Lapcom VX-2000 Lite-20/100 All Quick Guide

CONTENTS

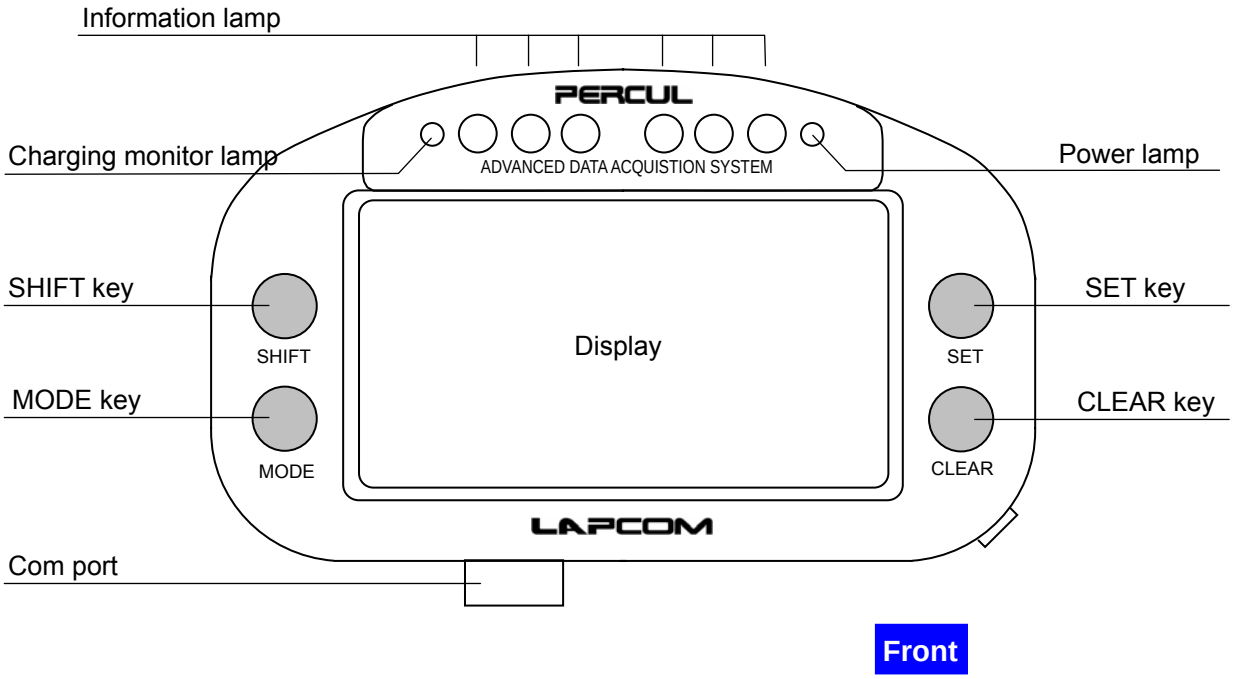
1) Confirm Standard System Components

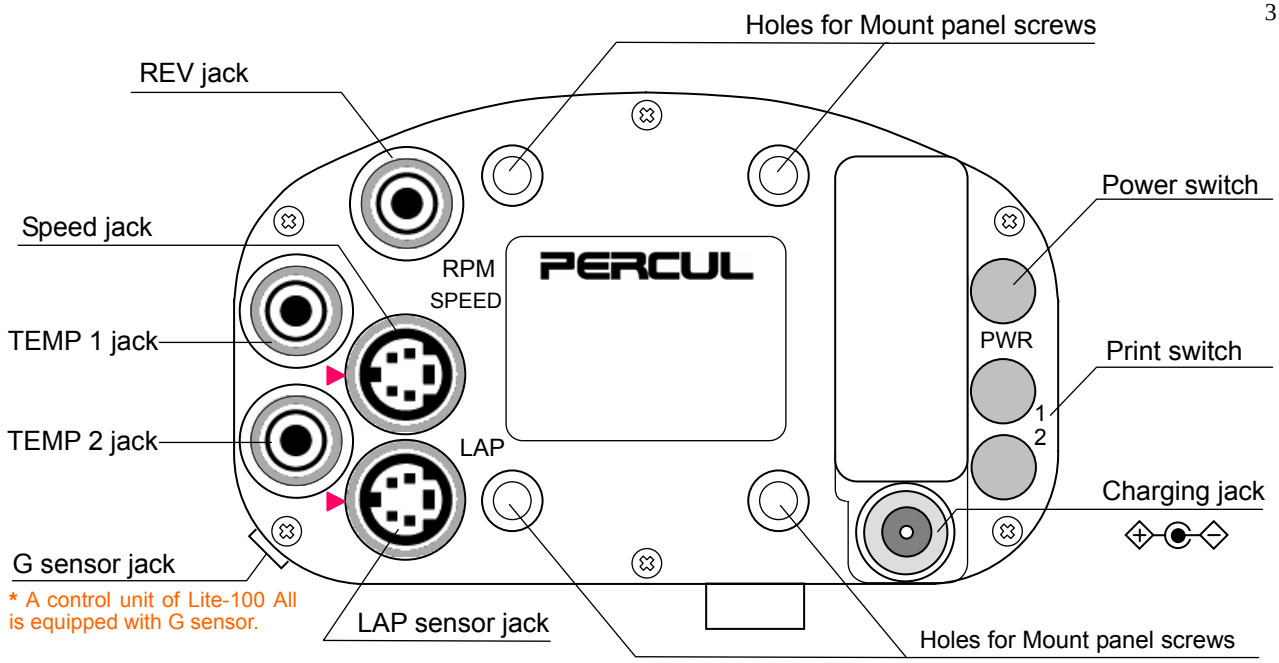
 Front  Back			
Control unit (Data logger) with display *1		Speed Sensor and magnets	Pulse lead for RPM
		Now printing	-User's guide and additional information
Magnetic sensor for kart *2	AC adapter and plug	Mount panel and screws	

*1 A control unit of Lite-100 All is equipped with G sensor.
*2 You can choose a magnetic sensor for car instead of a magnetic sensor for Kart.

2) Confirm Parts and Connectors

Confirm the names of parts & connectors of the control unit.





Back

3) Charging the control unit

1. Make sure that the power switch is turned OFF.
2. Insert the DC plug of the AC adapter into the charging jack of the control unit.
3. Fit the adapter plug to the AC adapter.
4. After plugging the AC adapter into the power outlet, quick charging starts and the charging monitor lamp is illuminated. Quick charging finishes in about an hour and a half, the monitor lamp goes out, and trickle charging starts. To fully charge the control unit, continue trickle charging for about 10 hours*.

* Please continue trickle charging for 14-15 hours before first using this device.

Caution : Observe the following instructions to avoid deterioration of the internal battery.
Do not charge the control unit for longer than the recommended time.
Charge the unit within the temperature range of 5 to 40°C.

A fully charged internal battery is capable of running Lite-20/100 All continuously for up to 7 hours. When the battery is running low, a "V" starts flashing on the display and the power lamp will go out due to the auto power off function even though the power switch is still turned ON. When that occurs, turn the power switch OFF and start charging the unit. If the power switch is turned ON again before charging, auto power off will not function and the total discharge of the battery will cause the loss of all stored data in the control unit.

Charge the battery before first using this device or if it has not been used for some time. Sometimes quick charging may start after some trickle charging. If this occurs it is not an error. If quick charging immediately followed by trickle charging occurs over and over even though the internal battery is not charged, activate the battery by turning the power switch ON to discharge it after a 15 hour trickle charge. Repeat this process 2 or 3 times.

Important notice

If you expect not to use the unit more than 2 weeks after using the unit, charge the battery to avoid the total discharge. Because the unit gradually consumes the battery even though the power switch is off.

4) Installation

1. Control unit

1. Attach the mount panel to the rear of the control unit with the supplied 4 small screws.
2. Install the control unit to the steering wheel by fastening the supplied long screw.

2. Wheel speed sensor

1. Arrange the supplied magnet triggers around the axle or wheel. Usually 4 to 10 magnets are used. The speed pulse length (outer circumference of tire / number of magnets) should be between 100mm and 999mm. Determine the number of magnets to set the speed pulse length in this range.
2. Affix the magnets with tape. If you mount the magnets on the sprocket or wheel by drilling holes make sure that might reduce their strength.
3. Install the sensor bracket* on the place for ease installation of the sensor. (For example, on the outside bearing hanger on the brake side of the chassis) Install the wheel speed sensor so that the sensing surface is close to the magnets but not touching them. Any touching would cause damage to the sensor. The distance between the sensing surface and the magnets depends on the installation condition, but a gap of 5mm is recommended.
4. Insert the wheel speed sensor connector into the speed sensor jack of the control unit.

*Wheel speed sensor bracket and screws are not supplied.

Caution

During installation, do not subject the upper resinous part of the sensor to any stress by pinching or wrenching it with a tool.

3. Pulse lead for RPM

1. For Kart engines, replace the spark plug cap with a noise-suppressing product (NGK

LB05EMH or equivalent) or use a resistor spark plug.

2. Clip the lead to where RPM is correctly measured such as where all the plug leads are gathered or the ignition coil lead.
3. Insert the pulse lead connector into the REV jack of the control unit. Make sure the cable is affixed to the chassis in several positions.

Caution

The RPM pulse lead has not been soldered to the clip to help dampen large engine ignition pulses that may enter the microcomputer of the control unit from the RPM pulse lead. If there is any damage that needs repair, ensure there is no electrical contact between the cable and clip.

4. Magnetic sensor

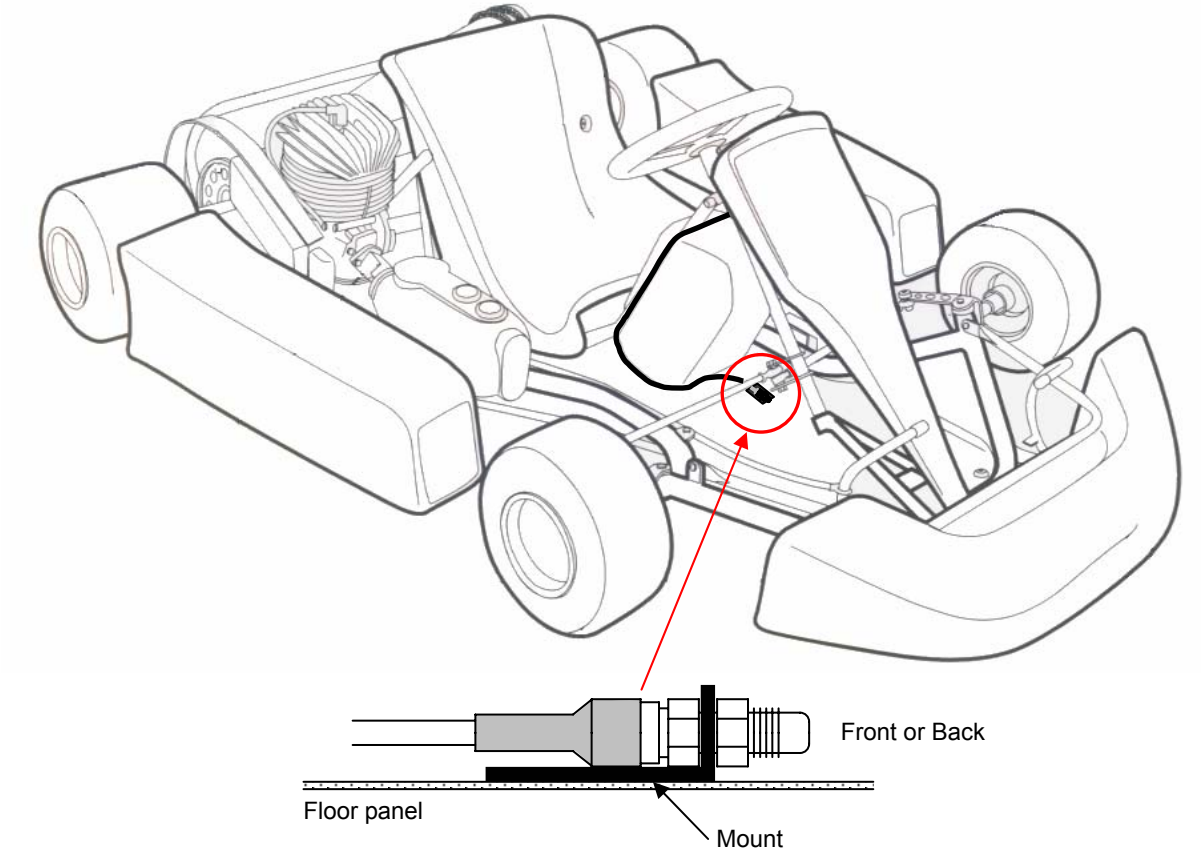
1. Install the supplied mount on the floor panel of the vehicle. Fix the magnetic sensor on the mount ensuring the head of the sensor is placed in the direction of travel.
2. Keep the sensor 5cm or more away from any main chassis rails.
3. Insert the magnetic sensor connector into the LAP sensor jack of the control unit. When plugging the magnetic sensor into the control unit, make sure the power switch is off. If the power switch is on, lap count may automatically start. It is not an error. Press the CLEAR key to stop the count.

Caution

Keep the sensor away from the ignition coil and plug cord that generate magnetism as far as possible.

Keep the sensor cable away from the pulse lead cable.

If the sensor is installed to touch steel parts of the vehicle directly, measurement errors may occur. Put rubber packing between the sensor and the steel parts.



5. Optical sensor

1. Install the optical sensor by drilling a 16φ sized hole in the desired place, such as to the front panel, so that infrared rays from the transmitter strike the front of the optical sensor lens.
2. If installing the sensor on a metallic part of the body such as the roll bar, avoid the effects of noise by insulating the sensor from the body with the resinous plate supplied.
3. Do not lay the cable close to a spark plug or ignition device, and do not bind the cable together with the pulse lead.
4. Insert the optical sensor connector into the LAP sensor jack of the control unit.

Caution

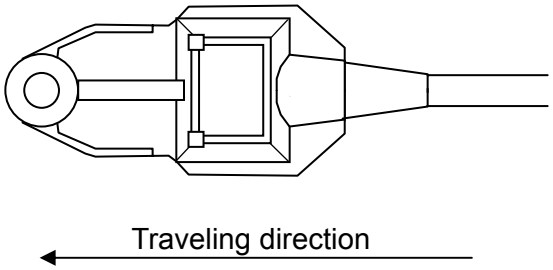
Lap times will not be recorded if strong sunlight shines on the optical sensor, especially from the morning or setting sun. In these circumstances, move the transmitter to a spot where the optical sensor will not be affected by sunlight, or wind about 50mm of masking tape or dark paper around the outside of the sensor's screw to block the sunlight.

Regularly check the sensor's lens for oil or dust. Clean the lens with a cotton swab as needed.

6. G sensor

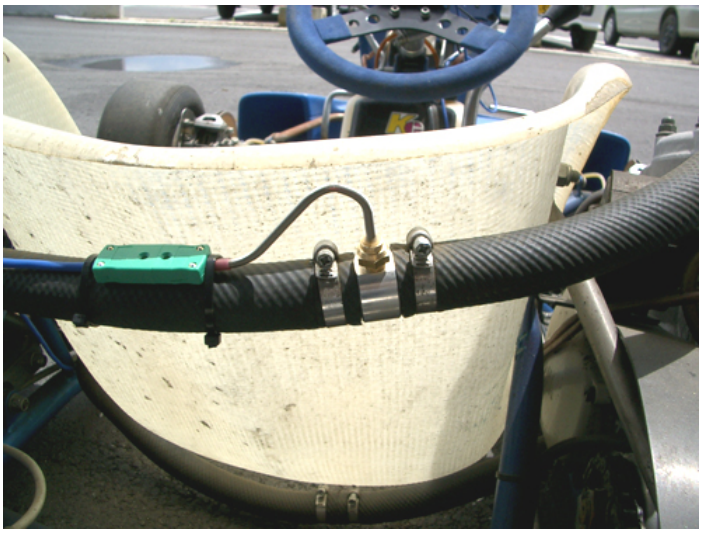
Lite-20 All isn't equipped with G sensor. Only for Lite-100 All.

1. Install the sensor on the floor panel of the vehicle ensuring the head of the sensor is placed in the direction of travel.
2. Keep the left and right orientation of the sensor in a horizontal position. As long as you can keep this sensor position, it could be possible to install the sensor any place on the vehicle.
3. Fix the sensor by screwing* on the floor panel through the hole of the sensor's head. Even if the G value is not exactly 0.00, it will be automatically corrected during the traveling.
   * A screw is not supplied.



7. Liquid sensor

1. Cut the radiator hose and install the hose joint to connect the both edges of the cut hose.
2. Fasten the bands* the both sides of the hose joint. *These bands are not supplied.
3. Install the liquid sensor into the hose joint. Bend the spring of the sensor roundly like in the picture below.
4. Fix the cable on the radiator side of the vehicle in several points.
5. Insert the liquid sensor connector into the TEMP sensor jack of the control unit.

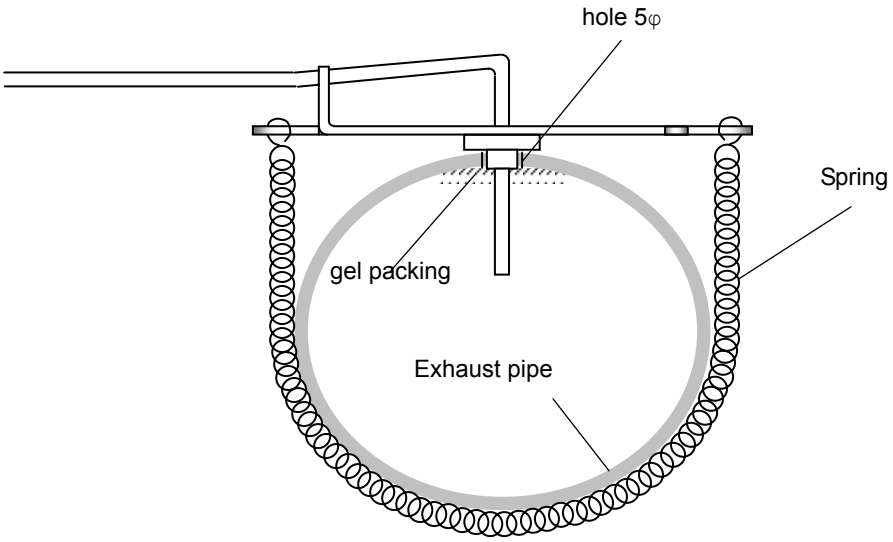


Caution

Keep the sensor away from the engine head. It may occur an error due to the engine noise.

8. Intake/Exhaust Air Temperature Sensor (05221)

1. Make a hole 5φ~5.5φ on the exhaust pipe.
2. Cover the around the hole with gel packing. Install the sensor into the hole.
3. Fix the sensor by the attached spring.
4. Insert the sensor connector into TEMP sensor jack of the control unit.



5) Setting of Parameters

To enter the parameter setting mode;

1. Turn on the control unit.
2. The READY command must appear on the screen. If it is not displayed, press CLEAR key to display the READY command.
3. Press the Mode and SHIFT keys simultaneously for 3 seconds. The READY command should disappear and the parameter number should appear in the bottom right hand side of the screen.

1. Parameter No.1: Backlight (ILLUM) / Sensor Off Timer

<Backlight>

This function will not available unless the optional backlight is equipped with the display.

1. In the parameter setting mode, display the parameter number 1. If the number 1 is not displayed, press MODE key to scroll the numbers.
2. Press SET key to select the numerical value : ON (1), ON (2), or ON (3). The brightness of the backlight is only one level. The default setting is OFF.

<Sensor off timer>

This function allows the user to set the control unit to ignore any other transmitter or magnetic pickups in the course for a set time period. This is used to an error occurring when transmitters with the same channel number are installed. This is also used to measure only lap times by canceling any other

buried magnets in the course where multiple magnets are used.

1. In the parameter number 1 setting mode, press SHSIFT key for 3 seconds.
2. Press SET key to set the time.

[0:01] The default setting is one second. Keep this default for regular driving.

[0:00] Do not set this value. The off timer will be set 10 minutes.

3. To return the backlight setting, press SHSIFT key for 3 seconds.
4. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

Note

When measuring segment times according to course data that has been edited and divided between straights and corners, make sure that the time is sufficient to enable the vehicle to pass the final buried magnet in the course.

Do not set a time that exceeds the expected lap times.

2. Parameter No.2: Speed Pulse Length [Default: 999mm]

Enter the speed pulse length to measure the accurate speed data with the control unit. Measure the diameter of the tire and divide this by the number of magnets. The speed pulse length (outer circumference of tire / number of magnets) should be between 100mm and 999mm.

1. In the parameter setting mode, display the parameter number 2. If the number 2 is not displayed, press MODE key to scroll the numbers.
2. Press SHIFT key until the numerical value to be changed starts flashing.
3. Press SET key to select a value. Set the desired speed pulse length (mm) by repeating operation 2 and 3.
4. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

3. Parameter No.3: Unit of Speed (km/h or m/h) [Default: kph]

1. In the parameter setting mode, display the parameter number 3. If the number 3 is not displayed, press MODE key to scroll the numbers.
2. Press SET key to select the unit of speed km/h or m/h.
3. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

4. Parameter No.4: REV Position [Default: P:2]

Enter the REV position according to the following table.

P:1	4 Stroke	1 Cylinder
P:2	2 Stroke 4 Stroke	1 Cylinder 2 Cylinders
P:3	4 Stroke	3 Cylinders
P:4	2 Stroke 4 Stroke	2 Cylinders 4 Cylinders
P:6	2 Stroke 4 Stroke	3 Cylinders 6 Cylinders
P:8	4 Stroke	8 Cylinders
P:10	4 Stroke	10 Cylinders
P:12	4 Stroke	12 Cylinders

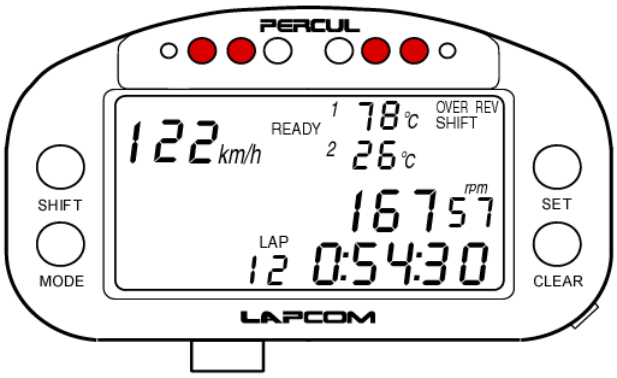
1. In the parameter setting mode, display the parameter number 4. If the number 4 is not

displayed, press MODE key to scroll the numbers.

2. Press SET key to select the desired REV position.
3. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

5. Parameter No.5: Shift Lamp [Default: 16000rpm]

This function allows the user to set the value at which information lamps will start being illuminated as a shift lamp as the following drawing. This setting is mainly used to advise the driver of the timing for gear change.



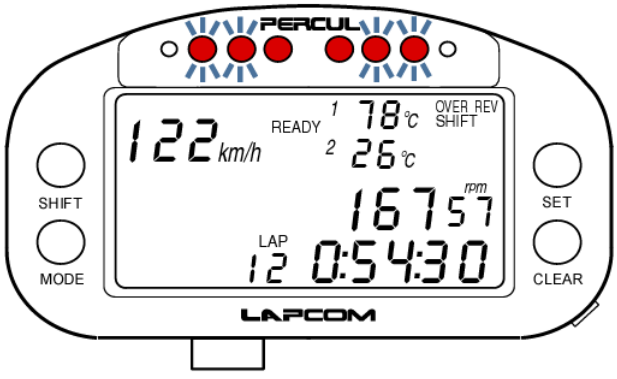
1. In the parameter setting mode, display the parameter number 5. If the number 5 is not displayed, press MODE key to scroll the numbers.
2. Press SHIFT key to until the numerical value to be changed starts flashing.
3. Press SET key to select a value. Set the desired RPM, at which the shift lamp starts being illuminated, by repeating operation 2 and 3.
4. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

Note

This setting should be set at a value lower than the maximum allowable for the engine being used.

6. Parameter No.6: Red Line and Full Scale [Default: 20000rpm]

This function allows the user to set the value at which information lamps will start being illuminated and flashing as a red line Rev limit as the following drawing.



1. In the parameter setting mode, display the parameter number 6. If the number 6 is not displayed, press MODE key to scroll the numbers.
2. Press SHIFT key to until the numerical value to be changed starts flashing.

3. Press SET key to select a value. Set the desired RPM, at which the shift lamp starts being illuminated and flashing, by repeating operation 2 and 3.
4. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

7. Parameter No.7: Selection of the Pressure Sensor

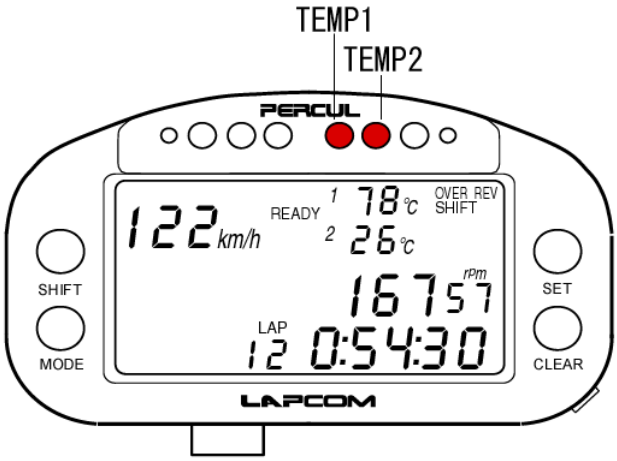
Not applicable to Lite-20/100 All Users

8. Parameter No.8: Alarm for a Pressure Drop

Not applicable to Lite-20/100 All Users

9. Parameter No.9: Alarm for a Temperature Increase in Probe 1 [Default: 200°C]

This function allows the user to set the value at which information lamps will start flashing as an alarm for a temperature increase as the following drawing.



The control unit automatically switches the temperature measurement mode between low (0°C to 200°C) and high (201°C or higher) depending on the value set for the alarm. If the alarm value is less than 200°C, it operates in low mode and cannot measure values over 200°C. If the alarm value is 201°C or higher, it operates in high mode and cannot measure values below 201°C. According to the sensors, set the mode as follows;

Liquid sensor	Low mode (0 to 200°C)
Intake/Exhaust air sensor	High mode (201°C or higher)

1. In the parameter setting mode, display the parameter number 9. If the number 9 is not displayed, press MODE key to scroll the numbers.
2. Press SHIFT key to until the numerical value to be changed starts flashing.
3. Press SET key to select a value. Set the desired RPM, at which the shift lamp starts being illuminated and flashing, by repeating operation 2 and 3.

If setting the alarm to greater than 1000°C, first select a value lower than 1000°C. Then, press SHIFT key to make "°C" flash and press SET key to display "+103".

4. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

Note

To turn the alarm function off, set the value to 000°C.

10. Parameter No.10: Alarm for a Temperature Increase in Probe 2 [Default: 200°C]

See the parameter No. 9. The procedure is the same.

11. Parameter No.11: Selection of Vehicle [Default: CAR]

Keep the default setting for kart and car.

12. Parameter No.12: Air Fuel Ratio

Not applicable to Lite-20/100 All Users

13. Parameter No.13: Data Transmission Rate and Baud Rate [Default: S/9600bps]

Keep the default values for regular driving.

14. Parameter No.14: Selection of Print Form (with Optional Handy Printer) [Default: 0]

1. In the parameter setting mode, display the parameter number 14. If the number 14 is not displayed, press MODE key to scroll the numbers.
2. Press SET key to select the desired print form (0-1-2-3-4-5-6).
3. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

Note

If PRINT 0 (default) is selected, all the forms from PRINT 1 to PRINT 6 can be generated.
If segment times are not to be measured, form 2 is not generated.

15. Parameter No.15: Measurement Mode and Transmitter Channel

1. In the parameter setting mode, display the parameter number 15. If the number 15 is not displayed, press MODE key to scroll the numbers.

<If using Magnetic sensor>

1. Press SHIFT key until the value to be changed starts flashing.
2. Press SET key to select a value. Set the value according to the following table depending on the number of magnets in the course, by repeating operation 1 and 2.

One magnet in the course	ch-.-1
Two magnets in the course	ch-.2
Three magnets in the course	ch-.3

3. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

<If using Optical sensor & Transmitter>

1. Press SHIFT key until the value to be changed starts flashing.
2. Press SET key to select a value. Set the value according to the following table depending on the number of magnets in the course, by repeating operation 1 and 2.

One transmitter X is the channel number	chX.-1

3. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

16. Parameter No.16: Lateral G

Not applicable to Lite-20 All Users. For Lite-100 All users, please ignore this function. This is for advanced users.

17. Parameter No.17: Measurement Pattern

For Lite-20/100 All users, please ignore this function. This is for advanced users.

18. Parameter No.18: Auto-off Timer [Default: 0:00]

This function allows the user to set the auto-off timer setting. If the vehicle does not pass through the measurement section or does not complete a lap within the set time, it will be deemed that the vehicle has slowed down or stopped. Then the measurement will be canceled and the logging will stop.

1. In the parameter setting mode, display the parameter number 18. If the number 18 is not displayed, press MODE key to scroll the numbers.
2. Press SHIFT key until the numerical value to be changed starts flashing.
3. Press SET key to enter a value that is greater than the lap time. The default value of 0.00 is actually 10 minutes.

Note

When you keep the default time of 10 minutes, press CLEAR key to stop the measurement after driving. Otherwise, the control unit continues logging for 10 minutes even though the data is empty, and then the first 10 minutes of the logging time will be deleted.

When the vehicle enters the pit without passing the transmitter, it slows down dramatically and stops for a certain period. In order to make this lap time data valid for recording set the speed as follows:

1. Press SHIFT key for 3 seconds to start the unit of speed flashing.
2. Press SHIFT key again until the numerical value to be changed starts flashing.
3. Press SET key to select a value. Set the desired speed where logging stops or starts by repeating operations 2 and 3.
4. Press SHIFT key again for 3 seconds to return the time setting.
5. Press MODE key to advance to the next parameter setting or press CLEAR key to exit.

19. Parameter No.19: Calibration of the Steering Movement

Not applicable to Lite-20/100 All Users

20. Parameter No.20: Calibration of the Throttle Position

Not applicable to Lite-20/100 All Users

6) Downloading Data

How to download

1. Install Lapcom Terminal from the attached CD.
2. Turn off the power to the control unit. Connect the serial communication cable to the COM port of the control unit. Connect the other end of the serial communication cable to the serial port of the PC. Turn on the power to the control unit.
3. Click Main Line Setting in the menu at the top of Lapcom Terminal. Click Main Port Condition from the popup menu.
4. In the Main Port Condition Setting box, select the baud rate, port number (COM1 to COM5). Leave the communication command box blank. Keep the baud rate 9600 bps. Click OK.
5. Click the Connect button in Communication Line command box in the bottom left hand corner of Lapcom terminal. If the parameter window is opened, the control unit is correctly connected to the PC. If the parameter window doesn't appear, check the operation from 1 to 4 again.
6. Close the parameter window. Click Main Line Setting in the menu at the top of Lapcom Terminal. Select either Download or Fast Download. If either cannot be selected, click Stop Transfer to stop the data transferring from the control unit and then select again.
7. Select whether the date is to be included at the head of the file. Select whether the data in the control unit will be deleted after downloading. Enter a file name. Select a baud rate for data download. Click OK.
8. Enter the range of data to be downloaded. To download all data, "1-100" or "-100" should be entered. Click OK to start download.

7) Reviewing Data from the display

1. Confirm that READY appears on the left-hand side of the display. If it is not displayed, press CLEAR key to display it.
2. Press CLEAR key to get the initial display. The display data should include lap time and wheel speed.
3. To review each Lap, press SHIFT key to display the oldest lap time. Press SHIFT key to scroll the lap times. If you press MODE key instead of SHIFT key, the latest lap time is displayed. Press MODE key to scroll the lap times backward.
4. To display BEST LAP, press MODE key for 3 seconds. The best lap is displayed with the BEST LAP comment.
5. To review each segment data, press MODE and SHIFT key simultaneously to start SEG flashing. Press MODE key to scroll the segment data in order from the latest lap to the oldest lap. Press SHIFT key to reverse the order of laps.
6. To review the same segment data for each lap, press MODE and SHIFT key simultaneously to start LAP and SEG flashing. Press MODE key to scroll the segment data in order from the latest lap to the oldest lap. Press SHIFT key to reverse the order of laps.
7. To display BEST SEG, press MODE key for 3 seconds. The best segment lap is displayed with the BEST SEG comment.
8. To return to the operation 3, press MODE and SHIFT key simultaneously.
9. Press CLEAR key to finish reviewing data.

8) Displaying other Data

The data that can be displayed in the mid right hand section of the display consists of the following: Internal Battery Voltage (V), G force (G) on appropriate model, Steering Position (θ°) on appropriate model, Air Fuel ratio (λ) on appropriate model, Distance (m), Engine RPM (rpm) and Time (SEC).

1. Confirm that READY appears on the left-hand side of the display. If it is not displayed, press CLEAR key to display it.
2. Press SET key and all of the options will be illuminated. By pressing SET key again, you can step through the settings to be displayed. As you step through them the flashing setting is the current setting. Wait for a few seconds then this setting will be displayed on the display.

9) How to Delete Individual Lap Data

1. Confirm that READY appears on the left-hand side of the display. If it is not displayed, press CLEAR key to display it.
2. Press MODE or CLEAR key to display the lap data to be deleted.
3. Press SET and CLEAR key simultaneously for 3 seconds.
4. Press CLEAR key to finish deleting data.

10) How to Delete all the Data in a Single Block

1. Confirm that READY appears on the left-hand side of the display. If it is not displayed, press CLEAR key to display it.
2. Press SET and CLEAR key simultaneously for 3 seconds.

11) Analyzing Data

< Analyzing data with Lapcom Terminal >

Please visit the following web page.

http://www.percul.co.jp/english/lapvx_en/lapt_playback_en.htm

< Analyzing data with Lapcom Analysis >

1. Install Lapcom Analysis from the supplied CD.

2. Start analyzing data following the operations in the included Basic Operation Manual for Lapcom Analysis.