

**MINISTERE DES TRANSPORTS**

Luxembourg, le 10 mai 2006  
19-21, Boulevard Royal  
L-2910 Luxembourg  
Tél 478-1 – Télécopieur 241 817 – Télex 1465 CIVAIR LU

REFERENCE: E13\*67R00\*67R01\*0194\*02

ANNEXES: Documentation technique



**Communication concernant:**

Communication concerning:


- ~~la délivrance d'une homologation~~  
approval granted
- ~~l'extension d'homologation~~  
approval extended
- ~~le refus d'homologation~~  
approval refused
- ~~le retrait d'homologation~~  
approval withdrawn
- ~~l'arrêt définitif de la production~~  
production definitely discontinued

**d'un type d'équipement GPL en application du Règlement N° 67**  
of a type of LPG equipment pursuant to regulation N° 67

**Numéro d'homologation:**  
Approval number:

E13\*67R00\*67R01\*0194\*02

**Marque d'homologation:**  
Approval mark:

 67R-010194 class 2

1.

**Equipement GPL:**  
LPG equipment considered: <sup>1</sup>

**Réservoir:**  
Container:

- container

**Accessoires fixés au réservoir:**  
Accessories fitted to the container:

- 80 % stop valve
- lever indicator
- pressure relief valve (discharge valve)
- remotely controlled service valve with excess valve
- with/without LPG fuel pump

- Bloc multivannes, y compris les accessoires suivants:**  
Multivalve, including the following accessories:
- gas-tight housing
  - power supply bushing (pump/actuators)
  - LPG fuel pump
  - vaporizer/pressure regulator
  - shut-off valve
  - non-return valve
  - gas-tube pressure relief valve
  - service coupling
  - flexible hose
  - remote filling unit
  - gas injection device or injector
  - fuel rail
  - gas dosage unit
  - gas mixing piece
  - electronic control unit
  - pressure/temperature sensor
  - LPG filter unit
2. **Marque de fabrique ou de commerce:**  
Trade name or mark: LOVATO
- Type:**  
Type: STIL inj
- Variantes:**  
Variants: STIL three versions of 2, 3, 4 injectors  
L2, L3, L4 three versions of 2, 3, 4 injectors  
N2, N3, N4 three versions of 2, 3, 4 injectors
3. **Nom et adresse du fabricant:**  
Manufacturer's name and address: Officine Lovato S.p.A.  
Strada Casale, 175  
I-36100 Vicenza  
ITALY
4. **Le cas échéant, nom et adresse du mandataire du fabricant:**  
If applicable, name and address of the manufacturer's representative: not applicable
5. **Equipement présenté à l'homologation le:**  
Submitted for approval on: from 22.12.2005 to 12.01.2006
6. **Autorité déléguée:**  
Assigned authority: Société Nationale de Certification et d'Homologation  
L-5201 Sandweiler
- Service technique chargé des essais d'homologation:**  
Technical service responsible for conducting approval tests: Luxcontrol S.A.  
B.P. 349  
L-4004 Esch-sur-Alzette
7. **Date du procès-verbal délivré par ce service:**  
Date of report issued by that service: 02.05.2006
8. **Numéro du procès-verbal:**  
Number of test report issued by that service: LCA 54 309 002 6
9. **Homologation:**  
Approval: extended
10. **Raisons de l'extension (éventuellement):**  
Reason(s) for extension (if applicable): refer to annex A - Page 1 of technical report

11. **Lieu:**  
Place: Luxembourg
12. **Date:**  
Date: 10 mai 2006
13. **Signature:**  
Signature: Pour le Ministre des Transports



A handwritten signature in black ink, appearing to be "Paul Schmit".



Paul Schmit  
Commissaire du Gouvernement

14. **Des copies soumis dans le dossier d'homologation ou d'extension de l'homologation peuvent être obtenues sur demande.**

The documents filed with the application or extension of approval can be obtained upon request.

See index to type-approval report

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<sup>1</sup> **Biffer les mentions inutiles.**  
Strike out what does not apply

**Appendice 1 (réservoirs uniquement)**

Appendix 1 (containers only)

**1. Caractéristiques du réservoir de base (configuration 00)**

Container characteristics from the parent container (configuration 00)

**a) Marque de fabrique ou de commerce:**

a) Trade name or mark: not applicable

**b) Forme:**

b) Shape: not applicable

**c) Matériau:**

c) Material: not applicable

**d) Ouvertures:**

d) Openings: not applicable

**e) Epaisseur de la paroi:**

e) Wall thickness: not applicable

**f) Diamètre (réservoir cylindrique):**

f) Diameter (cylindrical container): not applicable

**g) Hauteur (forme de réservoir spéciale):**

g) Height (special container shape): not applicable

**h) Surface externe:**

h) External surface: not applicable

**i) Configuration des accessoires fixés au réservoir (voir tableau 1):**

i) Configuration of accessories fitted to container (see table 1):

**Tableau 1:**

Table 1:

N° N°	Accessoire Item	Type Type	N° d'homologation Approval N°	N° d'extension Extension N°
a)	<b>Limiteur de remplissage à 80%</b> 80% stop valve:	-	-	-
b)	<b>Jauge</b> Level indicator	-	-	-
c)	<b>Soupape de surpression:</b> Pressure relieve valve:	-	-	-
d)	<b>Vanne d'isolement télécommandée avec limiteur de débit:</b> Remotely controlled service valve with excess valve:	-	-	-
e)	<b>Pompe à GPL:</b> Fuel pump	-	-	-
f)	<b>Bloc multivannes:</b> Multivalve:	-	-	-
g)	<b>Enceinte étanche:</b> Gas-tight housing	-	-	-
h)	<b>Raccord électrique d'alimentation:</b> Power supply bushing:	-	-	-

i)	<b>Soupape antiretour:</b> Non return valve:	-	-	-
j)	<b>Dispositif de surpression:</b> Pressure relief device:	-	-	-

2. **Liste des réservoirs de la même famille**  
(les listes des réservoirs de la même famille indiquent le diamètre, la capacité, la surface externe et la (les) configuration(s) possible(s) des accessoires fixés au réservoir):

List of container family (The lists of the container family indicate the diameter, capacity, external surface and the possible configuration(s) of the accessories fitted to the container):

**Tableau 2:**

Table 2:

N° N°	Type Type	Diamètre/hauteur Diameter/height [mm]	Capacité Capacity [l]	Surface externe External surface [cm <sup>2</sup> ]	Configuration des accessoires Configuration of accessories [codes] <sup>1</sup>
-	-	-	-	-	-
-	-	-	-	-	-

3. **Listes des configurations possibles des accessoires fixés au réservoir (indiquer la liste des accessoires possibles, qui diffèrent de la configuration essayée (code 00) et qui peuvent être fixés au type de réservoir en question. Pour tous les accessoires, préciser le type, le numéro d'homologation et le numéro d'extension, en indiquant pour chacun son propre code de configuration):**

Lists of the possible configurations of accessories fitted to the container (Specify a list of the possible accessories, which differ from the tested configuration of accessories (code 00) and which may be fitted to the type of container. Specify for all accessories, type, approval number and extension number, indicating its own configuration code):

**Tableau: 3**

Table 3:

N° N°	Accessoires Accessories	Type Type	N° d'homologation Approval N°	N° d'extension Extension N°	Configuration des accessoires [code] Configuration of accessories [code]
a)	-	-	-	-	-

<sup>1</sup> Code 00 et, s'il y a lieu, même(s) code(s) qu'au tableau 3.  
Code 00 and, if applicable, same code(s) from table 3.

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REFERENCE: E13\*67R00\*67R01\*0194\*02

ANNEXES: Documentation technique

**Index du dossier d'homologation**

Index to type-approval

	<b>Numéro d'homologation:</b> Approval number:	E13*67R00*67R01*0194*02
	<b>Marque de fabrique ou de commerce:</b> Trade name or mark:	LOVATO
	<b>Type:</b> Type:	STIL inj
1.	<b>Procès-verbal d'essai</b> Test report:	LCA 54 309 002 6
	- Technical report	Page 1 to 6
	- Index:	Annex A – Page 1
2.	<b>Dossier du constructeur:</b> Report of the manufacturer:	
	- index to information document:	refer to Annex A page 1 of technical report
3.	<b>Autres documents annexés:</b> Other documents annexed:	not applicable
4.	<b>Date de délivrance de l'homologation initiale:</b> Date of issue of initial type approval:	19.07.2002
5.	<b>Date de la dernière délivrance de pages révisées:</b> Date of last issue of revised pages:	not applicable
6.	<b>Date de la dernière délivrance d'une homologation révisée :</b> Date of last extension:	10.05.2006



## TECHNICAL REPORT

No.: LCA 54 309 002 6

Inspection concerning the

### Specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system

performed according to

**ECE – Regulation No. 67**

Type: STIL inj  
Manufacturer: Officine Lovato s.p.a.  
Strada Casale, 175  
I-36100 Vicenza

Extension 2 to ECE Type Approval no.: E13\*67R00\*67R01\*0194\*00

#### Index:

1. General	Page	2
2. Inspections and their results	Page	3
3. Evaluation of test results	Page	5
4. Statement of compliance	Page	6
5. Annex (beginning with an index)		

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E13\*67R00\*67R01\*0194\*02  
Société Nationale de Certification et d'Homologation  
L-5201 SANDWEILER (Luxembourg)  
Organisme accrédité OLAS EN 45011  
Accréditation N° 5/001 (Portée communiquée sur demande)

...  
- **Luxcontrol SA**

1, Av. des Terres Rouges  
BP 349  
L-4004 Esch-sur-Alzette

Tél: ++352-54.70.51-1  
Fax: ++352-54.04.48  
E-Mail: homologation@luxcontrol.com  
Int.: www.luxcontrol.com

CCP: 58 197-94  
BGL: 30-161 207-27

TVA: LU 113 536 61  
RC Lux.: n° B15664



1. **General**

1.1. **Test Provisions**

The inspection was carried out according to the requirements of ECE-Regulation No. 67 including Supplement 2 to the 01 series of amendments, which entered into force on July 16, 2003.

1.2. **Information concerning the vehicle type and the requested approval**

The statements below apply to the previous ECE type-approval as referred to on page 1.

1.2.1. **[] Numbering according to the communication concerning the approval of ECE-R67**

[1.] LPG equipment considered:

**Injector**

- **Type:** STIL inj
- **Variants:** STIL (three versions of 2, 3, 4 injectors)  
L2, L3, L4 (three versions of 2, 3, 4 injectors)  
N2, N3, N4 (three versions of 2, 3, 4 injectors)

[2.] Trade name or mark:

**LOVATO**

[3.] Manufacturer's name and address:

**Officine Lovato s.p.a.  
Strada Casale, 175  
I-36100 Vicenza**

[4.] If applicable, name and address of manufacturer's representative:

**not applicable**

[5.] Submitted for approval on: **December 22, 2005**

[10.] Reason(s) of extension:

**added variants L2, L3, L4, N2, N3, N4 including two new electrovalves and three injectors position arrangements. The pastille support is integrated in the injector body.**





## 2. Inspections and their results

### 2.1. Version of the tested equipment

The following variants have been used for testing (if not stated in part 1.2.1. of this report):

Gruppo 4 elett.ri STIL c/ugelli intercambiabili

### 2.2. Inspection items

	Location of test:	Date of receipt of test item:	Date of test:	Inspectors
Main	CSI – v.le Lombardia	May 8, 2002	May 2002	--
Ext. 1:	I-20021 Bollate (MI)	August 25, 03	August 25, 03	D. Durazzi
Ext. 2:		December 22, 05	December 22, 05	D. Durazzi

#### 2.2.1. General

The marking requirements according to item 4.1. and 4.2. of Part I of the Regulation are fulfilled.

Every material of the equipment in contact with LPG is compatible with it.

The installation of the component of the LPG-equipment has to comply with the relevant electromagnetic compatibility requirements according to the Regulation 10.02 series of amendments, or equivalent.

The device is classified Class 2.



\* LCA 54 309 002 6 \* OFFICINE LOVATO S.p.A. \* STIL inj \* -- \* R67 \*

Page 4

2.2.2. Inspections: Annex 11 (Class 2 device)

Tests	Test results	Line item
Overpressure test	no rupture or permanent distortion at a pressure of 1015 kPa (tested with all injectors open)	Annex 15, par. 4
External leakage test	leakage from stem or body seals or other joints less than 15 cm <sup>3</sup> / hour under a pressure of 675 kPa at room temperature, - 20°C and + 120°C (tests performed both with injectors open and closed)	Annex 15, par. 5
High temperature test	leakage from stem or body seals or other joints less than 15 cm <sup>3</sup> / hour under a pressure of 675 kPa at + 120°C (tests performed both with injectors open and closed)	Annex 15, par. 6
Low temperature test	leakage from stem or body seals or other joints less than 15 cm <sup>3</sup> / hour under a pressure of 675 kPa at - 20°C (tests performed both with injectors open and closed)	Annex 15, par. 7
LPG compatibility	all the synthetic materials used satisfy the requirements	Annex 15, par. 11
Corrosion resistance	requirements fulfilled	Annex 15, par. 12
Provisions regarding electrical insulation	requirements fulfilled	Part 1, 6.15.2.
Provisions regarding the insulation class	requirements fulfilled	Part 1, 6.15.2.1.
Provisions on valves activated by el. power	requirements fulfilled	Part 1, 6.15.3.1.
Provision regarding heat exchange medium (compatibility / pressure)	requirements fulfilled	Part 1, 6.15.4.1.

E13\*67R00\*67R01\*0194\*02 :

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**2.3. Remarks**

Inspection results are only applicable to items, which have been tested.

**2.4. Test facilities**

Calibration of measuring and test equipment used to carry out the inspections is in accordance with the EEC-Directive and/or ECE-Regulation stated in 1.1. of this report and with ISO 17025.

**3. Evaluation of test results**

**3.1. Variants and equipment covered**

The tests carried out cover the following variations as far as these are relevant for the gas unit:

- versions and variants as stated in the information document

**3.2. Remarks**

**3.2.1. Main report:**

Not applicable

**3.2.2. Extension 1:**

The added versions did require new tests to be performed

**3.2.3. Extension 2:**

The added variants and versions did require new tests to be performed

...



4. **Statement of compliance**

The inspections items and measurements carried out have shown the compliance of the vehicle type described in this report and the attached Annex with the requirements of ECE-Regulation No. 67 including Supplement 2 to the 01 series of amendments, which entered into force on July 16, 2003.

Esch/Alzette, May 02, 2006

Luxcontrol s.a.  
Service Homologation-automobile

Paul Wax  
Ingénieur-Inspecteur

David Durazzi  
Ingénieur-Inspecteur

**Annex**



4. **Statement of compliance**

The inspections items and measurements carried out have shown the compliance of the vehicle type described in this report and the attached Annex with the requirements of ECE-Regulation No. 67 including Supplement 6 to the 01 series of amendments, which entered into force on January 18, 2006.

Esch/Alzette, January 25, 2007

Luxcontrol s.a.  
Service Homologation-automobile

David Durazzi  
Ingénieur-Inspecteur

Fernand Haas  
Ingénieur-Inspecteur

**Annex**



Index to the information package, including a summary in chronological order, concerning extensions and/or amendments

**EEC type-approval No.: not applicable**

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**Main Report**

Technical Report No.: LCA 54 309 020 6 Page 1 to 7

Composition of the Annex:

A: Index Page 1

B: Information folder Page 1 to 50

**Index to the information folder:**

- manufacturer's information document (page 1 to 50)




 Responsabile tecnico  
 Ing. Guido Gritti

Vicenza 23 gennaio 2007

## RELAZIONE TECNICA

### VAPORIZZATORE – REGOLATORE DI PRESSIONE GPL

### TYPE “ RGJ ” CLASSE 1-2-3

#### INTRODUZIONE

Il componente in oggetto è un vaporizzatore – regolatore di pressione con elettrovalvola integrata in ingresso del riduttore, per l'alimentazione di motori a combustione interna a ciclo otto.

#### DESCRIZIONE DEL COMPONENTE

(A) Il regolatore di pressione è costituito da un corpo riduttore, da un otturatore, da una membrana, da un piattello, da un sistema a molla per la riduzione della pressione e da un coperchio detto superiore. Questi componenti dello stadio di riduzione hanno la funzione di ridurre la pressione del GPL proveniente dall'elettrovalvola in ingresso del corpo ad un valore variabile fino a un massimo di 1,3 bar relativi al MAP. La pressione di esercizio non supera mai i 4,5 bar relativi e quindi il componente è classificato in classe 2.

(B) Il vaporizzatore è costituito da un corpo e da un coperchio detto inferiore. Esso svolge la funzione di scambiatore di calore acqua-GPL al fine di garantire al GPL la completa gassificazione ed una temperatura tale da evitarne la condensazione lungo il circuito di alimentazione al motore.

(C) L'elettrovalvola di intercettazione in fase liquida è integrata nel corpo riduttore, è un dispositivo elettromagnetico che impedisce il passaggio del GPL proveniente dal serbatoio in assenza di alimentazione elettrica. È posizionata all'ingresso del circuito gas, dopo il filtro(2) che ha la funzione di pulire il GPL, ed è costituita da un nucleo mobile(6), un nucleo fisso, un tubo guida detto campanile e da una bobina(7) alimentata +12V.

#### FUNZIONAMENTO DEL COMPONENTE

##### AFFLUSSO DI GPL E RIDUZIONE DI PRESSIONE (A)

Il GPL allo stato liquido spinto dalla pressione esistente nel serbatoio entra dall'ingresso (1) e arriva all'interno del filtro (2). Attraverso il canale (4) entra nella parte superiore dell'elettrovalvola (5) dove si trova il nucleo mobile (6) comandato dall'elettromagnete (7). Questo apre il foro di comunicazione con il canale (8) che porta il GPL sotto l'otturatore (9). Attraversa l'otturatore (9), esce dai fori dell'ugello (10) e arriva nella camera di uscita ridotto alla pressione variabile come citato al punto (A). Tale pressione è relativa a quella esistente nella camera superiore della membrana, posta in comunicazione pneumatica con il collettore d'aspirazione del motore a valle della valvola a farfalla. La riduzione della pressione è eseguita tramite l'otturatore (9) azionato dalla membrana (12), dalla molle inferiore (17) e dal sistema a molla (13) superiore tarabile con la vite di registro (15).

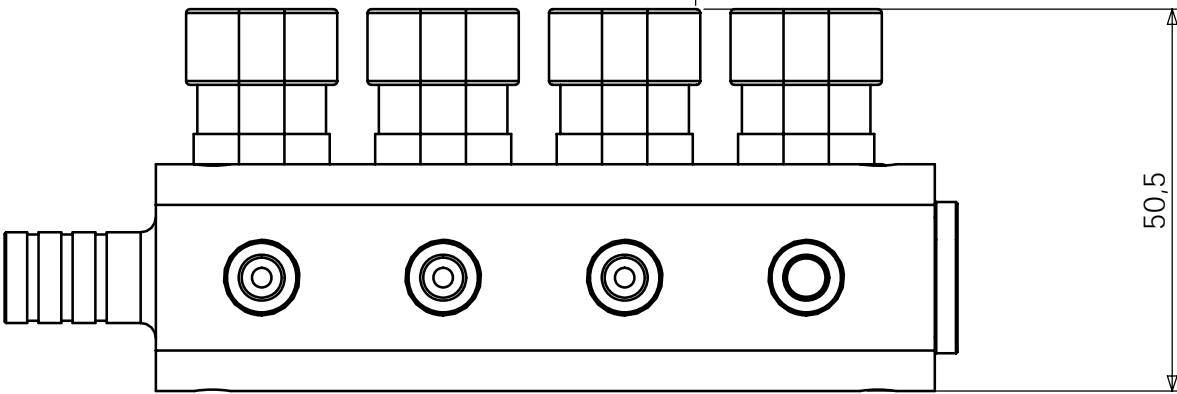
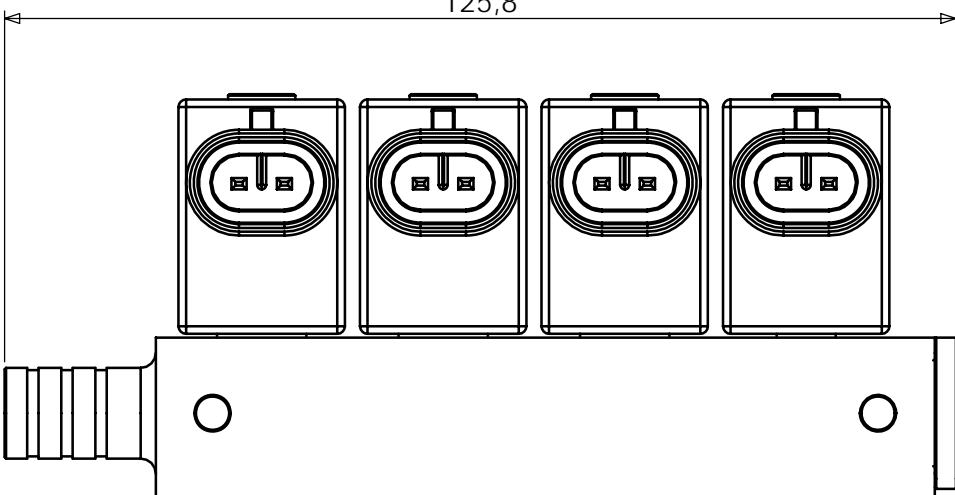
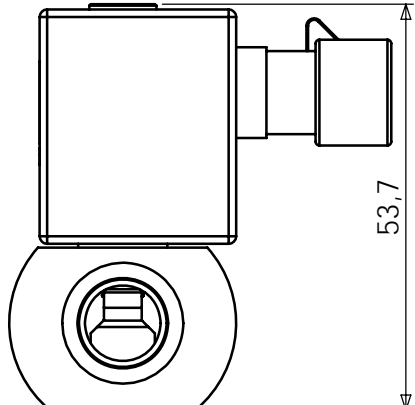
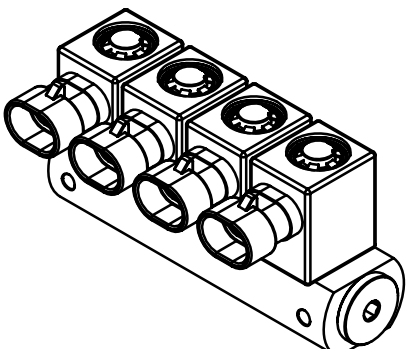



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