

Forecourt Data Controller (FDC)

RoSys COMFORTER 12T

INSTALLATION MANUAL



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REVISION HISTORY

Revision	Date	Description
1.0	30/05/2017	Initial version
1.1	26/07/2017	Corrections related to the general purpose release
1.2	31/07/2018	Corrections related to the general purpose release

1. Scope

This document describes the purpose and the hardware installation of the Forecourt Data Controller (FDC) – RoSyS Comforter 12T.

2. Concept

Forecourt Data Controller (FDC) is a controller designed to collect information related to the fuelling transactions, status, electronic-counters and display-data of each of the connected to the system pumps as well as ATGs (automatic tank gauges). The FDC is connected to Dispenser Smart Boxes (DSBs) integrated in each fuel dispenser via wireless network and retrieves all the information from them. The system is designed to ensure flexible operation and independent pump control without distracting the fuel deliveries. Each DSB ensures the pump-control of the connected to it dispenser(s) where the FDC collects and consolidates the information from all of the connected points. The FDC offers an integrated web-server where all settings, statuses and reports can be seen in real-time.



3. Front and back panel indicators and connectors

3.1. Front panel indicators



Figure 1 – FDC (Front Panel) – Indicators and connectors

Index	Function
1	USB port - firmware update and logging
2	Status – Ready LED (green), Error LED (orange and red)
3	Interfaces in use: <ul style="list-style-type: none"> - WiFi - RS422 - MDM (modem) - LAN - USB - CAN
4	Communication points <ul style="list-style-type: none"> - 1 – 12: DSB from 1 to 12 - TLG

3.2. Back panel – power and label



Figure 2

Index	Function
1	Label including the serial number of the device
2	Main power switch
3	Main power cable

3.3. Back panel – connectors



Figure 3

Index	Function
1	Antenna (used only when internal wireless module is available)
2	5V output for external (auxiliary) device
3	RS422/RS485 interface connector (not used in the current release)
4	Modem connector (not used in the current release)
5	LAN network connector
6	CAN connector (not used in the current connector)
7	RS232 interface used for trace logging
8	RS232 interface used to connect a TLG console

4. Connection power and network router to FDC RoSyS Comforter 12T

The below steps describes how to connect the FDC to the main power and properly attach the WiFi router to it.

4.1 Connect the power



Figure 4 – FDC Power cable

Connect the power-cable to the “RoSyS Comforter 12T” and make sure that the “POWER ON” button is switched to position “I” and it lights in green.
The “Comforter 12T” can be supplied with voltage from 110VAC to 230VAC (+/- 10%).

4.2 Connect the patch cable



Figure 5 – Router and FDC patch cable connection

Connect the patch cable to one of the LAN ports of the router (1). Note: make sure that you don't use the WAN port (usually marked in blue) for this connection!
Connect the other side of the same patch cable to the LAN-port of the “RoSyS Comforter 12T” (2).
We have now a TCP/IP network established between the router and the FDC RoSyS Comforter 12T.

4.3. Power On the router



Figure 6 – Router power connector

Connect the 5V power-adaptor of the router's connector. The power-adaptor should be plugged to main power.

4.4 Predefined network configuration

The diagram below describes the predefined network configuration set in the router and the FDC RoSyS Comforter 12T. Note that using the WAN port of the router the system could be connected to another internal network or another router providing Internet. To access the system outside the local network make sure that the connected router has the mentioned ports forwarded.

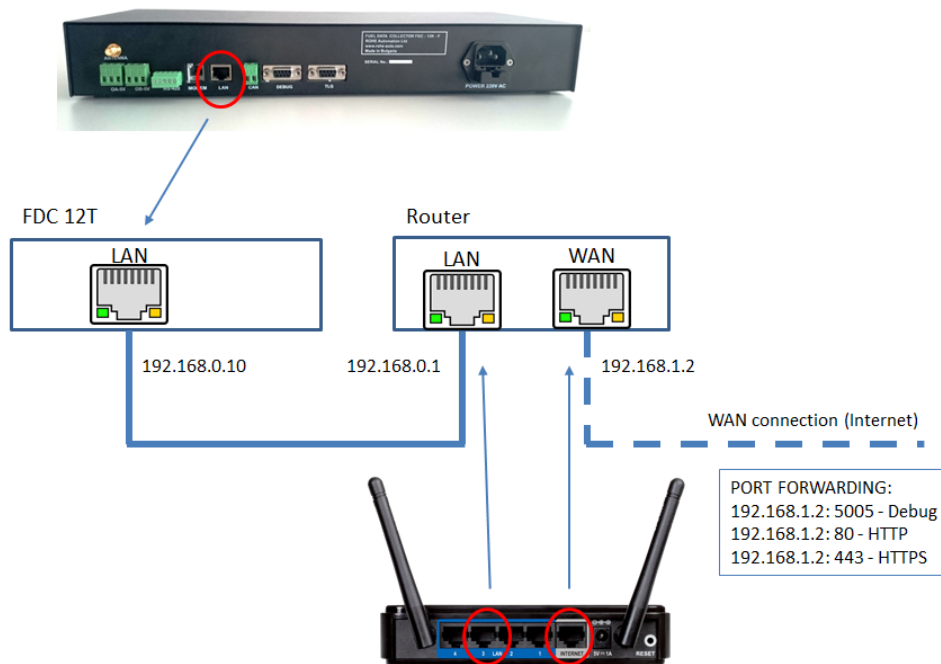


Figure 7 – Internal system network

4.5 Web –server system access

You can access the build-in web-server from a laptop or PC by connecting a patch-cable between computer’s LAN-port and any of the free LAN-ports on system’s router. You need to configure the IP-address (TCP/IPv4) on your computer as shown on Figure 8 using the network settings of the connected PC or laptop:

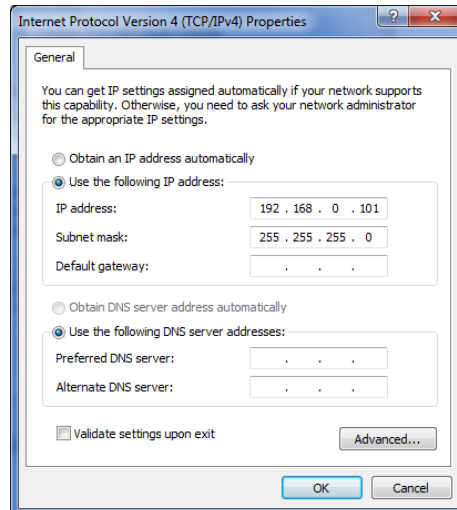


Figure 8 – TCP/IPv4 properties configuration

Optionally a command window can be opened and check the connection to “RoSyS Comforter 12T” by typing: “ping 192.168.0.10 -t”

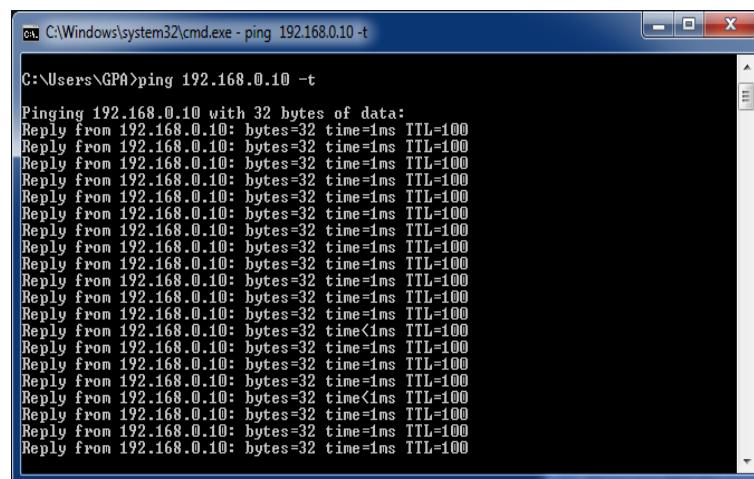


Figure 9 – command window showing ping 192.169.0.100 -t

When connection between the computer and the system is ensured then you can open any web-browser on your computer (preferably Chrome or Firefox) and enter the following IP-address: 192.168.0.10 – as shown on Figure 10 below:

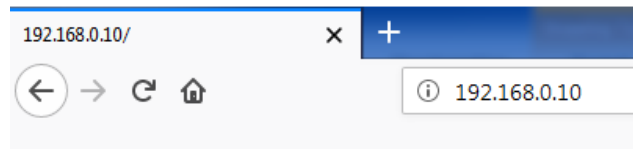


Figure 10

If the connection is OK, an authentication prompt will appear like the one shown on Figure 11:

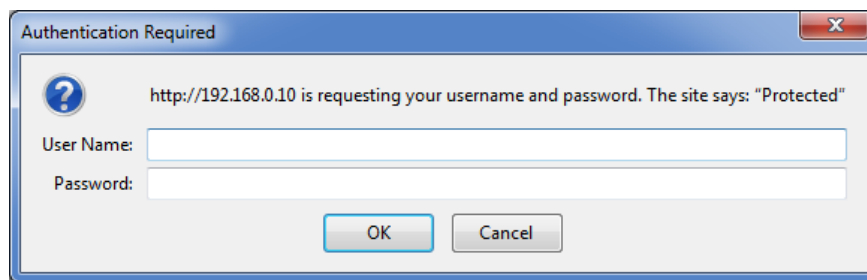


Figure 11

The access passwords are provided by the local distributor or by the manufacturer to the approved distributors.

5. Dispenser Smart Box - DSB

The Dispenser Smart Box (DSB) is part of the system by providing smart connection to each of the fuel dispensers that are installed on the petrol-station. It controls the particular pump and provides information to the FDC like transaction-data, totalizers, status, errors, etc. From the FDC it receives unit prices for the different fuels, high-level commands like pump-blocking and unblocking as well as different configuration parameters.

5.1 Block diagram and main modules

On Figure 12 is shown the block diagram of the DSB and its main modules. It contains the following modules:

- Power supply – converts the main power to the necessary internal voltages
- WiFi module – insures wireless connection the FDC RoSyS Comforter 12T unit
- Smart module – the main CPU module where all pump-control routines are executed
- Pump interface – the module that provides the physical interface to the particular pump.

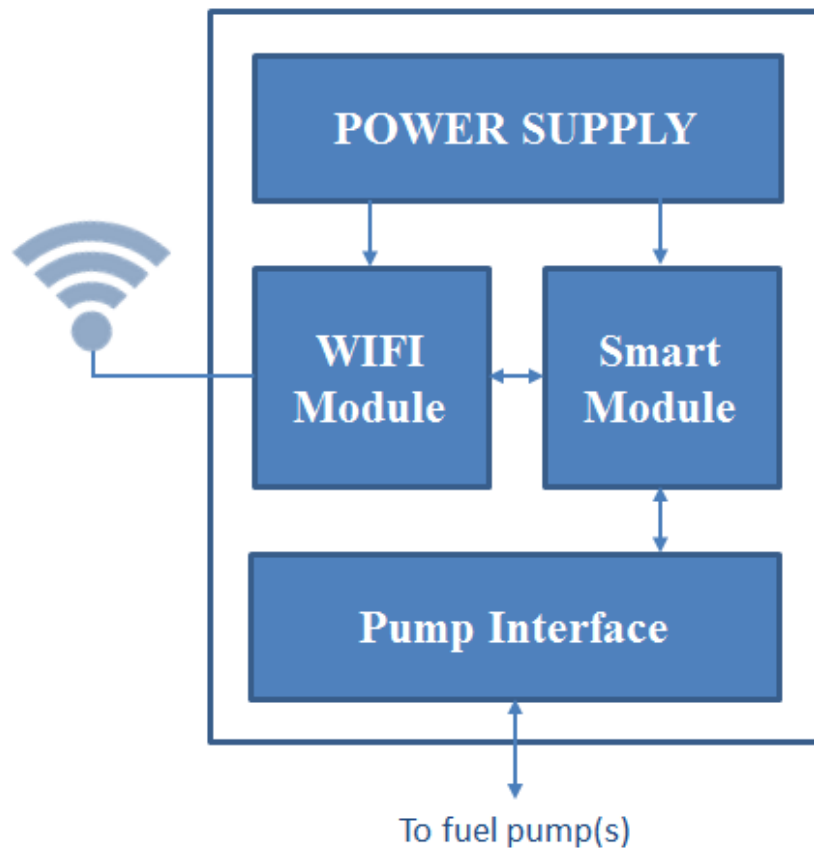


Figure 12 – Block diagram of DSB

5.2 Connecting a DSB to the system

Each DSB has its own ID. The ID number is defined by the IP-address set to the DSB. By default each DSB has IP-address 192.168.0.22 – this makes them to appear as point 12 in the system. When connecting a new DSB make sure that there is no DSB assigned to point12 as this will cause a conflict between the devices.

When logged-in to RoSyS Comforter’s build-in web-server (see Chapter 4.5 how this should be done) and a new DSB is powered-on it connects automatically to point12 and appears on the main screen as shown on Figure 13:

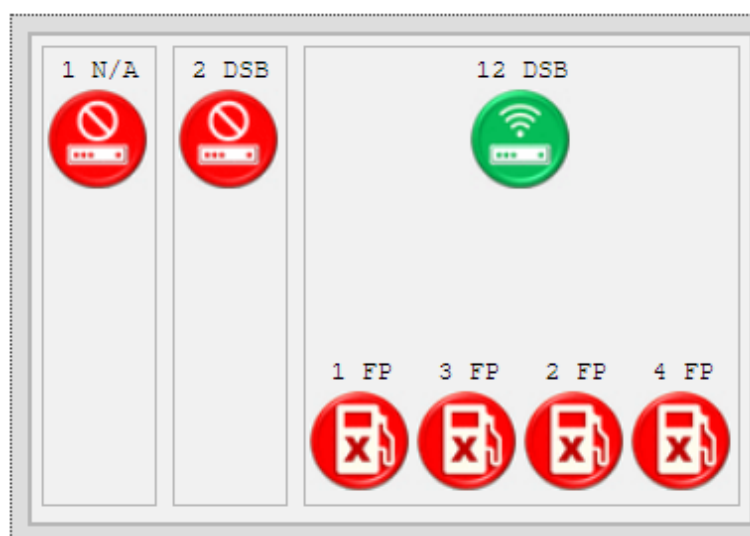


Figure 13 – New DSB appear on point-12

5.2 DSB configuration from the Web-server

Once connected to the system the new DSB could be configured like assigning a proper ID, pump-protocol, fuelling parameters, etc. First step to be done this is to read the current DSB configuration from the Web-server – menu “EFD/DSB Config Set” -> “Device”:

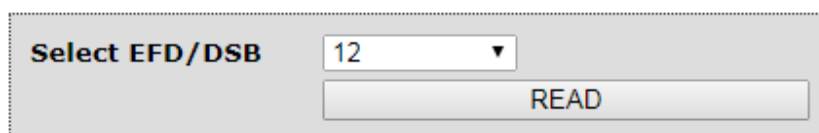


Figure 13

Pressing the “Read” button will bring all DSB parameters visible:

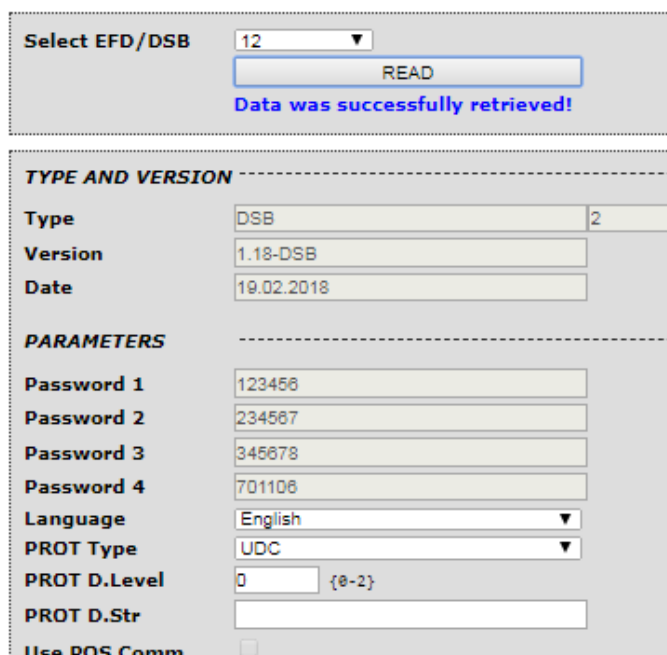


Figure 14 – DSB configuration parameters

After retrieving the window with the parameters – most of them can be changed and saved back by clicking the “SAVE” button on the bottom of the window.

The most important parameters from the DSB configuration window are:

- **PROT Type** – this parameter specifies the pump protocol that will control the particular fuel-pump. The table below (Table-1) provides the relation between the selected protocol, the pump-brand and what interface module should be installed on the DSB;

	Fuel Pump Type	DSB I/F board signature	Protocol type
1	Tokheim (EU, BR)	BOX69_DTKh1 / DTKh2	UDC
2	IFSF-LON (ALL)	BOX69_LON0	IFSF_UDC
3	Tokheim (IND)	TANZ_DARh0 / DARh1	UDC
4	Gilbarco TWI (USA, CN, BR)	TANZ_CL0 / CL1	GIL
5	Wayne (USA, BR)	TANZ_DARh0 / DARh1	DART
6	Mekser (TR)	TANZ_DARh0 / DARh1	DART_MEKS
7	Mepsan (TR)	TANZ_DARh0 / DARh1	DART_MPSN
8	Hong Yang (CN)	TANZ_HY0	HY_1
9	Prowalco SPD (SA)	TANZ_CL0 / CL1	PROW_SPD
10	Prowalco MPD (SA)	TANZ_CL0 / CL1	PROW_MPD
11	Gapco Converter (IND)	TANZ_DARh0 / DARh1	GAPCO
12	Midco (IND)	TANZ_DARh0 / DARh1	MIDCO
13	Sanki (CN)	TANZ_4850	SANKI
14	Tokheim Heng Shan (CN)	TANZ_HS0	HS_1
15	Tatsuno (JP)	TANZ_4850	TATSUNO
16	EagleStar (CN)	TANZ_DARh0 / DARh1	EAGLESTAR
17	WenZhou (CN)	TANZ_DARh0 / DARh1	WENZHOU
18	Stabilizing (CN)	TANZ_4850	STABILIZING

19	Chang Long IFSF (CN)	BOX69_LON0	IFSF_UDC
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Table 1 – Relation between Protocol-type and interface board

- **Force Cold Start** – when ticked and the parameters are saved it forces the DSB to perform “cold-start” or reset all the parameters to their default values. Note that the ID/IP-address will return back to 12.
- **IP Address** – The IP-address of the DSB that FDC is communicating with. The last digit of the IP-address is also by default used as ID number of the current DSB by substituting 10 from it. Example 22 – 10 = 12 i.e. ID = 12. (See also chapter 6.5 about how the “EFD” which is the FDC’s communication point can be set).
- **AP1 Enabled** – keep always ticked otherwise the DSB cannot connect to the wireless network.
- **AP1 Name** – The SSID of the network to be connected to – by default FDC_SPOT1.
- **AP1 Password** – The password needed to connect to “AP1 Name”.
- **AP1 IP Address** – the IP address of the FDC to be connected to – by default 192.168.0.10
- **AP1 Port** – the communication port that needs to be enabled – by default 5001.

Filling Point Parameters:

- **Active** – activate/de-activate (enable / disable) the current filling point.
- **Address** – specifies the address of the filling point – the address is defined by the fuel-pump. The DSB is just appointed to communicate with the specified address.
- **Dec.P.xxxxxx** – defines the decimal point position of unit-price, volume, amount, volume-totalizer and amount-totalizer.
- **MaxVolume/Amount** – defines the preset (usually the maximum value) where the pump will stop if not stopped manually earlier. When these values are set to 0 – the preset is allowed only by the pump’s keyboard.
- **Noz. X Product** – defines the product assigned to nozzle-X
- **Noz. X Tang** – defines the tank assigned to the product of nozzle X.
- **FPs Config** – specifies whether the pump is with 4 or 2 FPs – default value is 4.

5.3 Retrieving DSB signal strength - RSSI

When the DSB is connected to the FDC-system there is an option to check the strength of the wireless signal where the particular DSB is. From menu ‘EFD/DSB Read Config -> RSSI’ a DSB should be selected by its ID and the “READ” button pressed – after several seconds the result is shown in dBs (Decibels).

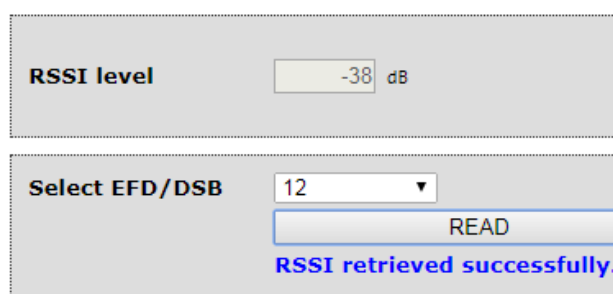


Figure 14 – DSB RSSI level read option

If there is no DSB assigned to this EFD-point or the signal is extremely low an error/timeout message will appear alarming that the value cannot be retrieved.

For better understanding on the RSSI levels have a look on table-1 below:

RSSI	Quality
> -50dB	Excellent
-51dB to -65dB	Good
-66dB to -75dB	Fair
-76dB to -85dB	Bad
< -85dB	No connection

Table 2 – RSSI levels estimation

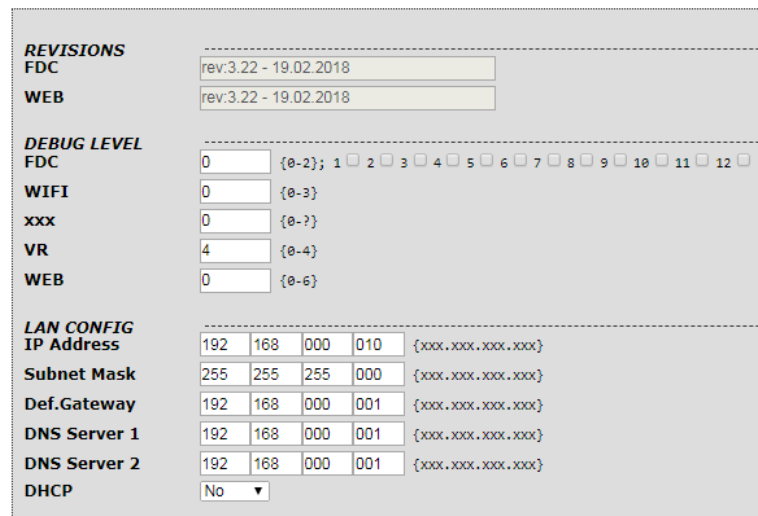
Always try to ensure better signal levels by finding appropriate place for the DSB-antenna and the FDC-router.

6. Basic configurations at FDC RoSyS Comforter 12T

Once connected to the system (see Chapter 4.5) the basic parameters can be configured through the Web-server. See below an overview of the important parameters:

6.1 System Configuration

From the HOME page's menu – “FDC Config” -> “System” a new window with parameters appear where all system's parameters are grouped by several categories.



The screenshot shows a configuration window with three main sections:

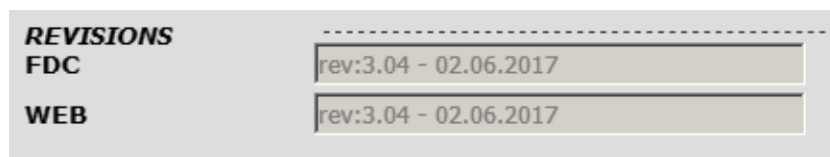
- REVISIONS:** FDC and WEB fields both show "rev:3.22 - 19.02.2018".
- DEBUG LEVEL:** FDC is 0 (checkboxes 1-12 are unchecked), WIFI is 0, xxx is 0, VR is 4, and WEB is 0.
- LAN CONFIG:** IP Address (192.168.000.010), Subnet Mask (255.255.255.000), Def.Gateway (192.168.000.001), DNS Server 1 (192.168.000.001), DNS Server 2 (192.168.000.001), and DHCP (No).

Figure 15 – System Configuration window

The different group of parameters there are as following:

A. REVISIONS

In this section are shown product and web page software versions and their release dates.

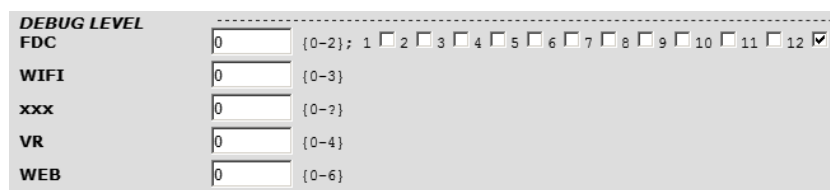


This close-up shows the REVISIONS section with FDC and WEB fields, both displaying "rev:3.04 - 02.06.2017".

Figure 16 – Firmware revisions

B. DEBUG LEVEL

By changing fields from zero to numbers in brackets, different types of debug information will be present on debug channel(s). If no need of providing debug-information – keep these options to 0 and un-ticked.



This close-up shows the DEBUG LEVEL section. The FDC field is 0, but the checkboxes for 1 through 12 are all checked. Other fields (WIFI, xxx, VR, WEB) are 0.

Figure 17 – Debug level selection

C. LAN CONFIG

Enter the FDC configuration parameters in the appropriate fields:

- **IP Address** – the FDC unique address. By executing this address into a web browser, a FDC Home page will open.
- **Subnet mask** - Subnet mask is a mask used to determine what subnet an IP address belongs to;

- **Default Gateway** – IP address of the node that is assumed to know how to forward packets on to other networks;
- **DNS Servers** – IP addresses of the name servers;
- **Dynamic Host Configuration Protocol (DHCP)** - a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.

LAN CONFIG					
IP Address	172	016	003	109	{xxx.xxx.xxx.xxx}
Subnet Mask	255	255	255	000	{xxx.xxx.xxx.xxx}
Def.Gateway	172	016	003	003	{xxx.xxx.xxx.xxx}
DNS Server 1	172	016	003	003	{xxx.xxx.xxx.xxx}
DNS Server 2	172	016	003	003	{xxx.xxx.xxx.xxx}
DHCP	No <input type="button" value="v"/>				

Figure 18 – LAN Configuration Parameters

D. UPLOAD FTP CLIENT

In this section are placed the settings for the FTP Upload client – this parameters are used to define the ftp-server and the folder in it where the FDC will upload the transactions and all other XML-files.

UPLOAD FTP CLIENT		
Server	ftp.rohe-auto.com	{0-9}; {A-Z}
User Name	fdc2015@rohe-auto.com	{0-9}; {A-Z}
User Password	fdc2015	{0-9}; {A-Z}
Folder	/ROHE/CARD1	{0-9}; {A-Z}
XML Export	Yes <input type="button" value="v"/>	

Figure 19 – Upload FTP client parameters

- **Server** – ftp server address;
- **User name and User password** – you should define the user name and the password used to login into FTP server;
- **Folder** – define the folder or subfolder where the data will be saved;
- **XML Export** – select ‘Yes’ to export some reports in XML format to FTP location.

E. DOWNLOAD FTP CLIENT

In this section are placed the settings for the FTP Download client – this parameters are used to define the ftp-server and the folder where the FDC can download some information XML-files – like product prices, configuration parameters, etc.

DOWNLOAD FTP CLIENT	
Server	ftp.rohe-auto.com {0-9}; {A-Z}
User Name	fdc2015@rohe-auto.com {0-9}; {A-Z}
User Password	fdc2015 {0-9}; {A-Z}
Folder	/fdc_download {0-9}; {A-Z}
Enable	No

Figure 20 – Download FTP client parameters

- **Server** – ftp server address;
- **User name and User password** – you should define the user name and the password used to login into FTP server;
- **Folder** – define the folder or subfolder where the data will be saved;
- **Enable** – click ‘Yes’ to enable this function.

F. STATUS REPORT SERVER

Activate this server if you want to get some remote information (via third party software) about the FDC system status. Select ‘Yes’ from Active dropdown field, enter the IP address of the server and port number. Finally click on ‘SAVE’ button to keep the changes.

STATUS REPORT SERVER	
Active	No
IP Address	172 016 003 049 {xxx.xxx.xxx.xxx}
Port	5010 {0-9}; [5000-65535]

Figure 21 – Upload FTP client parameters

G. EFD COMMUN.

The system gives possibility for choosing from two types of communication between the FDC and EFD’s- wireless or with cable (Ethernet).

If ‘WIFI’ communication type is selected, populate the next fields:

- **Communication Type** – wireless(WIFI);
- **Active** – select ‘Yes’ to activate the communication;
- **APN Name** – enter the Access Point Name (APN);
- **APN Password** – Access Point Password;
- **Channel** – select channel as shown in brackets;
- **Pass.Encryption** – select the password encryption. It’s recommended to use more secured type (WPA, WPA2);
- **IP Address** – FDC WiFi Address;
- **Port** - port number;
- **Timeout** – time in seconds, that the EFD’s will try to connect and then will write a connection error.

EFD COMMUN. Commun.Type	WIFI		
Active	Yes		
APN Name	FDC_SPOT1	{0-9}; {A-Z}	
APN Password	fdc_spot1_pass	{0-9}; {A-Z}	
Channel	5	{0-9}; {01-15}	
Pass.Encryption	WPA2_PSK		
IP Address	192	168	000 010 {xxx.xxx.xxx.xxx}
Port	5001	{0-9}; {5000-5100}	
Timeout	60	{0-9}; {0-7200}	

Figure 22 – EFD communication parameters when WIFI is selected

If you choose the ‘Ethernet’ communication Type, populate the next fields:

- **Communication Type** – Ethernet;
- **Active** – select ‘Yes’ to activate the communication;
- **Port**- port number;

EFD COMMUN. Commun.Type	ETHERNET		
Active	Yes		
Port	5001	{0-9}; {5000-5100}	

Figure 23 – EFD communication parameters when Ethernet is selected

* After changing the communication type and other settings the system should be restarted.

H. OTHER

Several settings are listed in the section:

- **FDC Number** – select FDC number 0-9;
- **FDC Name** – enter a FDC name;
- **FDC Init Date** – the date when the system installation was done (optional);
- **Dec.P.Price** – position of the decimal point in fuel price;
- **Dec.P.Volume** – position of the decimal point in volume;
- **Dec.P.Amount** – position of the decimal point in amount;

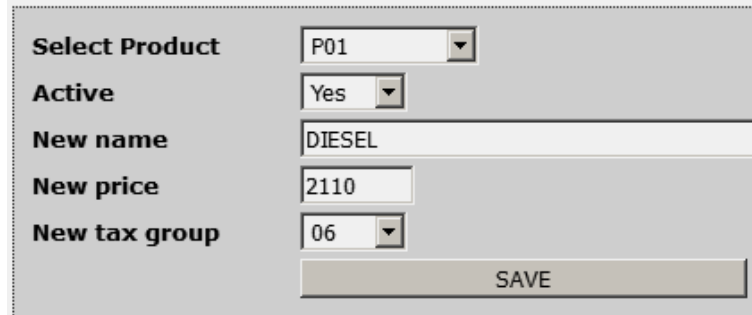
OTHER			
FDC Number	1	{0-9}	
FDC Name	SHELL ORLOV MOS	{0-9}; {A-Z}	
FDC Init Date	01-01-2099 00:00:00	[DD-MM-YYYY HH:MM:SS]	
Dec.P.Price	0	{0-3}	
Dec.P.Volume	2	{2-3}	
Dec.P.Amount	0	{0-3}	

Figure 24 – Other parameters group

6.2 Product Configuration

Product configuration page is located in 'FDC Config -> Product' menu. This option enables the certain number of different products (fuels) to be used of the pumps installed on the particular petrol-station. The maximum number of products that can be allowed is 16.

For product activating, select first product number, then choose 'yes' to activate. Enter the name, price and choose tax group. Finally click 'SAVE' button to keep the changes.



The screenshot shows a form with the following fields:

- Select Product:** A dropdown menu with 'P01' selected.
- Active:** A dropdown menu with 'Yes' selected.
- New name:** A text input field containing 'DIESEL'.
- New price:** A text input field containing '2110'.
- New tax group:** A dropdown menu with '06' selected.
- SAVE:** A button at the bottom right of the form.

Figure 25 – Product configuration options

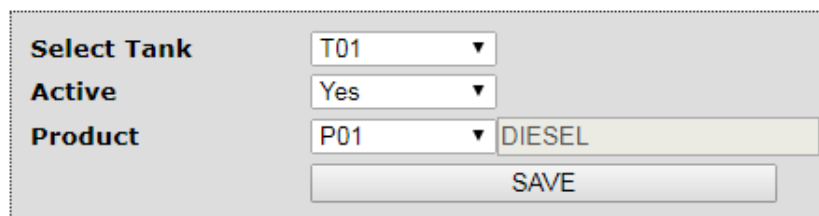
Another possible way to change only the product prices is from 'Operations -> Set Fuel Price' page. In this page the prices of the active products can be changed.

* IMPORTANT! Closing day needed when prices are updated (changed).

6.3 Tank Configuration

Tank configuration page is located in 'FDC Config -> Tank' menu. This option enables the certain number of tanks to be assigned to the products (fuels) that are enabled and in use petrol-station. The maximum number of tanks that can be allowed is 16.

The selection and the activation of the particular tank are done same way as the products described in the previous chapter.



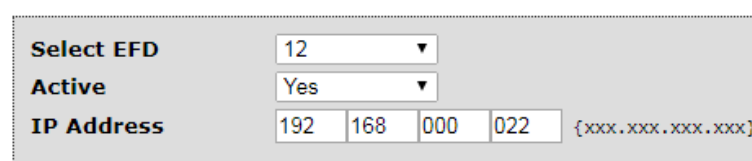
The screenshot shows a form with the following fields:

- Select Tank:** A dropdown menu with 'T01' selected.
- Active:** A dropdown menu with 'Yes' selected.
- Product:** A dropdown menu with 'P01' selected and a text input field containing 'DIESEL'.
- SAVE:** A button at the bottom right of the form.

Figure 26 – Tank configuration options

6.4 EFD Enable/Disable

From menu 'FDC Config -> EFD' can be enabled or disabled a communication point (EFD) with ID number from 1 to 12 to appear on the main screen.



The screenshot shows a form with the following fields:

- Select EFD:** A dropdown menu with '12' selected.
- Active:** A dropdown menu with 'Yes' selected.
- IP Address:** Four text input fields containing '192', '168', '000', and '022', followed by a placeholder '{xxx.xxx.xxx.xxx}'.

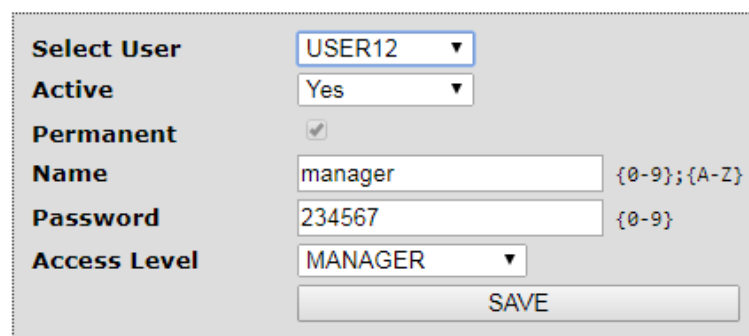
Figure 27 – Enable/Disable EFD option

The parameters here specify the following:

- Select EFD** – The EFD number that appear on the main/home screen;
- Active** – whether to appear or to be hidden;
- IP Address** – the IP-address of the DSB assigned to this point;

6.5 User definition

From menu ‘FDC Config -> User’ can be defined system-access parameters for different users as well as changing the parameters (user-name and password) of the existing ones.



Select User	USER12	
Active	Yes	
Permanent	<input checked="" type="checkbox"/>	
Name	manager	{0-9};{A-Z}
Password	234567	{0-9}
Access Level	MANAGER	
SAVE		

Figure 28 – User definition option

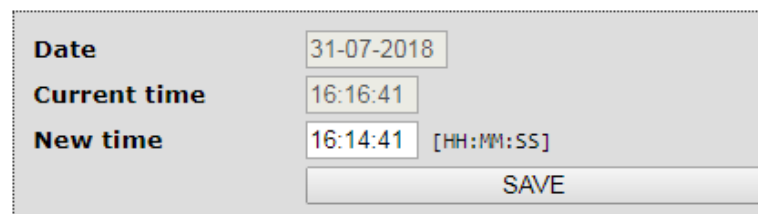
The parameters here specify the following:

- Select User** – user number from the list;
- Active** – to be active or not;
- Permanent** – (not editable) indicates that same users can’t be deactivated;
- Name** – user-name to access the system;
- Password** – password for system access
- Access Level** – defines the access-level of the current user;

6.6 Setting the system time

Manual system-time adjustment

From menu ‘Tools -> Set System Time’ the current time can be changed manually by pressing the “SAVE” button. By default in the “New Time” field is loaded the time of the browser’s computer.



Date	31-07-2018	
Current time	16:16:41	
New time	16:14:41	[HH:MM:SS]
SAVE		

Figure 29 – Manual time adjustment

Automatic system-time adjustment

If the system has internet connection there is an option to keep its internal system-time extremely accurate by adjusting it to an online server. From menu 'Tools -> Automatic Time' the time-server can be set.

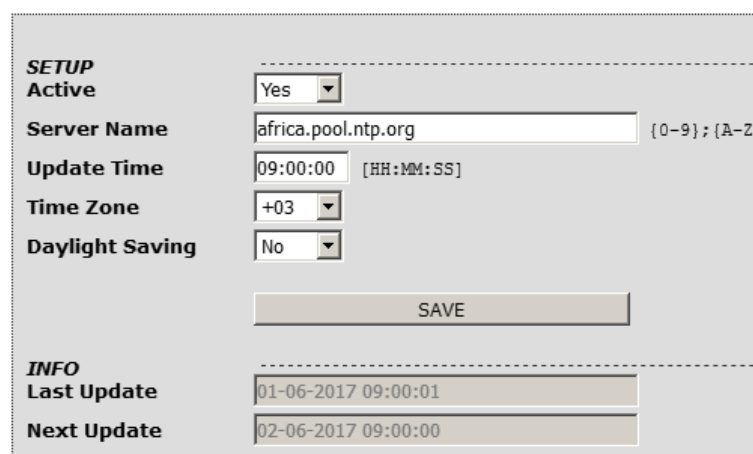


Figure 30 – Automatic time-server configuration

Fields description:

- **Active** – should select 'Yes' to activate automatic time update;
- **Server Name** – system will updating the time through this time server;
- **Update Time** – the exact time, when the system will update FDC clock;
- **Time Zone** – the country time-zone where the FDC is installed;
- **Daylight Saving** – Set to 'yes' if daylight saving time is used in the country;

All changes will be activated after clicking the 'SAVE' button.

For different automatic time-servers that corresponds better to the location where the system is installed you can have a look on the following link:

<https://www.ntppool.org/en/>

7. Connecting ATG console

7.1 Hardware connection

The FDC RoSyS Comforter 12T is capable to be connected to an ATG console over the RS-232 interface. On the back panel of the device there is a dedicated DB9 female connector (see chapter 3.3 – position 8) where the ATG cable should be connected.

The table below describes the DB9-connector signals used in the FDC RoSyS Comforter 12T:

Pin 1	Not used
Pin 2	FDC Transmit
Pin 3	FDC Receive
Pin 4	Not Used
Pin 5	GND - Ground
Pin 6	Not Used
Pin 7	Not Used
Pin 8	Not Used
Pin 9	Not Used

Table 2 – TLG DB9 used pins

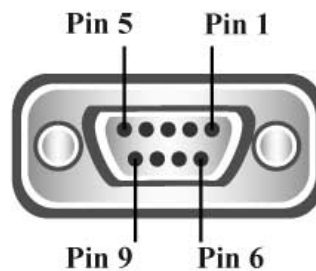


Figure 31 – DB9 ATG connector pinout

7.2 System configuration of the TLG port

The ATG communication parameters are adjustable from menu 'FDC Config -> TLG'.

COM PORT

Baud rate 9600 ▼

Data bits 7 ▼

Parity ODD ▼

Stop bits 1 ▼

SET TLG TIME

Active Yes ▼

Figure 32 – TLG configuration options

The parameters here stand for the following:

COM Port

Baud rate – defines the interface baud rate – default 9600 bps;

Data bits – the data bits defined for the protocol – default 8;

Parity – the parity bit – default “none”;

Stop bits – the number of stop bits defined for the protocol – default 1;

Set TLG Time

Active – defines whether the FDC should update the TLG-console with the system time;

If the connection to the TLG-console is successful the “TLG” - LED on the front panel (figure-1, point-4) of FDC Comforter 12T will turn green.

8. TECHNICAL DATA

Parameter	Range/Type	Remark
Operating Temperature	-20 to 50 °C / -4 to 122 °F	
Supply Voltage	100 V – 240 V AC	
Sealing	IP20	
Material	Stainless steel	