

Automation and management of fuel, oil and additive distribution systems for fleets



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1. OVERVIEW

The automation is carried out using equipment designed for use on systems with storage greater than 10 cubic meters, therefore metrologically approved according to the MID 2014/32 / EU directive, for distribution purposes with a relationship from third parties.

In this document the operating sequence of the refueling management system will be exposed, which will allow the automated identification of the vehicle, the authorization for the supply, the download of the relative data and the kilometers traveled and the eventual recognition of the driver.







2. PRELIMINARY OPERATIONS FOR THE USE OF THE AUTOMATION SYSTEM

The fuel supply automation operations described below are possible after carrying out some preliminary operations which are summarized below:

- Install latest generation dispensers compatible with the forecourt management terminal
- Installation of a stand-alone AT07 forecourt management terminal (or AT04)
- Use of a mechanical interface for the connection of mechanical dispensers with the terminal
- Installation of any forecourt devices for automatic vehicle recognition
- Installation of any "dRadioTrace" radio device for the automatic detection of the km traveled (which, in the absence of automation, you can type using the keyboard)
- Installation and configuration of any devices on board the vehicles
- Installation and configuration at the operational headquarters of the master data management and data download software ("OtControl Tre")

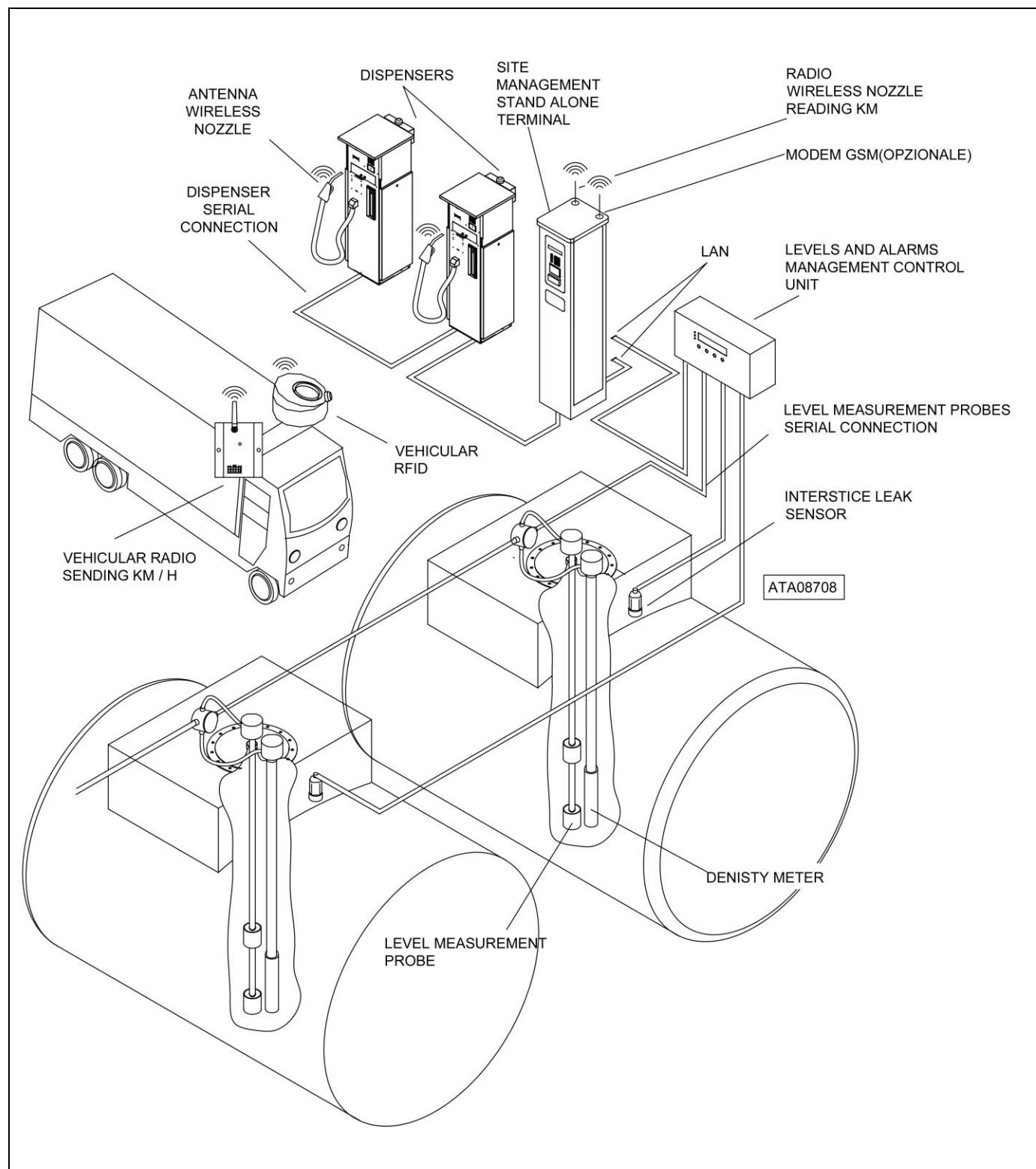
2.1 EQUIPMENT FOR AUTOMATED FLEET SUPPLY

					
DISPENSER OF FUEL	INTERFACE MECHANICS	FORECOURT TERMINAL INTEGRATED	SITE MANAGEMENT TERMINAL	LEVEL MEASUREMENT PROBE	READER ANTENNA UHF TAG LONG RANGE

DATA ENTRY		AUTOMATIC DATA RECEPTION			
					
CARD RFID	KEYCHAIN RFID	TANK CAP WITH RFID INTEGRATED	VEHICLE RFID FOR TANK FILLER	UHF TAG LONG RANGE FOR WINDSHIELD	TRANSCIVER FOR UNLOADING KM / HOURS FROM ODOMETER OR CANBUS

3. FLEET SUPPLY FORECOURT

This system is controlled automatically by the forecourt management terminal AT07. It can be connected to the central system via LAN (therefore, with appropriate devices, also via Wi-Fi) or via GSM / GPRS modem. It is possible to have a local or centralized data management by installing the specific SW OtControl Tre for managing the fleet refueling.



4. FUEL SUPPLY AUTOMATION LEVELS

In this chapter, we present a series of "standard" levels of system automation which, depending on the options present, allow you to optimize the stages of the process of enabling fuel delivery. Depending on the specific needs of the system, it is possible to configure the enabling sequence at will: you can identify only the driver or only the vehicle, checking the permits, or both (checking also that the driver can refuel the vehicle recognized in the sequence); it is possible to read the vehicle's kilometers and, if necessary, grant the delivery only if these are consistent with the system data.

AUTO- MATION LEVEL	OPTIONS				
	 keyboard	 RFID card and/or key fob	 tank cap with RFID integrated	 UHF tag long range	 dRadioTrace on odometer o canbus
LEVEL 1 Manual data entry	✓	✗		✗	✗
LEVEL 2 Identification of driver and/or vehicle easier	✓	✓		✗	✗
LEVEL 3 Automatic vehicle identification	✓	✓		✓	✗
LEVEL 4 Automatic vehicle Km reading	✓	✓		✓	✓

In detail:

- Level 1: manual entry of driver and / or vehicle codes and request for kilometers
- Level 2: driver and / or vehicle recognition by card and / or keyring with RFID reader on the terminal
- Level 3: automatic recognition of the vehicle by RFID on the tank filler or by tag
- Level 4: automatic transmission of the vehicle's km to the system via a radio device connected to the control unit

Each level includes the functionality of the previous level; the operations described below for the various automation levels can be parameterized and can be modified or excluded according to the needs of the user.

The forecourt management terminal (terminal AT07) is a unit capable of operating offline with respect to the management system: it has its own main and backup memory and does not require a constant connection to authorize refueling.

The data stored within the AT07 terminal for each supply are:

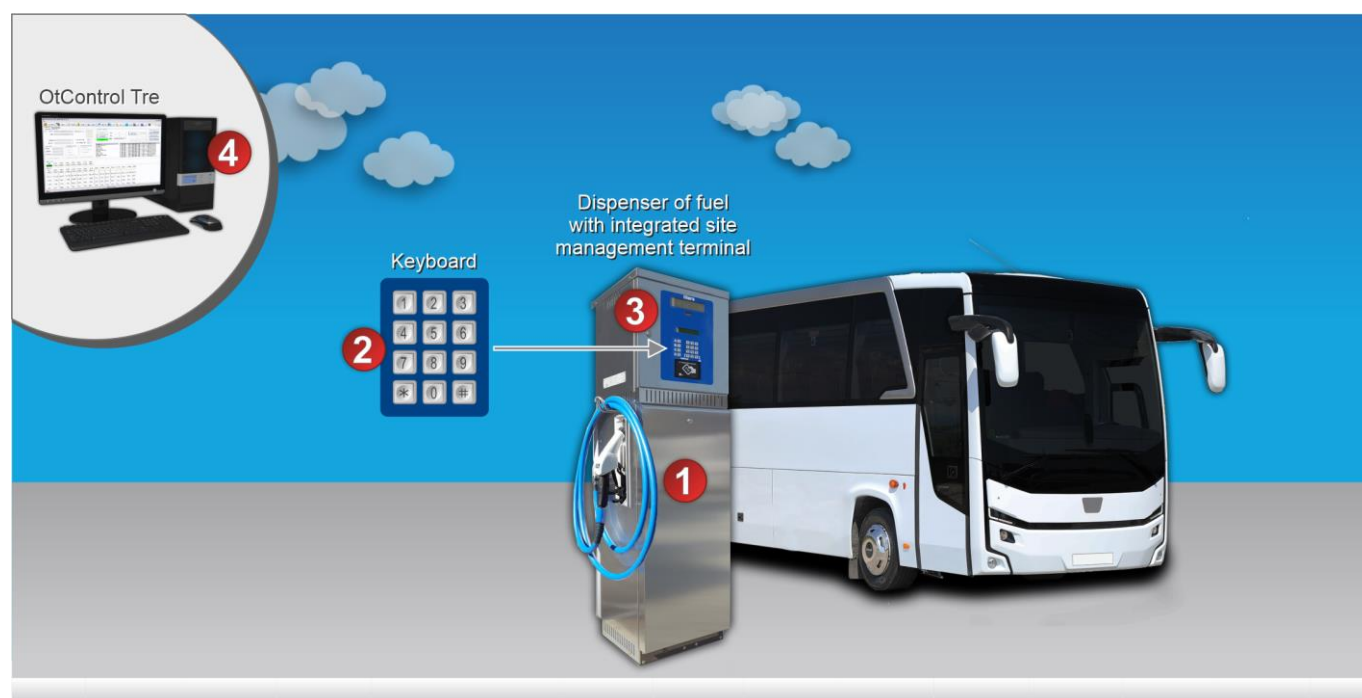
- Date and time of refueling
- Dispenser number
- Management terminal number
- Identification number of the inserted vehicle
- Type of fuel supplied
- Quantity of fuel delivered
- Operator code

4.1 LEVEL 1: MANUAL DATA ENTRY

A basic automation of the system involves entering a driver and / or vehicle code via the keyboard on the forecourt management terminal (terminal AT07) and, possibly, the km traveled read by the vehicle's tachograph.

To refuel the vehicle, you could have an operating sequence of this type:

- The vehicle approaches the fuel dispenser (1)
- The operator enables dispensing by typing the personal code on the AT07 terminal (3) from the keyboard (2)
- The operator enters the vehicle code and the kilometer data from the keyboard (2)
- The AT07 terminal checks the presence of the vehicle in its database, the consistency of the requested product, the maximum volume that can be delivered and, if everything is correct, it enables the delivery of fuel
- When refueling is completed (nozzle extracted from the vehicle tank and stored in its housing) the fuel dispenser communicates the end of delivery to the AT07 terminal
- The AT07 terminal stores the delivery data
- The data is sent to the OtControl Tre management software (4)



4.2 LEVEL 2: IDENTIFICATION OF DRIVER AND / OR VEHICLE EASIER

Compared to the basic automation of level 1, it is possible to facilitate the identification of the driver and / or vehicle using an RFID card or keychain. The appropriate reader must be installed on the AT07 terminal. The km traveled by the vehicle, if desired, can be entered manually using the keyboard.

To refuel the vehicle, you could have an operating sequence of this type:

- The vehicle approaches the fuel dispenser (1)
- The operator is identified by an RFID card or key fob (2) on the AT07 terminal (3)
- The operator identifies the vehicle using an RFID key fob and enters the kilometers via the keyboard
- The AT07 terminal checks the presence of the vehicle in its database, the consistency of the requested product, the maximum volume that can be delivered and, if everything is correct, it enables the delivery of fuel
- When refueling is completed (nozzle extracted from the vehicle tank and stored in its housing) the fuel dispenser communicates the end of delivery to the AT07 terminal
- The AT07 terminal stores the delivery data
- The data is sent to the OtControl Tre management software (4)



The use of contact-less RFID recognition devices makes the equipment highly reliable, as having no magnetized and moving parts, maintenance is reduced to a minimum

4.3 LEVEL 3: AUTOMATIC VEHICLE IDENTIFICATION

Compared to the two previous levels, level 3 allows automatic recognition of the presence of the vehicle to be refueled, thus reducing the risk of possible fuel shortages and further speeding up operations.

Two different technologies can be used for automatic vehicle recognition:

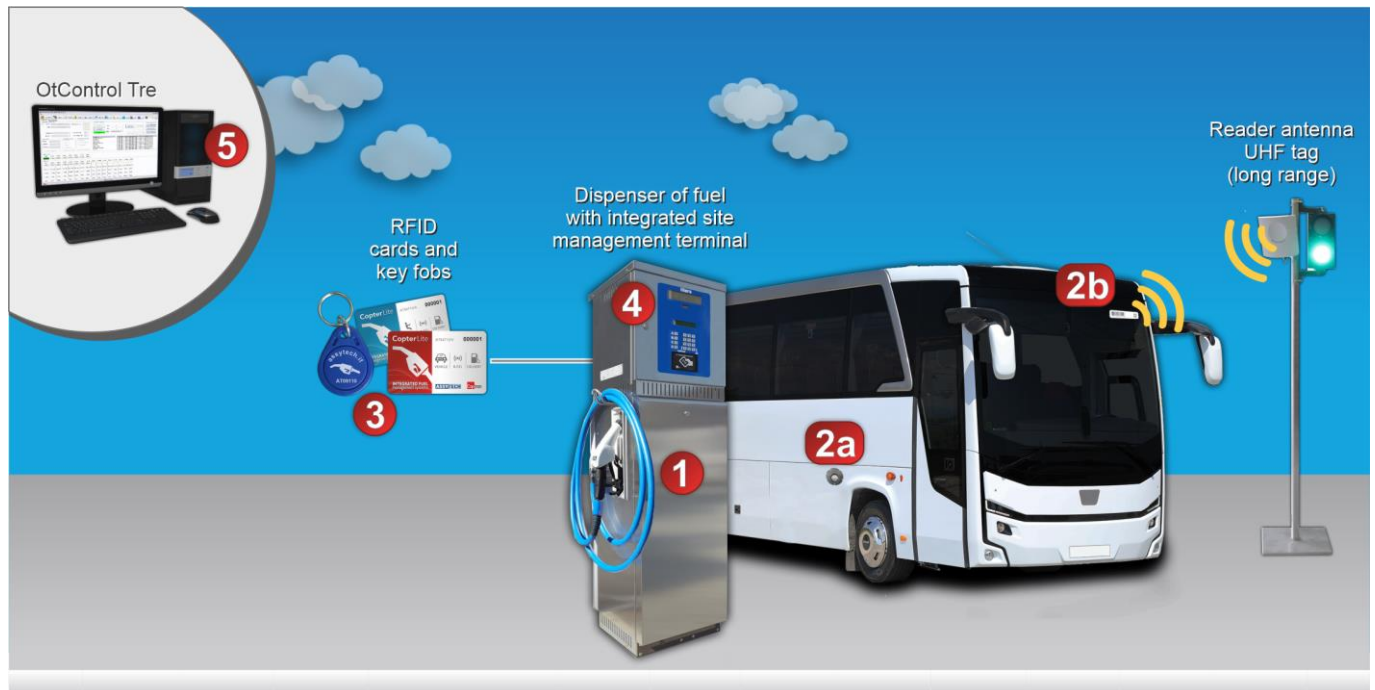
- RFID integrated on the tank cap of the vehicle, recognized by an antenna mounted on the fuel dispenser gun
- Adhesive UHF tag to be applied on the vehicle windshield and installation of an antenna with traffic light for reading the tag

Driver recognition is carried out by means of an RFID card read by the AT07 terminal.

The km traveled can be entered manually via the keyboard.

To refuel the vehicle, based on the technology chosen, an example of a sequence is:

- The vehicle approaches the fuel dispenser (1)
- In the case of vehicle recognition via RFID on the tank cap
- The operator inserts the nozzle into the filler neck of the tank (2a)
- The antenna mounted on the dispenser nozzle recognizes the presence of the vehicle and its identification
- The AT07 terminal checks the presence of the vehicle in its database, the congruence of the requested product, the maximum volume that can be delivered
- A flashing light or an acoustic signal confirm the recognition of the vehicle
- In the case of vehicle recognition through adhesive UHF tag applied on the vehicle glass
- The AT07 terminal checks the presence of the vehicle in its database, the congruence of the requested product, the maximum volume that can be delivered
- The driver waits for the traffic light of the tag reading antenna (2b) to turn green
- The remaining part of the operating sequence is common for both types of technology adopted:
- The AT07 terminal reads the driver's RFID card or key fob (3)
- The operator enters the vehicle's kilometers from the keyboard on the AT07 terminal (4)
- Terminal AT07 sends consent to the fuel dispenser
- When refueling is completed (nozzle extracted from the vehicle tank and stored in its housing) the fuel dispenser communicates the end of delivery to the AT07 terminal
- The AT07 terminal stores the delivery data
- The data is sent to the OtControl Tre management software (5)



4.4 LEVEL 4: AUTOMATIC VEHICLE KM READING

Level 4, in addition to the automatic recognition of the vehicle described in point 4.3, automatically reads the Km traveled via the radio module dRadioTrace installed on the vehicle.

This device allows you to download the Km traveled before refueling from the vehicle's tachograph.

A radio device present on the apron management terminal is activated after recognizing the presence of the; this then connects to the dRadioTrace installed on the vehicle obtaining the data.

To refuel the vehicle, you could have an operating sequence of this type:

- The vehicle approaches the diesel dispenser (1)
- The antenna of the tag reader detects the tag on the vehicle (2) and sends the data relating to the vehicle to the AT07 terminal
- The AT07 terminal checks the presence of the vehicle in its database, the congruence of the requested product, the maximum volume that can be delivered
- The driver waits for the traffic light of the tag reading antenna to turn green
- The AT07 terminal interrogates the dRadioTrace equipment installed on the vehicle (3) reading the kilometers traveled, the working hours and possibly the tank level
- The AT07 terminal reads the driver's RFID card or key fob (4)
- Terminal AT07 sends consent to the fuel dispenser
- When refueling is completed (gun extracted from the vehicle tank and stored in its housing) the fuel dispenser communicates the end of delivery to the AT07 terminal
- The AT07 terminal stores the delivery data
- The data is sent to the OtControl Tre management software (5)



4.5 ANTI-TRANSFER DEVICE

If during the refueling the nozzle is extracted from the tank, causing the separation between the RFID positioned on the nozzle of the vehicle and the antenna installed on the dispensing gun (distance greater than about 5 cm) the system automatically stops the delivery, if on the dispenser the function has been activated through a specific parameter. The maximum distance reduces out-of-tank refueling (e.g. cans) effectively ensuring (during normal use) that the diesel fuel used is used by authorized vehicles.

4.6 DELIVERY MANAGEMENT WITH ADBLUE

The system allows AdBlue refueling management for the vehicles in charge according to the automation level.

In detail, the following operations are carried out:

- **With RFID antenna on the tank filler**
 - The vehicle approaches the diesel dispenser
 - The operator inserts the nozzle into the filler neck of the tank
 - The antenna mounted on the dispensing gun recognizes the presence of the vehicle and its identification through the RFID device installed on the filler itself
 - A flashing light installed on the regulator confirms the recognition of the vehicle
 - The dispenser sends the data detected to the AT07 management terminal which verifies the presence of the vehicle in its database, the consistency of the requested product, the maximum volume that can be delivered
 - If necessary, the AT07 management terminal reads the driver's RFID card or key fob
 - The operator, after refueling the diesel fuel, refills AdBlue
 - At the end of the dispensing, first put the AdBlue dispenser gun and then the diesel one. The AT07 terminal stores the dispensing data
 - The data is sent to the OtControl Tre management software
- **With RFID antenna on the tank filler and dRadioTrace radio device**
 - The vehicle approaches the diesel dispenser
 - The operator inserts the nozzle into the filler neck of the tank
 - The antenna mounted on the dispensing gun recognizes the presence of the vehicle and its identification through the passive RFID device installed on the filler itself
 - A flashing light installed on the regulator confirms the recognition of the vehicle
 - The dispenser sends the data detected to the AT07 management terminal which verifies the presence of the vehicle in its database, the consistency of the requested product, the maximum volume that can be delivered
 - If necessary, the AT07 management terminal reads the driver's RFID card or key fob
 - Following the positive outcome of the operations described above, the AT07 terminal interrogates the dRadioTrace equipment installed on the vehicle, which will send the past kilometers, working hours and tank level of AdBlue to the AT07 terminal
 - The AT07 terminal at this point sends consent to the fuel dispenser
 - If the level of the AdBlue tank is less than 50% of the capacity, a flashing light is activated on the relevant dispenser
 - The operator, after refueling the diesel fuel, refills AdBlue
 - At the end of the dispensing, first put the AdBlue dispenser gun and then the diesel one. The AT07 terminal stores the dispensing data
 - The data is sent to the OtControl Tre management software
 - The operator inserts the AdBlue dispensing gun into the appropriate tank
 - A magnetic device inserted in the nozzle and one in the filler neck of the tank inhibits delivery if the gun is mistakenly inserted into the tank
 - The vehicle radio, connected to the minimum level contact of the additive tank, sends the signal to the AT07 management terminal which activates the indicator light installed on the AdBlue dispenser. The latter signals the operator the need to refuel.

4.7 REFILLING OIL, ANTIFREEZE AND ADDITIVES

Once the vehicle to be refueled is recognized, it is possible to activate automatically, using the dispensers on the same refueling line, the top up of oils, antifreeze and additives.

The data are recorded in the system by associating them with the recognized vehicle, and made available for any processing.

5. LEVEL MANAGEMENT

Using the AT05310 series magneto strictive measuring probes it is possible to detect the level of the product in the tanks, the temperature and the possible presence of water. The probes are connected with a specific interface to the forecourt management terminal.

These values can be read directly on the management terminal display or remotely via the OtControl Tre software.

Any anomalies, such as the presence of water or minimum fuel level, as well as being reported through the OtControl Tre software, can block delivery, thus avoiding putting out of service the dispensers or vehicles refueled.

6. DELIVERYS MANAGEMENT SOFTWARE

OtControl Tre software allows you to centralize and process data from the forecourt terminals of the CPT series.

It is available in the Master, Slave, Client and Lite versions:

FUNCTION	MASTER	SLAVE	CLIENT	LITE*
Password protected login	X	X	X	X
Vehicle management	X	X	X	X
Driver management	X	X	X	X
Management of vehicle and driver groups	X	X	X	X
CDC management (cost centers)	X	-	-	X
Customer management	X	-	-	X
Class categories management	X	-	-	X
Plant management	X	X	X	X
Profile management: sequence of operations on the terminal and association of profile / vehicles-drivers	X	X	X	X
Alarm management				
Print management	X	X	X	X
Scheduling of events for unloading supplies, sending identifiers, requesting levels, locking / unlocking terminals, closing connection and activating external programs	X	X	X	X
Collect database	X	-	-	-
UTF register management	-	X	X	X
Software user management	X	X	X	X
Level management	X	X	X	X
Terminal management	X	X	-	X

* the Lite version manages a limited number of vehicles, drivers and terminals

Can be used with various DB platforms including the most popular:



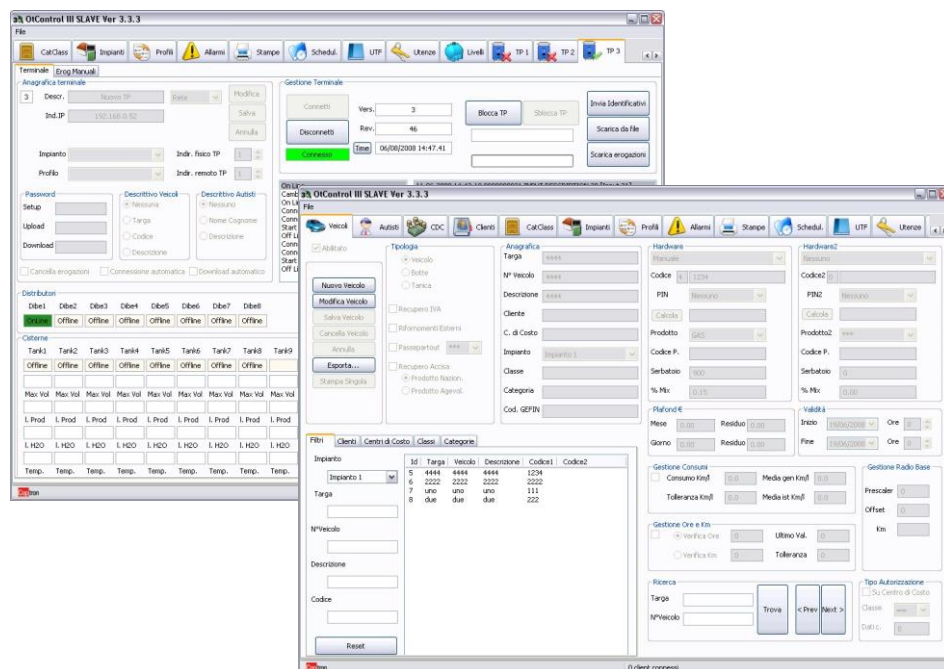
Differentiated login management for:

- User type
- Plant type
- Type of workstation



Complete registry management:

- Vehicles
- Drivers
- Groups
- Cost centers
- Clients
- Class categories
- Installations
- Units
- Terminals



Hardware

Nessuno

Codice

PIN

Calcola

Prodotto

Codice P.

Serbatoio

% Mix

Hardware2

Nessuno

Codice2

PIN2

Calcola

Prodotto2

Codice P.

Serbatoio

% Mix

Dual hardware source management for both the vehicle and the driver

Gestione Consumi

☐ Consumo Km/l

Media gen Km/l

☐ Tolleranza Km/l

Media ist Km/l

Gestione Ore e Km

☒ Verifica Ore

Ultimo Val.

☐ Verifica Km

Tolleranza

Check average and instantaneous consumption

Check mileage and operating hours

Management of refueling profiles simple and intuitive

Modello di profilo: Veicolo e Autista

Chiedi Descrizione

Chiedi Descrizione

Chiedi se stampare

Stampa sempre

Chiedi km veicolo

Chiedi ore veicolo

Chiedi riforn. esterni

Leggi km radio veicolo

Disattiva scontrino

Chiedi se stampare

Stampa sempre

Accetta password per erogare

Password:

Graphic selection of the first delivery category (driver or vehicle) and associated hardware source

Graphic selection of the second delivery category and associated hardware source

Check any description request for each category

Selection of end of dispensing operations

Possible manual release for delivery

Schedule upload and download operation

Abilitato

Id Terminale

Porta

Colleg. TP

Desc. TP

Id Schedul.

Desc. Sched.

Azzioni

Scarica Erogazioni

Cancella

Non cancella

Invia Identificativi

Chiedi Livelli

Blocca Tp

Sblocca Tp

Chiudi connessione

Selezione giorni

Lunedì

Martedì

Mercoledì

Giovedì

Venerdì

Sabato

Domenica

Selezione ore

00:00

06:00

12:00

18:00

01:00

07:00

13:00

19:00

02:00

08:00

14:00

20:00

03:00

09:00

15:00

21:00

04:00

10:00

16:00

22:00

05:00

11:00

17:00

23:00

Single or multiple action schedulable for each terminal, for each minute of the day, for each day of the week.

Tank data display

siena

Storici

Configurazione

TP1 Siena1-GAS

Giacenza 783L

Mancante 1237L

Volume prodotto 648L

Volume H2O 116L

Altezza Prodotto 78.3cm

Altezza H2O 11.7cm

Temperatura 18.70 °C

TP1 Siena2-GAS

Giacenza 734L

Mancante 1268L

Volume prodotto 87L

Volume H2O 647L

Altezza Prodotto 73.4cm

Altezza H2O 64.7cm

Temperatura Errore

Possibility of managing several groups of tanks (max 16 per group) with complete freedom of association

Detailed graphical display of tank data and status

UTF register

Carico

Scarico

N°Ordine

Documento di carico

Specie

Doc N°

Data

Emittitore

Gasolio

It a 15°

K a 15°

Temp.

Oli lubrificanti

Oli combustibili

Scarico

Gasolio

It a 15°

Coeff.

Kg

Pagina

Motivo

Note

Nuovo Scarico

Selezione data

Calcola Scarico

Salva Scarico

Automatic calculation of density at 15 ° using table B53

Automatic calculation of expansion coefficient through table B54

Automatic unloading calculation with presence control of supply data of all terminals

Temperature management for each supply in case of level probes

Customizable UTF register print

Customizable printouts and data export

Selezione campi da abilitare

<input checked="" type="checkbox"/> Id erogazione	<input type="checkbox"/> Tipo Erogazione	<input type="checkbox"/> IdVeicolo	<input type="checkbox"/> IdAutista
<input checked="" type="checkbox"/> Id terminale	<input type="checkbox"/> Km Veicolo	<input type="checkbox"/> HW1 Veicolo	<input type="checkbox"/> HW1 Autista
<input type="checkbox"/> Modello TP	<input type="checkbox"/> Ore Veicolo	<input type="checkbox"/> HW2 Veicolo	<input type="checkbox"/> HW2 Autista
<input type="checkbox"/> Descrizione TP	<input type="checkbox"/> Totalizzatore	<input checked="" type="checkbox"/> Codice Prodotto1	<input type="checkbox"/> Gruppo Autista
<input checked="" type="checkbox"/> Nome Impianto	<input type="checkbox"/> Hardware1	<input type="checkbox"/> Codice Prodotto2	
<input checked="" type="checkbox"/> Divisione	<input type="checkbox"/> Hardware2	<input checked="" type="checkbox"/> Gruppo Veicolo	
<input type="checkbox"/> Targa	<input type="checkbox"/> Categoria 1	<input type="checkbox"/> Impianto Veicolo	
<input checked="" type="checkbox"/> Codice Veicolo	<input type="checkbox"/> Categoria 2	<input type="checkbox"/> Tipo Veicolo	
<input checked="" type="checkbox"/> Descrizione Veicolo	<input type="checkbox"/> Classe 1	<input type="checkbox"/> Recupero IVA	
<input checked="" type="checkbox"/> Nome Autista	<input type="checkbox"/> Classe 2	<input type="checkbox"/> Rifornimenti Esterni	
<input checked="" type="checkbox"/> Cognome Aut.	<input type="checkbox"/> Funzione 1	<input type="checkbox"/> Passepartout	
<input type="checkbox"/> Descrizione Aut.	<input type="checkbox"/> Funzione 2	<input type="checkbox"/> Recupero Accisa	
<input type="checkbox"/> Prezzo Unitario	<input type="checkbox"/> Codice 1	<input type="checkbox"/> Centro di Costo	
<input type="checkbox"/> Volume	<input type="checkbox"/> Codice 2	<input type="checkbox"/> Codice GEFIN	
<input type="checkbox"/> Prodotto			
<input checked="" type="checkbox"/> Data e Ora			
<input type="checkbox"/> Durata			
<input type="checkbox"/> Erogatore			
<input type="checkbox"/> Pistola			

Descr. Default

Default

☒ DEFAULT

Nuovo

Cancella

Salva

Annulla

Modifica

Management of the selection profiles of the display, printing and export fields

Saving data in text files with separate and fixed-length fields or in html format

Centralization of station and data management

☒ Abilitato

Nome DB	Descrizione DB	Impianto
firomito	Database FI-Romito	Siena
User DB	Ultima connessione	
firomito	01/01/2000 23:59:59	
Password DB	Ultimo Id	
firomito	0	

Aggiorna

Scarica

Possibility of operation as a remote server

Update of the local data of each station

Download of the data of each plant to the server

Full execution and modification logs creation | deletion of data log

IdLog	DataOra	Pc	Utente	Sezione	Routine	Descrizione
1808	30/07/2007 16:45:00	PC	q	Evento	EngineDownload()	END su terminale 10: Scaricate 11 Erogazioni in 0m 0s
1807	30/07/2007 11:01:42	PC	q	PanelCollectDb	OnClickSalvaDb()	sql_string = UPDATE CollectDb SET DataUltimaConnessione = 20070730, OraUltimaConne
1806	30/07/2007 11:01:37	PC	q	PanelCollectDb	OnClickSalvaDb()	sql_string = UPDATE CollectDb SET DataUltimaConnessione = 20070730, OraUltimaConne
1805	27/07/2007 16:44:39	PC	q	Evento	EngineUploadId()	FINE Upload N° 1/1 Identificativi Tp = 10
1804	27/07/2007 16:44:39	PC	q	Evento	EngineDownload()	END su terminale 10: Scaricate 11 Erogazioni in 0m 0s
1803	27/07/2007 15:13:20	PC	q	PanelUtif	SalvaNuovoScarico()	sql_string = INSERT INTO UTFScarico (Data, Motivo, GasLt15, GasLtTA, Contatore, Coef
1802	27/07/2007 09:52:07	PC	q	PanelUtif	SalvaNuovoScarico()	sql_string = INSERT INTO UTFScarico (NOrdine, DataCarico, SpecieDoc, NDoc, DataDoc, E
1801	27/07/2007 08:34:13	PC	q	PanelCollectDb	OnClickSalvaDb()	sql_string = UPDATE CollectDb SET DataUltimaConnessione = 20070727, OraUltimaConne

Traces of events viewable by program with references of date, machine, user, section, routine and description

Log on file of database access sequences and events

7. EMERGENCY PROCEDURES

The plant is managed in every operation by the AT07 forecourt management terminal.

In case of failure of the same, it is possible to refuel the vehicles by setting the system in manual mode, thus ensuring the restoration of product delivery.

Once the correct management of the forecourt management terminal has been restored, it will be possible through simple operations to bring the system management back to fully automatic mode.

On power-up, the system generates an alignment transaction equal to the liters dispensed in manual mode.

Refueling carried out manually can be subsequently entered into the customer's information system, by typing by the operator, in order to guarantee complete IT traceability of the operations.