

# Queensland Code of Practice: Vehicle Modifications (QCOP)

Code LG6: Fitting of Air Operated Accessories

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# CODE LG6

## Light Vehicle Modifications for Fitting of Air Operated Accessories

### 1.0 Scope

The LG6 modification code specifies requirements for certifying modifications for the fitting of air operated accessories to light vehicles, that being vehicles having a Gross Vehicle Mass (GVM) rating that does not exceed 4,500 kg.

This code covers modifications to eligible light vehicles under the following Australian Design Rule (ADR) categories: MB, MC, MD1, MD2, MD3, NA and NB1. This code covers modifications to light vehicles including the installation of an additional method of brake application and pressure protection valves for air operated accessories in the brake system. This code does not cover the modifications related to any other modification or addition to the brake system.

The original vehicle manufacturer (OVM) refers to the entity holding the first stage Identification Plate Approval (IPA). An entity holding the Second Stage Manufacture (SSM) Approval or Registered Automotive Workshop Scheme (RAWS) Approval is not deemed as the OVM.

In cases where the OVM has not specified a GVM rating, the maximum laden mass at which the OVM has shown compliance with the ADRs is to be taken as the original GVM rating. This information must be obtained from a reliable and traceable source.

This code is not to be used for certifying modifications to new light vehicles before being provided to market in Australia. To certify modifications to heavy vehicles, that being vehicles that exceed 4,500 kg GVM or Aggregate Trailer Mass (ATM), refer to the *National Code of Practice for Heavy Vehicle Modifications* (VSB 6).

#### 1.1 Modifications permitted under Code LG6

Modifications that may be certified under LG6 code are:

- Installation of a pressure protection valve for the use with air operated accessories.
- Installation of an additional method of brake application.

#### 1.2 Modifications not permitted under Code LG6

Modifications that must not be certified under LG6 code are:

- Modifications other than those described in Section 1.1.
- Modifications to vehicles that are not mentioned in Section 1.3.
- Any other modifications or additions to the brake system.

#### 1.3 Vehicle categories permitted to be certified under Code LG6

Modifications that may be permitted as described in Section 1.1 must be in one of the vehicle categories as specified by Table LG6-1.

**Table LG6-1 List of permitted vehicles for LG6 modification**

<b>Vehicle Category</b>	<b>Category Code</b>
Forward-control passenger vehicle	MB
Off-road passenger vehicle	MC
Light omnibus up to 3.5 tonnes GVM and up to 12 seats up to 3.5 tonnes GVM and more than 12 seats over 3.5 tonnes and up to 4.5 tonnes GVM	MD1 MD2 MD3
Light goods vehicle	NA
Medium goods vehicle over 3.5 tonnes and up to 4.5 tonnes GVM	NB1

## 2.0 General Requirements

All work must also comply with the requirements contained in sub-section 2 *General Requirements* of Section LG of the *National Code of Practice (NCOP) – Light vehicle modifications* (VSB 14). Specific requirements in this code take precedence over any general instructions in VSB 14.

Extensive modifications to a vehicle may affect the warranty provided by the OVM. It is the responsibility of the certifying Approved Person (AP) to consider the effect of the modification on warranty and clarify this point to the modifier and vehicle operator prior to modification, if affected. Consideration of the effect this modification may have on product warranty is outside the scope of this code.

For audit purposes, sufficient documentary and photographic evidence of the modification must be retained by the certifying AP.

### 2.1 Compliance with applicable vehicle standards

- 2.1.1** The modified vehicle must continue to comply with the applicable ADRs.
- 2.1.2** If different or additional ADRs apply to the modified vehicle due to the modifications, the vehicle must comply with those ADRs that apply to it after modification.
- 2.1.3** A modified vehicle must comply with the applicable in-service requirements of the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2021* (the VSS regulation).
- 2.1.4** A pre-ADR modified vehicle must continue to comply with the VSS regulation.
- 2.1.5** Specific requirements, if listed in Section 3.0 of this code, take precedence over the requirements in Section 2.0.
- 2.1.6** Outlined in Table LG6-2 are areas of the vehicle that may be affected by the modifications and may require re-certification, testing and/or data to show compliance of the modified vehicle.

**Table LG6-2 List of items and likely affected ADRs**

<b>DETAIL</b>	<b>REQUIREMENTS</b>
Brake Hoses	ADR 7/.., 42/..
Brake System	ADR 31/.., 35/..
General Safety Requirements	ADR 42/
Brake Performance	<i>Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2021</i>

**Note:** This is not an exhaustive list and compliance to other ADRs may also be affected.

The ADR applicability is according to the vehicle's category and date of manufacture. It is the responsibility of the certifying AP to verify compliance to the applicable ADRs. The certification must include the vehicle date of manufacture in addition to the date of modification.

Sections 2.2 to 2.5 relate to the general requirements applying to different areas of the modifications under LG6 code.

## **2.2 Modification criteria**

- 2.2.1** The modification must be performed in accordance with the manufacturer's guidelines if applicable.

## **2.3 Parking brake system**

- 2.3.1** The vehicle must continue to meet performance requirements of ADR 31/.. or ADR 35/.., as applicable, when loaded to its GVM with a uniformly distributed load.
- 2.3.2** For pre-ADR vehicles, ensure that the combined load on all axles fitted with brakes actuated by the parking brake system is not less than one third of the vehicle's GVM.
- 2.3.3** For pre-ADR vehicles, the brake control must be designed to minimise the possibility of inadvertent release of the brake.
- 2.3.4** For pre-ADR vehicles, any modification that changes how the park brake system is applied must be designed to be separate from the service brake control and incorporate a device to retain it in the brake on position.

## **2.4 Joints and fittings**

- 2.4.1** All fittings must be of the correct type, size and compatible thread and all joints must be free from leakage.

## **2.5 Pipes, hoses and wiring**

- 2.5.1** All non-standard air or hydraulic lines must be of the appropriate sizing and material.
- 2.5.2** Pipes and hosing must meet appropriate standards as those in table LG6-3.

**Table LG6-3 Pipes and hosing appropriate standards**

<b>Component</b>	<b>Manufacturing Standard</b>
Air Brake Piping	SAE J844 or equivalent
Air Brake Hoses	SAE J1402 or equivalent
Hydraulic Brake Piping	SAE J1047 or equivalent
Hydraulic Brake Hoses	SAE J1401 or equivalent
Flares for Tubing	SAE J5336 or equivalent

**2.5.3** Components used must be within manufacturer ratings.

**2.5.4** All air and hydraulic lines that are installed must be protected from exposure to excessive heat, abrasion, movement, stress and impact.

### **3.0 Specific Requirements**

The following specific requirements apply.

#### **3.1 Pressure protection valves**

**3.1.1** The vehicle's air compressor must be of suitable capacity and duty cycle including for any air-operated accessories fitted.

**3.1.2** Air supply must be denied to any device deriving air from the same source as the service brake system whenever the pressure in the service brake system is less than 450 kPa.

**3.1.3** When the vehicle's air compressor supplies air to systems other than the brake system, the preference must be given to charging the brake system air reservoirs.

**3.1.4** If an auxiliary device fails, the service brake system must be able to maintain an air pressure of at least 450 kPa.

**3.1.5** If an additional tank is fitted for air powered accessories or after a pressure protection valve, the vehicle must continue to comply with the re-charge requirements of ADR 35/.. or the relevant vehicle standards regulation.

#### **3.2 Additional method of brake application**

**3.2.1** When installing an additional method of brake application, it must operate only on either the park brake system or the service brake system, not on both.

**3.2.2** The additional method of brake application must not be capable of engaging when the vehicle is travelling in excess of 10 km/h in the forward direction.

**3.2.3** Any additional methods of brake application or release must be within the reach of the driver in their normal seated position.

**3.2.4** An additional method of brake application must be fitted with an in-cab audible and visual warning to alert the driver when the system is activated.

### **3.3 Service brakes**

- 3.3.1** Where an additional method of brake system is installed, the application and release method(s) must meet the requirements of ADR 35/.. as applicable.
- 3.3.2** Ensure where connected to the service brake system the application method applies the brakes to all of the road wheels.

### **3.4 Park brakes**

- 3.4.1** Ensure where connected to the park brake system the release is designed to minimise the possibility of inadvertent release of the brake.

## **4.0 Limitations**

Section 1.2 of this code provides information about which types of modifications are not permitted to be certified under the LG6 code. In addition, the following limitations apply.

### **4.1 Electronic Stability Control**

If the vehicle is fitted with Electronic Stability Control (ESC) by the OVM, the following conditions must be met:

- 4.1.1** The ESC system must not be disabled.
- 4.1.2** It must be ensured that the modifications being certified do not reduce the effectiveness of the ESC system.
- 4.1.3** The effect of the modification on the ESC system should be considered and recertified if deemed required.

## **5.0 Additional Modifications and Changes to Vehicle Category**

- 5.1** If additional modifications are made that may or may not be essential for any modification to the brake system, all such modifications must be assessed separately and certified using appropriate codes or specific approvals. For example, modifications to the rear axle assembly would require certification under the LB2 modification code.
- 5.2** If the vehicle's ADR category has changed due to a change in seating capacity or GVM, the vehicle must comply with the vehicle standards that apply to it in its new category. Certification under such compliance using the appropriate additional code(s) must be provided, for example, certification to the LO1 code, unless specific exemption has been granted for this purpose.

## Checklist LG6

### CODE LG6: Modification for Fitting of Air Operated Accessories

Form No: LG6

Provide an answer to each of the following (N/A=Not Applicable, Y=Yes, N=No)

<b>Modification Certificate Number:</b>	_____	
<b>1</b>	<b>Brake system</b>	
1.1	Does the vehicle meet performance requirements of ADR 31/.. or ADR 35/.., as applicable, when loaded to the vehicle's GVM with the load uniformly distributed, or for a pre-ADR vehicle, meet the parking brake system requirements as stated in <b>Section 2.3</b> ?	<input type="checkbox"/> Y <input type="checkbox"/> N
<b>2</b>	<b>Joints and fittings</b>	
2.1	Are all fittings of the correct type, size and compatible thread?	<input type="checkbox"/> Y <input type="checkbox"/> N
2.2	Are all joints free of leakage?	<input type="checkbox"/> Y <input type="checkbox"/> N
<b>3</b>	<b>Pipes, hoses and wiring</b>	
3.1	Do the pipes and hosing meet the appropriate manufacturing standards as those in <b>Table LG6-3</b> ?	<input type="checkbox"/> Y <input type="checkbox"/> N
3.2	Are installed air and hydraulic lines protected from exposure to excessive heat, abrasion, movement, stress and impact?	<input type="checkbox"/> Y <input type="checkbox"/> N
3.3	Are components used within manufacturer ratings?	<input type="checkbox"/> Y <input type="checkbox"/> N
<b>4</b>	<b>Pressure protection valve</b>	
4.1	Is the air compressor of suitable capacity and duty cycle, considering the air draw of any air-operated accessories fitted?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
4.2	Are all air operated accessories which derive air from the same source as the service brake system denied air supply when the pressure in the service brake system is less than 450 kPa?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A

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4.3	When the vehicle's air compressor supplies air to systems other than the brake system, is the preference given to charging the brake system air reservoirs?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
4.4	In the case of a failure of an auxiliary device, does the service brake maintain an air pressure of at least 450 kPa?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
4.5	If an additional tank is fitted for the air operated accessories, or after the pressure protection valve, does the vehicle comply with the re-charge requirements of ADR 35/.. or the relevant vehicle standards regulation (as applicable)?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
<b>5</b>	<b>Additional method of brake application</b>	
5.1	Does the additional method of brake application operate on only the park brake system or the service brake system, that is, not both?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
5.2	When the vehicle is travelling in excess of 10 km/h, is the additional method of brake application rendered incapable of engaging the brakes?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
5.3	Does the additional method of brake application trigger an in-cab audible and visual warning to alert the driver when the system is activated?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
5.4	Is the control for the additional method of brake application within reach of the driver in their normal seated position?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
<b>6</b>	<b>Service brakes</b>	
6.1	Does the application and release method(s) of the additional method of brake application meet the requirements of ADR 35/.. as applicable?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
6.2	If the additional method of brake application is connected to the service brake system, does the application method apply to all of the road wheels?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
<b>7</b>	<b>Park brakes</b>	
7.1	If the additional method of brake application is connected to the park brake system, is the system designed to minimise the possibility of inadvertent release of the brake?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A

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<b>8</b>	<b>Electronic Stability Control (ESC) system</b>	
8.1	If fitted, is it ensured that the ESC system is not disabled?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
8.2	If fitted, is it ensured that the ESC system is not made less effective due to modifications carried out under this code?	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A
<b>9</b>	<b>Modification details</b>	
9.1	Has the modification been performed in accordance with the manufacturer's guidelines?	<input type="checkbox"/> Y <input type="checkbox"/> N
<b>10</b>	<b>ADR compliance</b>	
10.1	Does the modified vehicle continue to comply with all affected Australian Design Rules (ADRs)?	<input type="checkbox"/> Y <input type="checkbox"/> N
<b>11</b>	<b>Workmanship</b>	
11.1	Is the quality of the workmanship to a satisfactory industry standard?	<input type="checkbox"/> Y <input type="checkbox"/> N

**Note:** If the answer to any question is **N (No)**, other than 9: Modification details, the design cannot be certified under LG6 code.

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CERTIFICATION DETAILS																
<b>Make</b>						<b>Model</b>						<b>Year of Manufacture</b>				
<b>VIN</b>																
<b>Chassis Number (If applicable)</b>																
<b>Brief Description of Modification/s</b>																
<b>Vehicle Modified By</b>																
<b>Certificate Number (If applicable)</b>																
<b>Vehicle Certified By (<i>Print</i>)</b>																
<b>Signatory's Employer (If applicable)</b>																
<b>Signatory's Signature</b>											<b>Date</b>					