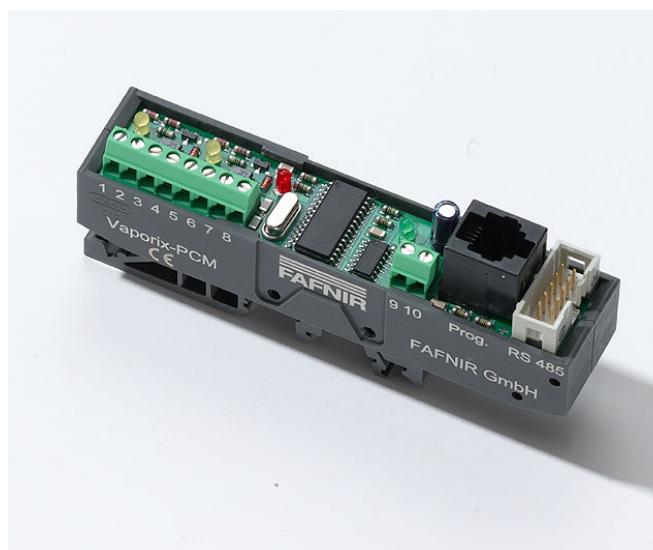


VAPORIX-PCM

**Corrective control module
for connection to VAPORIX-Control**



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VAPORIX-PCM

Principle of operation

VAPORIX-PCM (**P**ulse **C**orrection **M**odule) is a control module for pulse controlled vapour recovery systems. It can compensate physically caused drift effects of the vapor recovery rate (e.g., by temperature variations or swelling hoses and seals). VAPORIX-PCM receives the information of necessary corrections from VAPORIX-Control.

VAPORIX-Control saves the data of each refuelling in an internal history database. By analysing these history data it is able to recognize drift effects early and to pass corrective information to the VAPORIX-PCM. This allows generating corrected control pulses for the vapor recovery system to compensate the drift effects. The vapor recovery system is then no longer controlled by the fuel flow pulses themselves, but by the altered control pulses generated by the VAPORIX-PCM.

The advantage of the PCM compared to a regulated system is the distinction between inevitable small variations of the vapour recovery rate and unacceptable errors in the vapour recovery system. The detection of these errors using the analysis of the stored data enables the identification of necessary maintenance measures according to national Immission Control Acts (in Germany Bundesimmissionschutzverordnung BImSchV).

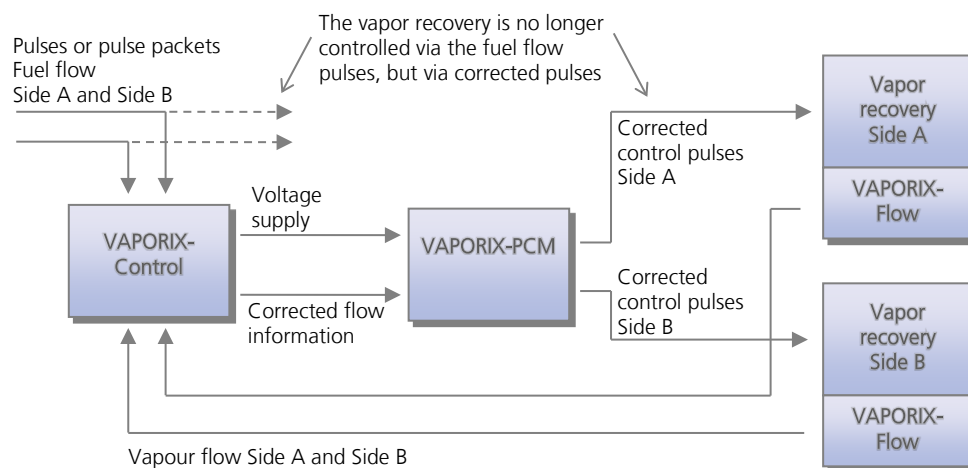


Figure 1: Operating principle of the corrected control

Safety instructions

The VAPORIX system is designed for measuring and evaluating the vapour flow of vapour recovery systems at petrol stations. The system must be used exclusively for this purpose. The manufacturer accepts no liability for any form of damage resulting from improper use!

The sensor and the control unit have been developed, manufactured and tested in accordance with state-of-the-art technology and with recognised safety rules and regulations. Nevertheless, hazards may arise from their use.

For this reason, the following safety information must be observed:

- Do not change or modify the system or add any equipment without the prior consent of the manufacturer.
- Only use original spare parts. These comply with the technical requirements specified by the manufacturer.
- The installation, operation and maintenance of the sensor and the control unit as well as configuration of the system must only be carried out by expert, authorised personnel. Specialised knowledge must be acquired by regular training.
- Operators, installers and service technicians must observe all applicable safety regulations. This also applies to any local safety and accident prevention regulations which are not stated in these operating instructions.
- VAPORIX-Flow and VAPORIX-Control are subject to the National construction approval and are therefore only allowed to be repaired by FAFNIR or companies authorized by FAFNIR. In case of failure, always the entire sensor or the entire control unit must be replaced.
- The control unit VAPORIX-Control is exclusively intended for mounting in the protective casing of the dispenser computer and not to be used in hazardous areas. It is only intended for use within the VAPORIX system.

The safety instructions in this manual are labelled as follows:



If these safety instructions are not observed, it may result in the risk of accident or damages to the VAPORIX system.



Useful information designed to ensure continued and correct operation of the system and to make your work easier.

Retrofitting of VAPORIX-PCM

The corrective control with VAPORIX-PCM is suitable for both new installations and retrofit:

- Due to its very small dimension, it can be used even in small spaces.
- No replacement of components of the existing vapor recovery system is required.
- No access to the calibrated area of the petrol pump is required.
- Suitable for use with all current, pulse controlled vapour recovery systems. There is no dependence on manufacturer-specific features (e.g. calibration data).
- Easy to connect and power supplied by the VAPORIX-Control.
- It can be retrofitted to an existing VAPORIX monitoring system without replacement of components.
- Also suitable for special requirements such as throttling the vapour recovery rate or deactivating the vapour recovery system for refuelling of On-board Refuelling Vapour Recovery (ORVR) vehicles. For this application a special firmware version for VAPORIX-Control is required.

Design and connectivity

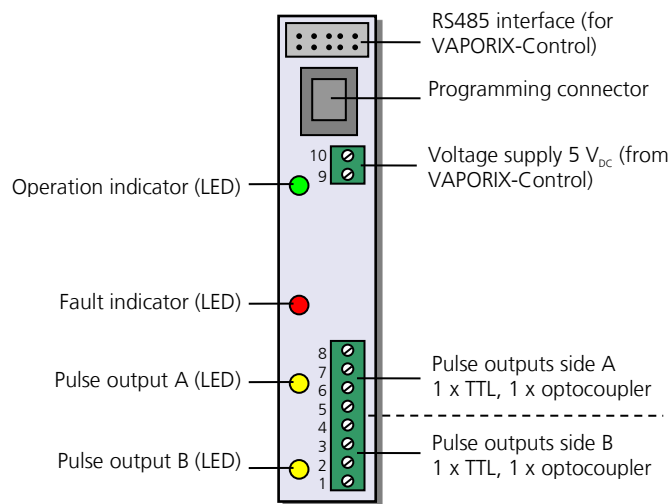


Figure 2: Connectors and indicators of VAPORIX-PCM

- Operation Indicator - green LED
 - Constantly flashing every second:
Normal operation.
 - Repeated 1 short flash:
Uncorrected operation at dry measurement (dongle position 7).
- Fault indicator - red LED
 - Repeated 1 short flash: Pulse frequency cannot be generated, since outside valid range of 2.00 Hz ... 200.00 Hz.
 - Repeated 2 short flashes:
Receipt of unknown command via RS485.
 - Repeated 3 short flashes:
Incorrect or defective RS485 data transmission.
 - Repeated 4 short flashes:
No data received since 60 seconds.
- Pulse output indicators - yellow LED
 - Indicate the pulse generation on side A and B.

Connection assignment

10	Supply		+5 V
9			⊥
8	Pulse side A	Optocoupler Output	Collector
7			Emitter
6		TTL Output	+
5			⊥
4	Pulse side B	Optocoupler Output	Collector
3			Emitter
2		TTL Output	+
1			⊥

Installation and set up

- VAPORIX-PCM corrects the drift of the vapour recovery rate and enables the detection of serious faults of the vapour recovery system. Before installation be sure to check whether the vapour recovery system is functioning properly. Otherwise, it should be repaired and/or be readjusted.



All installation work must be performed with the power supply disconnected. The relevant safety regulations have to be observed.

- In VAPORIX-Control at least the firmware version 1.36 or higher must be installed to operate the VAPORIX-PCM. If necessary, update the firmware of the VAPORIX-Control. The firmware update can be carried out on-site with a laptop.
- Mount VAPORIX-PCM close to the VAPORIX-Control.
- When wiring the VAPORIX-Control only the cable supplied is to be used.
- For wiring the vapor recovery system with VAPORIX-PCM a standard unshielded cable is sufficient. If a shielded cable is used (e.g. for vapor recovery systems with very high impedance inputs), which is not connected to ground (potential equalization or protection ground), then it can be connected to GND connections (1, 5) of the VAPORIX-PCM. If the shield is connected to ground potential, it must not be connected to VAPORIX-PCM, but it has to be left open.
- VAPORIX-PCM has to be wired to VAPORIX-Control and the vapor recovery system in accordance to Figure 3. The screws of the connection terminals of the VAPORIX-PCM are protected against falling out. For connecting use a screwdriver with suitable width of maximum 2.3 mm, as the mechanical protection can be damaged or destroyed by too large screwdrivers.

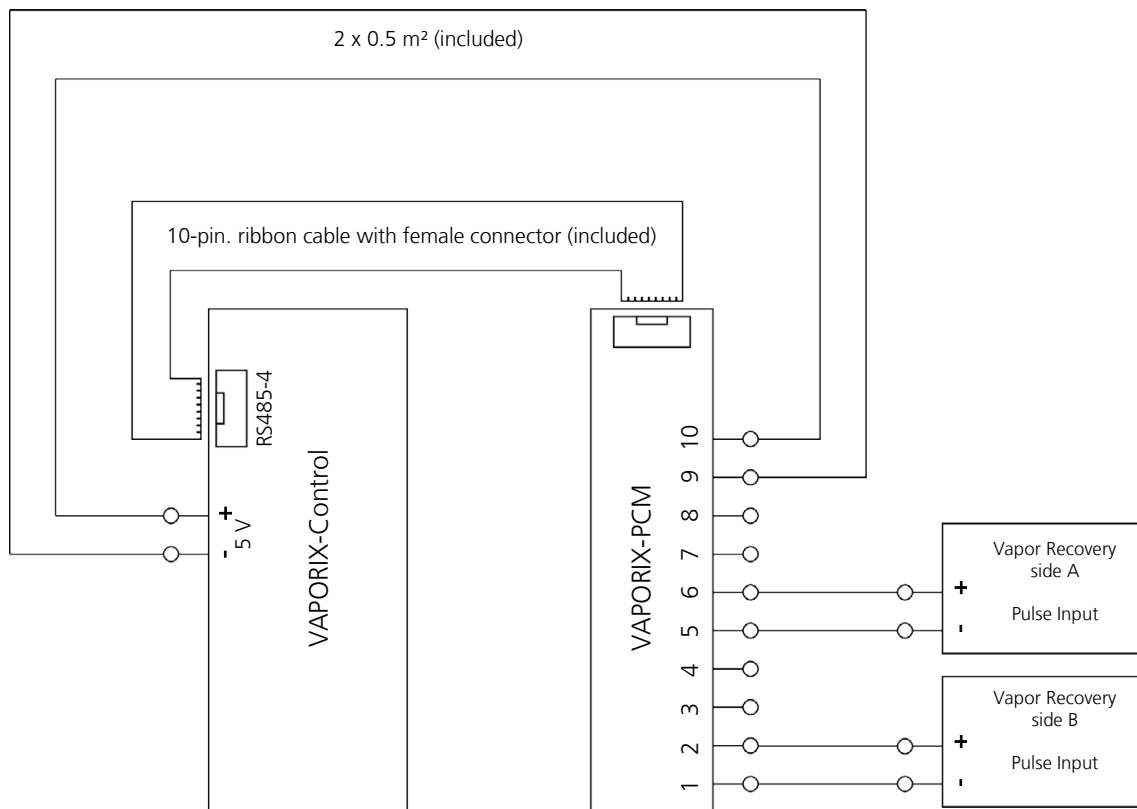


Figure 3: Wiring

- Power up the system again. VAPORIX-PCM then reports automatically via the RS485 interface- to VAPORIX-Control. No further configuration is required.
- For each side of the dispenser perform a test fuelling, to ensure that the vapour recovery system works. Alternatively, you can also wait for customer vehicle refuellings and check the result by reading the history data of the VAPORIX-Control.

Special Notes

- The VAPORIX system determines the correction values from the stored history data. However, after the first installation of the system these values are not available. Therefore, more than four valid refuellings are necessary on each side of the dispenser, until the correction values have been stabilized.
- If an error in the vapour recovery system has activated an alarm, the VAPORIX-Control should be reset with the VAPORIX-Service-Dongle after the remedy of the cause of the error. As a consequence the correction values are reset as well. Subsequently, more than four valid refuellings are necessary on each side of the dispenser, until the correction values have been stabilized.
- During a dry measurement (dongle position 7) the correction function is turned off for both sides so that the vapour recovery is controlled with the original, uncorrected pulse frequency. The reactivation of the corrected mode automatically happens when you log out the dongle or after 30 seconds when the dongle is removed.
- During the adjustment of the vapor recovery system with an operating unit (e.g. Bürkert) no pulses are generated, since the operating unit controls the vapor recovery directly.
- In other forms of adjustment (e.g. wet calibration) the pulses for controlling the vapor recovery can be necessary. In these cases, the correction function must be disabled using the dongle (dongle position 7).
- Alternatively to the TTL outputs shown in Figure 3, also galvanically isolated pulses of higher voltage can be generated via the optocoupler outputs (external resistor and voltage source is required). To avoid damaging the VAPORIX-PCM, the maximum switching voltage of 28 V and the maximum switching current of 10 mA must not be exceeded. For this option a consultation must be hold with the manufacturer of the vapor recovery system or of the dispenser.

Technical data

Power supply:	5 V _{DC} and ≤ 30 mA (from VAPORIX-Control), internal reverse voltage protection up to 30 V _{DC} , screw terminal for max. 1 mm ² . Cable for the connection to the VAPORIX-Control is included.
Pulse outputs per side:	1 x TTL compatible (4.7 V / 2 mA), short circuit protected. 1 x Optocoupler for generating galvanically isolated pulses via external voltage supply, collector and emitter open, max. switching current 10 mA _{DC} , max. switching voltage 28 V _{DC} , internal reverse polarity protection up to 30 V _{DC} . Screw terminals for max. 1 mm ² .
Pulse frequencies:	2.0 Hz ... 200.00 Hz Corresponds to 2.4 l/min (at 50 pulses/l) to 60.0 l/min (at 200 pulses/l).
Serial interface:	RS485, 4-wire, 10-pin connector, cable for VAPORIX-Control connection is included.
Operation indication:	green LED
Fault indication:	red LED
Pulse output indication:	yellow LED
Operating temperature range:	-20 °C to +70 °C
Dimensions (L x W x H):	105 mm x 24 mm x 47 mm
Housing:	Module carrier for DIN rail mounting



**EU-Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de Conformité**

**FAFNIR GmbH
Bahrenfelder Straße 19
22765 Hamburg / Germany**

erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt
declares as manufacturer under sole responsibility that the product
déclare sous sa seule responsabilité en qualité de fabricant que le produit

**Modul zur korrekativen Steuerung
Corrective Control Module
Module de commande corrective**

VAPORIX-PCM

den Vorschriften der europäischen Richtlinien
complies with the regulations of the European directives
est conforme aux réglementations des directives européennes suivantes

2011/65/EU	Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten	RoHS
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment	RoHS
2011/65/UE	Limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques	RoHS
2014/30/EU	Elektromagnetische Verträglichkeit	EMV
2014/30/EU	Electromagnetic compatibility	EMC
2014/30/UE	Compatibilité électromagnétique	CEM

durch die Anwendung folgender harmonisierter Normen entspricht
by applying the harmonised standards
par l'application des normes

**RoHS / RoHS / RoHS
EMV / EMC / CEM**

**EN 50581:2012
EN 61326-1:2013**

Das Produkt ist bestimmt als Elektro- und Elektronikgerät der RoHS-
The product is determined as electrical and electronic equipment of RoHS
Le produit est déterminés comme des équipements électriques et électroniques de RoHS

Kategorie / Category / Catégorie

**Überwachungs- und Kontrollinstrumenten in der Industrie /
Industrial Monitoring and Control Instruments /
Instruments de contrôle et de surveillance industriels**

Das Produkt entspricht den EMV-Anforderungen
The product complies with the EMC requirements
Le produit est conforme aux exigences CEM

**Störaussendung / Emission / Émission
Störfestigkeit / Immunity / D'immunité**

**Klasse B / Class B / Classe B
Grundlegende elektromagnetische Umgebung /
Basic electromagnetic environment /
Environnement électromagnétique ordinaire**

Hamburg, 20.04.2016
Ort, Datum / Place, Date / Lieu, Date



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