

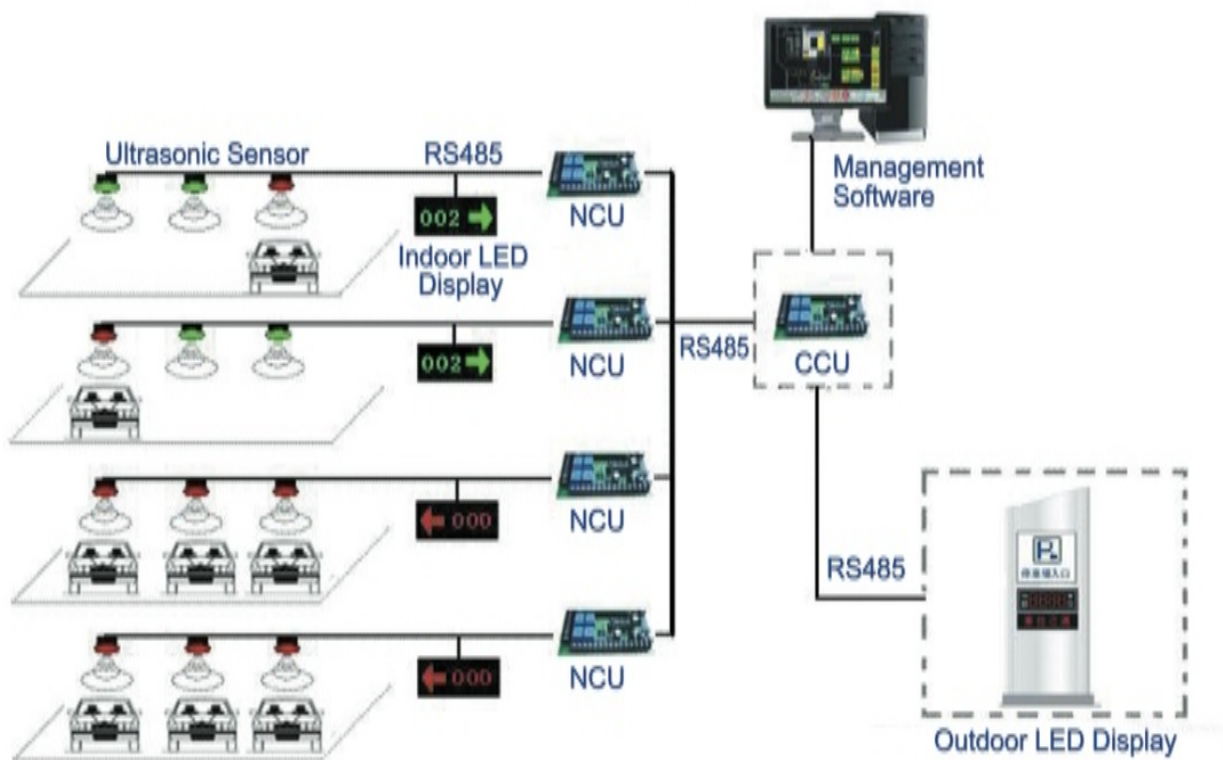
PARKING GUIDANCE SYSTEM

Technical Manual

1. System Overview

Been widely applied in large car parks at commercial buildings, hotel, railway station, airport, shopping mall etc., Dashou PGS monitors the real time parking space availability and 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; it also 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, Dashou 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.

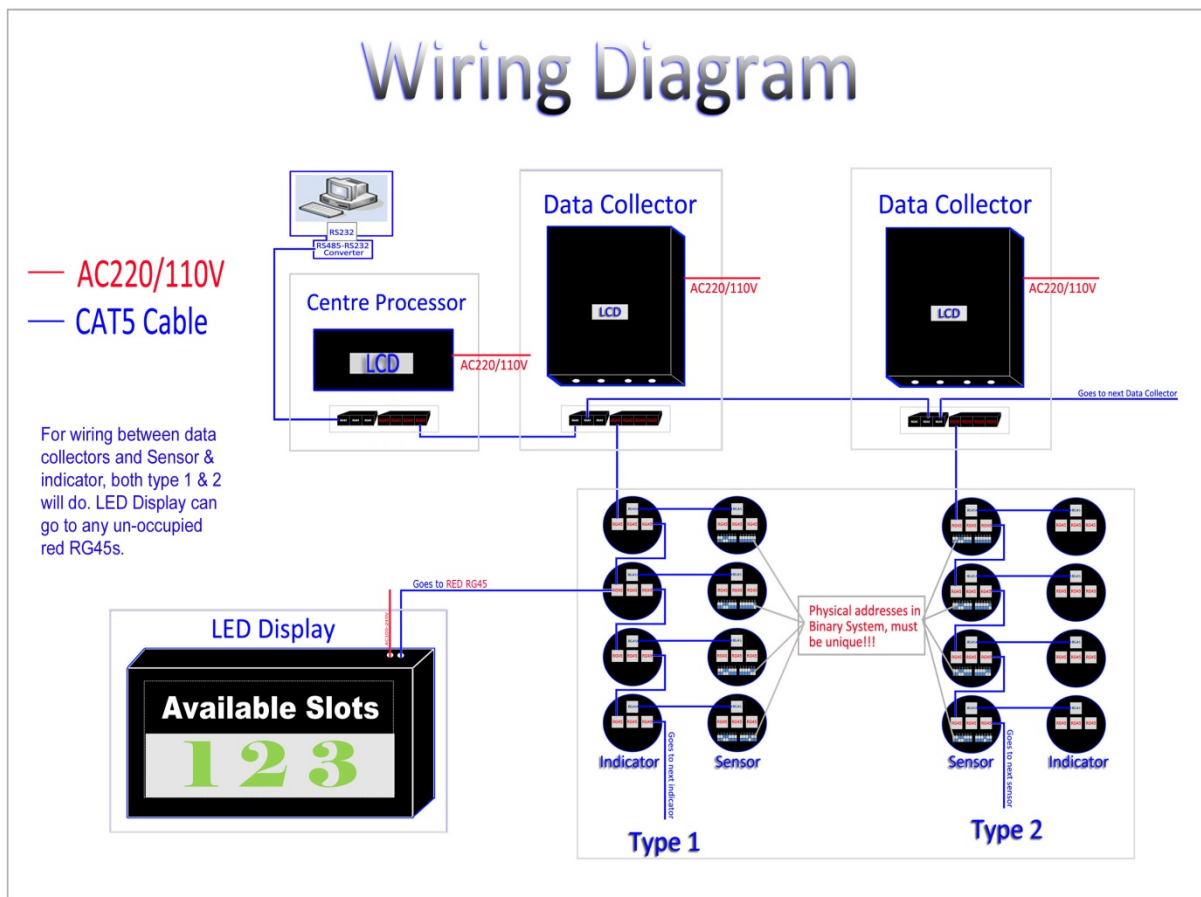


Picture 1 – System Diagram

2. System Composition & Wiring

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 4** for more details)
- 2) **Bay Indicator** (Refer to **Page 6** for more details)
- 3) **Data Collector** (Refer to **Page 7** for more details)
- 4) **Centre Processor** (Refer to **Page 9** for more details)
- 5) **LED Display** (Refer to **Page 10** for more details)
- 6) **Management Software** (Refer to **Page 12** 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!



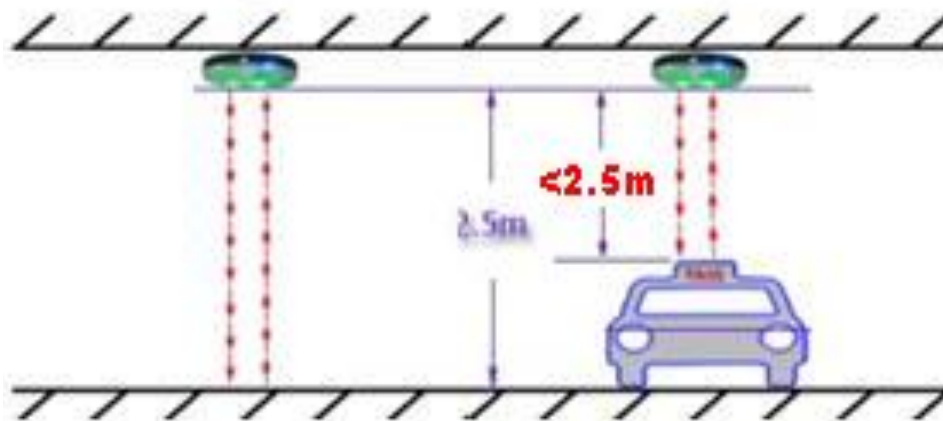
Picture 3 – Ultrasonic Sensor

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 ***Sound Speed*Travel Time/2*** and judges if there is a car.

3.3 Detection Mode

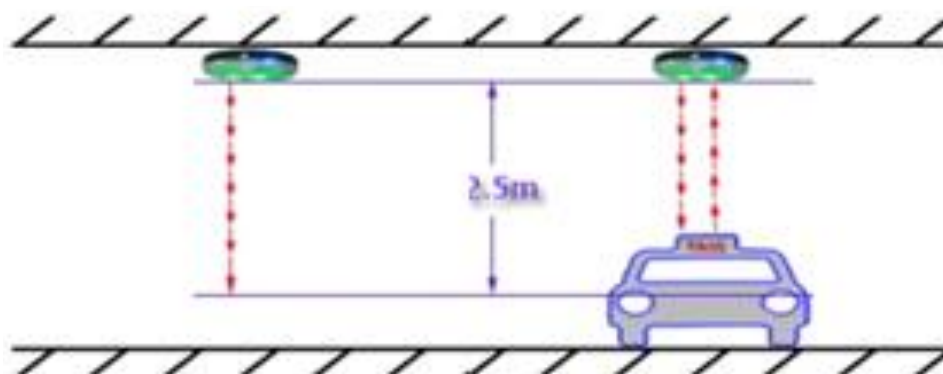
3.3.1 Ground detection: sensor detects the ground (when there's no car, ultrasound reaches the ground, reflected and received; when a car is parked, distance will be shorter and sensor recognize presence of the car)



Ground Detection: shorter on a 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



Car Detection: no car, no reflection

be reflected and received)

Picture 5 – Car Detection

3.4 Specifications

| | | | |
|---------------------|-------------------------------------|-----------------------|--------|
| Dimension | 13cm(D)*6cm(H) | Weight | 0.15kg |
| Color | Front: Frosted White Back: Black | Housing | ABS |
| Working Voltage | DC24V | Peak Current | 30mA |
| Frequency | 40KHz | Sensitivity | >-75dB |
| Communication Mode | RS485 | Transmission Distance | <1000m |
| Detection Angle | <30° | Detection Distance | 0.5-4m |
| Working Temperature | -25~70°C | Error | ±0.2m |

4 Bay Indicator

4.1 Overview

High brightness LED lights installed to the front upper position of the parking spaces to intuitively tell drivers the occupancy status of each parking space, Parkeasy Bay Indicator has several color options to differentiate space types, most popularly **RED/GREEN** (5 Red LED & 5 Green LED) are used for standard space and **RED/BLUE** (5 Red LED & 10 Blue LED) for disabled spaces.



Picture 6 – Bay Indicator

4.2 Specifications

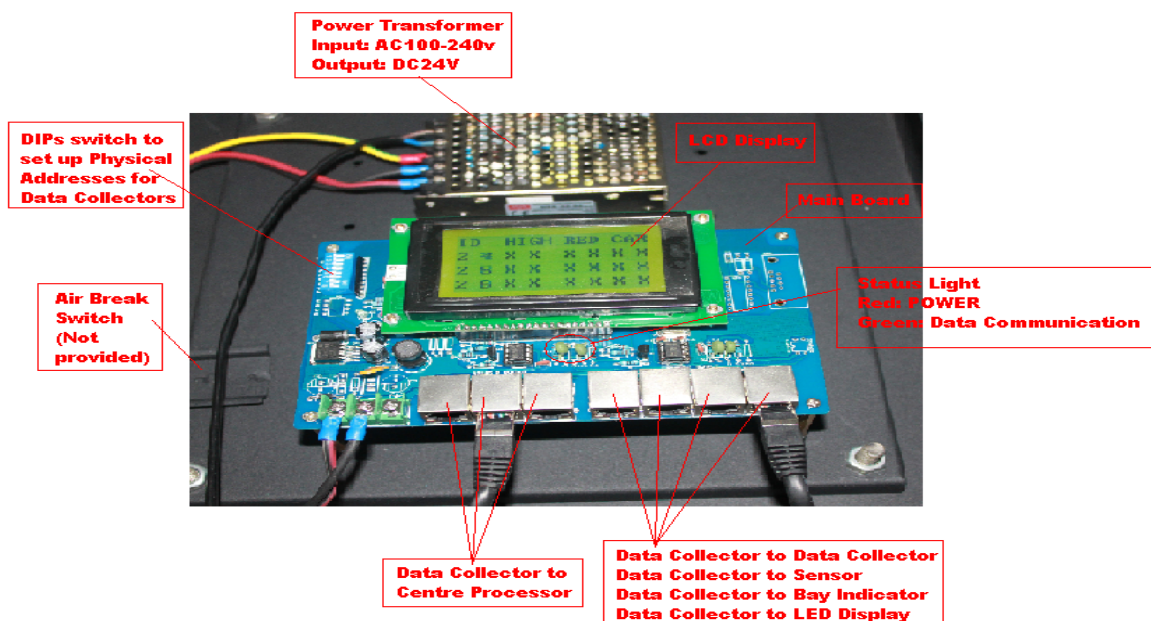
| | | | |
|-----------------|-------------------------------------|---------------------|----------|
| Dimension | 13cm(D)*6cm(H) | Weight | 0.15kg |
| Color | Front: Frosted White Back: Black | Housing | ABS |
| Working Voltage | DC24V | Peak Current | 30mA |
| LED Quantity | R/G: 5R/5G | Working Temperature | -25~70°C |
| | R/B: 5R/10B | | |

5 Data Collector

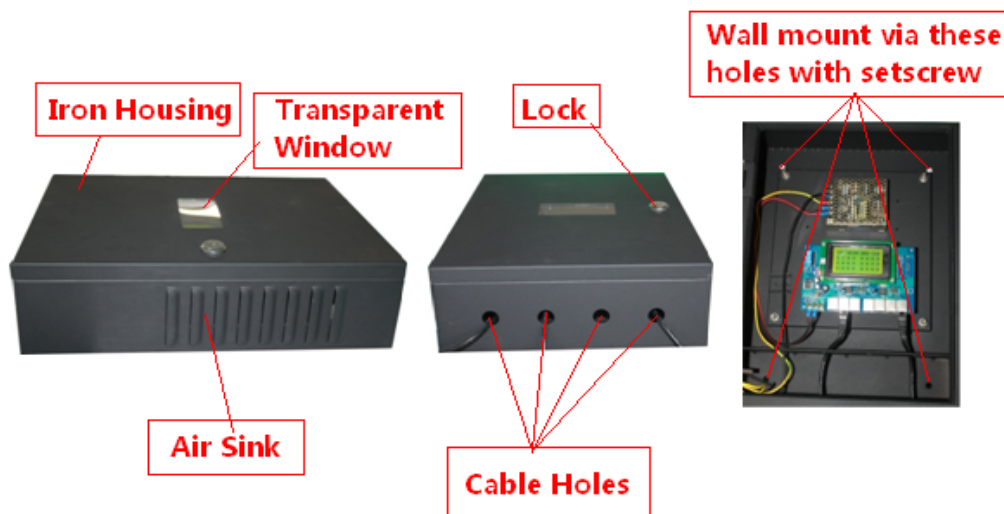
5.1 Overview

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.

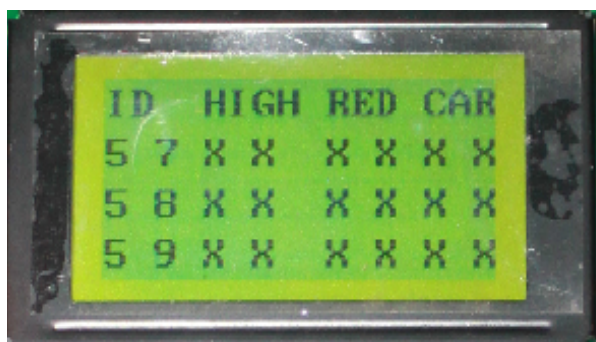
P.S. A Data Collector manages up to 60 sensors and 20 LED displays!



Picture 7 – 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: sensor faulty, not connected or improperly configured)

Picture 9 – Data Collector LCD

5.2 Specifications

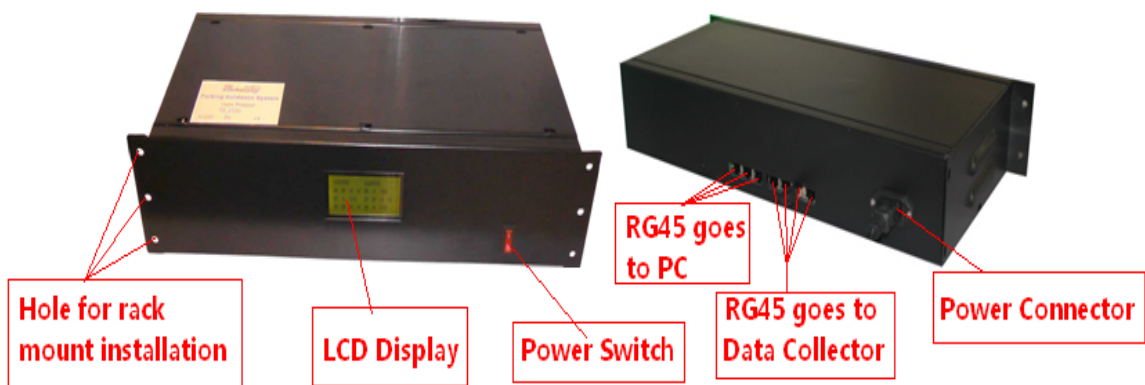
| | | | |
|-----------------------|----------------|---------------------|----------|
| Dimension | 43cm*34cm*12cm | Weight | 8.75kg |
| Color | Frosted Black | Housing | Iron |
| Working Voltage | DC24V | Peak Current | 45mA |
| Communication Mode | RS485 | Frequency | 4800Mps |
| Transmission Distance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

6 Centre Processor

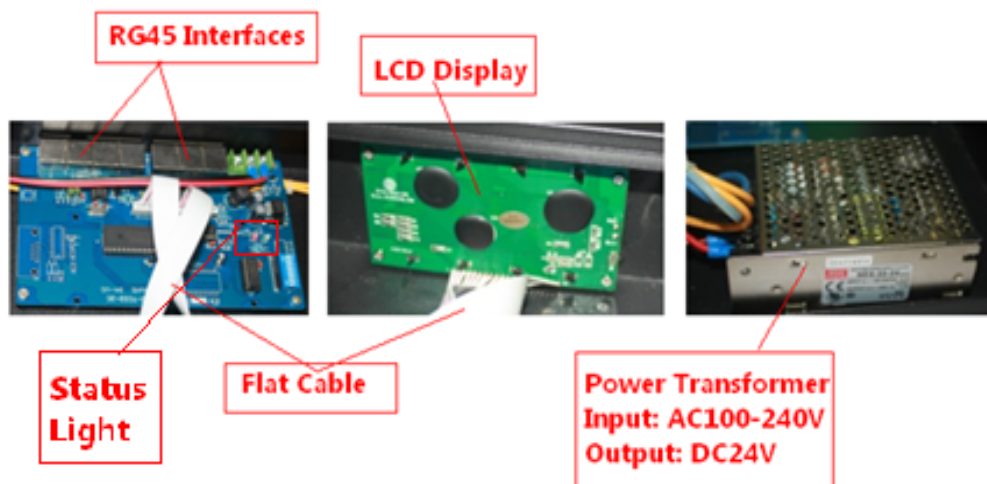
6.1 Overview

Centre Processor is core of Parkeasy 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 – Centre Processor



Picture 11 – Centre Processor Inner View



ADDR: Data Collector Address
OK: Data Collector perform well
XX: Communication problem of Data Collector

Picture 12 – Centre Processor LCD

6.2 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 |

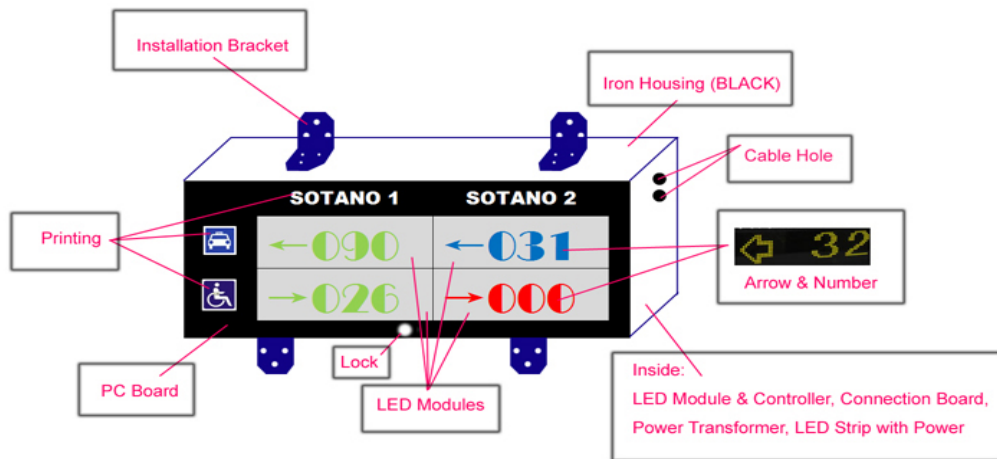
7 LED Display

7.1 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

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.

7.2 Specifications

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

8 Management Software

8.1 Overview

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

8.2 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

8.3 System Requirements


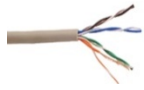
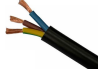

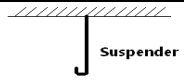


| | | | |
|--------|-----------------------------|----------|-------------|
| Brand | Dell or Lenovo recommended | Display | 17 inch LED |
| Memory | 1G or above | CD-ROM | Required |
| CPU | Intel Pentium 1.8G or above | USB Port | Recommended |

| | | | |
|----------|------------------------------|--------|--------------------------------|
| HD | 80G or above | OS | Window Seven |
| DATABASE | Microsoft SQL Server 2008 R2 | Others | At least one RS232 Serial Port |

9 Installation & Configuration

9.1 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

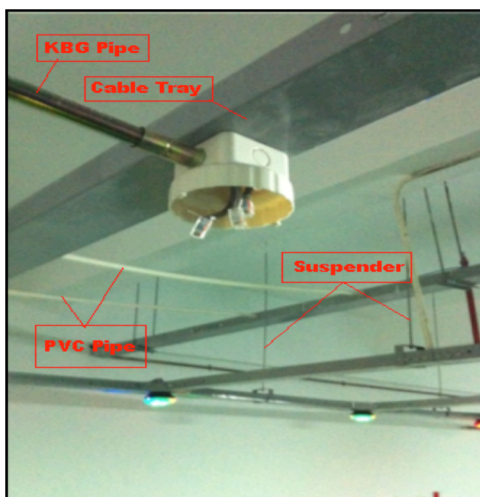
Refer to Picture 17 on the left, PVC tube, KBG tube or metal tray will be used to carry the cables; and the tubes/cable tray are hanged onto the ceiling with suspenders. During the cabling, back cover for sensor and indicators are fixed also.

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:

| | | | |
|---|-------------|-------------------------------|--------------------------------|
|  | 4567 | Detection Distance (M) | Installation Height (M) |
|---|-------------|-------------------------------|--------------------------------|

| | | | |
|--|---|---------------|---------|
| 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.  | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | 0.9(Reserved) | 1.2~1.5 |
| | <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.

9.2 Software Installation

Please refer to PGS Management Software Manual!

10 System Debugging

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

10.1 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.

10.2 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

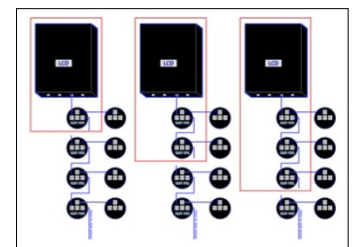
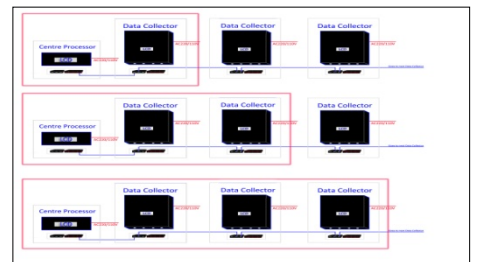
Troubleshooting tip: check all Data Collector; make sure all physical addresses are sole and unique

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.

10.3 PC Communication

Key points: when the PGS system is properly connected to PC via **RS485 to RS232 Converter**, and relevant **COM Port** 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

10.4 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

10.5 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 Parkeasy!