

# Технические характеристики

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# Parking Guidance System

## A cost-effective solution for car parks

The Dupline® parking guidance system guides you to the right spot.

This new innovative system saves time and reduces stress for drivers by leading them to free parking bays by the shortest possible route. Networked ultrasonic sensors monitor parking bay occupancy, and intelligent displays show the number of free spaces in the pointing direction, thereby preventing drivers from entering driveways or areas with no free spaces. The system is completely scalable and can be used within any type and size of indoor parking lot. In spite of the advanced function, the system is surprisingly easy to install and configure.

The users of busy parkings will experience an improved parking service, resulting in a higher perceived value. Precious time is saved, the level of comfort is increased, and furthermore, the stress and emotion created by the search and "fight" for free spaces is avoided.



## Easy configuration and advanced features

### Increased productivity

The carpark facility can be utilized more efficiently. Parking bays can be announced free and sold faster, because availability is detected immediately when the car leaves the parking bay.

### Reduced operating cost

With the Dupline® parking guidance system, driving can be reduced by 20 %, whereby the amount of exhaust gases decreases correspondingly.

The reduced need for ventilation provides direct savings in energy costs.

### Clear indication of free spaces

The Dupline® parking guidance system is characterized by a very clear indication of the free spaces. The parking bay indicators and the guidance displays are based on high-bright LEDs making them visible from a distance, and the guidance displays are featuring "moving arrows" attracting the attention of the drivers.

### Improved information level

By use of PC software it is possible to graphically monitor the real-time status of the entire parking system from one or several central locations. Thanks to the Carpark Web App, drivers can check real-time space availability in advance from the smart phone.

Furthermore, all parking events are recorded, thus enabling a powerful statistical analysis of the parking system performance.

### Easy handling

Easy design, planning, installation and commissioning are inherent features of the Dupline® bus. In fact, the entire carpark can be programmed and installed without the use of a PC. Addressing, testing and calibration of sensors are performed with simple handheld tools.

### Robust and reliable system

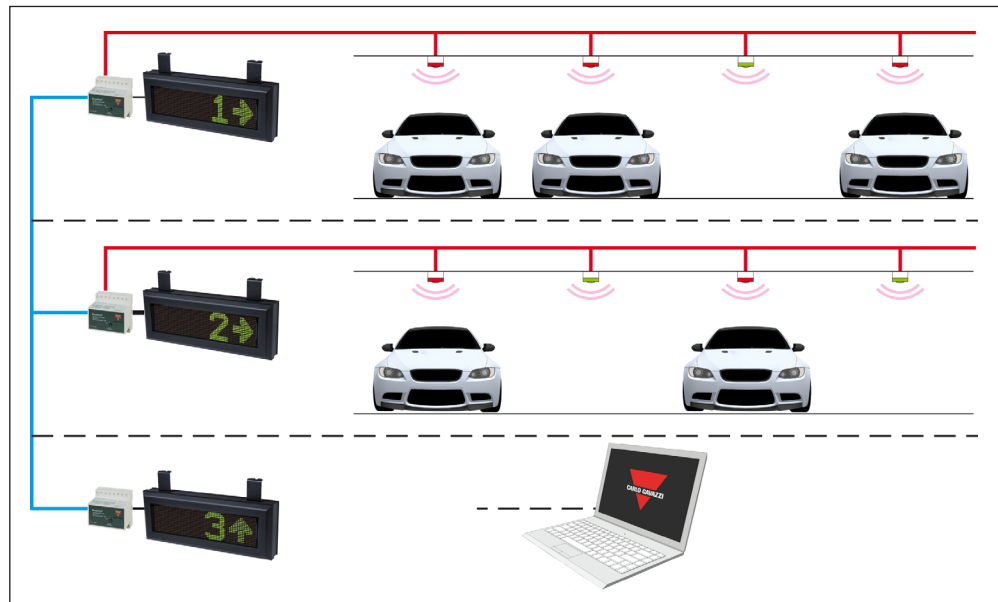
The products are based on Carlo Gavazzi's years of experience with sensing and communication technology within the industrial sector. The patented Dupline® 3-wire bus is a proven network with more than 150,000 installations worldwide.

## Stand-alone solution

One segment of the Dupline® 3-wire bus can link together and supply power for 120 sensors. Each segment can have several monitor modules, which are intelligent devices programmed to monitor a certain range of sensor addresses and calculate the number of free parking bays within that segment. The monitor module is connected to a slave display for indication of direction and number of free parking bays. The monitor modules can be linked together via an upper level Dupline® 3-wire bus, thereby enabling master monitor modules to add together and display the number of free parking bays from

several segments. The system operates as a stand-alone solution not depending on a PC. However, it is possible to con-

nect a PC for monitoring and booking purposes.

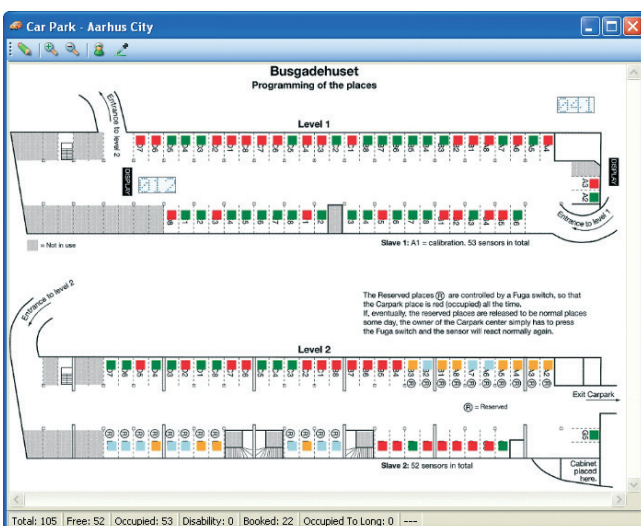


## PC software and Web App for monitoring and control

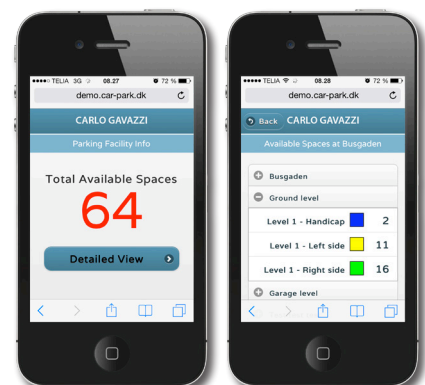
With the PC software it is possible to monitor and control the parking system from one or several central locations. Features include monitoring of real-time status based on graphical images and key figures for the various floors and areas, monitoring of alarms and an API

Web Service allowing 3<sup>rd</sup> party software to access availability data easily. The space booking feature provides a scheduler allowing the user to enter "book group" or "unbook group" commands on specific times of the day and days of the week or just as a single event. This can e.g. be used to reserve spaces for office employees during working hours. Inside the carpark, The LED indicators of the available booked spaces will turn amber to indicate that the space is not occupied, but reserved.

all parking events are stored in a database. Based on this it is possible to obtain historical reports e.g. for occupancy rates, space rotation frequencies, space popularity rates and alarms. By activating the carpark icon on the smart phone, the drivers can check real-time space availability in advance, thereby avoiding driving to a carpark that is already full. This feature is provided by the Carpark Web App, which is also included in the software package.



In order to provide useful statistical information,



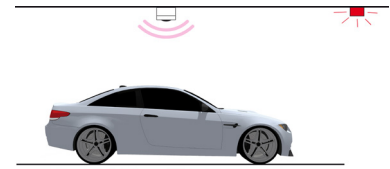
# Parking Guidance System

## A cost-effective solution for car parks

### Car detection with ultrasonic sensor

The ultrasonic sensor for car detection is a key component in the parking guidance system. At regular intervals, the sensor emits an ultrasonic pulse and measures the time delay until the echo pulse is received. If the echo time deviates from the floor echo time measured during calibration, the sensor will assume a car is present. Multiple sensors

can be calibrated simultaneously by issuing a calibration command via the network. The sensor is available with built-in 2-colour or 3-colour LED's for indication of the space status, but in many cases it is a better solution in terms of visibility to use external LED indicators mounted externally along the carpark driving lanes.

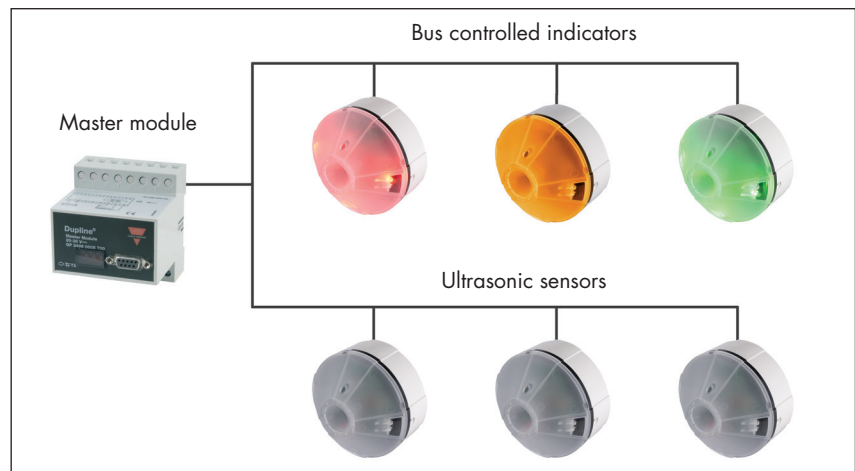


The sensor is equipped with a Dupline® 3-wire bus interface for power supply and communication.



### Multi-colour indication

With the external bus-controlled 3-colour LED-indicator it is possible to indicate 4 different states for each space, for example with green for free space, no light for occupied space, red light for exceeding pre-paid time, and amber for booked space. In such cases the colour is typically controlled from a PC software. The installation is faster and easier, even in a 2-colour system, because the bus-controlled indicators can be installed in one long multidrop line, thereby eliminating the need for perpendicular connections to the sensors. Furthermore, it is possible to configure an indicator to monitor multiple parking spaces. If all the selected spaces



are occupied, the light will be red, but if one space or more are available, the

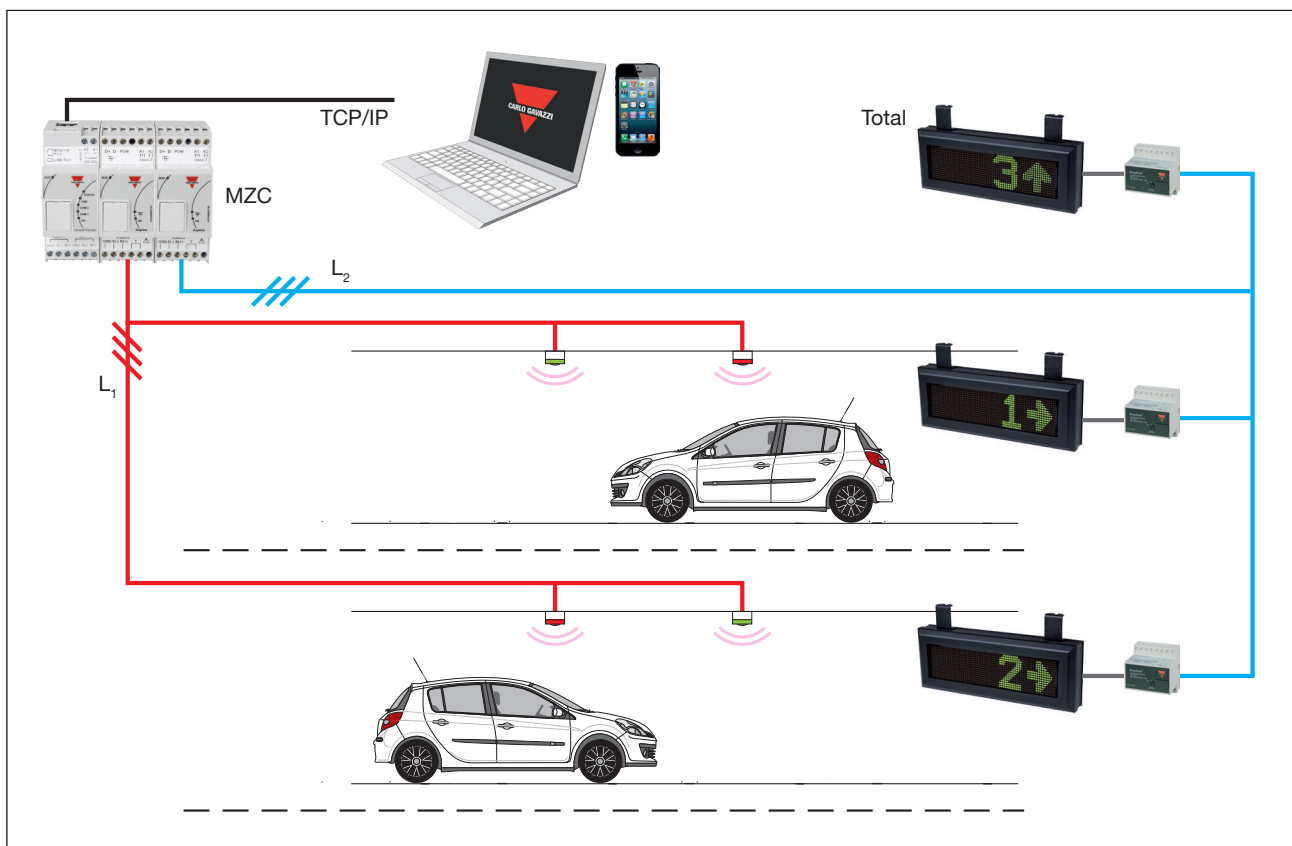
light will be green. This reduces the amount of indicators in the installation.

## Zone counting system

For roof tops and other outdoor parking areas, where ultrasonic sensors cannot be installed, the solution is to implement a zone counting system. This integrates seamlessly with the single spot part to form a combined system. It is also an option to reduce cost by implementing zone counting in the entire carpark, but then the guidance is

limited to zone displays with number of available spaces, and accuracy is less. The master zone counter keeps track of the available spaces in each zone and updates the displays accordingly. The entry and exit points of the zones are equipped with sensors, which are typically ultrasonic or loop detectors, but can also be photo-electric. For

optimized accuracy, two sensors can be used at each detection point, this allows car direction detection. The sensors are linked to the Master zone counter via the Dupline L<sub>1</sub> 3-wire bus. The built-in web-server makes it easy to monitor and adjust the zone count values simply by using the browser of your laptop or smart phone.



## Zone counting combined with handicap single spot detection

One of the issues in zone count systems is that they are not able to distinguish between standard and handicap spaces. This makes it impossible to display exact availability information outside the parking facility. However, the Dupline carpark guidance system

allows a split system where the handicap spaces, which are usually a limited number, are monitored as a single spot system. This enables the master zone counter to calculate the split between the two types of spaces, and thereby display exact availability information

on the signs. An economical way to achieve accurate zone availability data for both standard and handicap spaces.

# Parking Guidance System

## A cost-effective solution for car parks

### Ultrasonic sensor

GP6220xxxx724



- Ultrasonic sensor for detection of cars
- Power and communication via Dupline 3-wire bus
- Option for built-in 2-colour LED indication (red/green , red/blue)
- Option for built-in bus-controlled 3-colour LED indication (red/green/amber, red/green/blue, red/blue/amber)
- Option to use external LED indicator (2-colour or 3-colour)
- Protected against dust and moisture
- cUL approved

### 2-colour LED indicator

GP6289000x724



- External LED indicator for ultrasonic sensor
- 2-colour LED indication (red/green , red/blue)
- Controlled directly from carpark sensor G62402224724 output
- Low power consumption
- Protected against dust and moisture
- cUL approved

### 3-colour LED indicator

GP6265230x724



- External 3-colour LED indication (red/green/amber, red/green/blue, red/blue/amber)
- Power and control of colour via Dupline 3-wire bus
- LED colour can be controlled from PC software or Controller
- Protected against dust and moisture
- cUL approved

### Dupline master module

GP34960005700



- Driver of power and communication for one bus segment with up to 120 sensors
- Powered from 28 VDC
- Modbus-RTU communication over RS485 / TCP with server running software
- DIN-rail mounting
- cUL approved

### Carpark monitor

GP34829091724



- Programmable device for monitoring of several spaces
- Controls carpark displays via RS485 connection
- Slave mode for local segment monitoring, master mode for area monitoring
- DIN-rail mounting
- cUL approved

### Test unit

GP73800080



- Portable Configuration and Test Unit
- Configures the Carpark sensors, indicators and monitors
- Option to monitor the status of Dupline® addresses
- LCD-display
- 12-key tactile keyboard
- Supplied by standard 9V battery
- Multi calibration of the carpark sensors

## Count module

GP3295003700



- Controller in the Dupline® zone counting system
- Micro Linux PC with Ethernet port and Web-server
- Manages up to 3840 parking spaces in multiple zones
- Each zone can have multiple entry and exit points
- Easy configuration, monitoring and count adjustment via web-server
- Mixed systems with zone counting and single space detection possible
- Option to detect the split between handicap and standard spaces occupancy
- Requires 2 pcs GP32900003700 for external bus connection

## Channel generator

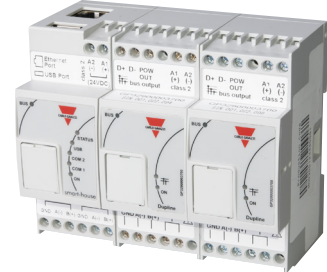
GP32900003700



- Channel generator for the Dupline® 3-wire bus in zone count systems
- Provides power supply and communication line for the carpark sensors and monitors
- Connect up to 120 count sensors via Dupline® L<sub>1</sub> 3-wire bus
- 24 VDC Power Supply

## Masterzone counter

GPMZC-SET



- Complete set of cabinet modules required for zone counting
- Controller in the Dupline® zone counting system
- Connect up to 120 count sensors via Dupline® L<sub>1</sub> 3-wire bus
- Dupline® ultrasonic sensors, loop detectors or photoelectric sensors can be used
- Manages up to 3840 parking spaces in multiple zones
- Each zone can have multiple entry and exit points
- Easy configuration, monitoring and count adjustment via web-server
- Mixed systems with zone counting and single space detection possible

## Carpark displays

GP676301XX



- Carpark display for guiding the drivers in the right direction with arrows and crosses
- Option to indicate the number of available spaces in the pointed direction
- Indoor and outdoor versions available
- 24 VDC DC-powered

GP676301XX



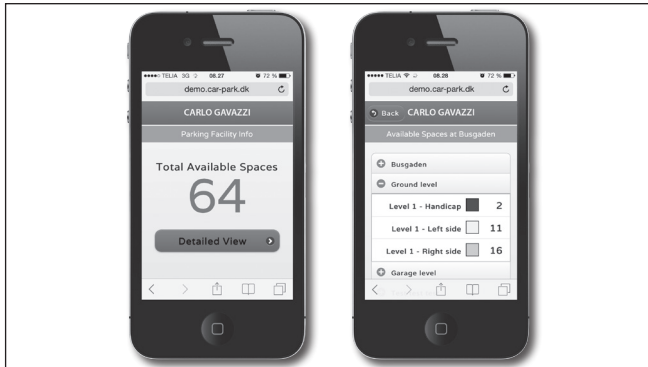
- Carpark display for guiding handicapped drivers in the right direction with arrows and crosses
- Option to indicate the number of available spaces in the pointed direction
- Indoor and outdoor versions available
- 24 VDC DC-powered

GP676301XX



- Alpha-numerical carpark display for indication of available spaces
- Typically used outdoor to indicate the status of the entire carpark or a large area
- Indoor and outdoor versions available
- 24 VDC DC-powered

# Dupline® Carpark Web App



- Allows smartphones to check space availability
- Online updated data
- The user is able to see available spaces
  - in total
  - on each level
- Different colours are used to indicate each level

## Product Description

This web app allows the drivers to use their smartphone to check the number of available spaces in the Carpark facility online - in total and on each

individual level. If the user has access to either Wi-Fi or mobile broadband, data can be accessed from anywhere.

## System Requirements

Any tablet, smartphone or PC with Wi-Fi or mobile

broadband can be used with the Dupline® Carpark App.

## Mode of Operation

The Carpark web app is included in the Dupline® Carpark software package DUP-PGS-SWxxxxx and delivered with standard functions and colours. It works with the software's built-in mobile web service which automatically provides the predefined texts and level definitions, together with data on availability. The web app pages are automatically created with no need for configuration.

The app design (e.g. specific logo) can be customized at additional charge.

Since the web app is connected to the Dupline® Carpark software, it will only be possible to read data in the web app if this software is installed and the API (Application Programming Interface) is selected.

## Installation

It is recommendable that the Dupline® Carpark Software and the web part are hosted on separate servers. The advantages of using this method:

- Backend and frontend are correctly separated.
- Webserver updates and handling of a system that is connected to the internet are performed by the Carpark holder's server.

- The web servers are able to handle heavy web traffic and many simultaneous requests.
- No special setup is required for web deployment. Use of existing infrastructure.

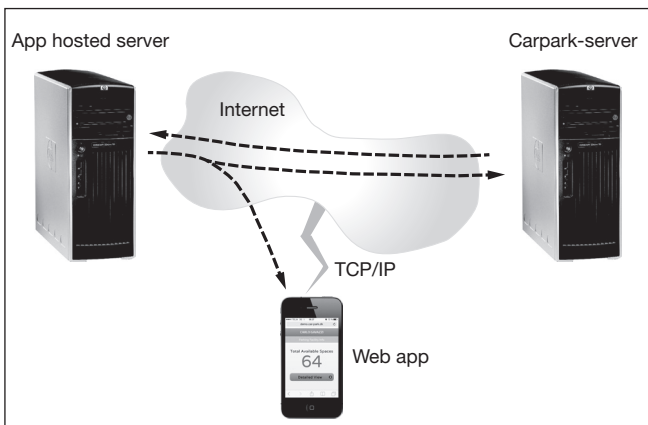
## Software installation

To install the web app, all generated files must be accessible on the server. Open the file: 'script.min.js' in an editor and change the "Variables" in top of the text:

```
/* Variables */
ServerIP = 'IPADDRESS';
ServerPort = 'PORT';
debug = false;
```

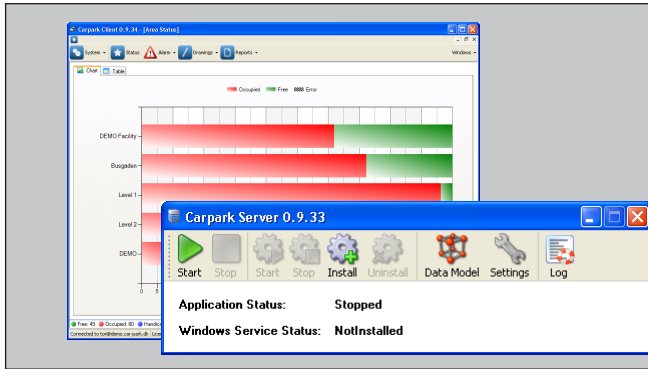
that there is access from the smartphone to the IP address and Port on the same network. If the server is connected to the internet, it can be accessed from any location with an internet connection.

Type the 'IPADDRESS' and "PORT" number of the server that is used for the Dupline® Carpark Software. Debug must be set to "false" When this is done, the web app should be running and accessible. Make sure





# Dupline® Carpark Software, Server and Client Types DUP-PGS-SWxxxxx



- Server software for control and handling of the Carpark facility, data logging and remote management
- Client software for control and monitoring of the Carpark facility, data management, booking of places
- Runs on Windows PC platform
- On-line management via LAN
- Data is stored in SQL database
- Access to server from any Windows based PC with the client installed, connected to the internet
- The user is able to
  - book places using up to 3 different colours
  - book places using a scheduler
  - monitor places and areas
  - monitor history and instantaneous values
  - select displays that show available spaces for zones
- Carpark Server and Mobile API

## Product Description

The Carpark Software is an application that gives you information achieved from your Carpark installation. It consists of two components, the server and the client. The server is installed on a Windows-based PC and manages the data traffic between the Carpark facility and the PC. The server is connected to the LAN/Internet that passes the communication from the Dupline Master Modules which in term monitors the parking places, or from the MZC as emulated ID numbers.

The Carpark client is installed on a Windows-based PC that is connected to LAN/Internet, which in term is connected to the PC which runs the Server. The client can monitor the parking facility in real-time. It can, once connected to the server on a remote location, have full access to all the data that is logged on the Server. The client also acts as the designing tool for the Carpark facility, so that full graphical overview can be achieved in an easy way. The system is built-up using Microsoft SQL Express database tool.

## Type Selection

### Carpark Server Software Ordering no.

DUP-PGS-SW250	250 parking places
DUP-PGS-SW500	500 parking places
DUP-PGS-SW1000	1000 parking places
DUP-PGS-SW2000	2000 parking places
DUP-PGS-SW3000	3000 parking places
DUP-PGS-SW4000	4000 parking places
DUP-PGS-SW5000	5000 parking places
DUP-PGS-SW6000	6000 parking places
DUP-PGS-SW7000	7000 parking places
DUP-PGS-SW8000	8000 parking places
DUP-PGS-SW9000	9000 parking places
DUP-PGS-SW10000	10000 parking places

(Other parking place numbers on request)

## System Requirements

The PC hardware requirements are:

**Client:** Operating Systems: Windows XP; Windows Vista; Windows 7

**Processor:** Follow Operation System requirement

**RAM:** Follow Operation System requirement

**Hard Disk:** Minimum 1 GB of available space

**Display:** 1024 x 768 high color, 32-bit (Minimum); 1600 x 1200 high color, 32-bit.

**Recommended:** 24" display, capable of showing 1600 x 1200 pixels in high color.

### Server:

Operating Systems: Windows Server 2003; Windows

Server 2008; Windows XP; Windows Vista; Windows 7

**Processor:** Core 2 Duo 2GHz Pentium processor or equivalent (Recommended)

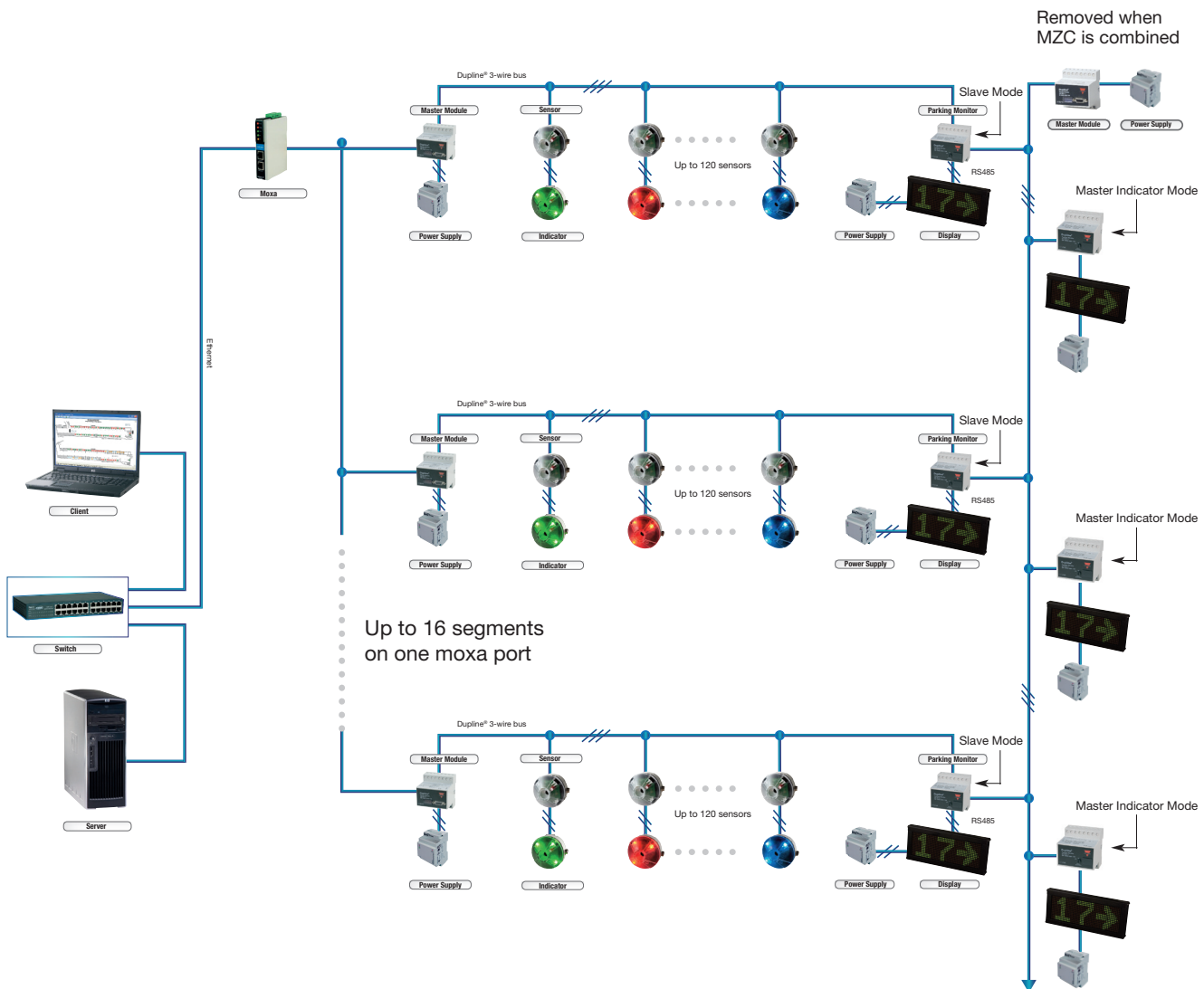
## Mode of Operation

The Carlo Gavazzi Parking Guidance System (DUP-PGS-SWxxxxx) is a Windows based software tool to monitor and control CarPark places. The DUP-PGS-SWxxxxx consists of a client and a server part. The client is normally the PC which the operator uses to monitor and reserve parking places. In an easy way the operator can get a full overview of the complete parking area and also be able to help customers with reservations.

The server receives data from the master modules or from the MZC as emulated ID numbers, via the LAN. The received data is online data from the CarPark facility. All the data is stored in a database on the server. The server is used to configure the program for the CarPark places.

It is possible to have many clients but there can only be one server in a system.

The server is the heart in the system. The server has all the programming and communicates with the entire master modules through the LAN.



The client (or clients) is also connected to the LAN. The client is the application for the operator of the system, who wants to receive information from the parking facility. The design of the parking facility is done by means of the client, where diagrams, pictures etc. can be uploaded as background for the programming.

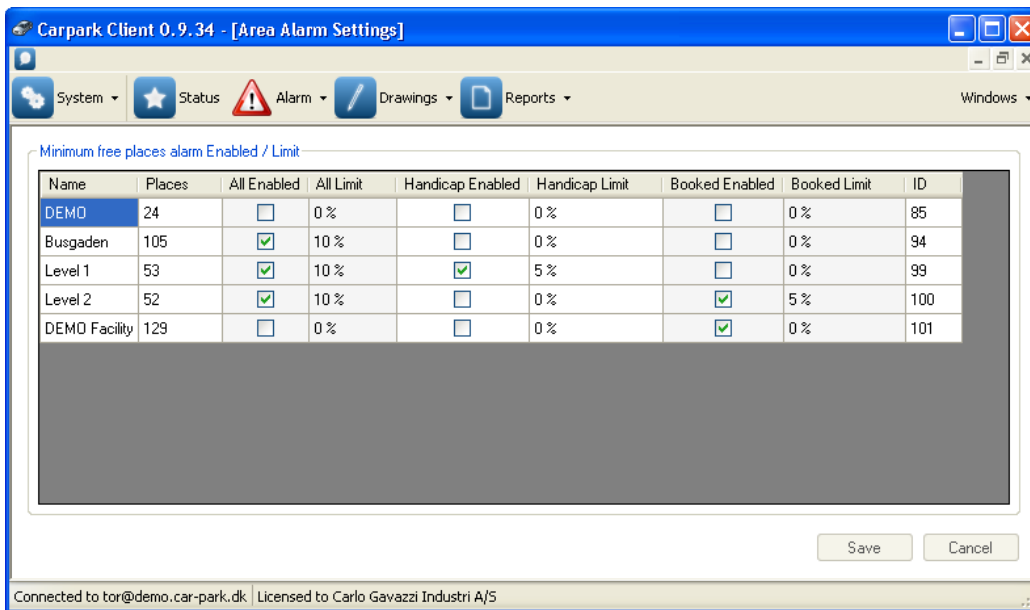
It is possible to make static reports, view the Carpark status online, make bookings, view different kind of parking occupancy etc. Several levels of rights can be used, so that more users with different interests can get access to the server, according to their needs.

The client user can achieve data from the server, and transfer them to a spreadsheet in order to build statistical information for other use.

## Mode of Operation

Area	Timestamp	Alarms	Occupied	Free	Handicap Occupied	Handicap Free	Booked Occupied	Booked Free	Places	Handicap	Booked	Error
DEMO Facility	2010-04-08 11:15:51	0	87	42	5	7	16	18	129	12	34	0
Busgaden	2010-04-08 11:15:51	0	83	22	5	1	12	10	105	6	22	0
Level 1	2010-04-08 11:15:51	1	51	2	5	1	0	0	53	6	0	0
Level 2	2010-04-08 11:15:51	0	32	20	0	0	12	10	52	0	22	0
DEMO	2010-04-08 11:15:51	0	4	20	0	6	4	8	24	6	12	0

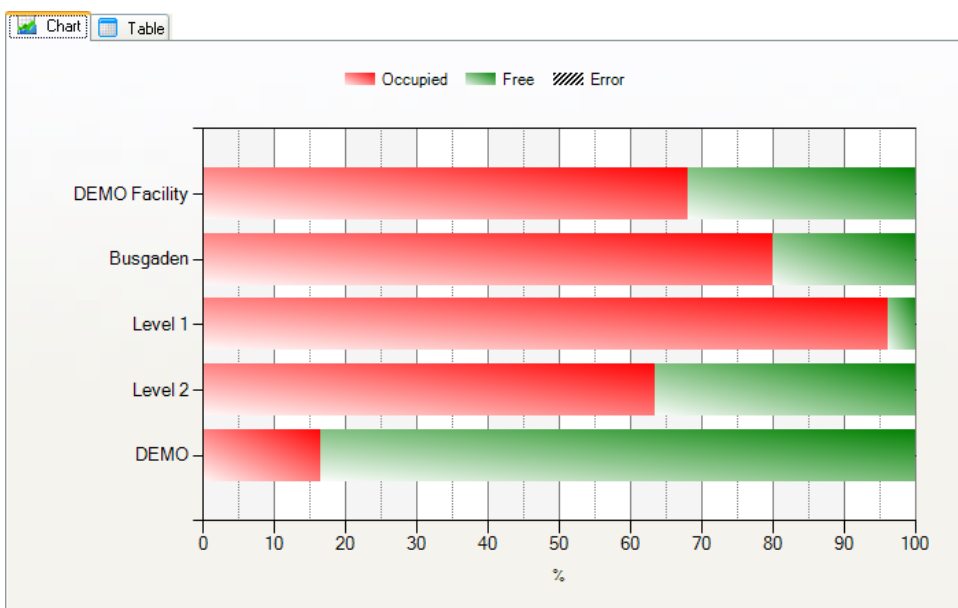
The user of the client will also be informed whenever an alarm is detected. The types of alarms are set in the client setup part of the application.



Name	Places	All Enabled	All Limit	Handicap Enabled	Handicap Limit	Booked Enabled	Booked Limit	ID
DEMO	24	<input type="checkbox"/>	0 %	<input type="checkbox"/>	0 %	<input type="checkbox"/>	0 %	85
Busgaden	105	<input checked="" type="checkbox"/>	10 %	<input type="checkbox"/>	0 %	<input type="checkbox"/>	0 %	94
Level 1	53	<input checked="" type="checkbox"/>	10 %	<input checked="" type="checkbox"/>	5 %	<input type="checkbox"/>	0 %	99
Level 2	52	<input checked="" type="checkbox"/>	10 %	<input type="checkbox"/>	0 %	<input checked="" type="checkbox"/>	5 %	100
DEMO Facility	129	<input type="checkbox"/>	0 %	<input type="checkbox"/>	0 %	<input checked="" type="checkbox"/>	0 %	101

The alarms will be visible for any user, and can be acknowledged by the users who have the rights to do that.

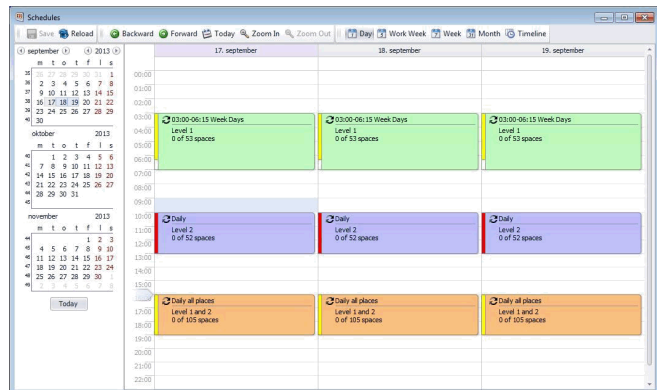
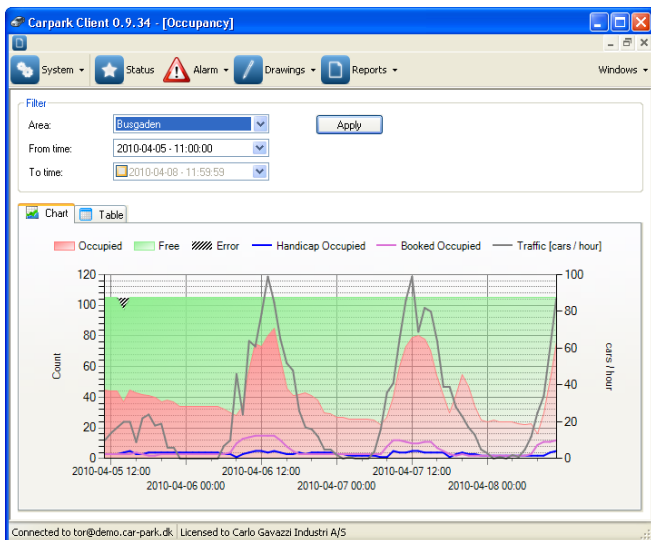
The client is able to read the instantaneous status of the sensors of the facility. It is able to show the actual status on the screen both graphically and in table format.



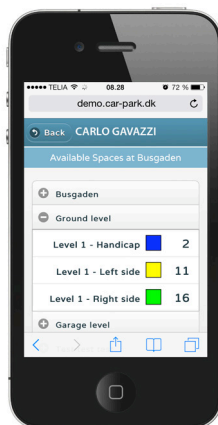
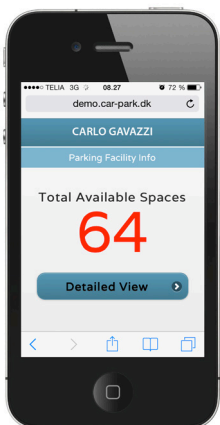
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Level 2	2010-04-08 11:15:51	0	32	20	0	0	12	10	52	0	22	0
DEMO	2010-04-08 11:15:51	0	4	20	0	6	4	8	24	6	12	0

Data can be shown graphically to give a good view of the situation on the facility. The data can also be exported to a spreadsheet used for other purposes. Using a Scheduler, the operator can schedule booking.



The Carpark software has the option to select API services (Application Programming interface). In the Carpark server this service can be enabled for e.g. Space Status Web Service and Mobile Site Web Service. The documentation how to implement the functions is described in the documentation for the Carpark server. See homepage : [Car-Park.dk/download](http://Car-Park.dk/download)



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Белгород (4722)40-23-64	Киров (8332)68-02-04	Оренбург (3532)37-68-04	Тверь (4822)63-31-35
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