



ELECTRONIC CONTROL SYSTEM

CybaMICRO 2011 Model

IMPORTANT SAFETY NOTICE



- Your StarLogixs CybaMICRO Controller provides vital safety features in your baler. If the Controller has been damaged always have it checked by a person qualified for electrical maintenance before operating the baler.
- Check all power leads and plugs for damage. If damage is found switch off and disconnect from supply, and have repaired by a person qualified for electrical maintenance.
- The 'door closed' sensors are critical to the safe operation of the baler. If they are damaged or the mechanism driving them is damaged never attempt to use the baler before calling an approved service agent.

The Controller has lethal voltages inside.

- **NEVER OPEN OR ATTEMPT TO SERVICE.**
- **NEVER REMOVE OR ATTEMPT TO REMOVE THE FRONT COVER.**
- **NO USER SERVICEABLE PARTS OR ADJUSTMENTS INSIDE.**
- **DO NOT DIRECTLY EXPOSE CONTROLLER TO RAIN OR HIGH PRESSURE WATER JETS.**
- **SHOULD YOU LEAVE YOUR BALER UNATTENDED FOR A PERIOD OF TIME, IT IS STRONGLY RECOMMENDED THAT YOU SWITCH THE POWER OFF AND REMOVE THE KEY.**
- **ANY UN-AUTHORISED ACCESS INTO THE CONTROLLER WILL VOID WARRANTY.**

Note to Serviceman

Always obtain the latest version of service manual from

www.starlogixs.com.au before attempting to service the control system.

Do not substitute items noted in the service manual as critical components in the safety systems.

Declaration of Conformity

The CybaMICRO Controller is designed to control baling presses and conforms with the following standards:

AS/NZS20641: 1997
(EC/CISPR11: 1992)



N10728

And is manufactured under Australian Communications Authority C-Tick approval number.
The safety door switches are monitored and have in-built redundancy.

Machine Model: _____

Serial Number: _____

Contents

1.0 Suggested Conditions of Use	P4
1.1 Qualified Operator	P4
1.2 Description of the Controller	P4
1.3 Situation of Normality	P4
1.4 Protection	P5
1.5 Installation—Qualified Person	P5
1.6 Electrical Connection	P5
1.7 Control of Protection Devices	P5
2.0 Basic Controller Function	P6
2.1 Operation of the Pressure Switch and Travel Switch	P6
2.2 Full Bale Detection	P7
2.3 Door Switches	P8
2.4 Tilt Switch	P8
3.0 CybaMICRO Display	P9
3.1 Status Messages	P9
4.0 Location of Internal Components	P10
5.0 Parts List	P11
6.0 Fault Messages	P12
6.1 Selected Fault Symptoms and Remedies	P12
7.0 Motor Reversing Plug System	P13
8.0 Location of Controls	P14
9.0 Main Wiring Harness	P15
10.0 Warranty	P16
10.1 Copyright	P16

1.0. Suggested Conditions of Use

1.1. Qualified Operators

Operator:

Qualified to operate the control unit in all normal day to day functions of the baler.

Person Qualified for Electrical Maintenance

Must be trained by the manufacturer and hold appropriate trade qualifications for the service of mains electrical equipment and safety related electronic equipment.

Safety Manager:

The Safety Manager is the person in charge, liable for protection and prevention from working risks. The safety manager will make sure that all persons operating with the machine receives all instructions concerning their jobs, as herewith contained, including and beginning from installation and machine starting.

Manufacturer:

It is necessary to contact StarLogixs for any operation not expressly covered in the present manual and assigned to any of the professionally qualified operators as listed above.

1.2. Description of the Controller

The CybaMICRO controller is an electronic industrial control system designed to provide control and safety features for baling machines. The controller co-ordinates control of the baler electronic motor and hydraulic solenoid valves, whilst monitoring a number of sensor devices to allow it to respond appropriately to pressing conditions in the baler. In particular the controller monitors a dual safety door switch with a fully redundant circuit that will detect a single failure in either the door switches or the monitor circuit.

The controller houses mains voltage and should only be serviced by qualified persons. It should be maintained in accordance with relevant electrical safety standards.

1.3. Situation of Normality

It is absolutely necessary that the controller is used in the conditions suggested by the present manual of use and maintenance. It is not allowed to misuse the controller or its safety devices nor to use the machine in abnormal conditions.

We wish to point out below some suggestions, to be carefully considered by the operator in order to avoid abnormal conditions of use.

- Do not operate the controller if it is not properly attached to the baler.
- Do not operate the controller if door sensors, emergency stops or other electrical components are damaged, or not functioning.
- It is strictly prohibited that persons other than the operator approach the machine.
- The controller shall not be installed and shall not operate in an explosive environment.
- The controller shall never be washed with jets of water or flammable liquids.
- Cleaning and maintenance operations shall be performed by qualified persons.
- The operator shall always perform periodical safety checks, as required by safety rules.
- The controller should be protected from direct exposure to rain and sunlight.

1.4. Protection

Emergency stop immediately stops machine operation by disconnecting power supply in the controller.

Door sensor open immediately holds all automatic operations and movement of the baler pressing apparatus and stops the baler electric motor.

1.5. Installation—Qualified Person: Safety Manager

Before proceeding with the preparation of the machine for its installation and starting it is necessary to make a careful visual inspection of the controller for damage that may have occurred in transit. In particular check:

- Door Switches
- Emergency Stop
- Mains Power Cable
- Mains Plug
- Controller Mounting
- Controller Casing for damage
- Signs of moisture ingress into Controller

1.6. Electrical Connection

Ensure that the power socket is correctly rated and is provided with an effective earth before plugging the controller in.

1.7 Control of Protection Devices

Check that pressing emergency stop causes controller Power LED to go out and machine to immediately stop. Also check that opening top baler door causes Door Open to be displayed in the System Monitor. The baler pressing apparatus should not move when the door is open.

The operator shall not disable or attempt to disable any of the safety features of the controller.

The Person Qualified for Electrical Maintenance shall not open the controller before disconnecting from the mains supply. Maintenance personnel should at all times be in control of the mains plug when working inside the controller.

At the completion of any work they should locate, assemble and check that all safety systems are functioning correctly.

The Safety Manager shall make sure the Operator and Persons Qualified for Electrical Maintenance have received all necessary information according to the present manual and electrical service manuals as maybe appropriate, and in particular will make sure that all safety systems and protection devices are correctly assembled and working and also that they have not been mishandled.

2.0 Basic Controller Function

The emergency stop must be released and the key switch in the ON position for the controller to be powered. Power LED should illuminate solidly, and display shows **StarLogixs** on line 1 and **ver:r1.0(11hk)** on line 2 for 2 seconds. Then the display will show **XXXX Bales**.

The CybaMICRO controller has only a single OPERATE button which changes function depending on the following conditions. When the power is initially switched on, pressing the OPERATE button will cause the baler to retract. Also if a full bale condition is sensed the cycle will terminate with the baler pressing apparatus locked in the compaction position. Pressing the OPERATE button in this case will also cause the baler to react. All other situations will cause the baler to cycle when the OPERATE button is pressed.

When the message Door Open is displayed all baler functions are suspended until the door is shut. Pressing the OPERATE button will only cause a baler action when the messages Ready to Press, Ready to Retract, Cardboard Full or Plastic Full are displayed on the system monitor.

The particular action the baler is currently performing is displayed on the system monitor. That is, Retracting is displayed when the baler is retracting, and Pressing is displayed for the duration of the pressing cycle.

Note that the cycle consists of the baler pressing apparatus moving down in the compaction stroke, a short delay in the compaction position, then the baler pressing apparatus moving back up to the starting position.

When a full bale condition is detected the Full LED will illuminate and the message 'Cardboard Full' or 'Plastic Full' will be displayed on the SYSTEM MONITOR depending on which chamber is full. In both cases 'Tie Off Bale NOW' will be displayed on the second line of the SYSTEM MONITOR. The baler cycle will terminate with the pressing apparatus locked in the compaction position. This ensures the baler is in the correct position for tying-off the baler strings (see baler data for details). When the OPERATE button is pressed the SYSTEM MONITOR will display Retracting and the baler will retract. However the cardboard full bale condition can not be cleared until the bale is removed from the chamber. No further cycling of the baler is possible until this is done. Even switching off the power will not clear this state.

2.1 Operation of the Pressure Switch and Travel Switch

The CybaMICRO controls the movement of the baler pressing apparatus by energizing solenoid coils on a hydraulic valve. If the A solenoid is energised, the pressing apparatus will move in one direction, and if the B solenoid is energised the pressing apparatus will move in the other direction (refer to baler manufacturers data for specific details.) When both A and B solenoids are de-energised the pressing apparatus will not move. The CybaMICRO controller is capable of monitoring a hydraulic pressure switch, and a travel switch.

The travel switch will be arranged so a cam or striker that is mechanically linked to the pressing apparatus will actuate and close the switch contacts at the mechanical travel limits of the pressing apparatus. The CybaMICRO controller will monitor the travel limit switch, and when its contacts close the hydraulic solenoid coil driving the pressing apparatus will be de-energised.

The hydraulic pressure switch will monitor the oil pressure, and when that pressure reaches a set-point (see baler manufacturers data), the pressure switch contacts will close. The advantage of the travel switch is that it allows the end of travel of the pressing apparatus to be detected without generating high oil pressures and mechanical forces.

However, the travel switch can not eliminate the need for the hydraulic pressure switch.

As the baler fills with material a point will be reached where the pressing force is insufficient to cause the pressing apparatus to move to the ends of its stroke. Thus the travel switch can not detect this condition, but the hydraulic pressure switch can detect the oil reaching the set-point pressure, and then de-energise the solenoid and stop the pressing cycle (see description of full bale detection.)

If the travel switch were to fail the baler will still stop at both ends of its stroke because the pressure switch will close. However the machine will detect a Cardboard Full condition at the bottom of each stroke.

If the hydraulic pressure switch were to fail when the travel switch was fitted, the fault would only become evident when the baler pressing chamber was full of material. In this condition there would not be sufficient force to cause the pressing apparatus to travel to the end of its compression stroke, so the travel limit switch would not operate, and the faulty hydraulic pressure switch would not work. The message 'Pressure Sw Open' would appear.

Finally, if the travel switch contacts were jammed in the close position or the wiring was shorted, the pressing apparatus would only cycle down (after the operate button was pressed) for about 3 seconds.

2.2 Full Bale Detection

When the pressing apparatus is moved in the compression stroke, its end of travel is detected by either the travel switch or the pressure switch (see Operation of the Pressure Switch and Travel Switch). When the baler fills with material only the pressure switch detects the end of the compression stroke, because the baler is not capable of supplying sufficient force to drive to the end of its stroke.

In this situation the closing of the pressure switch before the travel switch closes on the down stroke will be used to indicate Cardboard Full.

The full bale condition for the plastic chamber has a different sensing mechanism. The side of the plastic chamber is provided with a small spring biased pressure plate linked to a limit switch. When there is sufficient compaction force in the plastic chamber, the pressure plate is moved outward and the limit switch actuated. This is sensed by the controller to indicate Plastic Full.

The cardboard chamber is fitted with a twine sensor which allows the controller to detect if the full bale has been removed. When the twine is tied off it resets the twine sensor and resets the Cardboard Full condition.

The controller has the capability to monitor a similar sensor for the plastic chamber, but this is not fitted. Consequently the Plastic Full condition is reset as soon as the baler is retracted.

2.3 Door Switches

The CybaMICRO controller includes a door switch monitoring system to enhance the overall system safety. There is a door switch fitted to the cardboard chamber top door, and a separate switch to the plastic chamber top door.

Two separate switches must be used for each door as shown in the figure below. If one switch were to fail then the operation of the second switch would be sufficient to indicate the failure in the first switch. The monitoring circuitry will then default to the safe state, which is the Door Open. The monitoring system will also similarly detect

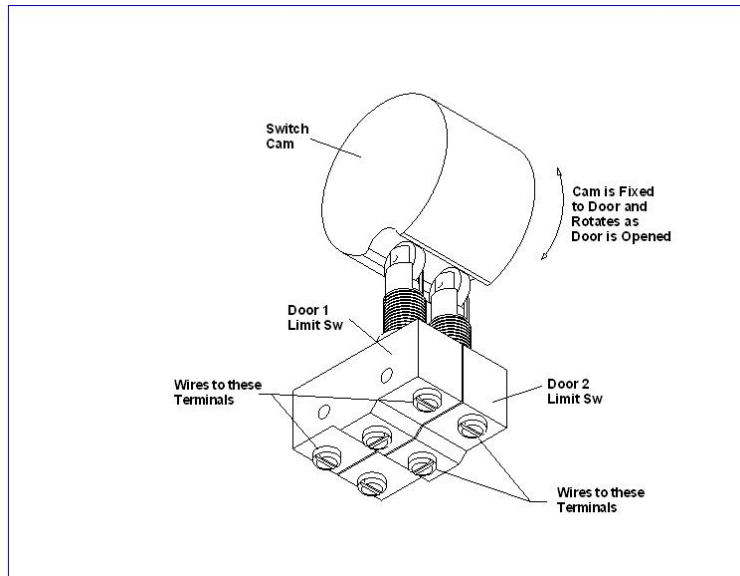


Fig 2: Door Switch Assembly Example

In this system Door 1 Limit Switch must close its contacts when the door is shut, and Door 2 Limit Switch must open its contacts when the door is shut. Whenever the door is changed from open to shut, or shut to open, the contacts in both switches must change state. That is, when the door is opened Door 1 Limit Switch must open its contacts, and Door 2 Limit Switch must close its contacts.

Any fault in the system will result in Door open being displayed in the system monitor.

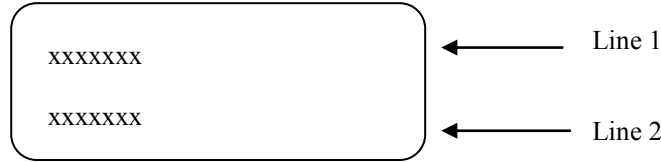
The CybaMICRO models may also have an encoded magnetic door switch fitted. The principle of operation is the same .

2.4 Tilt Switch

The CybaMICRO controller is designed to control a baler with dual hydraulic cylinders that must remain synchronized in their stroke. Under certain conditions these cylinders may lose their synchronization, and the tilt switch is fitted to the machine to indicate this condition and prevent the machine from operating and causing mechanical damage. If the message Tilt Fault appears when the power is switched on, then the cylinders must be re-synchronized before the baler can be operated (call baler manufacturer for details).

3.0 CybaMICRO Display

The CybaMICRO controller has a two line 16 character alphanumeric liquid crystal display unit.



SYSTEM MONITOR

There are two classes of messages that are displayed. The first is status messages during the normal operation of the controller, and the second is fault reporting messages.

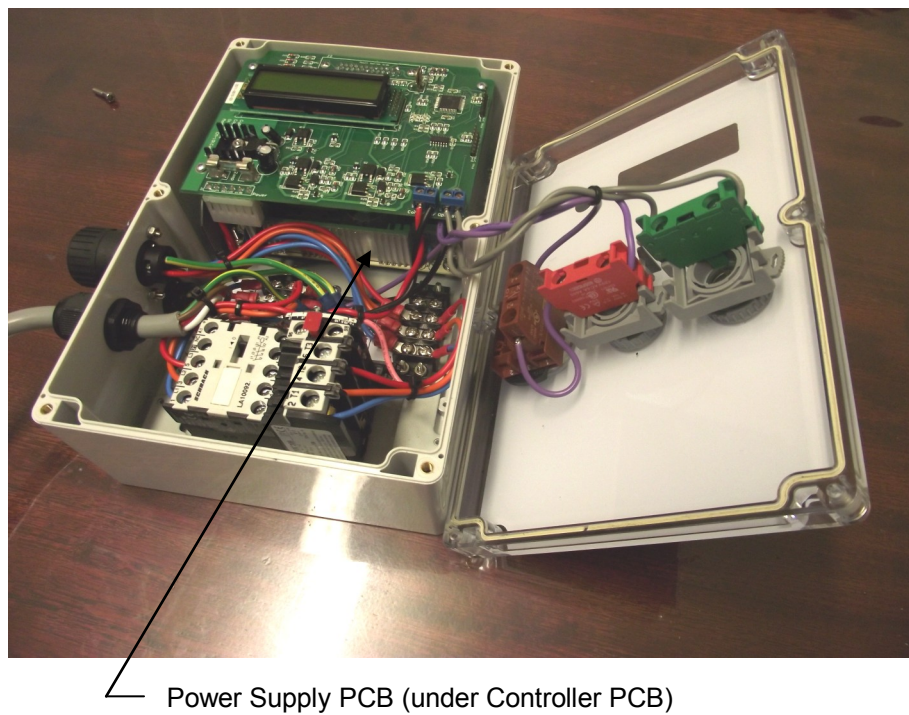
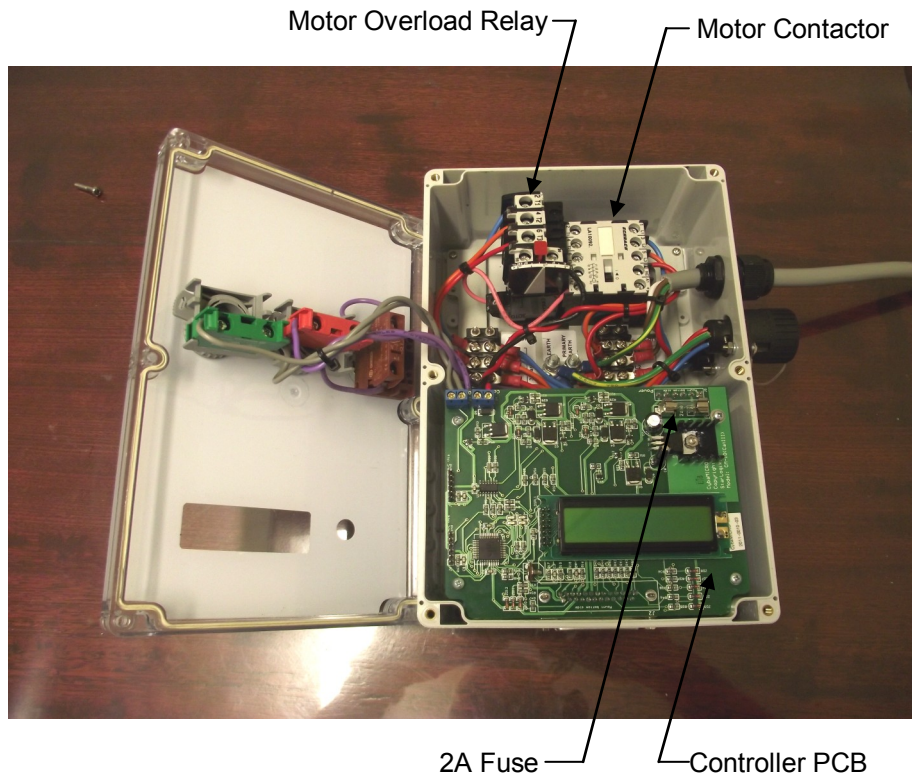
3.1 Status Messages

<u>ver:r1.0(11hk)</u>	indicates the code version in the controller (quote this when calling for service).
<u>1234 Bales</u>	baler count indicator displayed at power on for 2 seconds
<u>Door Open</u>	Indicates the baler top door is open. If the door is closed, but this message appears, there may be a fault with the door sensor switches, wiring or the controller PCB. Before calling for service open and close the baler door a couple of times and check if the door open message remains when the door is shut.
<u>Ready to Retract</u>	Indicates the baler is ready to retract when the OPERATE button is pressed.
<u>Ready to Press</u>	Indicates the baler is ready to perform a compaction cycle when the OPERATE button is pressed.
<u>Pressing</u>	Indicates the baler is performing a compaction cycle.
<u>Retracting</u>	Indicates the baler is retracting its pressing apparatus.
<u>Plastic Full</u>	Indicates the plastic pressing chamber is full. Note the Power LED will also flash when this message is displayed.
<u>Cardboard Full</u>	Indicates the cardboard pressing chamber is full. Note the Power LED will also flash when this message is displayed.

Warning Messages (displayed in line 2)

<u>Tie-off Bale NOW</u>	Warns operator it is time to tie-off the bale while the pressing plate is still keeping the bale compressed. If this is ignored and the pressing plate retracted, it cannot be made to re-compress the bale, and the loose bale has to be removed.
<u>Remove Bale</u>	Indicates the operator must now remove the bale to continue operating machine.

4.0 Location of Internal Components



5.0 Parts List

<u>Part Number</u>	<u>Description</u>
SL-A-F3S-TGR-NSPR-21-05	Magnetic Door Switch
SL-A-TM1308	TM1308 roller plunger limit switch
SL-X-CybaMICRO WiringLoom	Main wiring harness for baler
SL-S-CableChain	Protective cable chain for tilt sensor wiring
SL-A-LA100925	2.2kW Motor contactor—24Vdc coil
SL-A-LA100209	Motor overload relay
SL-S-PS-45-24	Power supply PCB
SL-X-CM-PCB2011	Controller PCB
SL-S-CEB2	2amp 20mm glass fuse
SL-S-CEB4	4amp 20mm glass fuse
SL-A-LEB22R	Emergency stop (includes contact block)
SL-A-P9XSCD0A95	Key Switch
SL-A-P9B10VN	N/O contact for key switch
SL-A-PBF22G	Operate button (includes contact block)
SL-X-CybaMICROMotorCable	R/A motor cable

6.0 Fault Messages

Pressure SW Open

Indicates the pressure switch is remaining open. This is tested by timing from when a hydraulic valve coil is energized, and if excessive time passes without the pressure switch closing, the hydraulic valve coils and motor are switched off and this message displayed. The most common causes are failed pressure switch, low hydraulic system pressure and oil leaks.

Tilt Fault

see section 2.3.1

6.1 Selected Fault Symptoms and Remedies

1. No Power - both power LED and SYSTEM MONITOR are off.

Actions:

- a) Ensure the mains outlet the baler is plugged into is energized.
- b) Visually inspect the wire connections inside the mains plug. Look through the clear case—do not dismantle the plug. Only qualified electricians are permitted to dismantle this plug.
- c) Ensure the power key switch is on and the emergency stop has been released by rotating the knob.
- d) Remove the main wiring harness plug from the bottom of the controller. If this clears the fault there is a short in the wiring harness or one of the sensors on the baler.

If all of the above actions do not clear the fault the 2A fuse on the controller PCB may be blown, or the 4A fuse on the power supply PCB may be blown. Ensure the mains plug is disconnected and tagged out before opening the controller. If the 4A power supply fuse continually blows replace power supply PCB. If the 2A controller PCB fuse continually blows with the main wiring loom disconnected replace the controller PCB. If the 2A controller PCB fuse only blows when the main wiring loom is connected then there is a short in the wiring or sensors on the baler—find short and repair.

2. Pressure SW Open – Fault Message

Actions:

- a) First check that the wires to the pressure switch are connected, and there is no obvious damage to the wiring harness.
- b) Fit a hydraulic pressure gauge to the test port on the hydraulic power pack. Close the baler door and ensure the controller is on and READY is displayed in the System Monitor. Press the Operate button and wait for the hydraulic cylinder to travel to the end of its stroke, then observe the indicated hydraulic pressure. Check with the baler manufacturers data to ensure the system pressure is correct. If the pressure is low there is a hydraulic fault.
Note: If travel switch is fitted this test can only be performed with a full bale of cardboard in the baler, and only at the end of the down compression stroke of the machine.
- c) Change the hydraulic pressure switch.

3. Door Open message will not disappear

Actions:

- a) The CybaMICRO controller has a monitored door switch system. Consequently there are two limit switches monitoring each baler door. Door 1 Limit Switch is closed when the door is shut, and Door 2 Limit Switch is open when the door is shut. When the door is open Door 1 Limit Switch must open and Door 2 Limit Switch must close. Any abnormality in this switch operation will be detected, and the controller will default to the safe state which is the Door Open. Check the operation of both switches.

Magnetic door switches also have two separate contacts encapsulated in a single switch unit. They also switch in the same pattern as above.

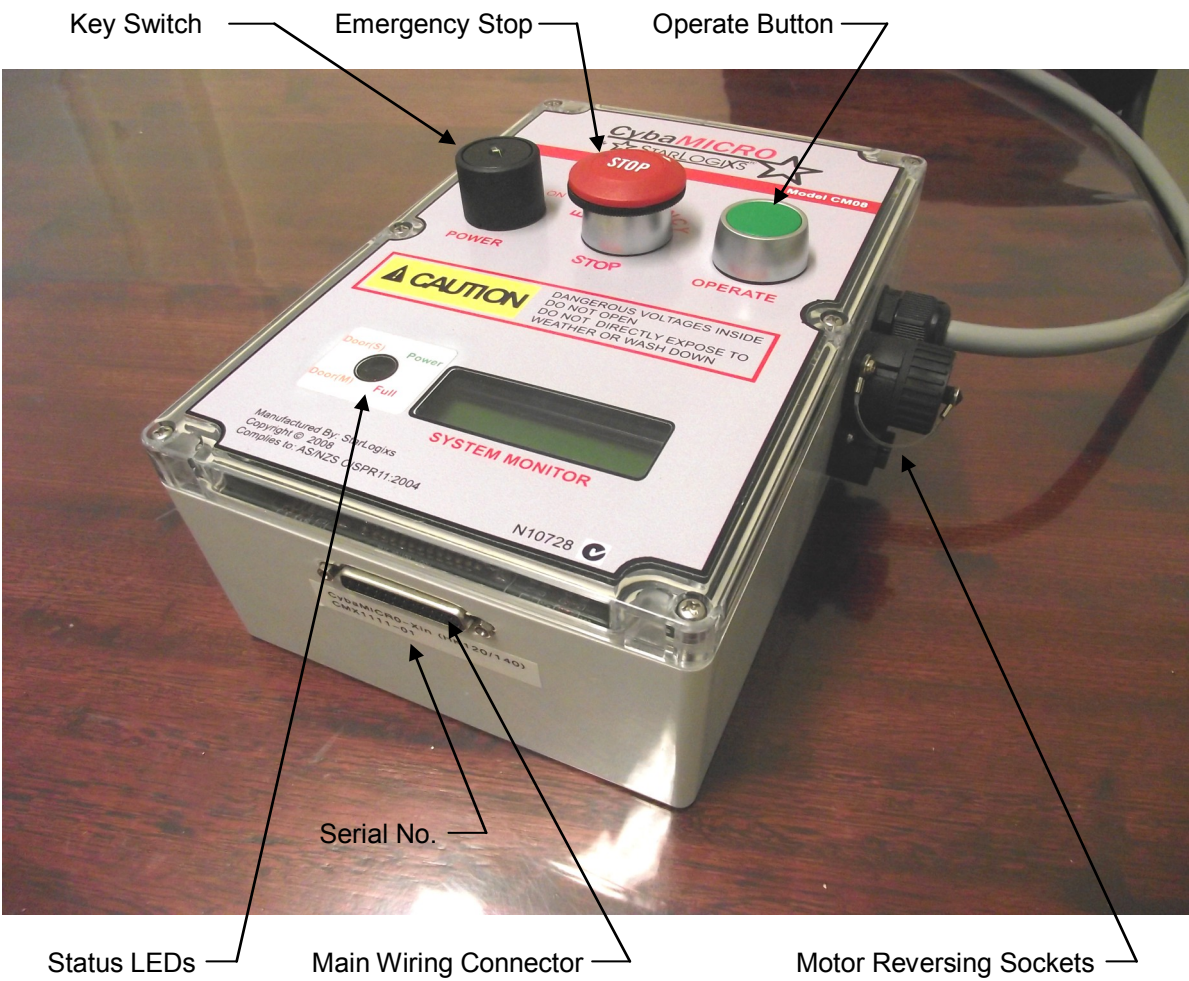
- b) Check carefully the wiring to both door limit switches. Also look along the length of the wire harness for signs of damage.
- c) Any detected fault in the PCB monitoring system will also default to Door Open. Possible PCB fault. The PCB has two door open LEDs labeled Door(S) and Door(M). These are provided for fault finding, and LED indicates the individual state of the dual redundant door switch monitoring circuitry. **They do not indicate the state of each switch contact.** In normal operation when the door is closed Door(S) will go out followed by Door(M) a second or so later. If calling for service note any abnormality in this function.

7.0 Motor Reversing Plug System

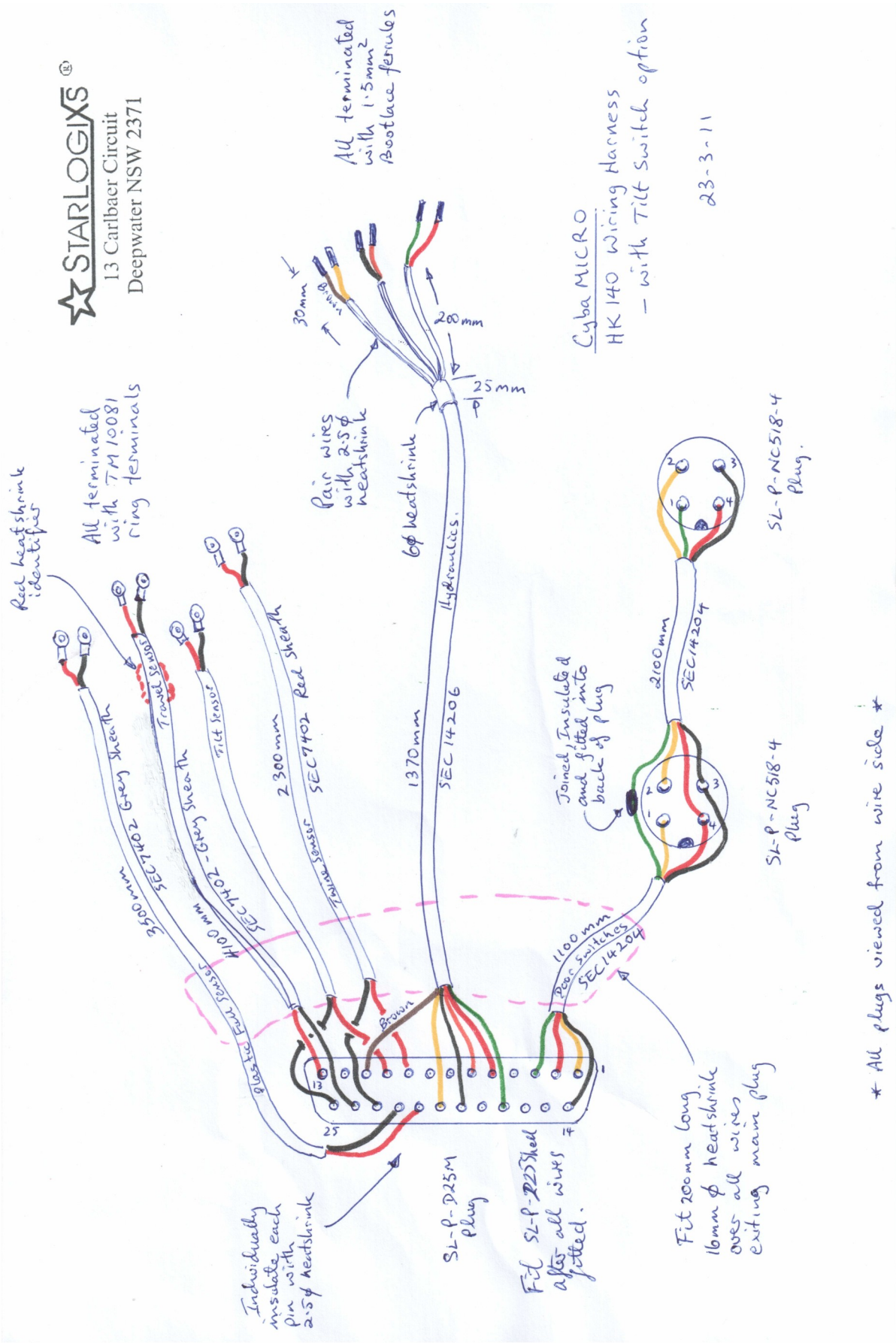
The CybaMICRO 2011 controller is fitted with two motor sockets. The motor cable can be plugged into either, however the motor direction will be reversed depending on which socket it is plugged into. Both motor sockets are simultaneously powered when the contactor closes, but two phase wires are swapped in one socket causing the motor to run in the opposite direction. This allows the correct motor direction to be selected without the need to call a qualified electrician.

NOTE: Never swap the motor plug into a different socket while the controller is switched on. Always fit the cap to the unused socket.

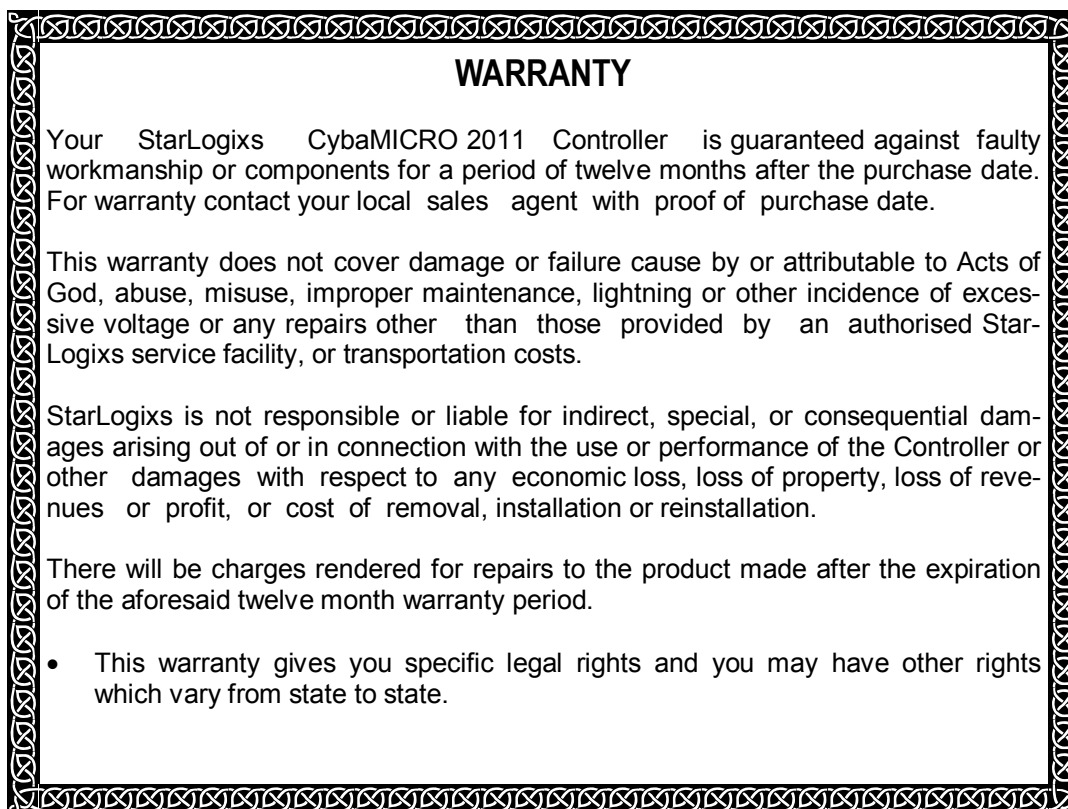
8.0 Location of Controls



9.0 Main Wiring Harness



10.0 Warranty



10.1 Copyright

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The contents of this document, CybaMICRO 2011 Controller front panel artwork, printed circuit board artwork, and firmware (programs contained in Controller integrated circuits) are subject to copyright and can not be reproduced, transmitted into any language or computer language, in any form or any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without prior written consent from Starlogixs Pty. Ltd.

5.2 Trademarks

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