Protrack® SCC Basic
Product Guide

0800 LIC AUTO (542288)
support@licautomation.co.nz
General information

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Scope
This document is intended as a reference for the end-user of Protrack SCC. Refer to the Installation and Maintenance Manual for detailed installation, maintenance and diagnostic procedures.
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1. Safety

1.1 General safety

- Read and understand the manual and all safety signs before you connect power supplies to operate, maintain or adjust the milking equipment.
- Wear the correct protective clothing and equipment.
- A first-aid kit must be available near the milking equipment. Store in a highly visible place.
- Know the emergency medical centre number for your area.
- Review safety related items with all operators frequently (annually).
- If working remotely or unaccompanied on farm ensure that workmates know your whereabouts and that you have access to a cell phone.

1.2 Electrical safety

- Identify and stay alert to the electrical hazards around the work area, observe all safety warnings and labels.
- If uncertain about a particular electrical situation, do not attempt any maintenance or installation of milking equipment.
- Note that network looms often carry supply voltages for devices on the network.
- Perform checks and inspections to ensure that de-energizing the equipment will not introduce additional safety hazards.
- De-energize all electrical conductors that are to be worked on or near. Before personnel are allowed to work on or near any exposed de-energized conductors, the circuit breakers and/or disconnect switches must be locked and tagged to prevent their inadvertent operation.
- Always be aware of the potential for electric shock from de-energized units, harmful charges may be stored in items such as capacitors.
- When work is complete, all personnel should be notified that the system is to be re-energized and warned to stay clear of circuits and equipment. Remove all tags and locks.
- If operating auxiliary equipment, ensure it is powered via an RCD (Residual Current Device) or similar isolating device.
- The light output of the products may cause injuries to human eyes in circumstances where the products are viewed directly for more than a few seconds.

1.3 Chemical safety

SCC Gel™ is a non-toxic liquid detergent. First aid measures are listed below.

- Inhalation: Remove to fresh air.
- Skin contact: Remove contaminated clothing and flush skin with large amounts of water.
  If redness, swelling, pain and/or blisters occur, transport to the nearest medical center.
- Eye contact: immediately flush eyes with large amounts of water with eyelids held open. Transport to the nearest medical center for additional treatment.
- Ingestion: in general no treatment is necessary. If large quantities are swallowed, however, get medical advice.
2. Overview

2.1 Product

- Protrack SCC is the world’s first in-line SCC sensor system for at bail SCC measurement and mastitis detection. Its precision makes it an invaluable tool for herd management decisions including the quick and early diagnosis, drafting and treatment of sub-clinically and clinically infected cows. This ultimately means lowering the overall SCC of the herd and therefore the bulk tank – and keeping it low. The SCC result is displayed with LED indicators before the cow leaves the bail.

2.1.1 Features

- Reports SCC before cow(s) leave the bail with a measurement output 1.5 minutes after cups-on.
- Simple in-shed interaction with a sturdy Optical Warning Light (OWL) for cups-on, or more advanced interaction with the PC application package.
- Measurement output displayed on an OWL in the simple form of coloured LEDs indicating SCC level between five different ranges.
- No sample-to-sample contamination with the Pre-rinse feature.
- Mounted in the milking line, with 6mL total milk extracted per sample.
- Thorough, automated wash cycle at the end of milking using the wash cycle and chemicals already in place at the milking plant.
- Environmentally friendly chemical detergent.
- Ability to temporarily disable sensor operation when running the colostrum mob through the parlour or when detergent has run out (Sleep mode).
2.2 How using Protrack SCC can help you

2.2.1 Mastitis costs

Mastitis is an elusive disease that costs most farmers big money. It is elusive for two main reasons:

1. Milk from a sub-clinically infected cow looks visibly normal, even to the eyes of the most careful milker;
2. The loss in milk yield per cow is often a hidden cost.

**BMSCC penalties:** Farmers are made aware of some of the cash costs of mastitis when bulk milk SCC (BMSCC) approaches penalty levels.

- A BMSCC between 400-500,000 cells/ml results in a 5% deduction in payment.
- This increases to a huge 10% deduction for BMSCC levels between 500-600,000 cells/ml.

**Loss in milk yield:** On top of the penalties imposed by the dairy companies, there is the hidden cost of loss in milk solids yield:

- A 1-2% loss with each 100,000 increase in SCC up to 500,000 cells/ml.
- Yield losses increase up to 10% as SCC gets even higher.

To control mastitis, it first needs to be detected. It follows that the more frequently farmers check their cows, and the earlier infections are identified, the greater the chance of turning these costs into gains.

2.2.2 SCC as an indictor of mastitis

SCC is the internationally accepted reference method for indicating mastitis infection. However, a variety of factors can influence the SCC result:

- Individual cows vary as to how they respond to an infection
- Infections caused by different bacteria cause different SCC responses
- SCC can fluctuate considerably from milking to milking
- SCC varies considerably throughout the milking
- SCC can fluctuate with different stages of bacteria and physiological states e.g. estrous

Therefore, SCC results based on a single milking should be interpreted with caution¹. Conversely, the more frequently cows are sampled the higher the chance of finding those that are infected.

¹We recommend that decisions are not based on a single Protrack SCC result.
2.2.3 Protrack SCC sensors

Protrack SCC enables farmers to measure individual cow SCC at bail giving a simple banded result. Protrack SCC takes a spot sample of milk early in milking, but generally after the cow has letdown, to get a SCC measurement well before the cow finishes milking. Measuring SCC at bail gives an early warning of developing mastitis and picks up those on-going sub-clinical infections.

To provide reliable information to the farmer, we recommend a minimum of one Protrack SCC unit installed on every 4th bail. This frequency of installation has been shown to catch at least 90% of the cows 2 or more times per week, and 99% at least once per week.

With Protrack SCC installed farmers have quick access to real-time results and can therefore eliminate the hassle of doing herd tests to monitor individual cow SCC data.

Because Protrack SCC results are displayed while the cow is milking, immediate actions could include:

- Removing cups to remove milk from the vat and visually checking the cow for clinical signs,
- Marking the cow for drafting separation, and further observation,
- If clinical treatment may be required (see SAMM plan or your local vet for treatment guidelines), it is recommended to identify the bacteria and get future advice on the best treatment or way to control the infection.
- One or more of the many management and treatment options available for sub-clinical infections e.g. frequent milking, oxytocin, massage, homeopathy (see SAMM plan or your local vet for treatment guidelines).

Electronic SCC capture:

While Protrack SCC results can be used ‘at bail’ as a stand alone system they can also be recorded electronically. This enables the user to harness the power of multiple data points to gather history on individual animals.

SCC information can be integrated to Protrack® ID or Protrack® Animal, giving date, bail number, SCC result and cow ID. When the sensors are integrated to this software it allows the user to track individual animals. Additional functions such as alerts and graphical depictions of historical results can also be carried out.
## 3. General specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td>SCC measurement of composite milk spot samples in conventional milking systems, including rotary and herringbone installations. Up to one sensor per bail.</td>
</tr>
<tr>
<td><strong>Configuration</strong></td>
<td>Sensor box with milk tube running through it, which contains all fluid handling.</td>
</tr>
<tr>
<td><strong>Main enclosure</strong></td>
<td>220x220x120mm, full 316 Stainless Steel Enclosure. 5kg including maximum contents</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>The sensor is normally mounted on the milk line.</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>Each sensor has four external connections: milk delivery line, detergent supply, waste line and data/power cable.</td>
</tr>
<tr>
<td><strong>Detergent distribution system</strong></td>
<td>Detergent is stored in a central reservoir and distributed to the sensors via a detergent tube.</td>
</tr>
<tr>
<td><strong>Fluid handling</strong></td>
<td>Three gear driven peristaltic pumps.</td>
</tr>
<tr>
<td><strong>Detergent usage</strong></td>
<td>7mL per test, on average.</td>
</tr>
<tr>
<td><strong>Detergent product</strong></td>
<td>SCC Gel™, ready-to-use detergent supplied</td>
</tr>
<tr>
<td><strong>Waste disposal</strong></td>
<td>Similar to the detergent distribution system, a waste tube takes waste directly to a convenient drain somewhere in the dairy shed.</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>Range 18-28 DC, 0.43A peak required per sensor.</td>
</tr>
<tr>
<td><strong>Cabling</strong></td>
<td>Combined 24V DC power and DeviceNet data cabling.</td>
</tr>
<tr>
<td><strong>Cleaning</strong></td>
<td>Wash cycle makes use of milking machine wash fluids. The user must initiate sensor wash cycle simultaneously with system wash after every session. Alternatively where Protrack® Milk is installed, wash will be initiated automatically.</td>
</tr>
<tr>
<td><strong>Servicing schedule</strong></td>
<td>Annual.</td>
</tr>
<tr>
<td><strong>Display format</strong></td>
<td>In connection with the Protrack OWL (Optical Warning Light) the result is presented in 1 of 5 bands as indicated by the LED lights on the OWL.</td>
</tr>
<tr>
<td><strong>Typical performance</strong></td>
<td>95% of results within 1 band of the reference method. <strong>NOTE:</strong> SCC may vary throughout a milking – on-line results are not directly comparable to herd test results.</td>
</tr>
<tr>
<td><strong>Cycle duration</strong></td>
<td>Result available 100 seconds after milk flow. Ready to commence another test 30 seconds later.</td>
</tr>
<tr>
<td><strong>Errors</strong></td>
<td>There are 3 levels of error:</td>
</tr>
<tr>
<td>Level 3</td>
<td>Sensor failed to complete its task and is now idle. For information only – no action required.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Action required to remedy error. Eg refill detergent.</td>
</tr>
</tbody>
</table>
| Level 1                     | Major error – sensor may need to be opened to clearian spam.


4. Operation

4.1 How Protrack SCC works

The fundamental measurement principle behind the SCC sensor is based on the California Mastitis Test (CMT). That is, a volume of a milk sample is mixed with a volume of a detergent-based chemical detergent and a time is allowed for a viscous gel to form.

But the CMT has always only been an ‘indicator’ of mastitis, and usually only effective with clinical cases or high SCCs. The SCC Sensor goes a step further by automating the entire process: from sample mixing to measurement of the viscosity of the gel itself. It even cleans itself after a measurement cycle. This automatic, hands-off system affords the big advantage of having the ability to consistently detect sub-clinical mastitis by measuring and quantifying both low and high SCC.

4.2 Measuring SCC with Protrack SCC

Firstly, the analyser cell is pre-rinsed with the intended milk sample from the main milk line. This is to prevent contamination from the previous sample. Then a 1ml volume of the sample – accurately measured using an optical level-detection system – is pumped in to the analyser cell followed by a 1.5mL of detergent.

When the gel formation process is initiated and measured by the picking up and dropping of the shuttle assembly – a means of indirectly measuring the viscosity. It is the concentration of somatic cells in the milk that determines the viscosity of the gel and hence fall time of the shuttle. Therefore, from the fall time of the gel, the SCC of the milk sample is obtained. After the fall time measurement, a SCC result is reported and the sample mixture is pumped to waste leaving the sensor ready for another sample.

For a sample where the SCC result is greater than 1000kSCC, the device will initiate a detergent rinse. This is to remove thick films and lessen the probability of cross contamination between samples.

When all milkings are finished, the sensor is simply put into wash mode during the day-to-day cleaning cycle of the milking plant, and it undergoes its own wash cycle. Wash water is pumped from the main milk line through the sensor and out to waste. Ideally the hot chemical wash should be targeted for the wash cycle; otherwise the cold chemical wash will be sufficient. This ensures the sensor is in perfect working order for the next milking. Alternatively where YieldSense is installed, wash will be initiated automatically.

4.3 Controlling Protrack SCC

Protrack SCC sensors have an autostart function where the sensor detects milk flow with a temperature probe, or through a Protrack® Milk sensor.

4.3.1 Using the Protrack OWL

The OWL is used to indicate the bail state (e.g., start of milking, etc.) through the use of flashing lights as seen in Figure 1 on the following page.
Figure 1
The Protrack OWL (pictured) displaying a SCC result > 2 million, or a stop and look signal. For easy interpretation from anywhere in the milking pit, five SCC bands are displayed.

OWL SCC Alerts
All system error code OWL flashes will be preceded by a purple flash.

<table>
<thead>
<tr>
<th>SCC Alerts</th>
<th>Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC level 0–200 1 Green</td>
<td>Sleep mode</td>
</tr>
<tr>
<td>SCC level 201–400 2 Orange</td>
<td>Wash mode</td>
</tr>
<tr>
<td>SCC level 401–800 3 Orange</td>
<td>Milking</td>
</tr>
<tr>
<td>SCC level 801–2M 4 Orange</td>
<td></td>
</tr>
<tr>
<td>SCC level &gt;2M 4 Red</td>
<td></td>
</tr>
</tbody>
</table>

Error Alerts

| Detergent time out Purple - Blue |
| Milk time out Purple - White |
| Stuck shuttle Purple - Orange |
| Temp too low Purple - Yellow |
| Blockage Purple - Red |
| |
4.3.2 Protrack Wash Switch

The Protrack Wash Switch can also be used with Protrack SCC. The Wash Switch is used to send a ‘broadcast wash’ message to all installed SCC sensors. The Wash Switch also has the ability to put the sensors into ‘Sleep’ mode so that they can be temporarily disabled if you have run out of SCC Gel or are running the Colostrum mob through the milking shed.

The Wash Switch is operated by tapping the top surface of the OWL with either two or three sequential taps, as outlined in the information below:

Table 2: Protrack Wash Switch display and navigation

<table>
<thead>
<tr>
<th>Display</th>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
</table>
|         | Milking (Idle)                      | System is in Milking Mode
|         |                                     | SCC sensors operation enabled                                               |
|         | Sleep                               | System is in Milking Mode
|         | Triple tap to enter or exit         | SCC sensor operation is disabled and will not test animals                  |
|         | Wash                                | System is in Wash Mode
|         | Double tap to enter or exit         | SCC sensors will undergo cleaning during the wash regardless of current Sleep mode |

Figure 2
Wash Switch State diagram

For more information on the user or wash interface consult their respective user guides.
5. Results

5.1 Protrack SCC results

Protrack SCC results are typically displayed on the Protrack OWL at bail while the cow is milking. For easy interpretation of results they are displayed in five different SCC bands. Where sensors are integrated into herd management systems, SCC results can be matched to time, date, bail number, cow ID and other management information.

On average, results are available approximately 100 seconds after milk begins to flow. Ninety five percent of Protrack SCC results are within one band of the reference method (Testlink SCC), however performance cannot be directly compared to herd test results as SCC may vary throughout a milking and Protrack SCC is using a spot sample early in the milking.

5.2 Use of Protrack SCC results

So, which Protrack SCC band do we choose to act on? This will very much depend on each personal situation and the BMSCC and infection status target for the individual herd. However, when selecting the ‘alert band’ it is important to keep in mind that a BMSCC below 150,000 cells/ml usually indicates that less than 15% of the herd is infected (SAMM Plan).

Most farmers first target those cows with highest results (4 red lights, above 2,000,000 cells/ml). Once the highest cows have been checked and dealt-with they can then target those cows with results in the next band, therefore successively cleaning up the herd. An example of how effective this strategy can be in lowering BMSCC is shown in Figure 3 below. Protrack SCC units were installed on June 1st after which cows with the highest band results were culled or taken out of the vat.

Figure 3
A farm BMSCC before and after the installation of Protrack SCC sensors on every 4th bail.
Marking cows to be drafted or for monitoring:

The method used to identify high SCC cows is up to personal preference. In general it is better to keep it simple to avoid mistakes, especially when there is temporary labour in the shed.

- To keep track of ‘suspect’ cows a suggested method of marking is shown below in Figure 4. The first alert (i.e. 4 red display) is marked with a vertical line, the second horizontal, across the udder. The resulting cross represents the four quarters where the infected quarter can be marked with a dot.
- Some farmers record banded results by writing the number of lights in the corresponding colour on the cow’s udder or rump e.g. 4 in red, 3 in orange etc. Others have used coloured electrical tape on the tail to monitor results.
- It is very important that the chosen marking method will distinguish between ‘suspect’ cows and those being treated with antibiotics to avoid the risk of receiving an inhibitory substances grade. Leg bands are commonly used to identify treated.

![Figure 4](image)

Markings on a cow after two consecutive 4 red (>2000,000 cells/ml) results. The dot indicates that the left front quarter is infected.

5.2.1 Use of Protrack SCC in early lactation

Early season is a very important time to catch mastitis. Action can be taken before there is spread of infection, substantial tissue damage and milk yield loss. It is often difficult to keep track of BMSCC early in the season when milk volumes are low, tanker pickup less frequent and before herd testing is practical. Just a few infected cows entering the main herd from the colostrum mob could boost BMSCC above penalty levels before the farmer is aware that there is a problem.

Protrack SCC can be used for:

- Frequent monitoring of individual cow SCC to pick up those early lactation infections and act on them before they get out of hand and result in BMSCC penalties.
- Early season identification and treatment of heifer mastitis is especially important. Research shows that infected heifers will not only lose more milk production in the existing season than mature cows, but the resulting damage will probably affect their lifetime production (Woolford et al 1983).
5.2.2 Use of Protrack SCC during mid lactation

During mid lactation if BMSCC rises or clots are found in the filter sock, it is often necessary to either manually check the whole herd (CMT or visual) or schedule a herd test in order to find the ‘culprit cows’.

Protrack SCC can be used:

- For continuously monitoring the herd. This feature is especially important when there are other priorities, during busy and stressful times of the season, e.g. breeding and silage making.
- For identifying those sub-clinical cows not obvious to the farmer, and, because SCC can fluctuate considerably from milking to milking and may not be identified by a herd test or by blanket CMT testing.
- When farmers feel they need to, e.g. when BMSCC increases or there are signs of clinical mastitis in the herd.

5.2.3 Use of Protrack SCC in late lactation

Later in the season BMSCC increases naturally as udders begin to regress and with declining milk volumes giving less of a dilution effect.

Protrack SCC can be used:

- To monitor the herd for high SCC cows and take them out of the vat hence avoiding BMSCC penalties in late lactation.
- In preparation for drying off, recent Protrack SCC band results can be combined with information on those cows with a history of clinical infections to make decisions on which cows will receive Dry Cow Therapy (DCT) at drying off and which cows are to be culled.

5.2.4 Once daily milking and Protrack SCC

Switching to once daily milking is well known to increase BMSCC. If cows are free from infection this increase is usually only for a few days until the cows adjust to the longer interval between milkings. However, once-a-day milking can aggravate mastitis in those cows with existing infections. This will cause further increases in BMSCC, and result in lost milk yield over a longer period.

Protrack SCC can be used:

- To select those cows unsuitable for once daily milking, and manage them separately.
- In late lactation, this may mean DCT and drying off.
- During established lactation this may mean splitting the herd so that infected cows can be monitored more carefully and, if necessary, milk withheld from the vat.

---

2 Monitoring does not only mean identifying new infections but also keeping track of suspect cows i.e. those that have been infected before or have finished a treatment and are due to return to the vat.

Cows whose SCC stay high after the withholding period are unlikely to be cured and may need further attention, especially if a clinical infection persists. The SAMM plan suggests taking samples to identify the bacteria and get further advice on the best treatment or way to control the infection.
Conclusions about interpreting and implementing Protrack SCC results

Protrack SCC provides the SCC information at bail. Farmers are then in control and can decide what band they will act on. Action taken will depend on their individual situation e.g. current BMSCC, the time of season, cow history, and probably of most influence, current workload. We recommend New Zealand farmers should follow information on managing mastitis in the SAMM plan, in consultation with their local veterinarian or farm advisor.

References
1. SAMM plan explanatory booklet. 2004 – 05 Season

5.3 Protrack SCC errors

To help with troubleshooting problems that may arise with Protrack SCC, the sensor reports errors divided into 3 separate error levels whereby one is the most serious and three the least. If Protrack OWLs are installed and a Protrack SCC error is identified, the the OWL on the affected bail will flash purple followed by another colour. The light colour indicates the severity of the error. Where sensors are integrated with herd management systems error numbers may be recorded and available for problem diagnosis.

Refer to the troubleshooting section in Figure 5 below and Figure 6 for guidance in handling Protrack SCC errors.

Figure 5.
The Protrack OWL LED light display for reporting Protrack SCC errors.
Any errors start with a purple flash followed by another colour to indicate the error.

<table>
<thead>
<tr>
<th>Error Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detergent time out Purple - Blue</td>
</tr>
<tr>
<td>Milk time out Purple - White</td>
</tr>
<tr>
<td>Stuck shuttle Purple - Orange</td>
</tr>
<tr>
<td>Temp too low Purple - Yellow</td>
</tr>
<tr>
<td>Blockage Purple - Red</td>
</tr>
</tbody>
</table>
# 6. Troubleshooting

When Protrack SCC errors are identified by either an OWL or by a herd management system, refer to the Table 3 for troubleshooting guidance.

## Table 3  Troubleshooting guide.

<table>
<thead>
<tr>
<th>Error Level</th>
<th>Error Colour</th>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>Detergent time out</td>
<td>Detergent reservoir or line empty Prime detergent tubes</td>
<td>Refill detergent reservoir</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detergent line not connected, has leaks, or is blocked</td>
<td>Check detergent line is connected, for leaks or blockages</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor fault</td>
<td>Contact your service technician</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Milk time out</td>
<td>No cow in bail or milk diverted or delayed</td>
<td>No action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor fault</td>
<td>Contact your service technician</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Stuck shuttle</td>
<td>Dirty sensor</td>
<td>Ensure the sensor is washing during hot wash</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor fault</td>
<td>Contact your service technician</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Unit in sleep mode</td>
<td>Devices have been placed in sleep mode</td>
<td>Return the network to MIP at the Wash Switch</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Temperature too low for operation</td>
<td>Internal temperature is below 5ºC</td>
<td>Reinitiate test, activation occur when air temperature has increased</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Blockage</td>
<td>Sensor fault</td>
<td>Reinitiate test for self recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dirty sensor washing during hot wash</td>
<td>Ensure the sensor is</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensor fault</td>
<td>Contact your service technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Power indication light flashing fast</td>
<td>Low power error</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Won’t communicate</td>
<td>Ensure plugged in and powered-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>Contact your service technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stuck in Wash state</td>
<td>Configured incorrectly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OWL not displaying sensor results</td>
<td>OWL configured incorrectly or faulty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Problem with sensor</td>
<td>Contact your service technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OWL LEDs turn on during milking</td>
<td>Protrack SCC result (refer to section ‘Protrack SCC Results’)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OWL LEDs are flashing purple and a colour</td>
<td>Protrack SCC error (refer to section ‘Protrack SCC Errors’)</td>
</tr>
</tbody>
</table>
7. Maintenance schedule

Detergent reservoirs will need filling when running low. It is better to fill the reservoirs before they are completely empty to avoid having to re-purge the detergent lines.

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>20L Detergent reservoirs</td>
<td>Fill when nearly empty</td>
</tr>
<tr>
<td>Service unit</td>
<td>28,000 samples or annually – whichever comes first</td>
</tr>
</tbody>
</table>

8. Storage, transport and disposal

Store in a dust-free and vibration-free environment. Transport preferably in the original packaging.

This device contains non-biodegradable parts such as metals and electronics. It is highly recommended that these parts be disposed of according to the prevailing legislation.

9. Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWL</td>
<td>Optical Warning Light</td>
</tr>
<tr>
<td>ACR</td>
<td>Automatic Cup Remover</td>
</tr>
<tr>
<td>SCC</td>
<td>Somatic Cell Count</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>DCT</td>
<td>Dry Cow Treatment</td>
</tr>
<tr>
<td>CMT</td>
<td>Californian Mastitis Test</td>
</tr>
</tbody>
</table>