

Solar Separator Alarm

Type 14007

Installation, Operation and Maintenance



**Separators And Alarms Should Be
Serviced And Maintained In Accordance
With BS EN 858-2**



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Declaration of Conformity

This product meets all the essential safety requirements of the relevant European Directives.

The full text of the Declaration of Conformity can be found at:

<http://www.darcymonitoring.co.uk/separator-monitoring/solar-powered-separator-alarm/>

IMPORTANT

Note: In all cases good, standard electrical practice should be followed, and the installation must conform to the appropriate local code of practice – e.g. BS EN 60079-25 in the UK. In essence, the installation must be such that the intrinsic safety is not compromised by: - exposure to risk of mechanical damage, unauthorised modification or interference, exposure to moisture, dust and foreign bodies, excessive heat, invasion of intrinsically safe circuit by other electrical equipment or circuitry. (See Note in installation section)

General Description

The standard system is supplied complete with an intrinsically safe control unit together with a high oil probe and a steel mounting stand. The control unit can monitor up to 6 probe units in 2 separator tanks (3 probes per tank), their current status is displayed via a 2 x 16 liquid crystal display. Two versions of this unit are available, one which signals an alarm via a flashing beacon, the other which communicates its status via GSM (mobile phone text messages).

| Model | Beacon | GSM | External Antenna |
|-------|----------|--------------------------------|--|
| 14506 | Yes | Not possible to upgrade to GSM | N/A |
| 14507 | Optional | Yes | Optional (installed instead of internal antenna) |

Table 1 - Solar separator alarm options

General Operation

The Control Unit monitors the condition of the connected probe units by checking their condition every 30 minutes, their current status is displayed on the display located on the front of the unit. If an alarm condition is detected, a warning message is displayed followed by notification of the alarm condition detected, e.g. *HAZARD ALERT* High Oil Alarm.

The unit then gives the option, via the display (or text message), to accept/acknowledge the alarm. On doing so, the display instructs the user to take the appropriate action, e.g. empty the separator. After the separator has been emptied and refilled with water, the control unit re-scans the probe sensors attached and presuming no alarm condition is detected, 'All Correct' will be displayed. If the push button is pressed before the separator has been emptied, or it has been emptied but not refilled with water, then the control simply scans the probe sensor(s) and reverts to the alarm condition.

It is a requirement of the certification that the cabinet door is kept closed during normal operation, only being opened for maintenance.

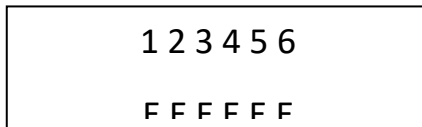
Changing Factory Settings

WARNING!!! Entering setup mode to change factory settings will set the unit back to a deactivated state and require a new activation code to be entered by contacting Darcy Spillcare Manufacture.

Unused probes can be disabled, and the probe check interval changed by entering “setup” mode. To enter setup mode, press and hold the Push Switch whilst pressing and releasing the “RESET” switch mounted on the board to the right of the LCD. After about 10 seconds the screen will display “Setup.” At this point release the Push Switch.

Disable Unused Probes

The factory default is for the high oil probe on zone 1 to be enabled and all other probes disabled. If any other probes are to be used, they can be enabled by entering setup mode, as described above. The following will be displayed, allowing probes to be enabled or disabled.



The block cursor will flash over the probe that can be currently toggled between enabled and disabled. To move to the next probe, press the reset switch mounted on the board to the right of the LCD. The display will blank for about 5 seconds before returning with the next selected probe. Table 2 shows how the sensor numbers relate to the probes.

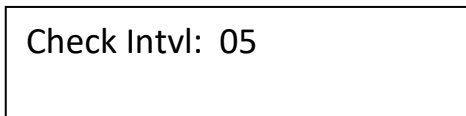
| Sensor Number | Zone | Probe Description |
|---------------|--------|-------------------|
| 1 | Zone 1 | High Oil |
| 2 | | High Liquid |
| 3 | | Silt |
| 4 | Zone 2 | High Oil |
| 5 | | High Liquid |
| 6 | | Silt |

Table 2 - Sensor to probe mappings

To exit from setup mode, press and hold the Push Switch whilst pressing and releasing the reset switch mounted on the board to the right of the LCD.

Probe Check Interval

Once setup mode is entered, as described earlier, press the “TEST” switch mounted on the board to the right of the LCD. The following will be displayed which allows the probe check interval to be adjusted between 5 and 60 minutes.



To exit from setup mode, press and hold the Push Switch whilst pressing and releasing the reset switch mounted on the board to the right of the LCD.

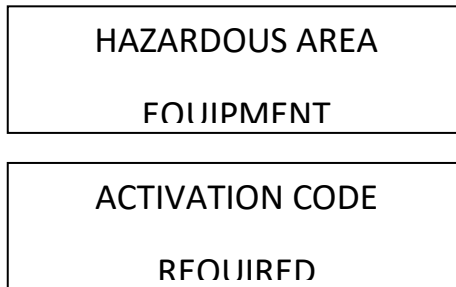
Testing the Probe Sensors

The probe interrogation function can be activated at any time by simply pressing the push switch.

Installation

This product has been designed and certified as being intrinsically safe. It is of paramount importance, that the unit should not be modified in any way and the installation be carried out by an approved installer, in accordance with the Environment Agency guidelines (PPG3). Any deviation from this could invalidate the certification warranty and render the unit unsafe for its intended use.

Upon powering up the unit for the first time, the LCD will display the following message:



The unit will not be able to function without the code which can be obtained by calling Darcy Spillcare Manufacture on 01732 441016.

For GSM units, Darcy staff will assist in programming the unit with 1 to 8 phone numbers which are required to receive alert messages.

Control Unit

Refer to Table 9 for required cable specifications.

The control unit is designed for installation outdoors and must be mounted on the stand provided to ensure it is out of the hazardous zone. For all wiring details, please refer to Table 3.

It is important that the solar panel has a clear line of sight towards the sun, faces due south and is kept clear of debris, e.g. leaves. Failure to do this will result in the battery not being charged sufficiently for continued normal operation. Care must also be taken to ensure that the solar panel is not partially or totally shadowed by nearby objects, e.g. buildings or trees, at certain times of the day as this will also reduce the charging efficiency.

Probes (High Oil and High Liquid Level Probes)

The high oil probe (PP/14000) and the high liquid probe (PP/14011) (if required), need to be installed such that the float switch housing is located below or above the static liquid level. The probe cable can be secured inside the neck of the separator using a probe mounting kit (PP/14050).

Please note the distance below or above the static liquid level will be determined by the type, style and/or size of separator. This information can be obtained from the separator manufacturer. However, as a general rule of thumb, the high liquid level probe should be placed 300mm **above** the static liquid level and the High Oil Probe placed 150mm **below** the static liquid level.

Due to the varying neck lengths (turrets) that occur within each separator, each normal probe unit is fitted with 5 metres of cable.

Silt Probe

The silt probe is suspended within the tank to the tank manufacturer's recommendations. The probe cable can be secured inside the neck of the separator using a probe mounting kit (PP/14050).

Cable Distribution Box

It is advisable to connect the probe cables to a cable distribution box (PP/14039) which should be fixed near to the top of the separator neck. The probe cable can then be terminated with a waterproof plug (provided with the distribution box). The plug is then connected to the bulkhead socket (provided with the distribution box). A cable must then be laid to connect the distribution box and the control unit. The type of connection cable required will be dependent on the environment it is used in, the route taken and maximum allowable cable capacitance and inductance (see cable parameters in Table 9).

After making the connections in the distribution box, it is advisable to spray the terminals with a conformal coating lacquer to prevent moisture ingress before finally sealing them with waterproof putty.

Connection to Control Unit

The Probe cable should be fed through the appropriate gland in the bottom right hand side of the control unit and connected to the terminals as instructed. The solar panel cable, and if used, any beacon or sounder cable, must be fed through the appropriate glands on the bottom left hand side of the control unit and connected to the terminals as instructed.

IMPORTANT NOTE: Under NO circumstances can cables be entered into the enclosure other than on the underside as indicated, as this would infringe the certification and therefore safety of the product.

ALL CABLES INSIDE THE ENCLOSURE MUST BE SECURED TO THE CRADLES WITH THE CABLE TIES PROVIDED.

DO NOT EARTH ANY PART OF THE UNIT OR STAND AS IT IS A REQUIREMENT OF THE CERTIFICATION THAT 500V ISOLATION IS MAINTAINED TO EARTH.

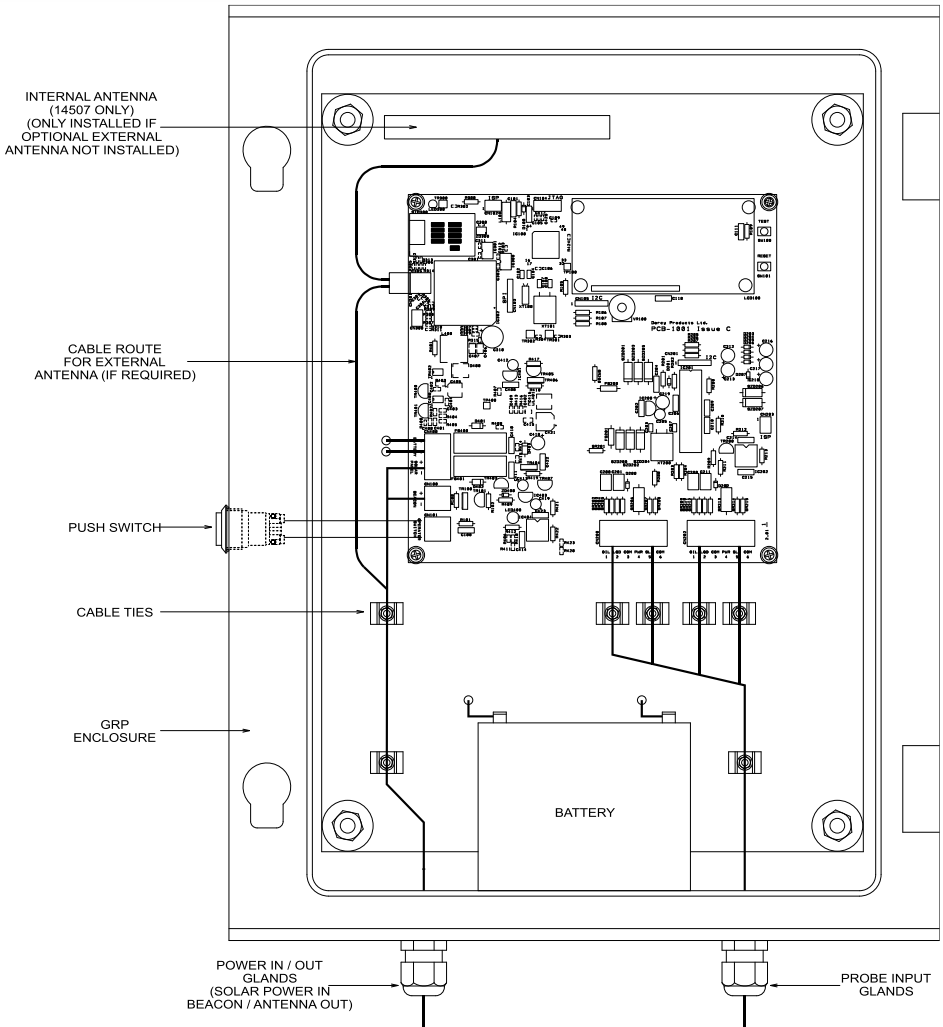


Figure 1 - Solar panel, probe connections (optional beacon and external antenna)

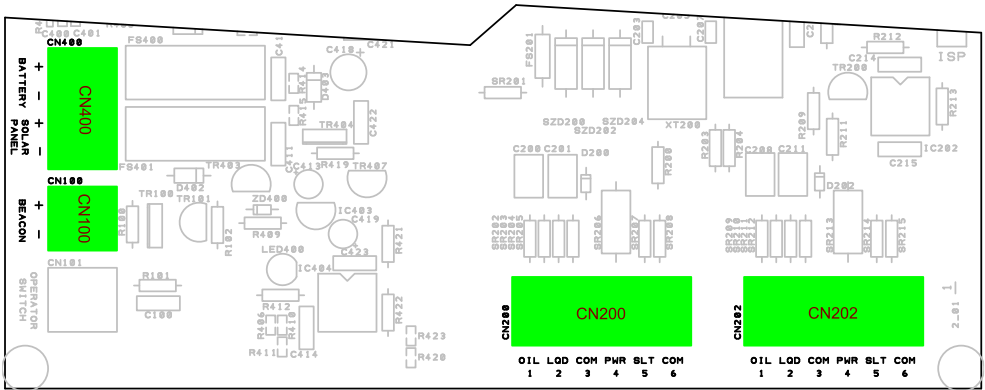


Figure 2 – Solar panel, battery and probe terminal locations

| Probe Type | Terminals | | | | | |
|-------------|--------------|--------------|------|-------|--------------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| High Oil | Brown or Red | | Blue | | | |
| High Liquid | | Brown or Red | Blue | | | |
| Silt | | | | Brown | Green/Yellow | Blue |

Table 3 - Probe connections (CN200 (zone 1), CN202 (zone 2))

| CN400 Terminal Assignment | | | |
|---------------------------|-------|-------------|-------|
| + | - | + | - |
| Red | Black | Red | Black |
| Battery | | Solar Panel | |

Table 4 - Battery and solar panel connections (CN400)

| CN100 Terminal Assignment | |
|---------------------------|---------------|
| + | - |
| Brown or Red | Blue or Black |
| Beacon | |

Table 5 - Beacon connections (CN100)

Maintenance and Repair

Due to the harsh environments which the probes can be subjected to, it is advised that they are inspected and cleaned at regular intervals.

The control unit does not contain user serviceable parts.

For all repairs, contact Darcy Spillcare Manufacture on 01732 441016.

Technical Information

Electrical

| | |
|-------------------------------|--|
| Supply Voltage | 12V DC |
| Max Probe Cable Length | 200m (less if values in Table 9 would be exceeded) |
| Beacon Output | 12V DC 100mA max. |

Table 6 - Electrical Specifications

Apparatus Supply and I/O Parameters

| | |
|-------------------------|---|
| U_m | 253Vrms (Note: only intended to operate from 12V DC! See Table 6) |
|-------------------------|---|

Table 7 - Battery, solar panel, beacon and Operator Switch terminals (CN400, CN100, CN101)

| | |
|-------------------------|-------|
| U_o | 12.6V |
| I_o | 41mA |
| P_o | 128mW |
| C_i | 0 |
| L_i | 0 |

Table 8 - Hazardous area terminals (CN200, CN202)

| Group | Capacitance (μ F) | Inductance (mH) | OR | L/R Ratio (μ H/ Ω) |
|-------|------------------------|-----------------|----|---------------------------------|
| IIC | 1.15 | 21.4 | | 92.3 |
| IIB | 7.4 | 85.7 | | 369 |
| IIA | 27 | 171 | | 739 |

Table 9 - CN200, CN202 load parameters

Special Conditions for Safe Use

The two connectors to the hazardous area CN200 and CN202 are isolated from earth but have ground connections that are connected to each other inside the apparatus. This must be considered when connecting to hazardous area equipment.

Probe Cables

The total capacitance and inductance of the cable used between the control unit and the probe must not exceed that shown in Table 9.

Mechanical

Protection and/or screening of the cable should also be considered. The maximum length of cable between probe and control unit must not exceed 200 metres or less if the values in Table 9 on would be exceeded.

GSM Commands

The following text commands (in bold) can be sent to the alarm panel, all commands can be upper or lower case, or even a mix.

STATUS – Performs a scan of the probes and returns the status of zone 1 in one text message and zone 2 in a separate message, if zone 2 is enabled. An example is shown below.

Battery: 100% (Normal)
Status zone 1:
High oil
High water
Silt build-up
Alarm unaccepted
Unaccepted alarms exist

ACCEPT 1 – Accepts the zone 1 alarm. Accepting the alarm above responds with a text message as shown below.

Battery: 100% (Normal)
Status zone 1:
High oil
High water
Silt build-up
alarms accepted

ACCEPT 2 – Accepts the zone 2 alarm. Accepting the above alarm above responds with a text message as shown below.

Battery: 100% (Normal)
Status zone 2:
High oil
High water
Silt build-up
alarms accepted

ACCEPT – Accepts the alarms on zone 1 and zone 2, but a low battery alarm must be accepted separately as below.

A low battery alarm looks like this:

Battery: 5% (Low)
alarm unaccepted
Status zone 1:
All correct
Unaccepted alarms exist

ACCEPT BATTERY – Accepts the low battery alarm and sends a response as shown below.

Battery: 5% (Low)

Brook House, Larkfield Trading Estate
New Hythe Lane
Larkfield, Kent
ME20 6GN

+44 (0)1732 762338
www.thedarcygroup.co.uk



alarm accepted
Status zone 1:
All correct

SIM

The SIM supplied with the 14507 GSM unit is a Vodafone SIM. As the product does not use any GPRS data services, any other SIM could be used instead. No PIN should be set on the SIM as this will prevent correct operation.

PLEASE NOTE:

The SIM card provided with this Alarm is Pay As You Go and comes with £10.00 credit. We strongly advise that the owner puts this SIM card on account with Vodafone. Failure to do so will in time render the Separator Alarm inoperable. Details of how to set up an account are contained within the Vodafone booklet supplied with the SIM.

Accessories

| | Part No. |
|------------------------------|----------|
| High Oil Probe..... | PP/14000 |
| High Level Probe | PP/14011 |
| Silt Probe | PP/14220 |
| Probe Mounting Kit | PP/14050 |
| Signal Distribution Box..... | PP/14039 |



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