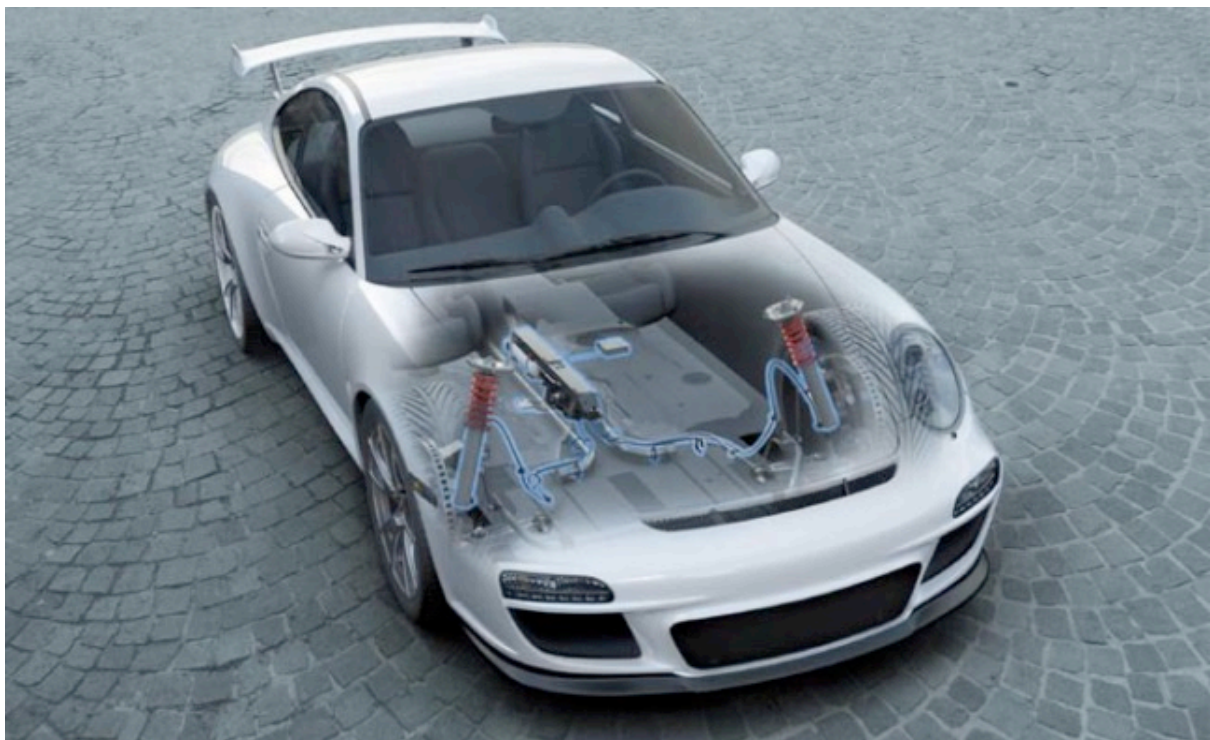


# Porsche Front Axle Lift System

997.2 GT3 (RS & RS4.0)



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## 1. Background

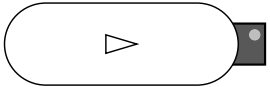
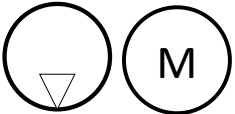


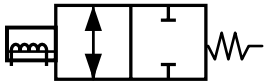
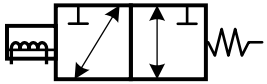
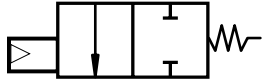
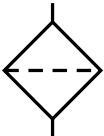
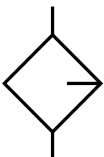
The purpose of this document is to capture the operation and components that make up the Front Axle Lift (FAL) option that was available from October 2009 for the generation two 997 (997.2) model GT3 and GT3 RS (Including RS 4.0) The cost for this option was £1936 at launch in the UK. This was Porsche's first attempt at an axle lift system and it should be noted that it is an electropneumatic system (Porsche replaced this design with a Hydraulic based system in the 991 model 911 as well as making it an option beyond the GT products)

The option code for this system was I475



*Figure 1: Electropneumatic Front Axle Lift System*

## 2. Electrical and Pneumatic Symbols utilised in this document

SYMBOL	KEY
	Pressure Tank
	Compressor and 12vDC Motor
	Check Valve
	Pressure Switch
	2/2 Way Solenoid Actuated Valve
	3/2 Way Solenoid Actuated Valve
	2/2 Way Pneumatic Actuated Valve
	Air Filter
	Air Dryer

### 3. FAL Functional Component Layout

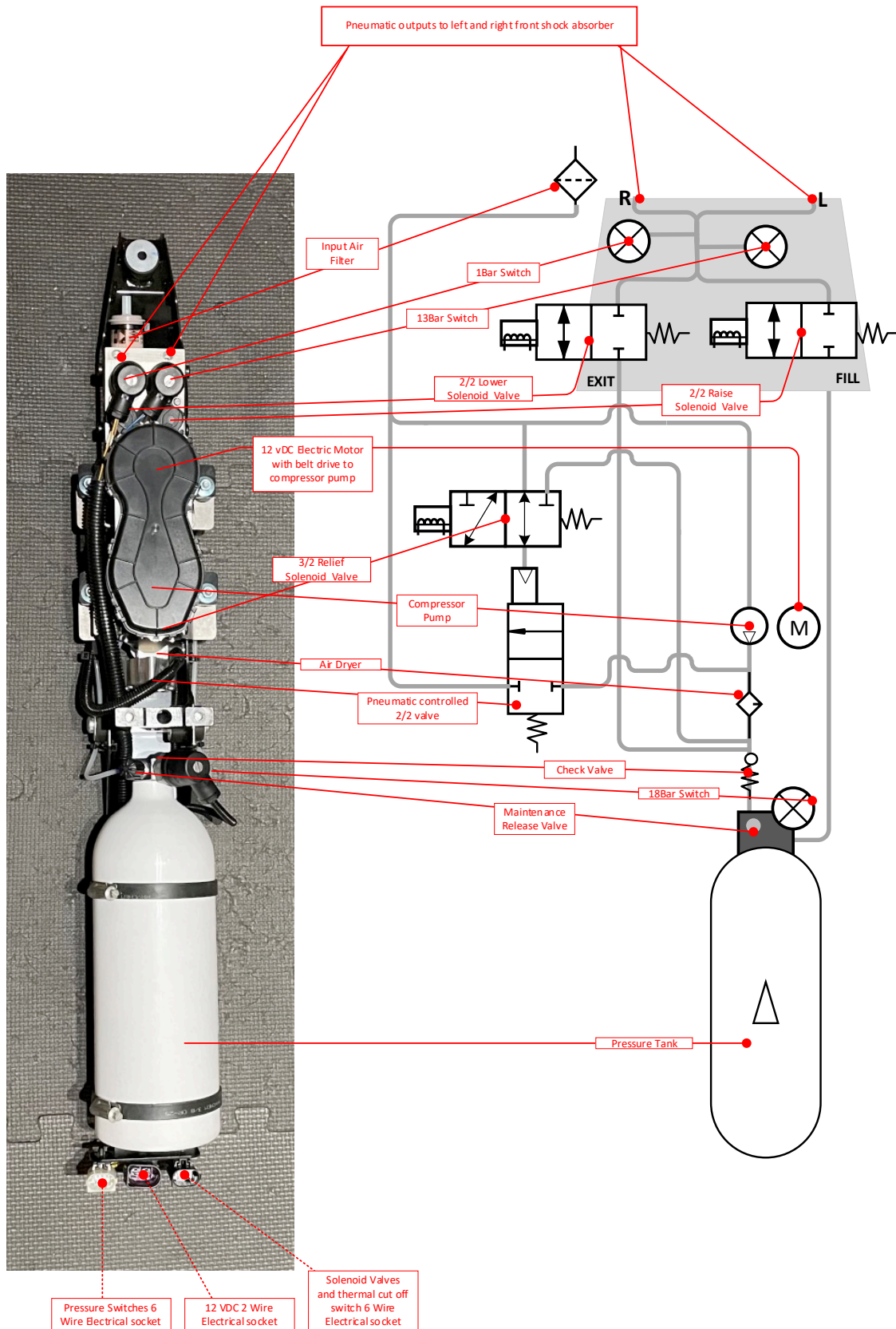


Figure 2: Electropneumatic FAL Functional Components

## 4. FAL Compressor Functional Components

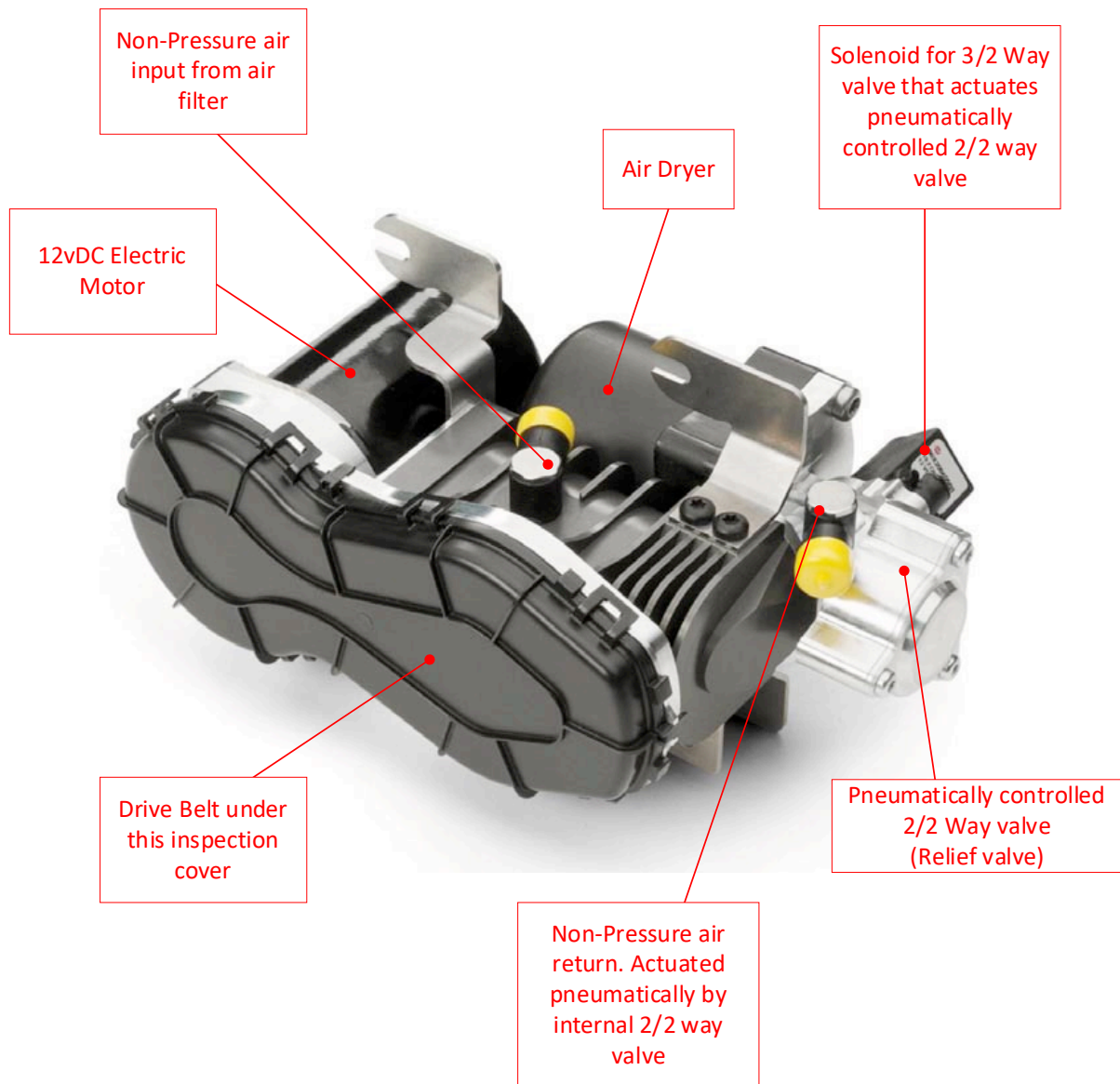


Figure 3: Electropneumatic FAL Compressor Unit Functional Components

## 5. FAL Pneumatic System Charging Procedure

- 1 On first Power up, if the 18Bar switch on the pressure tank is open (electrically) 12vDC is sent to the electric motor. This belt driven motor drives the compressor piston which draws external air in through the air filter.
- 2 This air passes through the air dryer and is pumped into the pressure tank (Note this can take over two minutes if the tank is empty)
- 3 Once the pressure in the tank reaches 18Bar, the pressure switch is forced closed causing the switch to electrically close.
- 4 The closing of the switch causes the control system to switch the electric motor off

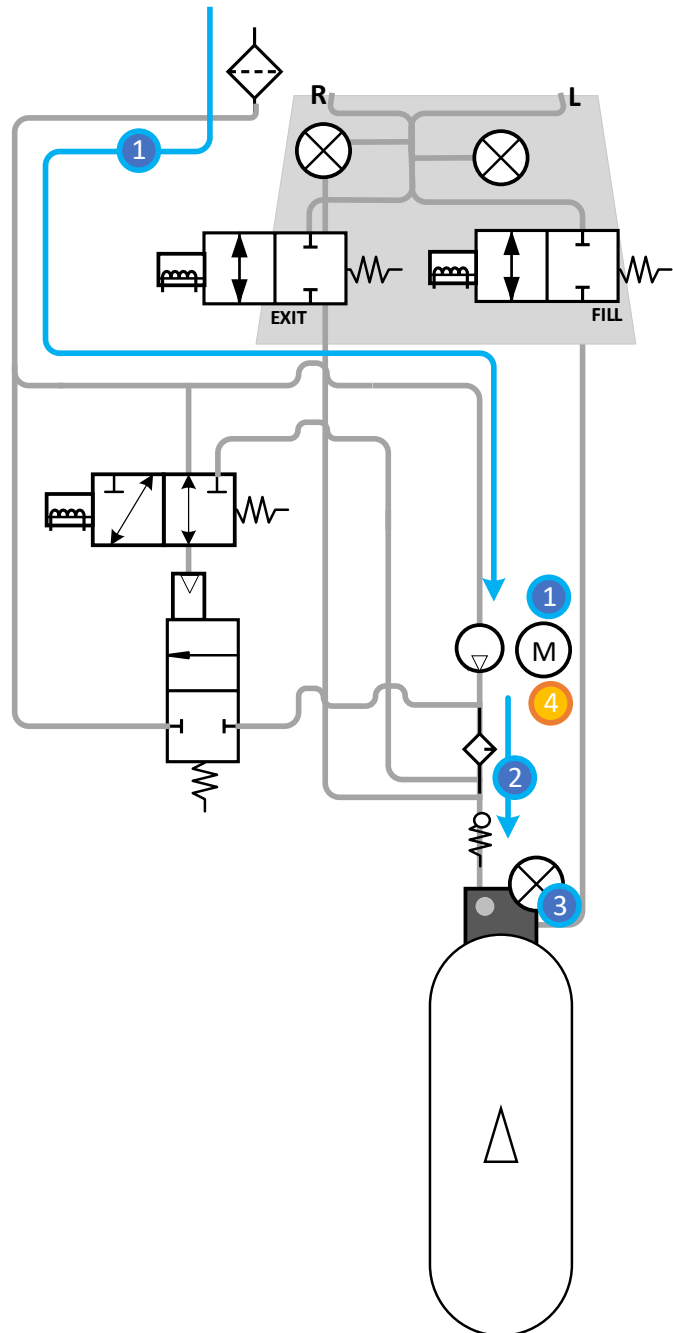


Figure 4: Electropneumatic FAL System Charging Procedure

## 6. FAL Pneumatic System Lift Operation Procedure

- 1 When the engine is running and the driver pushes the FAL switch the control system sends 12vDC to the UP solenoid controlling the fill 2/2 Way valve
  - 2 This valve opening causes compressed air stored in the cylinder to be released into the vehicle shock absorbers lift chambers
  - 3 Once the required 13 bar of pressure is reached in towards the shock absorbers the pressure switch is activated causing it to close an electrical contact that signals the control unit in the car to raise the 'LIFT' status on the dashboard. In parallel the system will also stop sending 12vDC to the lift solenoid, thus forcing the fill 2/2 way valve to close and keep pressure in the shock absorbers
- **NOTE:** In parallel to the lifting operation, as the pressure in the tank will drop below 18 bar, the pressure switch on the tank will open causing the electric motor to start and drive the compressor pump. (See previous functional diagram)

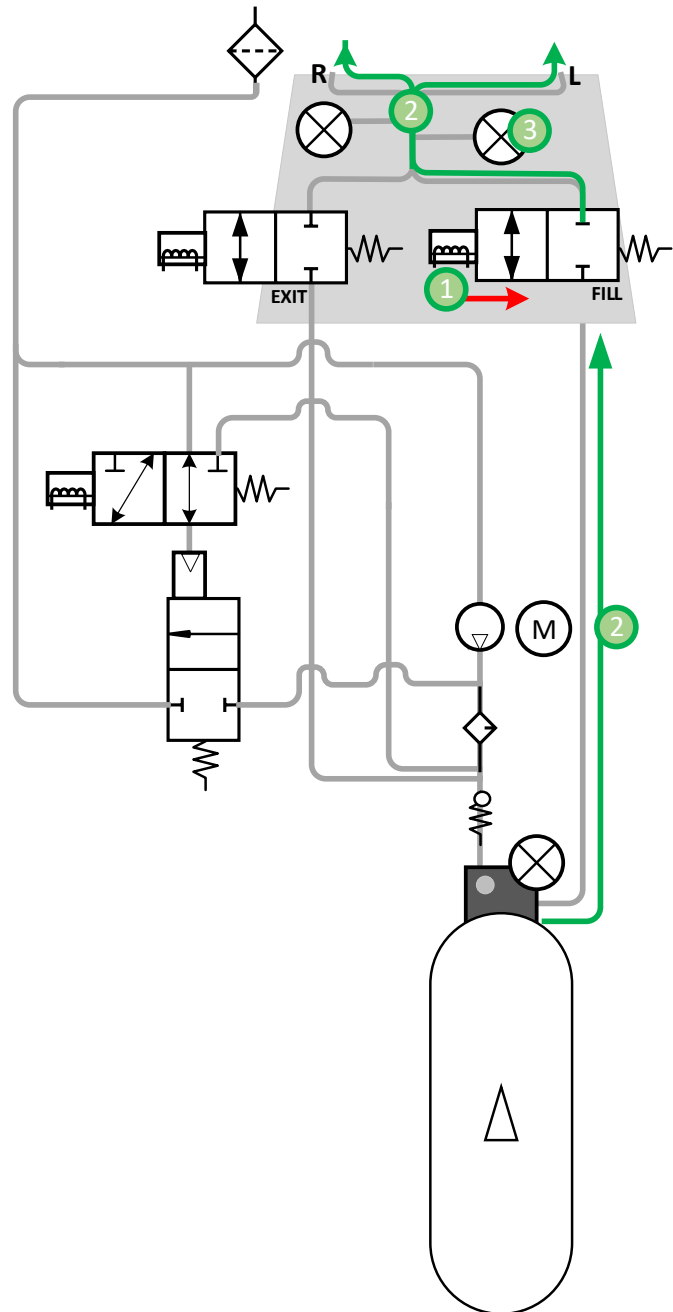


Figure 5: Electropneumatic FAL System Lift Initiation Procedure



## 7. FAL Pneumatic System Drop Operation Procedure

- 1 When the engine is running and the driver pushes the FAL switch (Providing the safety condition is met as highlighted in red text) the control system sends 12vDC to the down solenoid controlling the exit 2/2 Way valve
- 2 With this valve being actuated, air flows from the shock absorbers lift air chambers back towards the storage tank regulator, where it is then channelled back through the air dryer in the reverse direction and vented out through the air filter (Hence Whoosh sound)
- 3 When the air pressure lowers to 1 Bar the pressure switch is opened which in turn signals the 'LIFT' message on the dashboard matrix display to go out.

- 1<sub>a</sub> In Parallel to the down solenoid actuation the system also actuates the venting 3/2 way solenoid valve.

- 1<sub>b</sub> Actuating this valve causes air escaping from the shocks to be channelled through this valve and actuate the pneumatic 2/2 way valve, thus opening up a venting path.

- Note: It is possible that should the pressure in the storage tank drop below 18 Bar during this axle lowering process the 18 Bar pressure switch open on the storage tank regulator. It is likely that the control system will not act on this and therefore not activate the compressor pump when the system is lowering.
- SAFETY: The system will not respond to the FAL button being pressed in the centre console if a door is open on the vehicle. This is to prevent kurb damage occurring to the vehicle doors on lowering
- If the vehicle reaches a speed of 50Kph the system is programmed to automatically actuate the down solenoid (and recirculation solenoid). This will drop the lift so that aerodynamic of the vehicle being lifted at speed are not compromised

Note the idle state for this switch is open. It will remain closed when pressure above 1 bar and open below

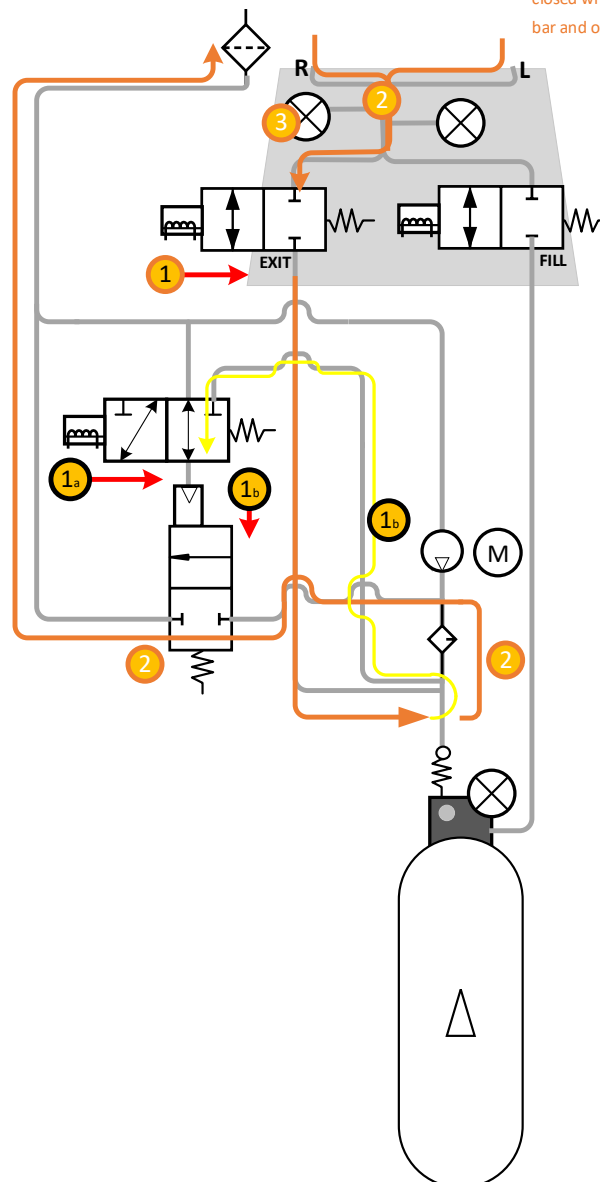


Figure 6: Electropneumatic FAL System Drop Initiation Procedure

## 8. FAL Electrical System Circuit

The thermal switch serves to prevent the system overheating in warmer climates and also from repeated use

The central control unit also has an anti-play function that prevents the system being repeatedly used. It is limited to six activations within 60 seconds. It then locks out for two minutes.

The system appears to be wired back to a modified version of the rear control unit in the car. This is located under the passenger seat. Two versions of this control unit exist for cars with or without Front Axle Lift (FAL)

Meter testing all three Suco Pressure switches proves them to be in open state when no calibrated actuation pressure is detected.

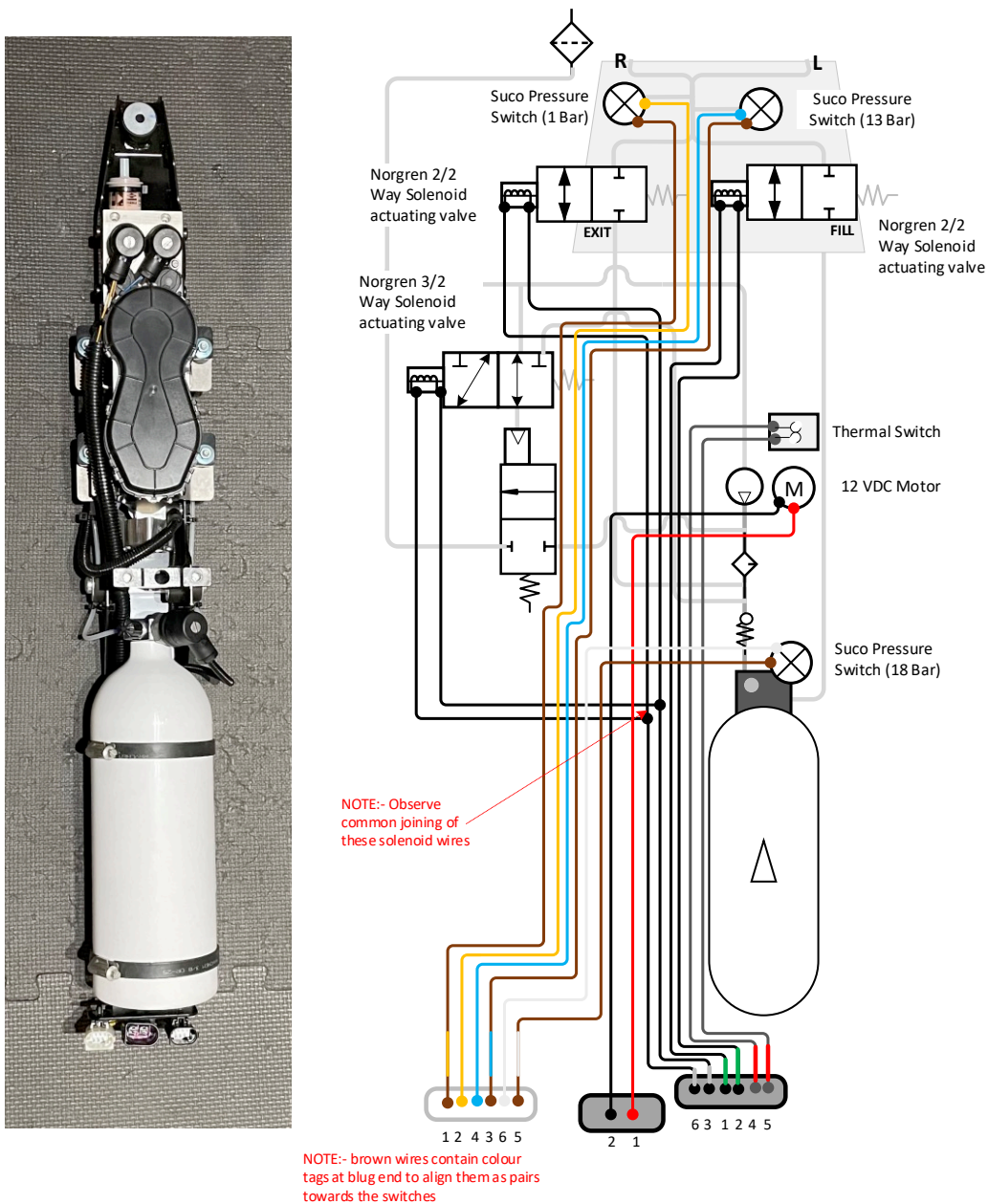


Figure 7: Electropneumatic FAL Unit Electrical Schematic