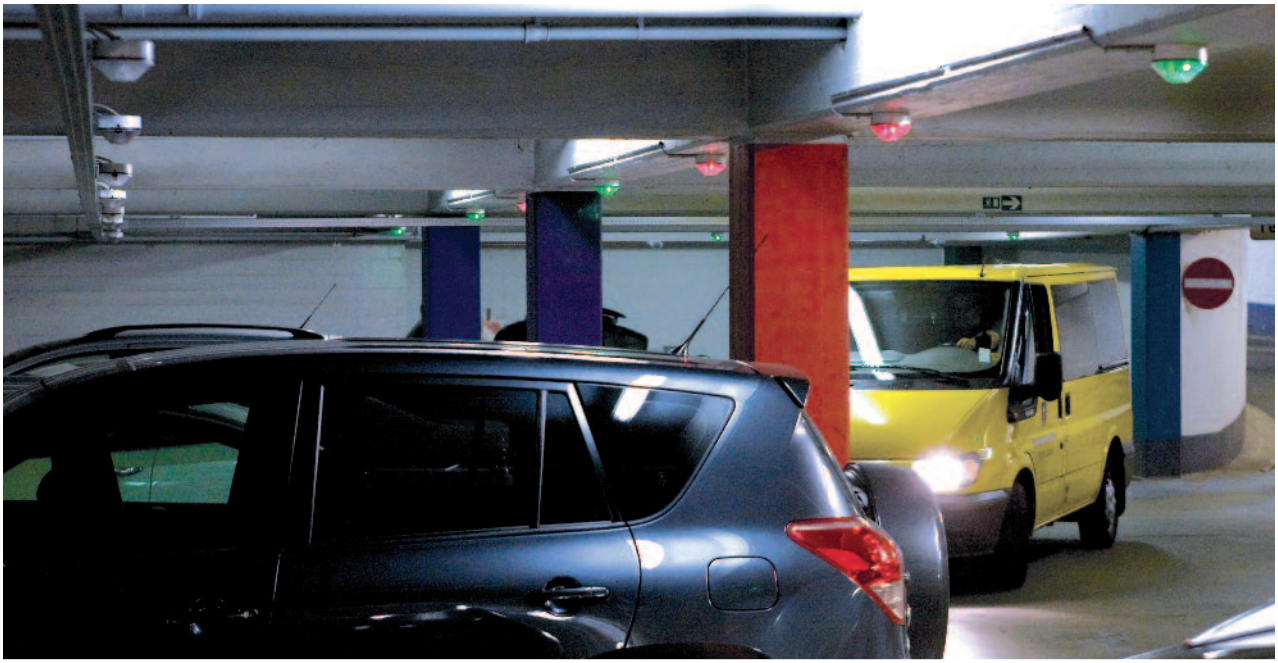
Carpark 2

System and Installation Manual



Dupline®
Fieldbus Installationbus

Carpark 2 System Manual ENG rev.10 - 01.2010

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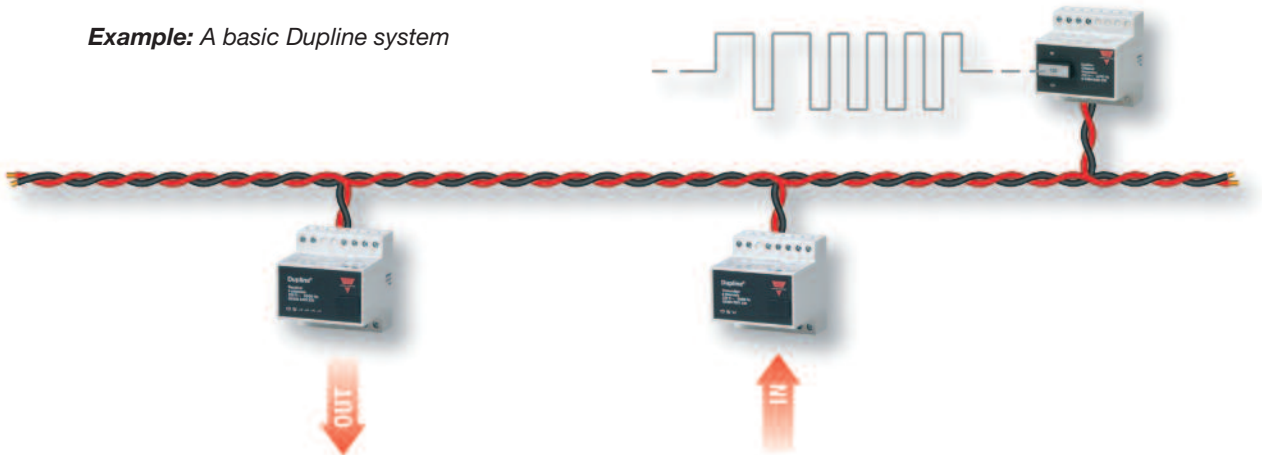
Dupline in General

Dupline® is a field- and installation-bus that offers unique solutions for a wide range of applications in building automation, water distribution, energy management, railway, carpark systems and many other areas.

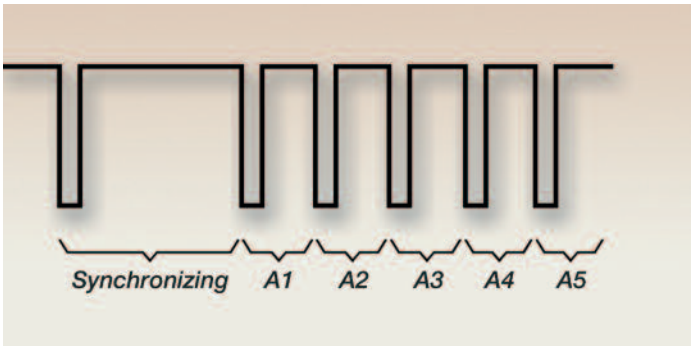
The strength of the Dupline® system lies in a unique set of features that enables elegant, flexible and cost-effective solutions. Most of these features originate from the effective time-division multiplex technology used. The efficiency of the protocol allows a low carrier frequency of 1 kHz, providing long transmission distance and superior noise immunity. Hence, Dupline® is capable of transmitting multiple digital and analogue signals over distances of up to 10 Km, via a non-shielded, non-twisted 2-wire cable, without using repeaters. These unique Dupline® features provide considerable cost savings in many installations.

A Dupline® network consists of 4 basic elements: A central unit, input modules, output modules and a 2-wire cable. The central unit controls the communication in all Dupline® installations. It sends out the Dupline® carrier signal and coordinates all transmission between input and output modules. Input modules connect to contacts, voltages and analogue signal sources etc. and transmit this information via the 2-wire cable.

Example: *A basic Dupline system*



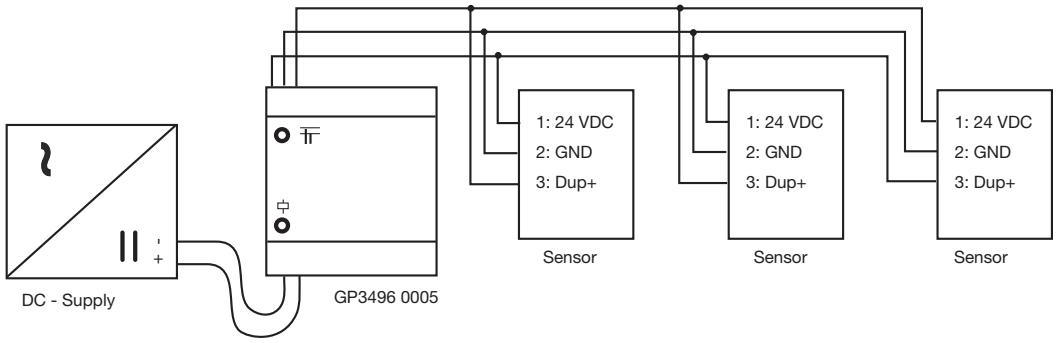
The Central unit (controller) generates a square-wave signal consisting of an 8 ms synchronization period followed by 128 pulses with a length of 1 ms each. This 136 ms pulse train is repeated continuously. Each pulse defines a time slot where those modules assigned to that specific pulse number are allowed to transmit and receive information. So, in fact the I/O modules are sharing the same two wires by using them in turn. The response time in a Dupline® system is always below 272 ms, regardless of the number of nodes and active signals in the network.



Each input or output needs to have one of the 128 addresses assigned. The address defines which pulse number in the Dupline® pulse train the I/O point must use for transmitting or receiving its signal. The 128 addresses are divided into 16 groups (A-P) with 8 addresses each (1-8). In this way, an address reference is a combination of a letter and a number, e.g. B3.

Dupline Used in Carpark Applications

By using a third wire, it is possible to add power to the system.
The Dupline® Master Module (DMM) (GP3496 0005 700) controls a 3-wire bus with signal, DC-power and common GND. The DMM is connected to a standard DC supply, which it synchronizes with the Dupline® carrier signal before it is output to supply the sensors (see example below).
This synchronization is necessary in order to enable the Dupline® and DC-supply to share the GND-wire.
This means that the Carpark installation uses only 3 wires in total for power and Dupline bus communication.



Carpark Modules

The Carpark system consists of a wide product range to fulfill the demands of the costumer.
Following products are available for ordering:

Carpark Sensors:

With LED, (red–green)	GP 6220 2201 724
With LED, (blue–green)	GP 6220 2202 724
Without LED	GP 6240 2224 724

Ultrasonic sensor connected on the L_1 bus. The sensors are designed to detect the presence of cars in parking bays or moving cars (lane sensors).

Passive LED Indicators:

Only LED, (red–green)	GP 6289 0001
Only LED, (blue–green)	GP 6289 0002

The passive LED indicator is used outside the Carpark place where the driver's visual overview is limited. This module is supplied by the GP6240 2224 724.

Master / Slave Monitor:

Carpark Monitor	GP 3482 9091 724

The monitor has two independent busses L_1 and L_2. The L_1 bus is connected to the sensors and the L_2 bus is connected to other Carpark monitors.
It is also possible to connect one or several displays on the RS485 bus.

Test and Configuration Unit:

Carpark Configurator	GP 7380 0080 709

The Carpark Configurator is the system's test and configuration unit. It is designed to configure sensors and monitors, and furthermore it is able to simulate sensors in test and maintenance situations. The Carpark Configurator is capable of calibrating the sensors as well.

Channel Generator:

Dupline Master Module	GP3496 0005 700

Used for powering and synchronizes the sensors on the Carpark L_1 bus.

Carpark Displays:

1 Arrow	GP6763 0106 (A)	(A = outdoor version)
1 Arrow + HCP (Right)	GP6763 0107 (A)	(A = outdoor version)
1 Arrow + HCP (Left)	GP6763 0108 (A)	(A = outdoor version)
1 Arrow + 2 Digits	GP6763 0109 (A)	(A = outdoor version)
1 Arrow +1 Digit + HCP (Right)	GP6763 0110 (A)	(A = outdoor version)
1 Arrow +1 Digit + HCP (Left)	GP6763 0111 (A)	(A = outdoor version)
8 Characters	GP6763 0112 (A)	(A = outdoor version)
8 Characters + HCP (Right)	GP6763 0113 (A)	(A = outdoor version)
8 Characters + HCP (Left)	GP6763 0114 (A)	(A = outdoor version)
9 Characters	GP6763 0115 (A)	(A = outdoor version)
3 Characters + Arrow	GP67630116 (A)	(A= outdoor version)

The LED Display is a versatile multi display able to show various forms of graphics, such as running text, arrows, handicap signs etc. in different colours. Communication via RS485.

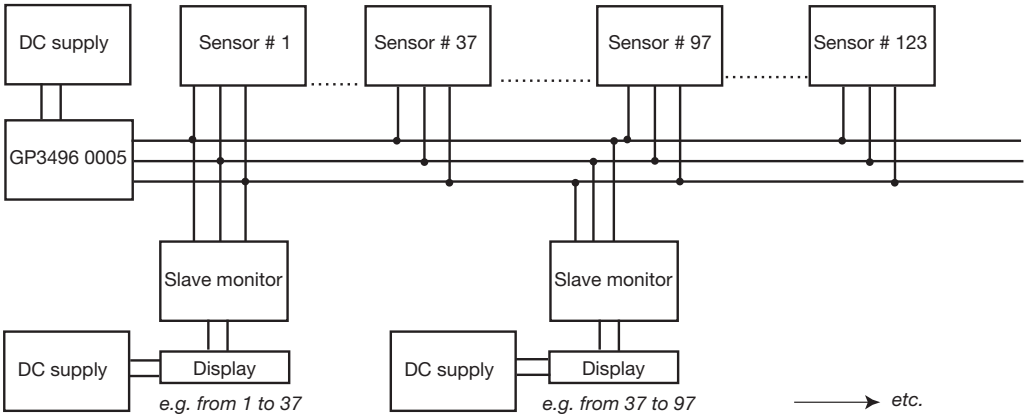
Optional Units:

Dupline Bus Repeater	D3892 0000 xxx	(For expanding the system)
Power coupler	G3485 0000 700	(Together with D3892 0000)

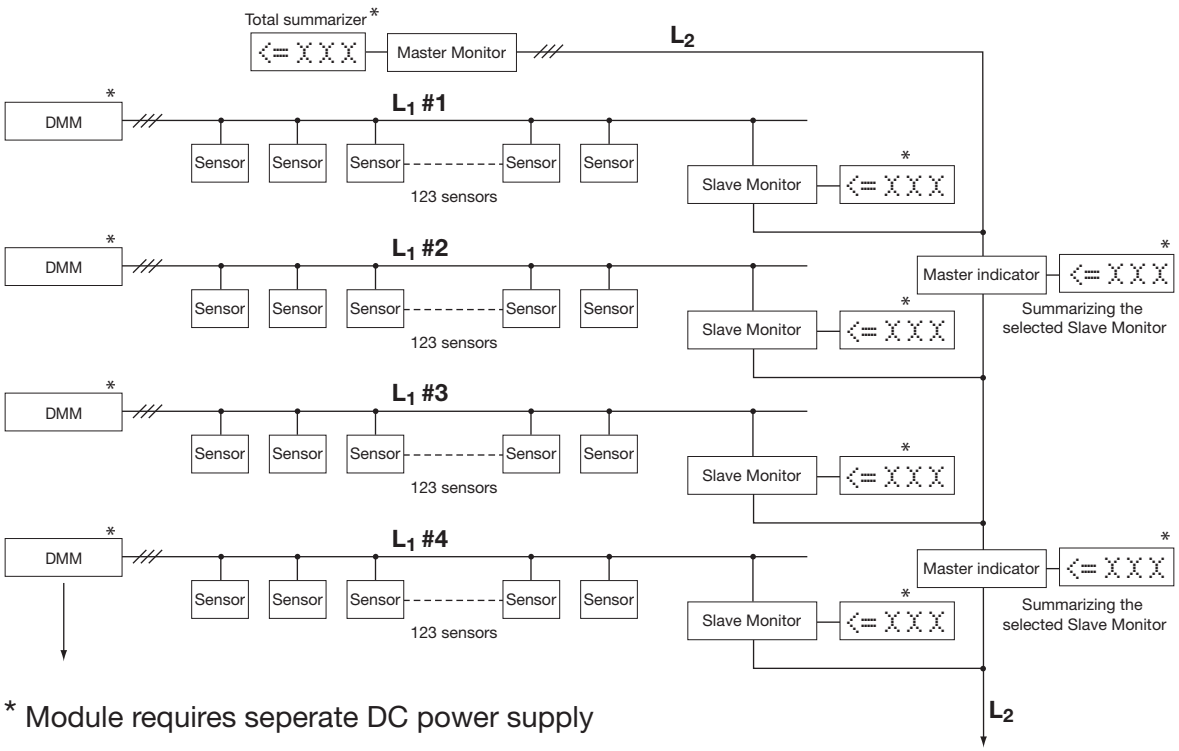
Used in installations with very long wiring together with many sensors.

Carpark in General

The Carpark system is developed to handle up to 60.000 sensors in a stand-alone system not depending on a PC (however, PC monitoring and statistics with Carpark software is still an option). The system communicates with to bus levels called L_1 and L_2. The sensors are always connected on the L_1 bus level. A complete system consists of several L_1 busses with up to 123 sensors each. Each group of sensors is monitored by a Carpark Monitor GP34829091724 set up as a "slave monitor". This slave monitor will control what the display shows. It is possible to have up to 480 slave monitors installed. Each slave can be programmed to monitor a specific number of sensors. See drawing below.



There is only one L_2 bus, and this bus is used to link the slave monitors together. This makes it possible to have a number of Carpark Monitors on L_2 set up as "summarizers" that summarize the values from a number of slave monitors (defined by the user) and enable the connected display to show the total value. This is used if, for instance, you want to have a display at the entrance to a floor showing the total number of free parking bays on this floor. In this case, the associated Carpark Monitor must summarize the values from all slave monitors on that floor.

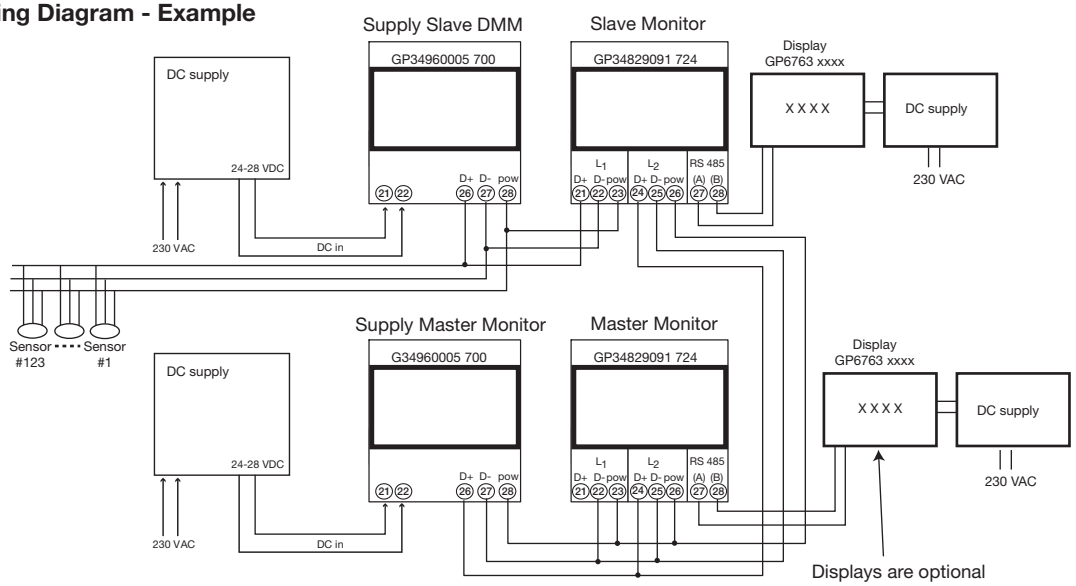


* Module requires seperate DC power supply

Another feature in the system includes the parking places on the roof of a building by counting the cars entering and leaving the roof, (since it is impossible or at least difficult/costly to install sensors and lamps on the roof). With this solution a display shows the number of free parking bays on the

roof, but when you enter the roof level there will be no further guiding. (You still have, however, the complete guiding on all of the other floors). It is possible to include the number of empty parking places when setting up “summarizer monitors”, e.g. the display placed in front of the building showing the total number of places available in the parking system.

Wiring Diagram - Example



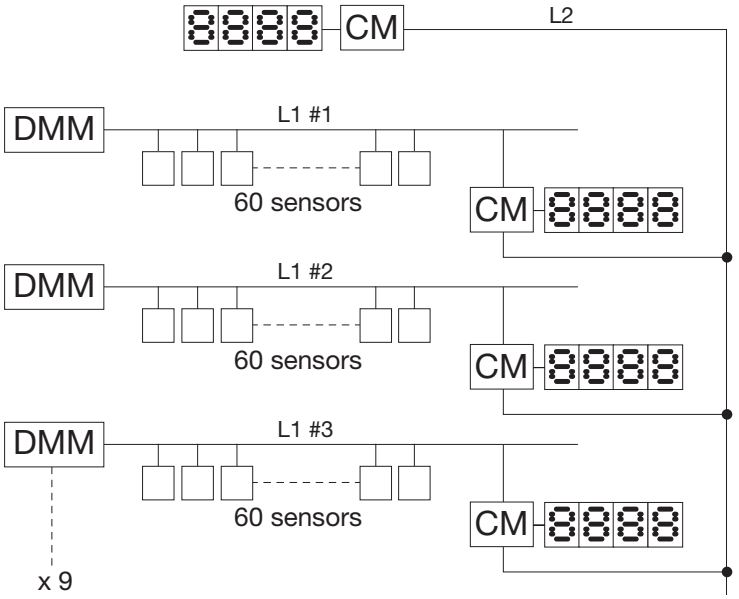
The wiring diagram shows the simplest installation possible with Carpark. Both slave monitor and master monitor are necessary. Each monitor must use its own DC-power supply because the two buses L_1 and L_2 must be galvanically separated from each other.
Pin 22 and 23 on the master monitor must be wired as the wiring diagram example shows. The module is powered via the two pins. Also the RS485 is powered through pin 22 and pin 23.
If a display is needed on the slave monitor, the display must be powered from its own DC-power supply. (Do not use pulsating power supplies for displays).
If a display is needed on the master monitor, the display must also have its own DC-power supply. (Do not use pulsating power supplies for displays).

Booking the Carpark Places
It is possible to make a booking of the Carpark place. However, this is only possible in a PC based software solution and not in a “stand alone” system. Using the PC-based solution makes is possible to “simulate” an occupied Carpark place and in that way make the booking. This means that a parking bay can be reserved by using the same address.

Planning and Considering a Carpark system

When evaluating a specific project, two numbers are always easy to calculate:
First step is to determine that the number of sensors and lamps always corresponds to the number of parking places.
Determine how many of the LEDs that will be used for handicap places (red/blue colour).
Second step is to define the number of displays needed, where they must be installed and what they must show. This is something that has to be done in close cooperation with the Carpark integrator/operator, since it depends on how the cars “flow” through the building. Naturally, a cost issue is involved in deciding the number of displays.
Third step is to define how the system must be divided into L_1 networks. This is where the wiring topology of the entire system is designed. In the diagram below, we have made a proposal on how to implement each floor in a system totalling 2000 sensors with 500 sensors on each floor. The floor will have 9 L_1 networks (each with up to 60 sensors) and a length of app. 150 m. Each L_1 network needs a DMM (GP34960005700) with a 28 V DC power supply to drive the bus. In the diagram we have put one Carpark Monitor (CM) with display on each L_1 bus, but it is easy to put in more if desired. The L_2 bus is linking the Carpark Monitors on the floor together, enabling the summarizer

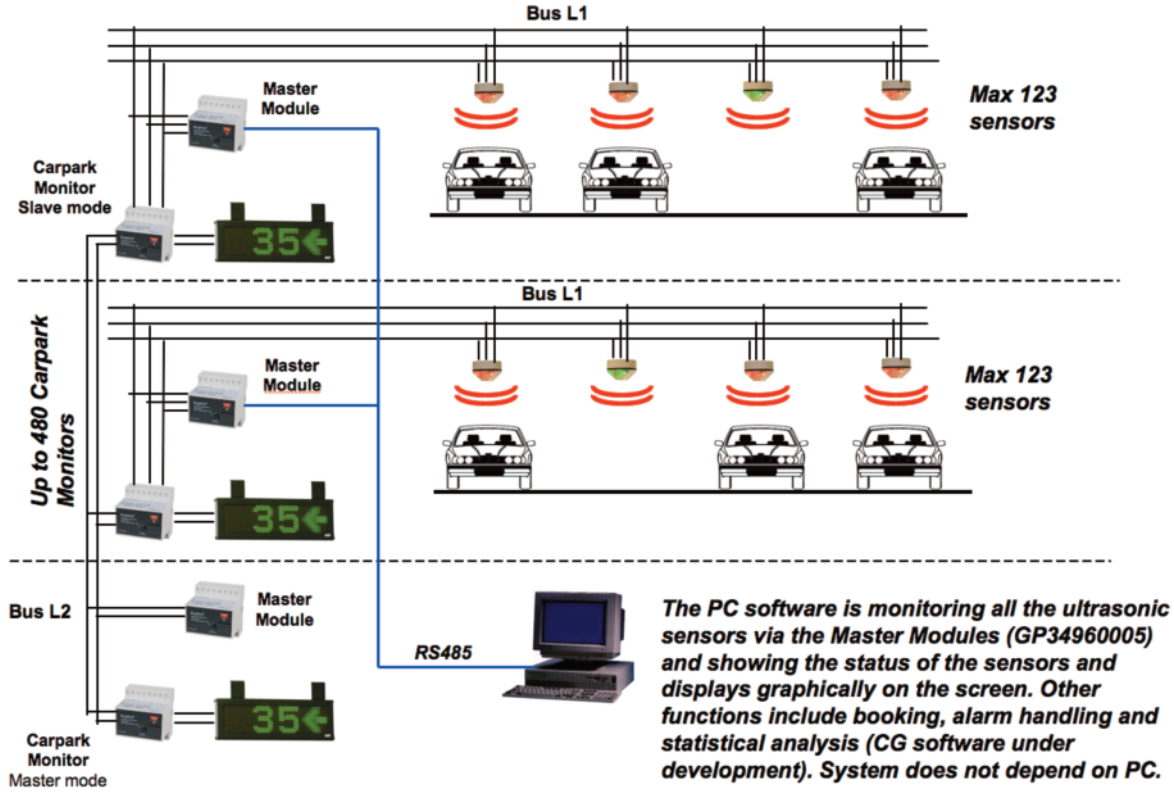
Carpark Monitor to add the values together and display the total amount of free places on the floor. All 4 floors should be set up this way. The L_2 bus cable will also connect all 4 floors. This is necessary to enable the final totalize display to show the complete number of places available in the entire Car Park. For the final design, it may be desirable to change the layout of the system slightly, depending on the display positions chosen, but it will not be far from the diagram below.



The fourth step is to calculate the number of DC power supplies needed. Each DMM and CM needs one power supply.
It is also important to consider the installation cost, especially the man-hours needed, but also the cost of cable and wall boxes. We specify the use of std. inexpensive 3-wire unshielded 1.5 mm^2 cable for the Carlo Gavazzi Carpark system. In order to reduce the man-hours needed for installation, we have designed the sensor in such a way it can be wired easily and quickly without the use of screwdrivers.

PC Based Carpark Solution

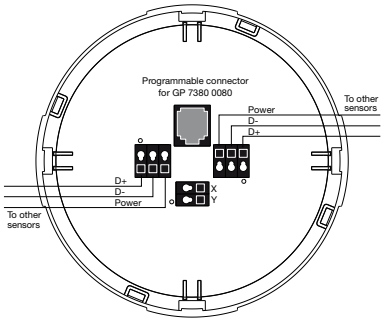
It is easy to implement a PC into the Carpark system. All Master modules have RS485 connectors communicating in either multidropping or Ethernet mode.
In Multidropping mode it is possible to connect 16 GP3496 0005 700 units.
By using Ethernet mode, all GP3496 0005 700 units can be connected to an Ethernet/ RS485 converter. The protocol used is Modbus RTU.



Description of the Carpark Modules

Carpark Sensors:

Sensor (red–green)	GP 6220 2201 724
Sensor (blue–green)	GP 6220 2202 724
Sensor without LED	GP 6240 2224 724



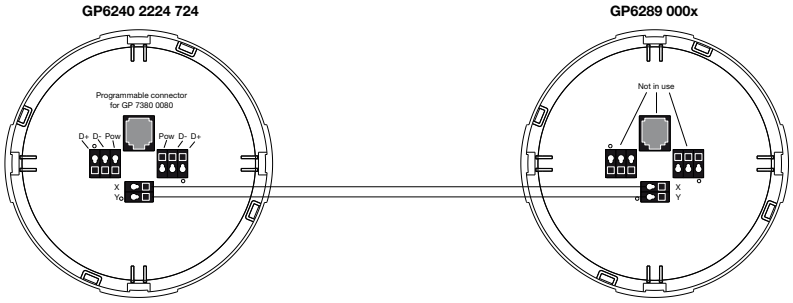
All sensors have the same housing and look the same on the outside. Each sensor can be programmed as a Lane sensor or as a Standard sensor (Parking sensor). The X, Y connection on the sensor is only in use for the GP6240 2224 724

- Dimensions: ø118 * 76 mm
- Operating temperature: -40 to 70 °C
- IP: 34
- Module is supplied from GP3496 0005 700
- Power consumption for GP6220 220x 724 is Max 20mA. See calculation example under the “Calculation” section
- Power consumption for GP6240 2224 724 is Max 15mA
- Operating distance between 1,5 and 4,0 m
- Programmed with Configurator GP7380 0080
- Use 3*1,5 mm^2 single core wire

Sensor connectors are using the “push-wire connection” method. No need for screwdrivers when installing wires into the connectors.

Carpark Passive Led indicators:

Passive LED indicator (red–green)	GP 6289 0001
Passive LED indicator (blue–green)	GP 6289 0002



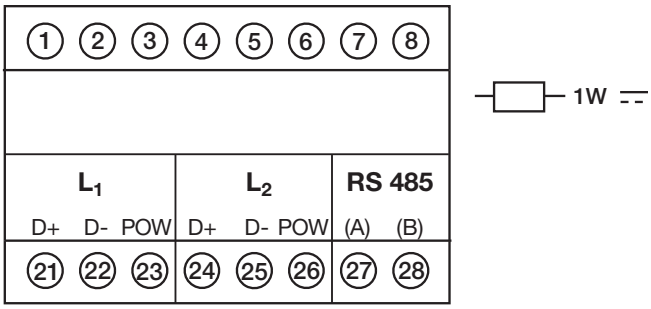
All Passive LED indicators have the same housing and look the same on the outside. The X, Y connection on the sensor is only in use for the GP6240 2224 724 and the GP6289 000x

- Dimensions: ø118 * 76 mm
- Operating temperature: -40 to 70 °C
- IP: 34
- Module is supplied from GP6240 2224 724
- Power consumption for GP6289 000x is Max 5mA
- Use 3*1,5mm2 single core wire

Passive LED indicator connectors are using the “push-wire connection” method. No need for screwdrivers when installing the wires into the connectors.

Master / Slave Monitor:

Carpark Monitor GP 3482 9091 724



The GP 3482 9091 monitor has two independent busses; L_1 and L_2. The L_1 bus is connected to the sensors and the L_2 bus is connected to other Master indicators or Master monitors.
It is also possible to connect one or several displays on the RS485 bus. See schematic drawing on how to connect the monitor.

The monitor has four modes:

- Slave mode – Collect data from 123 sensors on the L_1 bus.
- Roof mode – Two sensors at the roof entrance and exit counts the number of free parking bays.
- Master monitor mode – Connected to the L_2 bus and counts to total number of free parking bays in the whole system. The Master monitor creates the sync. signal in the system and there can be only one Master monitor in the entire system.

- Master Indicator mode - Connected to the L_2 bus and counts the total number of free parking bays in a specific area.

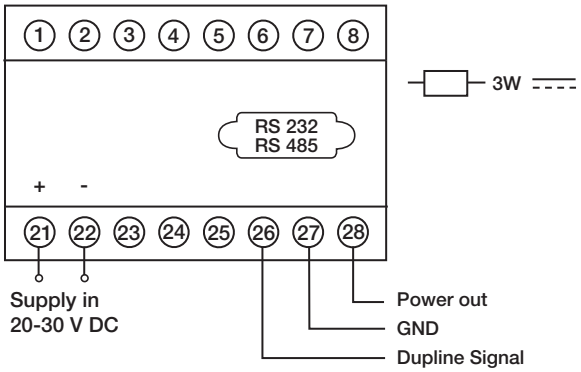
Powered by the GP3496 0005 700 on the L_1 bus. (Sync. signal included)
Powered by the G3496 0005 700 on the L_2 bus. (Standard DMM)
Programmed with the Carpark Configurator GP 7380 0080
Use 3*1,5 mm^2 single core wire for L_1 and L_2 bus
Use 2 wires with shield for the RS485 connection (Distance up to 1200 m)

Note: If the monitor is used as Master or Master Indicator, it is important to connect pin 22 and 23 to pin 25 and pin 26 respectively. Pin 22 and 23 power the module.

Channel Generator:

Dupline Master Module

GP3496 0005 700



The Carpark Master module GP3496 0005 700 has four functions:

It is a Dupline® channel generator, which performs power supply synchronization (enabling a 3-wire system with supply);
It is a RS232/RS422/RS485 interface; and it produces a synchronization signal on four specific Dupline® addresses for the Dupline® Carpark system.
It is used for powering and synchronizes the sensors on the Carpark L_1 bus.
16 GP3496 0005 700 units can be connected in multidropping mode via RS485.

Supplied with 20-30 V DC /6Amp (Because of the pulsating Dupline signal, the power supply for the master module must be double size. The GP3496 0005 700 is able to provide the Dupline bus with 3Amp the power supply must be able to supply the master with minimum 6Amp)
Use 3*1,5mm2 single core wire
Dipswitch 6 must be set to “on” to start the Sync. function

Test and Configuration Unit:

Carpark Configurator

GP 7380 0080 709

Configuration and Test / Simulations Unit for Carpark.

The Configurator configures the Carpark Sensors GP62x0 22xx and monitor unit GP34829091.
Also, the Configurator is able to monitor the Dupline® bus in GTU mode as well as simulate the presence of sensors. This module is essential for programming the Carpark modules

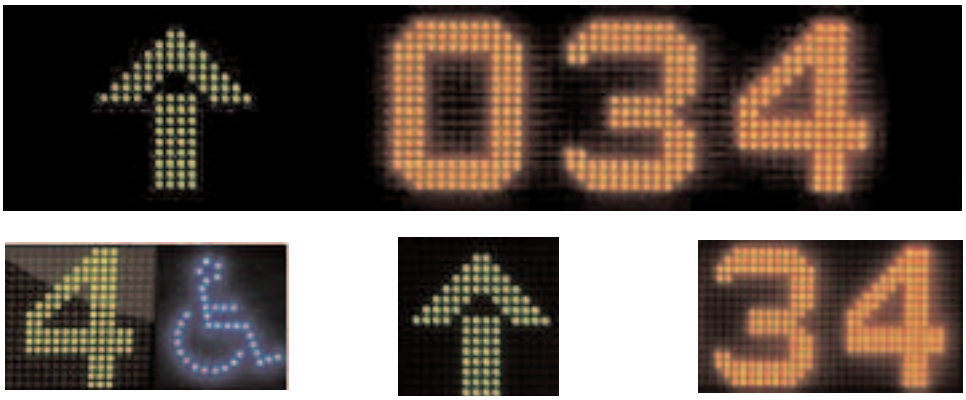
Supplied by a internal 9V DC battery

Configuration mode with the use of a cable with RJ12 plug
Test mode with the use of a cable with jack connection

Carpark Displays:

1 Arrow	GP6763 0106 (A)	(A = outdoor version)
1 Arrow + HCP (Right)	GP6763 0107 (A)	(A = outdoor version)
1 Arrow + HCP (Left)	GP6763 0108 (A)	(A = outdoor version)
1 Arrow + 2 Digits	GP6763 0109 (A)	(A = outdoor version)
1 Arrow +1 Digit + HCP (Right)	GP6763 0110 (A)	(A = outdoor version)
1 Arrow +1 Digit + HCP (Left)	GP6763 0111 (A)	(A = outdoor version)
8 Characters	GP6763 0112 (A)	(A = outdoor version)
8 Characters + HCP (Right)	GP6763 0113 (A)	(A = outdoor version)
8 Characters + HCP (Left)	GP6763 0114 (A)	(A = outdoor version)
9 Characters	GP6763 0115 (A)	(A = outdoor version)
3 Characters + Arrow	GP67630116 (A)	(A = outdoor version)

Examples of display types



The display guides the driver to find an available Carpark bay with the use of various graphics that is available in the different display types. The choice of display determines the graphics that can be selected. By changing the dip switches on the display, it is possible to change the performance of the display, such as running arrows, different directions etc.

Supplied by external 24V DC power supply
Protocol: Carpark
Communication RS485
Use 2 shielded wires for the RS485 connection (distance up to 1200 m)

Optional Units:

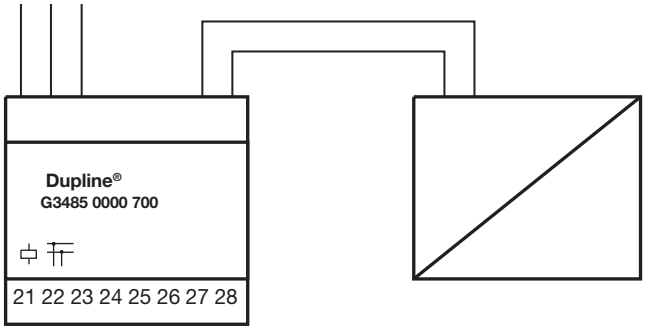
Dupline Bus Repeater	D3892 0000 xxx (For expanding the system)

The Dupline® Repeater is used to enable longer distances in a Dupline® network. Furthermore, it can be used as a "Power-booster" in sections with several Dupline®-supplied units.

Supply with either 24 V AC, 115 V AC or 230 V AC
Output current on the secondary Dupline net is max 45 mA

Power coupler

G3485 0000 700 (together with D3892 0000)



The power coupler is used in conjunction with the repeater D3892 0000, when the installation requires long wiring or many sensors.

Supplied with 20-30 V DC /6Amp (Because of the pulsating Dupline signal, the power supply for the power coupler must be double size. The G3485 0000 is able to provide the Dupline bus with 3 Amp. The external power supply for the G3485 0000 must be able to supply the module with minimum 6 Amp)
Use 3*1,5 mm^2 single core wire

System Calculation

The two calculation examples below show how it is possible to determine the number of sensors or the length of cable.

Calculation example: How to find the max cable length in a system

Example of a slave monitor with 100 sensors connected:

- Current consumption of the sensor is: 20 mA max
- Max voltage drop on the far end Sensor is 4,0 V (When using 28 V DC on the GP3496 0005)
- Cable resistance is 13 Ω/Km with the use of 1,5 mm^2

Max current in a system is 20 * 100 = 2,0 A
Internal resistance is 4,0 / 2,0 = 2,0 Ω
Maximum wire length is 2,0 /13/km = 154 m

Calculation example: How to find the max number of sensors with a known cable length

Example of a slave monitor with 200 m of wire to sensors:

- Current consumption of the sensor is: 20 mA max
- Max voltage drop on the far end Sensor is 4,0 V (When using 28 V DC on the GP3496 0005)
- Cable resistance is 13 Ω/km with the use of 1,5 mm^2
- Wire length is 200 m with 1,5 mm^2

Total wire resistance is 0,2 * 13/km = 2,6 Ω
Max current consumption is 4,0 / 2,6 = 1,54 A
Maximum number of sensors is 1,54 / 0,020 = 77 Sensors

It is possible to calculate in an easy way for instance the “total number of sensors” by using the

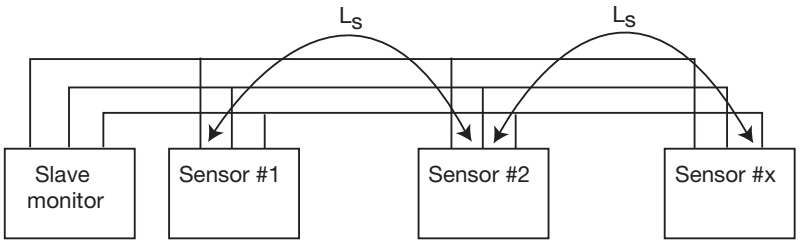
below equations:

Equation 1

$$x = \frac{116}{\sqrt{L_S}}$$

x="Max. number of sensors connected to one Dupline Master Module (GP34960005)"
L_S="Cable length between the sensors"

Example 1



L_S= 3 m between sensors

$$x = \frac{116}{\sqrt{3}} = \underline{67 \text{ sensors}}$$

Example 2

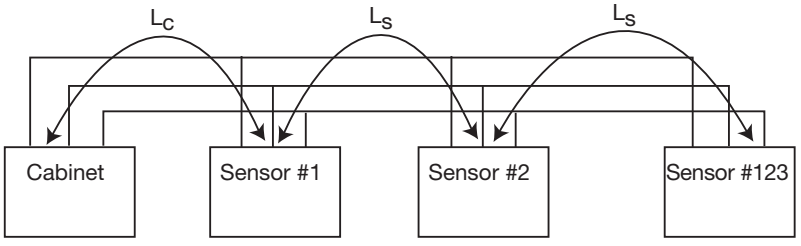
x= 45 sensors

$$L_S = \left(\frac{116}{45}\right)^2 = \underline{6.6 \text{ m}}$$

Equation 2

$$L_s \cdot x^2 + xL_c - 13460 = 0$$

x = "Max. number of sensors connected to one Dupline Master Module (GP34960005)"
L_s = Cable length between sensors
L_c = Cable length from cabinet to the first sensor in line



Example 1

$$L_S = \frac{13460 - xL_c}{x^2}$$

x= 55
Lc= 35

$$L_s = \frac{13460 - (55 \cdot 35)}{55^2} = \frac{11535}{3025} = \underline{3.8 \text{ m}}$$

The length between the sensors must not exceed 3.8 m when there are 55 sensors in a system and

35 m cable from the cabinet to the first sensor in line.

$$L_c = \frac{13460 - L_c x^2}{x}$$

Rule-of-thumb:
For each 200 m, 77 sensors can be placed when using a 1.5 mm^2 cable without a repeater installed.

Installing the Sensor

Parking Bay Sensor:
It must be considered what type of sensor should be used and where the sensor must be mounted. Basically, the sensor must be mounted in the middle of the parking bay. It must be mounted so that the driver is able to see the LED in due time, when driving in the lane. If anything obstructs the view, it may be considered to move the LED outside the parking bay on the ceiling (using the passive LED indicator GP 6289 000).
The sensor can be installed either directly on the ceiling or it can be lowered and installed/connected on metal rails/pipes.
It is recommended to install the sensor for reservations (Blue/Red) near elevators/escalators

Lane Sensor:
All three types of sensors can be used as lane sensors. The sensor must be mounted directly over the lane. The LEDs do not show status when the sensor is programmed as a lane sensor. The LED is only lid when calibration is running or an error is detected.

Note:
When using the Roof mode (Monitor GP3482 9091 724), the sensor works like a lane sensor.
One sensor must be mounted over the lane at the entrance to the roof and one sensor must be mounted over the lane at the exit from the roof.

Programming the Sensor

The Carpark Configurator GP7380 0080 is used to program the sensor.

Normal Sensor Mode:
Normal sensor mode detects the presence of a car in the parking bay.

GP7380 0080 Configurator

GP7380 0080 Configurator

The Status address shows if the parking bay is occupied or not. There are 123 addresses available; this addresses range from A1, A2…A8, P1,P2…P4.
The calibration address is used for calibration of the sensor. It is recommended that all sensors use the same address for calibration making it easy to perform a global calibration when the system only occupies one address for this purpose.

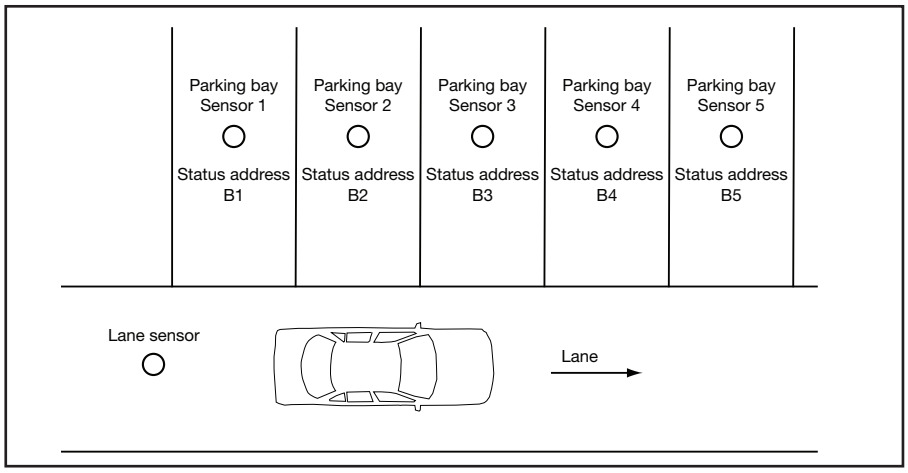
Lane Sensor Mode:
The Carpark system will decrease the total number of free places when detecting a moving car and show the reduced number on the monitor. This is to prevent too many moving cars in a specific Carpark area.

The sensor is programmed just like in the “Normal Sensor mode”, selecting “Lane” instead of “Normal”.

Sensor Addresses

Assigning addresses to the sensors should be considered at the project phase or at least before installing the sensors.
The sensor has a built-in cross-talk feature that keeps the sensors from interrupting each other. This feature is implemented in the sensor and is automatically assigned an address at the same time as the “status address” is assigned.

Example: Recommended programming of the status address of the sensor



To avoid this crosstalk, sensors should be assigned in the following way:

Status addresses for the sensor	
A1-P1	Must not be mounted side by side
A2-P2	Must not be mounted side by side
A3-P3	Must not be mounted side by side
A4-P4	Must not be mounted side by side
A5-O5	Must not be mounted side by side
A6-O6	Must not be mounted side by side
A7-O7	Must not be mounted side by side
A8-O8	Must not be mounted side by side

The addresses P5, P6, P7 and P8 are used for sync. signal and cannot be used for other purposes. The calibration address is freely selectable between the 123 addresses from A1 to P4. It is recommended to use the same address as the one used for slave monitors.

Calibration of the Sensor

The sensor can be calibrated locally by using a push-button on the sensor, or globally with the Carpark Configurator GP 7380 0080.

Calibration Process:
The sensor is a self-calibrating module. It is important to perform the calibration when the parking bay is empty.

- Push the button on the outside of the sensor.
- The LED flashes green for 30 seconds with 1 Hz. (The electrician has time to get clear of the sensor before the calibration starts).
- The calibration starts when the LED flashes green for 6 seconds with 4 Hz.
- If the calibration is OK, the LED will respond with a constant green light.

The global calibration process is performed with the Carpark Configurator GP7380 0080 in GTU8 mode. If the sensors have the same address for calibration, it is possible to make a global calibration on all sensors simultaneously.

The Monitor

The Monitor G3482 9091 724 is the intelligent part of the system. It is programmed with Carpark Configurator GP7380 0080.

The Monitor can be programmed as: 1. Slave monitor (“normal” or “roof” mode), 2. Master indicator monitor, 3. Master monitor.

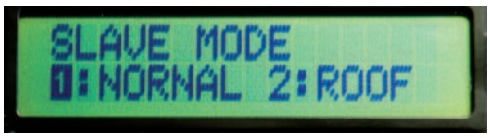
1. Slave monitor. Monitors the connected and selected sensors in a segment/roof and sends the free numbers of parking places to a connected display as well as the L_2 bus for further use.

The slave monitor mode is selected by pressing “2” on the Configurator.

ID number of the monitor

It is possible to have 480 slave monitors with unique ID numbers in a system. Each slave monitor must have its own ID number.

Select between “Normal” and “Roof” slave mode.



Normal: Standard sensor mode where the sensor detects if a car is present in a parking bay.
Roof: Special roof mode where two sensors are connected at the entrance to and at the exit from the roof counting the number of cars passing.

Selectable calibration address of the sensors

In “Normal” mode the user must know if a “Lane Detector” is used on the L_1 bus. If the user does not use a “Lane Detector”, it is possible to disable the address. If the “Lane Detector” is selected, it is possible to implement an “off delay”. When a car moves under the “Lane Detector”, the Carpark system decreases the number of free parking spaces by one, for a specified period of time. After this time period, the Carpark system will go back to the previous value until the “Lane Detector” is activated again.

In “Roof” mode, the slave monitor is able to monitor up to 127 sensors. At the entrance to the roof, a sensor detects each car passing and decreases the total number of free spaces. At the exit, it increases the total number of free spaces.

2. Master indicator monitor

Monitors the selected slave monitors and sends the free numbers of parking places to a connected display as well as the L_2 bus for further use. Several Master indicators can be installed in a system. The Master indicator mode is selected by pressing “1” on the Configurator.

3. Master monitor

There can be only one Master in a system.
The Master mode is selected by pressing “2” on the Configurator.
The two modes are identical except that the Master mode is providing the system with the sync. signal. The masters are used as summarizers. The master indicator summarizes the number of free parking places from the slave monitors on the L_1 bus and shows this on a display. At the same time it sends this information on the L_2 bus.

Tips and Tricks

- Always use 1,5 mm^2 single core wire for the sensors and for the passive LED indicators.
- To ensure that the sensors work over a long wiring distance, be sure to have min. 28 V DC at the GP3496 0005 700.
- If the system requires an expansion that contains the Repeater D3892 0000 xxx, please contact your local Carlo Gavazzi sales company.
- If two or more slave monitors share the same ID number, the sensors will have the same address which will cause a conflict.
- Use the Carpark Configurator GP7380 0080 in GTU8 mode to simulate the presence of sensors during installation or troubleshooting.
- If the two wires on the X, Y on the GP6589 0000 are reversed, the LED will show the wrong colour: red for vacant and green for occupied.

Faults and Errors

• No Yellow LED on the GP3482 9091 724 or GP3496 0005 700 could be caused by
  - Short circuit of the Dupline bus
  - No power on the GP3496 0005 700
  - No connection

• Sensor LED blinks red:
  - Needs calibration
  - Sensor not aligned according to datasheet
  - Short-circuit of the Dupline bus
  - Dupline bus disconnected

• Configurator not working or no connection to Carpark modules
  - Battery defect
  - Cable defect
  - No Dupline carrier