

Features:

- Excitation system: self-excited (AREP and PMG are optional)
- ATS (automatic transfer switch) receptacle
- Lockable battery isolator switch
- Stainless galvanized zinc plates with strong corrosion resistance
- Vibration isolators between the engine/alternator and base frame
- Integrated wiring design
- Base fuel tank for at least 8 hours running
- Equipped with an industrial muffler
- Engine oil pump
- 50 C radiator
- Top lifting and steel base frame with forklift holes
- Drainage for fuel tank
- Complete protection functions and safety labels
- IP54 (soundproof sets), IP56 (control system)
- Water jacket preheater, oil heater and double air cleaner, etc. are available.



Output Ratings

| Generating Set Model | Prime | Standby |
|----------------------|--------------|--------------|
| WPS350/S | 350kVA/280kW | 385kVA/308kW |

Ratings at 0.8 power factor.

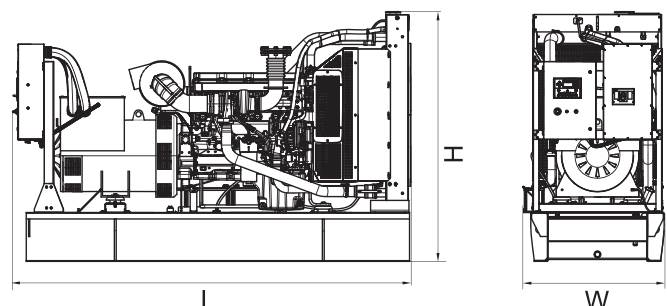
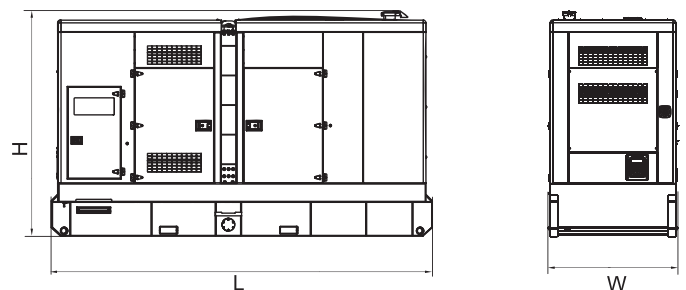
Ratings and Performance Data

| | | |
|---|--------------------|-----|
| Engine Make & Model: | 2206C-E13TAG2 | |
| Alternator Model: | LSA47.2VS1 | |
| Alternator Brand: | Leroy Somer | |
| Control System: | PLC-920 / PLC-7420 | |
| Noise Level @7m: | / | |
| Circuit Breaker Type: | / | |
| Frequency & Phase: | 50Hz & 3PH | |
| Engine Speed: RPM | 1500 | |
| Structure Type: | WPS350 | B |
| | WPS350S | R |
| Fuel Tank Capacity: L | WPS350 | 900 |
| | WPS350S | 800 |
| Fuel Consumption: l/hr (100% Load) | Prime | / |
| | Standby | / |

Dimensions and Weights

| Generating Set Model | Length (L) mm (in) | Width (W) mm (in) | Height (H) mm (in) | Dry kg (lb) | Wet kg (lb) |
|----------------------|-----------------------|----------------------|-----------------------|----------------|----------------|
| WPS350 | 3400 | 1090 | 2150 | 3130 | / |
| WPS350S | 4242 | 1400 | 2512 | 4473 | / |

Dry = With Lube Oil Wet = With Lube Oil and Coolant



Also available in the following voltages: 415/240V-380/220V-220/127V-200/115V;

ESP: Standby Power Standby duty, operation under variable load, without over load;

PRP: Prime Power-Continuous duty operation, under variable load 24/24h-10% over load permissible 1 hour/12 hours;

The data is only for your reference but not for use of sales.

M: Mechanical speed governor, E/ECCU: Electronic speed governor;

NA: Naturally aspirated, TC: Turbocharged, TCA: Turbocharged and air-air aftercooled. TCW: Water-cooled Turbocharged;

The weights are approximate and without fuel.



Engine model: 2206C-E13TAG2

Cooling system

Radiator

Face area 1,238 m²
 Number of rows and materials 1rows, aluminium
 Matrix density and material 12 fins per inch, aluminium
 Width of matrix 1048 mm
 Height of matrix 1100 mm
 Weight of radiator (dry) 132 kg
 Pressure cap setting (min) 70 kPa

Charge cooler

Face area 1,006 m²
 Number of rows and materials 1rows, aluminium
 Matrix density and material 12 fins per inch, aluminium
 Width of matrix 915 mm
 Height of matrix 1100 mm

Coolant pump

Speed @ 1500 rev/min 2056 rev/min
 Speed @ 1800 rev/min 2468 rev/min
 Drive method Gear

Fan

Diameter 927 mm
 Drive ratio 0,92:1
 Number of blades 9
 Material composite
 Type pusher
 Cooling fan air flow @ 1500 rev/min 654 m³/min
 Cooling fan air flow @ 1800 rev/min 788 m³/min

Coolant

Total system capacity 51,4 litres
 Max. top tank temperature 104 °C
 Temperature rise across engine 10 °C
 Max. pressure in engine cooling circuit 70 kPa
 Max. permissible external system resistance 30 kPa
 Max. static pressure head on pump 30 kPa
 Coolant flow against 30 kPa restriction
 -1500 rev/min 5,3 litres/sec
 -1800 rev/min 6,7 litres/sec
 Thermostat operation range 87 to 98°C

For details of recommended coolant specifications, refer to the Operation and Maintenance Manual for this engine model

Duct allowance

Duct allowance 2206C-E13TAG2

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow

| Engine speed rev/min | Ambient clearance inhibited coolant °C | Duct allowance Pa | m ³ /min |
|----------------------|--|-------------------|---------------------|
| 1500 | 59 | 200 | 563 |
| 1800 | 59 | 200 | 716 |

Duct allowance 2206C-E13TAG3

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow

| Engine speed rev/min | Ambient clearance inhibited coolant °C | Duct allowance Pa | m ³ /min |
|----------------------|--|-------------------|---------------------|
| 1500 | 52 | 200 | 661 |
| 1800 | 57 | 200 | 716 |

Electrical system

-type 24 Volt negative earth
 Alternator type 22SI
 -alternator voltage 24V
 -alternator output 70A
 Starter motor type 39MT
 -starter motor voltage 24V
 -starter motor power 7,8 kW
 Number of teeth on flywheel 113
 Number of teeth on starter pinion 11
 Minimum cranking speed 106 rev/min
 Starter solenoid maximum
 -pull-in current @ -25°C 200A
 -hold-in current @ -25°C 25A

Cold start recommendations

-5°C to -10°C

Oil SAE grade 15W40
 Starter 42MT
 Battery 24V
 Max. breakaway current 1311A
 Cranking current 588A
 Starting aids (ECM controlled) none
 Min. mean cranking speed 106 rev/min

-11°C to -25°C

Oil SAE grade 5W40
 Starter 42MT
 Battery 24 volts
 Max. breakaway current 1585 amps
 Cranking current 828 amps
 Starting aids (ECM controlled) block heater 1,5 (110V/240V)
 Min. mean cranking speed 106 rev/min

Exhaust system

Maximum back pressure

-1500 rev/min 10,0 kPa
 -1800 rev/min 10,0 kPa
 Exhaust outlet, internal diameter 123 mm

Fuel system

Injection system MEUI
 Injector type MEUI
 Governor type electronic
 Governing conforms to ISO8528-5 Class G2
 Injector pressure 207 MPa

Fuel lift pump

-lift pump type gear driven
 -lift pump delivery - 1500 rev/min 480 litres/min
 -lift pump delivery - 100 rev/min 600 litres/min
 -lift pump delivery pressure 621 kPa
 -max. suction head at pump inlet 0,3 m
 -max. static pressure head 0,4 m
 -max. fuel inlet temperature 55 °C
 -fuel filter spacing primary 10 microns
 -fuel filter spacing secondary 2 microns

Fuel specification

BS2869 Class A2 or BSEN590
 ASTM D975 Class 1D and class 2D

Note: For further information on fuel specifications and restrictions, refer to the OMM, "Fluid Recommendations" for this engine model.



Alternator model: LSA47.2VS1

SPECIALY ADAPTED FOR APPLICATIONS

The LSA 46.2 alternator is designed to be suitable for typical generator applications, such as: backup, standard production, cogeneration, marine applications, rental, telecommunications, etc.

COMPLIANT WITH INTERNATIONAL STANDARDS

The LSA 46.2 alternator conforms to the main international standards and regulations:

IEC 60034, NEMA MG 1.22, ISO 8528, CSA/UL on request, marine regulations, etc.

It can be integrated into a CE marked generator.

The LSA 46.2 is designed, manufactured and marketed in an ISO 9001 and ISO 14001 environment.

TOP OF THE RANGE ELECTRICAL PERFORMANCE

- Class H insulation.
- Standard 12-wire re-connectable winding, 2/3 pitch, type no. 6 .
- Voltage range: 220 V - 240 V and 380 V - 415 V (440 V) - 50 Hz / 208 V - 240 V and 380 V - 480 V - 60 Hz.
- High efficiency and motor starting capacity.
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440 V (no. 7), 500 V (no. 9), 600 V (no. 23), 690 V (no. 10 or 52)
 - 60 Hz: 380 V and 416 V (no. 8), 600 V (no. 9).
- THD Total harmonic distortion < 2,5% (full load).
- R 791 interference suppression conforming to standard EN 55011 group 1 class B standard for European zone (CE marking).

EXCITATION AND REGULATION SYSTEM SUITED TO THE APPLICATION

| Excitation system | | | | Regulation options | | | | |
|-------------------|----------|----------|----------|---|----------------------------|--------------------------|--|-----------------------------------|
| Voltage regulator | SHUNT | AREP | PMG | T.I. Current transformer for paralleling | R 726 Mains paralleling | R 731 3-phase sensing | R 734 3-phase sensing on mains paralleling unbalanced | P Remote voltage potentiometer |
| R 250 | Std | - | - | - | - | - | - | √ |
| R 450 | optional | Std | Std | √ | √ | √ | √ | √ |
| D 510 | optional | optional | optional | √ | included | included | contact factory | √ |

Voltage regulator accuracy +/- 0.5%.

√ : possible mounting

PROTECTION SYSTEM SUITED TO THE ENVIRONMENT

- The LSA 46. 2 is IP 23.
- Standard winding protection for clean environments with relative humidity ≤ 95 %, including indoor marine environments.
- Options: - Filters on air inlet : derating 5%
 - Filters on air inlet and air outlet (IP 44) : derating 10%.
 - Winding protections for harsh environments and relative humidity greater than 95%.
 - Space heaters.
 - Thermal protection for windings and shields.

REINFORCED MECHANICAL STRUCTURE USING FINITE ELEMENT MODELLING

- Compact and rigid assembly to better withstand generator vibrations.
- Steel frame.
- Cast iron flanges and shields.
- Twin-bearing and single-bearing versions designed to be suitable for engines on the market.
- Half-key balancing.
- Greased for life bearings (regreasable bearings optional).

ACCESSIBLE TERMINAL BOX PROPORTIONED FOR OPTIONAL EQUIPMENT

- Easy access to the voltage regulator and to the connections.
- Possible clusion of accessories for paralleling, protection and measurement.
- 12 way terminal block for reconnecting voltage reconnection.



WPS350 / WPS350S

Control System PLC-920 (Optional)

Multiphase power PLC-920 generator controllers integrating digital, intelligent and network techniques are used as the automatic control systems for diesel generators. It can carry out functions including pre-alarm, warning & electrical trip, fail monitoring and controls etc.

FEATURES

- Parameter configuration via RS-232 serial communication;
- Log last 50 events & alarm information with measured values;
- Statistics records;
- Remote start/stop;
- Speed sensing from alternator voltage or magnetic pickup;
- Configurable 3 inputs and 6 outputs;
- ECU powers, ECU stop, STOP or fuel solenoid selection;
- Automatic transfer switching control and engine control;
- Adjustable start, load and stop timers.



SPECIFICATION

- Dimensions: 111mm*81mm*61mm
- Protection: IP65 at front panel
- Operating temperature: -20 °C to 70 °C
- Max. Operating current is 360mA
- Sender measurement: 0 to 1300 ohm
- Panel cut-out: 81mm*70mm
- Weight: approximately 0.3kg
- DC battery supply voltage: 8 to 32Vdc
- CT secondary: 5A
- Accuracy: 1%FS, resolution: 1 ohm

FUNCTION

- Pre-Alarm
- Engine temperature
- Oil pressure
- Over/under voltage
- Over/under frequency
- Over/under speed
- Warning & Electrical trip
- Over current
- Short circuit
- Error
- Over/under speed
- Speed loss
- Battery low
- Battery high
- Maintenance
- Over current
- Short circuit
- Engine stop
- Can bus
- Charge alternator
- Fail monitoring
- Emergency stop
- Multiple engage fail
- Failed to start
- Low oil pressure
- High temperature
- Speed failure
- Voltage
- Charging fail
- Shutdown
- Warning
- Controls
- Fuel and stop solenoid
- ECU power and stop
- Starter motor
- Automatic generator start
- Preheat
- External alarm horn
- Engine cooling
- Idle mode

Control System function list

| | MODEL | PLC-920 | PLC-7420 | |
|------------------------------------|--|----------------------------|----------|---|
| General accessory | AVR | ● | ● | |
| | Electronic Governing | × | × | |
| | Glow plug control | ● | ● | |
| | Cycle Cranking | ● | ● | |
| | (MODBUS) Networking | × | ● | |
| | Fault History | ● | ● | |
| Operator Interface | manual start/stop | ● | ● | |
| | Auto/remote start | ● | ● | |
| | Regular Test | ● | ● | |
| | Auto operation LED | ● | ● | |
| | Manual operation LED | ● | ● | |
| | Common Shutdown LED | ● | ● | |
| | Common warning LED | ● | ● | |
| | Fail to start LED | ● | ● | |
| | Emergency stop(local) | ● | ● | |
| | Alphanumeric screen | ● | ● | |
| Measurement and Instrumentation | Remote start input active LED | × | ● | |
| | Alarm reset | ● | ● | |
| | Engine | Oil pressure | ● | ● |
| | | Water Temperature | ● | ● |
| | | Engine Speed | ● | ● |
| | Alternator | Hours Run | ● | ● |
| | | Number of Starts | ● | ● |
| | | Battery Voltage | ● | ● |
| | | Coolant Temperature | ● | ● |
| | | 3Phase-L Voltage&Frequency | ● | ● |
| 3phase Current | | ● | ● | |
| Frequency | | ● | ● | |
| kWh | | ● | ● | |
| Apparent Power | | ● | ● | |
| Active Power and Reactive Power | | ● | ● | |
| Power Factor | ● | ● | | |
| Mains Expression | Per PhasekW, kW/r | ● | ● | |
| | Per Phase kVA | ● | ● | |
| | Phase Voltage | ● | ● | |
| Output Power | × | ● | | |
| Grid Line Voltage | × | ● | | |
| Grid Phase Voltage | × | ● | | |
| Grid Frequency | × | ● | | |
| Shutdown Protection and Indication | Low Fuel Level | ● | ● | |
| | High Fuel Level | × | ○ | |
| | Low Oil Pressure | ● | ● | |
| | High Water Temperature | ● | ● | |
| | Failure to Stop | ● | ● | |
| | Failure to Start | ● | ● | |
| | Controlable start circles/times | × | ● | |
| | Overspeed | ● | ● | |
| | Under&Over Voltage | ● | ● | |
| | Under&Over Frequency | ● | ● | |
| Threshold Warning/Indication | Overcurrent | ● | ● | |
| | Earth Leakage | ○ | ○ | |
| | Reverse Power | × | × | |
| | Reverse kW/r | × | × | |
| | Low Oil Pressure | ● | ● | |
| | Low Water Temperature | ○ | ○ | |
| | High Water Temperature | ● | ● | |
| | Low Water Level | ● | ● | |
| | Low/High Battery Voltage | ● | ● | |
| | Failure to Charge | ● | ● | |
| Paralleling Capability | Overcurrent | ● | ● | |
| | Overload | ● | ● | |
| | genset Under/Over Voltage | ● | ● | |
| | genset Under/Over Frequency | ● | ● | |
| | under/over Speed | ● | ● | |
| | High Engine Temperature | ● | ● | |
| | Earth Leakage | ○ | ○ | |
| | Synchroscope(Independent Bus) | × | × | |
| | Active and Reactive Power Control | × | × | |
| | Synchroscope(Shared Bus) | × | × | |
| Power Transfer Function | Synchronization Detector | × | × | |
| | Peak Lopping | × | × | |
| | Automatic Transfer | ○ | ● | |
| | Hard Closed Transition | ● | ● | |
| | Soft Closed Transition | × | × | |
| | Gen/Mains Breaker | × | ● | |
| | Gen/Mains Breaker Status Protection | × | ● | |
| | Speed/Voltage Control | × | × | |
| | Power Indication | × | ● | |
| | Fuel&Solenoid Valve Control | ● | ● | |
| Environment | Starter Control | ● | ● | |
| | Preheating | ○ | ○ | |
| | Mains Transfer Switch (Standard) | × | ● | |
| | Mains Transfer Switch (Emergency) | × | ● | |
| | Operating Temperature (-40 °C - 70 °C) | ● | ● | |
| | Ambient Temperature (-25 °C - 45 °C) | ● | ● | |
| | Humidity ≤ 80% | ● | ● | |
| | Grid Over/Under Voltage Control | × | ● | |
| | Grid Over/Under Frequency Control | × | ● | |
| | Remote Start Output(Load/No-load) | ● | ● | |
| Monitoring Function | Optional Relay Output | ● | ● | |
| | Engine Instrument Monitoring | ● | ● | |
| | Remotely Control with All Functions | × | ● | |
| | Alternator Output Instrument Monitoring | ● | ● | |
| | Connection Point with All-around Setting For 4 Users | ● | ● | |
| | 3 Users Input Connection Point | ● | ● | |
| | LCD Light Control of Low Light Operation Environment | ● | ● | |
| | Safe PIN Code | ● | ● | |
| | RS232/485 Interface | × | ● | |
| | Language Selection | ● | ● | |
| Multi-Language Function | ● | ● | | |



Control System

Digital, intelligent control system allows easier operation.

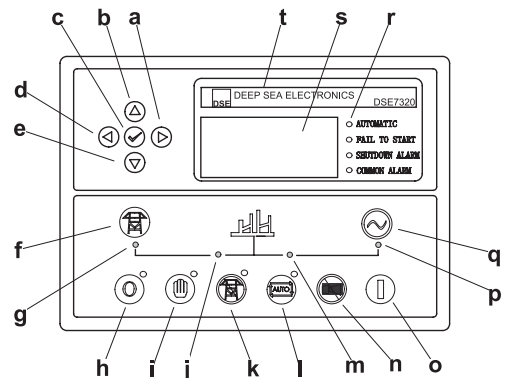
PLC-7420

PLC-7420 is an advanced control module based on micro-processor, containing all necessary functions for protection of the genset and the breaker control. It can monitor the mains supply, breaker control and automatically start the engine when the mains is abnormal. Accurately measure various operational parameters and display all values and alarms information on the LCD. In addition, the control module can automatically shut down the engine and indicate the engine failure.



FEATURES

- Microprocessor control, with high stability and credibility
- Monitoring and measuring operational parameters of the mains supply and genset
- Indicating operation status, fault conditions, all parameters and alarms
- Multiple protections; multiple parameters display, like pressure, temp. etc.
- Manual, automatic and remote work mode selectable
- Real time clock for time and date display, overall runtime display, 250 log entries
- Overall power output display
- Integral speed/frequency detecting, telling status of start, rated operation, overspeed etc.
- Communication with PC via RS485 OR RS232 interface, using MODBUS protocol



Control Panel

- a Button (next page)
- b Button (increase value / previous item)
- c Button (accept)
- d Button (previous page)
- e Button (decrease value / next item)
- f Button (transfer the load to the mains supply, when in Manual mode only)
- g Mains supply available LED
- h Stop / Reset button
- i Manual button (Manual control mode)
- j Mains supply on load LED
- k Test button (Test mode)
- l Auto button (Auto mode)
- m Genset on load LED
- n Mute/Lamp test button
- o Start button (Manual)
- p Genset available LED
- q Button (transfer the load to the genset, when in Manual mode only)
- r Alarm LED (4 alarm items)
- s LCD display
- t Control module name



Optional

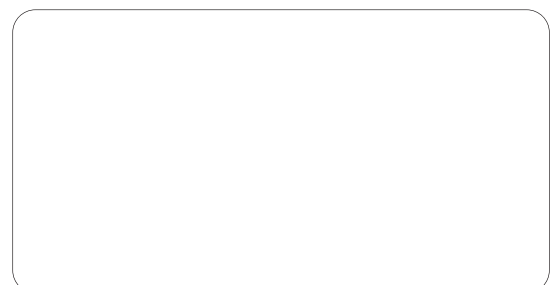
| Engine | Alternator | Generator Set | Fuel System | Canopy |
|---|---|--|--|--|
| <ul style="list-style-type: none"> Water Jacket Preheater Oil Preheater | <ul style="list-style-type: none"> Winding Temperature Measuring Instrument Alternator Preheater PMG Anti-damp and anti-corrosion treatment Anti-condensation heater | <ul style="list-style-type: none"> Tools with the machine | <ul style="list-style-type: none"> Low fuel level alarm Automatic fuel feeding system Fuel T-valves | <ul style="list-style-type: none"> Trailer |
| Lubricating System | Exhaust System | Cooling System | Control Panel | Voltages |
| <ul style="list-style-type: none"> Oil with the machine | <ul style="list-style-type: none"> Protection board from hotness | <ul style="list-style-type: none"> Front heat protection Coolant (-30°C) | <ul style="list-style-type: none"> Remote control panel PLC-920 PLC-7420 ATS | <ul style="list-style-type: none"> 415/240V 400/230V 380/220V 220/127V 200-115V |

The following lists are optional by the needs of customers.

Engine Model: 2206C-E13TAG2

Minor Repair / 1000 hrs optional

| No. | Part Name | Part No. | Qty | Remark |
|-----|-------------------------|----------|-----|--------|
| 1 | Fuel Filter | CH10931 | 6 | |
| 2 | Pre-Fule Filter | CH10930 | 6 | |
| 3 | Oil Filter | CH10929 | 6 | |
| 4 | Air Filter | CH11217 | 5 | |
| 5 | BELT | CH12032 | 1 | |
| 6 | ALT belt | CH11037 | 1 | |
| 7 | SEAL - ROCKER BOX COVER | CH12142 | 1 | |
| 8 | GASKET - CYLINDER HEAD | CH12454 | 1 | |
| 9 | THERMOSTAT | CH11620 | 2 | |
| 10 | FRONT OIL SEAL | CH12442 | 1 | |
| 11 | SEAL - REAR END OIL | CH12721 | 1 | |



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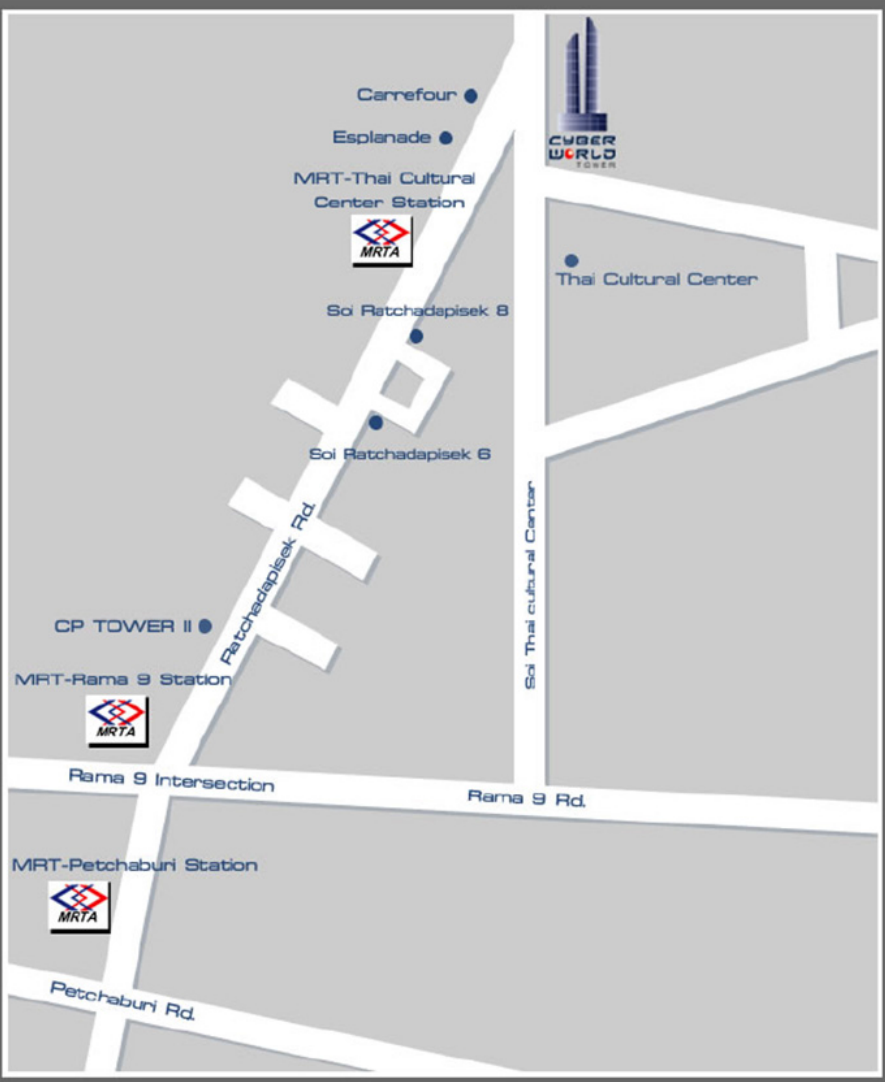


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