

# **Pollock Steplift**

Electrical Systems

13/05/2002 - ON

(Version 1.C)

# Introduction

The Steplift Unit can be broken down into four main parts:

The Platform	See Drawing SLPF01/02.
The Pump / Main ControlBox	See Drawings SLPG02/02 & .SLIF/03.
The two WallBoxes	See Drawing SLWB03/03.
The Upper LevelGate	See Drawing SLPG02/02.

The Main ControlBox is located inside the Pump Box.

The Platform is connected to the Main ControlBox using two 12-way flexible cables (TerminalBlocks A & C).

The WallBoxes are connected to the Main ControlBox using 10 cores of two more 12-way flexible cables (TerminalBlocks B1 & B2).

The Gate is connected to the Main ControlBox using a 2-core cable to the Gate Interlock Switch, a 2-core cable to the Gate Solenoid and a 4-core cable to the Gate Actuator Assembly [Optional] (TerminalD2).

The Pump unit is connected to the Main ControlBox using a 4-core cable assembly (TerminalBlock D1).

The Steplift can only be used when the timer has been turned on using a suitable key in the spring return Key-Switches fitted to the two wallboxes.

Once the Main Timer has been turned on the lift will only respond to calls if none of the three STOP push-button Switches has been activated. The STOP push-button Switches are of the twist to release type.

The following sheets give details of the sequence of events expected when the Steplift is going up or down, how the main timer and actuator assembly work and a list of connections to the Main ControlBox. These sheets should be used in conjunction with the listed drawings to understand the operation of the Steplift and for faultfinding purposes.

# Sequence of operations for an UP Call

## Start conditions.

The Platform should be parked at the Bottom Stop position with the ramp fully lowered.

All the STOP switches should be made. These are the STOP push-button Switch on the Platform, the 2 Wall Box STOP push-button Switches and the Over-Travel Micro-switch fitted underneath the platform.

The gate fitted at the Top Stop position should be closed if one has been fitted.

The Main Timer should be active.

## UP Sequence.

Activate the UP Circuit by pushing any one of the three UP push-button switches.

The UP push-button switches should illuminate to indicate that the UP Circuit has latched on.

The DOWN Circuit should now lock out.

The Main Timer should be held on whilst the UP Circuit is active.

The Ramp Enable Micro-switch should be made while the platform is at the Bottom Stop position.

## Ramp

2 seconds after the UP Circuit engages the Main Control Box should send a RAISE signal to the actuator assembly.

The actuator should start to extend, raising the ramp.

*As the ramp rises the amount of current flowing to the actuator is monitored. If it rises above a pre-set level for more than 0.5 seconds a latching trip signal is generated. This cancels the RAISE signal. After 2 seconds the actuator assembly receives a LOWER signal. A current overload as the ramp lowers repeats this sequence to cancel the trip signal and raise the ramp. If the ramp returns to the fully lowered position with the UP Circuit active and an active trip signal, the UP Circuit de-energises.*

The Ramp Raised Micro-switch stops the actuator moving when it reaches the fully raised position. The RAISE signal to the Actuator Assembly remains active while the UP Circuit is active and the Ramp Enable Micro-switch is closed.

## UP Movement

As the ramp comes up the mechanical Ramp Lock engages at a ramp angle of approximately 70°. The contacts on the Ramp Interlock Micro-switch should close.

The Ramp Interlock Micro-switch and the Gate Lock Micro-switch control the movement of the Platform. For the Platform to move in either direction both switches must have their contacts closed.

When the Ramp Interlock Micro-switch closes there is a slight delay then the PUMP Solenoid on the Hydraulic Pump energises, raising the platform.

*At the same moment as the Pump energises the Run Time Limiter (RTL) starts. This should be pre-set to 120% of the maximum expected run time. If the pump runs for more than the pre-set period the RTL cuts all power to the UP, DOWN and STOP circuits. The RTL can only be reset by temporarily disconnecting D1 from the Main ControlBox.*

As the Platform comes up the switches on the Bottom Stop Switch Assembly should deactivate. The Ramp Enable Micro-switch should open, the Bottom Stop Micro-switch should close and the Safety Edge by-pass Switch should open.

At the top of the Platform's travel the Top Stop Switch Assembly comes in to play. The Top Stop Micro-switch should open and the Gate Enable Micro-switch should close.

As soon as the Top Stop Micro-switch opens the Pump Solenoid should de-energise. This also cancels the RTL.

*If the Platform continues past its Top Stop position the Over-Travel Micro-switch opens. This breaks the STOP circuit. The Main ControlBox will not respond to UP or DOWN calls until the Platform is lowered manually, allowing the contacts on the Over-Travel Micro-switch to close. An over-travel condition will cause the controlbox to lock out and display an OT fault. Once the fault is cleared the controlbox must be reset by temporarily disconnecting D1 from the Main ControlBox.*

### Gate

As soon as the Gate Enable Micro-switch closes the Gate Lock Solenoid energises. If a manual gate is fitted then the UP circuit will turn off after approximately 2 seconds. If the optional Powered Gate is fitted then 2 seconds after the solenoid energises power is sent to terminals D2 (4) and D2 (5) so that the gate opens (the Gate Actuator retracts causing the gate to open).

When the Gate Actuator is fully retracted the Gate Actuator microswitch activates. Terminal D1 (1) goes high. This de-energises the UP Circuit.

Once the UP Circuit de-energises the Main Timer starts counting down. For a full description of the operation of the Main Timer see the Main Timer Section.

# Sequence of operations for a DOW N Call

## Start conditions.

The Platform should be parked at the Top Stop position with the ramp raised.

All the STOP switches should be made. These are the STOP push-button Switch on the Platform, the 2 WallBox STOP push-button Switches and the Over-Travel Micro-switch fitted underneath the platform.

The gate fitted at the Top Stop position should be closed if one has been fitted.

The Main Timer should be active.

## DOW N Sequence.

Open the gate at the Top Stop position by pushing the UP push-button switch on either of the WallBoxes or on the Platform.

Activate the DOW N Circuit by pushing any one of the three DOW N push-button switches.

The DOW N push-button switches should illuminate to indicate that the DOW N Circuit has latched on.

The UP Circuit should now lock out.

The Main Timer should be held on whilst the DOW N Circuit is active.

The Gate Enable Micro-switch should be made while the platform is at the Top Stop position.

### Gate

Approximately 2 seconds after the DOW N Circuit engages the Main ControlBox should send a CLO SE signal to the Gate Actuator.

The CLO SE signal to the Gate Actuator remains active while the DOW N Circuit is active and the Gate Enable Micro-switch is closed.

As the gate closes the contacts on the Gate Interlock Switch should also close. The Gate Actuator turns off approximately 2 seconds after the Gate Interlock Switch closes.

This delay should allow the Gate to shut tight against the lock.

### Down Movement.

The Ramp Interlock Micro-switch and the Gate Lock Micro-switch control the movement of the Platform. For the Platform to move in either direction both switches must have their contacts closed.

When the Gate Interlock Micro-switch closes there is a 3-second delay then the DOW N Solenoid on the Hydraulic Pump energises. This releases the pressure in the Hydraulic System, lowering the Platform.

*At the same moment as the DOWN Solenoid energises the Run Time Limiter (RTL) starts. This should be pre-set to 120% of the maximum expected run time. If the DOWN Solenoid is active for more than the pre-set period the RTL cuts all power to the UP, DOWN and STOP circuits. The RTL can only be reset by temporarily disconnecting connector block D1 from the Main Control Box.*

*Where a manual gate is fitted the gate would normally be closed before the DOWN push-button switch is pushed. In this case the DOWN sequence would start from where the contacts on the Gate Interlock Micro-switch close.*

As the Platform moves away from the Top Stop position the Top Stop Switch Assembly should disengage. The contacts on the Top Stop Micro-switch should close and the contacts on the Gate Enable Micro-switch should open.

If any of the Bottom Safety Edge Switches are activated at any stage of the DOWN sequence, the Down Circuit will de-energise immediately. The DOWN Circuit cannot be energised while the contacts on any of the Bottom Safety Edge Switches are open.

As the Platform approaches the Bottom Stop position the Bottom Stop Switch Assembly comes into play. About 7mm off the Bottom Stop position the contacts on the Safety Edge by-pass Switch close. If any of the Bottom Safety Edge Switches are activated after this point, they will have no effect.

At the Bottom Stop position the contacts on the Bottom Stop Micro-switch open. After a delay of approximately 0.5 seconds the power to the DOWN Solenoid on the pump is cut. The Platform can rise slightly when the user moves off it. This delay allows the Platform to come hard onto the Bottom Stop Switch Assembly preventing it disengaging if this happens.

The RTL will cancel at the same time as the DOWN Solenoid on the pump de-energises.

### Ramp

As soon as the contacts on the Ramp Enable Micro-switch close, the Ramp Lock Solenoid energises. This disengages the mechanical lock on the ramp.

2 seconds after the contacts on the Ramp Enable Micro-switch close the Main Control Box sends a LOWER signal to the actuator assembly.

The actuator should start to retract, lowering the ramp.

*As the ramp lowers the amount of current flowing to the actuator is monitored. If it rises above a pre-set level for more than 0.5 seconds a latching trip signal is generated. This cancels the LOWER signal. After 2 seconds the actuator assembly receives a RAISE signal. A current overload as the ramp raises repeats this sequence to cancel the trip signal and lower the ramp. If the ramp returns to the fully raised position with the DOWN Circuit active and an active trip signal, the DOWN circuit de-energises.*

The Ramp Lowered micro-switch stops the actuator moving when it reaches the fully lowered position. The Main Control Box should now get a Ramp Fully Lowered signal, cancelling the DOWN circuit.

Once the DOW N Circuit de-energises the M ain T imer starts counting down. For a full description of the operation of the M ain T imer see the M ain T imer Section.

**The DOW N Circuit cannot be energised if the contacts on the Ramp Enable micro-switch are closed or the contacts on the Safety Edge By-pass Switch are closed. If the platform is at the Bottom Stop Position it must be moved up high enough to fully release the Bottom Stop Switch Assembly before the DOW N circuit can be re-engaged.**

## The Ramp Actuator Assembly

The Ramp Actuator Assembly is used to control the movement of the Platform Ramp. It consists of an actuator, two limit switches and an interface PCB. There are four lines connecting the Actuator Assembly to the Main Control Box.

Two of these lines are power connections and two are used to give positional information.

To RAISE Ramp	Blue/C (6)	0 Volts (negative)
	Brown/C (7)	+24 Volts (positive)
To LOWER Ramp	Brown/C (7)	0 Volts (negative)
	Blue/C (6)	+24 Volts (positive)

The Ramp is fully raised when Blue/C (6) is at 0 Volts, and Grey/C (8) is at +24 Volts.

The Ramp is fully lowered when Brown/C (7) is at 0 Volts and White/C (9) is at +24 Volts.

## The Gate Actuator Assembly

The Gate Actuator assembly is used to control the movement of the Powered Gate. It consists of an actuator, a limit switch and an interface PCB. There are three lines connecting the Gate Actuator Assembly to the Main Control Box.

Two of these lines are power connections and the third is used to signal when the Gate is fully open.

To OPEN Gate	Blue/D 2 (4)	+24 Volts (positive)
	Brown/D 2 (5)	0 Volts (negative)
To CLOSE Gate	Blue/D 2 (4)	0 Volts (negative)
	Brown/D 2 (5)	+24 Volts (positive)

The Gate is fully OPEN when Brown/D 2 (5) is at 0 Volts, and White/D 2 (1) is at +24 Volts.

## The Main Timer.

The Main Timer is used to control access to the Platform Unit.

A spring-return Key-Switch is fitted to each of the Wall Boxes. Turning either of these Key-Switches can activate the timer.

While the Main Timer is inactive there is no power to the three UP Push-button switches, the three DOWN Push-button switches or the three STOP Push-button switches.

Once the Main Timer is triggered the count is held at zero whilst either the UP or DOWN circuit is active. The timer count starts once the active circuit de-energises.

Once the timer reaches its pre-set level (approximately 2 minutes) it turns off, preventing the lift from being used until such time as the circuit is re-activated.

The Main Control Box can be programmed to send the lift down if it is left in the raised position. The box can be programmed for Gate Fitted (GF) or No Gate (NG). When the GF setting is selected as the timer turns off it will send out a DOWN call (identical to pushing any of the DOWN push-button switches). If the Platform is already at the Bottom Stop position the DOWN Circuit cannot activate and the Main Timer turns off. If however the Platform has been left at the Top Stop position it will respond to the DOWN call, returning the Platform to the Bottom Stop position and then going into stand-by mode.

If a manual gate is fitted then the gate must be closed for the run-down circuit to function correctly. If the Gate is left open then the DOWN call will latch on but the lift cannot move until the Gate Interlock Switch closes.

The standard Control Box features latching drive circuits. If local standards require that constant pressure must be maintained on the directional switches during operation then the Euro-Switch option should be specified prior to delivery.

## List of Connections to the Main Control Box.

- A (1) +24V (positive) {Timed} to the Platform ControlPanel.
- A (2) +24V (positive) {Timed} to the Platform STOP P/B (STOP 1)
- A (3) Return From STOP 1
- A (4) Return from the UP P/B Switch on the Platform ControlPanel (UP 1).
- A (5) +24V feed to the Lamp on the UP P/B Switch, UP 1.
- A (6) Return from the DOWN P/B Switch on the Platform ControlPanel (DOWN 1).
- A (7) +24V feed to the Lamp on the DOWN P/B Switch, DOWN 1.
- A (8) SerialFeed to the Over-TravelMicro-switch (STOP 4) from STOP 3.
- A (9) Return from the Over-TravelMicro-switch, STOP 4 (STOP Circuit Out/Put).
- A (10) Return from the Ramp Interlock Micro-switch.
- A (11) Return from the Top Stop Micro-switch.
- A (12) 0V (negative) to the Platform ControlPanel.
  
- C (1) Return from the Safety Edge by-pass Switch.
- C (2) Return from the Bottom Safety Edge Switches.
- C (3) Return from the Gate Enable Micro-switch.
- C (4) Return from the Ramp Enable Micro-switch.
- C (5) +24V feed to the Ramp Lock Solenoid.
- C (6) Actuator Feed 1.
- C (7) Actuator Feed 2.
- C (8) Actuator Position 1.
- C (9) Actuator Position 2.
- C (10) Not Used.
- C (11) Return from the Bottom Stop Micro-switch.
- C (12) 0V feed to the Ramp Lock Solenoid.
  
- B1(1) +24V feed to the Main Timer Key-Switches on WallBox 1
- B1(2) Feed to the STOP P/B switch on WallBox 1.
- B1(3) Return from the STOP P/B switch on WallBox 1.
- B1(4) Return from the Key-Switch on WallBox 1.
- B1(5) Return from the UP P/B Switches on WallBox 1 (UP 2).

- B1(6) Feed to the lamp on UP 2.
- B1(7) Return from the DOWN P/Bs on WallBox 1 (DOWN 2).
- B1(8) Feed to the lamp on DOWN 2.
- B1(9) +24V feed (Timed) to the UP & DOWN P/B Switches on WallBox 1.
- B1(10) 0V feed to WallBox 1 and WallBox 2.
- 
- B2 (1) +24V feed to the Main Timer Key-Switch on WallBox 2.
- B2 (2) Feed to the STOP P/B switch on WallBox 2.
- B2 (3) Return from the STOP P/B switch on WallBox 2.
- B2 (4) Return from the Key-Switch on WallBox 2.
- B2 (5) Return from the UP P/B Switches on WallBox 2 (UP 3).
- B2 (6) Feed to the lamp on UP 3.
- B2 (7) Return from the DOWN P/Bs on WallBox 2 (DOWN 3).
- B2 (8) Feed to the lamp on DOWN 3.
- B2 (9) +24V feed (Timed) to the UP & DOWN P/B Switches on WallBox 2.
- B2 (10) 0V feed to WallBox 2.
- 
- D1(1) +24V supply from the Battery Pack.
- D1(2) Feed to the DOWN Solenoid.
- D1(3) Not Used.
- D1(4) Feed to the PUMP Solenoid.
- D1(5) 0V supply from the Battery Pack & 0V feed to the Gate Lock Solenoid.
- D1(6) Not Used
- 
- D2 (1) Gate fully Open signal.
- D2 (2) Not Used.
- D2 (3) Feed to the Gate Lock Solenoid.
- D2 (4) Power to the Gate Actuator Assembly (Blue).
- D2 (5) Power to the Gate Actuator Assembly (Brown).
- D2 (6) Serial feed to the Gate Interlock Micro-switch from the Ramp Lock Micro-switch.
- D2 (7) Return from the Gate Lock Micro-switch (Output from the LOCK circuit).
- D2 (8) 0 Volt feed to the Gate Mechanism .

## Setting Up the Step-Lift Control Box.

Locate the 2-digit display on the Step-Lift Control PCB.

Locate the two push-button switches to the right of the LED display.

When voltage (24V dc) is applied to the Control Box the 2-digit LED display should read . . .

If it does not then disconnect the D1 connector block from the Control Box then re-connect it.

Press the two push-button switches to the right of the 2-digit LED display simultaneously.

The display should read PG then after a slight delay either **GF** or **NG**.

**GF** means Gate Fitted. In this mode the run-down timer is active.

**NG** means No Gate. In this mode the run-down timer is de-activated.

To change from **GF** to **NG** push and hold the lower of the two push-button switches. Release the switch when the display changes to **NG**.

To change from **NG** to **GF** push and hold the upper of the two push-button switches. Release the switch when the display changes to **GF**.

To leave this setting unaltered press both push-button switches simultaneously.

The display should now alternate between **tu** and a two digit number between 0.1 and 5.0. This is the current setting for the ramp reversal circuit in the UP direction. The value can be increased or decreased in 0.1 increments using the top push-button to increase the value and the lower push-button switch to decrease it. Once set to the required value (usually between 1.5 and 1.9 amps) press both push-button switches simultaneously.

The display should now alternate between **td** and a two digit number between 0.1 and 5.0. This is the current setting for the ramp reversal circuit in the DOWN direction. The value can be increased or decreased in 0.1 increments using the top push-button to increase the value and the lower push-button switch to decrease it. Once set to the required value (usually between 1.1 and 1.6 amps) press both push-button switches simultaneously.

The display should now alternate between **tl** and a two digit number between 01 and 99. This is the run time limit on the pump for both the UP and DOWN directions. If the platform takes more than the tl value to move from one floor stop to another then the control system is locked out until the power is reset. The displayed value is the time limit in seconds. The value can be increased or decreased in 1second increments using the top push-button to increase the value and the lower push-button switch to decrease it. Once set to the required value (usually default 60 seconds) press both push-button switches simultaneously.

The display should now show -- for approximately 1 second then go back to . . .

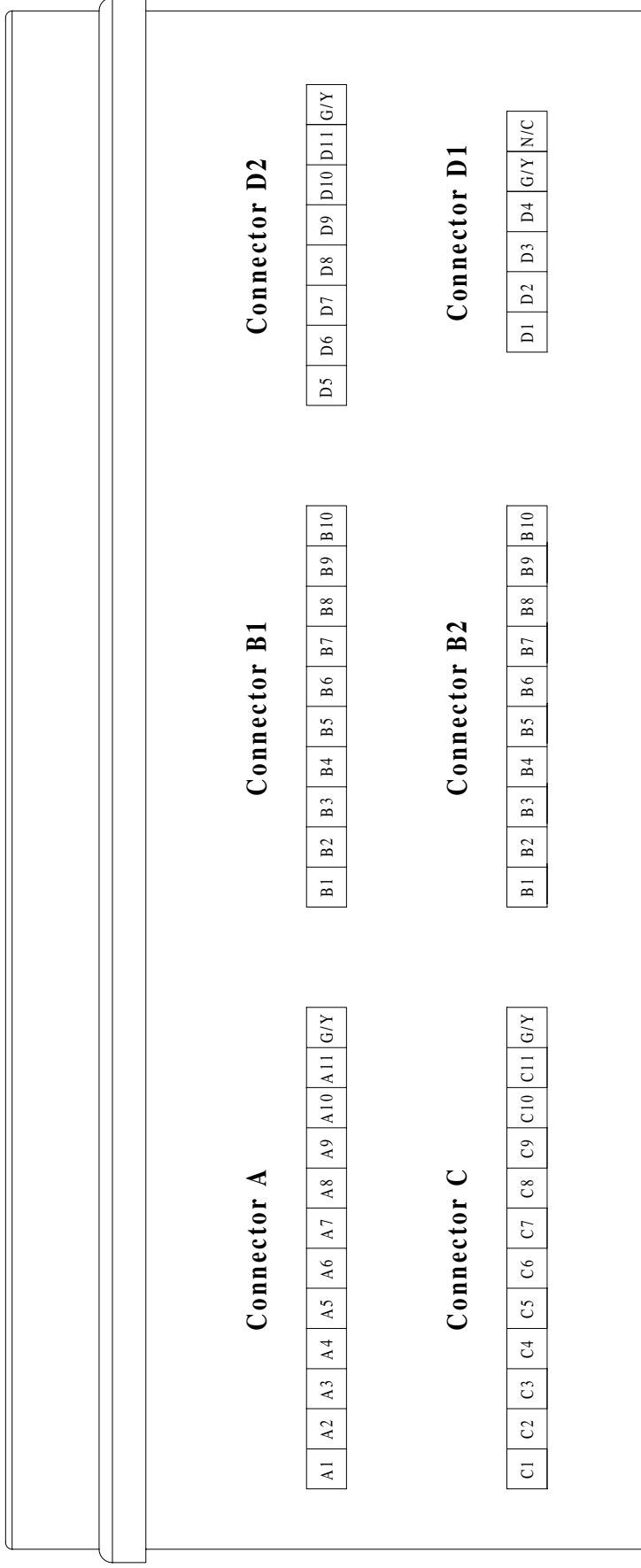
The Step-Lift should now be ready for operation.

## Codes used on the 2-digit LED display.

- ON The timer is active and ready to be used.
- RU Ramp Up. The control box is sending a RAISE signal to the ramp.
- UP The step-lift UP sequence is active.
- DN The step-lift DOWN sequence is active.
- GC Gate close. The control box is sending a signal to close the gate
- RD Ramp down. The control box is sending a LOWER signal to the ramp.
- RI Ramp Interlock. The lift will not move until the ramp interlock switch is closed.
- GI Gate Interlock. The lift will not move until the gate interlock switch is closed.
- DT Down Trip. The ramp reverse circuit has cut in as the ramp is coming down.
- UT Up Trip. The ramp reverse circuit has cut in as the ramp is going up.
- ES Edge Stop. The lift has stopped on the way down because the bottom safety edge has been activated. **Check this with the status LEDs as some other faults can trigger an ES fault.**
- The lift can still be driven up with an active ES fault. Hold the UP push-button switch until the lift starts to go up.

- SP Stop Circuit. One of the three Emergency Stop switches has been activated. If not check the 2 fuses on the PCB.
- OT Over Travel. The lift has not stopped at the upper stop position and has triggered the over-travel circuit. If the lift stops at the top but "creeps" onto the over-travel switch it can generate an ES fault. Check with the status LEDs. An over travel fault needs a power re-set to clear.
- TL Time Limit. The platform has taken longer than the pre-set limit to move from one floor stop to the other. A TL fault requires a power re-set to clear.
- GO Gate Open. The lift should be parked at the upper level and the UP circuit should be active. Power is supplied to the Gate Actuator such that the gate opens.
- GC Gate Close. The lift should be parked at the upper level and the DOWN circuit should be active. Power is supplied to the Gate Actuator such that the gate closes.
- RE Ramp switch fault. Mismatch fault between the Ramp Actuator Switches and the Ramp Interlock Switch (the ramp interlock switch is closed but the ramp control switches indicate that the ramp is down).
- GE Gate switch fault. Mismatch fault between the Gate Actuator Switches and the Gate Interlock Switch (the gate interlock switch is closed but the gate control switches indicate that the gate is down).

# Steplift Control Box Connections for Screw Type Connectors.



A1	Platform Cable A
A2	Platform Cable A
A3	Platform Cable A
A4	Platform Cable A
A5	Platform Cable A
A6	Platform Cable A
A7	Platform Cable A
A8	Platform Cable A
A9	Platform Cable A
A10	Platform Cable A
A11	Platform Cable A
G/Y	Platform Cable A

C1	Platform Cable C
C2	Platform Cable C
C3	Platform Cable C
C4	Platform Cable C
C5	Platform Cable C
C6	Platform Cable C
C7	Platform Cable C
C8	Platform Cable C
C9	Platform Cable C
C10	Platform Cable C
C11	Platform Cable C
G/Y	Platform Cable C

B1	Wall Box (Red)
B2	Wall Box (Brown)
B3	Wall Box (Green)
B4	Wall Box (Blue)
B5	Wall Box (Yellow)
B6	Wall Box (Orange)
B7	Wall Box (White)
B8	Wall Box (Grey)
B9	Wall Box (Violet)
B10	Wall Box (Black)

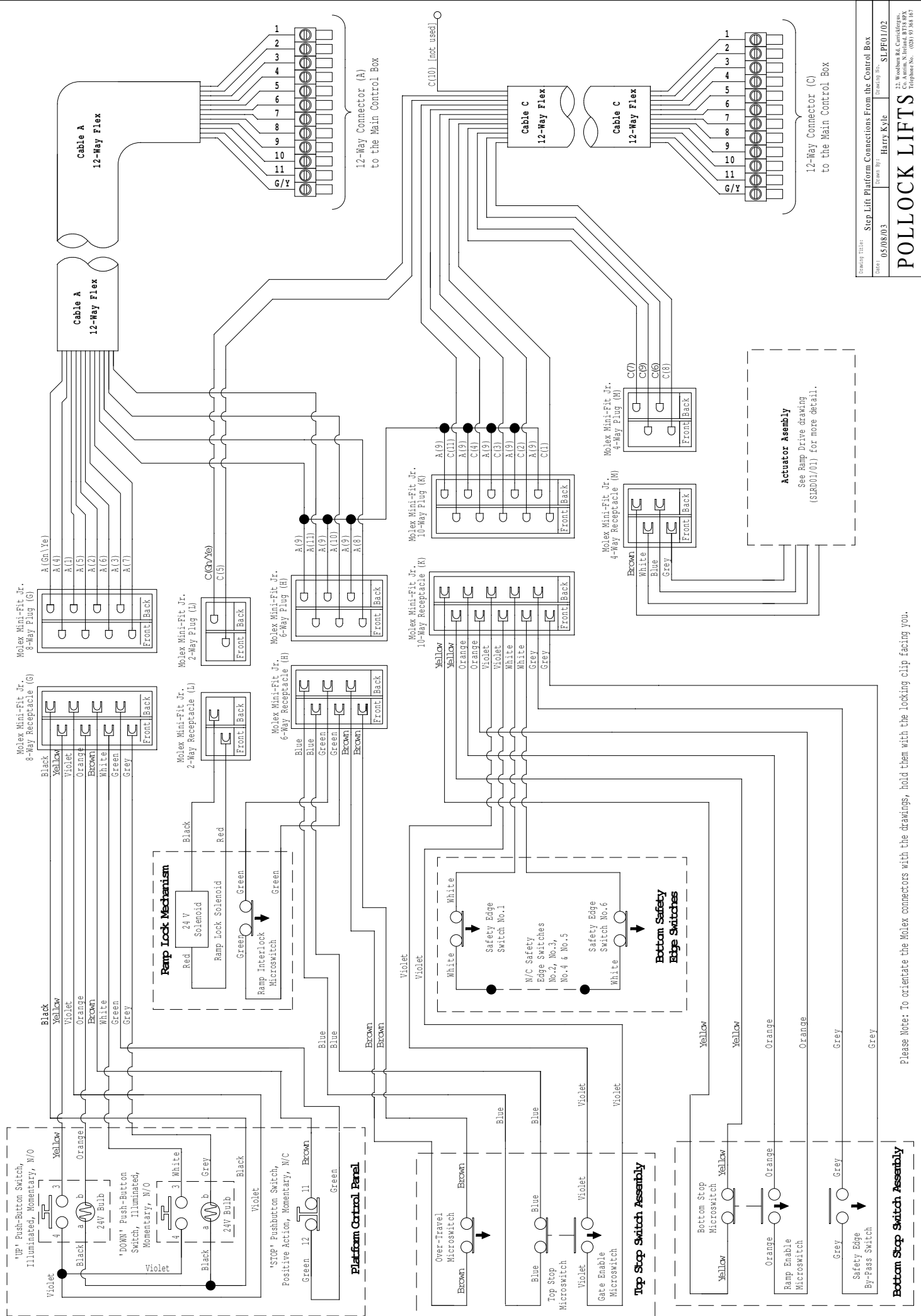
D1	Pump Box (Red)
D2	Pump Box (Violet)
D3	Pump Box (Not Used)
D4	Pump Box (Orange)
G/Y	Pump Box (Black)

D5	Gate Open Signal
D6	Gate (Not Used)
D7	Gate (+ Solenoid)
D8	Gate Actuator (1)
D9	Gate Actuator (2)
D10	Gate (Switch)
D11	Gate (Switch)
G/Y	Gate (- Solenoid)

Drawing Title: <b>Connections for Screw Connector Type Steplift</b>	
Date: <b>20/05/03</b>	Drawing No. <b>SLIF/03</b>
Drawn By: <b>Harry Kyle</b>	

POLLOCK LIFTS

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Drawing Title: Step Lift Platform Connections From the Control Box  
 Date: 05/08/03  
 Drawn By: Harry Kyle  
 SLP/01/02  
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**Bottom Stop Switch Assembly**

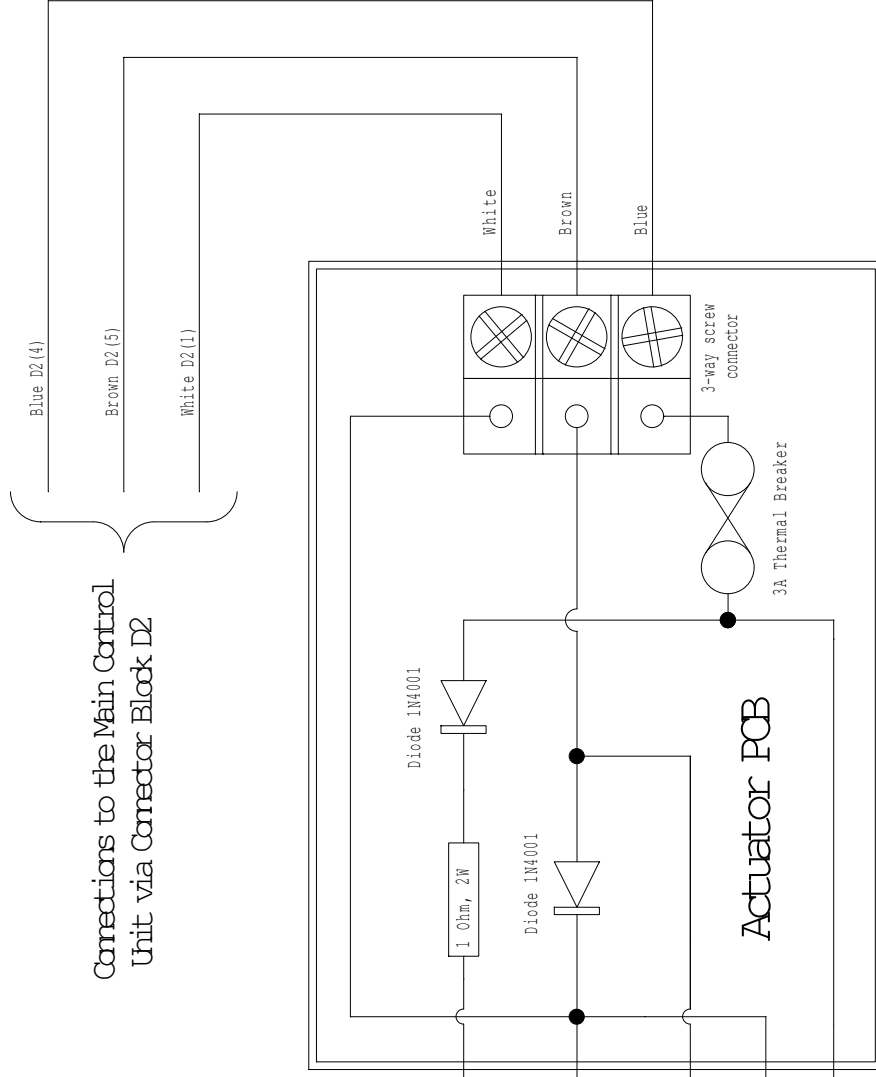
Please Note: To orientate the Molex connectors with the drawings, hold them with the locking clip facing you.

**POLLOCK LIFTS**

# Gate Drive System

Blue	Positive	Negative
Brown	Negative	Positive
	Open Gate	Close Gate

\* The control box assumes that the gate is fully open when both the white and blue cables on connector D2 are positive.



Connections to the Main Control Unit via Connector Block D2

Blue D2 (4)

Brown D2 (5)

White D2 (1)

White

Orange

Grey

White

Black

White

Orange

Grey

White

Black

W4 Lever Roller Microswitch

Diode 1N4001

1 Ohm, 2W

Diode 1N4001

Actuator PCB

3A Thermal Breaker

3-way screw connector

Motor  
24V dc, 2A  
Bi-Directional

Drawing Title: **Steplift Power Gate Actuator Assembly**

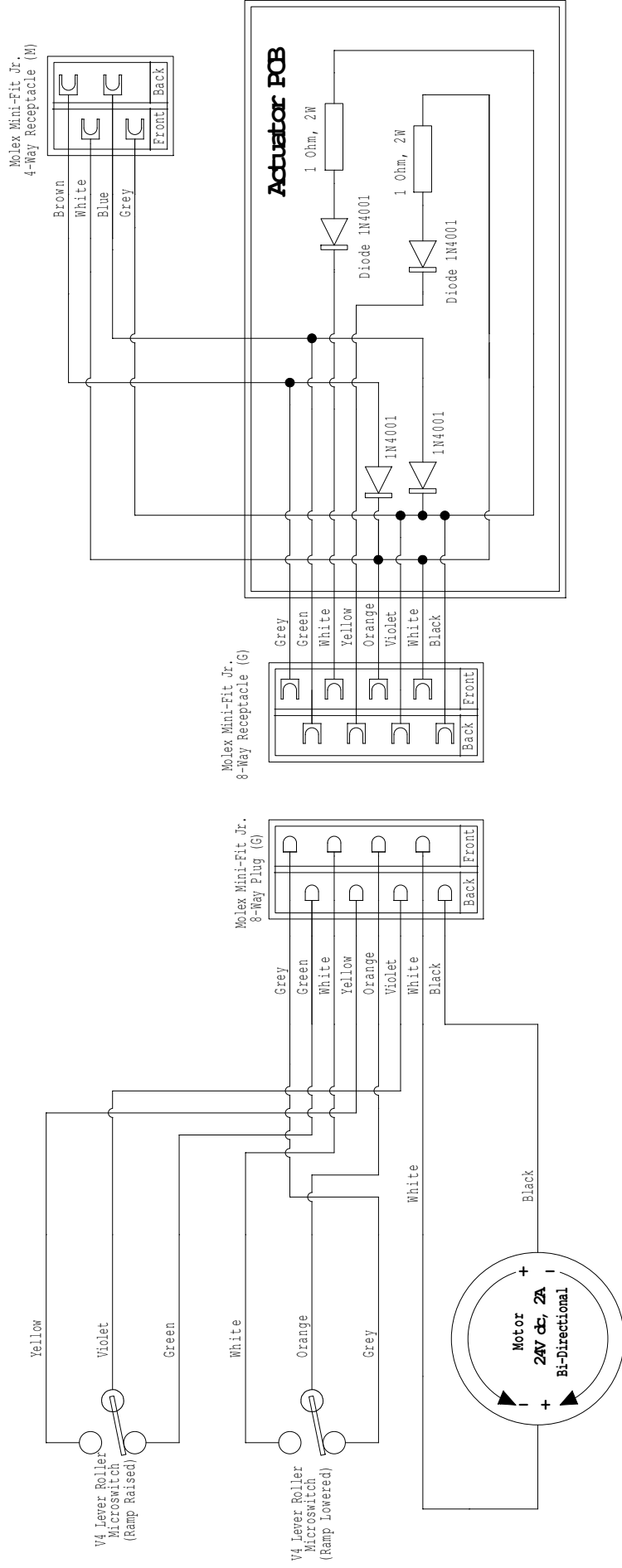
Date: **04/08/03** Drawn By: **Harry Kyle** Drawing No. **SLPG01/01**

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# Ramp Drive System



Drawing Title:

Steplift Ramp Drive System

Date:

26/04/02

Drawn By:

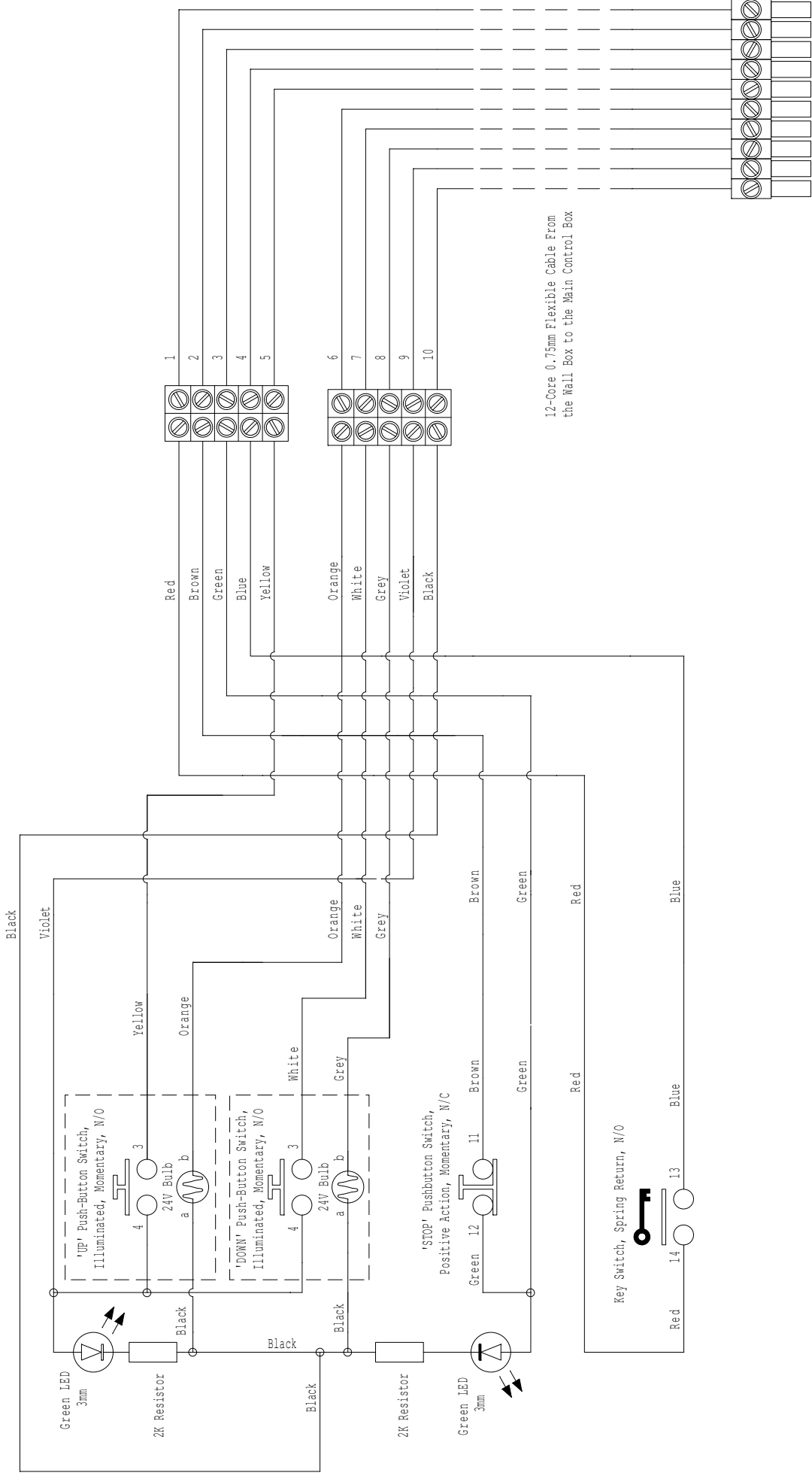
Harry Kyle

Drawing No.

SLRD01/01

**POLLOCK LIFTS**

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12-Core 0.75mm Flexible Cable From the Wall Box to the Main Control Box

10-Way Connector (B1 and B2) to the Main Control Box

Drawing Title: <b>Step Lift Platform Wall Box Schematic</b>	
Date: <b>07/04/03</b>	Drawn By: <b>Harry Kyle</b>
Drawing No. <b>SLWB03/03</b>	

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