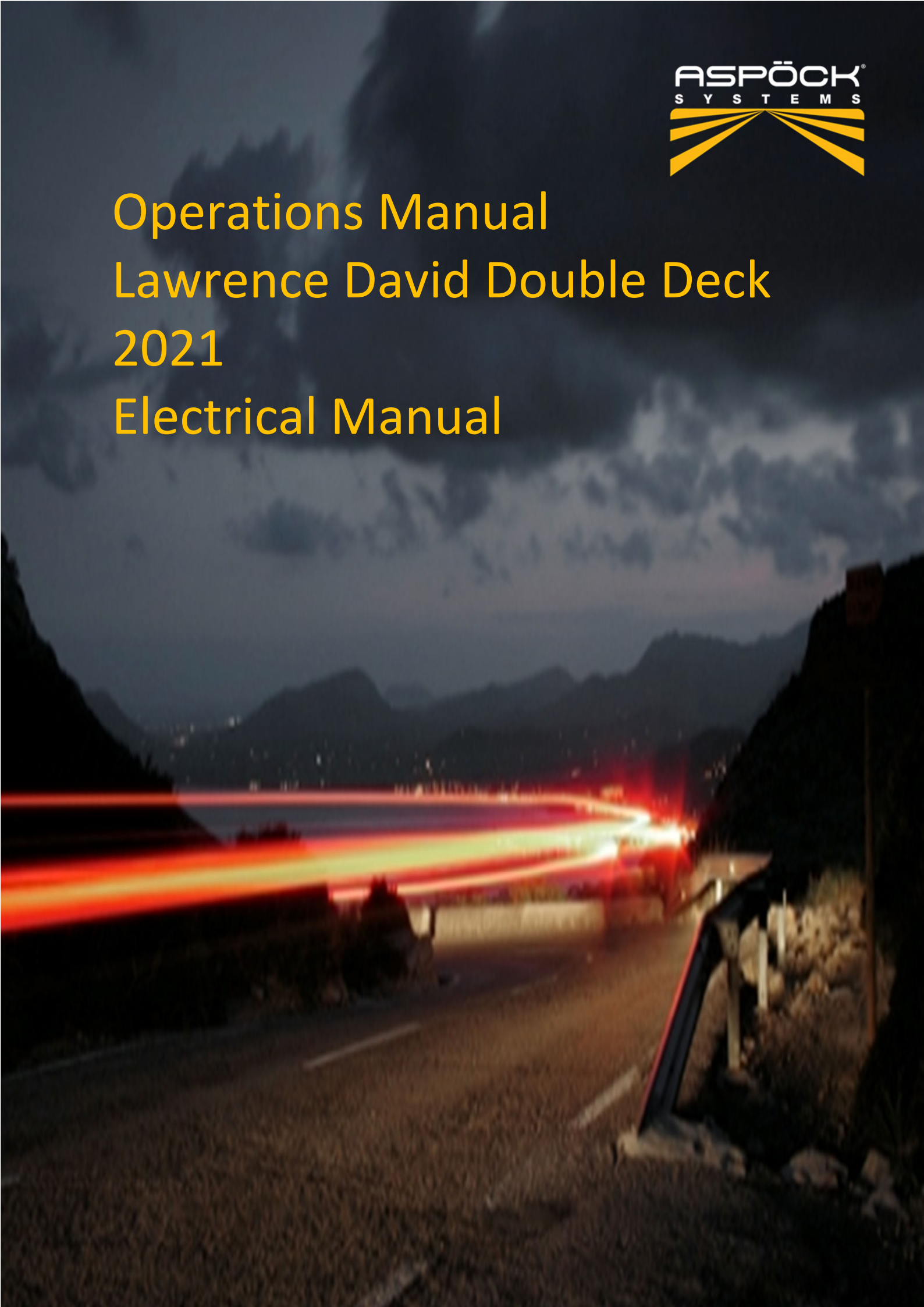




Operations Manual
Lawrence David Double Deck
2021
Electrical Manual



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2. Revision Control

Date	Release	Person	Notes
15/07/2021	0.1	Adam Mitchell	Pre Release
21/07/21	1.0	Adam Mitchell	Release 1

3. Aim and Use

This document is designed to impart a level of understanding and competence to the operators of the Double Deck system.



Section 4 will explain the system spec and any health and safety instructions

Section 5 will explain the layout and controls

Section 6 will explain the deck system operation

Section 7 will provide basic fault finding and maintenance information.

It must be noted that this document is drafted only from the electrical perspective and does not cover any other aspects.

4. System Specification and health and safety notes

The system is designed to work at 24v DC.

Deviations of + 10% (26.4v) and -10% (21.6v) are within the system tolerances.

The system has multiple fail-safes and protections built in, some of which are noted below, but none of these remove the need for the operator to be trained and competent in line with the operating company's procedures.

Nor do any of the items below in any way preclude the user not maintaining full attention to the operation and following all of the operating company's procedures.

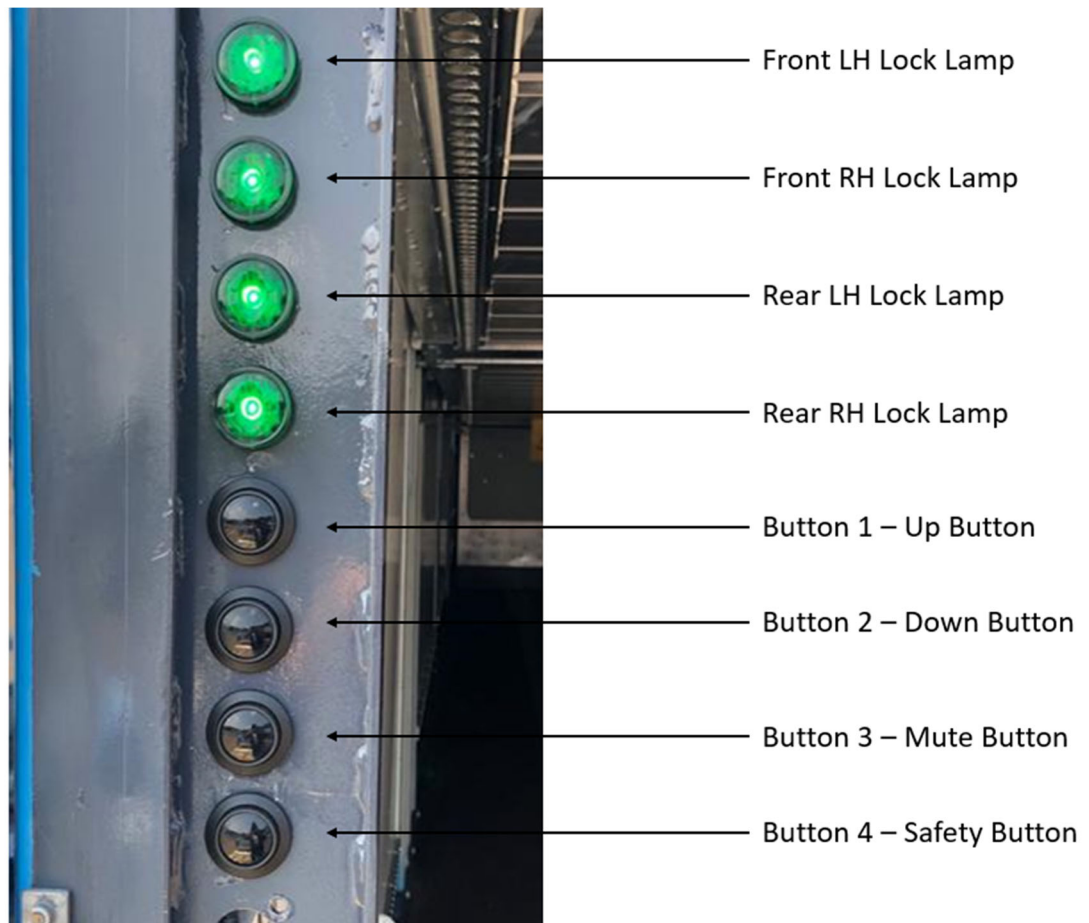
5. System Layout and Controls

The control panel is located in the Rear Near Side frame and is the only point at which the system can be operated during normal usage.



5.1. Button Layout and position.

All users should be familiar with the button layout as below before continuing to read the document. The function of each button will be listed below in Section 5.2.



5.2. Control Layout and Button Functions.

- Button 1: Used for the Deck Up function
- Button 2: Used for the Deck Down function
- Button 3: Used to mute the sounder that activates when the deck moves
- Button 4: Used as a safety button when moving the deck

5.3. Lock Sensors

In the centre bottom of the screen are 4 lock position sensor indicators.

In the safe position, these will illuminate green.

If these are not green you **MUST** not enter under the deck.

For further information, please see section 7.

6. Deck operation

6.1. Up.

In order to lift the deck, the user should press and hold the up button (Button 1) and the safety button (Button 4)

There is, by design, a brief delay before any active movement occurs. During this time, the user can cancel the action by simply removing their fingers from either button.

6.2. Down

In order to lower the deck, the user should press and hold the down button (Button 2) and the safety button (Button 4)

There is, by design, a brief delay before any active movement occurs. During this time, the user can cancel the action by simply removing their fingers from either button.

Please note, with each new 'down action', the deck will lift then pause briefly before the lowering begins. This is by design and is to allow the locks to fully retract. In order for the lowering to begin, all locks **MUST** be seen as off (the lock indicator lamps as discussed in 5.3 will no longer be illuminated):

In the event this does not happen, the user may experience either no lowering, or, if they try successive failed lowering attempts, they may notice the deck has lifted. This is normal in the event of a lock sensor fault and assistance should be sought.

Please see section 7 for more information.

6.3. Sounder Mute

The system contains a strobe lamp and a sounder to alert users to the deck movement. The sounder can be muted, if and when the operating company's procedures allow.

In order to mute the system, the user should press and hold button 3 for around 4 seconds.

The same action will unmute the system.

Note, this will reset on the next deck system power up !

7. Maintenance and Fault Finding

7.1. Maintenance

The system is designed to be low maintenance. We do, however, recommend:

Before each use:-

- The operator should ensure the lamps and buttons are free from damage and can be used safely.

Every 4 – 6 weeks:

- The switches should be checked for damage to the membrane and pressed (with the power off !) to ensure a strong, positive clicking action occurs. The switch is very tactile, and this will be best felt, rather than heard.
- The cables should be checked to ensure no damage has occurred to prevent issues.
- The warning system (Strobe lamps and sounder) should be checked
- The Anderson connectors should be greased and checked for damage
- The lock sensors should be checked for calibration (Please see 7.2.1)

7.2. Fault Finding

7.2.1 Locks

As covered in section 5.3, the lock status can be seen when positive on the rear frame

Lock positions are as follows:

Green = Lock is seen as on and safe for the user to enter under the deck.

Off = Lock is seen as off and it is NOT safe for the user to enter under the deck.

Note, in the event that a lock has not been seen as 'safe' for 7 minutes, the system will flag a lock fault.

This will disable the deck from being moved via the rear controls until the fault has been cleared.

Note the operating range of the sensors is 8mm, with a 10% tolerance, so a real world maximum range of 0.5 – 6mm is recommended.

Lock sensors can also be manually checked by observing the LED at the base of each sensor – this will illuminate ONLY when the sensor is detecting !

In the event one suspects the lock sensor as faulty, placing a coin or washer over the sensor will activate the sensor. Remember to remove once this is done !

7.2.2. Voltage.

As noted in section 4, the system is designed to operate at 24v DC, with a tolerance of +10% and -10%. These values exist in order to protect the mechanical items in the system, for example, solenoids, relays and the motor.

In the event the power drops below 19v for more than 120 Seconds, the low power warning system will cut off the power until sufficient voltage is seen.

Note, this will prevent the deck from working to protect the system until the voltage is returned to a sustainable level.

This warning should not be ignored – continued use of poor power supply WILL cause system failures.

Note, in the event of the deck ‘stuttering’ every 120 seconds, it is advised to check the power supply is not suffering voltage drop !

8. Additional Info

8.1. IO List

The below list of ports on the PLC can be used for fault finding.

Main PLC List

INPUT	FUNCTION	OUTPUT	FUNCTION
0	UP SWITCH RETURN	0	SV01 SOLENOID
1	DOWN SWITCH RETURN	1	SV02 SOLENOID
2	MUTE SWITCH RETURN	2	SOUNDER
3	NOT USED	3	NOT USED
4	FRONT RH LOCK SENSOR	4	FRONT RH LOCK LAMP
5	FRONT LH LOCK SENSOR	5	FRONT LH LOCK LAMP
6	REAR RH LOCK SENSOR	6	REAR RH LOCK LAMP

7	REAR LH LOCK SENSOR	7	REAR LH LOCK LAMP
8	NOT USED	8	NOT USED
9	NOT USED	9	SV03 SOLENOID
10	NOT USED	10	SV04 SOLENOID
11	SAFETY SWITCH RETURN	11	MOTOR SOLENOID

Others

N2	VBBS	SECONDARY CAN LIVE
N2	GND	SECONDARY CAN EARTH
N2	CAN2 H	SECONDARY CAN LINE HIGH
N2	CAN2 L	SECONDARY CAN LINE LOW

P/N1	VBBS	PLC LIVE IN
P/N1	VBB1	PLC LIVE IN
P/N1	VBB2	PLC LIVE IN
P/N1	GND	PLC EARTH IN
P/N1	CAN1 H	PLC CAN LINE HIGH
P/N1	CAN1 L	PLC CAN LINE LOW

8.2. Fuse List and Functions

LOCATION	RATING	JOB
CIRCUIT BREAKER	6A	SUPPLY OUTPUTS 0-7
CIRCUIT BREAKER	3A	SUPPLY OUTPUTS 8-11
CIRCUIT BREAKER	1A	SENSOR + PLC POWER
EARTH STUD	10A	MAIN POWER LINE
EARTH STUD	10A	INTERIOR LAMPS
LIVE STUD	10A	MAIN POWER LINE
LIVE STUD	10A	INTERIOR LAMPS
RELAY 1	10A	SOUNDER LIVE
RELAY 2	10A	MOTOR + STROBE LIVE

8.3. GA Wiring layout

8.4. Trouble shooting chart

Problem	Suggestions
System will not turn on	Check Fuses
	Check circuit breakers
	Check Cabling
PLC will not turn on	Check Fuses
	Check circuit breakers
Sounder In-Op	Check Fuse
	Check Not Muted
Deck Will Not Lift	Check Motor Fuse
	Check Locks are functioning
	Check Lock Sensor Calibration
Deck Will Not Lower	Check Motor Fuse
	Check Locks are functioning
	Check Lock Sensor Calibration
Green Lock Lamps not coming on	Check Locks are functioning
	Check Lock Sensor Calibration