



## **DFL-1 / DFL-2**

### Fuel Flow Meters

*For Fuel Consumption Measurement  
in Mobile Vehicle Instrumentation*

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# **USER MANUAL**

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## 1 Safety instructions

### Please read carefully before operating the sensor

To assure safe and proper operation of the sensor, the unit must be carefully transported and stored, as well as professionally installed and operated. Furthermore, careful maintenance and usage in accordance with operating instructions is imperative.

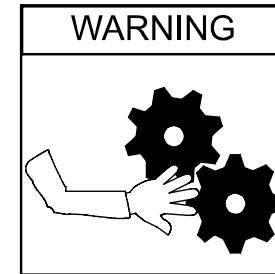
This sensor should be installed and operated only by qualified persons who are familiar with devices of this type.

Should the information provided by these operating instructions not be sufficient, contact the service department of CORRSYS-DATRON Sensorsysteme GmbH for help with further details.

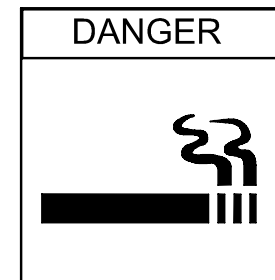
Read and follow all the points in this manual before operating the equipment.

Please note

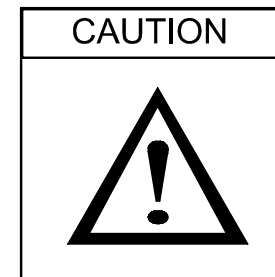
- dangers from the engine
- dangers from the flow meter
- dangers from the measured medium
- note the safety and accident prevention procedures
- regularly check that all precautionary measures are kept to
- do not modify or change the sensor or its accessories arbitrarily.



Risk of injury by rotating engine parts



Explosion or fire hazard by leaking fuel



Risk of personal injury

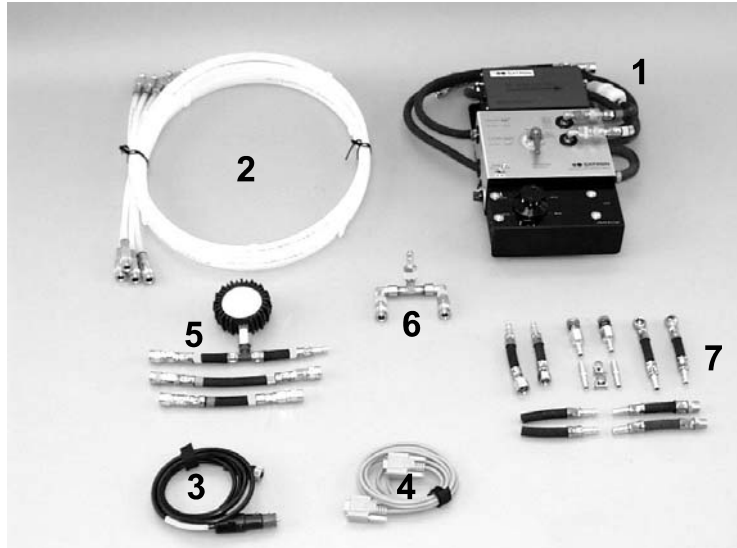


Danger by defects of the pump



### 3 Scope of delivery

#### Accessories



- 1 DFL
- 2 Pipe set (2,5m)
- 3 Supply cable
- 4 PC-cable
- 5 Manometer set
- 6 Diesel connection set
- 7 Connection set

- further equipment only by request -

### 4 Technical specifications

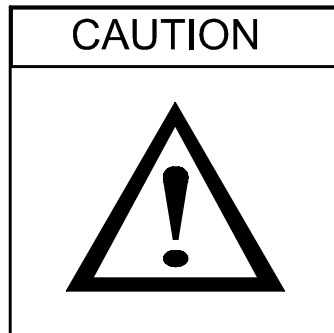
Measuring unit	0.333 cm <sup>3</sup>
Output	1500 pulses/cm <sup>3</sup>
Measuring range	0.5 ... 60 l/h
Measuring accuracy	± 0.5 %
Max. permissible temperature of media	170 °C Under normal conditions the fuel starts to evaporate at 70 °C. If there are gas bubbles the measurement becomes inaccurate.
Dimensions	370 mm x 260 mm x 110 mm
Power supply:	
Fuel pump	12 V x 2.4 A
Signal conditioning	12 V x 0.8 A
Measuring volume	The ascertainable amount of litres per measurement depends on the used data acquisition system. <u>Example:</u> µEEP - 0 ... 4.200.000 L with an resolution of 1cm <sup>3</sup>

## 5 Installation, connection and storage

### 5.1 Advice before installing the unit

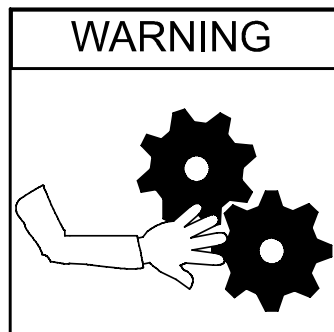


Do not make any alterations to the DFL measurement unit on your own authority



Before the unit is used for the first time, the air must be bled from it.

Do not lay the pulse cable near the ignition coil.



Danger of personal injury by rotating parts of the engine – turn off the engine before installing the DFL unit.

## 5.2 Assembly and location

The complete assembly is located in the foot-well next to the driver and is connected to the engine by means of flexible polyamide hoses.

### 5.3 Storage

The system should always be full when stored.

The petrol remains in the system. If the unit is stored for more than two months, it should be filled with diesel.

On the position "Purge" the diesel is pumped in the vehicle tank and it mixes with the total petrol volume.

Reliable medium for fuel consumption measurement:

**allowed:** All fuel for vehicles which are mineral based

- normal fuel
- super fuel
- unleaded fuel
- leaded fuel petroleum based
- diesel

**not allowed:** Methanol based fuel (clarify with the manufacturer and state the percentage of the composition).

## 5.4 Mounting instructions

There are different assembly procedures for installing the DFL depending on the type of fuel injection system. The systems are therefore divided into four groups:

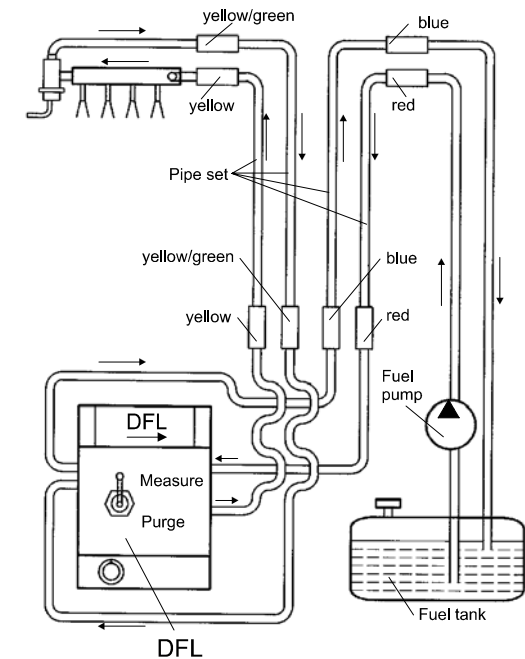
Group 1: E-Jetronic, K-Jetronic, L-Jetronic

Group 2: Single-point injection systems

Group 3: Diesel engines with rotation pump

Group 4: Carburettor engines

### Group 1: E-jetronic, K-jetronic and L-jetronic



Disconnect feed and return pipes and fit 4 suitable quick-connect couplings. Connect the hoses by means of couplings according to the colour codes.

Red = feed from the fuel tank

Blue = return to the fuel tank

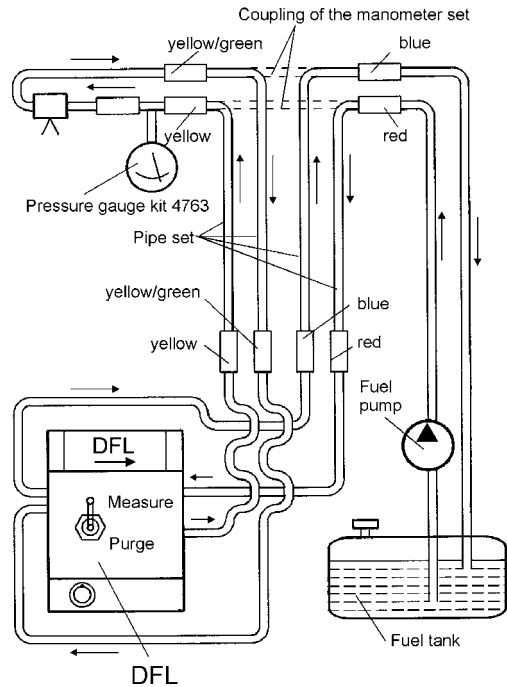
Yellow = feed into the engine

Yellow/green = return from the engine

Place the DFL assembly in foot well and attach power cable. Turn flowjet vent valve handle to "Purge" setting, and turn on unit at On/Off switch. Start engine, and wait about 20 seconds. Thereafter turn flowjet vent handle to "run".

The regulator of the pressure pump should be set to 150 l/h.

### Group 2: Single-point injection systems

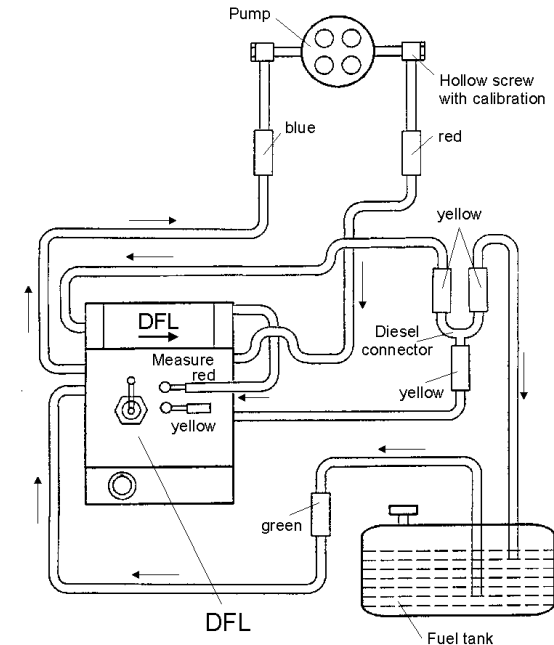


Disconnect feed and return pipes and fit 4 suitable quick-connect couplings. Blank off the return pipe with the supplied coupling and locate the pressure gauge in the feed line. Start engine and note the pressure in the feed line using the pressure gauge.

Mount the pipe and replace the couplings of the manometer set. After approx. 30 seconds with the engine running, adjust the pressure in the line so that it indicates the same pressure as during the 30 seconds warm-up period. Replace the manometer for beginning of measuring.

Note: This method of measurement is necessary as a single-point injection system uses a fuel which demands a smaller supply pressure.

### Group 3: Diesel engines with rotation pump Old version without heat exchanger



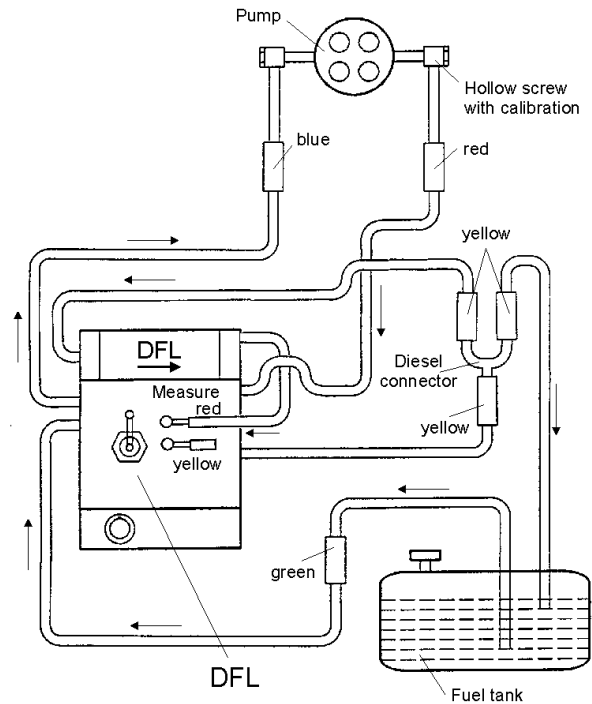
Disconnect the feed and return pipes and fit the adapter set for the DFL 3 unit.

Note: The hose-connection which connects the return pipe to the injection pumps is fitted with a calibrated needle-valve and therefore must be fitted in the same place. Switch the flowjet vent valve handle to "Purge" (yellow) and start the engine. Wait 20 seconds and start test.

Note: As the diesel rotation pumps are self aspirating and require a calibrated return flow, under no circumstances should the flowjet vent unit be activated and used.

ATTENTION: The standard extent of delivery of DFL 1/DFL 2 does not include adapter set for DFL 3 and purge valve.

### Group 3: Diesel engines with rotation pump New version using the heat exchanger

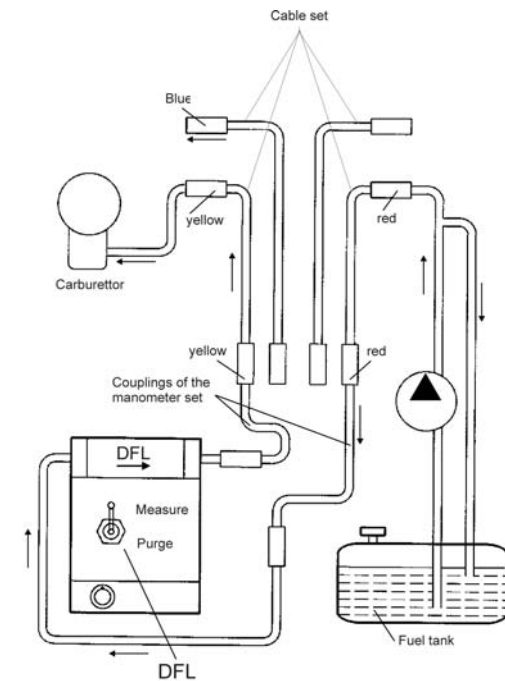


Disconnect the feed and return pipes and fit the diesel connection.

Note: The hose-connection which connects the return pipe to the injection pumps is fitted with a calibrated needle-valve and therefore must be fitted in the same place. Leave the flowjet vent handle in the measure position. Set the potentiometer to 100 l/h and start the engine.

Important: The flowjet vent handle is not to be set to "Purge". The system will automatically purge itself in approx. 1 minute.

### Group 4: Carburettor engines



In order to measure fuel consumption of carburettor engines, please use only the DFL flow meter.

The complete DFL assembly can be placed in the foot-well area of the vehicle during the test. Only 2 of the 4 cable of the cable-set are necessary for connection.

For carburettor engines, the transducer is switched between the pump and the carburettor in the fuel pipe.

If a return pipe is available, the transducer has to be connected below the stop flow-back on the carburettor. The diesel-connector has to be installed for this (extent of delivery includes the special-T-piece).

### 5.5 DFL connection

With a digital pulse multiplication the internal signal conditioning converts the measuring device with a pulse per 0,333 cm³ to 1500 pulses/cm³.

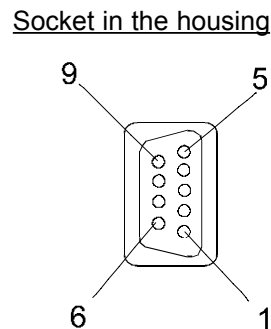
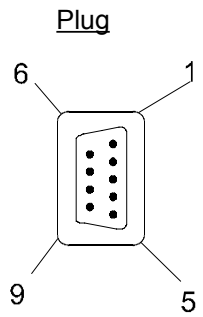
Additionally, the signal conditioning controls the fuel flow direction.

The devices DFL 1 and DFL 2 have different connections.

#### DFL 1 connections

Signal and power: 9-pin D-Sub-connector

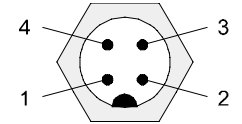
- Pin 1 Reserved
- Pin 2 TTL out/TxD out
- Pin 3 RxD
- Pin 4 Interface detection  
 -12 V = interface active  
 open = TTL output active  
 +12 V = TTL output active
- Pin 5 Digital GND
- Pin 6 Reserved
- Pin 7 +U<sub>B</sub>
- Pin 8 GND (-U<sub>B</sub>)
- Pin 9 Shield (housing)



#### DFL 2 connection

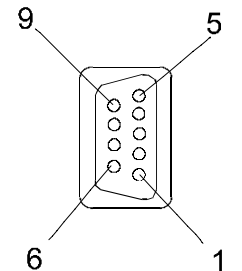
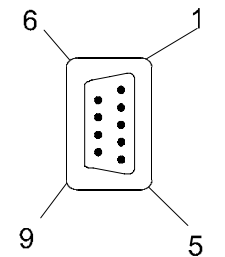
Power supply; 4-pin Binder connection with DFL 2  
 Connect the DFL supply cable to vehicle electric system.

- Pin 1 +U<sub>B</sub>
- Housing-plug
- Pin 2 +U<sub>B</sub>
- Pin 3 GND
- Pin 4 GND



Signal: 9-pin D-Sub-socket

- Pin 1 Reserved
- Plug
- Pin 2 TTL out/TxD out
- Pin 3 RxD
- Pin 4 Interface detection  
 -12 V = interface active  
 open = TTL output active  
 +12 V = TTL output active
- Pin 5 Digital GND
- Socket in the housing
- Pin 6 Reserved
- Pin 7 Reserved
- Pin 8 Original pulse sensor
- Pin 9 Shield (housing)



## LEDs

### Green

The green LED blinks for a second (some one second on, some one second off). This indicates the DFL ready state.

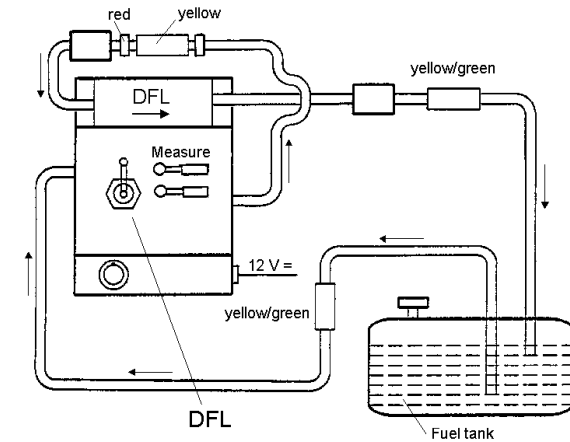
If the green LED blinks faster, the fuel flow direction is unambiguously detected false. In this case, please correct the flow direction with the hose connections.

### Red

The red LED blinks with the detection of a flank of the measuring device. The orientation of the measuring device due to the false fuel flow direction remains unconsidered.

## 6 Overcoming errors

### Checking the Transducer



The quantity of fuel flow can be set with the potentiometer. On full power, approx. 160 l/h should be reached (please only do this for a short period of time). If the transducer was blocked, it should run on 100 l/h for 5 - 10 minutes.

If no flow (no signal via TTL out, Pin 2) is indicated with checking of the measuring device, although the green LED is blinking for a second and with the red LED blinking, then the hose connection may be wrong. This characteristic may occur when the measuring device is not integrated in a circulation system but in a blocked fuel hose system. In this case, the fuel pump can cause a to and fro flow of the fuel. This moves the measuring device, and forces to create a measuring signal (the red LED is blinking). The signal conditioning detects the repeated change of fuel flow direction and does not put out flow accordingly (in fact, there is none). As a check, you will see no fuel coming out of the hose end after the measuring device.

Please check the colors on the hose plug connectors.

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## 7 Warranty and service

### Performance

We guarantee delivery of perfect products. All statements regarding use and accuracy are without liability and are based on the experience of the manufacturer. This will not relieve the user from checking the instrument in each case. We do not assume any liability for damages or resulting costs caused by improper use of the sensor.

The right to claim under guarantee expires as soon as the instrument is opened.

The limited warranty is 1 year on material and proper function.

### Technical service

All devices, as well as the software were manufactured and tested with greatest care and according to the latest technical standards.

If you, however, find reason to complain using the devices, we kindly ask not to try to solve the problem on your own. In this case, please contact our company representation in your country, or directly contact our central service team under following address:

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