# eVP-500 REDUCER MANUAL

- Product Information
- Product variants
- Installation Instructions
- Programming & Calibration
- Service & Maintenance
- Frequently Asked Questions

This document provides information of the eVP-500:

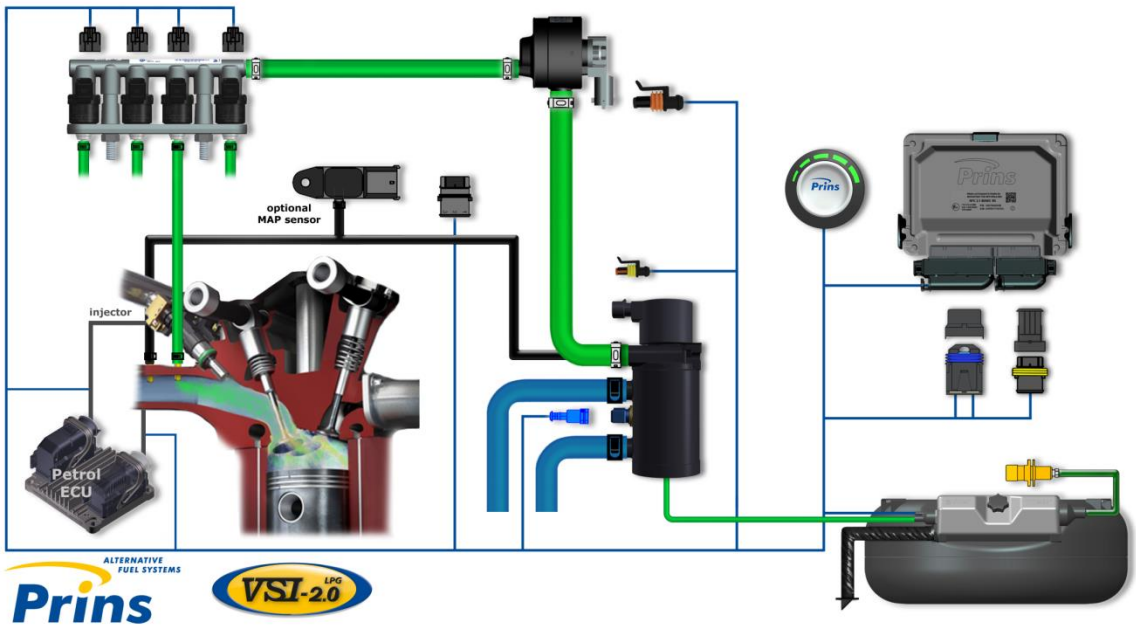
- Product information
- Product variants
- Installation instruction
- Calibration information
- Service and maintenance information.

## Contents

## Product information

eVP-500 is the abbreviation of electronic Variable Pressure 500Hp. It is a state-of-the-art full electronic reducer for the LPG market. It does not only surpass competitors in terms of capacity (500hp), it also extends the benefits of an electronic controlled LPG system with the possibility to fully control the system pressure.

### System overview




### Features

| |
|---|
| **Unique, next-generation concept** |
| - High performance (>370kW / 500hp) |
| - No diaphragm |
| **Housing** |
| - Compact and light weight design |
| - Lock-off valve integrated |
| - Integrated safety pressure relief valve |
| **System pressure** |
| - Fully dynamic output pressure |
| - Pressure adjustment by software |
| - No pressure loss even at higher flows |
| - No pressure drift over time |
| - No pressure peaks during fuel cut-off |
| **Service and Maintenance** |
| - Replaceable filter |
| - Easily accessible from top |
| **Installation / calibration** |
| - MAP connection not required / Via optional MAP sensor |
| - Special calibration parameters |
| - Standard coolant temperature sensor |
| - Regular Prins two pole Superseal connector for actuator |

## Technical Specifications

| | |
|---|---|
| **Type** | Single stage full electronic LPG pressure reducer |
| **Fuel type** | Liquefied Petroleum Gas (LPG) |
| **Environment** | Engine compartment |
| **Weight** | 800g |
| **Dimensions** | Ø56mm x 142mm |
| **Input pressure (Abs.)** | 300-2500 kPa |
| **Output pressure (Abs.)** | 0- 550 kPa, adjustable (software limited between 50-380kPa) |
| **Max Fuel flow rate** | >100 kg/h at 60°C ECT |
| **Pressure relieve valve** | 585 ±50 kPa (acc.to R67-01) |
| **Operating temperatures** | -40 to +120°C |
| **Gas inlet** | M12x1: 180/030001/B→ (Adapter ¼ NPT available)<br>M10x1 : 180/030001/A |
| **Gas outlet** | 16 mm hose connection |
| **Coolant connections** | 16mm hose connection (no flow direction specified) |
| **Temperature sensor type** | Standard Prins sensor, R-ntc at 20˚C is 2500Ω, IP 54A Connector |
| **MAP Reference** | Controlled by software |
| **AFC compatibility** | ~~AFC-2.0 V1~~ - AFC-2.0 V2 - AFC-2.1 V1 - AFC-2.1 V2 |

## Parts identification

eVP-500

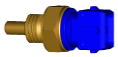
Actuator

Filter type 1

Filter type 2

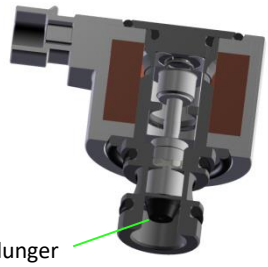
Body

PRV (Pressure relief valve)



ECT

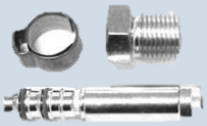
Heat exchanger



Plunger

**eVP-500 Variants**

- **Part number: 180/030001**

| Revision | /A | /B | /C |
|---|---|---|---|
| Solenoid |  O-ring at the bottom | |  O-ring above the thread |
| Filter |  Type 1 | |  Type 2 |
| Gas inlet | M10x1 | M12x1 | |
| Fitting hose LPG inlet |  |  Fitting Screw Flare M12x1 straight Standard |  Fitting Screw Flare M12x1 90° XD4: 081/350114/A XD5: 081/350115/A |

## Installation

### Tools

- Prins AFC Software v2
- Torque spanner (5 -25 Nm )
- Socket 10 mm
- Socket Torx T45
- Combination spanner size 10mm
- Combination spanner size 15mm
- O-ring grease
- Compressed air
- Brake cleaner
- Gas leak detector

### Tightening torques

| Tightening torques | Nm |
|---|---|
| Body mounting bolts | 7 |
| Actuator | 15 |
| Banjo bolt / LPG hose | 20 |
| Pressure Relief Valve | 4 |
| ECT sensor | 4 |

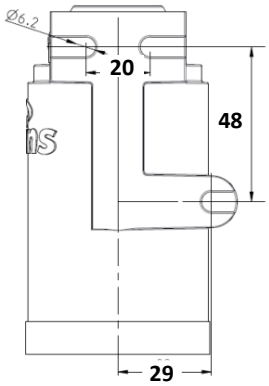
### Mounting the eVP-500

Mount the eVP-500 in the engine compartment as seen on the images below and according to local regulations. Always use the two upper mounting points. Use the third mounting point if the reducer suffers from vibration. Use the M6 bolts, nuts and spring lock washers delivered in the kit.



7Nm Do not Exceed torque, this may cause damage


Use spring lock washer



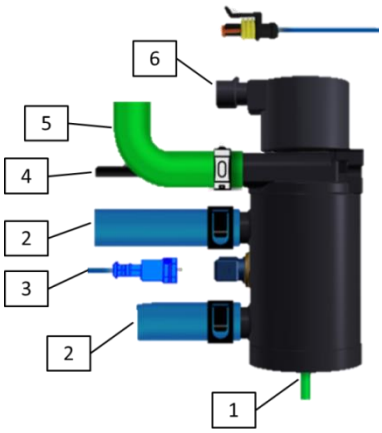

Design your own bracket according the dimensions or order a bracket separately.

Basic strip eVP: 001/999040

Bracket universal zinc plated steel: 001/080131

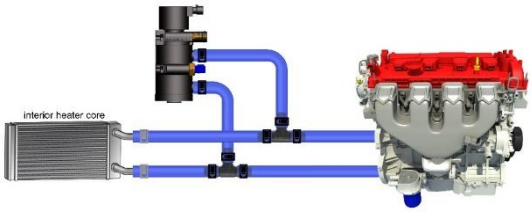
## Wiring and hoses

1) LPG in
   a. …/B → M12x1 (XD4, XD5 flare straight / flare 90°)
   b. …./A: Standard M10x1
2) Coolant pipes
   - 16mm hose connection
   - No flow direction specified
3) ECT sensor (Engine Coolant Temperature)
   - Standard Prins sensor
   - NTC resistor
   - R20˚C ≈ 2500Ω
   - IP 54A Connector
4) Pressure Relief Valve (PRV)
   - Connect to inlet manifold or air intake
5) Gas Out to filter unit
   - 16 mm hose connection
6) Actuator connector
   - Regular Prins two pole Superseal connector

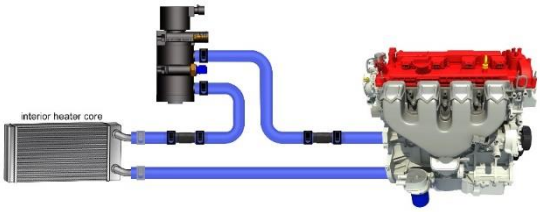



## Coolant connection

**2-3-4-5-6- cylinder engine**

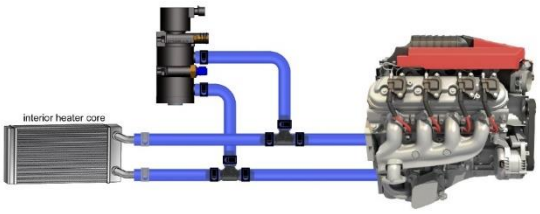



**Parallel connection**

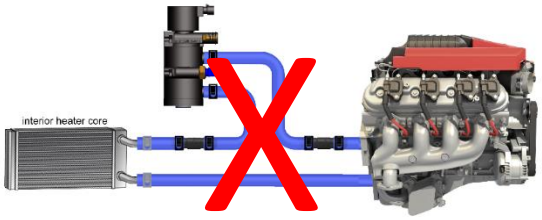



**Serial connection**

**8-10-12- cylinder engine**




**Parallel connection**




**Serial connection**

**8-10-12 Cylinder engines can have an extreme high coolant flow. For example, a RAM 5.7v8 and 6.4v8 has a coolant flow of surpassing 2000 l/hr direct from the coolant pump.**

# Programming / Calibration

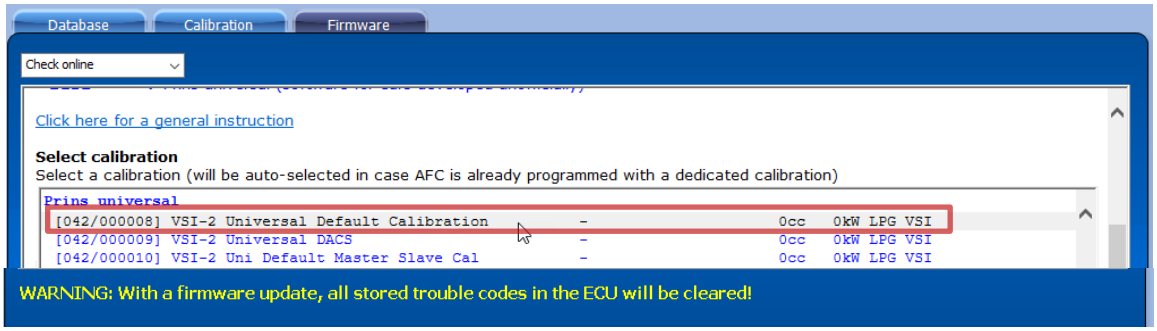
## Firmware

Use the Prins AFC Software v2 to flash the 'Online VSI-2 Universal Default Calibration' into the AFC.

**1**

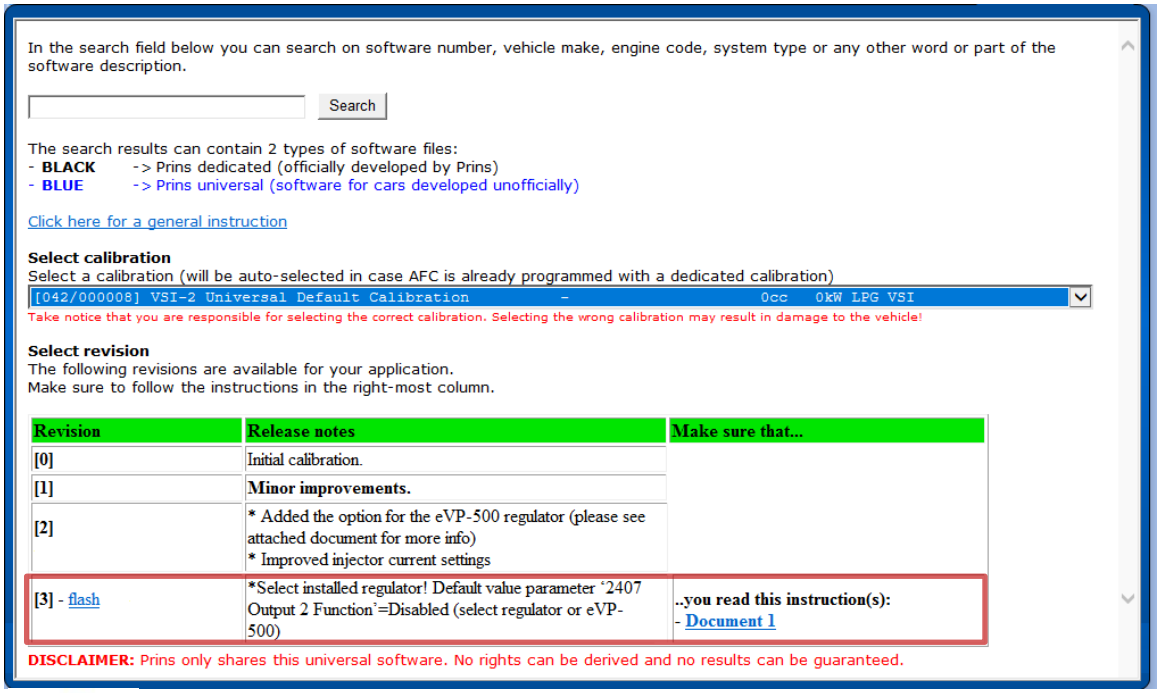

Go to Load-Save -> Firmware -> Check online

**2**




Scroll down to the blue 'Prins universal' Firmware.
Select software [042/000008] VSI-2 universal Default calibration.

**3**

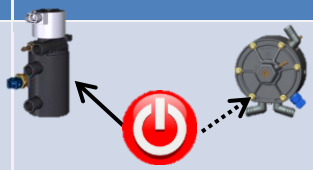



First read the Release notes and the document.
As of revision [3] parameter '2407 Output 2 Function' is 'Disabled'
The engine will not run without selection of the correct reducer.
Select flash to program the AFC.

## Calibration

Set the calibration parameters as described in the table below.

**WARNING:**
When the VSI regulator is selected, then the eVP-500 actuator valve opens completely. The system pressure will rise to maximum and the PRV opens to release the too high gas pressure. Be sure to set the calibration parameter '2407 Output 2 Function' to 'eVP-500' before switching over to gas.

| ID | Name | Value default | Set to value | Additional info |
|---|---|---|---|---|
| [2407] | Output 2 Function | Disabled | eVP-500 |  |
| [495] | Regulator Map referenced | No | Optional: Yes | Yes: Target-, Idle -and Tank Empty pressure is based on "Delta pressure". |
| [15314] | System EPR_Target Pressure Source | Static Value | Static: GAP or Delta pressure = [15295]<br>Table lookup: Variable pressure | |
| [15295] | eVP-500 Target pressure | 2200 mbar | Tune during engine high idle and high RPM and load<br>• Minimum Gas injection time >2,8ms<br>• Maximum duty cycle <120% | Note *1 |
| [195] | Tank Empty | 1500 mbar | = [15295] – 400 mbar<br>= [15295] – 600 mbar | XD3= - 400mbar<br>XD4= - 600mbar<br>XD5= - 600mbar |
| Table [230] | EPR Target Pressure | | Engine Speed [rev/min]<br>800 / 2400 / 3200 / 4400<br>0,0: 1800 / 1800 / 2000 / 2400 | GAP/ Delta pressure depends on engine revs.<br>Note *1 |

**WARNING:**
Be sure calibration parameter '2407 Output 2 Function' => 'eVP-500' before switching over to gas.
When VSI regulator is selected, then eVP-500 actuator valve opens completely. System pressure will rise to maximum and PRV opens to release the too high gas pressure.

**Note *1**
When regulator is MAP referenced, then lower the pressure with 1000mbar.

## Service and maintenance

A filter is mounted inside the eVP-500. The filter needs to be replaced according to the service interval to assure the performance of the eVP-500.
The interval of the filter is equal to the VSI reducer. It depends on the gas quality and the amount of pollution inside the LPG tank.
Always replace the eVP-500 filter and filter unit at the same time.

### Parts Replacement kit eVP-500 filters

| Type | Picture example | REPLACEMENT FILTERS eVP | 1x | Box 50X |
|---|---|---|---|---|
| Type 1 |  | PRINS 16X11 MM | 180/800501/A | 180/800048/A |
| | | PRINS 16X11X11 MM | 180/800502/A | 180/800049/A |
| | | KEIHIN 16X11MM | 180/800503/A | 180/800050/A |
| | | KEIHIN 16X11X11MM | 180/800504/A | 180/800051/A |
| | | | | |
| Type 2 |  | PRINS 16X11 MM | 180/800505/A | 180/800053/A |
| | | PRINS 16X11X11 MM | 180/800506/A | 180/800054/A |
| | | KEIHIN 16X11MM | 180/800507/A | 180/800055/A |
| | | KEIHIN 16X11X11MM | 180/800508/A | 180/800056/A |

### Maximum Service interval

The interval of the filters is equal to the existing VSI reducer.

| | | | | | |
|---|---|---|---|---|---|
|   eVP-500 filter  Filter unit | **25.000 km* / 2 year* / 500 hr** | **50.000* / 2 year* / 500 hr** | **75.000* / 2 year* / 500 hr** | **100.000 / 2 year* / 500 hr** | **> +25.000* / 2 year* / 500 hr** |

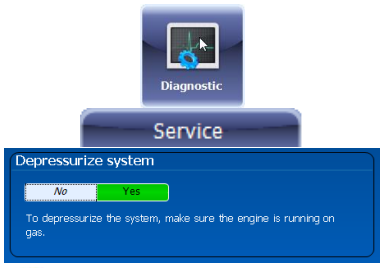
* Depends on local conditions and gas quality.

## How to replace the eVP-500 filter

Look at the video at the Prins YouTube page:
[Maintenance eVP-500 reducer | Replacing Filter | Instruction Video | Prins Tech Talk]

Link: https://youtu.be/33J7EWMvrkQ

**1**




To prevent damage to the eVP-500 use the diagnostic tool to release the pressure

**2**


Remove dirt and dust.
Use low pressure water or brake cleaner and compressed air

**3**

Remove the P/T sensor to release the system pressure

**4**

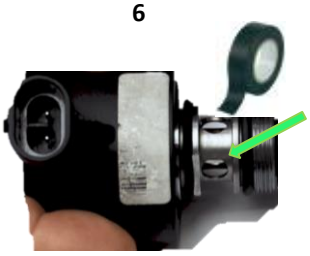
T45

Torx: T45

**5**

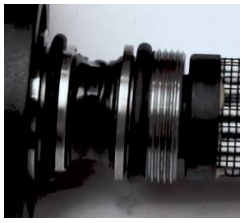
Remove actuator with filter

**6**



Add tape to protect the plunjer

**7**

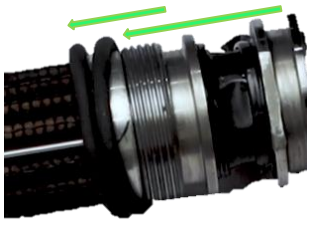


Result of mounting the tape

**8**

Remove the O-rings with a plastic o-ring picker

**9**

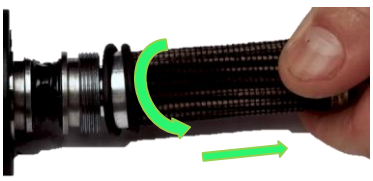


Slide the o-rings onto the filter

**10**

Clean grooves thoroughly with a solvent, cleaning paper and compressed air

**11**



Remove the filter

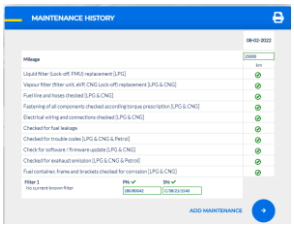
**12**

Place 2 new o-rings

| 13 | 14 | 15 |
|---|---|---|
|  |  |  |
| Add the o-ring onto the new filter | Place the filter into the actuator | Clean thread and O-ring grooves thoroughly |

| 16 | 17 | 18 |
|---|---|---|
|  |  |  |
| Remove the tape | Place the big o-ring | Place the actuator with filter |

| 19 | 20 | 21 |
|---|---|---|
|   |  |  |
| Tighten with 15Nm | Place the P/T sensor into the new filter | mount the hoses |

| 22 | 23 | |
|---|---|---|
|   |   | |
| Check for gas leakage. | Register maintenance in the warranty portal and service manual | |

# FAQ eVP-500

**Why do I need to release the pressure before maintain the eVP-500?**

- Otherwise the actuator or the heat exchanger can shoot out the body. With serious injury or damage as a result.

**I see only one connection to connect the hose to the intake manifold.**

- That's correct. You only need to connect the PRV to the inlet manifold / intake (preferred with a turbo / supercharged engine).
- The eVP-500 is MAP-regulated by software.
- You still need to connect the MAP sensor to the AFC and calibrate it

**The Pressure Relief Valve vents LPG.**

- System pressure is too high.
- Check if calibration parameter '2407 Output 2 Function' is set to 'eVP-500'.

**When do I need to install a MAP sensor to the VSI-2.0 system?**

- With a turbo/supercharged engine.
- When the lowest gas injector time is lower than 3ms and when the gas injector duty cycle exceeds 90%.

**Tank empty detection with a non-empty tank when demanding engine power.**

- Check that the capacity of the tank valve is sufficient.
- Check that the size of the LPG fuel line between tank and reducer is sufficient.
- Check for contaminated internal eVP-500 filter.
- Check for contamination of the low-pressure VSI filter.
- Check for fouled gas hoses.
- Calibrate the system with the calibration manual or Calibration Wizard

**Low gas temperatures when demanding engine power.**

- Check the operating temperature of the reducer.
- Check for sufficient coolant flow

**What to do if DTC 236 Internal gas leakage is present after replacing the filter?**

- Remove the filter.
- Clean the O-ring grooves and the area around the plunger thoroughly.
- Install the filter as described in this document.

**I need to replace an /A version with an /C version. What do I need to do?**

- Cut the LPG line and replace the LPG line connection to fitting screw flare M12x1.

**Can I use the /C actuator for the /A or /B?**

- No, it's not possible. The thread and the position of the o-ring is different. Also the filter has a larger diameter. It will not fit.

Please contact your distributer if you have question or remarks about the content in this information bulletin.

Kind regards,
Prins Autogassystemen B.V.
After Sales department