AQUA SENTRY

Operating Manual

Solar Separator Alarm

Type 14506 & 14507

Installation, Operation & Maintenance

darcy group

Aquasentry.uk

PP-MAN-8010-EN, Rev 12, 2024-12-09

darcy spillcare AQUA SENTRY AYLES FERNIE

Working today for a cleaner tomorrow

Contents

Separators and alarms should be serviced and maintained in accordance with BS EN 858-2

Declaration of Conformity

This product meets all the essential safety requirements of the referenced UK Statutory Instruments and EU Directives listed below and is issued under the sole responsibility of the manufacturer.

Equipment Name and Type		**14007 Series Solar Separator Alarm**
Manufacturer		**Darcy Products Ltd.** **Brook House** **Larkfield Trading Estate** **New Hythe Lane** **Larkfield** **Kent** **ME20 6GN**
UK Legislation compliance		**S.I. 2016/1091** Electromagnetic Compatibility Regulations 2016 **S.I. 2016/1101** Electrical Equipment (Safety) Regulations 2016 **S.I. 2016/1107** Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 **S.I. 2017/1206** Radio Equipment Regulations 2017 **S.I. 2012/3032** The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
Certificate Number		BAS21UKEX0013
Specific Marking of Explosion Protection		Ⓔx II (1) G [Ex ia Ga] IIC (-20°C ≤ Ta ≤ +50°C)
Approved Body Number		SGS United Kingdom Ltd. 1180
Standards Used	EMC	EN IEC 61326-1:2021 (Emissions Class B)
	LVD	EN 61010-1:2010/A1:2019
	UKEX	EN 60079-0:2018 EN 60079-11:2012
	RED	EN 301 511 v12.5.1 EN 301 908-1 v13.1.1 EN 301 908-2 v13.1.1
	RoHS	EN IEC 63000:2018
Serial Number and Year of Manufacture		Displayed on the side of the control unit
On behalf of the above-named company, I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the above listed directives and standards. Jurgen Fenney – Quality Manager		
		DATED: 05/04/2023 Larkfield

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Applicable European Directives:		2014/30/EU – Electromagnetic Compatibility Directive (EMC) 2014/35/EU – Low Voltage Directive (LVD) 2014/34/EU – Equipment for Potentially Explosive Atmospheres (ATEX) 2014/53/EU – Radio Equipment Directive 2011/65/EU – Restriction of Hazardous Substances Directive (RoHS)
Certificate Number		Baseefa08ATEX0171X
Specific Marking of Explosion Protection		Ⓔx II (1) G [Ex ia Ga] IIC (-20°C ≤ Ta ≤ +50°C)
Notified Body Number		SGS Fimko Oy, Finland 0598
EU Harmonised Standards	EMC	EN IEC 61326-1:2013 (Emissions Class B)
	LVD	EN 61010-1:2010/A1:2019
	ATEX	EN 60079-0:2018 EN 60079-11:2012
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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.

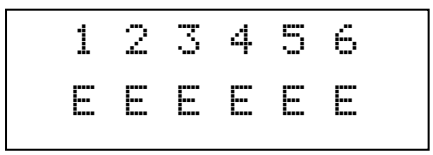
Changing Factory Settings

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.

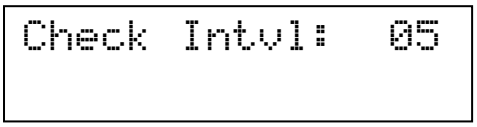
Sensor Number	Zone	Probe Description
1	Zone 1	High Oil
2		High Liquid
3		Silt
4	Zone 2	High Oil
5		High Liquid
6		Silt

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.

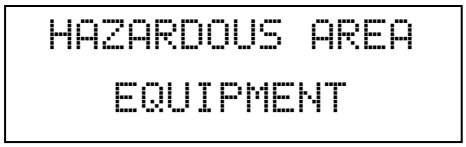
Testing the Probe Sensors

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 may 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 +44 (0)1732 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 (Northern Hemisphere) or north (Southern Hemisphere) 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 or PP/PROBE/HLQD-1) 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.

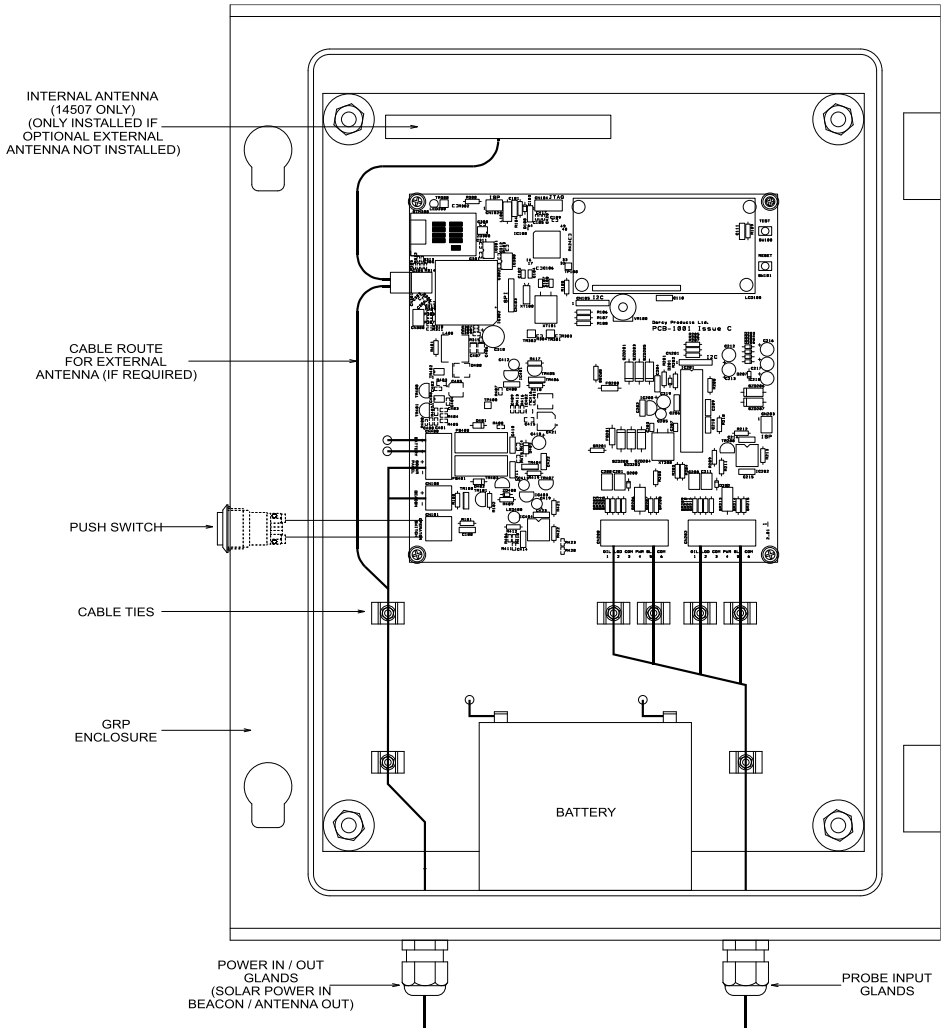


Figure 1 - Solar panel, probe connections (optional beacon and external antenna)

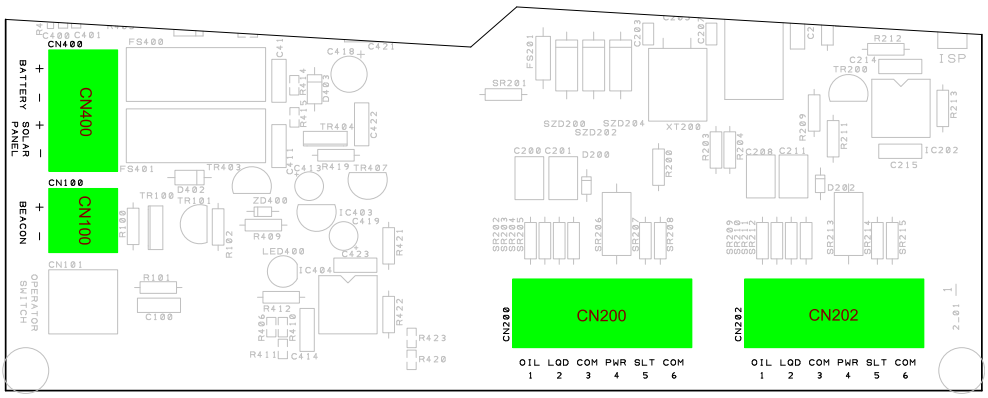


Figure 2 - Solar panel, battery and probe terminal locations

Probe Type	Terminals					
	1	2	3	4	5	6
High Oil	Brown or Red		Blue			
High Liquid		Brown or Red	Blue (or BLACK)			
Silt (PP/14220)				Brown	Green/ Yellow	Blue
Silt (PP/PROBE /SILT-1)				1	4	2, 3, 5

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 +44 (0)1732 441016.

Technical Information

Electrical

Supply voltage	12V DC
Max probe cable length	200m (less if values in Table 9 would be exceeded)
Unit weight	10.5 kg
Enclosure material	Polyester monobloc
Ingress protection	IP66
Dimensions	H430xW330xD200mm glazed door
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 (µF)	Inductance (mH)	OR	L/R Ratio (µH/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 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)

 alarm accepted

Status zone 1:

 All correct
```

SIM

If a Darcy SIM Management plan is purchased with the unit then the user does not need to do anything further with the SIM card. Darcy will contact the user annually to renew the SIM Management plan.

If the unit is purchased without a SIM Management plan then the user should provide their own SIM card. We strongly suggest using a contract SIM as if a pay as you go SIM is used and runs out of credit then the unit will no longer send out alerts.

Accessories

	Part No.
High Oil Probe	PP/14000
High Level Probe	PP/14011
High Liquid Probe	PP/PROBE/HLQD-1
Silt Probe	PP/14220
Silt Probe	PP/PROBE/SILT-1
Probe Mounting Kit	PP/14050
Signal Distribution Box	PP/14039

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