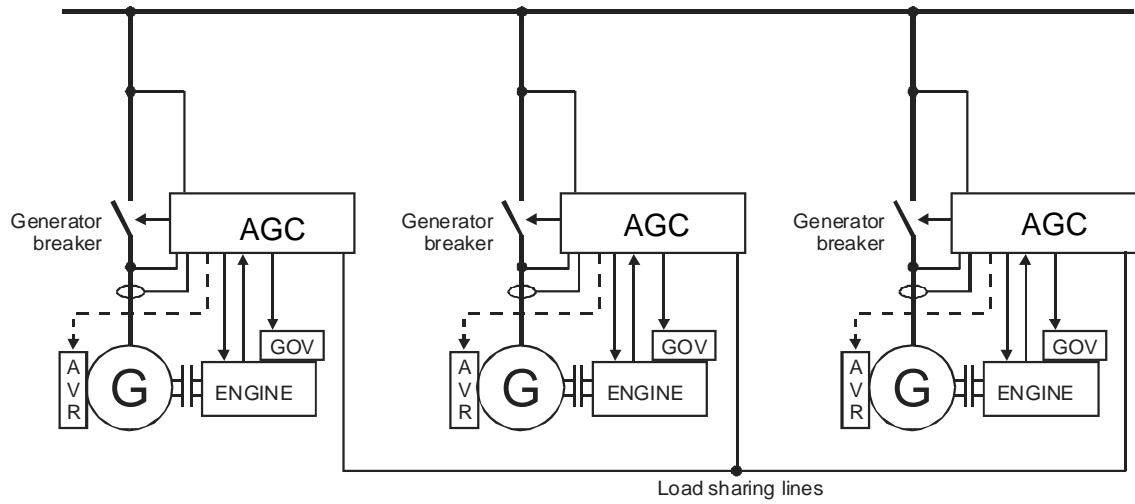


VDO engine interface PCB

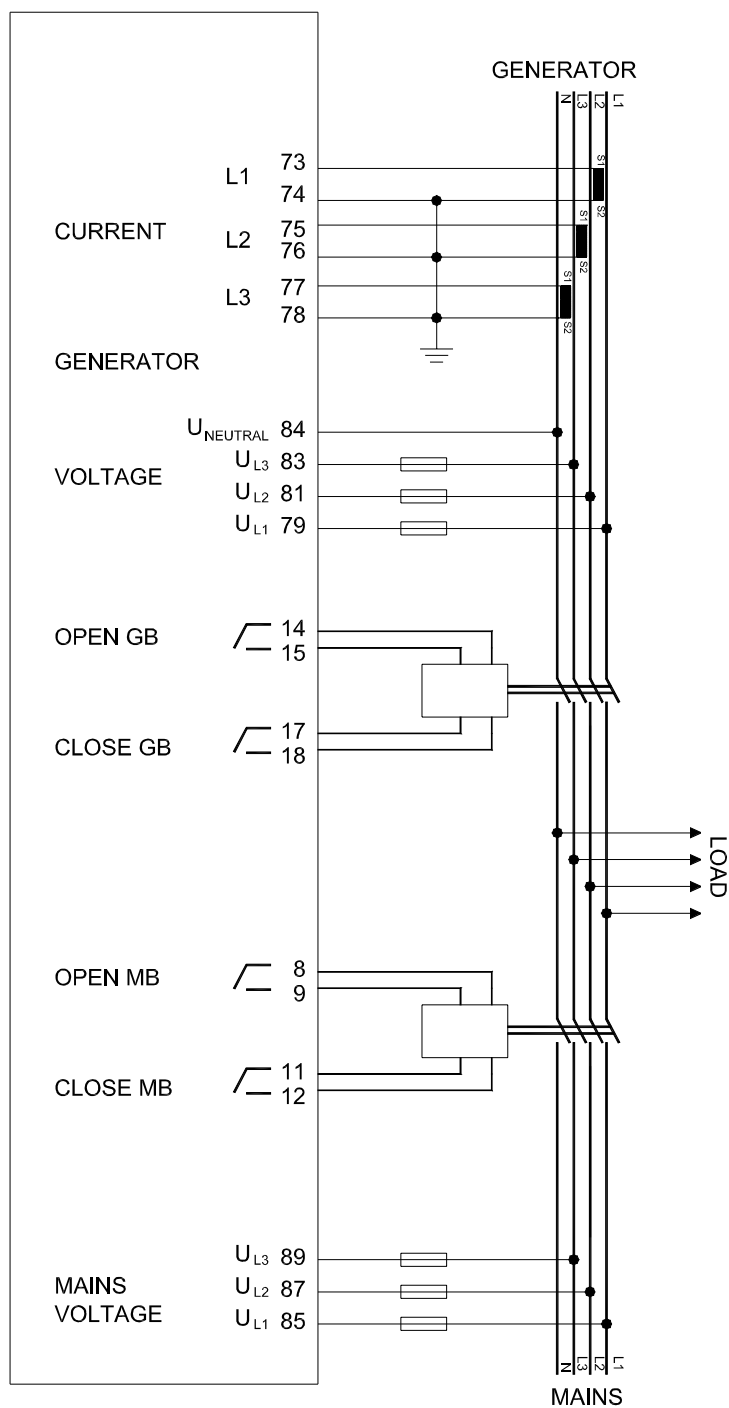


6. Load sharing

System single-line diagram

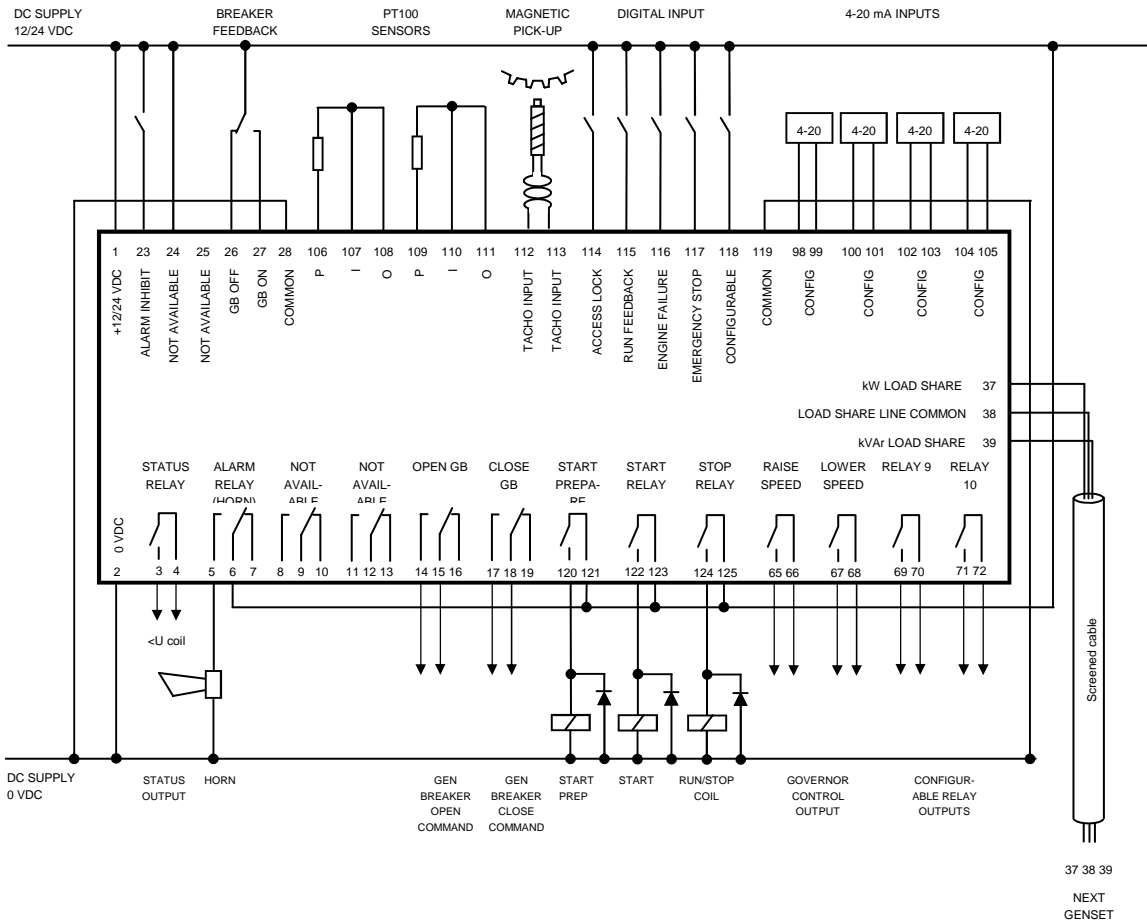


AC connections

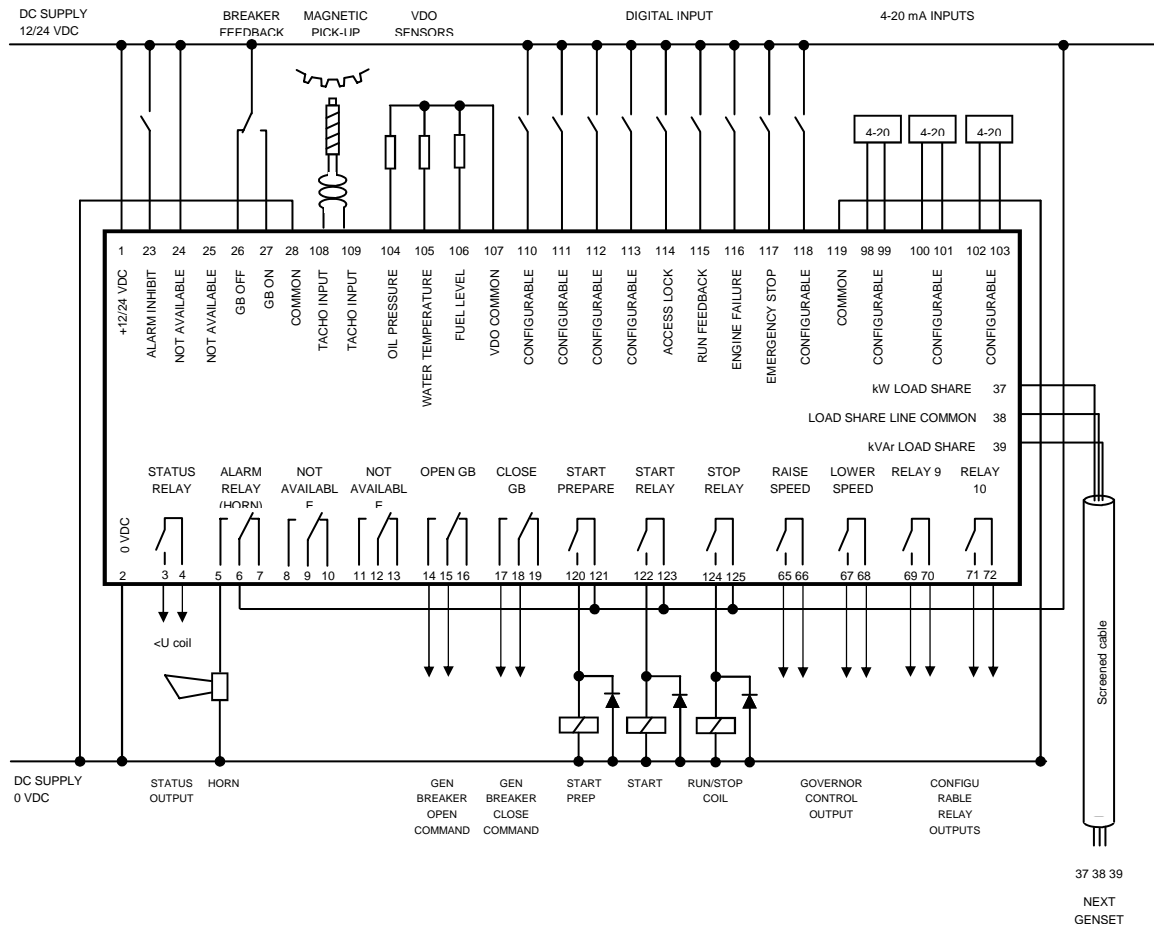


DC connections

PT100 engine interface PCB



VDO engine interface PCB



Additional DC connections

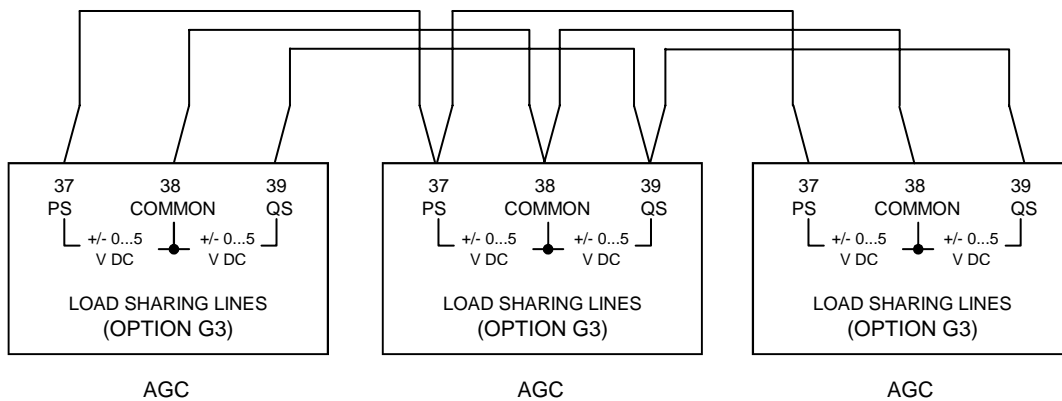
Load sharing connections

In theory, the load sharing lines have no maximum distance. The impedance of the input of the load sharing line is 22k Ω . 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.



7. PT100 sensors

Introduction

If option M2 is not selected, then the unit will be fitted with option M1. In this case, two PT100 sensors can be connected to inputs 106 and 109.

The PT100 inputs are specified as indicated in the table:

Type	Configuration	Temperature range	Standards
3-wire PT100	Cooling water temperature	-40...+250°C	EN 60751
	Configurable		IEC 751

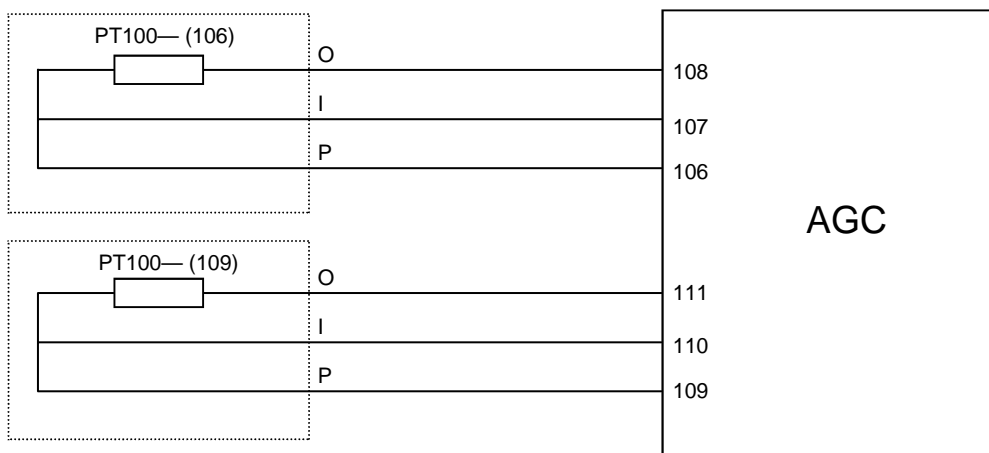


PT100 sensors are also known as RTD sensors (Resistance Temperature Detector).

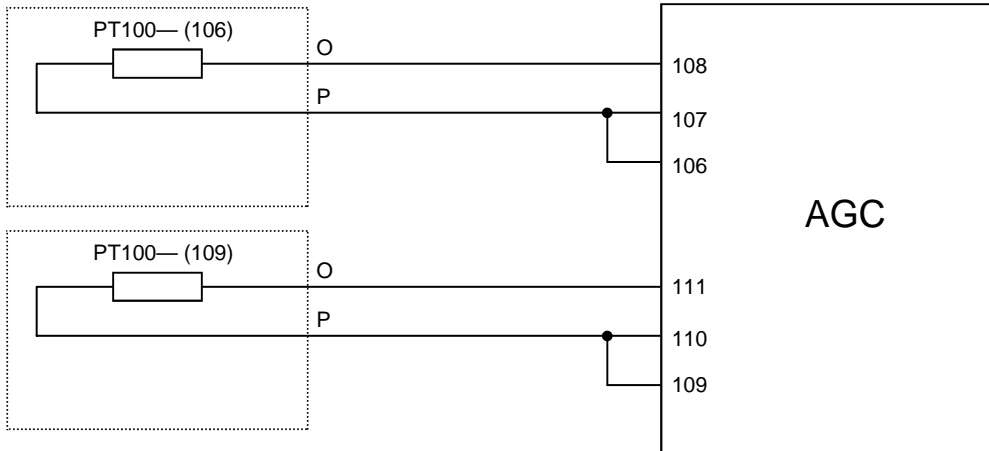
Connections

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 two-wire sensor.

3-wire connections



2-wire connections



8. VDO sensors

Introduction

If option M1 is not selected, then the unit will be fitted with option M2. In this case, 3 VDO sensors can be connected to inputs 104, 105 and 106.

The VDO inputs are specified as indicated in the table:

Type	Configuration	Resistance range			
		Type 1	Type 2	Type 3	Type 'level switch'
VDO 104	Oil pressure	10-184Ω	10-184Ω		200> R <200
VDO 105	Cooling water temperature	291-22Ω	481-18Ω	69-7Ω	1700> R <1700
VDO 106	Fuel level	79-2Ω	3-180Ω		

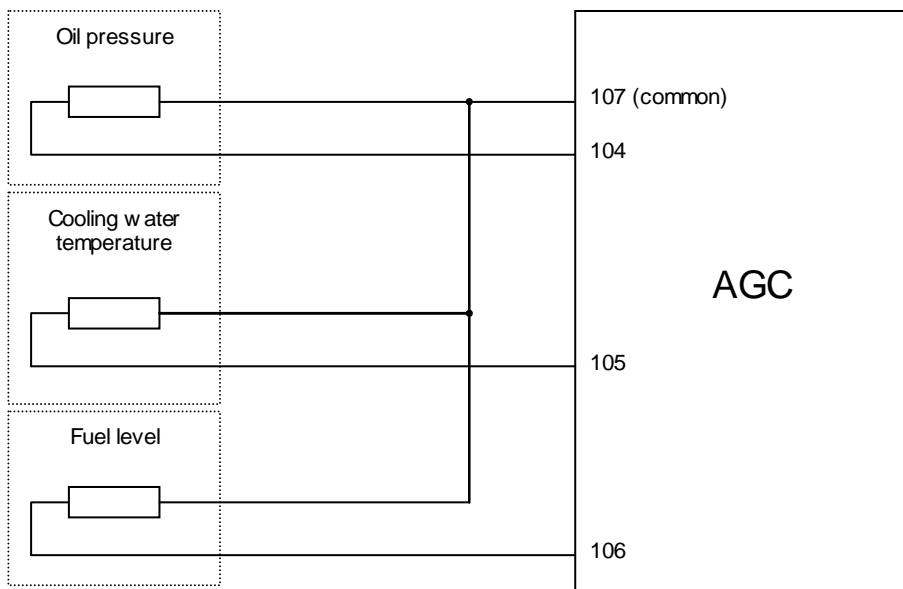


The measurement is only a resistance measurement. It is not necessary to connect an auxiliary supply to the sender.

Connections

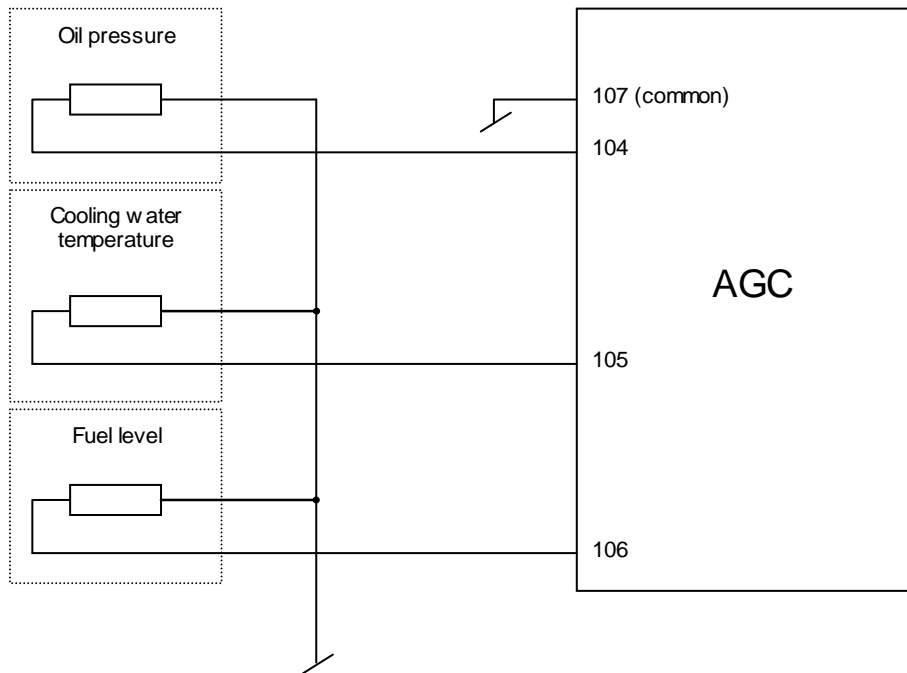
2-wire sensors

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



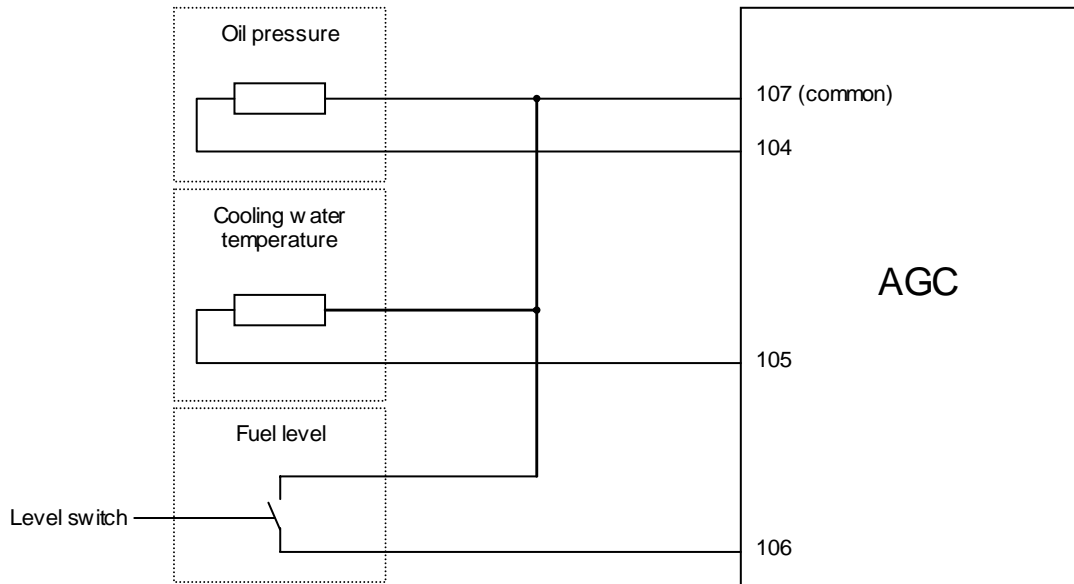
1-wire VDO sensor

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



VDO level switch

This diagram shows how a VDO input is wired when it is used as a binary input.



9. 4...20mA inputs

Introduction

The unit has a number of 4...20mA inputs. The actual number is option dependent.

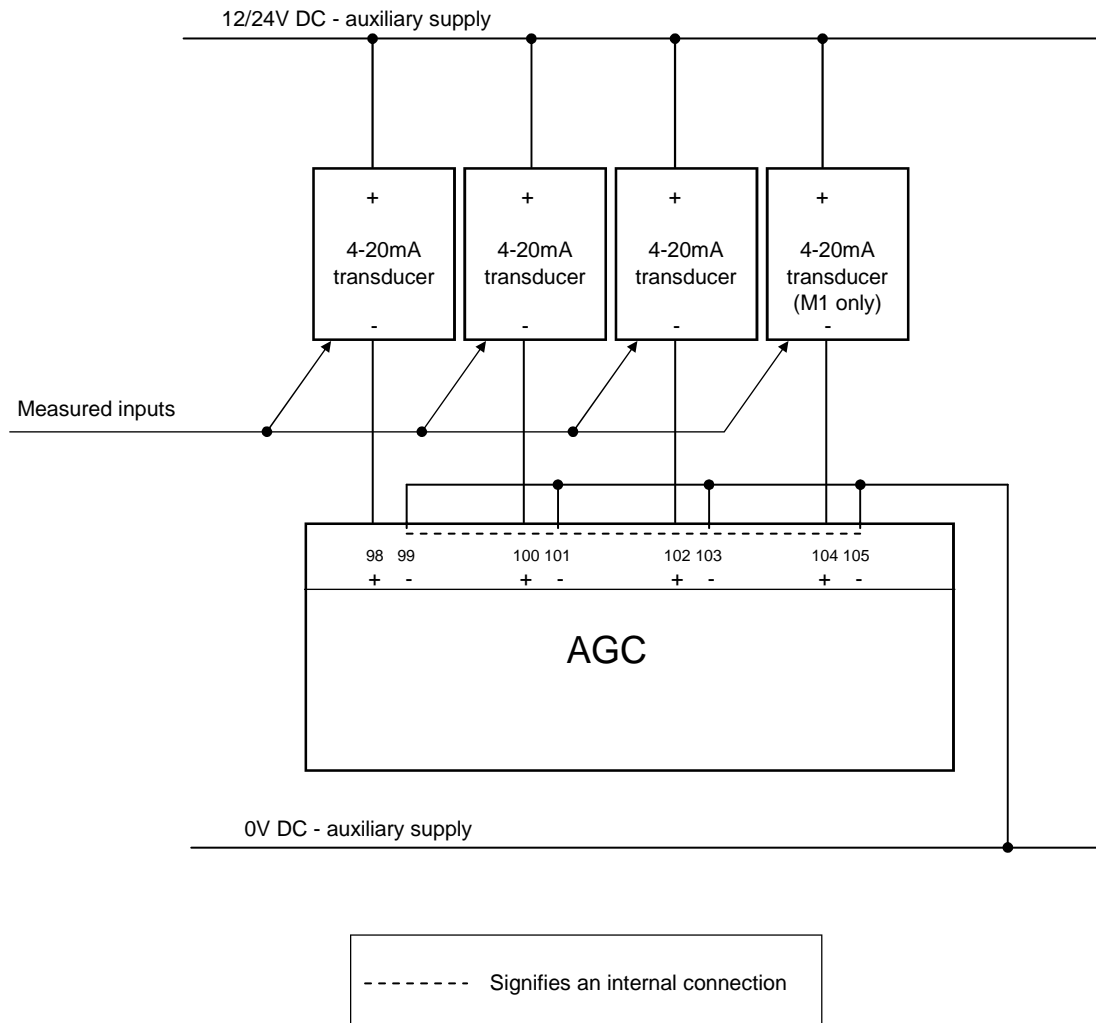
Option	No. of inputs	Available inputs	Placed in (Slot number)
M1		4	7
M2		3	7
M1 + M15		8	7 + 6
M2 + M15		7	7 + 6

In the drawings below option M15 (four 4...20mA inputs) is not shown since the principle of the connections is similar to the 4...20mA inputs on the engine interface PCB (M1/M2).

Connections

Passive transducers

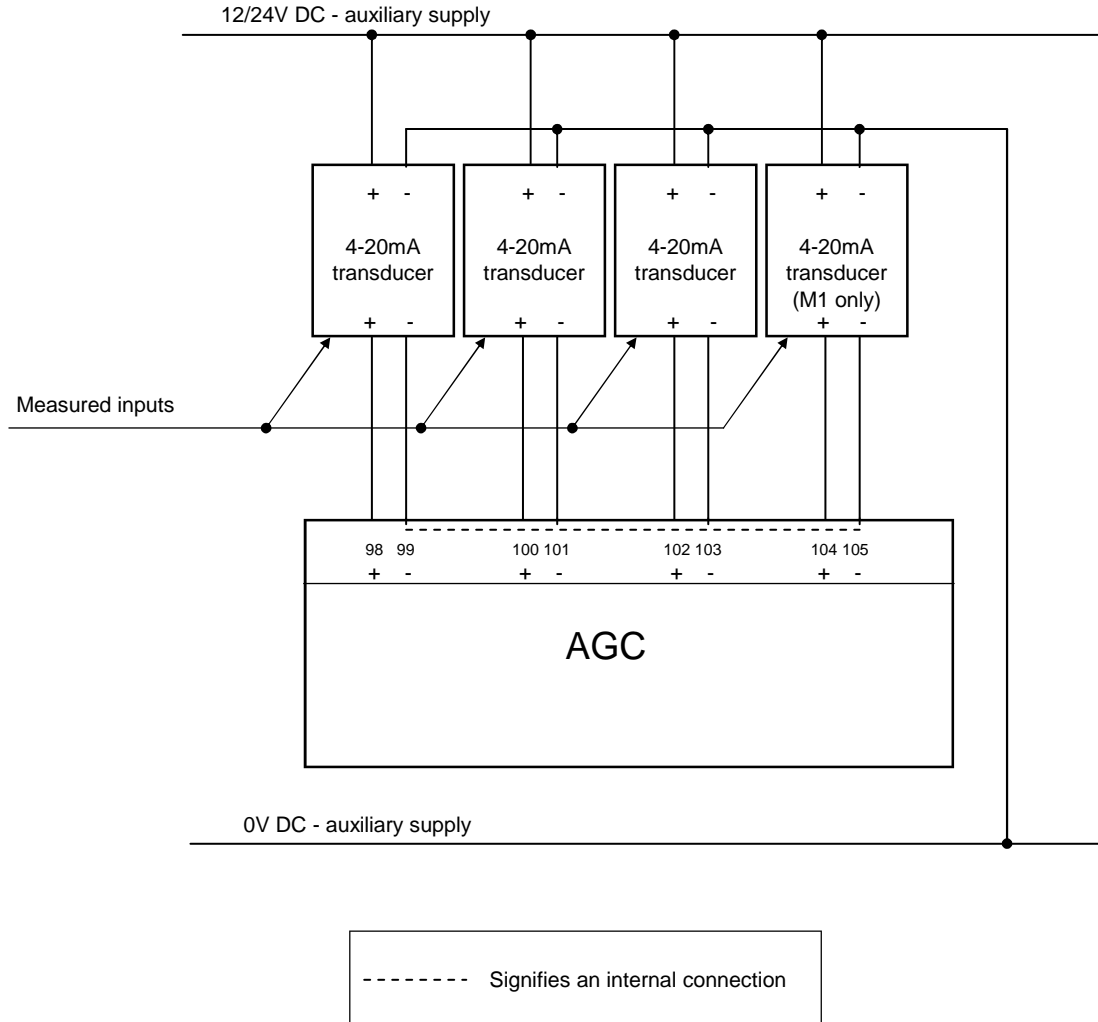
If the passive 4...20mA transducers are used then the following connection must be used.



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

Active transducers

Active transducers are connected like this:



10. Digital inputs

Introduction

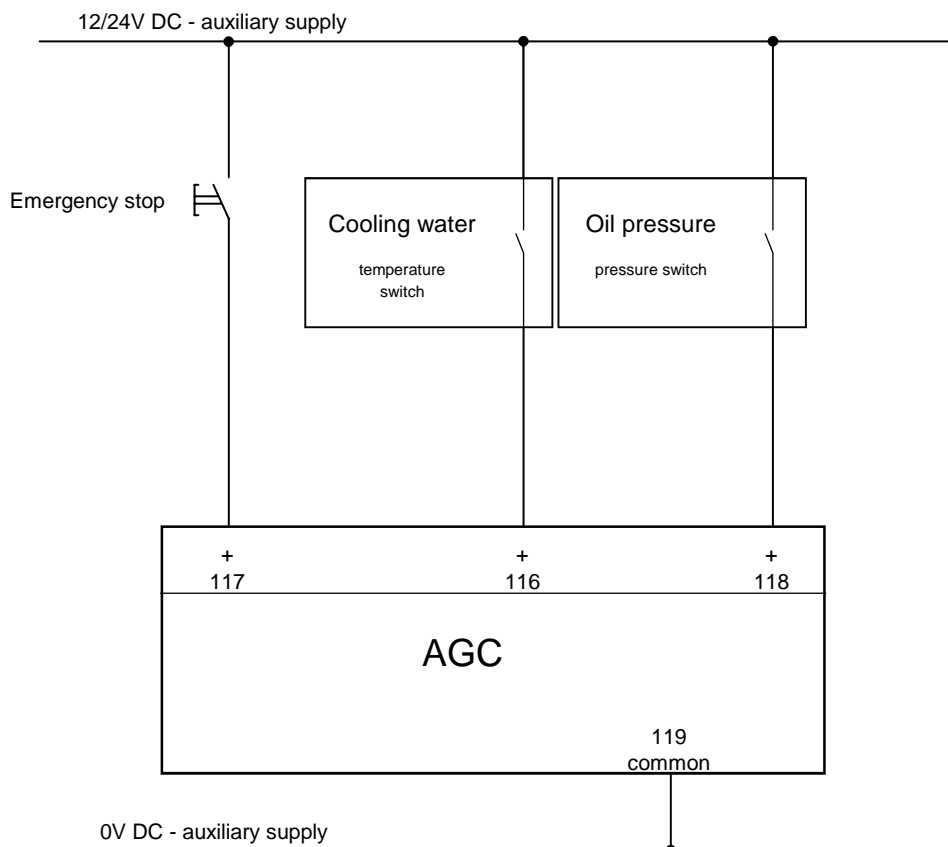
The digital inputs can be used as protection inputs or as function/control inputs. The protection inputs can be used as normally open or normally closed. When used as function/control inputs they depend on the specific function and how the function is activated.



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

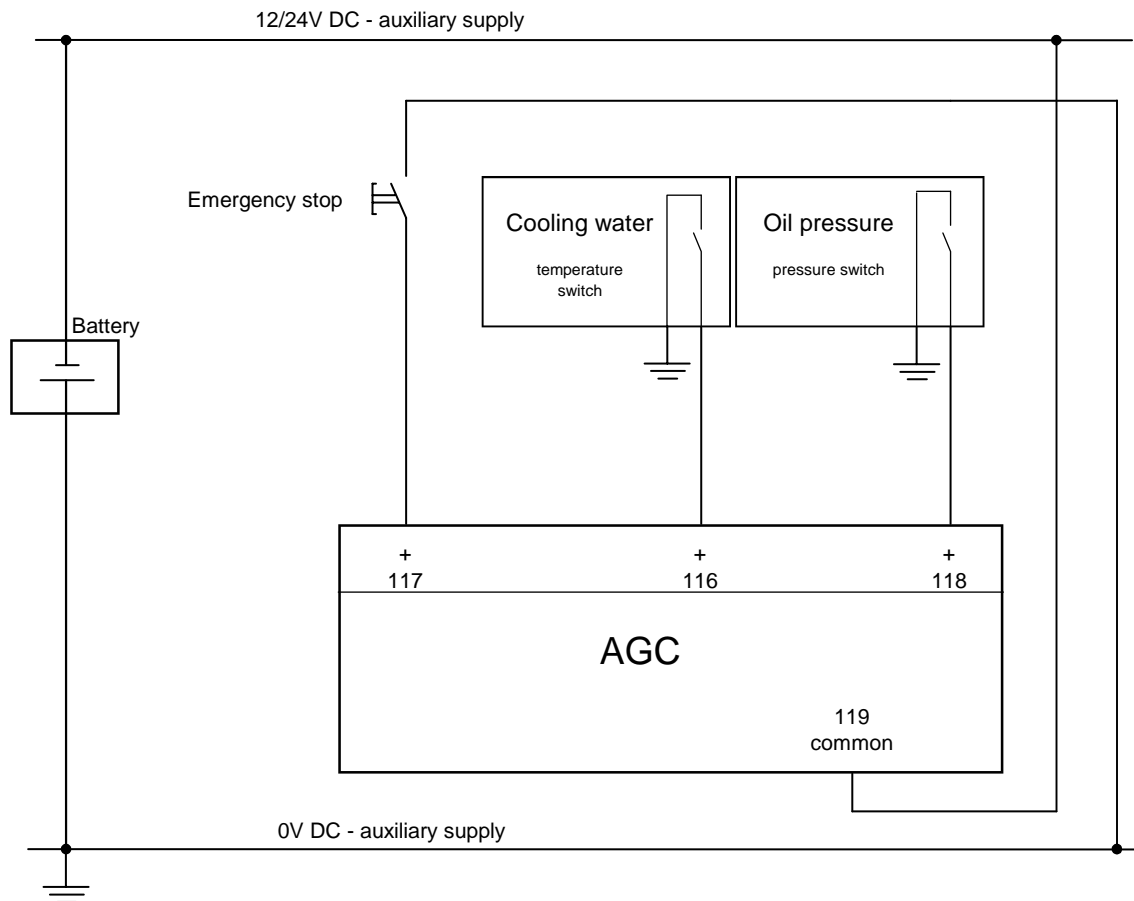
Connection

Battery positive to input



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.



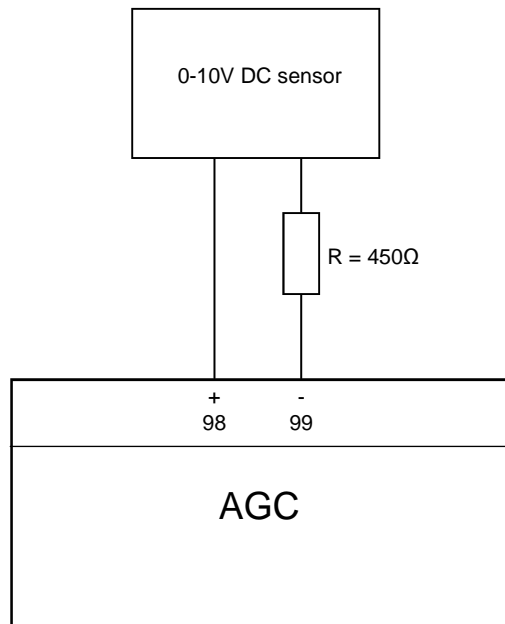
The digital inputs are bi-directional.

11. Other sensors

Introduction

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

Connection



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

DEIF A/S reserves the right to change any of the above