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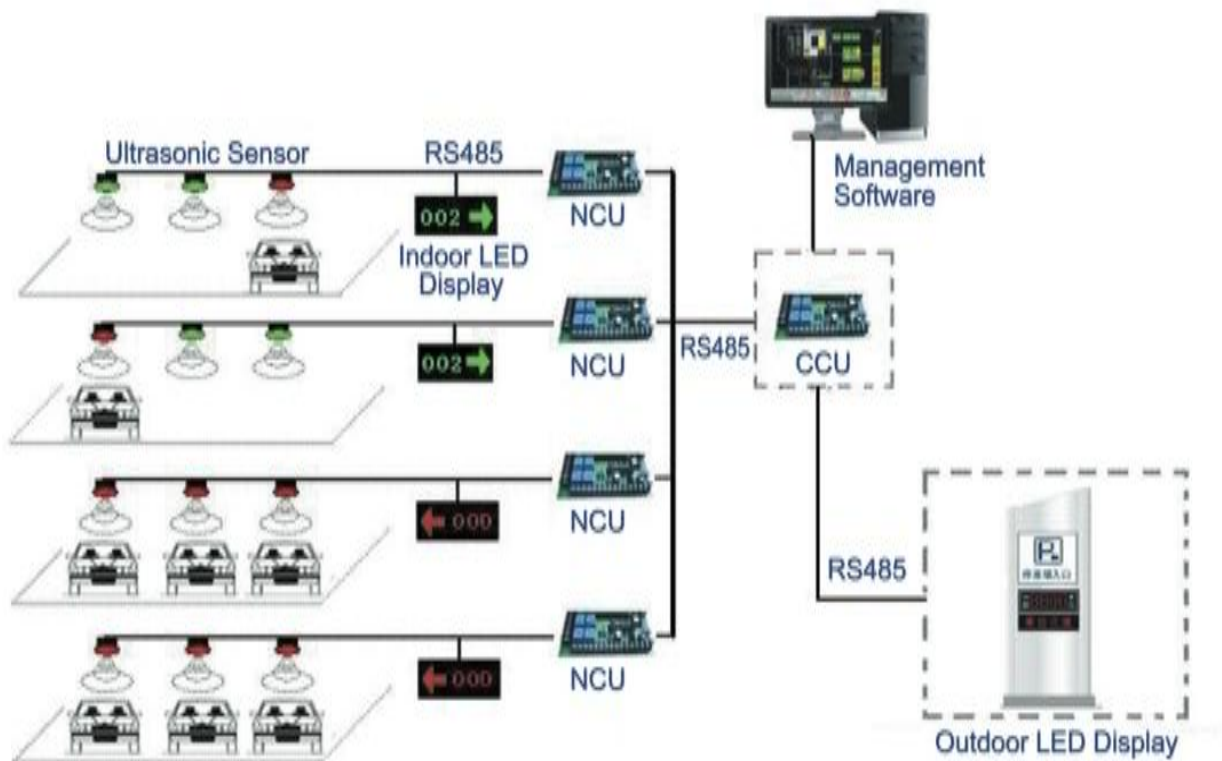
PGS

Parking Made Easy

1. System Overview

Been widely applied in large car parks at commercial buildings, hotel, railway station, airport, shopping malletc, Parking PGS monitors the real time parking space availabilityand guides drivers to unoccupied slots, greatly shorten their time spent looking for parking. The system helps improve parking space usage rate, lower operation costs and improve public image of the facility management; italso helps to create an eco friendly facility by reducing air pollution.

Please refer to the picture below, by installing an ultrasonic sensor above each and every parking space, Parking PGS monitors the availability of the space, Data Collector (NCU) collects the information of all sensors and transmit to Centre Processor (CCU), CCU processed the data and save the information to the Management Software database, at the meantime, availability information are shown on LED Display which will be installed at entrances, exits and intersections to tell drivers which direction to take.



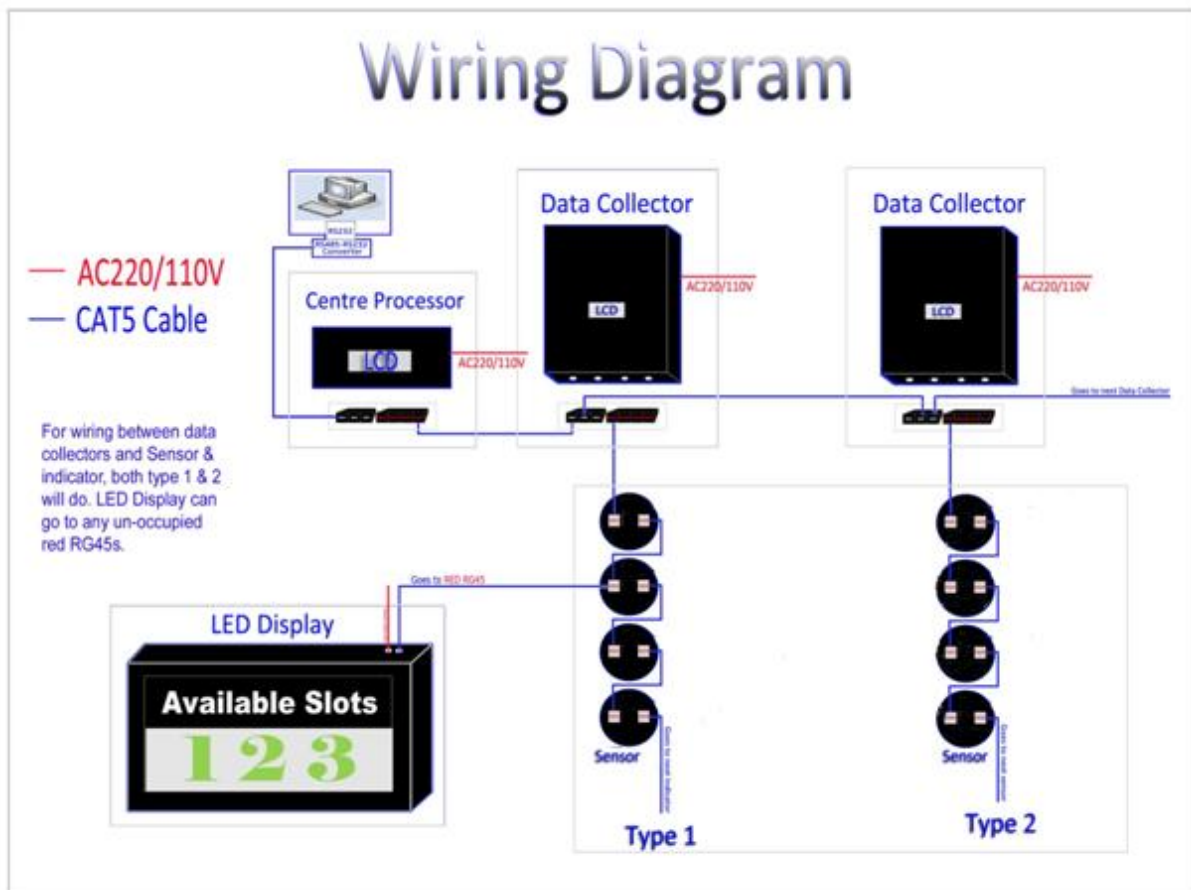
Picture 1 – System Diagram

2. System Composition & Wiring

Parking PGS system is composed of the listed items and each of them is connected as in the Wiring Diagram below:

- 1) **Ultrasonic Sensor**(Refer to **Page 3-4** for more details)
- 2) **Data Collector**(Refer to **Page 5-6** for more details)
- 3) **Centre Processor**(Refer to **Page 6-7** for more details)
- 4) **LED Display**(Refer to **Page 8** for more details)
- 5) **Management Software** (Refer to **Page 9** for more details)

Picture 2–Wiring Diagram



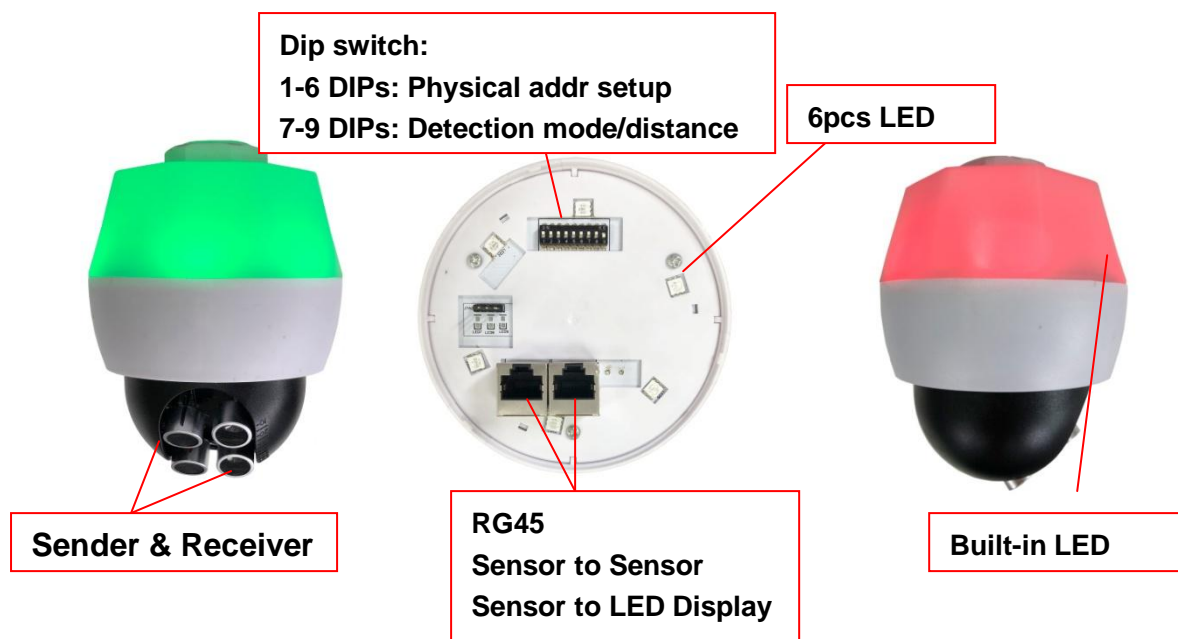
3. Ultrasonic Sensor

3.1 Overview

As a basic but vitally important component of the Parking Guidance System, Ultrasonic Sensor adopts ultrasonic detection technology (with a sender and a receiver) to monitor presence of vehicles over parking slots and provides real-time, dynamic availability information of parking spaces.

P.S. To be installed to the upper middle of all parking spaces!

Picture 3–Ultrasonic Sensor

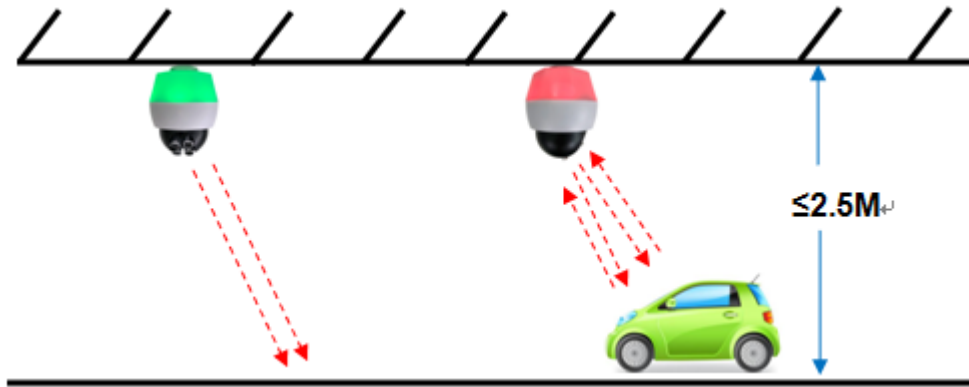


3.2 Working Principle

Sender sends ultrasound which travels at 340m/s, when the sound wave reaches an object, it will be reflected and received by Receiver. Sensor calculates the distance of the reachable object by $\text{Sound Speed} * \text{Travel Time} / 2$ and judges if there is a car.

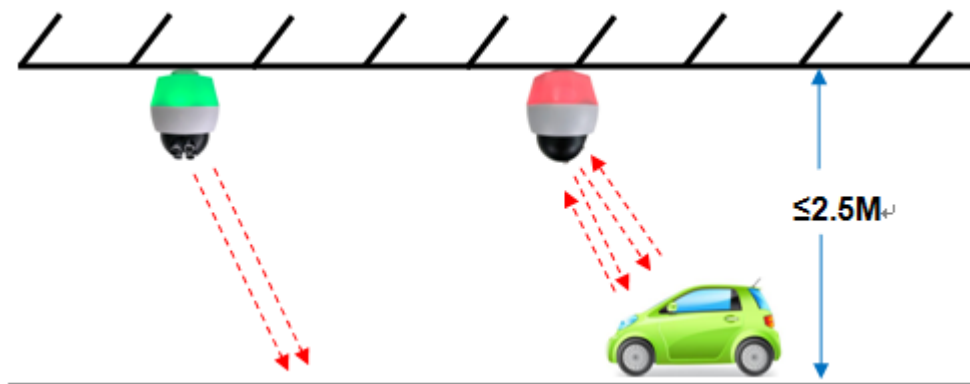
3.3 Detection Mode

3.3.1 Ground detection: sensor detects the ground (when there's no car, ultrasound reaches the ground, reflected and received; when a car is parked, distance will be shorten and sensor recognize presence of the car)



Picture 4–Ground Detection

3.3.2 Car Detection: sensor detects the car (detecting distance was set and ultrasound can not reach the ground, when there's no car, there's no reflection; when a car is parked, the wave will be reflected and received)



Picture 5 –Car Detection

3.4 Specifications

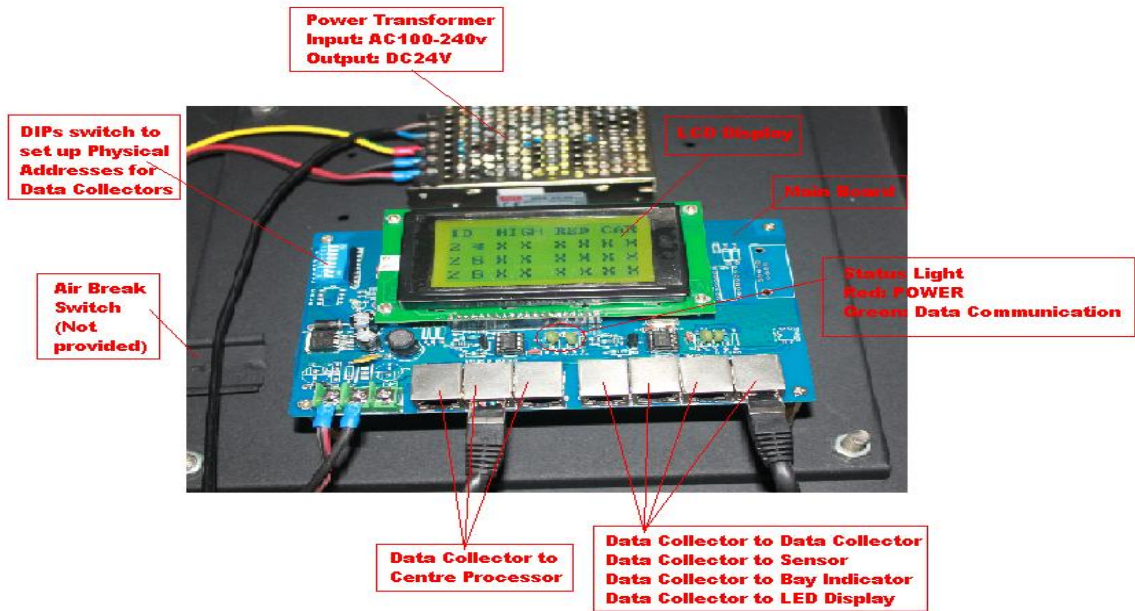
Dimension	105mm(D)*120mm(H)	Weight	0.15kg
Color	Front: Black Back: Frosted White	Housing	ABS
Working Voltage	DC24V	Peak Current	30mA
Frequency	40KHz	Sensitivity	>-75dB
Communication Mode	RS485	Transmission Distance	<1000m
Detection Angle	<30°	Detection Distance	0.5-2.5m
Working Temperature	-25~70°C	Error	±0.2m

4 Data Collector

4.1 Overview

Data Collector manages sensors and LED display by group, it checks sensor information repeatedly and transmits data to Centre Processor for final processing; and also serves as the bridge to transfer availability information from Centre Processor to LED Displays.

P.S. A Data Collector manages up to 60 sensors and 20 LED displays!



Picture7–Data Collector Inner View



Picture 8– Data Collector



ID: Physical address

HIGH: Detection distance (Meter)

RED: Detection mode

CAR: Occupancy status

XX: No data (Hint: sensorfaulty, not connected or improperly configured)

Picture 9– Data Collector LCD

4.2 Specifications

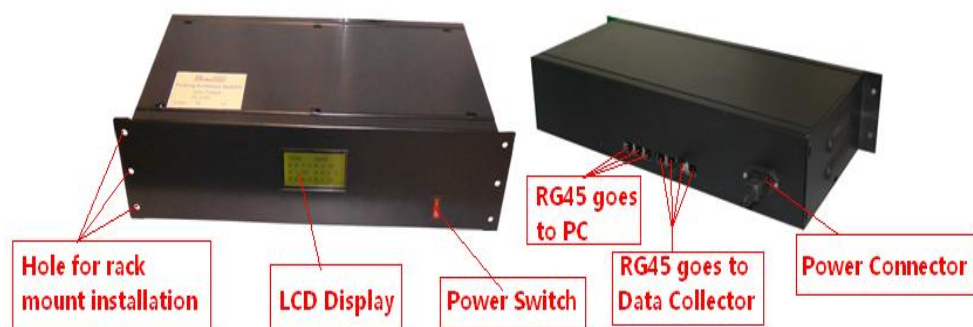
Dimension	43cm*34cm*12cm	Weight	8.75kg
Color	Frosted Black	Housing	Iron
Working Voltage	DC24V	Peak Current	45mA
Communication Mode	RS485	Frequency	4800Mps
Transmission Distance	1000m	Working Temperature	-25~70°C

5 Centre Processor

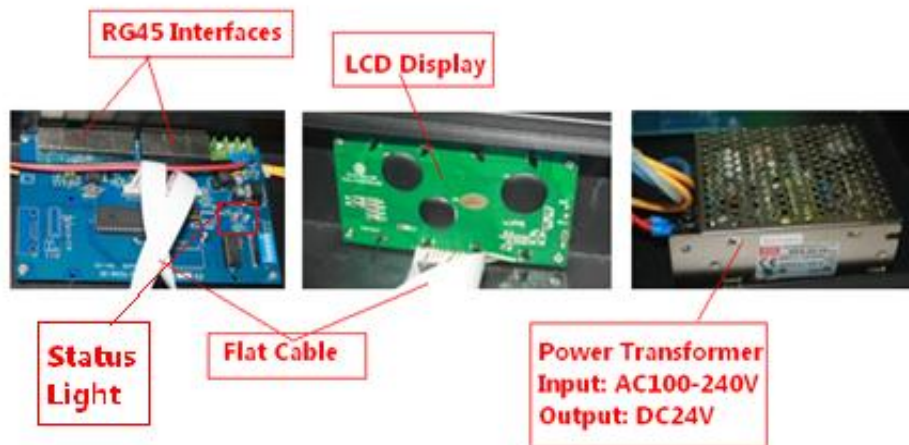
5.1 Overview

Centre Processor is core of Parking PGS system. It deals with the analysis of data, feedback the information to Management Software database and release information to be shown on LED displays to realize the guidance function.

P.S. A Centre Processor manages up to 60 Data Collectors!



Picture 10–CentreProcessor



Picture 11–CentreProcessor Inner View



ADDR: Data Collector Address

OK: Data Collector perform well

XX: Communication problem of Data Collector

Picture 12–CentreProcessor LCD

5.2 Specifications

Dimension	48cm*20cm*8.6cm	Weight	3.7kg
Color	Black	Housing	Iron
Working Voltage	DC24V	Peak Current	35mA
Communication Mode	RS485	Frequency	4800Mps
Transmission Distance	1000m	Working Temperature	-25~70°C

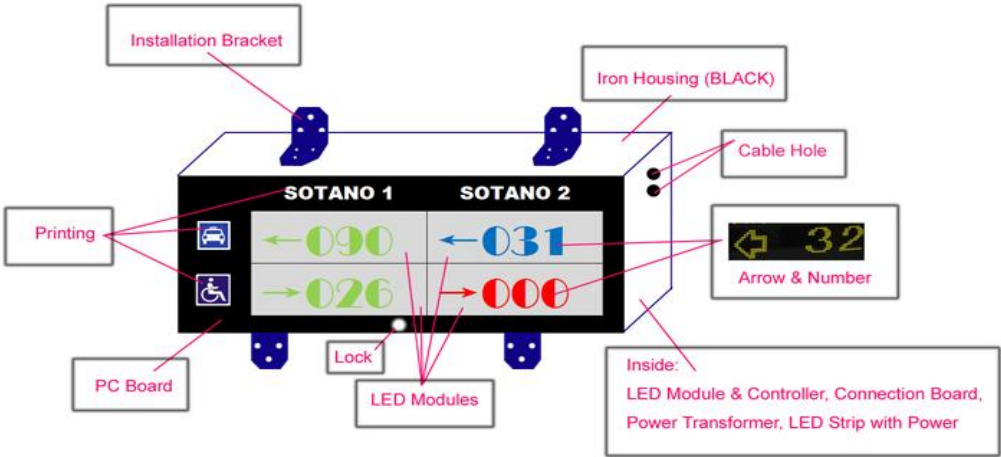
6 LED Display

6.1 Overview

LED Display is installed at entrances, exits and intersections of the parking to tell drivers the space availability in each area, level and the entire garage, guide them which direction to take.

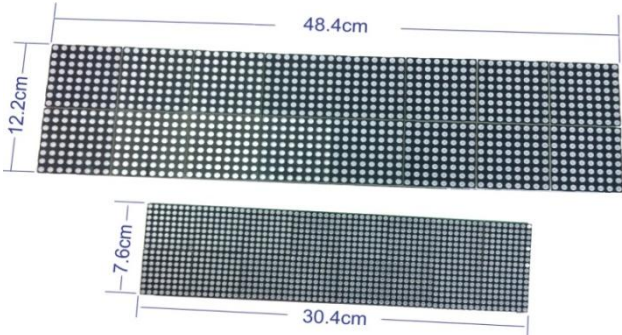


Picture 13–LED Display



Picture 14–LED Display

In accordance with real need, the quantity of LED module differs, , and Size of the iron housing for LED Display also differs accordingly, normally we use two sizes of module as in the picture below. For colors, normally Red/Green is used for Standard spaces and Red/Blue for Disabled.



Picture 15–LED Modules

6.2 Specifications

Working Voltage	DC5V	Frequency	50-60Hz
Communication Mode	RS485	Transmission Distance	<1000m

7 Management Software

7.1 Overview

Parking PGS Management Software is a graphical application developed based on Window 7 and SQL database software, with intuitive UI, simplified operation and complete statistics functions.

Picture 16–Management Software

7.2 Key Functions



- Real-time dynamic parking information display: occupancy status of parking spaces
- Statistical reports: parking time, parking usage, car flow and overtime parking statistics
- Multiuser with different authorities: definable user & roles
- Remote configuration: manage LED Display from PC
- Facility supervising: real-time supervising all PGS components, false will be set off in case of error


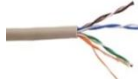


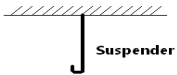


7.3 System Requirements

Brand	Dell or Lenovo recommended	Display	17 inch LED
Memory	1G or above	CD-ROM	Required
CPU	Intel Pentium 1.8G or above	USB Port	Recommended
HD	80G or above	OS	Window Seven
DATABASE	Microsoft SQL Server 2008 R2	Others	At least one RS232 Serial Port

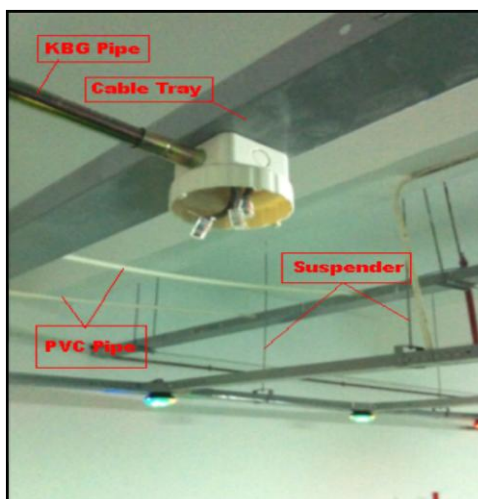
8 Installation & Configuration

8.1 Hardware Installation

a. Installation Materials Preparation

Cables	CAT5 (8*0.58mm) 3 meter/pcs with RJ45	For connection between Sensors and Indicators	
	CAT5 (8*0.58mm) without RJ45	For connection between Data Collectors	
	RVV single cord 1.5mm*3	For AC110V/220V power supply	
Tubes/Cable Tray & Accessory	PVC/KBG 20mm tube Accessories: Bold connection Elbow connection Straight joint	To carry CAT5 cable	
Suspender	12mm Diameter	To hang PVC/KBG tubes onto the ceiling	
Air Break Switch	Local Standard	For all AC110V/220V power supply	
COM Cable	RS232	For Centre Processor to PC connection	

b. Cabling



Refer to Picture 17 on the left, PVC tube, KBG tube or metal tray will be used to carry the cables; and the tubes/cable tray are hanged onto the ceiling with suspenders. During the cabling, back cover for sensor and indicators are fixed also.

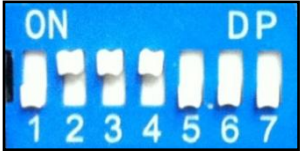
Picture 17–Cabling

c. Install Ultrasonic Sensor & Bay Indicator

After the cabling, simply plug the RJ45s to the sensors (properly configured) and indicators according to the wiring diagram in PAGE 3 and buckle the sensor/indicator up onto the back cover to finish the installation.

d. Ultrasonic Sensor Configuration

Detection Distance: Please refer to the **BLUE DIPs No.4567** on the sensor and are used to set up the detection distance of sensor, followed setting instruction:

 Instructions: BLUE 1: Useless BLUE 2: LED Switch BLUE 3: Detect mode BLUE 4567: Detect distance <input checked="" type="checkbox"/> ON/ <input type="checkbox"/> OFF RED 123456: Physical addr.	4 5 6 7	Detection Distance (M)	Installation Height (M)
		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	0.9(Reserved)
	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1.3	1.5~2
	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1.8	2.1~2.5
	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	2.3	2.5~3
	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	2.3	2.5~3
	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	2.8	3~3.5
	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	3.5	4~4.5
	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	4 (Reserved)	4.5~5

Physical Address: To differentiate from other sensors under the same Data Collector, each sensor has a unique physical address which is setup on the **RED DIPs No.1-6** using binary system. Picture 18 in the next page is a setup guide for addresses from 0-59

(Physical Address Setup Guide ON/ OFF)

Picture 18–DIP setup guide

DIPs Addr	1	2	3	4	5	6
0						
1						■
2					■	
3					■	■
4				■		
5				■	■	■
6				■	■	
7				■	■	■
8			■			
9			■			■
10			■		■	
11			■		■	■
12			■	■		
13			■	■		■
14			■	■	■	
15			■	■	■	■
16		■				
17		■				■
18		■			■	
19		■			■	■
20		■		■		
21		■				■
22		■		■	■	
23		■		■	■	■
24		■	■			
25		■	■			■
26		■	■		■	
27		■	■		■	■
28		■	■	■		
29		■	■	■		■

DIPs Addr	1	2	3	4	5	6
30		■	■	■	■	
31		■	■	■	■	■
32	■					
33	■					■
34	■				■	■
35	■				■	■
36	■			■		
37	■			■	■	■
38	■			■	■	
39	■			■	■	■
40	■		■			
41	■		■			■
42	■		■		■	
43	■		■	■	■	■
44	■		■	■		
45	■		■	■		■
46	■		■	■	■	
47	■		■	■	■	■
48	■	■				
49	■	■				■
50	■	■			■	
51	■	■			■	■
52	■	■		■		
53	■	■		■		■
54	■	■		■	■	
55	■	■		■	■	■
56	■	■	■	■		
57	■	■	■	■		■
58	■	■	■	■	■	
59	■	■	■	■	■	■

e. **Install Data Collector, Centre Processor and LED Display**

Data Collector is wall mount design; please fix it on the wall via the four preserved holes on the back of the iron housing with setscrews.

Centre Processor is rack mount design; please fix it on a rack with proper size screws.

LED Display can be wall mount or roof hang design, brackets and screws will be provided along with the housing, please install it accordingly.

8.2 Software Installation

Please refer to Parking PGS Management Software Manual!

9 System Debugging

Attention: Before power on, please make sure the system is installed in strict accordance with our AutoCAD diagram.

9.1 Data Collector

Key points: **GREEN** status lights on Data Collectors and **BLUE** on related sensors must be twinkling! (Communication is normal!)

1) If the **GREEN** is static, there's no communication between Data Collector and sensors, and the possibilities are:

a. Data Collector Problem

Troubleshooting tip: test Data Collector with one normal sensor

- a) If the **GREEN** on Data Collector and the **BLUE** on sensor are both twinkling, the Data Collector is good;
- b) If the **GREEN** remains static, something is wrong with the Data Collector, please replace with a new one.

b. Ultrasonic Sensor or CAT 5 Cable Problem

Troubleshooting tip: test the sensors & cable one by one from the nearest sensor to the farthest, see picture 1

- a) If both **GREEN** and **BLUE** are twinkling, the sensors and cable are good;

- b) If the **GREEN** remains static, either the sensor or cable is broken; please check cables with tester first, if the cable is good, please replace the sensor.
- c) Repeat last step until all **GREEN**lights on Data Collector and **BLUE**on sensors are twinkling.

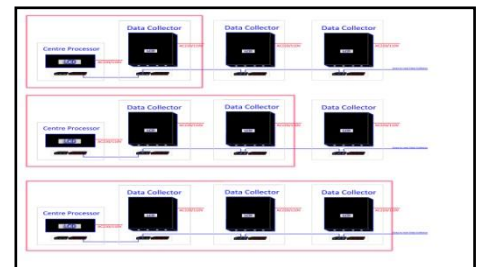
9.2 Centre Processor

Key points: On the **LCD Display** of Centre Processor, all Data Collector (been connected) status must be **OK**. (Communication is normal!)

1) If all the status is **XX**

Troubleshooting tip: test Centre Processor with one normal Data Collector

- a. If the status on Centre Processor LCD Display is **OK**, test the Data Collectors one by one from the nearest to farthest, see picture 2.
- b. If status on Centre Processor LCD Display remains **XX**, replace Centre Processor with a new one.



2) If only some connected Data Collector status is **XX**, there's no communication between Centre Processor and the **XX** Data Collector, and the possibilities are:

a. Repeated Physical Address

Troubleshooting tip: check all Data Collector; make sure all physical addresses are sole and unique

b. Data Collector RG45 Problem

Troubleshooting tip: replace the mainboard

c. Cable Problem

Troubleshooting tip: if the problem remains after mainboard replaced, please test the cable, it probably is the cause of the problem



Please follow above steps and make sure communication between Centre Processor and all Data Collector are normal.

9.3 PC Communication

Key points: when the PGS system is properly connected to PC via **RS485 to RS232 Converter**, and relevant **COMPort** open, the information on the **Software** must be updated at the mean time. If the info does not update, there's no communication between Centre Processor and PC, the problem can be:

- 1) **RS485 to RS232 Converter** Problem

Troubleshooting tip: replace the converter and try again

- 2) **COM Port** Setup Problem

Troubleshooting tip: set up COM Port according to the software user manual

9.4 LED Display

Key points: the information shown on the LED Display must be in **RED**, **GREEN** or **BLUE** color. (Communication is normal)

If the color is **ORANGE**, there's no communication between the LED Display and the system. The possibilities are:

- 1) **Wrong Physical Address**

Troubleshooting tip: check physical address; it should be the same as in the Centre Processor configuration (Excel sheet will be provided)

- 2) **LED Controller Problem**

Troubleshooting tip: replace the LED Controller and try again

- 3) **Cable Problem**

Troubleshooting tip: replace the LED Controller and try again

9.5 Configuration

Key points: all the information (**Number, Arrow Direction, Format etc.**) shown on **LED Display** must be in strict accordance with the customer requirements.

If any mistake, please correct them on the **Centre Processor configuration**

Remarks: all configurations will be done in factory; if any unmentioned issues, please do not hesitate to contact Parking!

10 Why PGS

With Parking PGS coordinating your parking facility, you will be able to:

- 1) Ensure a pleasurable and stress free parking experience, establish a marketable reputation for convenient and effective parking;
- 2) Ensure an eco-friendly facility by reducing toxic emissions from idling cars;
- 3) Instantly pinpoint parking spaces and ensure maximum occupancy and maximize profitability and revenues;
- 4) Back up from a supplier internationally renowned for consistent reliability.



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