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★ STARLOGIX<sup>®</sup>

**Cyba***MICRO* ★

ELECTRONIC CONTROL SYSTEM

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## **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](http://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)

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: \_\_\_\_\_

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## .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 or 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 bailing 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.
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#### 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 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. The POWER LED should illuminate (no flashing) and the SYSTEM MONITOR should illuminate and a message displayed.

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 react. 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 some baler action when the message READY or FULL are displayed on the system monitor.

The particular action the baler is currently performing is displayed on the system monitor. That is, RETRACT is displayed when the baler is retracting, and CYCLE is displayed for the whole duration of the 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 POWER LED will flash and the message 'FULL' will be displayed on 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 full bale condition is cleared, so the POWER LED ceases to flash and illuminates continuously and the 'FULL' message changes to 'RETRACT' on the SYSTEM MONITOR.

## 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 optionally a travel switch.

If the travel switch is fitted it will be arranged so a cam or sticker 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. If the travel switch is not fitted then the pressing apparatus will move to the end of its mechanical travel, at which point the hydraulic pressure will build up to the set-point and close the contacts in the pressure switch, and cause the valve solenoid to de-energise.

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.)

Because there are two sensors detecting the same action it becomes a little more difficult to determine where a fault may be. If the travel switch is fitted, but the hydraulic oil pressure reaches the set-point at both ends of the pressing apparatus stroke, then the travel switch or its wiring may be faulty, or the mechanism driving the travel switch is damaged or not adjusted correctly. Monitor hydraulic oil pressure by fitting a pressure gauge to the test part or the hydraulic system (refer to baler manufacturers data.)

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 Switch Open' would appear.

Finally, if the travel switch contacts were jammed in the close position or the wiring was shorted, the pressing apparatus would cycle down (after the operate button was pressed) for about 3 seconds. The action would then terminate and the full bale indication would occur.

## 2.2 Full Bale Detection Switch

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). As the baler fills with material only the pressure switch detects the end of the compression stroke, and as more material is added to the bale the stroke ends further from the mechanical limit of the stroke.

That is, the pressing apparatus stops before it reaches the end of its compression stroke, because there is insufficient force to compress the material in the baler any further.

The full bale switch is arranged so it is actuated by a cam when the pressing apparatus nears the end of its compression stroke (see baler manufacturers data for specific details on adjusting the full bale switch). When the full bale switch is actuated its contacts close.

When either the pressure switch or the travel switch indicate to the CybaMICRO controller that the pressing apparatus has reached the end of its compression stroke, the full bale switch condition is checked. If the full bale switch contacts have closed then the bale is not full. However, if the volume of material in the baler has caused the pressure switch to stop the compression stroke of the pressing apparatus well before the mechanical end of stroke, the full bale switch contacts will remain open and a full bale condition will be indicated.

### 2.3 Door Switches

The CybaMICRO controller includes a door switch monitoring system to enhance the overall system safety.

Two separate switches must be used 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 faults in the wiring to the door switches and within itself.

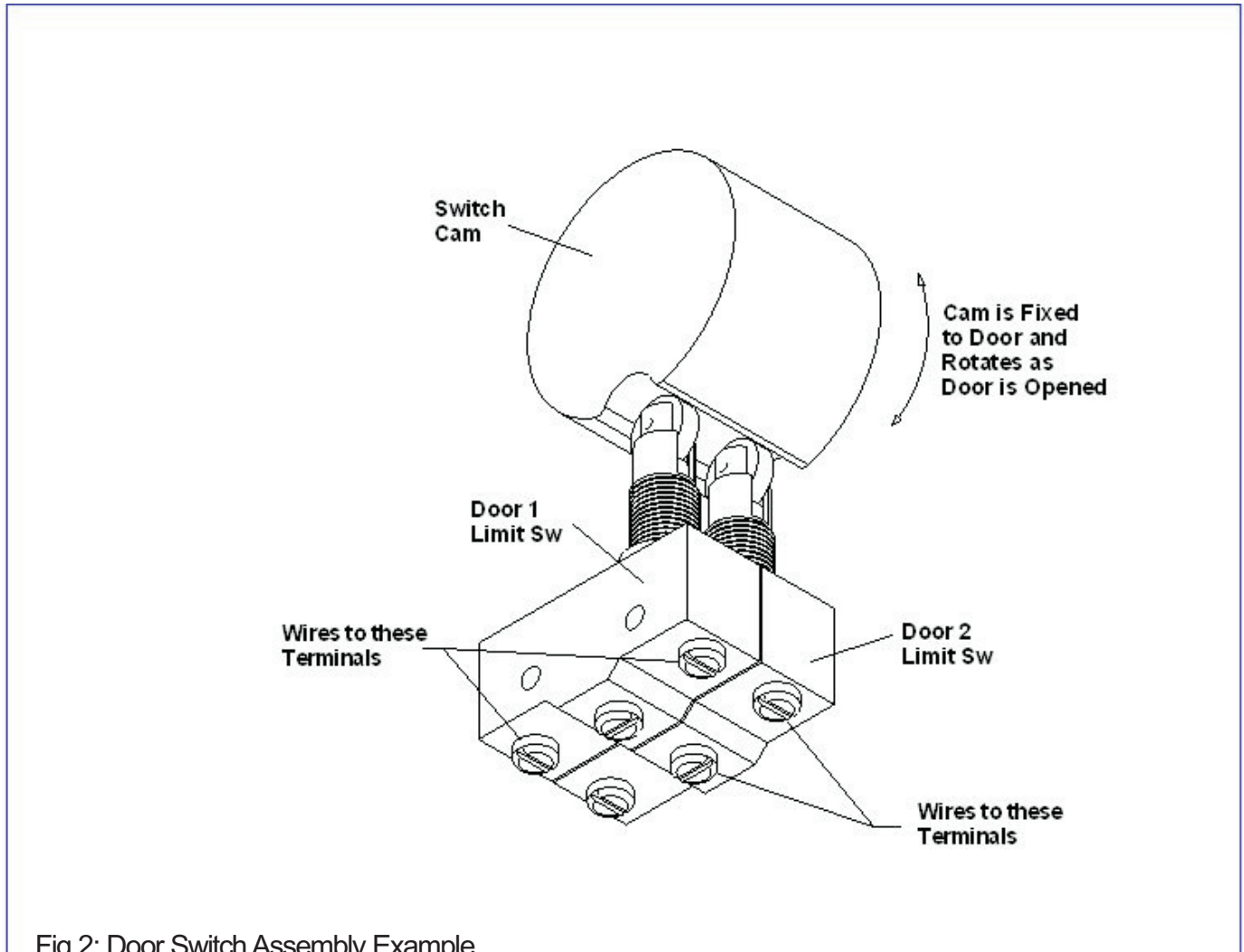


Fig 2: Door Switch Assembly Example

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.



### 3.0 CybaMICRO Display

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



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 (always displayed on Line 1)

<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</u>	Indicates the baler is ready to cycle when the OPERATE button is pressed.
<u>Cycle</u>	Indicates the baler is performing a compaction cycle.
<u>Retract</u>	Indicates the baler is retracting its pressing apparatus.
<u>Full</u>	Indicates a full bale condition has been sensed. Note the Power LED will also flash when this message is displayed.

#### 3.2 Fault Messages

(The fault message will be displayed on Line 1, and 'starlogixs.com' will be displayed on Line 2. Full service data is available at this website.)

<u>Coil not powered</u>	Indicates the controller is not energizing one of the hydraulic valve coils, when it should. Possibly a fault in the controller PCB.
<u>Coil not Sw-off</u>	Indicates one of the hydraulic valve coils is not switching off when it should. Possibly a fault in the controller PCB or a valve wire shorted +24V.
<u>Contactors Welded</u>	Indicates the motor contactor has jammed closed. Probably a failed contactor.
<u>Contactors Open</u>	Indicates the motor contactor is not closing, when it should. Could be a faulty contactor, broken wiring from PCB to contactor, or a faulty PCB. Also could indicate the motor overload relay has tripped.

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.
Valve Jammed	Indicates the metering spool inside a hydraulic valve has jammed. Fault is detected the pressure switch remains closed when all hydraulic valve coils are de-energized. Usually caused by oil contaminants jamming the hydraulic valve spools.

### **3.3. 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 3.15A fuse on the controller PCB may be blown. Ensure the mains plug is disconnected and tagged out before opening the controller.

#### **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.

### 3. Valve Jammed - Fault Message

#### **Actions:**

- a) Manually over-ride the hydraulic valve spool by firmly pressing the buttons on the ends of the valve with a blunt tool. Press one end to slide spool one way then the other end to slide the spool the other way. Repeat a couple of times. If this seems to clear the problem then the possible cause is contamination of the hydraulic oil. It is also possible that the hydraulic valve has become faulty. Consult the baler manufacturer's data for the correct course of action.
- b) Check the wiring to the pressure switch for shorts. Check along the length of the wiring harness for damage.
- c) In very rare cases the pressure switch can fail closed. Remove both wires from the pressure switch and using a multi-meter check if there is continuity across the switch (ensure controller is switched off). If there is continuity replace the pressure switch.

### 4. Door Open message will not disappear

#### **Actions:**

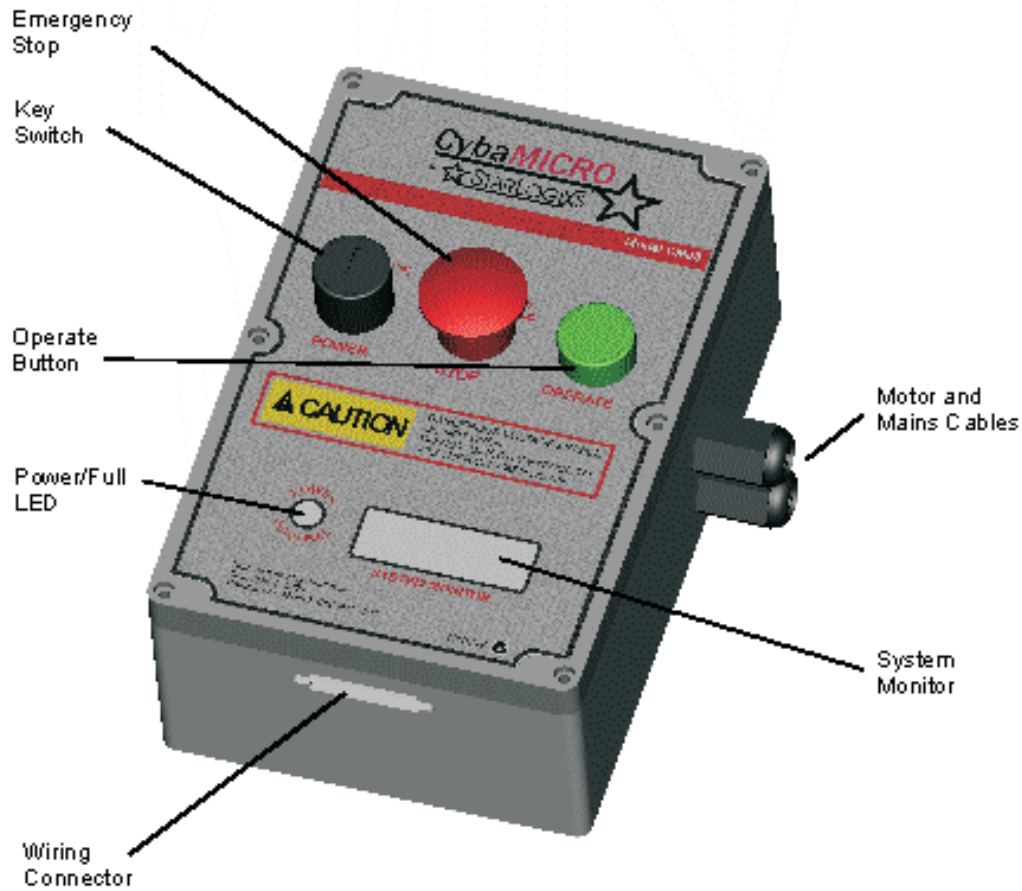
- a) The CybaMICRO controller has a monitored door switch system. Consequently there are two limit switches monitoring the baler door. Door 1 Limit Switch is closed when the door is shut, and Door 2 Limit Switch is open when the door is shut. When the door is open Door 1 Limit Switch must open and Door 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.
- 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.

### 5. Contactor Open - Fault Message

#### **Actions:**

- a) The coil that closes the contactor is powered in series through the over load relay. If the overload relay were to trip, this message would appear. Switch controller off and wait 5 minutes for overload relay to automatically reset. If this only briefly clears the problem, but the electric motor does start or attempt to start then the overload relay may be re-tripping. Possible causes are a failed electric motor, mechanically overloaded motor, de-energized phase in three phase systems or a broken or burnt power wire in the mains circuit.
- b) The contactor coil could be open circuit or the contactor has mechanically jammed in the open position. Replace contactor. Note the contactor has a 24Vdc coil and is not commonly available. Use of the original part is recommended.
- c) Wiring from the PCB to the contactor or the PCB itself may have failed.

## 4.0 Location of Controls



## 5.1 Copyright

Copyright 2001 by Starlogixs Pty Ltd.  
All rights reserved.

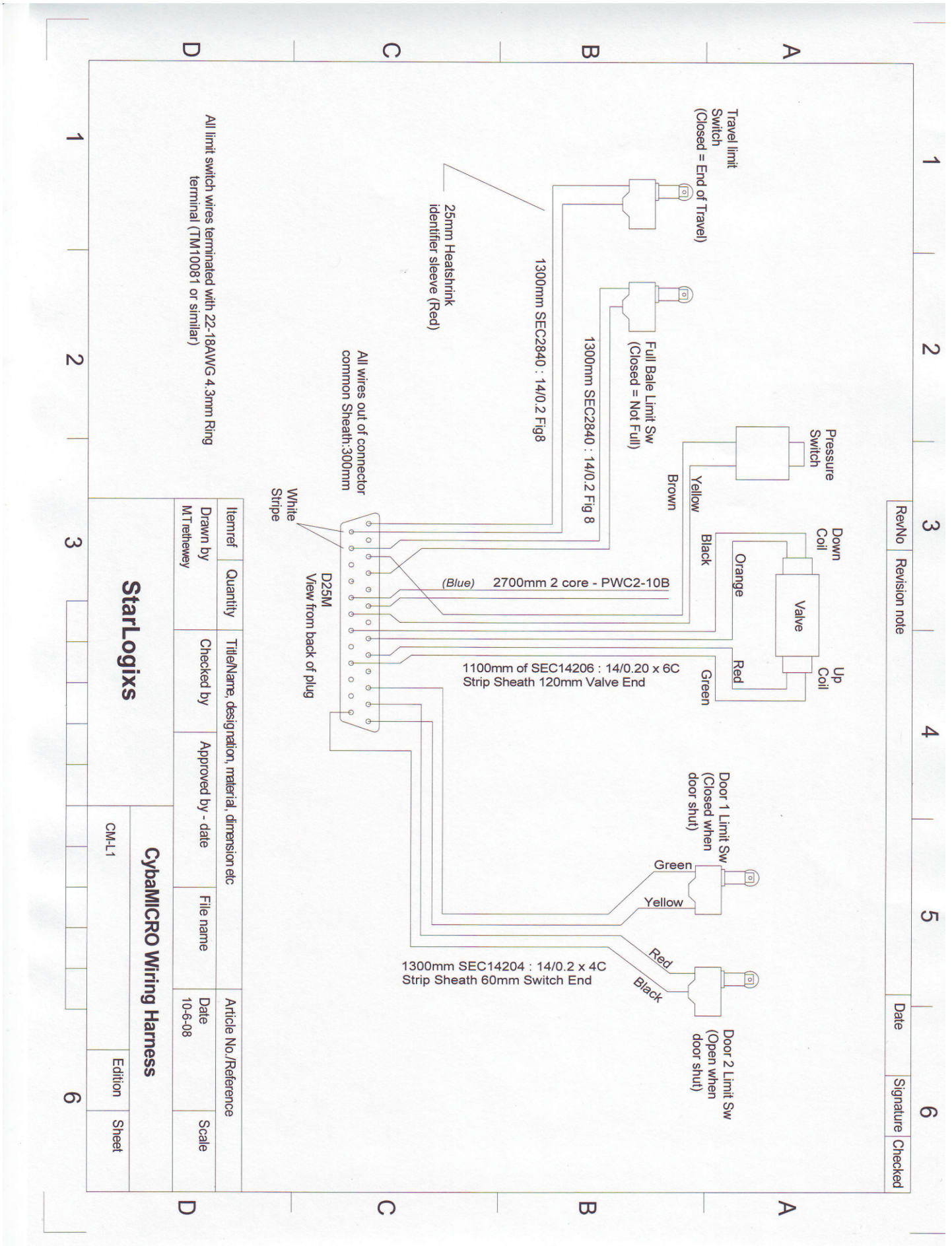
The contents of this document, CybaMICRO Controller front panel artwork, printed circuit board artwork, and firmware (programs contained in Controller integrated circuits) are subject to copyright and can not be reproduced, transmitted into any language or computer language, in any form or any means,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

## 5.2 Trademarks

The symbols  

are subject to Australian and international Trademark registrations, and their use is expressly prohibited without written consent from StarLogixs Pty Ltd.





RevNo	Revision note	Date	Signature	Checked
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Itemref	Quantity	Title/Name, designation, material, dimension etc		Article No./Reference
Drawn by MTTrehewey	Checked by	Approved by - date	File name	Date 10-6-08
<b>StarLogixs</b>				<b>CybamicRO Wiring Harness</b>

All limit switch wires terminated with 22-18AWG 4.3mm Ring terminal (TMM10081 or similar)

All wires out of connector common Sheath: 300mm

25mm Heatshrink Identifier sleeve (Red)

D25M  
View from back of plug

(Blue) 2700mm 2 core - PWC2-10B

1100mm of SEC14206 : 14/0.20 x 6C Strip Sheath 120mm Valve End

1300mm SEC14204 : 14/0.2 x 4C Strip Sheath 60mm Switch End

1300mm SEC2840 : 14/0.2 Fig 8

1300mm SEC2840 : 14/0.2 Fig 8

## 7.0 Warranty

### WARRANTY

Your StarLogixs CybaMICRO Controller is guaranteed against faulty workmanship or components for a period of twelve months after the purchase date. For warranty contact your local sales agent with proof of purchase date.

This warranty does not cover damage or failure cause by or attributable to Acts of God, abuse, misuse, improper maintenance, lightning or other incidence of excessive voltage or any repairs other than those provided by an authorised StarLogixs service facility, or transportation costs.

StarLogixs is not responsible or liable for indirect, special, or consequential damages arising out of or in connection with the use or performance of the Controller or other damages with respect to any economic loss, loss of property, loss of revenues or profit, or cost of removal, installation or reinstallation.

There will be charges rendered for repairs to the product made after the expiration of the aforesaid twelve month warranty period.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.



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