



INSTRUCTION MANUAL

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PRESENTATION

We wish to express our thanks for the confidence in us which you have demonstrated by your interest in our purchase of the DIESEL-CONTROL 100.

For us, this confidence inspires us to work harder every day to deserve it, and thus, to justify the tradition of quality which our products have.

This manual will allow you to see the capacity of the unit as well as its installation and use.

However, if any doubts should remain, let us know and we will happy attend to them.

1. FUNCIONAL DESCRIPTION

This is an electronic unit for the automatic starting and stopping of diesel and petrol engines, with breakdown detection.

STARTING

Starting can be carried out:

- By means of a programmable clock which can be built into the unit.
- By signals from external elements (level sensors, another programmer, etc.).
- Manually ("MANUAL START" button).

The activation time of the starter motor can be adjusted between 1 and 12 seconds ("START" button).

In case of a failure in the starting, the unit will make up to 4 attempts, with 2 minute pauses between them. If all attempts fail, there is an illuminated indicator which warns of the occurrence ("START FAIL").

The unit will detect the starter failure by means of the oil pressure.

There is a illuminated warning light for engine working order ("WORKING").

STARTER FUNCTIONING THEORY

On receiving a start order, be it from the builtin clock, the manual start or external elements, the unit activates the starter relay for the prefixed time set by the corresponding adjustment. On finishing, it waits for 1 and a half minutes to detect the working of the engine through the oil pressure.

If it has failed to start, it will carry out up to 4 attempts, separated by a fixed timing of two minutes.

If all these attempts fail to start the engine, the "START FAIL" indicator will be activated

The contact relay and the "WORKING" indicator remain activated from start to stop.

If the engine is working and the pressure gauge input is disconnected, the unit not obey start orders.

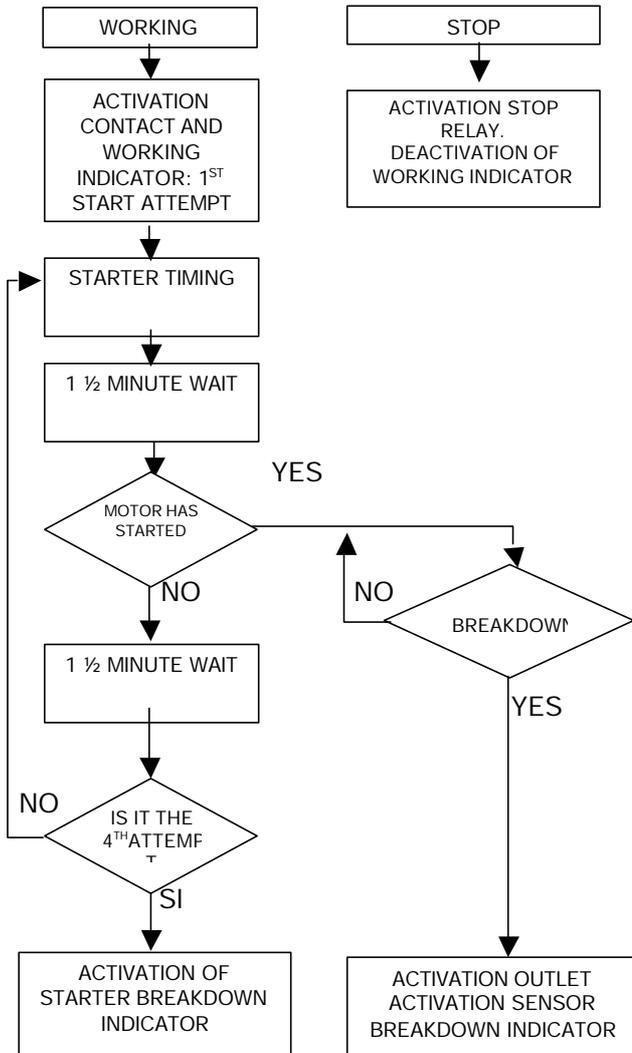
There is a CONTACT outlet which remains

activated from when the first attempt at starting is made until the stop.

An electrovalve for irrigation can also be connected to the contact outlet.

Optionally, the unit can be supplied with a warm-up function. In this case, it will have a button for programming the warm-up timing on the front, which will function before the activation of the starter motor.

FUNCTION DIAGRAM



STOP

The stop can be caused:

- By the end of the timing programmed on the clock.
- By obeying external elements such as, for example, level sensors, irrigation programmers, etc.
- Manually ("MANUAL STOP" button).
- By the detection of a breakdown by a sensor connected to the corresponding input (motor overheating, oil pressure, lack of water, etc.), this being recorded by the illuminated indicators ("SENSOR BREAKDOWN").

STOP FUNCTION THEORY

The stop is carried out by the activation of an outlet, for a short period of time, which can be connected to an electro-valve (cut in the fuel supply) or an electro-magnet (choking the engine).

It is advisable to mount the electro-valve, for the stop, on the engine, between the filter and the injector.

Stop time is adjustable from 6 to 90 seconds ("STOP" button).

The setting for the stop timing should be left at least 30 % longer than the time the engine actually takes to stop.

BREAKDOWN DETECTION

Breakdowns will only be detected from one and a half minutes after the engine has actually started.

On detecting a breakdown through the sensors or in the oil pressure, the unit will automatically activate the stop relay, also keeping the "SENSOR BREAKDOWN" indicator lit although the breakdown disappears. This will only go out on restarting engine again. However, if the breakdown continues, the unit stop the

OPTIONS

WITHOUT CLOCK. In this option, the unit incorporates a start/stop input for possible connection to programmers or other external elements.

WITH ONE DAY CLOCK, which repeats the programmes every day. In this option, 15 minute intervals between orders are possible.

WITH WEEKLY CLOCK, which repeats the programmes daily or weekly. In this model, the intervals between orders are two-hourly.

WITH DOUBLE SPHERE CLOCK, which repeats the programmes daily or weekly, as in the "WEEKLY" version, but with 30 minute intervals between orders.

WITH DOUBLE OUTLET DIGITAL CLOCK, which allows orders by minutes and with daily or weekly frequency. It has 2 outlets for, per example, working with two different irrigation sectors, or with only one but with independent fertilizer application.

WITH PRE-HEATING. With this option, the unit preheats the engine before each attempt at starting.

CLOCK

The Diesel Control can incorporate different kinds of clocks. If they are digital, moreover of this manual, there is one about the clock. If they are analogical (of gantries) you can follow these instructions:

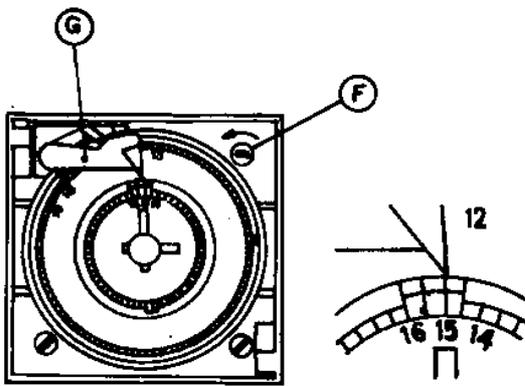
PROGRAMATION

Adapt the gantries of programming moving them out (for the time that you want the engine to be active) or pressing to put them in.

SETTING IN TIME

Use the command "F" of working of spheres and pointers, avoiding moving them directly. For the setting in time, consider the index of operations "G" as much as the pointers; thus, if we want to select 15 hours, the index of operations "G" should have to indicate 15,00 and the pointers should be at the position that the figure indicates.

In the double sphere clocks, have to be programmed the internal and the external sphere.



WARRANTY

The unit is warranted against manufacturing defects for two years.

Breakdowns caused by accidents, mis-connection and unauthorised use are excluded from this warranty.

2. TECHNICAL CHARACTERISTICS

PROTECTION

Protection against polarity changes in the feed input.

Protection against power surges.

Protection against the chance activation of the starter when the engine is working.

UNIT CONSUMPTION

Stopped 0,0025 A (0,03 W).

Working 0,0600 A (0,70 W).

PERMITTED WORKING TEMPERATURES

From -5 ° C to +45 ° C.

COMPONENTS

C-MOS integrated circuits. 10 A relay outlet.

MOUNTING BOX

Metal with lock, 25x25x8.

3. INSTALLATION

3.1. WALL MOUNTING

4 pieces for wall mounting are supplied with the unit, which are mounted, from the outside and without need to open the unit, in the holes on the back of this.

Site the engine, battery and DIESEL-CONTROL as close as possible to each other, bearing in mind possible problems which might arise such as, for example, a water leak from the pump wetting the unit, engine vibrations, etc...

3.2. CONNECTIONS

To connect the unit, remove the "connection housing" cover.

3.3. INPUTS

Feed the unit 12v DC (INPUT terminals 7 and 8) respecting the polarity.

The connection should be made with 2.5 mm² cross-section cables, with direct feed from the battery terminals, without any other connection between these two points.

On connecting the unit to the battery, wait about 3 minutes before beginning any working operation. If any warning light stays lit, press the MANUAL STOP button and the unit will be prepared to initiate the starter sequence.

Input no. 5 (STARTER DETECTOR) must be connected directly to the oil pressure gauge, prescinding any other connection (for example, the oil warning light). To make the connection, first disconnect the pressure gauge and do not reconnect it as, if not, the unit could be damaged. The cable cross-section should be 1.5 mm².

When the unit does not obey start orders, it will

normally be because of the oil pressure gauge, given that if it fails to receive a signal from this gauge, the unit will understand that the engine is already working.

3.4. ACTIVATION BY EXTERNAL ORDER

When the Diesel-Control is delivered without clock, and thus, is destined for activation by other units, it will dispose of an input (terminals 1 and 2) for these.

In this case it will be necessary to leave the outlet to be used by these external units free of tension.

The Diesel-Control, on receiving a signal will initiate the start and when the signal ceases it will activate the stop. Because of this, it will keep the engine activated while there is a contact on inputs 1 and 2.

Even when the unit includes a clock, it can carry out starts and stops obeying level sensors, or similar, by way of inputs 2, 3 and 4. (External signals always free of tension). In these inputs the cables can be of 1 or 1.5 mm² cross-section.

These inputs, differently from number 1 and 2 before, are independent for starts and stops and, furthermore, only function with the initial impulse of a signal or contact.

There use will be useful when the start has to be by clock and the stop by level indicator (inputs 2 and 4); or when the activation is by sensor (inputs 2 and 3) and the stop by clock; or when there is external activation and deactivation by way of differentiated impulses for start and stop.

In input 6 (breakdown) any kind of sensor with a normally open contact, free of tension can be connected. The cross-section of the cable can also be either 1 or 1.5 mm².

3.5. OUTLETS

Terminal no. 1 (common outlet) must be connected directly to the positive battery terminal. The cross-section of this cable can be 2.5 mm².

The outlet for activating the starter motor (terminal 2) has a relay with a maximum intensity of 10^a (as have the remaining outlets).

However, it is necessary to install a supplementary relay between this outlet and the starter motor. Follow the instructions which appear later.

This terminal has to be connected to one pole of the supplementary starter relay winding. The other pole has to be connected directly to the negative. These cables can be of 1.5 mm² cross-section.

The starter relay common outlet must be connected directly to the positive with a direct 6 or 8 mm² wire. The other contact must be connected to the distributor with a similar wire.

There are engines which need to work with double injection by way of a small electro-magnet which will be connected in parallel with the starter.

The stop outlet (terminal 3) can act directly without a relay in between, through an electro-valve (which will temporarily cut the fuel supply) with a 1.5mm² cable.

The stop electro-valve will be installed between the filter and as close as possible to the injector input and will normally be open and at 12v DC.

The engine can also be stopped by way of an electro-magnet (which chokes the engine).

If the electro-magnet system is chosen, a supplementary relay must be installed. The connecting up of the Diesel-control and the relay and that of this to the electro-magnet will be carried out in the same way as in the case of the start. It being possible to bridge the negatives of the relay windings and the positives of the common outlets of the contacts, with the same sections as specified above.

The contact outlet (terminal no. 4 will remain activated from the moment of starting until the stop.

The contact outlet gives positive whenever the unit is working ("WORKING" LED illuminated). This outlet will only be used in case we need to activate a general aperture electro-valve, or when the engine needs the contact signal to charge the battery.

In this case it can be connected directly to the contact position of the starter key.

At the contact outlet, an electro-valve for irrigation can be connected if necessary.

Use 35 mm² cross-section cable as normally used in the motor industry from the battery negative to the engine chassis. This section should be increased if the distance between the battery and the engine is greater than 3 metres.

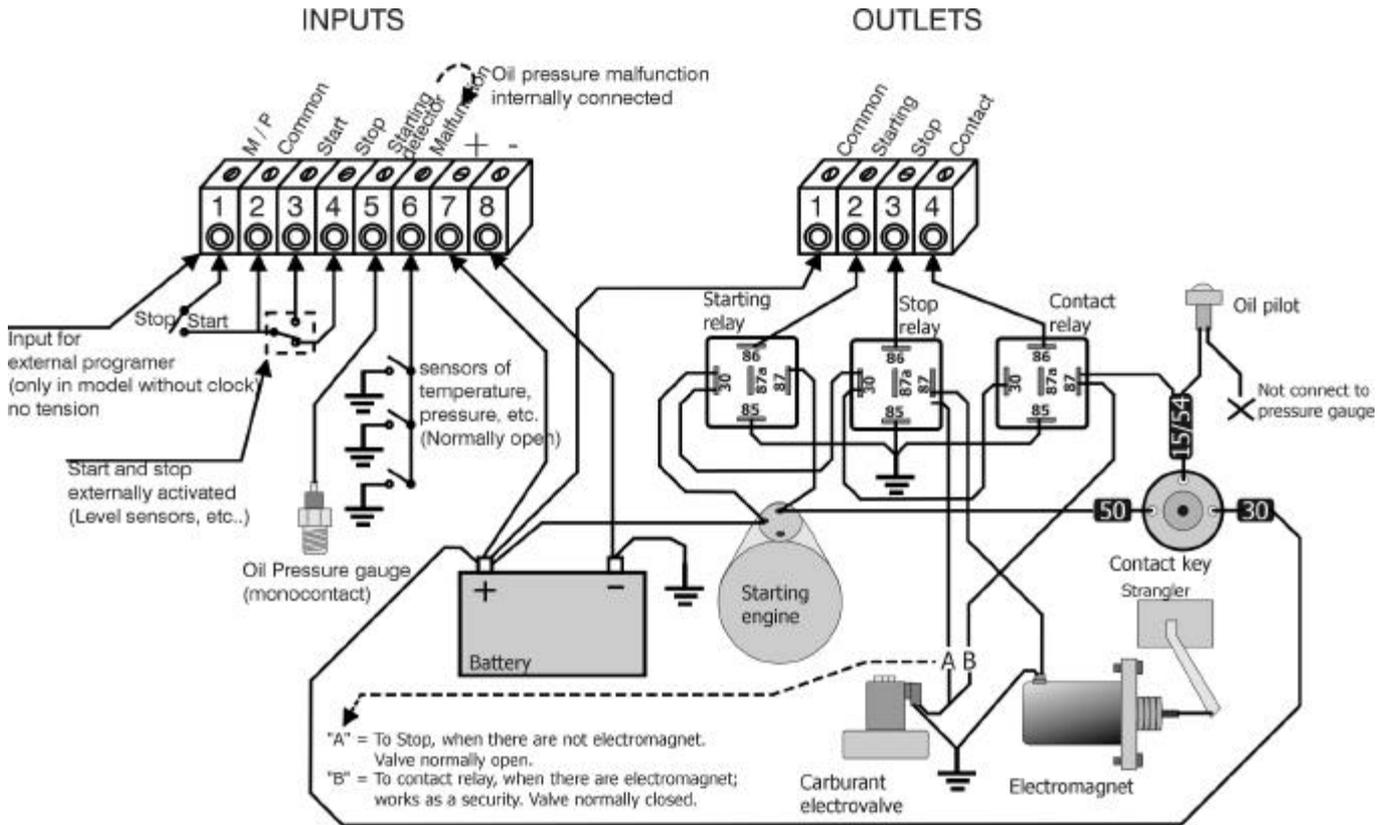
The connection to the engine or the support must be good. An adequate place could be where the rectifier negative connects to the earth 9.

The cable from the positive to the starter motor terminal should have a cross-section of 20 mm², for a distance not greater than 4 metres, so that the tension drop on starting the engine is minimum; this way the battery charge will also be used to its maximum by the alternator.

For the connection of Diesel-control, it would be convenient if all the cables had terminals, by which a greater degree of security and a better appearance would be achieved in the connections, thus also avoiding poor connections which occasionally causes false contacts.

Avoid producing short-circuits in the cables given that the unit does not contain fuses (to avoid tension drops in the same).

CONNECTIONS SCHEME



3.6. SUPPLEMENTARY RELAYS

The supplementary relays on the start and stop outlets will protect the Diesel-control from possible anomalies from problems arising from the high power which the distributor or electro-magnet needs for its correct working.

The relays used will be 12v, with a shorting capacity of 20 or 30^a. These relays are the type usually used in the motor industry.

The supplementary relays can be placed inside a sealed box of the type used in electrical installations, which will be mounted as close as possible to the engine.

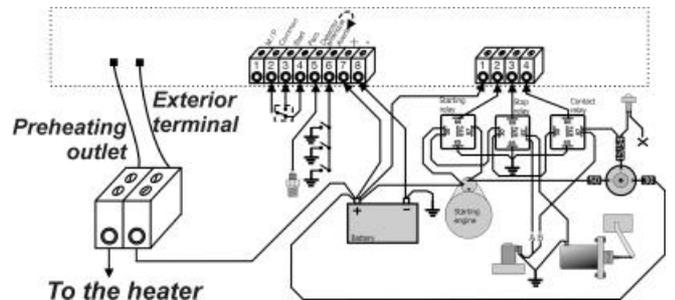
The cables (1.5 mm² sections) which govern the supplementary relays will come out of terminals 2 and 3 (start and stop). These cables carry the positive to the pole of the winding.

3.7. OPTION WITH PREHEATING

The units delivered with this option incorporate another button on the frontpiece where the timing (in seconds), of the preheating to be carried out before the attempt at starting, can be programmed.

To connect the heater, in the connection housing there will be a loose terminal which comes from the positive. Place a relay like those described above here.

CONNECTIONS SCHEME

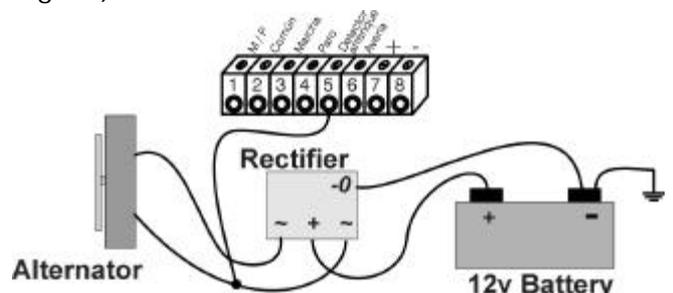


3.8. OPTION FOR PETROL ENGINES

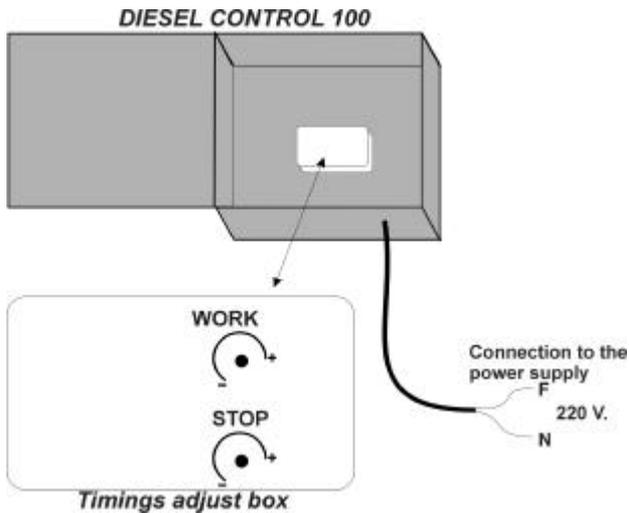
Only for the units that they have this option.

In petrol engines, which generally do not have oil pressure gauges, the detection of the start is determined by the moment when the alternator begins to generate electrical tension.

For the connection of the unit it is sufficient to take one of the poles of the alternating current generated by the alternator to input terminal no.5 before it enters the rectifier. (See the following diagram).



3.9. OPTION START-UP OF ELECTRIC GENERATOR FOR NET FAILURE DETECTION



For start-up the electric generator its necessary to connect the marked cable in the picture, to the 220 V power supply.

Inside the Diesel control it can find a small box with the timings adjust of work and stop; The maximum time in each of them is three minutes. The start-up it corresponds to the time since the supply fail until its carry out the start-up of the electric generator. The stop it corresponds to the time that it takes in stop the electric generator, once the current supply has returned.

3.10. MISCELLANEOUS NOTES

When the start/stop is related to other units which act on the flow rate (for example, irrigation programmers) this must be borne in mind that on ordering the stop and closing all the flow outlets (electro-valves) the engine takes time to stop, and for this reason, in some cases, it could be necessary to connect a flow outlet electro-valve to the stop outlet of the Diesel-control (terminals – and 3) to avoid a pressure surge.

With fuel cut-off electro-valves “normally closed” as incorporated in some engines, it is necessary to supply them between terminal no. 4 (contact) and the negative. This way, they will open at the first start attempt and will close with the stop order, staying open during the working period.

4. BREAKDOWN GUIDE

SYMPTOM:

With MANUAL START, the unit is not activated and the “WORKING” LED does not light up.

CAUSES:

- Mistaken polarity in the supply.
- The oil pressure gauge is not connected to terminal 5.

- The oil pressure gauge is defective or does not indicate mass with the engine stopped.

SYMPTOM:

The unit is not activated by the clock or external sensor, but is activated by the “MANUAL” button.

CAUSES:

- An internal track is fused. Bridge input terminals 2 and 8 and the problem will be solved.

SYMPTOM:

The “START” LED is activated but the does not attempt to start, although it does stop.

CAUSES:

- Start relay stuck in contact and does not transmit start signals. A supplementary relay between the Diesel-control outlet and the starter distributor is recommended.

SYMPTOM:

The “START” LED lights up momentarily but goes out immediately and does not start well.

CAUSES:

- The battery is low. Recharge it.
- The unit feed cables and/or the common outlet are of an insufficient cross-section.
- The positive feed to the unit and that for the outlets is bridged and are not two independent cables as they should be.

SYMPTOM:

Does not stop.

CAUSES:

- The plastic support for the stop relay is hot and does not push the moving contact enough. The cause is overheating due to a higher current than intended having passed through it.
- The moving contact of the relay has caught on the rear part, which is made of plastic. The cause is overheating as above.
- The stop circuit has shorted as a result of a power surge caused by bad external handling or a short circuit.

SYMPTOM:

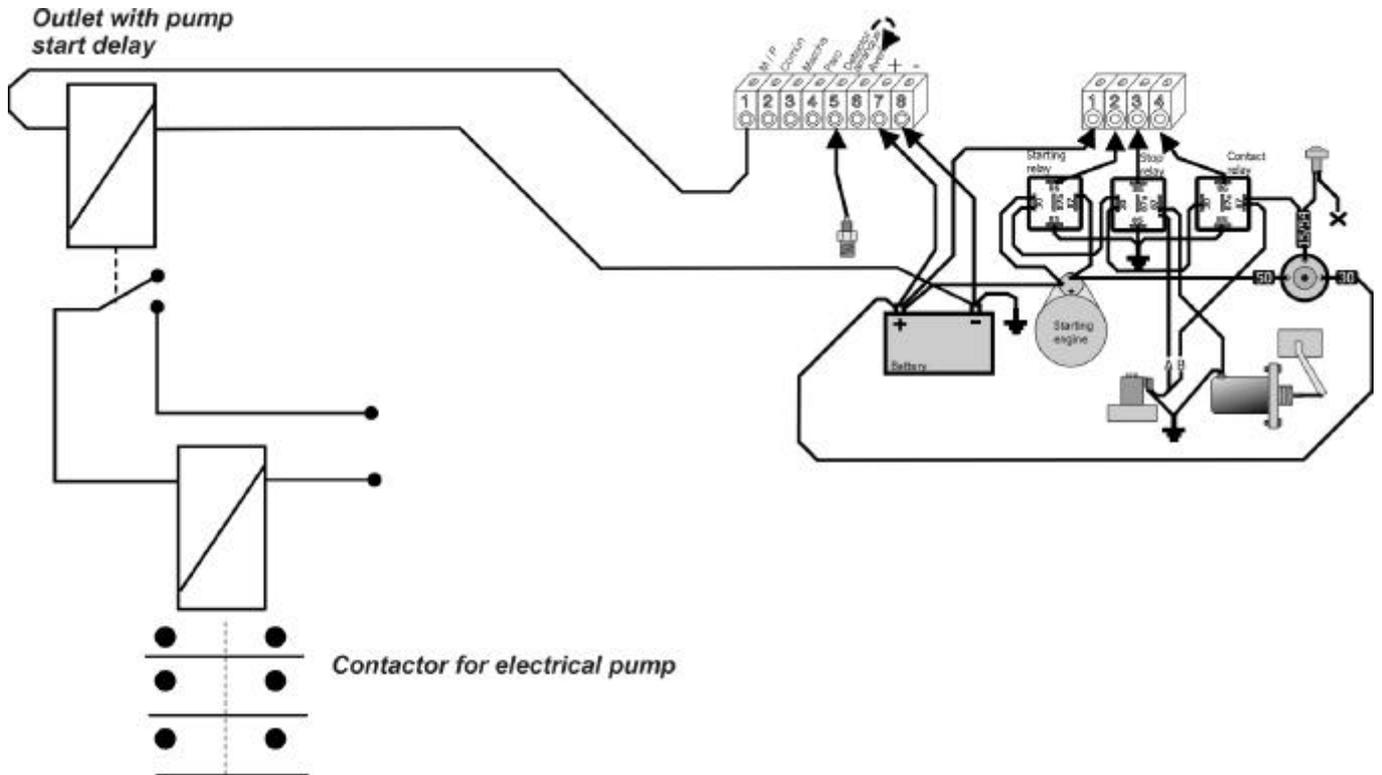
The relays cannot be heard vibrating.

CAUSES:

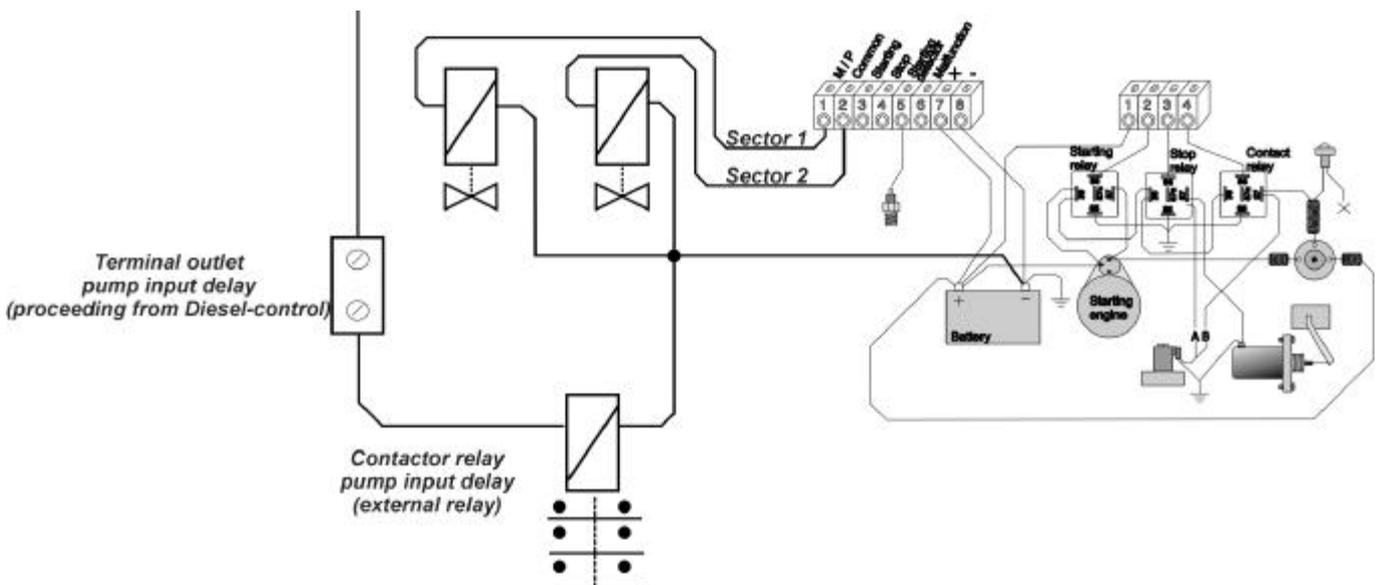
- Battery is low. Recharge it.
- The feed cables are too small.

5. CONNECTION SCHEME OF MISCELLANEOUS OPTIONS

- ◆ Delay option in the pump input.



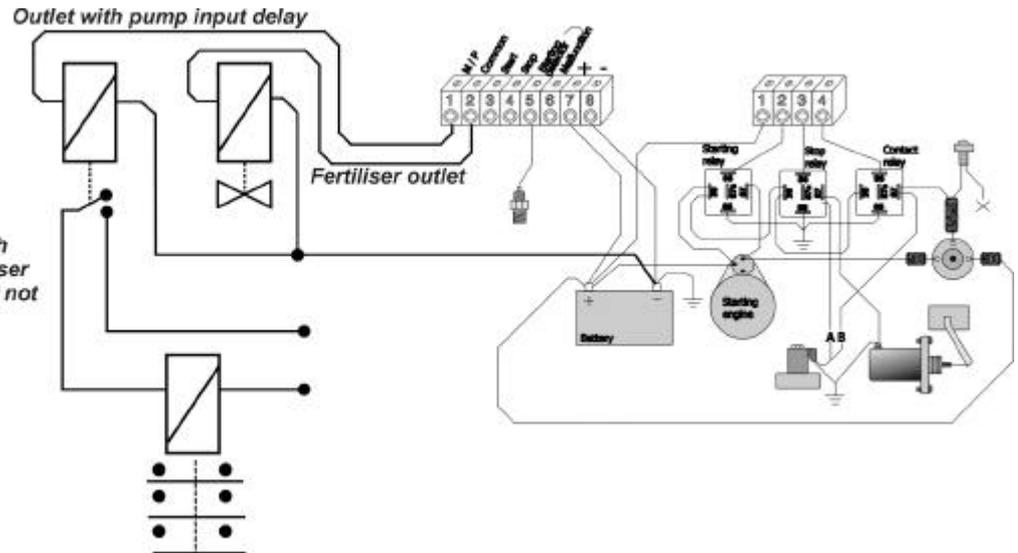
- ◆ Option of 2 irrigation sector with delay in the input pump.



Option of irrigation plus fertiliser with delay in the input pump.

NOTE:

In case that not have the outlet with pump input delay option, the fertiliser outlet will be for the terminal 1 and not for the terminal 2.



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