Montracon Trailers

SanuControl Double Deck Manual

December 2015

Montracon
the trailer for road transport

Introduction

This document has been prepared to outline the basic operation of the double deck system that controls the moving deck system

This document has had the hydraulic equipment added as this completes the control system.

Contents

1. Introduction

The deck is moved by an electro hydraulic power pack and is controlled by a PLC. These systems are both chassis mounted. The electric controls are contained in a plastic toolbox on the N/S of the trailer just to the rear of the landing legs. The hydraulic power pack is situated next to the electrical enclosure in a stainless steel enclosure.

The hydraulic operation is covered in a separate section but all the electrical interfaces to the hydraulic system are covered in this section.

The main interconnections are all made in the boxes under the chassis.

Hydraulic Enclosure (Stainless steel box)

Electrical Enclosure (Plastic box)

2. Power

The system is 24v DC system and has a two input plugs, an Anderson socket mounted on the front bulkhead and another Anderson connector fitted under the body on the RNS.

All Anderson connectors have fuses fitted, these are 175 Amp Mega fuses.

These are fitted in the neck of the trailer and under the chassis at the rear as per the following photographs.

Transformers (if used) must smoothed as AC current will damage the electronic systems on board and may cause false triggering of sensors

An on board DC-DC converter can be specified to smooth the input voltage if required.

If any welding is carried out please disconnect the power connectors to the PLC as failure to do so may damage the unit.

3. Safety Warning Devices

There are 3 different electrical safety warning devices on the trailer they are as follows:-

a. Warning Bleeper

This device is fitted at the rear of the trailer

The warning will sound whenever the deck is moving

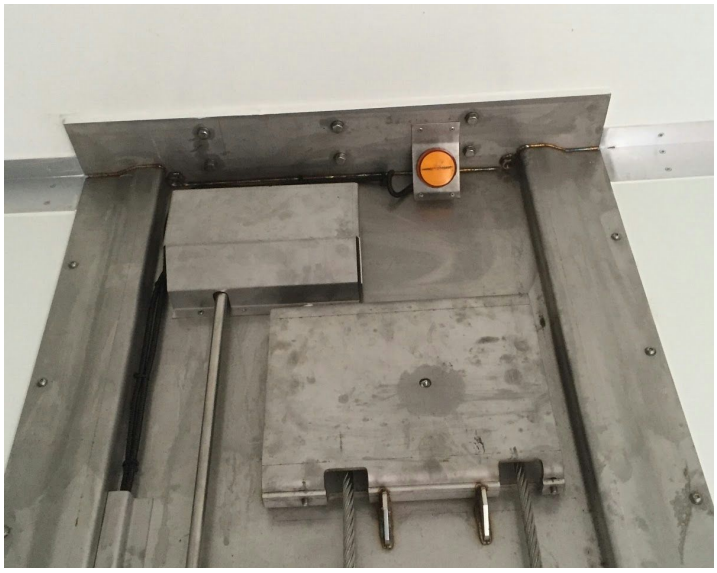
The alarm is wired onto the main feed from the PLC box, a joint is found at the rear. The final termination in the box is as follows:-

Brown	**Live**	**Pin OUT04**	**Bank E, Pin 1**
White	**Earth**	**Pin GND**	**Bank E, Pin 2**

b. Amber Flashing Strobe

This device is fitted to the top of the rear RH post

The unit will strobe whenever the deck is moving



The strobe is fitted on a 2 core extension cable, this comes out of the rear connector and is connected as follows:-

Brown	**Live**	**Pin OUT05**	**Bank F, Pin 3**
White	**Earth**	**Pin GND**	**Bank F, Pin 4**

c. Safe Access LED

This light is fitted in the rear operational panel and illuminates when the deck is in the roof and all the flags (locks) are in the safe condition (under deck).

The wiring is as follows:-

Brown	**Live**	**Pin OUT06**	**Bank F, Pin 5**
White	**Earth**	**Pin GND**	**Bank F, Pin 6**

4. On Board Switches

There are 2 different switches used to operate the electrical system of the double deck.

They give outputs the PLC to identify different conditions

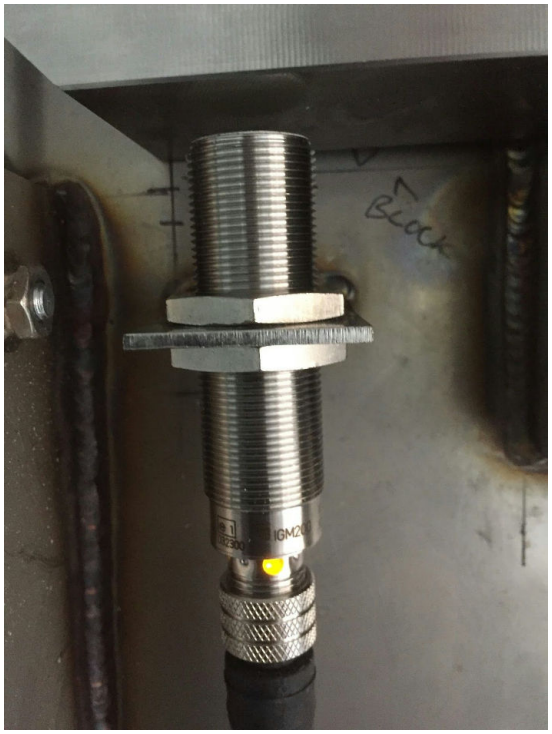
a. **Proximity Switches**

i) Lock position proximity switches

These units are mounted in the locks on each pillar and in the roof, these identify the conditions of the locks and the deck.

The switches have covers fitted for protection:-

When the lock is on the proximity switch is made the LED on the barrel of the proximity switch illuminates.



All the proximity Switches are powered directly to the PLC.

They are wired as follows:-

2 x Brown from FOS & FNS Proxy Switch Live		Bank A, Pin 8
Black from FNS Proxy Switch		Bank A, Pin 6
Black from FOS Proxy Switch		Bank A, Pin 7
2 x Blue from FOS & FNS Proxy Switch Earth		Bank A, Pin 5
2 x Blue from ROS & RNS Proxy Switch Earth		Bank B, Pin 4
Black from RNS Proxy Switch		Bank B, Pin 2
Black from ROS Proxy Switch		Bank B, Pin 3
2 x Brown from ROS & RNS Proxy Switch- Live		Bank B, Pin 1

Note:-

M12 Wiring Codes are as follows:-

Black = Output from the switch

Blue = Earth

Brown = Live in

All proximity switches are PNP

i) Lock position proximity switches

This is the same type of a proximity switch as used for the lock position switch. The switch is located at the top of the front UK N/S pillar and it is set to give an output when the deck is above the lock flags.

The operation is identical to the flag sensors detailed above

It is wired as follows:-

Black from Deck in Roof Proxy Switch		**Bank B, Pin 2**
Blue from Deck in Roof Proxy Switch		**Bank B, Pin 5**
Brown from Deck in Roof Proxy Switch- Live		**Bank B, Pin 8**

b. Operational Buttons

The operational buttons are situated inside the UK N/S on the rear pillar, there are 2 buttons (Up, Down)

5. Specifics of deck operation

To raise the deck

- **Ensure safe to proceed (from operational manual) and you are trained / qualified to operate.**
- **Press the Raise (Red) button.**
- **Once pressed the buzzer and flasher will activate and if the plc detects the system is below the maximum stroke the motor will start and the deck will raise.**
- **As soon as the raise (up) button is released the deck will stop.**
- **If the deck is stopped at full height (by the deck in roof sensor) then the deck locks will automatically engage and the motor will stop working.**

To lower the deck.

- **Press the down (green) button**
- **The plc will verify the position of the locks and if safe to lower then the system will begin to operate.**
- **The buzzer and flasher will activate and the hydraulic valves will open allowing the oil to return to tank thus allowing the deck to lower.**
- **As soon as the button is released the deck will stop.**

ATTENTION

- **Please ensure the deck is regularly checked for signs of wear**
- **Ensure there are no obstructions that would prevent / hinder the decks operation**
- **Do not operate as a passenger lift.**
- **When lowering the deck please pay attention there are no crushing hazards**
- **Do not operated the system on a voltage of less than 22v DC**
- **The system (plc) will not allow deck operation if the voltage is less than 18 volts.**
- **When operating the deck please always pay attention to the locks and ensure all locks are retracted when the deck is moving**
- **The system is not designed for continuous running!**
- **Maximum advised duty is XXX per hour.**

6. Fuses and Protection Devices

The systems are all protected by various devices these are positioned as follows:-

a. **Front Input fuses – Unders chassis at neck FNS Beam**
b. **Rear Input Fuse - Under chassis at rear RNS Beam**

These units are fitted on the front bulkhead and are 175 Amp Mega Fuses

To replace:-

Ensure the power has been removed from the vehicle (all possible sources)

Remove the cover

Remove the nuts retaining Mega Fuse

Remove and replace the failed fuse

Refit in reverse order.

b. PLC Circuit Breakers

The main PLC (control system) is protected by a set of circuit breakers. These are located on the side of the PLC control box inside the small black plastic enclosure.

There are 3 breakers:-

1 protect the PLC

1 protects the inputs

1 protects the outputs

All circuit breakers have dust caps fitted and are simply reset by pushing down the button.

Typical Circuit Breaker – mounted in box (visible)

c. Load Dump module

This device is mounted inside the PLC control box

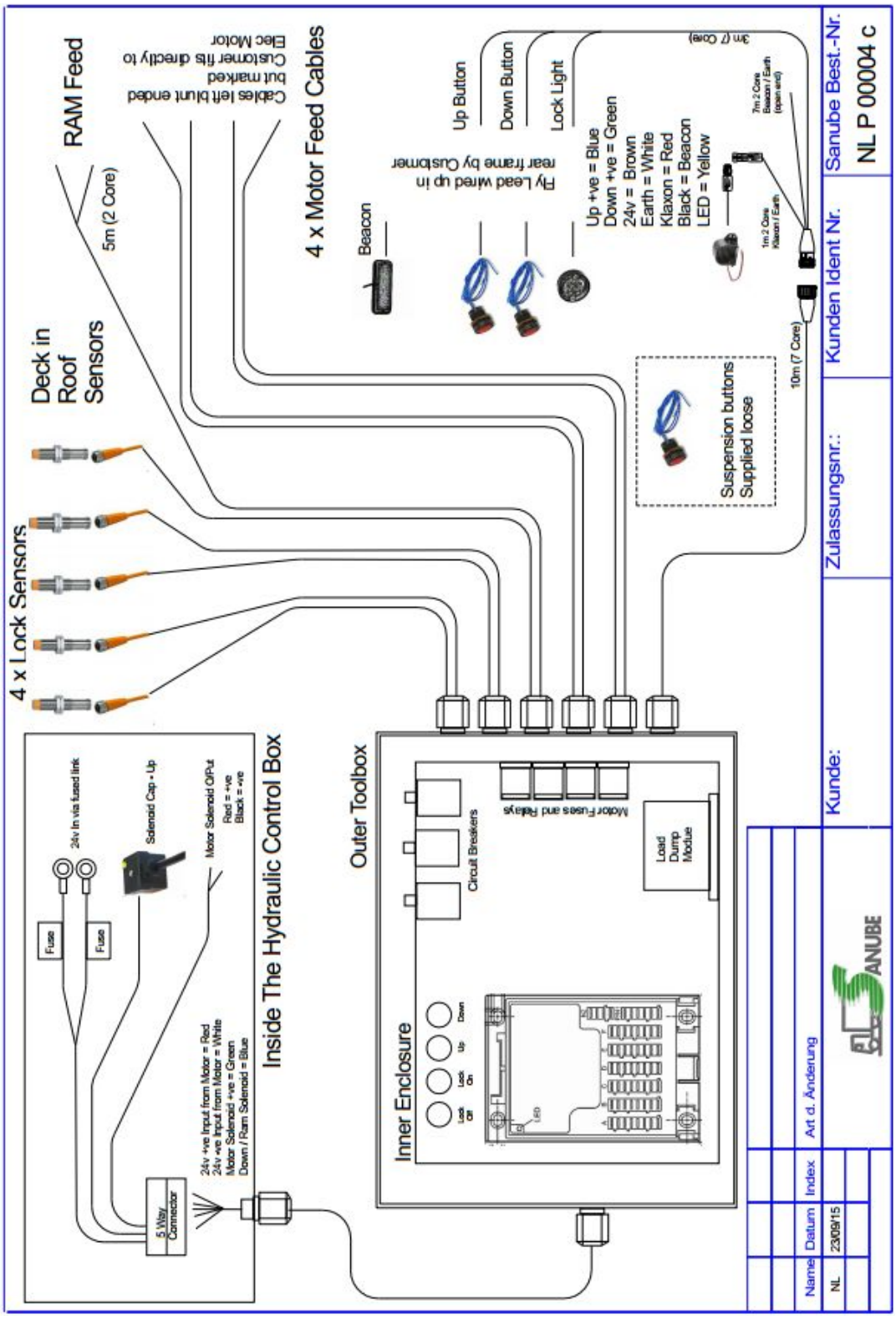
It protects the PLC from external voltage spikes that may be generated by external switches and relays that induce small spikes into the supply voltage.

Note: This is not a replacement for appropriate voltage regulation.

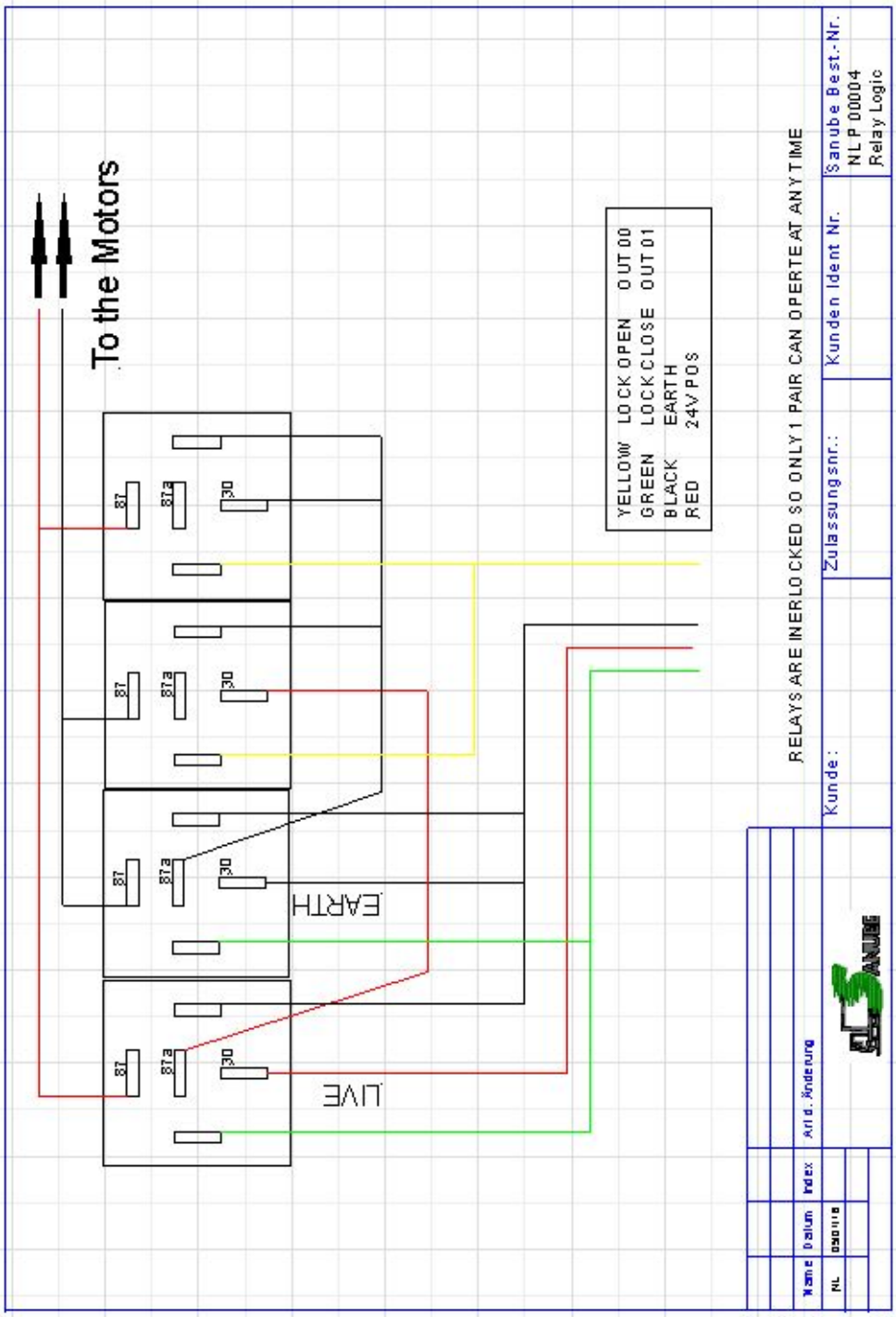
Note: Constant overvoltage will damage the load dump module

Load Dump Module before Fitment

7. General Arrangement of the System



8. Motor Relay Logic



9. Electrical Connections in the Hydraulic Power Pack

There is a interconnecting cable from the PLC enclosure to the hydraulic power pack enclosure.

The photos show the cables inside the enclosure the functions and where they are wired:-

A: Main Power to PLC

This comes from the same terminal as the input power to the Motor

Red to Load Dump Module (+ve)

Black to Load Dump Module (-ve)

Main -ve taken from motor -ve stud

Main +ve taken from the +ve on the motor solenoid

B: Motor Solenoid

2 x 6.3mm spades on Motor solenoid marked + and –

2 Core cable

Red	**Live**	**Pin OUT2**	**Bank E, Pin 5**
Black	**Earth**	**Pin GND**	**Bank E, Pin 6**

C: Lock Solenoid

Moulded 2P+E Connector

LED Illuminates when device is operated

3 Core cable

Green / Yellow	**Not Used**	**N/A**	
Blue	**Earth**	**Pin OUT0**	**Bank E, Pin 1**
Brown	**Live to coil from PLC**	**Pin GND**	**Bank E, Pin 2**

D: Ram Solenoid

This is a direct feed from the PLC enclosure

Red	**Earth**	**Pin GND**	**Bank E, Pin 5**
Black	**Live to coil from PLC**	**Pin OUT03**	**Bank E, Pin 6**

PLC Input / Output configuration

A

1	VBBs	
2	IN0	UP Button
3	IN1	Down Button
4	GND	
5	GND	
6	IN2	FNS Proxy
7	IN3	FOS Proxy
8	VBBs	

B

1	VBBs	
2	IN4	RNS Proxy
3	IN5	ROS Proxy
4	GND	
5	GND	
6	IN6	Deck in roof Proxy
7	IN7	
8	VBBs	

C

1	VBBs	
2	IN8	
3	IN9	
4	GND	
5	GND	
6	IN10	
7	IN11	
8	VBBs	

E

1	OUT 0	Locks Open
2	GND	
3	OUT 1	Locks Close
4	GND	
5	OUT 2	Motor Solenoid
6	GND	
7	OUT 3	Lower & Ram Solenoid
8	GND	

F

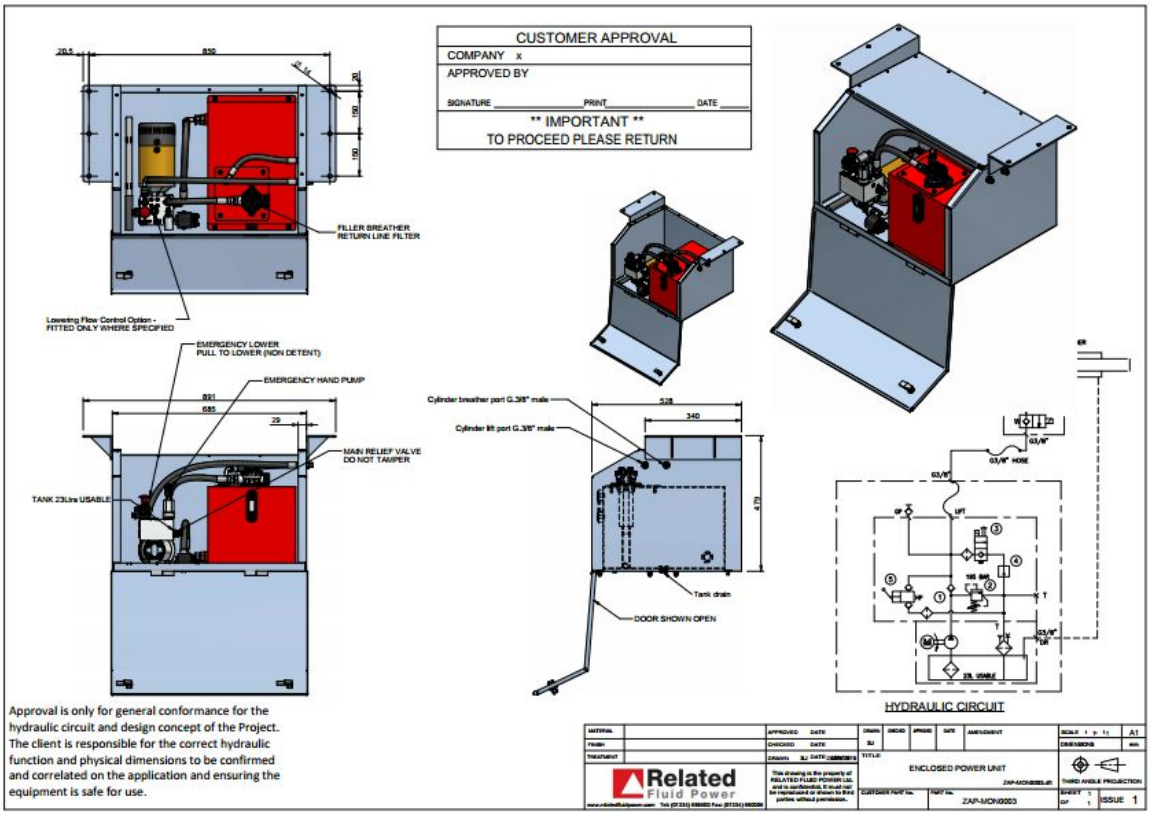
1	OUT 4	Klaxxon +ve
2	GND	
3	OUT 5	Strobe +ve
4	GND	
5	OUT 6	Safe Access LED +ve
6	GND	
7	OUT 7	Maintenance Buttons
8	GND	

1	VBBs	<Not Used>
2	GND	<Not Used>
3	CAN2 Hi	<Not Used>
4	CAN2 Lo	<Not Used>

1	VBBs	Live from 3A C/Breaker
2	VBB1	Live from 6A C/Breaker
3	VBB2	Live from 1A C/Breaker
4	GND	Earth
5	CAN1 Hi	Brown from PC (Program)
6	CAN1 Low	White from PC (Program)

10. Hydraulic system

The following shows the hydraulic system layout:-



11. Maintenance / Fault finding information

Plug in Power – No power (interior lights not on)	**Check input power**
	Check main input fuse
	Check circuit breakers on PLC box

Deck will not move	**Check flag positions**
	Check the proxy switch setting (gap)
	Check circuit breakers on plc box

Flags will not move	**Check fuse on power to motor control relays inside plc box**
	Check circuit breakers on plc box

Emergency operational buttons

On the lid of the plc enclosure there are 4 emergency use buttons

These should only be used in case of maintenance or emergency operation.

The buttons operate the following:-

Locks on

Locks off

Deck up

Deck Down

These buttons should only be used by trained staff under supervised conditions as you do not have a sight of the inside of the deck while operating the buttons.

12. (Re)Programming and program version

The main plc is fitted with a programming cable that is accessible from just inside the main outer enclosure. this should be an IFM interface cable terminated in a 2 pin superseal (note: remember the terminal resistor)

When looking at the program you must have the same program on the PC trying to log in.

The version of the program installed is marked on the outside of the PLC enclosure.

Note: If you log in with another version of the program you will delete the original program and replace with the program on the PC.