GREGORY TECHNOLOGY GMBH

Product Information

flowtronic FCS-D-Systems

FCS-D-190, -380, -570, -700

Introduction

GREGORY Technology continues the ongoing development of the worldwide introduced flowtronic product line with the new measuring system generation FCS-D.

The versions FCS-D-190 up to FCS-D-700 are especially designed for fuel consumption testing of engines with fuel supply pump located at the engine (underpressure fuel supply).

Due to the modular design, the FCS-D is available in several versions with different max. circulation rates up to approx. 700l/h. Herewith the new product line also covers large and very large diesel engines

The systems can be used within many stationary as well as mobile fuel consumption testing applications with medium to very large trucks, earth movers, tanks, agricultural or any other specialized vehicles.

Features

The new flowtronic FCS-D systems in combination with the signal electronic (SE8005D or S8005AD) provide a noticeable improved handling and also outstanding technical features.

- integrated systems with sensor unit, heat exchanger, fuel pumps, etc. in a robust housing for fuel consumption measurement of engines with the fuel supply pump located at the engine (underpressure fuel supply, typically diesel engines)
- fuel delivery rate of built-in pumps up to approx. 700l/h, depending on the ordered FCS-D systems configuration
- system measuring range 0.1 up to 240l/h
- fast installation into the fuel supply system as well as comfortable operation and increased operational safety due to quick-lock couplings
- system control with status display provides protection against excess voltage, wrong polarity, exceeding operational temperature, failure of internal fuel pumps and quick system shutoff e.g. in case of an accident etc.
- robust and almost maintenance free operation
- external signal electronic with easy operation via touch screen display, analogue and digital signal outputs, RS232/USB interface for external PC and printer, signal input for distance sensor or GPS based system for distance related fuel consumption measurement, software for data transmission and storage on external PC
- two optional built-in sensors for fuel temperature measurement
- direct connection to 24V DC power supply (22...27V DC) from truck battery
- robust carrying case with fuel resistant special foam inserts for transport and storage

FCS-D Systems

The FCS-D systems are an integrated system for diesel fuel consumption measurement. The FCS-D systems can be easily installed into the existing fuel supply via four fuel tube connections equipped with quick lock couplings.

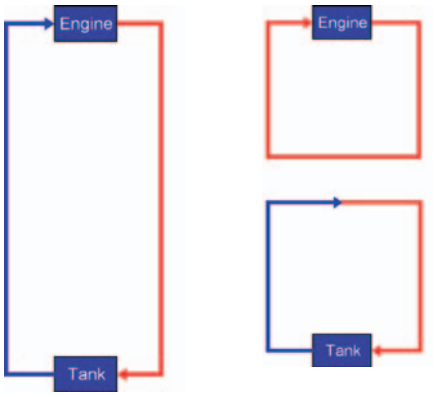
With many engine types the installed fuel supply system does not only provide fuel for combustion. The overall system functionality consists of fuel supply to the engine, the return of surplus fuel back to the tank and the constant fuel circulation for cooling of the fuel supply components located close to the engine.

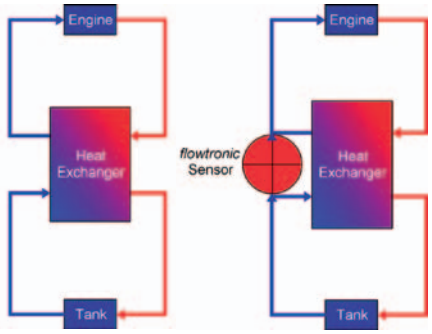
For correct fuel consumption measurement, the FCS-D systems splits the original fuel circuit into two separate circuits.

One circuit is related to the engine and the other is related to the tank. This design allows correct fuel consumption measurement by the flowtronic sensor which is located between the tank circuit and the engine circuit. This sensor module is based on a four piston counter.

To avoid overheating and gas bubbles within the engine related fuel circulation the FCS-D include a heat exchanger module for cooling.

The fuel pump within the FCS-D systems provides the required fuel supply to the engine as well as fuel circulation for cooling purpose. For proper operation, the systems are protected by one easy accessible fuel filter.





Signal Electronics for the FCS-D Systems

For system operation one out of the two available signal electronics SE8005D or S8005AD is generally required.

Signal Electronics S8005AD

The signal electronic with basic functionality.

Technical features:

- signal input for the FCS-D sensor module
- signal output for fuel volume (TTL) and flow rate (analogue)
- display of system status via LEDs
- power supply with 12V DC (vehicle power)

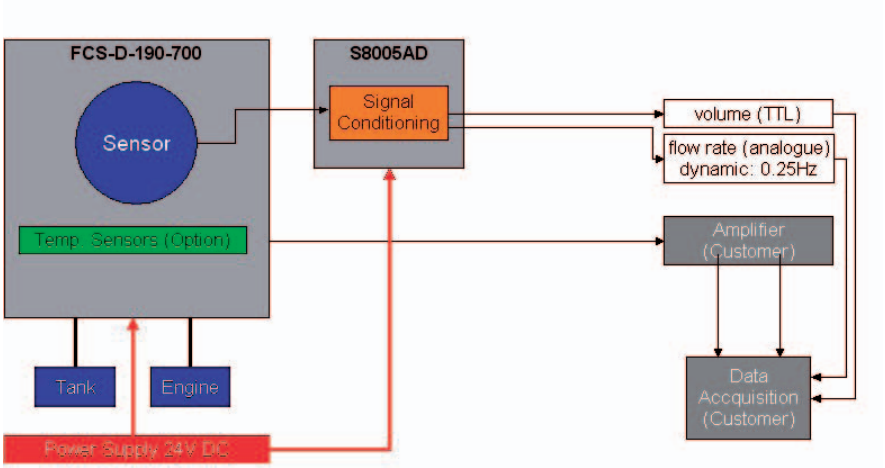
Signal Electronics SE8005D

The powerful signal electronic with touch screen LC display and internal software for operation and data display.

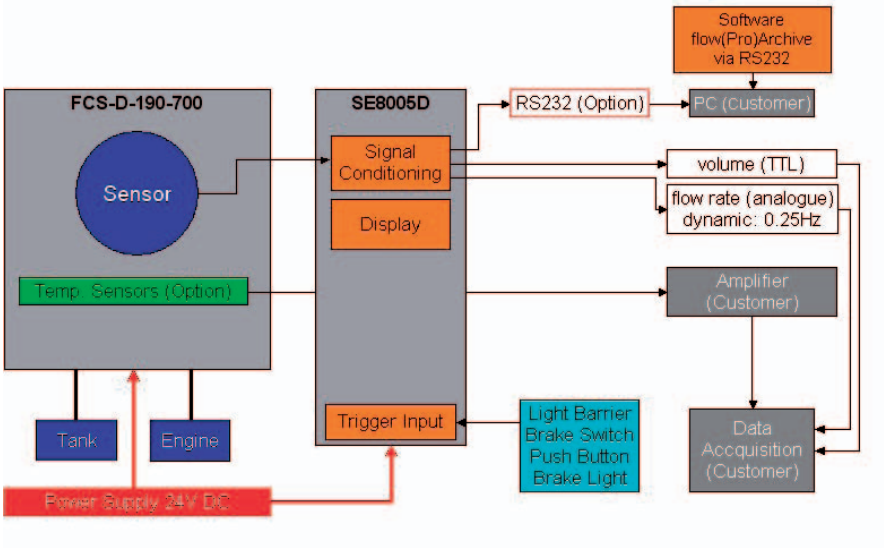
Technical features: (partly options)

- input for the *flowtronic* sensor within the FCS-D
- signal input for external distance sensor for distance-based fuel consumption measurement
- one each signal output for fuel volume (TTL) and flow rate (analogue) trigger input with start/stop function for manual remote control, light barrier or other switches, also to be used for external speed/distance sensor calibration
- RS232 interface, USB via included adapter for connection to a notebook/PC in combination with software flow-ProArchive or for external *flowtronic* printer
- integrated software with test procedures for:
  - "Flow Display" for flow rate, total flow and average values
  - "Elapsed Time" for time, flow rate, time based total flow and average values
  - "Distance" for flow rate, distance, speed and average values
- The software also includes a calibration procedure for the external distance sensor.
- display of system status via LEDs
- robust suction holder for mounting to the front screen
- power supply with 12V DC (vehicle power)

System Architecture of FCS-D-190-700 Systems with Signal Electronic S8005AD



System Architecture of FCS-D-190-700 Systems with Signal Electronic SE8005D



Adapter Sets

Adapter sets are available for the FCS-D systems. For easy and fast installation into the engine's fuel supply system all adapters are equipped with quick lock connectors.

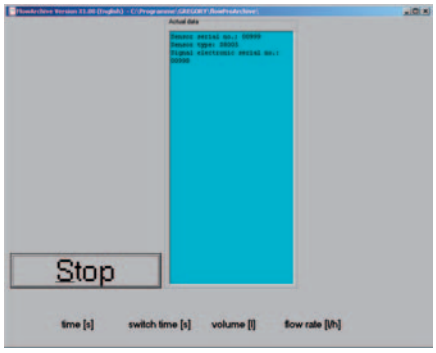
Option Distance and Speed Sensor

The signal electronic SE8005D includes a TTL input for distance and speed related fuel consumption measurement (l/100km, km/l). This connects for example the wheel pulse encoder flowtronic 208, a non-contact (Correvit®)- or a GPS-based distance sensor.

Option Fuel Temperature Measurement

For advanced fuel consumption measurement the FCS-D systems can be supplied with four thermocouples (K-type). They are mounted into the fuel flow, namely at the in- and outlet of the flow sensor element and one each at the fuel connections to and returning back from the engine. An amplifier for the thermocouple signal is required separately (not included in delivery).

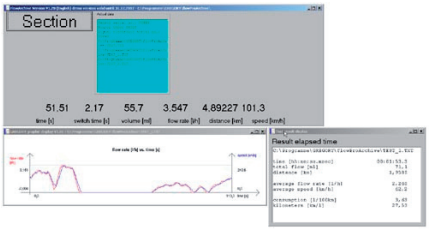
Option Software flowProArchive



The software "flowProArchive" is running under MS-Windows 98SE ... Vista (32-bit version). It is designed for data transfer between the signal electronic SE8005D to a notebook/PC via serial connection.

USB connection is also available by using the USB/serial adapter. The system parameters of the signal electronic SE8005D can be set by this software.

On top the software provides data transmission from the signal processing unit to the notebook/PC and creates test data files. These files can be imported to spread sheet calculation software for further evaluation and presentation.



The software "flowProArchive" provides additional functionality like off-line on-screen test data presentation in table or graphic format.

The much more advanced software "flowDataProArchive" is designed for special applications with many test data files (for example like fleet testing) and offers much more functionality especially for test data handling and test data evaluation. This software version will be designed according to the customer's requirements.

Option External *flowtronic* Printer

External printer for connection to the serial interface of the signal electronic SE8005D. The software prints the calculated and formatted test data after each test. Upon request, the same test data can be printed several times.

The manufacturer specifies a long storage time for the original thermal printer paper. Please refer to the manual for further details.

Rechargeable batteries are included to this printer for power supply. The unit can alternatively be operated by 12V DC (vehicle power).

Carrying Case

Robust carrying case with edge protection for the FCS-D systems.

- robust fuel resistant plastic material, aluminium profiles with plastic edge protection
- foam inserts made of fuel resistant, high- quality closed porous material
- temperature resistance -40...+80°C
- one lockable latch
- complete with two retractable handles and an integrated trolley for a more easy handling
- additional inner aluminium case for signal electronic, cables and electric accessories for increased protection against soiling by small remains of fuel
- to be used for storage and transport (for shipping only when packed into an additional cardboard box according to GREGORY Technology shipping instructions)

Operational Safety

The FCS-D systems are also designed for mounting outside from the passenger compartment. Especially for this application, the FCS-D includes outstanding safety features.

The system generation FCS-D includes optional a new type of quick lock couplings. These are designed for leakage-free and almost completely clean operation. This feature improves the fast and clean installation of the new measurement system.

Please note, that all FCS-D systems components are therefore not fitting to former flowtronic products!

Important Information

For failure free operation the fuel filter must be replaced at regular intervals. For easy access the filter is located at the front side of the FCS-D. Over and above a regular visual inspection no other service work can be carried out by the user. In any case, the fuel filter has to be replaced periodically all 2 months or every 250 operating hours.

Due to quality assurance the flowtronic sensor recalibration is recommended all 12 months. This will be carried out on test benches at GREGORY Technology.

Technical Data FCS-D Systems		
Applications		fuel consumption measurement of engines (typically diesel engines) with the fuel supply pump located at the engine
Permitted fuel types		diesel, optionally gasoline, bio and alcohol based fuel
Measurement parameters		fuel volume, fuel temperature (option), fuel pressure (option)
Flow rate	Measuring Range	0,1…240 l/h
Volume	Measuring Accuracy Measuring Resolution	± 0.5% of value (at a flow rate within 1...50l/h) $4x10^{-3}$ml
Fuel temperature (option)	Measuring Range Measuring Accuracy Measuring Resolution	-20...+75°C K-Type Thermo couples DIN IEC 584, class 1 depending on external data acquisition (not included to delivery)
Fuel circulation rate		170 - 780 l/h (depending on system configuration)
Inner diamter (mm) of engine fuel tube		≤ 20 ≤ 25
Nominal width of couplings		Nw 10.0FF NW 16.0FFself closing and leakage free
Quick lock couplings		
Operational pressure		max. 0,2 bar
Operational temperature		-20 °C .... +70° C
Fuel filter		located on the front side
Operating directions		any
Mounting		by thread inserts M6 in the bottom plate (see operational manual)
Dimensions (WxHxD)		approx. 254 x 165 x 290 (mm) (depending on system configuration)
Weight		approx. 18...22 kg (depending on system configuration)
Power supply		22...27 V DC, nominal 24 V DC
Power consumption		200...600 W (depending on max. circulation fuel flow rate)

Technical Data Signal Electronics S8005AD und SE8005D			
		S8005AD	SE8005D
To be used with		Sensor S8005C and FCS-D Systems	
Analogue output	Unit Scaling Output Voltage Range Connector Dynamic	l/h 100mV/(l/h) for the measuring range 0...100l/h 65mV/(l/h) for the measuring range 0...150l/h 40mV(l/h) for the measuring range 0...250l/h 0...10V DC BNC 0.25 Hz	
Digital output	Unit max. Frequency Scaling Level Duty cycle Connector	P/ccm 30kHz 800P/ccm for the measuring range 0...100l/h 480 P/ccm for the measuring range 0...150l/h 288 P/ccm for the measuring range 0...250l/h 5V, max. 15mA 50% / 1:1 BNC	
Sample / Transfer rate (option RS232 only)		-	3 Hz
Power supply		nominal 12 V DC (9 ... 36 V DC)	
Power consumption		5 W	
Power supply cable		2m, with BOSCH vehicle plug or 4mm banana plugs (The FCS-D includes 4mm banana sockets for power supply)	
Ambient temperature range (operation)		-20…+70°C	
Weight		approx. 500g	approx. 600g
Dimension (WxHxD)		ca. 110x45x165 (mm)	ca. 130x90x100 (mm)
Signal cable to sensor		3m (standard) or 15m (option), 15pin HDSub socket/ 8pin CANON MIL socket	
Options for SE8005D only	Input for : Light Barrier, Brake Switch, Hand Push Button	not available	potential free switch contact, 9 pin DSub plug OR combination, switch function triggers the Start/Stop function of the display
	Brake Light Input	not available	0...24V DC, switch level at 2.5V, 9 pin DSub plug
	RS232 Interface	not available	communication with PC/Notebook, 9pol. DSub socket
	Distance Sensor Input	not available	for example *flowtronic* 208, CORRSYS-Datron, vBox etc.

		SE8005D
Display	Type Size Character Height	monochrome LC display 240x128 pixel, 4.2 inch depending on software function
Refresh-rate		3 times / s
Resolution of display	volume flow rate distance speed time	7 digits, 000000.0, leading sign (only positive), unit „Millilitre“ 6 digits, 000.000, leading sign, unit „Litre per hour“ 7 digits, 000.0000, without leading sign, unit „Kilometre“ 4 digits, 000.0, without leading sign, unit „Kilometre per hour“ 7 digits, 00:00:00.0, without leading sign, unit „hh:mm:ss:msec“ Units are abbreviated, e.g.: „l“ for „Litre“, „km“ for „Kilometre“
Display illumination and contrast		automatic
Ambient temperature range (operation)		-20…+70°C
Function keys		software based, programmed touch screen buttons, depending on provided software, for example manual start / stop, “Start“ resets the total consumption value to zero and starts the measurement. “Stop“ ends the measurement and freezes the displayed values

Warning:

To ensure correct use please read all technical documentation before setting the system into operation. This helps to avoid inaccurate operation. Working according to the operation manual is required for a safe and technically intended use of the FCS-D systems. In case of questions please do not hesitate to contact GREGORY Technology GmbH for further assistance.

Please visit us for our complete service range at www.flowtronic.de and at www.GREGORY.de .

Please feel free to ask for individual special solutions.

DISTRIBUTION FRANCE
Motion Dynamics
18 rue Charles De Gaulle 91400 Orsay
Tél: +33(0) 1 64 86 15 60 / +33(0) 6 68 60 15 60
Email: automotive@imagine-optic.com
Web: http://www.motion-dynamics.fr
Capital: 90 000 euros - SIRET 410 072 532 000 30 - APE 2651B RCS EVRY

GREGORY TECHNOLOGY GMBH

Mombacher Str. 56
D-55122 Mainz
Phone: +49 (0) 6131-60 30 9-0
Fax: +49 (0) 6131-60 30 9-99
www.flowtronic.de, www.GREGORY.de
email: info@GREGORY.de